BEFORE THE
NOVA SCOTIA UTILITY AND REVIEW BOARD
OF THE PROVINCE OF NOVA SCOTIA

NORTH AMERICAN ELECTRIC)
RELIABILITY CORPORATION)

SECOND QUARTER 2012 APPLICATION FOR APPROVAL OF RELIABILITY STANDARDS OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

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I. INTRODUCTION

The North American Electric Reliability Corporation ("NERC") hereby submits to the Nova Scotia Utility and Review Board ("NSUARB") an application for approval of the NERC Reliability Standards and an updated NERC Glossary of Terms approved by the United States Federal Energy Regulatory Commission ("FERC" or "Commission"). This filing covers the time period from April 1, 2012, through June 30, 2012. NERC requests that the Reliability Standards and updated NERC Glossary of Terms be made mandatory and enforceable for users, owners, and operators of the bulk power system within the Province of Nova Scotia.

In support of this request for approval of the proposed Reliability Standards, NERC submits the following information: (1) an updated list of the currently-effective Reliability Standards as approved by FERC (*see* **Exhibit A**); (2) Reliability Standards approved by FERC in the second quarter of 2012 and the associated NERC Glossary of Terms (*see* **Exhibit B**); and (3) informational summary of each Reliability Standard approved by FERC in the second quarter of 2012, including each standard's purpose, applicability, and ballot body approval percentages (*see* **Exhibit C**).

II. NOTICES AND COMMUNICATIONS

Notices and communications regarding this Application may be addressed to:

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III. REQUEST FOR APPROVAL OF RELIABILITY STANDARDS

A. NERC Quarterly Filing of Proposed Reliability Standards

On July 20, 2011, NSUARB issued a decision approving the Reliability Standards and NERC Glossary of Terms that NERC submitted to NSUARB on June 30, 2010, and accepted as guidance the Violation Risk Factors ("VRF") and Violation Severity Levels ("VSL") associated with the currently-effective Reliability Standards.[1]

[1] *In the Matter of an Application by North American Electric Reliability Corporation for Approval of its Reliability Standards, and an application by Northeast Power Coordinating Council, Inc. for Approval of its Regional Reliability Criteria*, NSUARB-NERC-R-10 (July 20, 2011) ("NSUARB Decision").

NERC has been certified as the Electric Reliability Organization ("ERO")[2] in the United States under Section 215 of the Federal Power Act.[3] The Reliability Standards contained in Exhibit B have been approved as mandatory and enforceable for users, owners, and operators within the United States by FERC.[4] Some or all of NERC's Reliability Standards are now mandatory in the Canadian Provinces of Alberta, British Columbia, New Brunswick, Nova Scotia, Ontario, and Saskatchewan.

NERC entered into a Memorandum of Understanding ("MOU") with the NSUARB[5] and a separate MOU with Nova Scotia Power Incorporated ("NSPI"), and the Northeast Power Coordinating Council, Inc. ("NPCC"),[6] which became effective on December 22, 2006 and May 11, 2010, respectively. The May 11, 2010 MOU sets forth the mutual understandings of NERC, NSPI, and NPCC regarding the approval and implementation of NERC Reliability Standards and NPCC Regional Reliability Criteria in Nova Scotia and other related matters.

In addition, the NSUARB Decision approved a "quarterly review" process for considering new and amended NERC standards and criteria.[7] On September 2, 2011, NERC submitted its Second Quarter 2011 application filing to NSUARB, in which NERC committed to file a quarterly application with the NSUARB within sixty days

[2] Through enactment of the Energy Policy Act of 2005, the U.S. Congress entrusted FERC with the duties of approving and enforcing rules in the U.S. to ensure the reliability of the Nation's bulk power system, and with the duties of certifying an ERO. On July 20, 2006, FERC certified NERC as the ERO, charged with developing mandatory and enforceable Reliability Standards, which are subject to FERC review and approval.

3 16 U.S.C. § 824o(f) (2006).

[4] Those standards marked with an asterisk are not yet effective, but have been approved by FERC.

[5] *See* Memorandum of Understanding between Nova Scotia Utility and Review Board and North American Electric Reliability Corporation (signed December 22, 2006).

[6] *See* Memorandum of Understanding between Nova Scotia Power Incorporated and the Northeast Power Coordinating Council, Inc. and the North American Electric Reliability Corporation (signed May 11, 2010).

[7] NSUARB Decision at P 30.

after the end of each quarter for approval of all NERC Reliability Standards and updated Glossary of Terms approved by FERC during that quarter, as necessary.

The NSUARB Decision also determined that quarterly "applications will not be processed by the Board until [FERC] has approved or remanded the standards in the United States."[8] Therefore, NERC is only requesting NSUARB approval for those Reliability Standards approved by FERC.

The NSUARB Decision also concluded that NSUARB approval is not required for VRFs and VSLs associated with proposed Reliability Standards.[9] Thus, NERC does not seek formal approval of VRFs and VSLs associated with the Reliability Standards submitted in this quarterly application. However, because the NSUARB has determined that it will accept the VRFs and VSLs as guidance, NERC is providing a link to the associated FERC-approved VRFs and VSLs for the Reliability Standards for information only.[10]

NERC has not included in this filing the full developmental record for the standards, which consists of the draft standards, comments received, responses to the comments by the drafting teams, and the full voting record, because the record for each standard may consist of several thousand pages. NERC will make the full developmental record available to the NSUARB or other interested parties upon request.

[8] NSUARB Decision at P 30.
[9] *Id*. at P 33.
[10] NERC's VRF and VSL matrices can be found at: http://www.nerc.com/page.php?cid=2|20. *See* left-hand side of webpage for downloadable documents.

B. Overview of Reliability Standards Development Process

NERC Reliability Standards define the requirements for reliably planning and operating the North American bulk power system. These standards are developed by industry stakeholders using a balanced, open, fair and inclusive process managed by the NERC Standards Committee. The Standards Committee is facilitated by NERC staff and comprised of representatives from ten electricity stakeholder segments. Stakeholders, through the balloting process, and the NERC Board of Trustees have approved the standards provided in **Exhibit B**.

NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) and Appendix 3A, (Standards Processes Manual) of its Rules of Procedure.[11] A detailed overview of the Reliability Standards development process was provided in NERC's June 30, 2010 application.[12] That overview included an explanation of the requirements in Section 300 of the NERC Rules of Procedure and the benchmarks of an excellent Reliability Standard. In addition, NERC's June 30, 2010 application explained that the Reliability Standards development process has been approved by the American National Standards Institute as being open, inclusive, balanced, and fair.[13]

C. Description of Proposed Reliability Standards

The Reliability Standards presented in Exhibit B are grouped by topical area, as summarized below.

[11] NERC's Rules of Procedure are available at: http://www.nerc.com/page.php?cid=1|8|169.
[12] NERC June 30, 2010 Application at pp. 8-13.
[13] *Id*. at pp. 13-19.

Reliability Standard[14]	Effective Date
Critical Infrastructure Protection (CIP) Standards	
CIP-002-4	4/1/2014*
CIP-003-4	4/1/2014*
CIP-004-4	4/1/2014*
CIP-005-4a	4/1/2014*
CIP-006-4c	4/1/2014*
CIP-007-4	4/1/2014*
CIP-008-4	4/1/2014*
CIP-009-4	4/1/2014*
Emergency Preparedness and Operations (EOP) Standards	
EOP-003-2	10/1/2013*
Protection and Control (PRC) Standards	
PRC-006-1	10/1/2013*

The NERC Glossary of Terms used in Reliability Standards – most recently updated May 25, 2012 – lists each term that is defined for use in one or more of NERC's continent-wide or Regional Reliability Standards adopted by the NERC Board of Trustees.

IV. CONCLUSION

By this filing, NERC requests that the NSUARB approve the Reliability Standards and NERC Glossary of Terms Used in Reliability Standards, as set out in Exhibit B.

Respectfully submitted,

/s/ *Willie L. Phillips*

[14] Reliability Standards marked with an asterisk are not yet mandatorily effective, but have been approved by FERC and have a future mandatory effective date.

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Exhibit A

List of Currently Effective NERC Reliability Standards

Resource and Demand Balancing (BAL) Standards
BAL-001-0.1a
BAL-002-1
BAL-003-0.1b
BAL-004-0
BAL-004-WECC-01
BAL-005-0.1b
BAL-006-2
BAL-STD-002-0
BAL-502-RFC-02
Critical Infrastructure Protection (CIP) Standards
CIP-001-2a
CIP-002-3
CIP-003-3
CIP-004-3
CIP-005-3a
CIP-006-3c
CIP-007-3
CIP-008-3
CIP-009-3
Communications (COM) Standards
COM-001-1.1
COM-002-2
Emergency Preparedness and Operations (EOP) Standards
EOP-001-0b
EOP-002-3
EOP-003-1
EOP-004-1
EOP-005-1
EOP-006-1
EOP-008-0
EOP-009-0
Facilities Design, Connections, and Maintenance (FAC) Standards
FAC-001-0
FAC-002-1
FAC-003-1
FAC-008-1
FAC-009-1
FAC-010-2.1
FAC-011-2
FAC-013-1
FAC-014-2
FAC-501-WECC-1

Standards Interchange Scheduling and Coordination (INT)
INT-001-3
INT-003-3
INT-004-2
INT-005-3
INT-006-3
INT-007-1
INT-008-3
INT-009-1
INT-010-1
Interconnection Reliability Operations and Coordination (IRO)
IRO-001-1.1
IRO-002-2
IRO-003-2
IRO-004-2
IRO-005-3a
IRO-006-5
IRO-008-1
IRO-009-1
IRO-010-1a
IRO-014-1
IRO-015-1
IRO-016-1
IRO-006-EAST-1
IRO-006-WECC-1
IRO-006-TRE-1
Modeling, Data, and Analysis (MOD) Standards
MOD-001-1a
MOD-004-1
MOD-008-1
MOD-010-0
MOD-012-0
MOD-016-1.1
MOD-017-0.1
MOD-018-0
MOD-019-0.1
MOD-020-0
MOD-021-1
MOD-028-1
MOD-029-1a
MOD-030-2
Nuclear (NUC) Standards
NUC-001-2
Personnel Performance, Training, and Qualification (PER) Standards
PER-001-0.1

PER-002-0
PER-003-0
PER-004-1
PER-004-2
PER-005-1
Protection and Control (PRC) Standards
PRC-001-1
PRC-002-NPCC-01
PRC-004-2a
PRC-004-WECC-1
PRC-005-1b
PRC-007-0
PRC-008-0
PRC-009-0
PRC-010-0
PRC-011-0
PRC-015-0
PRC-016-0.1
PRC-017-0
PRC-018-1
PRC-021-1
PRC-022-1
PRC-023-1
PRC-023-2
Transmission Operations (TOP) Standards
TOP-001-1a
TOP-002-2b
TOP-003-1
TOP-004-2
TOP-005-2a
TOP-006-2
TOP-007-0
TOP-008-1
TOP-007-WECC-1
Transmission Planning (TPL) Standards
TPL-001-0.1
TPL-002-0b
TPL-003-0a
TPL-004-0
Voltage and Reactive (VAR) Standards
VAR-001-2
VAR-002-1.1b
VAR-002-WECC-1
VAR-501-WECC-1

Exhibit B

1.) **NERC Reliability Standards Applicable to Nova Scotia Approved by FERC in Second Quarter 2012**

2.) **PDF Copies of Reliability Standards being filed for approval; and**

3.) **Updated NERC Glossary of Terms for approval**

Reliability Standard	Effective Date
Critical Infrastructure Protection (CIP) Standards	
CIP-002-4	4/1/2014*
CIP-003-4	4/1/2014*
CIP-004-4	4/1/2014*
CIP-005-4a	4/1/2014*
CIP-006-4c	4/1/2014*
CIP-007-4	4/1/2014*
CIP-008-4	4/1/2014*
CIP-009-4	4/1/2014*
Emergency Preparedness and Operations (EOP) Standards	
EOP-003-2	10/1/2013*
Protection and Control (PRC) Standards	
PRC-006-1	10/1/2013*

***At the time of this filing, all standards marked with an asterisk are not yet mandatorily effective, but have been approved by FERC and have a future mandatory effective date.**

A. Introduction

1. Title: Cyber Security — Critical Cyber Asset Identification

2. Number: CIP-002-4

3. Purpose: NERC Standards CIP-002-4 through CIP-009-4 provide a cyber security framework for the identification and protection of Critical Cyber Assets to support reliable operation of the Bulk Electric System.

These standards recognize the differing roles of each entity in the operation of the Bulk Electric System, the criticality and vulnerability of the assets needed to manage Bulk Electric System reliability, and the risks to which they are exposed.

Business and operational demands for managing and maintaining a reliable Bulk Electric System increasingly rely on Cyber Assets supporting critical reliability functions and processes to communicate with each other, across functions and organizations, for services and data. This results in increased risks to these Cyber Assets.

Standard CIP-002-4 requires the identification and documentation of the Critical Cyber Assets associated with the Critical Assets that support the reliable operation of the Bulk Electric System. These Critical Assets are to be identified through the application of the criteria in Attachment 1.

4. Applicability:

4.1. Within the text of Standard CIP-002-4, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator.

4.1.2 Balancing Authority.

4.1.3 Interchange Authority.

4.1.4 Transmission Service Provider.

4.1.5 Transmission Owner.

4.1.6 Transmission Operator.

4.1.7 Generator Owner.

4.1.8 Generator Operator.

4.1.9 Load Serving Entity.

4.1.10 NERC.

4.1.11 Regional Entity.

4.2. The following are exempt from Standard CIP-002-4:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54.

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required)

B. Requirements

R1. Critical Asset Identification — The Responsible Entity shall develop a list of its identified Critical Assets determined through an annual application of the criteria contained in *CIP-002-4 Attachment 1 – Critical Asset Criteria*. The Responsible Entity shall update this list as necessary, and review it at least annually.

R2. Critical Cyber Asset Identification — Using the list of Critical Assets developed pursuant to Requirement R1, the Responsible Entity shall develop a list of associated Critical Cyber Assets essential to the operation of the Critical Asset. The Responsible Entity shall update this list as necessary, and review it at least annually.

For each group of generating units (including nuclear generation) at a single plant location identified in Attachment 1, criterion 1.1, the only Cyber Assets that must be considered are those shared Cyber Assets that could, within 15 minutes, adversely impact the reliable operation of any combination of units that in aggregate equal or exceed Attachment 1, criterion 1.1.

For the purpose of Standard CIP-002-4, Critical Cyber Assets are further qualified to be those having at least one of the following characteristics:

- The Cyber Asset uses a routable protocol to communicate outside the Electronic Security Perimeter; or,
- The Cyber Asset uses a routable protocol within a control center; or,
- The Cyber Asset is dial-up accessible.

R3. Annual Approval — The senior manager or delegate(s) shall approve annually the list of Critical Assets and the list of Critical Cyber Assets. Based on Requirements R1 and R2 the Responsible Entity may determine that it has no Critical Assets or Critical Cyber Assets. The Responsible Entity shall keep a signed and dated record of the senior manager or delegate(s)'s approval of the list of Critical Assets and the list of Critical Cyber Assets (even if such lists are null.)

C. Measures

M1. The Responsible Entity shall make available its list of Critical Assets as specified in Requirement R1.

M2. The Responsible Entity shall make available its list of Critical Cyber Assets as specified in Requirement R2.

M3. The Responsible Entity shall make available its records of approvals as specified in Requirement R3.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.1.1 The Regional Entity shall serve as the Compliance Enforcement Authority with the following exceptions:

- For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.
- For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.
- For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.
- For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.2. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.3. Data Retention

1.3.1 The Responsible Entity shall keep documentation required by Standard CIP-002-4 from the previous full calendar year unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.3.2 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.4. Additional Compliance Information

1.4.1 None.

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	HIGH	N/A	N/A	The Responsible Entity has developed a list of Critical Assets but the list has not been reviewed and updated annually as required.	The Responsible Entity did not develop a list of its identified Critical Assets even if such list is null.
R2	HIGH	N/A	N/A	The Responsible Entity has developed a list of associated Critical Cyber Assets essential to the operation of the Critical Asset list as per requirement R2 but the list has not been reviewed and updated annually as required.	The Responsible Entity did not develop a list of associated Critical Cyber Assets essential to the operation of the Critical Asset list as per requirement R2 even if such list is null. OR A Cyber Asset essential to the operation of the Critical Asset was identified that met at least one of the bulleted characteristics in this requirement but was not included in the Critical Cyber Asset List.
R3	LOWER	N/A	N/A	The Responsible Entity does not have a signed and dated record of the senior manager or delegate(s)'s annual approval of the list of Critical Assets. OR The Responsible Entity does not have a signed and dated record of the senior manager or delegate(s)'s annual approval of the list of Critical Cyber Assets (even if such lists are null.)	The Responsible Entity does not have a signed and dated record of the senior manager or delegate(s)'s annual approval of both the list of Critical Assets and the list of Critical Cyber Assets (even if such lists are null.)

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
1	January 16, 2006	R3.2 — Change “Control Center” to “control center”	03/24/06
2		Modifications to clarify the requirements and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards. Removal of reasonable business judgment. Replaced the RRO with the RE as a responsible entity. Rewording of Effective Date. Changed compliance monitor to Compliance Enforcement Authority.	
3		Updated version number from -2 to -3	
3	12/16/09	Approved by the NERC Board of Trustees	Update
4	12/30/10	Modified to add specific criteria for Critical Asset identification	Update
4	1/24/11	Approved by the NERC Board of Trustees	
4	4/19/12	FERC Order issued approving CIP-002-4 (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

CIP-002-4 - Attachment 1

Critical Asset Criteria

The following are considered Critical Assets:

1.1. Each group of generating units (including nuclear generation) at a single plant location with an aggregate highest rated net Real Power capability of the preceding 12 months equal to or exceeding 1500 MW in a single Interconnection.

1.2. Each reactive resource or group of resources at a single location (excluding generation Facilities) having aggregate net Reactive Power nameplate rating of 1000 MVAR or greater.

1.3. Each generation Facility that the Planning Coordinator or Transmission Planner designates and informs the Generator Owner or Generator Operator as necessary to avoid BES Adverse Reliability Impacts in the long-term planning horizon.

1.4. Each Blackstart Resource identified in the Transmission Operator's restoration plan.

1.5. The Facilities comprising the Cranking Paths and meeting the initial switching requirements from the Blackstart Resource to the first interconnection point of the generation unit(s) to be started, or up to the point on the Cranking Path where two or more path options exist, as identified in the Transmission Operator's restoration plan.

1.6. Transmission Facilities operated at 500 kV or higher.

1.7. Transmission Facilities operated at 300 kV or higher at stations or substations interconnected at 300 kV or higher with three or more other transmission stations or substations.

1.8. Transmission Facilities at a single station or substation location that are identified by the Reliability Coordinator, Planning Authority or Transmission Planner as critical to the derivation of Interconnection Reliability Operating Limits (IROLs) and their associated contingencies.

1.9. Flexible AC Transmission Systems (FACTS), at a single station or substation location, that are identified by the Reliability Coordinator, Planning Authority or Transmission Planner as critical to the derivation of Interconnection Reliability Operating Limits (IROLs) and their associated contingencies.

1.10. Transmission Facilities providing the generation interconnection required to connect generator output to the transmission system that, if destroyed, degraded, misused, or otherwise rendered unavailable, would result in the loss of the assets identified by any Generator Owner as a result of its application of Attachment 1, criterion 1.1 or 1.3.

1.11. Transmission Facilities identified as essential to meeting Nuclear Plant Interface Requirements.

1.12. Each Special Protection System (SPS), Remedial Action Scheme (RAS) or automated switching system that operates BES Elements that, if destroyed, degraded, misused or otherwise rendered unavailable, would cause one or more Interconnection Reliability Operating Limits (IROLs) violations for failure to operate as designed.

1.13. Each system or Facility that performs automatic load shedding, without human operator initiation, of 300 MW or more implementing Under Voltage Load Shedding (UVLS) or Under Frequency Load Shedding (UFLS) as required by the regional load shedding program.

1.14. Each control center or backup control center used to perform the functional obligations of the Reliability Coordinator.

1.15. Each control center or backup control center used to control generation at multiple plant locations, for any generation Facility or group of generation Facilities identified in criteria 1.1, 1.3, or 1.4. Each control center or backup control center used to control generation equal to or exceeding 1500 MW in a single Interconnection.

1.16. Each control center or backup control center used to perform the functional obligations of the Transmission Operator that includes control of at least one asset identified in criteria 1.2, 1.5, 1.6, 1.7, 1.8, 1.9, 1.10, 1.11 or 1.12.

1.17. Each control center or backup control center used to perform the functional obligations of the Balancing Authority that includes at least one asset identified in criteria 1.1, 1.3, 1.4, or 1.13. Each control center or backup control center used to perform the functional obligations of the Balancing Authority for generation equal to or greater than an aggregate of 1500 MW in a single Interconnection.

A. Introduction

1. Title: Cyber Security — Security Management Controls

2. Number: CIP-003-4

3. Purpose: Standard CIP-003-4 requires that Responsible Entities have minimum security management controls in place to protect Critical Cyber Assets. Standard CIP-003-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

4. Applicability:

4.1. Within the text of Standard CIP-003-4, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator.

4.1.2 Balancing Authority.

4.1.3 Interchange Authority.

4.1.4 Transmission Service Provider.

4.1.5 Transmission Owner.

4.1.6 Transmission Operator.

4.1.7 Generator Owner.

4.1.8 Generator Operator.

4.1.9 Load Serving Entity.

4.1.10 NERC.

4.1.11 Regional Entity.

4.2. The following are exempt from Standard CIP-003-4:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54

4.2.4 Responsible Entities that, in compliance with Standard CIP-002-4, identify that they have no Critical Cyber Assets shall only be required to comply with CIP-003-4 Requirement R2.

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. Cyber Security Policy — The Responsible Entity shall document and implement a cyber security policy that represents management's commitment and ability to secure its Critical Cyber Assets. The Responsible Entity shall, at minimum, ensure the following:

R1.1. The cyber security policy addresses the requirements in Standards CIP-002-4 through CIP-009-4, including provision for emergency situations.

R1.2. The cyber security policy is readily available to all personnel who have access to, or are responsible for, Critical Cyber Assets.

R1.3. Annual review and approval of the cyber security policy by the senior manager assigned pursuant to R2.

R2. Leadership — The Responsible Entity shall assign a single senior manager with overall responsibility and authority for leading and managing the entity's implementation of, and adherence to, Standards CIP-002-4 through CIP-009-4.

R2.1. The senior manager shall be identified by name, title, and date of designation.

R2.2. Changes to the senior manager must be documented within thirty calendar days of the effective date.

R2.3. Where allowed by Standards CIP-002-4 through CIP-009-4, the senior manager may delegate authority for specific actions to a named delegate or delegates. These delegations shall be documented in the same manner as R2.1 and R2.2, and approved by the senior manager.

R2.4. The senior manager or delegate(s), shall authorize and document any exception from the requirements of the cyber security policy.

R3. Exceptions — Instances where the Responsible Entity cannot conform to its cyber security policy must be documented as exceptions and authorized by the senior manager or delegate(s).

R3.1. Exceptions to the Responsible Entity's cyber security policy must be documented within thirty days of being approved by the senior manager or delegate(s).

R3.2. Documented exceptions to the cyber security policy must include an explanation as to why the exception is necessary and any compensating measures.

R3.3. Authorized exceptions to the cyber security policy must be reviewed and approved annually by the senior manager or delegate(s) to ensure the exceptions are still required and valid. Such review and approval shall be documented.

R4. Information Protection — The Responsible Entity shall implement and document a program to identify, classify, and protect information associated with Critical Cyber Assets.

R4.1. The Critical Cyber Asset information to be protected shall include, at a minimum and regardless of media type, operational procedures, lists as required in Standard CIP-002-4, network topology or similar diagrams, floor plans of computing centers that contain Critical Cyber Assets, equipment layouts of Critical Cyber Assets, disaster recovery plans, incident response plans, and security configuration information.

R4.2. The Responsible Entity shall classify information to be protected under this program based on the sensitivity of the Critical Cyber Asset information.

R4.3. The Responsible Entity shall, at least annually, assess adherence to its Critical Cyber Asset information protection program, document the assessment results, and implement an action plan to remediate deficiencies identified during the assessment.

R5. Access Control — The Responsible Entity shall document and implement a program for managing access to protected Critical Cyber Asset information.

R5.1. The Responsible Entity shall maintain a list of designated personnel who are responsible for authorizing logical or physical access to protected information.

R5.1.1. Personnel shall be identified by name, title, and the information for which they are responsible for authorizing access.

R5.1.2. The list of personnel responsible for authorizing access to protected information shall be verified at least annually.

R5.2. The Responsible Entity shall review at least annually the access privileges to protected information to confirm that access privileges are correct and that they correspond with the Responsible Entity's needs and appropriate personnel roles and responsibilities.

R5.3. The Responsible Entity shall assess and document at least annually the processes for controlling access privileges to protected information.

R6. Change Control and Configuration Management — The Responsible Entity shall establish and document a process of change control and configuration management for adding, modifying, replacing, or removing Critical Cyber Asset hardware or software, and implement supporting configuration management activities to identify, control and document all entity or vendor-related changes to hardware and software components of Critical Cyber Assets pursuant to the change control process.

C. Measures

M1. The Responsible Entity shall make available documentation of its cyber security policy as specified in Requirement R1. Additionally, the Responsible Entity shall demonstrate that the cyber security policy is available as specified in Requirement R1.2.

M2. The Responsible Entity shall make available documentation of the assignment of, and changes to, its leadership as specified in Requirement R2.

M3. The Responsible Entity shall make available documentation of the exceptions, as specified in Requirement R3.

M4. The Responsible Entity shall make available documentation of its information protection program as specified in Requirement R4.

M5. The Responsible Entity shall make available its access control documentation as specified in Requirement R5.

M6. The Responsible Entity shall make available its change control and configuration management documentation as specified in Requirement R6.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.2. The RE shall serve as the CEA with the following exceptions:

1.2.1 For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

1.2.2 For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

1.2.3 For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2.4 For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.3. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

1.4.1 The Responsible Entity shall keep all documentation and records from the previous full calendar year unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.4.2 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

1.5.1 None

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	MEDIUM	N/A	N/A	The Responsible Entity has documented but not implemented a cyber security policy.	The Responsible Entity has not documented nor implemented a cyber security policy.
R1.1.	LOWER	N/A	N/A	N/A	The Responsible Entity's cyber security policy does not address all the requirements in Standards CIP-002-4 through CIP-009-4, including provision for emergency situations.
R1.2.	LOWER	N/A	N/A	N/A	The Responsible Entity's cyber security policy is not readily available to all personnel who have access to, or are responsible for, Critical Cyber Assets.
R1.3	LOWER	N/A	N/A	The Responsible Entity's senior manager, assigned pursuant to R2, annually reviewed but did not annually approve its cyber security policy.	The Responsible Entity's senior manager, assigned pursuant to R2, did not annually review nor approve its cyber security policy.
R2.	LOWER	N/A	N/A	N/A	The Responsible Entity has not assigned a single senior manager with overall responsibility and authority for leading and managing the entity’s implementation of, and adherence to, Standards CIP-002-4 through CIP-009-4.
R2.1.	LOWER	N/A	N/A	N/A	The senior manager is not identified by name, title, and date of designation.
R2.2.	LOWER	Changes to the senior manager were documented in greater than 30 but less than 60 days of the effective date.	Changes to the senior manager were documented in 60 or more but less than 90 days of the effective date.	Changes to the senior manager were documented in 90 or more but less than 120 days of the effective date.	Changes to the senior manager were documented in 120 or more days of the effective date.
R2.3.	LOWER	N/A	N/A	The identification of a senior manager’s delegate does not include at least one of the following; name, title, or date of the designation, OR The document is not approved by the senior manager, OR Changes to the delegated authority are not documented	A senior manager’s delegate is not identified by name, title, and date of designation; the document delegating the authority does not identify the authority being delegated; the document delegating the authority is not approved by the senior manager; AND changes to the delegated authority are not documented within thirty calendar days of the effective date.

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
				within thirty calendar days of the effective date.	
R2.4	LOWER	N/A	N/A	N/A	The senior manager or delegate(s) did not authorize and document any exceptions from the requirements of the cyber security policy as required.
R3.	LOWER	N/A	N/A	In Instances where the Responsible Entity cannot conform to its cyber security policy (pertaining to CIP 002 through CIP 009), exceptions were documented, but were not authorized by the senior manager or delegate(s).	In Instances where the Responsible Entity cannot conform to its cyber security policy (pertaining to CIP 002 through CIP 009), exceptions were not documented, and were not authorized by the senior manager or delegate(s).
R3.1.	LOWER	Exceptions to the Responsible Entity's cyber security policy were documented in more than 30 but less than 60 days of being approved by the senior manager or delegate(s).	Exceptions to the Responsible Entity's cyber security policy were documented in 60 or more but less than 90 days of being approved by the senior manager or delegate(s).	Exceptions to the Responsible Entity's cyber security policy were documented in 90 or more but less than 120 days of being approved by the senior manager or delegate(s).	Exceptions to the Responsible Entity's cyber security policy were documented in 120 or more days of being approved by the senior manager or delegate(s).
R3.2.	LOWER	N/A	N/A	The Responsible Entity has a documented exception to the cyber security policy (pertaining to CIP 002-4 through CIP 009-4) but did not include either: 1) an explanation as to why the exception is necessary, or 2) any compensating measures.	The Responsible Entity has a documented exception to the cyber security policy (pertaining to CIP 002-4 through CIP 009-4) but did not include both: 1) an explanation as to why the exception is necessary, and 2) any compensating measures.
R3.3.	LOWER	N/A	N/A	Exceptions to the cyber security policy (pertaining to CIP 002-4 through CIP 009-4) were reviewed but not approved annually by the senior manager or delegate(s) to ensure the exceptions are still required and valid.	Exceptions to the cyber security policy (pertaining to CIP 002-4 through CIP 009-4) were not reviewed nor approved annually by the senior manager or delegate(s) to ensure the exceptions are still required and valid.
R4.	MEDIUM	N/A	The Responsible Entity implemented but did not document a program to identify, classify, and protect information associated with Critical Cyber Assets.	The Responsible Entity documented but did not implement a program to identify, classify, and protect information associated with Critical Cyber Assets.	The Responsible Entity did not implement nor document a program to identify, classify, and protect information associated with Critical Cyber Assets.
R4.1.	MEDIUM	N/A	N/A	The information protection program does not include one of the minimum information types to be protected as detailed in R4.1.	The information protection program does not include two or more of the minimum information types to be protected as detailed in R4.1.

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R4.2.	LOWER	N/A	N/A	N/A	The Responsible Entity did not classify the information to be protected under this program based on the sensitivity of the Critical Cyber Asset information.
R4.3.	LOWER	N/A	The Responsible Entity annually assessed adherence to its Critical Cyber Asset information protection program, documented the assessment results, which included deficiencies identified during the assessment but did not implement a remediation plan.	The Responsible Entity annually assessed adherence to its Critical Cyber Asset information protection program, did not document the assessment results, and did not implement a remediation plan.	The Responsible Entity did not annually, assess adherence to its Critical Cyber Asset information protection program, document the assessment results, nor implement an action plan to remediate deficiencies identified during the assessment.
R5.	LOWER	N/A	The Responsible Entity implemented but did not document a program for managing access to protected Critical Cyber Asset information.	The Responsible Entity documented but did not implement a program for managing access to protected Critical Cyber Asset information.	The Responsible Entity did not implement nor document a program for managing access to protected Critical Cyber Asset information.
R5.1.	LOWER	N/A	N/A	The Responsible Entity maintained a list of designated personnel for authorizing either logical or physical access but not both.	The Responsible Entity did not maintain a list of designated personnel who are responsible for authorizing logical or physical access to protected information.
R5.1.1.	LOWER	N/A	N/A	The Responsible Entity did identify the personnel by name and title but did not identify the information for which they are responsible for authorizing access.	The Responsible Entity did not identify the personnel by name and title nor the information for which they are responsible for authorizing access.
R5.1.2.	LOWER	N/A	N/A	N/A	The Responsible Entity did not verify at least annually the list of personnel responsible for authorizing access to protected information.
R5.2.	LOWER	N/A	N/A	N/A	The Responsible Entity did not review at least annually the access privileges to protected information to confirm that access privileges are correct and that they correspond with the Responsible Entity's needs and appropriate personnel roles and responsibilities.
R5.3.	LOWER	N/A	N/A	N/A	The Responsible Entity did not assess and document at least annually the processes for controlling access privileges to protected information.
R6.	LOWER	The Responsible Entity has established but not documented a change	The Responsible Entity has established but not documented both a change control process and configuration management	The Responsible Entity has not established and documented a change control process OR	The Responsible Entity has not established and documented a change control process AND

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
		control process OR The Responsible Entity has established but not documented a configuration management process.	process.	The Responsible Entity has not established and documented a configuration management process.	The Responsible Entity has not established and documented a configuration management process.

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
2		Modifications to clarify the requirements and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards. Removal of reasonable business judgment. Replaced the RRO with the RE as a responsible entity. Rewording of Effective Date. Requirement R2 applies to all Responsible Entities, including Responsible Entities which have no Critical Cyber Assets. Modified the personnel identification information requirements in R5.1.1 to include name, title, and the information for which they are responsible for authorizing access (removed the business phone information). Changed compliance monitor to Compliance Enforcement Authority.	
3		Update version number from -2 to -3	
3	12/16/09	Approved by the NERC Board of Trustees	Update
4	Board approved 01/24/2011	Update version number from “3” to “4”	Update to conform to changes to CIP-002-4 (Project 2008-06)
4	4/19/12	FERC Order issued approving CIP-003-4 (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

A. Introduction

1. Title: Cyber Security — Personnel & Training

2. Number: CIP-004-4

3. Purpose: Standard CIP-004-4 requires that personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including contractors and service vendors, have an appropriate level of personnel risk assessment, training, and security awareness. Standard CIP-004-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

4. Applicability:

4.1. Within the text of Standard CIP-004-4, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator.

4.1.2 Balancing Authority.

4.1.3 Interchange Authority.

4.1.4 Transmission Service Provider.

4.1.5 Transmission Owner.

4.1.6 Transmission Operator.

4.1.7 Generator Owner.

4.1.8 Generator Operator.

4.1.9 Load Serving Entity.

4.1.10 NERC.

4.1.11 Regional Entity.

4.2. The following are exempt from Standard CIP-004-4:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54

4.2.4 Responsible Entities that, in compliance with Standard CIP-002-4, identify that they have no Critical Cyber Assets.

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. Awareness — The Responsible Entity shall establish, document, implement, and maintain a security awareness program to ensure personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets receive on-going reinforcement in sound security practices. The program shall include security awareness reinforcement on at least a quarterly basis using mechanisms such as:

- Direct communications (e.g., emails, memos, computer based training, etc.);

- Indirect communications (e.g., posters, intranet, brochures, etc.);
- Management support and reinforcement (e.g., presentations, meetings, etc.).

R2. Training — The Responsible Entity shall establish, document, implement, and maintain an annual cyber security training program for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets. The cyber security training program shall be reviewed annually, at a minimum, and shall be updated whenever necessary.

R2.1. This program will ensure that all personnel having such access to Critical Cyber Assets, including contractors and service vendors, are trained prior to their being granted such access except in specified circumstances such as an emergency.

R2.2. Training shall cover the policies, access controls, and procedures as developed for the Critical Cyber Assets covered by CIP-004-4, and include, at a minimum, the following required items appropriate to personnel roles and responsibilities:

R2.2.1. The proper use of Critical Cyber Assets;

R2.2.2. Physical and electronic access controls to Critical Cyber Assets;

R2.2.3. The proper handling of Critical Cyber Asset information; and,

R2.2.4. Action plans and procedures to recover or re-establish Critical Cyber Assets and access thereto following a Cyber Security Incident.

R2.3. The Responsible Entity shall maintain documentation that training is conducted at least annually, including the date the training was completed and attendance records.

R3. Personnel Risk Assessment —The Responsible Entity shall have a documented personnel risk assessment program, in accordance with federal, state, provincial, and local laws, and subject to existing collective bargaining unit agreements, for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets. A personnel risk assessment shall be conducted pursuant to that program prior to such personnel being granted such access except in specified circumstances such as an emergency.

The personnel risk assessment program shall at a minimum include:

R3.1. The Responsible Entity shall ensure that each assessment conducted include, at least, identity verification (e.g., Social Security Number verification in the U.S.) and seven-year criminal check. The Responsible Entity may conduct more detailed reviews, as permitted by law and subject to existing collective bargaining unit agreements, depending upon the criticality of the position.

R3.2. The Responsible Entity shall update each personnel risk assessment at least every seven years after the initial personnel risk assessment or for cause.

R3.3. The Responsible Entity shall document the results of personnel risk assessments of its personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets, and that personnel risk assessments of contractor and service vendor personnel with such access are conducted pursuant to Standard CIP-004-4.

R4. Access — The Responsible Entity shall maintain list(s) of personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including their specific electronic and physical access rights to Critical Cyber Assets.

R4.1. The Responsible Entity shall review the list(s) of its personnel who have such access to Critical Cyber Assets quarterly, and update the list(s) within seven calendar days of any change of personnel with such access to Critical Cyber Assets, or any change in the access rights of such personnel. The Responsible Entity shall ensure access list(s) for contractors and service vendors are properly maintained.

R4.2. The Responsible Entity shall revoke such access to Critical Cyber Assets within 24 hours for personnel terminated for cause and within seven calendar days for personnel who no longer require such access to Critical Cyber Assets.

C. Measures

M1. The Responsible Entity shall make available documentation of its security awareness and reinforcement program as specified in Requirement R1.

M2. The Responsible Entity shall make available documentation of its cyber security training program, review, and records as specified in Requirement R2.

M3. The Responsible Entity shall make available documentation of the personnel risk assessment program and that personnel risk assessments have been applied to all personnel who have authorized cyber or authorized unescorted physical access to Critical Cyber Assets, as specified in Requirement R3.

M4. The Responsible Entity shall make available documentation of the list(s), list review and update, and access revocation as needed as specified in Requirement R4.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.2. The RE shall serve as the CEA with the following exceptions:

1.2.1 For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

1.2.2 For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

1.2.3 For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2.4 For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.3. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

1.4.1 The Responsible Entity shall keep personnel risk assessment documents in accordance with federal, state, provincial, and local laws.

1.4.2 The Responsible Entity shall keep all other documentation required by Standard CIP-004-4 from the previous full calendar year unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.4.3 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	LOWER	The Responsible Entity established, implemented, and maintained but did not document a security awareness program to ensure personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets receive ongoing reinforcement in sound security practices.	The Responsibility Entity did not provide security awareness reinforcement on at least a quarterly basis.	The Responsible Entity did document but did not establish, implement, nor maintain a security awareness program to ensure personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets receive on-going reinforcement in sound security practices.	The Responsible Entity did not establish, implement, maintain, nor document a security awareness program to ensure personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets receive on-going reinforcement in sound security practices.
R2.	LOWER	The Responsible Entity established, implemented, and maintained but did not document an annual cyber security training program for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets.	The Responsibility Entity did not review the training program on an annual basis.	The Responsible Entity did document but did not establish, implement, nor maintain an annual cyber security training program for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets.	The Responsible Entity did not establish, document, implement, nor maintain an annual cyber security training program for personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets.
R2.1.	MEDIUM	At least one individual but less than 5% of personnel having authorized cyber or unescorted physical access to Critical Cyber Assets, including contractors and service vendors, were not trained prior to their being granted such access except in specified circumstances such as an emergency.	At least 5% but less than 10% of all personnel having authorized cyber or unescorted physical access to Critical Cyber Assets, including contractors and service vendors, were not trained prior to their being granted such access except in specified circumstances such as an emergency.	At least 10% but less than 15% of all personnel having authorized cyber or unescorted physical access to Critical Cyber Assets, including contractors and service vendors, were not trained prior to their being granted such access except in specified circumstances such as an emergency.	15% or more of all personnel having authorized cyber or unescorted physical access to Critical Cyber Assets, including contractors and service vendors, were not trained prior to their being granted such access except in specified circumstances such as an emergency.
R2.2.	MEDIUM	N/A	The training does not include one of the minimum topics as detailed in R2.2.1, R2.2.2,	The training does not include two of the minimum topics as detailed in R2.2.1, R2.2.2, R2.2.3, R2.2.4.	The training does not include three or more of the minimum topics as detailed in R2.2.1, R2.2.2, R2.2.3, R2.2.4.

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
			R2.2.3, R2.2.4.		
R2.2.1.	LOWER	N/A	N/A	N/A	N/A
R2.2.2.	LOWER	N/A	N/A	N/A	N/A
R2.2.3.	LOWER	N/A	N/A	N/A	N/A
R2.2.4.	LOWER	N/A	N/A	N/A	N/A
R2.3.	LOWER	N/A	N/A	The Responsible Entity did maintain documentation that training is conducted at least annually, but did not include either the date the training was completed or attendance records.	The Responsible Entity did not maintain documentation that training is conducted at least annually, including the date the training was completed or attendance records.
R3.	MEDIUM	N/A	The Responsible Entity has a personnel risk assessment program, in accordance with federal, state, provincial, and local laws, and subject to existing collective bargaining unit agreements, for personnel having authorized cyber or authorized unescorted physical access, but the program is not documented.	The Responsible Entity has a personnel risk assessment program as stated in R3, but conducted the personnel risk assessment pursuant to that program after such personnel were granted such access except in specified circumstances such as an emergency.	The Responsible Entity does not have a documented personnel risk assessment program, in accordance with federal, state, provincial, and local laws, and subject to existing collective bargaining unit agreements, for personnel having authorized cyber or authorized unescorted physical access. OR The Responsible Entity did not conduct the personnel risk assessment pursuant to that program for personnel granted such access except in specified circumstances such as an emergency.
R3.1.	LOWER	N/A	N/A	The Responsible Entity did not ensure that an assessment conducted included an identity verification (e.g., Social Security Number verification in the U.S.) or a seven-year criminal check.	The Responsible Entity did not ensure that each assessment conducted include, at least, identity verification (e.g., Social Security Number verification in the U.S.) and seven-year criminal check.

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R3.2.	LOWER	N/A	The Responsible Entity did not update each personnel risk assessment at least every seven years after the initial personnel risk assessment but did update it for cause when applicable.	The Responsible Entity did not update each personnel risk assessment for cause (when applicable) but did at least updated it every seven years after the initial personnel risk assessment.	The Responsible Entity did not update each personnel risk assessment at least every seven years after the initial personnel risk assessment nor was it updated for cause when applicable.
R3.3.	LOWER	The Responsible Entity did not document the results of personnel risk assessments for at least one individual but less than 5% of all personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, pursuant to Standard CIP-004-4.	The Responsible Entity did not document the results of personnel risk assessments for 5% or more but less than 10% of all personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, pursuant to Standard CIP-004-4.	The Responsible Entity did not document the results of personnel risk assessments for 10% or more but less than 15% of all personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, pursuant to Standard CIP-004-4.	The Responsible Entity did not document the results of personnel risk assessments for 15% or more of all personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, pursuant to Standard CIP-004-4.
R4.	LOWER	The Responsible Entity did not maintain complete list(s) of personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including their specific electronic and physical access rights to Critical Cyber Assets, missing at least one individual but less than 5% of the authorized personnel.	The Responsible Entity did not maintain complete list(s) of personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including their specific electronic and physical access rights to Critical Cyber Assets, missing 5% or more but less than 10% of the authorized personnel.	The Responsible Entity did not maintain complete list(s) of personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including their specific electronic and physical access rights to Critical Cyber Assets, missing 10% or more but less than 15%of the authorized personnel.	The Responsible Entity did not maintain complete list(s) of personnel with authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including their specific electronic and physical access rights to Critical Cyber Assets, missing 15% or more of the authorized personnel.
R4.1.	LOWER	N/A	The Responsible Entity did not review the list(s) of its personnel who have access to Critical Cyber Assets quarterly.	The Responsible Entity did not update the list(s) within seven calendar days of any change of personnel with such access to Critical Cyber Assets, nor any change in the access rights of such personnel.	The Responsible Entity did not review the list(s) of all personnel who have access to Critical Cyber Assets quarterly, nor update the list(s) within seven calendar days of any change of personnel with such access to Critical Cyber Assets, nor any change in the access rights of such personnel.
R4.2.	MEDIUM	N/A	The Responsible Entity did not revoke access within seven calendar days for personnel who no longer require such access to Critical Cyber Assets.	The Responsible Entity did not revoke access to Critical Cyber Assets within 24 hours for personnel terminated for cause.	The Responsible Entity did not revoke access to Critical Cyber Assets within 24 hours for personnel terminated for cause nor within seven calendar days for personnel who no longer require such access to Critical Cyber Assets.

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
1	01/16/06	D.2.2.4 — Insert the phrase "for cause" as intended. "One instance of personnel termination for cause…"	03/24/06
1	06/01/06	D.2.1.4 — Change "access control rights" to "access rights."	06/05/06
2		Modifications to clarify the requirements and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards. Removal of reasonable business judgment. Replaced the RRO with the RE as a responsible entity. Rewording of Effective Date. Reference to emergency situations. Modification to R1 for the Responsible Entity to establish, document, implement, and maintain the awareness program. Modification to R2 for the Responsible Entity to establish, document, implement, and maintain the training program; also stating the requirements for the cyber security training program. Modification to R3 Personnel Risk Assessment to clarify that it pertains to personnel having authorized cyber or authorized unescorted physical access to "Critical Cyber Assets". Removal of 90 day window to complete training and 30 day window to complete personnel risk assessments. Changed compliance monitor to Compliance Enforcement Authority.	
3		Update version number from -2 to -3	
3	12/16/09	Approved by NERC Board of Trustees	Update
4	Board approved 01/24/2011	Update version number from "3" to "4"	Update to conform to changes to CIP-002-4 (Project 2008-06)
4	4/19/12	FERC Order issued approving CIP-004-4 (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

A. Introduction

1. Title: Cyber Security — Electronic Security Perimeter(s)

2. Number: CIP-005-4a

3. Purpose: Standard CIP-005-4a requires the identification and protection of the Electronic Security Perimeter(s) inside which all Critical Cyber Assets reside, as well as all access points on the perimeter. Standard CIP-005-4a should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

4. Applicability

4.1. Within the text of Standard CIP-005-4a, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator.

4.1.2 Balancing Authority.

4.1.3 Interchange Authority.

4.1.4 Transmission Service Provider.

4.1.5 Transmission Owner.

4.1.6 Transmission Operator.

4.1.7 Generator Owner.

4.1.8 Generator Operator.

4.1.9 Load Serving Entity.

4.1.10 NERC.

4.1.11 Regional Entity

4.2. The following are exempt from Standard CIP-005-4a:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 Responsible Entities that, in compliance with Standard CIP-002-4, identify that they have no Critical Cyber Assets.

4.2.4 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54.

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. Electronic Security Perimeter — The Responsible Entity shall ensure that every Critical Cyber Asset resides within an Electronic Security Perimeter. The Responsible Entity shall identify and document the Electronic Security Perimeter(s) and all access points to the perimeter(s).

R1.1. Access points to the Electronic Security Perimeter(s) shall include any externally connected communication end point (for example, dial-up modems) terminating at any device within the Electronic Security Perimeter(s).

R1.2. For a dial-up accessible Critical Cyber Asset that uses a non-routable protocol, the Responsible Entity shall define an Electronic Security Perimeter for that single access point at the dial-up device.

R1.3. Communication links connecting discrete Electronic Security Perimeters shall not be considered part of the Electronic Security Perimeter. However, end points of these communication links within the Electronic Security Perimeter(s) shall be considered access points to the Electronic Security Perimeter(s).

R1.4. Any non-critical Cyber Asset within a defined Electronic Security Perimeter shall be identified and protected pursuant to the requirements of Standard CIP-005-4a.

R1.5. Cyber Assets used in the access control and/or monitoring of the Electronic Security Perimeter(s) shall be afforded the protective measures as a specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4a Requirements R2 and R3; Standard CIP-006-4c Requirement R3; Standard CIP-007-4 Requirements R1 and R3 through R9; Standard CIP-008-4; and Standard CIP-009-4.

R1.6. The Responsible Entity shall maintain documentation of Electronic Security Perimeter(s), all interconnected Critical and non-critical Cyber Assets within the Electronic Security Perimeter(s), all electronic access points to the Electronic Security Perimeter(s) and the Cyber Assets deployed for the access control and monitoring of these access points.

R2. Electronic Access Controls — The Responsible Entity shall implement and document the organizational processes and technical and procedural mechanisms for control of electronic access at all electronic access points to the Electronic Security Perimeter(s).

R2.1. These processes and mechanisms shall use an access control model that denies access by default, such that explicit access permissions must be specified.

R2.2. At all access points to the Electronic Security Perimeter(s), the Responsible Entity shall enable only ports and services required for operations and for monitoring Cyber Assets within the Electronic Security Perimeter, and shall document, individually or by specified grouping, the configuration of those ports and services.

R2.3. The Responsible Entity shall implement and maintain a procedure for securing dial-up access to the Electronic Security Perimeter(s).

R2.4. Where external interactive access into the Electronic Security Perimeter has been enabled, the Responsible Entity shall implement strong procedural or technical controls at the access points to ensure authenticity of the accessing party, where technically feasible.

R2.5. The required documentation shall, at least, identify and describe:

R2.5.1. The processes for access request and authorization.

R2.5.2. The authentication methods.

R2.5.3. The review process for authorization rights, in accordance with Standard CIP-004-4 Requirement R4.

R2.5.4. The controls used to secure dial-up accessible connections.

R2.6. Appropriate Use Banner — Where technically feasible, electronic access control devices shall display an appropriate use banner on the user screen upon all interactive access attempts. The Responsible Entity shall maintain a document identifying the content of the banner.

R3. Monitoring Electronic Access — The Responsible Entity shall implement and document an electronic or manual process(es) for monitoring and logging access at access points to the Electronic Security Perimeter(s) twenty-four hours a day, seven days a week.

R3.1. For dial-up accessible Critical Cyber Assets that use non-routable protocols, the Responsible Entity shall implement and document monitoring process(es) at each access point to the dial-up device, where technically feasible.

R3.2. Where technically feasible, the security monitoring process(es) shall detect and alert for attempts at or actual unauthorized accesses. These alerts shall provide for appropriate notification to designated response personnel. Where alerting is not technically feasible, the Responsible Entity shall review or otherwise assess access logs for attempts at or actual unauthorized accesses at least every ninety calendar days.

R4. Cyber Vulnerability Assessment — The Responsible Entity shall perform a cyber vulnerability assessment of the electronic access points to the Electronic Security Perimeter(s) at least annually. The vulnerability assessment shall include, at a minimum, the following:

R4.1. A document identifying the vulnerability assessment process;

R4.2. A review to verify that only ports and services required for operations at these access points are enabled;

R4.3. The discovery of all access points to the Electronic Security Perimeter;

R4.4. A review of controls for default accounts, passwords, and network management community strings;

R4.5. Documentation of the results of the assessment, the action plan to remediate or mitigate vulnerabilities identified in the assessment, and the execution status of that action plan.

R5. Documentation Review and Maintenance — The Responsible Entity shall review, update, and maintain all documentation to support compliance with the requirements of Standard CIP-005-4a.

R5.1. The Responsible Entity shall ensure that all documentation required by Standard CIP-005-4a reflect current configurations and processes and shall review the documents and procedures referenced in Standard CIP-005-4a at least annually.

R5.2. The Responsible Entity shall update the documentation to reflect the modification of the network or controls within ninety calendar days of the change.

R5.3. The Responsible Entity shall retain electronic access logs for at least ninety calendar days. Logs related to reportable incidents shall be kept in accordance with the requirements of Standard CIP-008-4.

C. Measures

M1. The Responsible Entity shall make available documentation about the Electronic Security Perimeter as specified in Requirement R1.

M2. The Responsible Entity shall make available documentation of the electronic access controls to the Electronic Security Perimeter(s), as specified in Requirement R2.

M3. The Responsible Entity shall make available documentation of controls implemented to log and monitor access to the Electronic Security Perimeter(s) as specified in Requirement R3.

M4. The Responsible Entity shall make available documentation of its annual vulnerability assessment as specified in Requirement R4.

M5. The Responsible Entity shall make available access logs and documentation of review, changes, and log retention as specified in Requirement R5.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.2. The RE shall serve as the CEA with the following exceptions:

1.2.1 For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

1.2.1 For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

1.2.1 For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2.2 For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.3. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

1.4.1 The Responsible Entity shall keep logs for a minimum of ninety calendar days, unless: a) longer retention is required pursuant to Standard CIP-008-4, Requirement R2; b) directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.4.2 The Responsible Entity shall keep other documents and records required by Standard CIP-005-4a from the previous full calendar year.

1.4.3 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	MEDIUM	The Responsible Entity did not document one or more access points to the Electronic Security Perimeter(s).	The Responsible Entity identified but did not document one or more Electronic Security Perimeter(s).	The Responsible Entity did not ensure that one or more of the Critical Cyber Assets resides within an Electronic Security Perimeter. OR The Responsible Entity did not identify nor document one or more Electronic Security Perimeter(s).	The Responsible Entity did not ensure that one or more Critical Cyber Assets resides within an Electronic Security Perimeter, and the Responsible Entity did not identify and document the Electronic Security Perimeter(s) and all access points to the perimeter(s) for all Critical Cyber Assets.
R1.1.	MEDIUM	N/A	N/A	N/A	Access points to the Electronic Security Perimeter(s) do not include all externally connected communication end point (for example, dial-up modems) terminating at any device within the Electronic Security Perimeter(s).
R1.2.	MEDIUM	N/A	N/A	N/A	For one or more dial-up accessible Critical Cyber Assets that use a non-routable protocol, the Responsible Entity did not define an Electronic Security Perimeter for that single access point at the dial-up device.
R1.3.	MEDIUM	N/A	N/A	N/A	At least one end point of a communication link within the Electronic Security Perimeter(s) connecting discrete Electronic Security Perimeters was not considered an access point to the Electronic Security Perimeter.
R1.4.	MEDIUM	N/A	One or more non-critical Cyber Asset within a defined Electronic Security Perimeter is not identified but is protected pursuant to the requirements of Standard CIP-005.	One or more non-critical Cyber Asset within a defined Electronic Security Perimeter is identified but not protected pursuant to the requirements of Standard CIP-005.	One or more non-critical Cyber Asset within a defined Electronic Security Perimeter is not identified and is not protected pursuant to the requirements of Standard CIP-005.
R1.5.	MEDIUM	A Cyber Asset used in the access control and/or monitoring of the Electronic Security Perimeter(s) is provided with all but one (1) of the protective measures as specified in Standard CIP-003-4; Standard CIP-004-4 Requirement	A Cyber Asset used in the access control and/or monitoring of the Electronic Security Perimeter(s) is provided with all but two (2) of the protective measures as specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4 Requirements R2 and R3;	A Cyber Asset used in the access control and/or monitoring of the Electronic Security Perimeter(s) is provided with all but three (3) of the protective measures as specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4 Requirements R2 and R3; Standard CIP-006-4 Requirement R3; Standard CIP-007-4 Requirements R1 and R3 through R9; Standard CIP-008-4;	A Cyber Asset used in the access control and/or monitoring of the Electronic Security Perimeter(s) is provided without four (4) or more of the protective measures as specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4 Requirements R2 and R3; Standard CIP-006-4 Requirement R3; Standard CIP-007-4 Requirements R1 and R3 through R9; Standard CIP-008-4;

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
		R3; Standard CIP-005-4 Requirements R2 and R3; Standard CIP-006-4 Requirement R3; Standard CIP-007-4 Requirements R1 and R3 through R9; Standard CIP-008-4; and Standard CIP-009-4.	Standard CIP-006-4 Requirement R3; Standard CIP-007-4 Requirements R1 and R3 through R9; Standard CIP-008-4; and Standard CIP-009-4.	and Standard CIP-009-4.	and Standard CIP-009-4.
R1.6.	LOWER	N/A	N/A	The Responsible Entity did not maintain documentation of one of the following: Electronic Security Perimeter(s), interconnected Critical and non-critical Cyber Assets within the Electronic Security Perimeter(s), electronic access point to the Electronic Security Perimeter(s) or Cyber Asset deployed for the access control and monitoring of these access points.	The Responsible Entity did not maintain documentation of two or more of the following: Electronic Security Perimeter(s), interconnected Critical and non-critical Cyber Assets within the Electronic Security Perimeter(s), electronic access points to the Electronic Security Perimeter(s) and Cyber Assets deployed for the access control and monitoring of these access points.
R2.	MEDIUM	N/A	The Responsible Entity implemented but did not document the organizational processes and technical and procedural mechanisms for control of electronic access at all electronic access points to the Electronic Security Perimeter(s).	The Responsible Entity documented but did not implement the organizational processes and technical and procedural mechanisms for control of electronic access at all electronic access points to the Electronic Security Perimeter(s).	The Responsible Entity did not implement nor document the organizational processes and technical and procedural mechanisms for control of electronic access at all electronic access points to the Electronic Security Perimeter(s).
R2.1.	MEDIUM	N/A	N/A	N/A	The processes and mechanisms did not use an access control model that denies access by default, such that explicit access permissions must be specified.
R2.2.	MEDIUM	N/A	At one or more access points to the Electronic Security Perimeter(s), the Responsible Entity did not document, individually or by specified grouping, the configuration of those ports and services required for operation and for monitoring Cyber Assets within the Electronic Security	At one or more access points to the Electronic Security Perimeter(s), the Responsible Entity enabled ports and services not required for operations and for monitoring Cyber Assets within the Electronic Security Perimeter but did document, individually or by specified grouping, the configuration of those ports and services.	At one or more access points to the Electronic Security Perimeter(s), the Responsible Entity enabled ports and services not required for operations and for monitoring Cyber Assets within the Electronic Security Perimeter, and did not document, individually or by specified grouping, the configuration of those ports and services.

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
			Perimeter.		
R2.3.	MEDIUM	N/A	N/A	The Responsible Entity did implement but did not maintain a procedure for securing dial-up access to the Electronic Security Perimeter(s) where applicable.	The Responsible Entity did not implement nor maintain a procedure for securing dial-up access to the Electronic Security Perimeter(s) where applicable.
R2.4.	MEDIUM	N/A	N/A	N/A	Where external interactive access into the Electronic Security Perimeter has been enabled the Responsible Entity did not implement strong procedural or technical controls at the access points to ensure authenticity of the accessing party, where technically feasible.
R2.5.	LOWER	The required documentation for R2 did not include one of the elements described in R2.5.1 through R2.5.4	The required documentation for R2 did not include two of the elements described in R2.5.1 through R2.5.4	The required documentation for R2 did not include three of the elements described in R2.5.1 through R2.5.4	The required documentation for R2 did not include any of the elements described in R2.5.1 through R2.5.4
R2.5.1.	LOWER	N/A	N/A	N/A	N/A
R2.5.2.	LOWER	N/A	N/A	N/A	N/A
R2.5.3.	LOWER	N/A	N/A	N/A	N/A
R2.5.4.	LOWER	N/A	N/A	N/A	N/A
R2.6.	LOWER	The Responsible Entity did not maintain a document identifying the content of the banner. OR	Where technically feasible 5% but less than 10% of electronic access control devices did not display an appropriate use banner on the user screen upon all interactive access attempts.	Where technically feasible 10% but less than 15% of electronic access control devices did not display an appropriate use banner on the user screen upon all interactive access attempts.	Where technically feasible, 15% or more electronic access control devices did not display an appropriate use banner on the user screen upon all interactive access attempts.

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
		Where technically feasible less than 5% electronic access control devices did not display an appropriate use banner on the user screen upon all interactive access attempts.			
R3.	MEDIUM	The Responsible Entity did not document the electronic or manual processes for monitoring and logging access to access points. OR The Responsible Entity did not implement electronic or manual processes monitoring and logging at less than 5% of the access points.	The Responsible Entity did not implement electronic or manual processes monitoring and logging at 5% or more but less than 10% of the access points.	The Responsible Entity did not implement electronic or manual processes monitoring and logging at 10% or more but less than 15 % of the access points.	The Responsible Entity did not implement electronic or manual processes monitoring and logging at 15% or more of the access points.
R3.1.	MEDIUM	The Responsible Entity did not document the electronic or manual processes for monitoring access points to dial-up devices. OR Where technically feasible, the Responsible Entity did not implement electronic or manual processes for monitoring at less than 5% of the access points to dial-up devices.	Where technically feasible, the Responsible Entity did not implement electronic or manual processes for monitoring at 5% or more but less than 10% of the access points to dial-up devices.	Where technically feasible, the Responsible Entity did not implement electronic or manual processes for monitoring at 10% or more but less than 15% of the access points to dial-up devices.	Where technically feasible, the Responsible Entity did not implement electronic or manual processes for monitoring at 15% or more of the access points to dial-up devices.
R3.2.	MEDIUM	N/A	N/A	Where technically feasible, the Responsible Entity implemented security monitoring process(es) to detect and alert for attempts at or actual unauthorized accesses, however the alerts do not provide for appropriate	Where technically feasible, the Responsible Entity did not implement security monitoring process(es) to detect and alert for attempts at or actual unauthorized accesses. OR

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
				notification to designated response personnel.	Where alerting is not technically feasible, the Responsible Entity did not review or otherwise assess access logs for attempts at or actual unauthorized accesses at least every ninety calendar days
R4.	MEDIUM	The Responsible Entity did not perform a Vulnerability Assessment at least annually for less than 5% of access points to the Electronic Security Perimeter(s).	The Responsible Entity did not perform a Vulnerability Assessment at least annually for 5% or more but less than 10% of access points to the Electronic Security Perimeter(s).	The Responsible Entity did not perform a Vulnerability Assessment at least annually for 10% or more but less than 15% of access points to the Electronic Security Perimeter(s).	The Responsible Entity did not perform a Vulnerability Assessment at least annually for 15% or more of access points to the Electronic Security Perimeter(s). OR The vulnerability assessment did not include one (1) or more of the subrequirements R 4.1, R4.2, R4.3, R4.4, R4.5.
R4.1.	LOWER	N/A	N/A	N/A	N/A
R4.2.	MEDIUM	N/A	N/A	N/A	N/A
R4.3.	MEDIUM	N/A	N/A	N/A	N/A
R4.4.	MEDIUM	N/A	N/A	N/A	N/A
R4.5.	MEDIUM	N/A	N/A	N/A	N/A
R5.	LOWER	The Responsible Entity did not review, update, and maintain at least one but less than or equal to 5% of the documentation to support compliance with the requirements of Standard CIP-005-4.	The Responsible Entity did not review, update, and maintain greater than 5% but less than or equal to 10% of the documentation to support compliance with the requirements of Standard CIP-005-4.	The Responsible Entity did not review, update, and maintain greater than 10% but less than or equal to 15% of the documentation to support compliance with the requirements of Standard CIP-005-4.	The Responsible Entity did not review, update, and maintain greater than 15% of the documentation to support compliance with the requirements of Standard CIP-005-4.

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R5.1.	LOWER	N/A	The Responsible Entity did not provide evidence of an annual review of the documents and procedures referenced in Standard CIP-005-4.	The Responsible Entity did not document current configurations and processes referenced in Standard CIP-005-4.	The Responsible Entity did not document current configurations and processes and did not review the documents and procedures referenced in Standard CIP-005-4 at least annually.
R5.2.	LOWER	For less than 5% of the applicable changes, the Responsible Entity did not update the documentation to reflect the modification of the network or controls within ninety calendar days of the change.	For 5% or more but less than 10% of the applicable changes, the Responsible Entity did not update the documentation to reflect the modification of the network or controls within ninety calendar days of the change.	For 10% or more but less than 15% of the applicable changes, the Responsible Entity did not update the documentation to reflect the modification of the network or controls within ninety calendar days of the change.	For 15% or more of the applicable changes, the Responsible Entity did not update the documentation to reflect the modification of the network or controls within ninety calendar days of the change.
R5.3.	LOWER	The Responsible Entity retained electronic access logs for 75 or more calendar days, but for less than 90 calendar days.	The Responsible Entity retained electronic access logs for 60 or more calendar days, but for less than 75 calendar days.	The Responsible Entity retained electronic access logs for 45 or more calendar days , but for less than 60 calendar days.	The Responsible Entity retained electronic access logs for less than 45 calendar days.

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
1	01/16/06	D.2.3.1 — Change "Critical Assets," to "Critical Cyber Assets" as intended.	03/24/06
2	Approved by NERC Board of Trustees 5/6/09	Modifications to clarify the requirements and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards. Removal of reasonable business judgment. Replaced the RRO with the RE as a responsible entity. Rewording of Effective Date. Revised the wording of the Electronic Access Controls requirement stated in R2.3 to clarify that the Responsible Entity shall "implement and maintain" a procedure for securing dial-up access to the Electronic Security Perimeter(s). Changed compliance monitor to Compliance Enforcement Authority.	Revised.
3	12/16/09	Changed CIP-005-2 to CIP-005-3. Changed all references to CIP Version "2" standards to CIP Version "3" standards. For Violation Severity Levels, changed, "To be developed later" to "Developed separately."	Conforming revisions for FERC Order on CIP V2 Standards (9/30/2009)
2a	02/16/10	Added Appendix 1 — Interpretation of R1.3 approved by BOT on February 16, 2010	Addition
4a	01/24/11	Adopted by the NERC Board of Trustees	Update to conform to changes to CIP-002-4 (Project 2008-06) Update version number from "3" to "4a"
4a	4/19/12	FERC Order issued approving CIP-005-4a (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

Appendix 1

Requirement Number and Text of Requirement
Section 4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters. **Requirement R1.3** Communication links connecting discrete Electronic Security Perimeters shall not be considered part of the Electronic Security Perimeter. However, end points of these communication links within the Electronic Security Perimeter(s) shall be considered access points to the Electronic Security Perimeter(s).
Question 1 (Section 4.2.2)
What kind of cyber assets are referenced in 4.2.2 as "associated"? What else could be meant except the devices forming the communication link?
Response to Question 1
In the context of applicability, associated Cyber Assets refer to any communications devices external to the Electronic Security Perimeter, i.e., beyond the point at which access to the Electronic Security Perimeter is controlled. Devices controlling access into the Electronic Security Perimeter are not exempt.
Question 2 (Section 4.2.2)
Is the communication link physical or logical? Where does it begin and terminate?
Response to Question 2
The drafting team interprets the data communication link to be physical or logical, and its termination points depend upon the design and architecture of the communication link.
Question 3 (Requirement R1.3)
Please clarify what is meant by an “endpoint”? Is it physical termination? Logical termination of OSI layer 2, layer 3, or above?
Response to Question 3
The drafting team interprets the endpoint to mean the device at which a physical or logical communication link terminates. The endpoint is the Electronic Security Perimeter access point if access into the Electronic Security Perimeter is controlled at the endpoint, irrespective of which Open Systems Interconnection (OSI) layer is managing the communication.
Question 4 (Requirement R1.3)
If “endpoint” is defined as logical and refers to layer 3 and above, please clarify if the termination points of an encrypted tunnel (layer 3) must be treated as an “access point? If two control centers are

owned and managed by the same entity, connected via an encrypted link by properly applied Federal Information Processing Standards, with tunnel termination points that are within the control center ESPs and PSPs and do not terminate on the firewall but on a separate internal device, and the encrypted traffic already passes through a firewall access point at each ESP boundary where port/protocol restrictions are applied, must these encrypted communication tunnel termination points be treated as "access points" in addition to the firewalls through which the encrypted traffic has already passed?
Response to Question 4
In the case where the “endpoint” is defined as logical and is >= layer 3, the termination points of an encrypted tunnel must be treated as an “access point.” The encrypted communication tunnel termination points referred to above are “access points.”

A. Introduction

1. Title: Cyber Security — Physical Security of Critical Cyber Assets

2. Number: CIP-006-4c

3. Purpose: Standard CIP-006-4c is intended to ensure the implementation of a physical security program for the protection of Critical Cyber Assets. Standard CIP-006-4c should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

4. Applicability:

4.1. Within the text of Standard CIP-006-4c, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator

4.1.2 Balancing Authority

4.1.3 Interchange Authority

4.1.4 Transmission Service Provider

4.1.5 Transmission Owner

4.1.6 Transmission Operator

4.1.7 Generator Owner

4.1.8 Generator Operator

4.1.9 Load Serving Entity

4.1.10 NERC

4.1.11 Regional Entity

4.2. The following are exempt from Standard CIP-006-4c:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54

4.2.4 Responsible Entities that, in compliance with Standard CIP-002-4, identify that they have no Critical Cyber Assets

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. Physical Security Plan — The Responsible Entity shall document, implement, and maintain a physical security plan, approved by the senior manager or delegate(s) that shall address, at a minimum, the following:

R1.1. All Cyber Assets within an Electronic Security Perimeter shall reside within an identified Physical Security Perimeter. Where a completely enclosed ("six-wall") border cannot be established, the Responsible Entity shall deploy and document alternative measures to control physical access to such Cyber Assets.

R1.2. Identification of all physical access points through each Physical Security Perimeter and measures to control entry at those access points.

R1.3. Processes, tools, and procedures to monitor physical access to the perimeter(s).

R1.4. Appropriate use of physical access controls as described in Requirement R4 including visitor pass management, response to loss, and prohibition of inappropriate use of physical access controls.

R1.5. Review of access authorization requests and revocation of access authorization, in accordance with CIP-004-4 Requirement R4.

R1.6. A visitor control program for visitors (personnel without authorized unescorted access to a Physical Security Perimeter), containing at a minimum the following:

R1.6.1. Logs (manual or automated) to document the entry and exit of visitors, including the date and time, to and from Physical Security Perimeters.

R1.6.2. Continuous escorted access of visitors within the Physical Security Perimeter.

R1.7. Update of the physical security plan within thirty calendar days of the completion of any physical security system redesign or reconfiguration, including, but not limited to, addition or removal of access points through the Physical Security Perimeter, physical access controls, monitoring controls, or logging controls.

R1.8. Annual review of the physical security plan.

R2. Protection of Physical Access Control Systems — Cyber Assets that authorize and/or log access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge readers, shall:

R2.1. Be protected from unauthorized physical access.

R2.2. Be afforded the protective measures specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4a Requirements R2 and R3; Standard CIP-006-4c Requirements R4 and R5; Standard CIP-007-4; Standard CIP-008-4; and Standard CIP-009-4.

R3. Protection of Electronic Access Control Systems — Cyber Assets used in the access control and/or monitoring of the Electronic Security Perimeter(s) shall reside within an identified Physical Security Perimeter.

R4. Physical Access Controls — The Responsible Entity shall document and implement the operational and procedural controls to manage physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week. The Responsible Entity shall implement one or more of the following physical access methods:

- Card Key: A means of electronic access where the access rights of the card holder are predefined in a computer database. Access rights may differ from one perimeter to another.
- Special Locks: These include, but are not limited to, locks with "restricted key" systems, magnetic locks that can be operated remotely, and "man-trap" systems.
- Security Personnel: Personnel responsible for controlling physical access who may reside on-site or at a monitoring station.
- Other Authentication Devices: Biometric, keypad, token, or other equivalent devices that control physical access to the Critical Cyber Assets.

R5. Monitoring Physical Access — The Responsible Entity shall document and implement the technical and procedural controls for monitoring physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week. Unauthorized access attempts shall be reviewed immediately and handled in accordance with the procedures specified in Requirement CIP-008-4. One or more of the following monitoring methods shall be used:

- Alarm Systems: Systems that alarm to indicate a door, gate or window has been opened without authorization. These alarms must provide for immediate notification to personnel responsible for response.
- Human Observation of Access Points: Monitoring of physical access points by authorized personnel as specified in Requirement R4.

R6. Logging Physical Access — Logging shall record sufficient information to uniquely identify individuals and the time of access twenty-four hours a day, seven days a week. The Responsible Entity shall implement and document the technical and procedural mechanisms for logging physical entry at all access points to the Physical Security Perimeter(s) using one or more of the following logging methods or their equivalent:

- Computerized Logging: Electronic logs produced by the Responsible Entity's selected access control and monitoring method.
- Video Recording: Electronic capture of video images of sufficient quality to determine identity.
- Manual Logging: A log book or sign-in sheet, or other record of physical access maintained by security or other personnel authorized to control and monitor physical access as specified in Requirement R4.

R7. Access Log Retention — The Responsible Entity shall retain physical access logs for at least ninety calendar days. Logs related to reportable incidents shall be kept in accordance with the requirements of Standard CIP-008-4.

R8. Maintenance and Testing — The Responsible Entity shall implement a maintenance and testing program to ensure that all physical security systems under Requirements R4, R5, and R6 function properly. The program must include, at a minimum, the following:

R8.1. Testing and maintenance of all physical security mechanisms on a cycle no longer than three years.

R8.2. Retention of testing and maintenance records for the cycle determined by the Responsible Entity in Requirement R8.1.

R8.3. Retention of outage records regarding access controls, logging, and monitoring for a minimum of one calendar year.

C. Measures

M1. The Responsible Entity shall make available the physical security plan as specified in Requirement R1 and documentation of the implementation, review and updating of the plan.

M2. The Responsible Entity shall make available documentation that the physical access control systems are protected as specified in Requirement R2.

M3. The Responsible Entity shall make available documentation that the electronic access control systems are located within an identified Physical Security Perimeter as specified in Requirement R3.

M4. The Responsible Entity shall make available documentation identifying the methods for controlling physical access to each access point of a Physical Security Perimeter as specified in Requirement R4.

M5. The Responsible Entity shall make available documentation identifying the methods for monitoring physical access as specified in Requirement R5.

M6. The Responsible Entity shall make available documentation identifying the methods for logging physical access as specified in Requirement R6.

M7. The Responsible Entity shall make available documentation to show retention of access logs as specified in Requirement R7.

M8. The Responsible Entity shall make available documentation to show its implementation of a physical security system maintenance and testing program as specified in Requirement R8.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.2. The RE shall serve as the CEA with the following exceptions:

1.2.1 For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

1.2.2 For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

1.2.3 For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2.4 For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.3. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

1.4.1 The Responsible Entity shall keep documents other than those specified in Requirements R7 and R8.2 from the previous full calendar year unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.4.2 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

1.5.1 The Responsible Entity may not make exceptions in its cyber security policy to the creation, documentation, or maintenance of a physical security plan.

1.5.2 For dial-up accessible Critical Cyber Assets that use non-routable protocols, the Responsible Entity shall not be required to comply with Standard CIP-006-4c for that single access point at the dial-up device.

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	MEDIUM	N/A	N/A	The Responsible Entity created a physical security plan but did not gain approval by a senior manager or delegate(s). OR The Responsible Entity created and implemented but did not maintain a physical security plan.	The Responsible Entity did not document, implement, and maintain a physical security plan.
R1.1.	MEDIUM	N/A	Where a completely enclosed ("six-wall") border cannot be established, the Responsible Entity has deployed but not documented alternative measures to control physical access to such Cyber Assets within the Electronic Security Perimeter.	Where a completely enclosed ("six-wall") border cannot be established, the Responsible Entity has not deployed alternative measures to control physical access to such Cyber Assets within the Electronic Security Perimeter.	The Responsible Entity's physical security plan does not include processes to ensure and document that all Cyber Assets within an Electronic Security Perimeter also reside within an identified Physical Security Perimeter. OR Where a completely enclosed ("six-wall") border cannot be established, the Responsible Entity has not deployed and documented alternative measures to control physical to such Cyber Assets within the Electronic Security Perimeter.
R1.2.	MEDIUM	N/A	The Responsible Entity's physical security plan includes measures to control entry at access points but does not identify all access points through each Physical Security Perimeter.	The Responsible Entity's physical security identifies all access points through each Physical Security Perimeter but does not identify measures to control entry at those access points.	The Responsible Entity's physical security plan does not identify all access points through each Physical Security Perimeter nor measures to control entry at those access points.
R1.3	MEDIUM	N/A	N/A	N/A	The Responsible Entity's physical security plan does not include processes, tools, and procedures to monitor physical access to the perimeter(s).

R1.4	MEDIUM	N/A	N/A	N/A	The Responsible Entity's physical security plan does not address the appropriate use of physical access controls as described in Requirement R4.
R1.5	MEDIUM	N/A	N/A	The Responsible Entity's physical security plan does not address either the process for reviewing access authorization requests or the process for revocation of access authorization, in accordance with CIP-004-4 Requirement R4.	The Responsible Entity's physical security plan does not address the process for reviewing access authorization requests and the process for revocation of access authorization, in accordance with CIP-004-4 Requirement R4.
R1.6	MEDIUM	The responsible Entity included a visitor control program in its physical security plan, but either did not log the visitor entrance or did not log the visitor exit from the Physical Security Perimeter.	The responsible Entity included a visitor control program in its physical security plan, but either did not log the visitor or did not log the escort.	The responsible Entity included a visitor control program in its physical security plan, but it does not meet the requirements of continuous escort.	The Responsible Entity did not include or implement a visitor control program in its physical security plan.
R1.6.1	MEDIUM	N/A	N/A	N/A	N/A
R1.6.2	MEDIUM	N/A	N/A	N/A	N/A
R1.7	LOWER	N/A	N/A	The Responsible Entity's physical security plan addresses a process for updating the physical security plan within thirty calendar days of the completion of any physical security system redesign or reconfiguration **but** the plan was not updated within thirty calendar days of the completion of a physical security system redesign or reconfiguration.	The Responsible Entity's physical security plan does not address a process for updating the physical security plan within thirty calendar days of the completion of a physical security system redesign or reconfiguration.
R1.8	LOWER	N/A	N/A	N/A	The Responsible Entity's physical Security plan does not address a process for ensuring that the physical security plan is reviewed at least annually.
R2	MEDIUM	A Cyber Asset that authorizes and/or logs access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge readers was provided with all but one	A Cyber Asset that authorizes and/or logs access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge readers was provided with all but two (2) of the protective measures specified in Standard CIP-003-4; Standard CIP-004-4	A Cyber Asset that authorizes and/or logs access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge readers was provided with all but three (3) of the protective measures specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4 Requirements R2 and R3; Standard CIP-006-4 Requirements R4 and R5; Standard CIP-007-4; Standard CIP-008-4; and Standard CIP-009-4.	A Cyber Asset that authorizes and/or logs access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge readers, was not protected from unauthorized physical access. OR

		(1) of the protective measures specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4 Requirements R2 and R3; Standard CIP-006-4 Requirements R4 and R5; Standard CIP-007-4; Standard CIP-008-4; and Standard CIP- 009-4.	Requirement R3; Standard CIP-005-4 Requirements R2 and R3; Standard CIP-006-4 Requirements R4 and R5; Standard CIP-007-4; Standard CIP-008-4; and Standard CIP-009-4.		A Cyber Asset that authorizes and/or logs access to the Physical Security Perimeter(s), exclusive of hardware at the Physical Security Perimeter access point such as electronic lock control mechanisms and badge readers was provided without four (4) or more of the protective measures specified in Standard CIP-003-4; Standard CIP-004-4 Requirement R3; Standard CIP-005-4 Requirements R2 and R3; Standard CIP-006-4 Requirements R4 and R5; Standard CIP-007-4; Standard CIP-008-4; and Standard CIP-009-4.
R2.1.	MEDIUM	N/A	N/A	N/A	N/A
R2.2.	MEDIUM	N/A	N/A	N/A	N/A
R3	MEDIUM	N/A	N/A	N/A	A Cyber Assets used in the access control and/or monitoring of the Electronic Security Perimeter(s) did not reside within an identified Physical Security Perimeter.
R4	MEDIUM	N/A	The Responsible Entity **has implemented but not documented** the operational and procedural controls to manage physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week using one or more of the following physical access methods: • Card Key: A means of electronic access where the access rights of the card holder are predefined in a computer database. Access rights may differ from one perimeter to another. • Special Locks: These include, but are not limited to, locks with “restricted key” systems, magnetic locks that can be operated remotely, and “man-trap” systems.	The Responsible Entity **has documented but not implemented** the operational and procedural controls to manage physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week using one or more of the following physical access methods: • Card Key: A means of electronic access where the access rights of the card holder are predefined in a computer database. Access rights may differ from one perimeter to another. • Special Locks: These include, but are not limited to, locks with “restricted key” systems, magnetic locks that can be operated remotely, and “man-trap” systems. • Security Personnel: Personnel responsible for controlling physical access who may reside on-site or at a monitoring station. • Other Authentication Devices: Biometric, keypad, token, or other equivalent devices that control physical access to the Critical Cyber Assets.	The Responsible Entity has not documented nor implemented the operational and procedural controls to manage physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week using one or more of the following physical access methods: • Card Key: A means of electronic access where the access rights of the card holder are predefined in a computer database. Access rights may differ from one perimeter to another. • Special Locks: These include, but are not limited to, locks with “restricted key” systems, magnetic locks that can be operated remotely, and “man-trap” systems. • Security Personnel: Personnel responsible for controlling physical access who may reside on-site or at a monitoring station. • Other Authentication Devices: Biometric, keypad, token, or other equivalent devices that control physical access to the Critical Cyber Assets..

			• Security Personnel: Personnel responsible for controlling physical access who may reside on-site or at a monitoring station. • Other Authentication Devices: Biometric, keypad, token, or other equivalent devices that control physical access to the Critical Cyber Assets.		
R5	MEDIUM	N/A	The Responsible Entity has implemented but not documented the technical and procedural controls for monitoring physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week using one or more of the following monitoring methods: • Alarm Systems: Systems that alarm to indicate a door, gate or window has been opened without authorization. These alarms must provide for immediate notification to personnel responsible for response. • Human Observation of Access Points: Monitoring of physical access points by authorized personnel as specified in Requirement R4.	The Responsible Entity has documented but not implemented the technical and procedural controls for monitoring physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week using one or more of the following monitoring methods: • Alarm Systems: Systems that alarm to indicate a door, gate or window has been opened without authorization. These alarms must provide for immediate notification to personnel responsible for response. • Human Observation of Access Points: Monitoring of physical access points by authorized personnel as specified in Requirement R4.	The Responsible Entity has not documented nor implemented the technical and procedural controls for monitoring physical access at all access points to the Physical Security Perimeter(s) twenty-four hours a day, seven days a week using one or more of the following monitoring methods: • Alarm Systems: Systems that alarm to indicate a door, gate or window has been opened without authorization. These alarms must provide for immediate notification to personnel responsible for response. • Human Observation of Access Points: Monitoring of physical access points by authorized personnel as specified in Requirement R4. OR An unauthorized access attempt was not reviewed immediately and handled in accordance with CIP-008-4.
R6	LOWER	The Responsible Entity has implemented but not documented the technical and procedural mechanisms for logging physical entry at all access points to the Physical Security Perimeter(s) using one or more of the following logging methods or their equivalent: • Computerized Logging:	The Responsible Entity has implemented the technical and procedural mechanisms for logging physical entry at all access points to the Physical Security Perimeter(s) using one or more of the following logging methods or their equivalent: • Computerized Logging: Electronic logs produced by the Responsible Entity's selected access control and monitoring method,	The Responsible Entity has documented but not implemented the technical and procedural mechanisms for logging physical entry at all access points to the Physical Security Perimeter(s) using one or more of the following logging methods or their equivalent: • Computerized Logging: Electronic logs produced by the Responsible Entity's selected access control and monitoring method, • Video Recording: Electronic capture of video images of sufficient quality to determine identity, or • Manual Logging: A log book or sign-in sheet, or other record of physical access maintained by security or other	The Responsible Entity has not implemented nor documented the technical and procedural mechanisms for logging physical entry at all access points to the Physical Security Perimeter(s) using one or more of the following logging methods or their equivalent: • Computerized Logging: Electronic logs produced by the Responsible Entity's selected access control and monitoring method, • Video Recording: Electronic capture of video images of sufficient quality to determine identity, or • Manual Logging: A log book or sign-in sheet, or other record of physical access maintained by security or other personnel

		Electronic logs produced by the Responsible Entity's selected access control and monitoring method, • Video Recording: Electronic capture of video images of sufficient quality to determine identity, or • Manual Logging: A log book or sign-in sheet, or other record of physical access maintained by security or other personnel authorized to control and monitor physical access as specified in Requirement R4, and has provided logging that records sufficient information to uniquely identify individuals and the time of access twenty-four hours a day, seven days a week.	• Video Recording: Electronic capture of video images of sufficient quality to determine identity, or • Manual Logging: A log book or sign-in sheet, or other record of physical access maintained by security or other personnel authorized to control and monitor physical access as specified in Requirement R4, **but** has not provided logging that records sufficient information to uniquely identify individuals and the time of access twenty-four hours a day, seven days a week..	personnel authorized to control and monitor physical access as specified in Requirement R4.	authorized to control and monitor physical access as specified in Requirement R4.
R7	LOWER	The Responsible Entity retained physical access logs for 75 or more calendar days, but for less than 90 calendar days.	The Responsible Entity retained physical access logs for 60 or more calendar days, but for less than 75 calendar days.	The Responsible Entity retained physical access logs for 45 or more calendar days, but for less than 60 calendar days.	The Responsible Entity retained physical access logs for less than 45 calendar days.
R8	MEDIUM	The Responsible Entity has implemented a maintenance and testing program to ensure that all physical security systems under Requirements R4, R5, and R6 function properly **but** the program does not include one of the Requirements R8.1, R8.2, and R8.3.	The Responsible Entity has implemented a maintenance and testing program to ensure that all physical security systems under Requirements R4, R5, and R6 function properly **but** the program does not include two of the Requirements R8.1, R8.2, and R8.3.	The Responsible Entity has implemented a maintenance and testing program to ensure that all physical security systems under Requirements R4, R5, and R6 function properly **but** the program does not include any of the Requirements R8.1, R8.2, and R8.3.	The Responsible Entity has not implemented a maintenance and testing program to ensure that all physical security systems under Requirements R4, R5, and R6 function properly.
R8.1	MEDIUM	N/A	N/A	N/A	N/A

R8.2	LOWER	N/A	N/A	N/A	N/A
R8.3	LOWER	N/A	N/A	N/A	N/A

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
1	May 2, 2006	Adopted by NERC Board of Trustees	
1	January 18, 2008	FERC Order issued approving CIP-006-1	
	February 12, 2008	Interpretation of R1 and Additional Compliance Information Section 1.4.4 adopted by NERC Board of Trustees	Project 2007-27
2		Updated version number from -1 to -2 Modifications to remove extraneous information from the requirements, improve readability, and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards.	Project 2008-06
2	May 6, 2009	Adopted by NERC Board of Trustees	
	August 5, 2009	Interpretation of R4 adopted by NERC Board of Trustees	Project 2008-15
2	September 30, 2009	FERC Order issued approving CIP-006-2	
3	November 18, 2009	Updated version number from -2 to -3 Revised Requirement 1.6 to add a Visitor Control program component to the Physical Security Plan, in response to FERC order issued September 30, 2009. In Requirement R7, the term "Responsible Entity" was capitalized. Updated Requirements R1.6.1 and R1.6.2 to be responsive to FERC Order RD09-7	Project 2009-21
3	December 16, 2009	Adopted by NERC Board of Trustees	
	February 16, 2010	Interpretation of R1 and R1.1 adopted by NERC Board of Trustees	Project 2009-13
3	March 31, 2010	FERC Order issued approving CIP-006-3	
2a/3a	July 15, 2010	FERC Order issued approving the Interpretation of R1 and R1.1. Updated version numbers from -2/-3 to -2a/-3a.	
4	January 24, 2011	Adopted by NERC Board of Trustees	
3c/4c	May 19, 2011	FERC Order issued approving two interpretations: 1) Interpretation of R1 and Additional Compliance	

		Information Section 1.4.4; and 2) Interpretation of R4. Updated version number from -3/-4 to -3c/-4c.	
4c	4/19/12	FERC Order issued approving CIP-006-4c (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

Appendix 1

Requirement Number and Text of Requirement
R1. Physical Security Plan — The Responsible Entity shall create and maintain a physical security plan, approved by a senior manager or delegate(s) that shall address, at a minimum, the following: R1.1. Processes to ensure and document that all Cyber Assets within an Electronic Security Perimeter also reside within an identified Physical Security Perimeter. Where a completely enclosed ("six-wall") border cannot be established, the Responsible Entity shall deploy and document alternative measures to control physical access to the Critical Cyber Assets.
Question
If a completely enclosed border cannot be created, what does the phrase, "to control physical access" require? Must the alternative measure be physical in nature? If so, must the physical barrier literally prevent physical access e.g. using concrete encased fiber, or can the alternative measure effectively mitigate the risks associated with physical access through cameras, motions sensors, or encryption? Does this requirement preclude the application of logical controls as an alternative measure in mitigating the risks of physical access to Critical Cyber Assets?
Response
For Electronic Security Perimeter wiring external to a Physical Security Perimeter, the drafting team interprets the Requirement R1.1 as not limited to measures that are "physical in nature." The alternative measures may be physical or logical, on the condition that they provide security equivalent or better to a completely enclosed ("six-wall") border. Alternative physical control measures may include, but are not limited to, multiple physical access control layers within a non-public, controlled space. Alternative logical control measures may include, but are not limited to, data encryption and/or circuit monitoring to detect unauthorized access or physical tampering.

Appendix 2

Interpretation of Requirement R1.1.

Request: *Are dial-up RTUs that use non-routable protocols and have dial-up access required to have a six-wall perimeters or are they exempted from CIP-006-1 and required to have only electronic security perimeters? This has a direct impact on how any identified RTUs will be physically secured.*

Interpretation:

Dial-up assets are Critical Cyber Assets, assuming they meet the criteria in CIP-002-1, and they must reside within an Electronic Security Perimeter. However, physical security control over a critical cyber asset is not required if that asset does not have a routable protocol. Since there is minimal risk of compromising other critical cyber assets dial-up devices such as Remote Terminals Units that do not use routable protocols are not required to be enclosed within a "six-wall" border.

CIP-006-1 — Requirement 1.1 requires a Responsible Entity to have a physical security plan that stipulate cyber assets that are within the Electronic Security Perimeter also be within a Physical Security Perimeter.

R1. Physical Security Plan — The Responsible Entity shall create and maintain a physical security plan, approved by a senior manager or delegate(s) that shall address, at a minimum, the following:

R1.1. Processes to ensure and document that all Cyber Assets within an Electronic Security Perimeter also reside within an identified Physical Security Perimeter. Where a completely enclosed ("six-wall") border cannot be established, the Responsible Entity shall deploy and document alternative measures to control physical access to the Critical Cyber Assets.

CIP-006-1 — Additional Compliance Information 1.4.4 identifies dial-up accessible assets that use non-routable protocols as a special class of cyber assets that are not subject to the Physical Security Perimeter requirement of this standard.

1.4. Additional Compliance Information

1.4.4 For dial-up accessible Critical Cyber Assets that use non-routable protocols, the Responsible Entity shall not be required to comply with Standard CIP-006 for that single access point at the dial-up device.

Appendix 3

The following interpretation of CIP-006-1a — Cyber Security — Physical Security of Critical Cyber Assets, Requirement R4 was developed by the standard drafting team assigned to Project 2008-14 (Cyber Security Violation Severity Levels) on October 23, 2008.

Request:

1. *For physical access control to cyber assets, does this include monitoring when an individual leaves the controlled access cyber area?*
2. *Does the term, "time of access" mean logging when the person entered the facility or does it mean logging the entry/exit time and "length" of time the person had access to the critical asset?*

Interpretation:

No, monitoring and logging of access are only required for ingress at this time. The term "time of access" refers to the time an authorized individual enters the physical security perimeter.

Requirement Number and Text of Requirement

R4. Logging Physical Access — Logging shall record sufficient information to uniquely identify individuals and the time of access twenty-four hours a day, seven days a week. The Responsible Entity shall implement and document the technical and procedural mechanisms for logging physical entry at all access points to the Physical Security Perimeter(s) using one or more of the following logging methods or their equivalent:

R4.1. Computerized Logging: Electronic logs produced by the Responsible Entity's selected access control and monitoring method.

R4.2. Video Recording: Electronic capture of video images of sufficient quality to determine identity.

R4.3. Manual Logging: A log book or sign-in sheet, or other record of physical access maintained by security or other personnel authorized to control and monitor physical access as specified in Requirement R2.3.

A. Introduction

1. Title: Cyber Security — Systems Security Management

2. Number: CIP-007-4

3. Purpose: Standard CIP-007-4 requires Responsible Entities to define methods, processes, and procedures for securing those systems determined to be Critical Cyber Assets, as well as the other (non-critical) Cyber Assets within the Electronic Security Perimeter(s). Standard CIP-007-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

4. Applicability:

4.1. Within the text of Standard CIP-007-4, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator.

4.1.2 Balancing Authority.

4.1.3 Interchange Authority.

4.1.4 Transmission Service Provider.

4.1.5 Transmission Owner.

4.1.6 Transmission Operator.

4.1.7 Generator Owner.

4.1.8 Generator Operator.

4.1.9 Load Serving Entity.

4.1.10 NERC.

4.1.11 Regional Entity.

4.2. The following are exempt from Standard CIP-007-4:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54

4.2.4 Responsible Entities that, in compliance with Standard CIP-002-4, identify that they have no Critical Cyber Assets.

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. Test Procedures — The Responsible Entity shall ensure that new Cyber Assets and significant changes to existing Cyber Assets within the Electronic Security Perimeter do not adversely affect existing cyber security controls. For purposes of Standard CIP-007-4, a significant change shall, at a minimum, include implementation of security patches, cumulative service packs, vendor releases, and version upgrades of operating systems, applications, database platforms, or other third-party software or firmware.

R1.1. The Responsible Entity shall create, implement, and maintain cyber security test procedures in a manner that minimizes adverse effects on the production system or its operation.

R1.2. The Responsible Entity shall document that testing is performed in a manner that reflects the production environment.

R1.3. The Responsible Entity shall document test results.

R2. Ports and Services — The Responsible Entity shall establish, document and implement a process to ensure that only those ports and services required for normal and emergency operations are enabled.

R2.1. The Responsible Entity shall enable only those ports and services required for normal and emergency operations.

R2.2. The Responsible Entity shall disable other ports and services, including those used for testing purposes, prior to production use of all Cyber Assets inside the Electronic Security Perimeter(s).

R2.3. In the case where unused ports and services cannot be disabled due to technical limitations, the Responsible Entity shall document compensating measure(s) applied to mitigate risk exposure.

R3. Security Patch Management — The Responsible Entity, either separately or as a component of the documented configuration management process specified in CIP-003-4 Requirement R6, shall establish, document and implement a security patch management program for tracking, evaluating, testing, and installing applicable cyber security software patches for all Cyber Assets within the Electronic Security Perimeter(s).

R3.1. The Responsible Entity shall document the assessment of security patches and security upgrades for applicability within thirty calendar days of availability of the patches or upgrades.

R3.2. The Responsible Entity shall document the implementation of security patches. In any case where the patch is not installed, the Responsible Entity shall document compensating measure(s) applied to mitigate risk exposure.

R4. Malicious Software Prevention — The Responsible Entity shall use anti-virus software and other malicious software ("malware") prevention tools, where technically feasible, to detect, prevent, deter, and mitigate the introduction, exposure, and propagation of malware on all Cyber Assets within the Electronic Security Perimeter(s).

R4.1. The Responsible Entity shall document and implement anti-virus and malware prevention tools. In the case where anti-virus software and malware prevention tools are not installed, the Responsible Entity shall document compensating measure(s) applied to mitigate risk exposure.

R4.2. The Responsible Entity shall document and implement a process for the update of anti-virus and malware prevention "signatures." The process must address testing and installing the signatures.

R5. Account Management — The Responsible Entity shall establish, implement, and document technical and procedural controls that enforce access authentication of, and accountability for, all user activity, and that minimize the risk of unauthorized system access.

R5.1. The Responsible Entity shall ensure that individual and shared system accounts and authorized access permissions are consistent with the concept of "need to know" with respect to work functions performed.

R5.1.1. The Responsible Entity shall ensure that user accounts are implemented as approved by designated personnel. Refer to Standard CIP-003-4 Requirement R5.

R5.1.2. The Responsible Entity shall establish methods, processes, and procedures that generate logs of sufficient detail to create historical audit trails of individual user account access activity for a minimum of ninety days.

R5.1.3. The Responsible Entity shall review, at least annually, user accounts to verify access privileges are in accordance with Standard CIP-003-4 Requirement R5 and Standard CIP-004-4 Requirement R4.

R5.2. The Responsible Entity shall implement a policy to minimize and manage the scope and acceptable use of administrator, shared, and other generic account privileges including factory default accounts.

R5.2.1. The policy shall include the removal, disabling, or renaming of such accounts where possible. For such accounts that must remain enabled, passwords shall be changed prior to putting any system into service.

R5.2.2. The Responsible Entity shall identify those individuals with access to shared accounts.

R5.2.3. Where such accounts must be shared, the Responsible Entity shall have a policy for managing the use of such accounts that limits access to only those with authorization, an audit trail of the account use (automated or manual), and steps for securing the account in the event of personnel changes (for example, change in assignment or termination).

R5.3. At a minimum, the Responsible Entity shall require and use passwords, subject to the following, as technically feasible:

R5.3.1. Each password shall be a minimum of six characters.

R5.3.2. Each password shall consist of a combination of alpha, numeric, and "special" characters.

R5.3.3. Each password shall be changed at least annually, or more frequently based on risk.

R6. Security Status Monitoring — The Responsible Entity shall ensure that all Cyber Assets within the Electronic Security Perimeter, as technically feasible, implement automated tools or organizational process controls to monitor system events that are related to cyber security.

R6.1. The Responsible Entity shall implement and document the organizational processes and technical and procedural mechanisms for monitoring for security events on all Cyber Assets within the Electronic Security Perimeter.

R6.2. The security monitoring controls shall issue automated or manual alerts for detected Cyber Security Incidents.

R6.3. The Responsible Entity shall maintain logs of system events related to cyber security, where technically feasible, to support incident response as required in Standard CIP-008-4.

R6.4. The Responsible Entity shall retain all logs specified in Requirement R6 for ninety calendar days.

R6.5. The Responsible Entity shall review logs of system events related to cyber security and maintain records documenting review of logs.

R7. Disposal or Redeployment — The Responsible Entity shall establish and implement formal methods, processes, and procedures for disposal or redeployment of Cyber Assets within the Electronic Security Perimeter(s) as identified and documented in Standard CIP-005-4.

R7.1. Prior to the disposal of such assets, the Responsible Entity shall destroy or erase the data storage media to prevent unauthorized retrieval of sensitive cyber security or reliability data.

R7.2. Prior to redeployment of such assets, the Responsible Entity shall, at a minimum, erase the data storage media to prevent unauthorized retrieval of sensitive cyber security or reliability data.

R7.3. The Responsible Entity shall maintain records that such assets were disposed of or redeployed in accordance with documented procedures.

R8. Cyber Vulnerability Assessment — The Responsible Entity shall perform a cyber vulnerability assessment of all Cyber Assets within the Electronic Security Perimeter at least annually. The vulnerability assessment shall include, at a minimum, the following:

R8.1. A document identifying the vulnerability assessment process;

R8.2. A review to verify that only ports and services required for operation of the Cyber Assets within the Electronic Security Perimeter are enabled;

R8.3. A review of controls for default accounts; and,

R8.4. Documentation of the results of the assessment, the action plan to remediate or mitigate vulnerabilities identified in the assessment, and the execution status of that action plan.

R9. Documentation Review and Maintenance — The Responsible Entity shall review and update the documentation specified in Standard CIP-007-4 at least annually. Changes resulting from modifications to the systems or controls shall be documented within thirty calendar days of the change being completed.

C. Measures

M1. The Responsible Entity shall make available documentation of its security test procedures as specified in Requirement R1.

M2. The Responsible Entity shall make available documentation as specified in Requirement R2.

M3. The Responsible Entity shall make available documentation and records of its security patch management program, as specified in Requirement R3.

M4. The Responsible Entity shall make available documentation and records of its malicious software prevention program as specified in Requirement R4.

M5. The Responsible Entity shall make available documentation and records of its account management program as specified in Requirement R5.

M6. The Responsible Entity shall make available documentation and records of its security status monitoring program as specified in Requirement R6.

M7. The Responsible Entity shall make available documentation and records of its program for the disposal or redeployment of Cyber Assets as specified in Requirement R7.

M8. The Responsible Entity shall make available documentation and records of its annual vulnerability assessment of all Cyber Assets within the Electronic Security Perimeters(s) as specified in Requirement R8.

M9. The Responsible Entity shall make available documentation and records demonstrating the review and update as specified in Requirement R9.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.2. The RE shall serve as the CEA with the following exceptions:

1.2.1 For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

1.2.2 For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

1.2.3 For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2.4 For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.3. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

1.4.1 The Responsible Entity shall keep all documentation and records from the previous full calendar year unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.4.2 The Responsible Entity shall retain security–related system event logs for ninety calendar days, unless longer retention is required pursuant to Standard CIP-008-4 Requirement R2.

1.4.3 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information.

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	MEDIUM	N/A	The Responsible Entity did create, implement and maintain the test procedures as required in R1.1, **but did not document** that testing is performed as required in R1.2. OR The Responsible Entity did not document the test results as required in R1.3.	The Responsible Entity did not create, implement and maintain the test procedures as required in R1.1.	The Responsible Entity did not create, implement and maintain the test procedures as required in R1.1, AND The Responsible Entity did not document that testing was performed as required in R1.2 AND The Responsible Entity did not document the test results as required in R1.3.
R1.1.	MEDIUM	N/A	N/A	N/A	N/A
R1.2.	LOWER	N/A	N/A	N/A	N/A
R1.3.	LOWER	N/A	N/A	N/A	N/A
R2.	MEDIUM	N/A	The Responsible Entity established (implemented) but did not document a process to ensure that only those ports and services required for normal and emergency operations are enabled.	The Responsible Entity documented but did not establish (implement) a process to ensure that only those ports and services required for normal and emergency operations are enabled.	The Responsible Entity did not establish (implement) nor document a process to ensure that only those ports and services required for normal and emergency operations are enabled.
R2.1.	MEDIUM	The Responsible Entity enabled ports and services not required for normal and emergency operations on at least one but less than 5% of the Cyber Assets inside the Electronic Security Perimeter(s).	The Responsible Entity enabled ports and services not required for normal and emergency operations on 5% or more but less than 10% of the Cyber Assets inside the Electronic Security Perimeter(s).	The Responsible Entity enabled ports and services not required for normal and emergency operations on 10% or more but less than 15% of the Cyber Assets inside the Electronic Security Perimeter(s).	The Responsible Entity enabled ports and services not required for normal and emergency operations on 15% or more of the Cyber Assets inside the Electronic Security Perimeter(s).
R2.2.	MEDIUM	The Responsible Entity did not disable other ports and services, including those used for	The Responsible Entity did not disable other ports and services, including those used for testing purposes, prior to production use	The Responsible Entity did not disable other ports and services, including those used for testing purposes, prior to production use for 10% or more but less than 15% of the Cyber Assets inside the Electronic Security Perimeter(s).	The Responsible Entity did not disable other ports and services, including those used for testing purposes, prior to production use for 15% or more of the Cyber Assets inside the Electronic Security Perimeter(s).

		testing purposes, prior to production use for at least one but less than 5% of the Cyber Assets inside the Electronic Security Perimeter(s).	for 5% or more but less than 10% of the Cyber Assets inside the Electronic Security Perimeter(s).		
R2.3.	MEDIUM	N/A	N/A	N/A	For cases where unused ports and services cannot be disabled due to technical limitations, the Responsible Entity did not document compensating measure(s) applied to mitigate risk exposure.
R3.	LOWER	The Responsible Entity established (implemented) and documented, either separately or as a component of the documented configuration management process specified in CIP-003-4 Requirement R6, a security patch management program **but** did not include one or more of the following: tracking, evaluating, testing, and installing applicable cyber security software patches for all Cyber Assets within the Electronic Security Perimeter(s).	The Responsible Entity established (implemented) but did not document, either separately or as a component of the documented configuration management process specified in CIP-003-4 Requirement R6, a security patch management program for tracking, evaluating, testing, and installing applicable cyber security software patches for all Cyber Assets within the Electronic Security Perimeter(s).	The Responsible Entity documented but did not establish (implement), either separately or as a component of the documented configuration management process specified in CIP-003-4 Requirement R6, a security patch management program for tracking, evaluating, testing, and installing applicable cyber security software patches for all Cyber Assets within the Electronic Security Perimeter(s).	The Responsible Entity did not establish (implement) nor document, either separately or as a component of the documented configuration management process specified in CIP-003-4 Requirement R6, a security patch management program for tracking, evaluating, testing, and installing applicable cyber security software patches for all Cyber Assets within the Electronic Security Perimeter(s).
R3.1.	LOWER	The Responsible Entity documented the assessment of security patches and security upgrades for applicability as required in Requirement R3 in more than 30 but less than 60 calendar days after the availability of the patches and upgrades.	The Responsible Entity documented the assessment of security patches and security upgrades for applicability as required in Requirement R3 in 60 or more but less than 90 calendar days after the availability of the patches and upgrades.	The Responsible Entity documented the assessment of security patches and security upgrades for applicability as required in Requirement R3 in 90 or more but less than 120 calendar days after the availability of the patches and upgrades.	The Responsible Entity documented the assessment of security patches and security upgrades for applicability as required in Requirement R3 in 120 calendar days or more after the availability of the patches and upgrades.

R3.2.	LOWER	N/A	N/A	N/A	The Responsible Entity did not document the implementation of applicable security patches as required in R3. OR Where an applicable patch was not installed, the Responsible Entity did not document the compensating measure(s) applied to mitigate risk exposure.
R4.	MEDIUM	The Responsible Entity, as technically feasible, did not use anti-virus software and other malicious software ("malware") prevention tools, nor implemented compensating measures, on at least one but less than 5% of Cyber Assets within the Electronic Security Perimeter(s).	The Responsible Entity, as technically feasible, did not use anti-virus software and other malicious software ("malware") prevention tools, nor implemented compensating measures, on at least 5% but less than 10% of Cyber Assets within the Electronic Security Perimeter(s).	The Responsible Entity, as technically feasible, did not use anti-virus software and other malicious software ("malware") prevention tools, nor implemented compensating measures, on at least 10% but less than 15% of Cyber Assets within the Electronic Security Perimeter(s).	The Responsible Entity, as technically feasible, did not use anti-virus software and other malicious software ("malware") prevention tools, nor implemented compensating measures, on 15% or more Cyber Assets within the Electronic Security Perimeter(s).
R4.1.	MEDIUM	N/A	N/A	N/A	The Responsible Entity did not document the implementation of antivirus and malware prevention tools for cyber assets within the electronic security perimeter. OR The Responsible Entity did not document the implementation of compensating measure(s) applied to mitigate risk exposure where antivirus and malware prevention tools are not installed.
R4.2.	MEDIUM	The Responsible Entity, as technically feasible, documented and implemented a process for the update of anti-virus and malware prevention "signatures.", but the process did not address testing and installation of the signatures.	The Responsible Entity, as technically feasible, did not document but implemented a process, including addressing testing and installing the signatures, for the update of anti-virus and malware prevention "signatures."	The Responsible Entity, as technically feasible, documented but did not implement a process, including addressing testing and installing the signatures, for the update of anti-virus and malware prevention "signatures."	The Responsible Entity, as technically feasible, did not document nor implement a process including addressing testing and installing the signatures for the update of anti-virus and malware prevention "signatures."
R5.	LOWER	N/A	The Responsible Entity implemented but did not document technical and procedural controls that enforce access authentication of, and accountability for, all user activity.	The Responsible Entity documented but did not implement technical and procedural controls that enforce access authentication of, and accountability for, all user activity.	The Responsible Entity did not document nor implement technical and procedural controls that enforce access authentication of, and accountability for, all user activity.

R5.1.	MEDIUM	N/A	N/A	N/A	The Responsible Entity did not ensure that individual and shared system accounts and authorized access permissions are consistent with the concept of "need to know" with respect to work functions performed.
R5.1.1.	LOWER	At least one user account but less than 1% of user accounts implemented by the Responsible Entity, were not approved by designated personnel.	One (1) % or more of user accounts but less than 3% of user accounts implemented by the Responsible Entity were not approved by designated personnel.	Three (3) % or more of user accounts but less than 5% of user accounts implemented by the Responsible Entity were not approved by designated personnel.	Five (5) % or more of user accounts implemented by the Responsible Entity were not approved by designated personnel.
R5.1.2.	LOWER	N/A	The Responsible Entity generated logs with sufficient detail to create historical audit trails of individual user account access activity, however the logs do not contain activity for a minimum of 90 days.	The Responsible Entity generated logs with insufficient detail to create historical audit trails of individual user account access activity.	The Responsible Entity did not generate logs of individual user account access activity.
R5.1.3.	MEDIUM	N/A	N/A	N/A	The Responsible Entity did not review, at least annually, user accounts to verify access privileges are in accordance with Standard CIP-003-4 Requirement R5 and Standard CIP-004-4 Requirement R4.
R5.2.	LOWER	N/A	N/A	N/A	The Responsible Entity did not implement a policy to minimize and manage the scope and acceptable use of administrator, shared, and other generic account privileges including factory default accounts.
R5.2.1.	MEDIUM	N/A	N/A	The Responsible Entity's policy did not include the removal, disabling, or renaming of such accounts where possible, however for accounts that must remain enabled, passwords were changed prior to putting any system into service.	For accounts that must remain enabled, the Responsible Entity did not change passwords prior to putting any system into service.
R5.2.2.	LOWER	N/A	N/A	N/A	The Responsible Entity did not identify all individuals with access to shared accounts.
R5.2.3.	MEDIUM	N/A	Where such accounts must be shared, the Responsible Entity has a policy for managing the use of such accounts, but is missing 1 of the following 3 items: a) limits access to only those with authorization, b) has an audit trail of the account use (automated or	Where such accounts must be shared, the Responsible Entity has a policy for managing the use of such accounts, but is missing 2 of the following 3 items: a) limits access to only those with authorization, b) has an audit trail of the account use (automated or manual), c) has specified steps for securing the account in the event of personnel changes (for example, change in assignment or termination).	Where such accounts must be shared, the Responsible Entity does not have a policy for managing the use of such accounts that limits access to only those with authorization, an audit trail of the account use (automated or manual), and steps for securing the account in the event of personnel changes (for example, change in assignment or termination).

			manual), c) has specified steps for securing the account in the event of personnel changes (for example, change in assignment or termination).		
R5.3.	LOWER	The Responsible Entity requires and uses passwords as technically feasible, but only addresses 2 of the requirements in R5.3.1, R5.3.2., R5.3.3.	The Responsible Entity requires and uses passwords as technically feasible but only addresses 1 of the requirements in R5.3.1, R5.3.2., R5.3.3.	The Responsible Entity requires but does not use passwords as required in R5.3.1, R5.3.2., R5.3.3 and did not demonstrate why it is not technically feasible.	The Responsible Entity does not require nor use passwords as required in R5.3.1, R5.3.2., R5.3.3 and did not demonstrate why it is not technically feasible.
R5.3.1.	LOWER	N/A	N/A	N/A	N/A
R5.3.2.	LOWER	N/A	N/A	N/A	N/A
R5.3.3.	MEDIUM	N/A	N/A	N/A	N/A
R6.	LOWER	The Responsible Entity, as technically feasible, did not implement automated tools or organizational process controls to monitor system events that are related to cyber security for at least one but less than 5% of Cyber Assets inside the Electronic Security Perimeter(s).	The Responsible Entity, as technically feasible, did not implement automated tools or organizational process controls to monitor system events that are related to cyber security for 5% or more but less than 10% of Cyber Assets inside the Electronic Security Perimeter(s).	The Responsible Entity did not implement automated tools or organizational process controls, as technically feasible, to monitor system events that are related to cyber security for 10% or more but less than 15% of Cyber Assets inside the Electronic Security Perimeter(s).	The Responsible Entity did not implement automated tools or organizational process controls, as technically feasible, to monitor system events that are related to cyber security for 15% or more of Cyber Assets inside the Electronic Security Perimeter(s).
R6.1.	MEDIUM	N/A	The Responsible Entity implemented but did not document the organizational processes and technical and procedural mechanisms for monitoring for security events on all Cyber Assets within the Electronic Security Perimeter.	The Responsible Entity documented but did not implement the organizational processes and technical and procedural mechanisms for monitoring for security events on all Cyber Assets within the Electronic Security Perimeter.	The Responsible Entity did not implement nor document the organizational processes and technical and procedural mechanisms for monitoring for security events on all Cyber Assets within the Electronic Security Perimeter.

R6.2.	MEDIUM	N/A	N/A	N/A	The Responsible entity's security monitoring controls do not issue automated or manual alerts for detected Cyber Security Incidents.
R6.3.	MEDIUM	N/A	N/A	N/A	The Responsible Entity did not maintain logs of system events related to cyber security, where technically feasible, to support incident response as required in Standard CIP-008-4.
R6.4.	LOWER	The Responsible Entity retained the logs specified in Requirement R6, for at least 60 days, but less than 90 days.	The Responsible Entity retained the logs specified in Requirement R6, for at least 30 days, but less than 60 days.	The Responsible Entity retained the logs specified in Requirement R6, for at least one day, but less than 30 days.	The Responsible Entity did not retain any logs specified in Requirement R6.
R6.5.	LOWER	N/A	N/A	N/A	The Responsible Entity did not review logs of system events related to cyber security nor maintain records documenting review of logs.
R7.	LOWER	The Responsible Entity established and implemented formal methods, processes, and procedures for disposal and redeployment of Cyber Assets within the Electronic Security Perimeter(s) as identified and documented in Standard CIP- 005-4 **but** did not maintain records as specified in R7.3.	The Responsible Entity established and implemented formal methods, processes, and procedures for disposal of Cyber Assets within the Electronic Security Perimeter(s) as identified and documented in Standard CIP-005-4 **but** did not address redeployment as specified in R7.2.	The Responsible Entity established and implemented formal methods, processes, and procedures for redeployment of Cyber Assets within the Electronic Security Perimeter(s) as identified and documented in Standard CIP-005-4 **but** did not address disposal as specified in R7.1.	The Responsible Entity did not establish or implement formal methods, processes, and procedures for disposal or redeployment of Cyber Assets within the Electronic Security Perimeter(s) as identified and documented in Standard CIP-005-4.
R7.1.	LOWER	N/A	N/A	N/A	N/A
R7.2.	LOWER	N/A	N/A	N/A	N/A
R7.3.	LOWER	N/A	N/A	N/A	N/A

R8	LOWER	The Responsible Entity performed at least annually a Vulnerability Assessment that included 95% or more but less than 100% of Cyber Assets within the Electronic Security Perimeter.	The Responsible Entity performed at least annually a Vulnerability Assessment that included 90% or more but less than 95% of Cyber Assets within the Electronic Security Perimeter.	The Responsible Entity performed at least annually a Vulnerability Assessment that included more than 85% but less than 90% of Cyber Assets within the Electronic Security Perimeter.	The Responsible Entity performed at least annually a Vulnerability Assessment for 85% or less of Cyber Assets within the Electronic Security Perimeter. OR The vulnerability assessment did not include one (1) or more of the subrequirements 8.1, 8.2, 8.3, 8.4.
R8.1.	LOWER	N/A	N/A	N/A	N/A
R8.2.	MEDIUM	N/A	N/A	N/A	N/A
R8.3.	MEDIUM	N/A	N/A	N/A	N/A
R8.4.	MEDIUM	N/A	N/A	N/A	N/A
R9	LOWER	N/A	N/A	The Responsible Entity did not review and update the documentation specified in Standard CIP-007-4 at least annually. OR The Responsible Entity did not document changes resulting from modifications to the systems or controls within thirty calendar days of the change being completed.	The Responsible Entity did not review and update the documentation specified in Standard CIP-007-4 at least annually **nor** were changes resulting from modifications to the systems or controls documented within thirty calendar days of the change being completed.

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
2		Modifications to clarify the requirements and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards. Removal of reasonable business judgment and acceptance of risk. Revised the Purpose of this standard to clarify that Standard CIP-007-2 requires Responsible Entities to define methods, processes, and procedures for securing Cyber Assets and other (non-Critical) Assets within an Electronic Security Perimeter. Replaced the RRO with the RE as a responsible entity. Rewording of Effective Date. R9 changed ninety (90) days to thirty (30) days Changed compliance monitor to Compliance Enforcement Authority.	
3		Updated version numbers from -2 to -3	
3	12/16/09	Approved by the NERC Board of Trustees	
4	Board approved 01/24/2011	Update version number from “3” to “4”	Update to conform to changes to CIP-002-4 (Project 2008-06)
4	4/19/12	FERC Order issued approving CIP-007-4 (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

A. Introduction

1. Title: Cyber Security — Incident Reporting and Response Planning

2. Number: CIP-008-4

3. Purpose: Standard CIP-008-4 ensures the identification, classification, response, and reporting of Cyber Security Incidents related to Critical Cyber Assets. Standard CIP-008-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

4. Applicability

4.1. Within the text of Standard CIP-008-4, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator.

4.1.2 Balancing Authority.

4.1.3 Interchange Authority.

4.1.4 Transmission Service Provider.

4.1.5 Transmission Owner.

4.1.6 Transmission Operator.

4.1.7 Generator Owner.

4.1.8 Generator Operator.

4.1.9 Load Serving Entity.

4.1.10 NERC.

4.1.11 Regional Entity.

4.2. The following are exempt from Standard CIP-008-4:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54

4.2.4 Responsible Entities that, in compliance with Standard CIP-002-4, identify that they have no Critical Cyber Assets.

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. Cyber Security Incident Response Plan — The Responsible Entity shall develop and maintain a Cyber Security Incident response plan and implement the plan in response to Cyber Security Incidents. The Cyber Security Incident response plan shall address, at a minimum, the following:

R1.1. Procedures to characterize and classify events as reportable Cyber Security Incidents.

R1.2. Response actions, including roles and responsibilities of Cyber Security Incident response teams, Cyber Security Incident handling procedures, and communication plans.

R1.3. Process for reporting Cyber Security Incidents to the Electricity Sector Information Sharing and Analysis Center (ES-ISAC). The Responsible Entity must ensure that all reportable Cyber Security Incidents are reported to the ES-ISAC either directly or through an intermediary.

R1.4. Process for updating the Cyber Security Incident response plan within thirty calendar days of any changes.

R1.5. Process for ensuring that the Cyber Security Incident response plan is reviewed at least annually.

R1.6. Process for ensuring the Cyber Security Incident response plan is tested at least annually. A test of the Cyber Security Incident response plan can range from a paper drill, to a full operational exercise, to the response to an actual incident.

R2. Cyber Security Incident Documentation — The Responsible Entity shall keep relevant documentation related to Cyber Security Incidents reportable per Requirement R1.1 for three calendar years.

C. Measures

M1. The Responsible Entity shall make available its Cyber Security Incident response plan as indicated in Requirement R1 and documentation of the review, updating, and testing of the plan.

M2. The Responsible Entity shall make available all documentation as specified in Requirement R2.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.2. The RE shall serve as the CEA with the following exceptions:

1.2.1 For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

1.2.2 For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

1.2.3 For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2.4 For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.3. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

1.4.1 The Responsible Entity shall keep documentation other than that required for reportable Cyber Security Incidents as specified in Standard CIP-008-4 for the previous full calendar year unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.4.2 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

1.5.1 The Responsible Entity may not take exception in its cyber security policies to the creation of a Cyber Security Incident response plan.

1.5.2 The Responsible Entity may not take exception in its cyber security policies to reporting Cyber Security Incidents to the ES ISAC.

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	LOWER	N/A	The Responsible Entity has developed but not maintained a Cyber Security Incident response plan.	The Responsible Entity has developed a Cyber Security Incident response plan but the plan does not address one or more of the subrequirements R1.1 through R1.6.	The Responsible Entity has not developed a Cyber Security Incident response plan or has not implemented the plan in response to a Cyber Security Incident.
R1.1.	LOWER	N/A	N/A	N/A	N/A
R1.2.	LOWER	N/A	N/A	N/A	N/A
R1.3.	LOWER	N/A	N/A	N/A	N/A
R1.4.	LOWER	N/A	N/A	N/A	N/A
R1.5.	LOWER	N/A	N/A	N/A	N/A
R1.6.	LOWER	N/A	N/A	N/A	N/A
R2	LOWER	The Responsible Entity has kept relevant documentation related to Cyber Security Incidents reportable per Requirement R1.1 for two but less than three calendar years.	The Responsible Entity has kept relevant documentation related to Cyber Security Incidents reportable per Requirement R1.1 for less than two calendar years.	The Responsible Entity has kept relevant documentation related to Cyber Security Incidents reportable per Requirement R1.1 for less than one calendar year.	The Responsible Entity has not kept relevant documentation related to Cyber Security Incidents reportable per Requirement R1.1.

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
2		Modifications to clarify the requirements and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards. Removal of reasonable business judgment. Replaced the RRO with the RE as a responsible entity. Rewording of Effective Date. Changed compliance monitor to Compliance Enforcement Authority.	
3		Updated Version number from -2 to -3 In Requirement 1.6, deleted the sentence pertaining to removing component or system from service in order to perform testing, in response to FERC order issued September 30, 2009.	
3	12/16/09	Approved by NERC Board of Trustees	Update
4	Board approved 01/24/2011	Update version number from “3” to “4”	Update to conform to changes to CIP-002-4 (Project 2008-06)
4	4/19/12	FERC Order issued approving CIP-008-4 (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

A. Introduction

1. Title: Cyber Security — Recovery Plans for Critical Cyber Assets

2. Number: CIP-009-4

3. Purpose: Standard CIP-009-4 ensures that recovery plan(s) are put in place for Critical Cyber Assets and that these plans follow established business continuity and disaster recovery techniques and practices. Standard CIP-009-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

4. Applicability:

4.1. Within the text of Standard CIP-009-3, "Responsible Entity" shall mean:

4.1.1 Reliability Coordinator

4.1.2 Balancing Authority

4.1.3 Interchange Authority

4.1.4 Transmission Service Provider

4.1.5 Transmission Owner

4.1.6 Transmission Operator

4.1.7 Generator Owner

4.1.8 Generator Operator

4.1.9 Load Serving Entity

4.1.10 NERC

4.1.11 Regional Entity

4.2. The following are exempt from Standard CIP-009-4:

4.2.1 Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.2 Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.

4.2.3 In nuclear plants, the systems, structures, and components that are regulated by the Nuclear Regulatory Commission under a cyber security plan pursuant to 10 C.F. R. Section 73.54

4.2.4 Responsible Entities that, in compliance with Standard CIP-002-4, identify that they have no Critical Cyber Assets.

5. Effective Date: The first day of the eighth calendar quarter after applicable regulatory approvals have been received (or the Reliability Standard otherwise becomes effective the first day of the ninth calendar quarter after BOT adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. Recovery Plans — The Responsible Entity shall create and annually review recovery plan(s) for Critical Cyber Assets. The recovery plan(s) shall address at a minimum the following:

R1.1. Specify the required actions in response to events or conditions of varying duration and severity that would activate the recovery plan(s).

R1.2. Define the roles and responsibilities of responders.

R2. Exercises — The recovery plan(s) shall be exercised at least annually. An exercise of the recovery plan(s) can range from a paper drill, to a full operational exercise, to recovery from an actual incident.

R3. Change Control — Recovery plan(s) shall be updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident. Updates shall be communicated to personnel responsible for the activation and implementation of the recovery plan(s) within thirty calendar days of the change being completed.

R4. Backup and Restore — The recovery plan(s) shall include processes and procedures for the backup and storage of information required to successfully restore Critical Cyber Assets. For example, backups may include spare electronic components or equipment, written documentation of configuration settings, tape backup, etc.

R5. Testing Backup Media — Information essential to recovery that is stored on backup media shall be tested at least annually to ensure that the information is available. Testing can be completed off site.

C. Measures

M1. The Responsible Entity shall make available its recovery plan(s) as specified in Requirement R1.

M2. The Responsible Entity shall make available its records documenting required exercises as specified in Requirement R2.

M3. The Responsible Entity shall make available its documentation of changes to the recovery plan(s), and documentation of all communications, as specified in Requirement R3.

M4. The Responsible Entity shall make available its documentation regarding backup and storage of information as specified in Requirement R4.

M5. The Responsible Entity shall make available its documentation of testing of backup media as specified in Requirement R5.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

1.2. The RE shall serve as the CEA with the following exceptions:

1.2.1 For entities that do not work for the Regional Entity, the Regional Entity shall serve as the Compliance Enforcement Authority.

1.2.2 For Reliability Coordinators and other functional entities that work for their Regional Entity, the ERO shall serve as the Compliance Enforcement Authority.

1.2.3 For Responsible Entities that are also Regional Entities, the ERO or a Regional Entity approved by the ERO and FERC or other applicable governmental authorities shall serve as the Compliance Enforcement Authority.

1.2.4 For the ERO, a third-party monitor without vested interest in the outcome for the ERO shall serve as the Compliance Enforcement Authority.

1.3. Compliance Monitoring and Enforcement Processes

Compliance Audits

Self-Certifications

Spot Checking

Compliance Violation Investigations

Self-Reporting

Complaints

1.4. Data Retention

1.4.1 The Responsible Entity shall keep documentation required by Standard CIP-009-4 from the previous full calendar year unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation.

1.4.2 The Compliance Enforcement Authority in conjunction with the Registered Entity shall keep the last audit records and all requested and submitted subsequent audit records.

1.5. Additional Compliance Information

2. Violation Severity Levels

Requirement	VRF	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	MEDIUM	N/A	The Responsible Entity has not annually reviewed recovery plan(s) for Critical Cyber Assets.	The Responsible Entity has created recovery plan(s) for Critical Cyber Assets but did not address one of the requirements CIP-009-4 R1.1 **or** R1.2.	The Responsible Entity has not created recovery plan(s) for Critical Cyber Assets that address at a minimum both requirements CIP-009-4 R1.1 **and** R1.2.
R1.1.	MEDIUM	N/A	N/A	N/A	N/A
R1.2.	MEDIUM	N/A	N/A	N/A	N/A
R2	LOWER	N/A	N/A	N/A	The Responsible Entity's recovery plan(s) have not been exercised at least annually.
R3	LOWER	The Responsible Entity's recovery plan(s) have been updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident but the updates were communicated to personnel responsible for the activation and implementation of the recovery plan(s) in more than 30 but less than or equal to 120 calendar days of the change.	The Responsible Entity's recovery plan(s) have been updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident but the updates were communicated to personnel responsible for the activation and implementation of the recovery plan(s) in more than 120 but less than or equal to 150 calendar days of the change.	The Responsible Entity's recovery plan(s) have been updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident but the updates were communicated to personnel responsible for the activation and implementation of the recovery plan(s) in more than 150 but less than or equal to 180 calendar days of the change.	The Responsible Entity's recovery plan(s) have not been updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident. OR The Responsible Entity's recovery plan(s) have been updated to reflect any changes or lessons learned as a result of an exercise or the recovery from an actual incident but the updates were communicated to personnel responsible for the activation and implementation of the recovery plan(s) in more than 180 calendar days of the change.
R4	LOWER	N/A	N/A	N/A	The Responsible Entity's recovery plan(s) do not include processes and procedures for the backup and storage of information required to successfully restore Critical Cyber Assets.
R5	LOWER	N/A	N/A	N/A	The Responsible Entity's information essential to recovery that is stored on backup media has not been tested at least annually to ensure that the information is available.

E. Regional Variances

None identified.

Version History

Version	Date	Action	Change Tracking
2		Modifications to clarify the requirements and to bring the compliance elements into conformance with the latest guidelines for developing compliance elements of standards. Removal of reasonable business judgment. Replaced the RRO with the RE as a responsible entity. Rewording of Effective Date. Communication of revisions to the recovery plan changed from 90 days to 30 days. Changed compliance monitor to Compliance Enforcement Authority.	
3		Updated version numbers from -2 to -3	
3	12/16/09	Approved by the NERC Board of Trustees	Update
4	Board approved 01/24/2011	Update version number from “3” to “4”	Update to conform to changes to CIP-002-4 (Project 2008-06)
4	4/19/12	FERC Order issued approving CIP-009-4 (approval becomes effective June 25, 2012) Added approved VRF/VSL table to section D.2.	

A. Introduction

1. Title: **Load Shedding Plans**

2. Number: EOP-003-2

3. Purpose: A Balancing Authority and Transmission Operator operating with insufficient generation or transmission capacity must have the capability and authority to shed load rather than risk an uncontrolled failure of the Interconnection.

4. Applicability:

4.1. Transmission Operators.

4.2. Balancing Authorities.

5. Effective Date: One year following the first day of the first calendar quarter after applicable regulatory approvals (or the standard otherwise becomes effective the first day of the first calendar quarter after NERC Board of Trustees adoption in those jurisdictions where regulatory approval is not required).

B. Requirements

R1. After taking all other remedial steps, a Transmission Operator or Balancing Authority operating with insufficient generation or transmission capacity shall shed customer load rather than risk an uncontrolled failure of components or cascading outages of the Interconnection. *[Violation Risk Factor: High]*

R2. Each Transmission Operator shall establish plans for automatic load shedding for undervoltage conditions if the Transmission Operator or its associated Transmission Planner(s) or Planning Coordinator(s) determine that an under-voltage load shedding scheme is required. *[Violation Risk Factor: High]*

R3. Each Transmission Operator and Balancing Authority shall coordinate load shedding plans, excluding automatic under-frequency load shedding plans, among other interconnected Transmission Operators and Balancing Authorities. *[Violation Risk Factor: High]*

R4. A Transmission Operator shall consider one or more of these factors in designing an automatic under voltage load shedding scheme: voltage level, rate of voltage decay, or power flow levels. *[Violation Risk Factor: High]*

R5. A Transmission Operator or Balancing Authority shall implement load shedding, excluding automatic under-frequency load shedding, in steps established to minimize the risk of further uncontrolled separation, loss of generation, or system shutdown. *[Violation Risk Factor: High]*

R6. After a Transmission Operator or Balancing Authority Area separates from the Interconnection, if there is insufficient generating capacity to restore system frequency following automatic underfrequency load shedding, the Transmission Operator or Balancing Authority shall shed additional load. *[Violation Risk Factor: High]*

R7. The Transmission Operator shall coordinate automatic undervoltage load shedding throughout their areas with tripping of shunt capacitors, and other automatic actions that will occur under abnormal voltage, or power flow conditions. *[Violation Risk Factor: High]*

R8. Each Transmission Operator or Balancing Authority shall have plans for operator controlled manual load shedding to respond to real-time emergencies. The Transmission Operator or

Balancing Authority shall be capable of implementing the load shedding in a timeframe adequate for responding to the emergency. *[Violation Risk Factor: High]*

C. Measures

M1. Each Transmission Operator that has or directs the deployment of undervoltage load shedding facilities, shall have and provide upon request, its automatic load shedding plans. (Requirement 2)

M2. Each Transmission Operator and Balancing Authority shall have and provide upon request its manual load shedding plans that will be used to confirm that it meets Requirement 8. (Part 1)

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Monitoring Responsibility

Regional Reliability Organizations shall be responsible for compliance monitoring.

1.2. Compliance Monitoring

One or more of the following methods will be used to assess compliance:

- Self-certification (Conducted annually with submission according to schedule.)
- Spot Check Audits (Conducted anytime with up to 30 days notice given to prepare.)
- Periodic Audit (Conducted once every three years according to schedule.)
- Triggered Investigations (Notification of an investigation must be made within 60 days of an event or complaint of noncompliance. The entity will have up to 30 days to prepare for the investigation. An entity may request an extension of the preparation period and the extension will be considered by the Compliance Monitor on a case-by-case basis.)

1.3. Additional Reporting Requirement

No additional reporting required.

1.4. Data Retention

Each Balancing Authority and Transmission Operator shall have its current, in-force load shedding plans.

If an entity is found non-compliant the entity shall keep information related to the noncompliance until found compliant or for two years plus the current year, whichever is longer.

Evidence used as part of a triggered investigation shall be retained by the entity being investigated for one year from the date that the investigation is closed, as determined by the Compliance Monitor.

The Compliance Monitor shall keep the last periodic audit report and all requested and submitted subsequent compliance records.

1.5. Additional Compliance Information

None

2. Violation Severity Levels

R#	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	N/A	N/A	N/A	The Transmission Operator or Balancing Authority failed to shed customer load.
R2	N/A	N/A	N/A	The Transmission Operator did not establish plans for automatic load shedding for undervoltage conditions as directed by the requirement.
R3.	The responsible entity did not coordinate load shedding plans, as directed by the requirement, affecting 5% or less of its required entities.	The responsible entity did not coordinate load shedding plans, as directed by the requirement, affecting more than 5% up to (and including) 10% of its required entities.	The responsible entity did not coordinate load shedding plans, as directed by the requirement, affecting more than 10%, up to (and including) 15% or less, of its required entities.	The responsible entity did not coordinate load shedding plans, as directed by the requirement, affecting more than 15% of its required entities.
R4.	N/A	N/A	N/A	The Transmission Operator failed to consider at least one of the three elements voltage level, rate of voltage decay, or power flow levels) listed in the requirement.
R5.	N/A	N/A	N/A	The Transmission Operator or Balancing Authority failed to implement load shedding in steps established to minimize the risk of further uncontrolled separation, loss of generation, or system shutdown.

R#	Lower VSL	Moderate VSL	High VSL	Severe VSL
R6.	N/A	N/A	N/A	The Transmission Operator or Balancing Authority failed to shed additional load after it had separated from the Interconnection when there was insufficient generating capacity to restore system frequency following automatic underfrequency load shedding.
R7.	The Transmission Operator did not coordinate automatic undervoltage load shedding with 5% or less of the types of automatic actions described in the Requirement.	The Transmission Operator did not coordinate automatic undervoltage load shedding with more than 5% up to (and including) 10% of the types of automatic actions described in the Requirement.	The Transmission Operator did not coordinate automatic undervoltage load shedding with more than 10% up to (and including) 15% of the types of automatic actions described in the Requirement.	The Transmission Operator did not coordinate automatic undervoltage load shedding with more than 15% of the types of automatic actions described in the Requirement.
R8.	N/A	The responsible entity did not have plans for operator controlled manual load shedding, as directed by the requirement.	The responsible entity has plans for manual load shedding but did not have the capability to implement the load shedding, as directed by the requirement.	The responsible entity did not have plans for operator controlled manual load shedding, as directed by the requirement nor had the capability to implement the load shedding, as directed by the requirement.

E. Regional Differences

None identified.

Version History

Version	Date	Action	Change Tracking
0	April 1, 2005	Effective Date	New
0	August 8, 2005	Removed "Proposed" from Effective Date	Errata
1	November 1, 2006	Adopted by Board of Trustees	Revised
2	November 4, 2010	Adopted by Board of Trustees; Modified R4, R5, R6 and associated VSLs for R2, R4, and R7 to clarify that the requirements don't apply to automatic underfrequency load shedding.	Revised to eliminate redundancies with PRC-006-1
2	May 7, 2012	FERC Order issued approving EOP-003-2 (approval becomes effective July 10, 2012)	

A. Introduction

1. Title: **Automatic Underfrequency Load Shedding**

2. Number: PRC-006-1

3. Purpose: To establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency, assist recovery of frequency following underfrequency events and provide last resort system preservation measures.

4. Applicability:

4.1. Planning Coordinators

4.2. UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:

4.2.1 Transmission Owners

4.2.2 Distribution Providers

4.3 Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.

5. (Proposed) Effective Date:

5.1. The standard, with the exception of Requirement R4, Parts 4.1 through 4.6, is effective the first day of the first calendar quarter one year after applicable regulatory approvals.

5.2. Parts 4.1 through 4.6 of Requirement R4 shall become effective and enforceable one year following the receipt of generation data as required in PRC-024-1, but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approvals of PRC-006-1.

B. Requirements

R1. Each Planning Coordinator shall develop and document criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES), including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

R2. Each Planning Coordinator shall identify one or more islands to serve as a basis for designing its UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

2.1. Those islands selected by applying the criteria in Requirement R1, and

2.2. Any portions of the BES designed to detach from the Interconnection (planned islands) as a result of the operation of a relay scheme or Special Protection System, and

2.3. A single island that includes all portions of the BES in either the Regional Entity area or the Interconnection in which the Planning Coordinator's area resides. If a Planning Coordinator's area resides in multiple Regional Entity areas, each of those Regional Entity areas shall be identified as an island. Planning Coordinators may adjust island boundaries to differ from Regional Entity area boundaries by mutual consent where necessary for the sole purpose of producing contiguous regional islands more suitable for simulation.

R3. Each Planning Coordinator shall develop a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

3.1. Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

3.2. Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

3.3. Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall not exceed 1.10 per unit for longer than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with each of the following:

3.3.1. Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

3.3.2. Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

3.3.3. Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

R4. Each Planning Coordinator shall conduct and document a UFLS design assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*

4.1. Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

4.2. Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

4.3. Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

4.4. Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

4.5. Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

4.6. Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

4.7. Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

R5. Each Planning Coordinator, whose area or portions of whose area is part of an island identified by it or another Planning Coordinator which includes multiple Planning Coordinator areas or portions of those areas, shall coordinate its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island through one of the following: *[VRF: Medium][Time Horizon: Long-term Planning]*

- Develop a common UFLS program design and schedule for implementation per Requirement R3 among the Planning Coordinators whose areas or portions of whose areas are part of the same identified island, or
- Conduct a joint UFLS design assessment per Requirement R4 among the Planning Coordinators whose areas or portions of whose areas are part of the same identified island, or
- Conduct an independent UFLS design assessment per Requirement R4 for the identified island, and in the event the UFLS design assessment fails to meet Requirement R3, identify modifications to the UFLS program(s) to meet

Requirement R3 and report these modifications as recommendations to the other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island and the ERO.

R6. Each Planning Coordinator shall maintain a UFLS database containing data necessary to model its UFLS program for use in event analyses and assessments of the UFLS program at least once each calendar year, with no more than 15 months between maintenance activities. *[VRF: Lower][Time Horizon: Long-term Planning]*

R7. Each Planning Coordinator shall provide its UFLS database containing data necessary to model its UFLS program to other Planning Coordinators within its Interconnection within 30 calendar days of a request. *[VRF: Lower][Time Horizon: Long-term Planning]*

R8. Each UFLS entity shall provide data to its Planning Coordinator(s) according to the format and schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database. *[VRF: Lower][Time Horizon: Long-term Planning]*

R9. Each UFLS entity shall provide automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by its Planning Coordinator(s) in each Planning Coordinator area in which it owns assets. *[VRF: High][Time Horizon: Long-term Planning]*

R10. Each Transmission Owner shall provide automatic switching of its existing capacitor banks, Transmission Lines, and reactors to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission. *[VRF: High][Time Horizon: Long-term Planning]*

R11. Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall conduct and document an assessment of the event within one year of event actuation to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

11.1. The performance of the UFLS equipment,

11.2. The effectiveness of the UFLS program.

R12. Each Planning Coordinator, in whose islanding event assessment (per R11) UFLS program deficiencies are identified, shall conduct and document a UFLS design assessment to consider the identified deficiencies within two years of event actuation. *[VRF: Medium][Time Horizon: Operations Assessment]*

R13. Each Planning Coordinator, in whose area a BES islanding event occurred that also included the area(s) or portions of area(s) of other Planning Coordinator(s) in the same islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, shall coordinate its event assessment (in accordance

with Requirement R11) with all other Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event through one of the following: *[VRF: Medium][Time Horizon: Operations Assessment]*

- Conduct a joint event assessment per Requirement R11 among the Planning Coordinators whose areas or portions of whose areas were included in the same islanding event, or
- Conduct an independent event assessment per Requirement R11 that reaches conclusions and recommendations consistent with those of the event assessments of the other Planning Coordinators whose areas or portions of whose areas were included in the same islanding event, or
- Conduct an independent event assessment per Requirement R11 and where the assessment fails to reach conclusions and recommendations consistent with those of the event assessments of the other Planning Coordinators whose areas or portions of whose areas were included in the same islanding event, identify differences in the assessments that likely resulted in the differences in the conclusions and recommendations and report these differences to the other Planning Coordinators whose areas or portions of whose areas were included in the same islanding event and the ERO.

R14. Each Planning Coordinator shall respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area following a comment period and before finalizing its UFLS program, indicating in the written response to comments whether changes will be made or reasons why changes will not be made to the following *[VRF: Lower][Time Horizon: Long-term Planning]*:

14.1. UFLS program, including a schedule for implementation

14.2. UFLS design assessment

14.3. Format and schedule of UFLS data submittal

C. Measures

M1. Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement R1.

M2. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s) as a basis for designing a UFLS program that meet the criteria in Requirement R2, Parts 2.1 through 2.3.

M3. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement R3, Parts 3.1 through 3.3.

M4. Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement R4, Parts 4.1 through 4.7.

M5. Each Planning Coordinator, whose area or portions of whose area is part of an island identified by it or another Planning Coordinator which includes multiple Planning Coordinator areas or portions of those areas, shall have dated evidence such as joint UFLS program design documents, reports describing a joint UFLS design assessment, letters that include recommendations, or other dated documentation demonstrating that it coordinated its UFLS program design with all other Planning Coordinators whose areas or portions of whose areas are also part of the same identified island per Requirement R5.

M6. Each Planning Coordinator shall have dated evidence such as a UFLS database, data requests, data input forms, or other dated documentation to show that it maintained a UFLS database for use in event analyses and assessments of the UFLS program per Requirement R6 at least once each calendar year, with no more than 15 months between maintenance activities.

M7. Each Planning Coordinator shall have dated evidence such as letters, memorandums, e-mails or other dated documentation that it provided their UFLS database to other Planning Coordinators within their Interconnection within 30 calendar days of a request per Requirement R7.

M8. Each UFLS Entity shall have dated evidence such as responses to data requests, spreadsheets, letters or other dated documentation that it provided data to its Planning Coordinator according to the format and schedule specified by the Planning Coordinator to support maintenance of the UFLS database per Requirement R8.

M9. Each UFLS Entity shall have dated evidence such as spreadsheets summarizing feeder load armed with UFLS relays, spreadsheets with UFLS relay settings, or other dated documentation that it provided automatic tripping of load in accordance with the UFLS program design and schedule for application per Requirement R9.

M10. Each Transmission Owner shall have dated evidence such as relay settings, tripping logic or other dated documentation that it provided automatic switching of its existing capacitor banks, Transmission Lines, and reactors in order to control over-voltage as a result of underfrequency load shedding if required by the UFLS program and schedule for application per Requirement R10.

M11. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted an event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement R11.

M12. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it conducted a

UFLS design assessment per Requirements R12 and R4 if UFLS program deficiencies are identified in R11.

M13. Each Planning Coordinator, in whose area a BES islanding event occurred that also included the area(s) or portions of area(s) of other Planning Coordinator(s) in the same islanding event and that resulted in system frequency excursions below the initializing set points of the UFLS program, shall have dated evidence such as a joint assessment report, independent assessment reports and letters describing likely reasons for differences in conclusions and recommendations, or other dated documentation demonstrating it coordinated its event assessment (per Requirement R11) with all other Planning Coordinator(s) whose areas or portions of whose areas were also included in the same islanding event per Requirement R13.

M14. Each Planning Coordinator shall have dated evidence of responses, such as e-mails and letters, to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area following a comment period and before finalizing its UFLS program per Requirement R14.

D. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority

Regional Entity

1.2. Data Retention

Each Planning Coordinator and UFLS entity shall keep data or evidence to show compliance as identified below unless directed by its Compliance Enforcement Authority to retain specific evidence for a longer period of time as part of an investigation:

- Each Planning Coordinator shall retain the current evidence of Requirements R1, R2, R3, R4, R5, R12, and R14, Measures M1, M2, M3, M4, M5, M12, and M14 as well as any evidence necessary to show compliance since the last compliance audit.
- Each Planning Coordinator shall retain the current evidence of UFLS database update in accordance with Requirement R6, Measure M6, and evidence of the prior year's UFLS database update.
- Each Planning Coordinator shall retain evidence of any UFLS database transmittal to another Planning Coordinator since the last compliance audit in accordance with Requirement R7, Measure M7.
- Each UFLS entity shall retain evidence of UFLS data transmittal to the Planning Coordinator(s) since the last compliance audit in accordance with Requirement R8, Measure M8.

- Each UFLS entity shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R9, Measure M9, and evidence of adherence since the last compliance audit.
- Transmission Owner shall retain the current evidence of adherence with the UFLS program in accordance with Requirement R10, Measure M10, and evidence of adherence since the last compliance audit.
- Each Planning Coordinator shall retain evidence of Requirements R11, and R13, and Measures M11, and M13 for 6 calendar years.

If a Planning Coordinator or UFLS entity is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The Compliance Enforcement Authority shall keep the last audit records and all requested and submitted subsequent audit records.

1.3. Compliance Monitoring and Assessment Processes

- Compliance Audit
- Self-Certification
- Spot Checking
- Compliance Violation Investigation
- Self-Reporting
- Complaint

1.4. Additional Compliance Information

Not applicable.

2. Violation Severity Levels

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	N/A	The Planning Coordinator developed and documented criteria but failed to include the consideration of historical events, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas that may form islands. OR The Planning Coordinator developed and documented criteria but failed to include the consideration of system studies, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas, that may form islands.	The Planning Coordinator developed and documented criteria but failed to include the consideration of historical events and system studies, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas, that may form islands.	The Planning Coordinator failed to develop and document criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas and Regional Entity areas, that may form islands.
R2	N/A	The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include one (1) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include two (2) of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3.	The Planning Coordinator identified an island(s) to serve as a basis for designing its UFLS program but failed to include all of the Parts as specified in Requirement R2, Parts 2.1, 2.2, or 2.3. OR The Planning Coordinator failed to identify any island(s) to serve as a basis for designing its UFLS program.

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
R3	N/A	The Planning Coordinator developed a UFLS program, including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., but failed to meet one (1) of the performance characteristic in Requirement R3, Parts 3.1, 3.2, or 3.3 in simulations of underfrequency conditions.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s)., but failed to meet two (2) of the performance characteristic in Requirement R3, Parts 3.1, 3.2, or 3.3 in simulations of underfrequency conditions.	The Planning Coordinator developed a UFLS program including notification of and a schedule for implementation by UFLS entities within its area where imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s).,but failed to meet all the performance characteristic in Requirement R3, Parts 3.1, 3.2, and 3.3 in simulations of underfrequency conditions. OR The Planning Coordinator failed to develop a UFLS program including notification of and a schedule for implementation by UFLS entities within its area
R4	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2 but the simulation failed to include one (1) of the items as specified in Requirement R4, Parts 4.1 through 4.7.	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2 but the simulation failed to include two (2) of the items as specified in Requirement R4, Parts 4.1 through 4.7.	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 for each island identified in Requirement R2 but the simulation failed to include three (3) of the items as specified in Requirement R4, Parts 4.1 through 4.7.	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determined through dynamic simulation whether the UFLS program design met the performance characteristics in Requirement R3 but simulation failed to include four (4) or more of the items as specified in Requirement R4, Parts 4.1 through 4.7. OR The Planning Coordinator failed to

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				conduct and document a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement R3 for each island identified in Requirement R2
R5	N/A	N/A	N/A	The Planning Coordinator, whose area or portions of whose area is part of an island identified by it or another Planning Coordinator which includes multiple Planning Coordinator areas or portions of those areas, failed to coordinate its UFLS program design through one of the manners described in Requirement R5.
R6	N/A	N/A	N/A	The Planning Coordinator failed to maintain a UFLS database for use in event analyses and assessments of the UFLS program at least once each calendar year, with no more than 15 months between maintenance activities.
R7	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 30 calendar days and up to and including 40 calendar days following the request.	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 40 calendar days but less than and including 50 calendar days following the request.	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 50 calendar days but less than and including 60 calendar days following the request.	The Planning Coordinator provided its UFLS database to other Planning Coordinators more than 60 calendar days following the request. OR The Planning Coordinator failed to

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				provide its UFLS database to other Planning Coordinators.
R8	The UFLS entity provided data to its Planning Coordinator(s) more than 5 calendar days but less than or equal to 10 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.	The UFLS entity provided data to its Planning Coordinator(s) more than 10 calendar days but less than or equal to 15 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database. OR The UFLS entity provided data to its Planning Coordinator(s) but the data was not according to the format specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.	The UFLS entity provided data to its Planning Coordinator(s) more than 15 calendar days but less than or equal to 20 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.	The UFLS entity provided data to its Planning Coordinator(s) more than 20 calendar days following the schedule specified by the Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database. OR The UFLS entity failed to provide data to its Planning Coordinator(s) to support maintenance of each Planning Coordinator's UFLS database.
R9	The UFLS entity provided less than 100% but more than (and including) 95% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 95% but more than (and including) 90% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 90% but more than (and including) 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.	The UFLS entity provided less than 85% of automatic tripping of Load in accordance with the UFLS program design and schedule for application determined by the Planning Coordinator(s) area in which it owns assets.
R10	The Transmission Owner provided less than 100% but more than (and including) 95% automatic switching of its existing capacitor banks,	The Transmission Owner provided less than 95% but more than (and including) 90% automatic switching of its existing capacitor banks,	The Transmission Owner provided less than 90% but more than (and including) 85% automatic switching of its existing capacitor banks,	The Transmission Owner provided less than 85% automatic switching of its existing capacitor banks, Transmission Lines, and reactors

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission	Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission	Transmission Lines, and reactors to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission	to control over-voltage if required by the UFLS program and schedule for application determined by the Planning Coordinator(s) in each Planning Coordinator area in which the Transmission Owner owns transmission
R11	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the parts as specified in Requirement R11, Parts 11.1 and 11.2 within a time greater than one year but less than or equal to 13 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the parts as specified in Requirement R11, Parts 11.1 and 11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the parts as specified in Requirement R11, Parts 11.1 and 11.2 within a time greater than 14 months but less than or equal to 15 months of actuation. OR The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event within one year of event actuation but failed to evaluate one (1) of the Parts as specified in Requirement R11, Parts11.1 or 11.2.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event and evaluated the parts as specified in Requirement R11, Parts 11.1 and 11.2 within a time greater than 15 months of actuation. OR The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to conduct and document an assessment of the event and evaluate the Parts as specified in Requirement R11, Parts 11.1 and 11.2. OR The Planning Coordinator, in

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, conducted and documented an assessment of the event within one year of event actuation but failed to evaluate all of the Parts as specified in Requirement R11, Parts 11.1 and 11.2.
R12	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, conducted and documented a UFLS design assessment to consider the identified deficiencies greater than two years but less than or equal to 25 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, conducted and documented a UFLS design assessment to consider the identified deficiencies greater than 25 months but less than or equal to 26 months of event actuation.	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, conducted and documented a UFLS design assessment to consider the identified deficiencies greater than 26 months of event actuation. OR The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement R11, failed to conduct and document a UFLS design assessment to consider the identified deficiencies.
R13	N/A	N/A	N/A	The Planning Coordinator, in whose area a BES islanding event occurred that also included the area(s) or portions of area(s) of other Planning Coordinator(s) in the same islanding event and that resulted in system frequency excursions below the initializing set

R #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				points of the UFLS program, failed to coordinate its UFLS event assessment with all other Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event in one of the manners described in Requirement R13
R14	N/A	N/A	N/A	The Planning Coordinator failed to respond to written comments submitted by UFLS entities and Transmission Owners within its Planning Coordinator area following a comment period and before finalizing its UFLS program, indicating in the written response to comments whether changes were made or reasons why changes were not made to the items in Parts 14.1 through 14.3.

E. Regional Variances

E.A. Regional Variance for the Quebec Interconnection

The following Interconnection-wide variance shall be applicable in the Quebec Interconnection and replaces, in their entirety, Requirements R3 and R4 and the violation severity levels associated with Requirements R3 and R4.

E.A.3. Each Planning Coordinator shall develop a UFLS program, including a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

E.A.3.1. Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

E.A.3.2. Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1A, either for 30 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

E.A.3.3. Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall not exceed 1.10 per unit for longer than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with each of the following:

EA.3.3.1. Individual generating unit greater than 50 MVA (gross nameplate rating) directly connected to the BES

EA.3.3.2. Generating plants/facilities greater than 50 MVA (gross aggregate nameplate rating) directly connected to the BES

EA.3.3.3. Facilities consisting of one or more units connected to the BES at a common bus with total generation above 50 MVA gross nameplate rating.

E.A.4. Each Planning Coordinator shall conduct and document a UFLS design assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3 for each island identified in Requirement R2. The simulation shall model each of the following; *[VRF: High][Time Horizon: Long-term Planning]*

E.A.4.1 Underfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly

connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1A, and

E.A.4.2 Overfrequency trip settings of individual generating units that are part of plants/facilities with a capacity of 50 MVA or more individually or cumulatively (gross nameplate rating), directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 - Attachment 2A, and

E.A.4.3 Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

M.E.A.3. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its UFLS program, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.A.3 Parts E.A.3.1 through EA3.3.

M.E.A.4. Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its UFLS design assessment that demonstrates it meets Requirement E.A.4 Parts E.A.4.1 through E.A.4.3.

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
EA3	N/A	The Planning Coordinator developed a UFLS program, including a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions	The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Parts E.A.3.1, E.A.3.2, or E.A.3.3 in simulations of underfrequency conditions	The Planning Coordinator developed a UFLS program including a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Parts E.A.3.1, E.A.3.2, and E.A.3.3 in simulations of underfrequency conditions OR The Planning Coordinator failed to develop a UFLS program.
EA4	N/A	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3 but simulation failed to include one (1) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include two (2) of the items as specified in Parts E.A.4.1, E.A.4.2 or E.A.4.3.	The Planning Coordinator conducted and documented a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E3 but simulation failed to include all of the items as specified in Parts E.A.4.1, E.A.4.2 and E.A.4.3. OR The Planning Coordinator failed to conduct and document a UFLS assessment at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.A.3

E.B. Regional Variance for the Western Electricity Coordinating Council

The following Interconnection-wide variance shall be applicable in the Western Electricity Coordinating Council (WECC) and replaces, in their entirety, Requirements R1, R2, R3, R4, R5, R11, R12, and R13.

E.B.1. Each Planning Coordinator shall participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that develops and documents criteria, including consideration of historical events and system studies, to select portions of the Bulk Electric System (BES) that may form islands. *[VRF: Medium][Time Horizon: Long-term Planning]*

E.B.2. Each Planning Coordinator shall identify one or more islands from the regional review (per E.B.1) to serve as a basis for designing a region-wide coordinated UFLS program including: *[VRF: Medium][Time Horizon: Long-term Planning]*

E.B.2.1. Those islands selected by applying the criteria in Requirement E.B.1, and

E.B.2.2. Any portions of the BES designed to detach from the Interconnection (planned islands) as a result of the operation of a relay scheme or Special Protection System.

EB.3. Each Planning Coordinator shall adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area, that meets the following performance characteristics in simulations of underfrequency conditions resulting from an imbalance scenario, where an imbalance = [(load — actual generation output) / (load)], of up to 25 percent within the identified island(s). *[VRF: High][Time Horizon: Long-term Planning]*

E.B.3.1. Frequency shall remain above the Underfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

E.B.3.2. Frequency shall remain below the Overfrequency Performance Characteristic curve in PRC-006-1 - Attachment 1, either for 60 seconds or until a steady-state condition between 59.3 Hz and 60.7 Hz is reached, and

E.B.3.3. Volts per Hz (V/Hz) shall not exceed 1.18 per unit for longer than two seconds cumulatively per simulated event, and shall not exceed 1.10 per unit for longer than 45 seconds cumulatively per simulated event at each generator bus and generator step-up transformer high-side bus associated with each of the following:

E.B.3.3.1. Individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES

E.B.3.3.2. Generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES

E.B.3.3.3. Facilities consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA gross nameplate rating.

E.B.4. Each Planning Coordinator shall participate in and document a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2. The simulation shall model each of the following: *[VRF: High][Time Horizon: Long-term Planning]*

E.B.4.1. Underfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

E.B.4.2. Underfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

E.B.4.3. Underfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip above the Generator Underfrequency Trip Modeling curve in PRC-006-1 - Attachment 1.

E.B.4.4. Overfrequency trip settings of individual generating units greater than 20 MVA (gross nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

E.B.4.5. Overfrequency trip settings of generating plants/facilities greater than 75 MVA (gross aggregate nameplate rating) directly connected to the BES that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

E.B.4.6. Overfrequency trip settings of any facility consisting of one or more units connected to the BES at a common bus with total generation above 75 MVA (gross nameplate rating) that trip below the Generator Overfrequency Trip Modeling curve in PRC-006-1 — Attachment 1.

E.B.4.7. Any automatic Load restoration that impacts frequency stabilization and operates within the duration of the simulations run for the assessment.

E.B.11. Each Planning Coordinator, in whose area a BES islanding event results in system frequency excursions below the initializing set points of the UFLS program, shall participate in and document a coordinated event assessment with all affected Planning Coordinators to conduct and document an assessment of the

event within one year of event actuation to evaluate: *[VRF: Medium][Time Horizon: Operations Assessment]*

E.B.11.1. The performance of the UFLS equipment,

E.B.11.2 The effectiveness of the UFLS program

E.B.12. Each Planning Coordinator, in whose islanding event assessment (per E.B.11) UFLS program deficiencies are identified, shall participate in and document a coordinated UFLS design assessment of the UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies within two years of event actuation. *[VRF: Medium][Time Horizon: Operations Assessment]*

M.E.B.1. Each Planning Coordinator shall have evidence such as reports, or other documentation of its criteria, developed as part of the joint regional review with other Planning Coordinators in the WECC Regional Entity area to select portions of the Bulk Electric System that may form islands including how system studies and historical events were considered to develop the criteria per Requirement E.B.1.

M.E.B.2. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, or other documentation supporting its identification of an island(s), from the regional review (per E.B.1), as a basis for designing a region-wide coordinated UFLS program that meet the criteria in Requirement E.B.2 Parts E.B.2.1 and E.B.2.2.

M.E.B.3. Each Planning Coordinator shall have evidence such as reports, memorandums, e-mails, program plans, or other documentation of its adoption of a UFLS program, coordinated across the WECC Regional Entity area, including the notification of the UFLS entities of implementation schedule, that meet the criteria in Requirement E.B.3 Parts E.B.3.1 through E.B.3.3.

M.E.B.4. Each Planning Coordinator shall have dated evidence such as reports, dynamic simulation models and results, or other dated documentation of its participation in a coordinated UFLS design assessment with the other Planning Coordinators in the WECC Regional Entity area that demonstrates it meets Requirement E.B.4 Parts E.B.4.1 through E.B.4.7.

M.E.B.11. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a coordinated event assessment of the performance of the UFLS equipment and the effectiveness of the UFLS program per Requirement E.B.11.

M.E.B.12. Each Planning Coordinator shall have dated evidence such as reports, data gathered from an historical event, or other dated documentation to show that it participated in a UFLS design assessment per Requirements E.B.12 and E.B.4 if UFLS program deficiencies are identified in E.B.11.

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
E.B.1	N/A	The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria but failed to include the consideration of historical events, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas, that may form islands OR The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria but failed to include the consideration of system studies, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas, that may form islands	The Planning Coordinator participated in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria but failed to include the consideration of historical events and system studies, to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas, that may form islands	The Planning Coordinator failed to participate in a joint regional review with the other Planning Coordinators in the WECC Regional Entity area that developed and documented criteria to select portions of the BES, including interconnected portions of the BES in adjacent Planning Coordinator areas that may form islands
E.B.2	N/A	N/A	The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include one (1) of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2	The Planning Coordinator identified an island(s) from the regional review to serve as a basis for designing its UFLS program but failed to include all of the parts as specified in Requirement E.B.2, Parts E.B.2.1 or E.B.2.2 OR

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
				The Planning Coordinator failed to identify any island(s) from the regional review to serve as a basis for designing its UFLS program.
E.B.3	N/A	The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet one (1) of the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions	The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet two (2) of the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, or E.B.3.3 in simulations of underfrequency conditions	The Planning Coordinator adopted a UFLS program, coordinated across the WECC Regional Entity area that included notification of and a schedule for implementation by UFLS entities within its area, but failed to meet all the performance characteristic in Requirement E.B.3, Parts E.B.3.1, E.B.3.2, and E.B.3.3 in simulations of underfrequency conditions OR The Planning Coordinator failed to adopt a UFLS program, coordinated across the WECC Regional Entity area, including notification of and a schedule for implementation by UFLS entities within its area.
E.B.4	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island	The Planning Coordinator participated in and documented a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
	identified in Requirement E.B.2 but the simulation failed to include one (1) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.	identified in Requirement E.B.2 but the simulation failed to include two (2) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.	identified in Requirement E.B.2 but the simulation failed to include three (3) of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7.	identified in Requirement E.B.2 but the simulation failed to include four (4) or more of the items as specified in Requirement E.B.4, Parts E.B.4.1 through E.B.4.7. OR The Planning Coordinator failed to participate in and document a coordinated UFLS assessment with the other Planning Coordinators in the WECC Regional Entity area at least once every five years that determines through dynamic simulation whether the UFLS program design meets the performance characteristics in Requirement E.B.3 for each island identified in Requirement E.B.2
E.B.11	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than one year but less than or equal to 13 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 13 months but less than or equal to 14 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 14 months but less than or equal to 15 months of actuation.	The Planning Coordinator, in whose area a BES islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event and evaluated the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2 within a time greater than 15 months of actuation. OR

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
			OR The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate one (1) of the parts as specified in Requirement E.B.11, Parts E.B.11.1 or E.B.11.2.	The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, failed to participate in and document a coordinated event assessment with all Planning Coordinators whose areas or portion of whose areas were also included in the same island event and evaluate the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2. OR The Planning Coordinator, in whose area an islanding event resulting in system frequency excursions below the initializing set points of the UFLS program, participated in and documented a coordinated event assessment with all Planning Coordinators whose areas or portions of whose areas were also included in the same islanding event within one year of event actuation but failed to evaluate all of the parts as specified in Requirement E.B.11, Parts E.B.11.1 and E.B.11.2.
E.B.12	N/A	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design	The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, participated in and documented a coordinated UFLS design

E #	Lower VSL	Moderate VSL	High VSL	Severe VSL
		assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than two years but less than or equal to 25 months of event actuation.	assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 25 months but less than or equal to 26 months of event actuation.	assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies in greater than 26 months of event actuation. OR The Planning Coordinator, in which UFLS program deficiencies were identified per Requirement E.B.11, failed to participate in and document a coordinated UFLS design assessment of the coordinated UFLS program with the other Planning Coordinators in the WECC Regional Entity area to consider the identified deficiencies

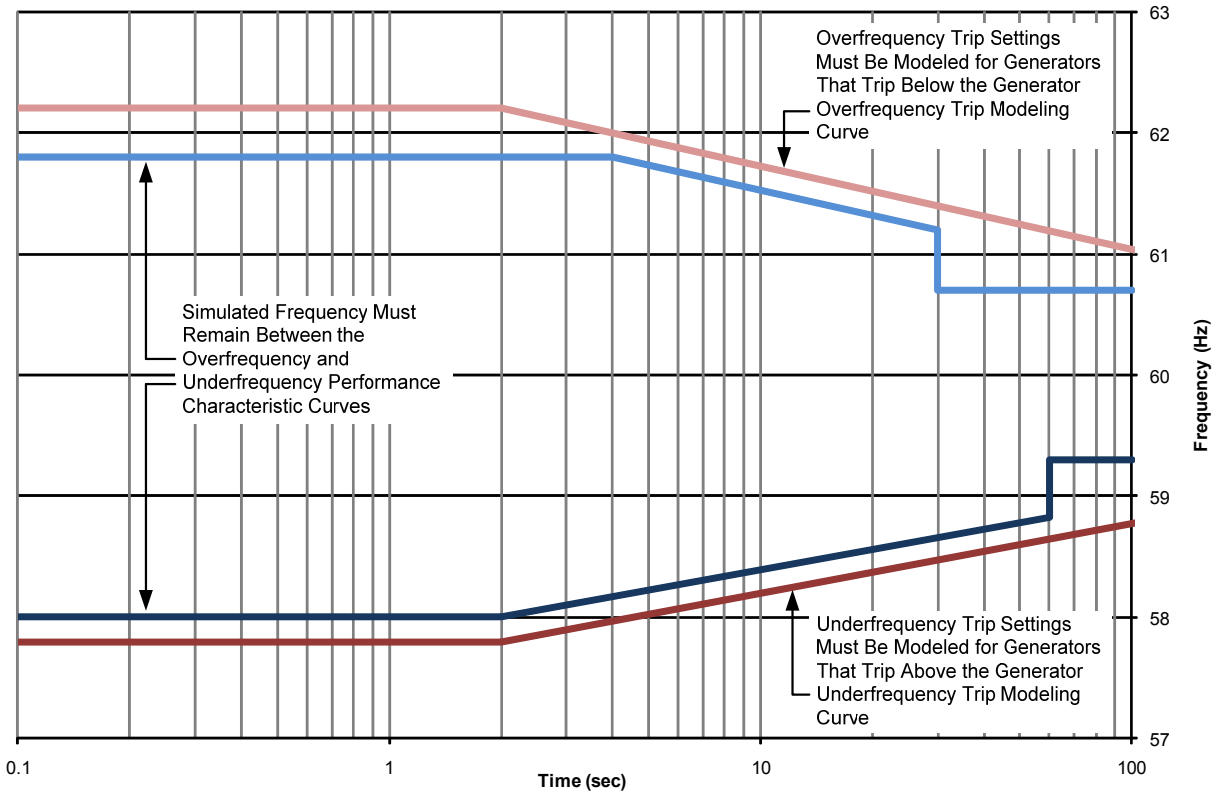
Associated Documents

Version History

Version	Date	Action	Change Tracking
1	May 25, 2010	Completed revision, merging and updating PRC-006-0, PRC-007-0 and PRC-009-0.	
1	November 4, 2010	Adopted by the Board of Trustees	
1	May 7, 2012	FERC Order issued approving PRC-006-1 (approval becomes effective July 10, 2012)	

PRC-006-1 – Attachment 1

Underfrequency Load Shedding Program Design Performance and Modeling Curves for Requirements R3 Parts 3.1-3.2 and R4 Parts 4.1-4.6

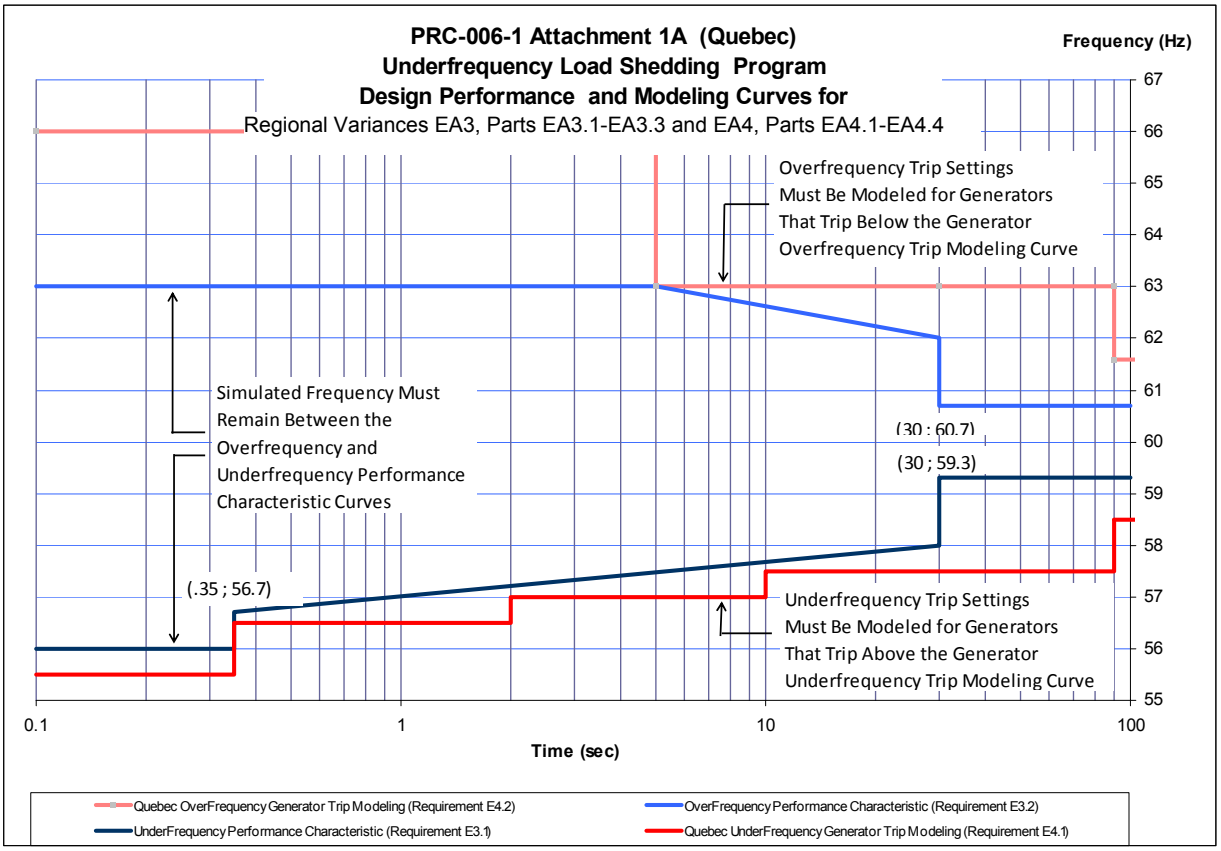


- Generator Overfrequency Trip Modeling (Requirement R4 Parts 4.4-4.6)
- Overfrequency Performance Characteristic (Requirement R3 Part 3.2)
- Underfrequency Performance Characteristic (Requirement R3 Part 3.1)
- Generator Underfrequency Trip Modeling (Requirement R4 Parts 4.1-4.3)

Curve Definitions

Generator Overfrequency Trip Modeling		Overfrequency Performance Characteristic		
t ≤ 2 s	t > 2 s	t ≤ 4 s	4 s < t ≤ 30 s	t > 30 s
f = 62.2 Hz	f = -0.686log(t) + 62.41 Hz	f = 61.8 Hz	f = -0.686log(t) + 62.21 Hz	f = 60.7 Hz

Generator Underfrequency Trip Modeling		Underfrequency Performance Characteristic		
t ≤ 2 s	t > 2 s	t ≤ 2 s	2 s < t ≤ 60 s	t > 60 s
f = 57.8 Hz	f = 0.575log(t) + 57.63 Hz	f = 58.0 Hz	f = 0.575log(t) + 57.83 Hz	f = 59.3 Hz


PRC-006-1 Attachment 1A (Quebec)
Underfrequency Load Shedding Program
Design Performance and Modeling Curves for
Regional Variances EA3, Parts EA3.1-EA3.3 and EA4, Parts EA4.1-EA4.4
Frequency (Hz)
Overfrequency Trip Settings
Must Be Modeled for Generators
That Trip Below the Generator
Overfrequency Trip Modeling Curve
Simulated Frequency Must
Remain Between the
Overfrequency and
Underfrequency Performance
Characteristic Curves
(30 ; 60.7)
(30 ; 59.3)
(.35 ; 56.7)
Underfrequency Trip Settings
Must Be Modeled for Generators
That Trip Above the Generator
Underfrequency Trip Modeling Curve
67
66
65
64
63
62
61
60
59
58
57
56
55
0.1
1
10
100
Time (sec)
Quebec OverFrequency Generator Trip Modeling (Requirement E4.2)
OverFrequency Performance Characteristic (Requirement E3.2)
UnderFrequency Performance Characteristic (Requirement E3.1)
Quebec UnderFrequency Generator Trip Modeling (Requirement E4.1)

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Glossary of Terms Used in NERC Reliability Standards

Updated May 25, 2012

Introduction:

This Glossary lists each term that was defined for use in one or more of NERC's continent-wide or Regional Reliability Standards and adopted by the NERC Board of Trustees from February 8, 2005 through May 25, 2012.

This reference is divided into two sections, and each section is organized in alphabetical order. The first section identifies all terms that have been adopted by the NERC Board of Trustees for use in continent-wide standards; the second section identifies all terms that have been adopted by the NERC Board of Trustees for use in regional standards. (WECC, NPCC and Reliability*First* are the only Regions that have definitions approved by the NERC Board of Trustees. If other Regions develop definitions for approved Regional Standards using a NERC-approved standards development process, those definitions will be added to the Regional Definitions section of this glossary.)

Most of the terms identified in this glossary were adopted as part of the development of NERC's initial set of reliability standards, called the "Version 0" standards. Subsequent to the development of Version 0 standards, new definitions have been developed and approved following NERC's Reliability Standards Development Process, and added to this glossary following board adoption, with the "FERC approved" date added following a final Order approving the definition.

Immediately under each term is a link to the archive for the development of that term.

Definitions that have been adopted by the NERC Board of Trustees but have not been approved by FERC, or FERC has not approved but has directed be modified, are shaded in blue. Definitions that have been remanded or retired are shaded in orange.

Any comments regarding this glossary should be reported to the following:
sarcomm@nerc.com with "Glossary Comment" in the subject line.

Continent-wide Definitions:

Regional Definitions:

Continent-wide Term	Acronym	BOT Approval Date	FERC Approval Date	Definition
Adequacy [Archive]		2/8/2005	3/16/2007	The ability of the electric system to supply the aggregate electrical demand and energy requirements of the end-use customers at all times, taking into account scheduled and reasonably expected unscheduled outages of system elements.
Adjacent Balancing Authority [Archive]		2/8/2005	3/16/2007	A Balancing Authority Area that is interconnected another Balancing Authority Area either directly or via a multi-party agreement or transmission tariff.
Adverse Reliability Impact [Archive]		2/7/2006	3/16/2007	The impact of an event that results in frequency-related instability; unplanned tripping of load or generation; or uncontrolled separation or cascading outages that affects a widespread area of the Interconnection.
Adverse Reliability Impact [Archive]		8/4/2011		The impact of an event that results in Bulk Electric System instability or Cascading.
After the Fact [Archive]	ATF	10/29/2008	12/17/2009	A time classification assigned to an RFI when the submittal time is greater than one hour after the start time of the RFI.
Agreement [Archive]		2/8/2005	3/16/2007	A contract or arrangement, either written or verbal and sometimes enforceable by law.
Altitude Correction Factor [Archive]		2/7/2006	3/16/2007	A multiplier applied to specify distances, which adjusts the distances to account for the change in relative air density (RAD) due to altitude from the RAD used to determine the specified distance. Altitude correction factors apply to both minimum worker approach distances and to minimum vegetation clearance distances.

Continent-wide Term	Acronym	BOT Approval Date	FERC Approval Date	Definition
Ancillary Service [Archive]		2/8/2005	3/16/2007	Those services that are necessary to support the transmission of capacity and energy from resources to loads while maintaining reliable operation of the Transmission Service Provider's transmission system in accordance with good utility practice. (*From FERC order 888-A.*)
Anti-Aliasing Filter [Archive]		2/8/2005	3/16/2007	An analog filter installed at a metering point to remove the high frequency components of the signal over the AGC sample period.
Area Control Error [Archive]	ACE	2/8/2005	3/16/2007	The instantaneous difference between a Balancing Authority's net actual and scheduled interchange, taking into account the effects of Frequency Bias and correction for meter error.
Area Interchange Methodology [Archive]		08/22/2008	11/24/2009	The Area Interchange methodology is characterized by determination of incremental transfer capability via simulation, from which Total Transfer Capability (TTC) can be mathematically derived. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from the TTC, and Postbacks and counterflows are added, to derive Available Transfer Capability. Under the Area Interchange Methodology, TTC results are generally reported on an area to area basis.
Arranged Interchange [Archive]		5/2/2006	3/16/2007	The state where the Interchange Authority has received the Interchange information (initial or revised).
Automatic Generation Control [Archive]	AGC	2/8/2005	3/16/2007	Equipment that automatically adjusts generation in a Balancing Authority Area from a central location to maintain the Balancing Authority's interchange schedule plus Frequency Bias. AGC may also accommodate automatic inadvertent payback and time error correction.

Continent-wide Term	Acronym	BOT Approval Date	FERC Approval Date	Definition
Available Flowgate Capability [Archive]	AFC	08/22/2008	11/24/2009	A measure of the flow capability remaining on a Flowgate for further commercial activity over and above already committed uses. It is defined as TFC less Existing Transmission Commitments (ETC), less a Capacity Benefit Margin, less a Transmission Reliability Margin, plus Postbacks, and plus counterflows.
Available Transfer Capability [Archive]	ATC	2/8/2005	3/16/2007	A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses. It is defined as Total Transfer Capability less existing transmission commitments (including retail customer service), less a Capacity Benefit Margin, less a Transmission Reliability Margin.
Available Transfer Capability [Archive]	ATC	08/22/2008	11/24/2009	A measure of the transfer capability remaining in the physical transmission network for further commercial activity over and above already committed uses. It is defined as Total Transfer Capability less Existing Transmission Commitments (including retail customer service), less a Capacity Benefit Margin, less a Transmission Reliability Margin, plus Postbacks, plus counterflows.
Available Transfer Capability Implementation Document [Archive]	ATCID	08/22/2008	11/24/2009	A document that describes the implementation of a methodology for calculating ATC or AFC, and provides information related to a Transmission Service Provider's calculation of ATC or AFC.

Continent-wide Term	Acronym	BOT Approval Date	FERC Approval Date	Definition
ATC Path [Archive]		08/22/2008	Not approved; Modification directed 11/24/09	Any combination of Point of Receipt and Point of Delivery for which ATC is calculated; and any Posted Path[1].

[1] See 18 CFR 37.6(b)(1)

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Balancing Authority [Archive]	BA	2/8/2005	3/16/2007	The responsible entity that integrates resource plans ahead of time, maintains load-interchange-generation balance within a Balancing Authority Area, and supports Interconnection frequency in real time.
Balancing Authority Area [Archive]		2/8/2005	3/16/2007	The collection of generation, transmission, and loads within the metered boundaries of the Balancing Authority. The Balancing Authority maintains load-resource balance within this area.
Base Load [Archive]		2/8/2005	3/16/2007	The minimum amount of electric power delivered or required over a given period at a constant rate.
Blackstart Capability Plan [Archive]		2/8/2005 Approved Retirement when EOP-005-2 becomes effective 8/5/2009	3/16/2007	A documented procedure for a generating unit or station to go from a shutdown condition to an operating condition delivering electric power without assistance from the electric system. This procedure is only a portion of an overall system restoration plan.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Blackstart Resource [Archive]		8/5/2009		A generating unit(s) and its associated set of equipment which has the ability to be started without support from the System or is designed to remain energized without connection to the remainder of the System, with the ability to energize a bus, meeting the Transmission Operator's restoration plan needs for real and reactive power capability, frequency and voltage control, and that has been included in the Transmission Operator's restoration plan
Block Dispatch [Archive]		08/22/2008	11/24/2009	A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, the capacity of a given generator is segmented into loadable "blocks," each of which is grouped and ordered relative to other blocks (based on characteristics including, but not limited to, efficiency, run of river or fuel supply considerations, and/or "must-run" status).
Bulk Electric System [Archive]	BES	2/8/2005	3/16/2007	As defined by the Regional Reliability Organization, the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment, generally operated at voltages of 100 kV or higher. Radial transmission facilities serving only load with one transmission source are generally not included in this definition.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Burden [Archive]		2/8/2005	3/16/2007	Operation of the Bulk Electric System that violates or is expected to violate a System Operating Limit or Interconnection Reliability Operating Limit in the Interconnection, or that violates any other NERC, Regional Reliability Organization, or local operating reliability standards or criteria.
Business Practices [Archive]		8/22/2008	Not approved; Modification directed 11/24/09	Those business rules contained in the Transmission Service Provider's applicable tariff, rules, or procedures; associated Regional Reliability Organization or regional entity business practices; or NAESB Business Practices.
Bus-tie Breaker [Archive]		8/4/2011		A circuit breaker that is positioned to connect two individual substation bus configurations.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Capacity Benefit Margin [Archive]	CBM	2/8/2005	3/16/2007	The amount of firm transmission transfer capability preserved by the transmission provider for Load-Serving Entities (LSEs), whose loads are located on that Transmission Service Provider's system, to enable access by the LSEs to generation from interconnected systems to meet generation reliability requirements. Preservation of CBM for an LSE allows that entity to reduce its installed generating capacity below that which may otherwise have been necessary without interconnections to meet its generation reliability requirements. The transmission transfer capability preserved as CBM is intended to be used by the LSE only in times of emergency generation deficiencies.
Capacity Benefit Margin Implementation Document [Archive]	CBMID	11/13/2008	11/24/2009	A document that describes the implementation of a Capacity Benefit Margin methodology.
Capacity Emergency [Archive]		2/8/2005	3/16/2007	A capacity emergency exists when a Balancing Authority Area's operating capacity, plus firm purchases from other systems, to the extent available or limited by transfer capability, is inadequate to meet its demand plus its regulating requirements.
Cascading [Archive]		2/8/2005	3/16/2007	The uncontrolled successive loss of system elements triggered by an incident at any location. Cascading results in widespread electric service interruption that cannot be restrained from sequentially spreading beyond an area predetermined by studies.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Cascading Outages [Archive]		11/1/2006 Withdrawn 2/12/2008	FERC Remanded 12/27/2007	~~The uncontrolled successive loss of Bulk Electric System Facilities triggered by an incident (or condition) at any location resulting in the interruption of electric service that cannot be restrained from spreading beyond a pre-determined area.~~
Clock Hour [Archive]		2/8/2005	3/16/2007	The 60-minute period ending at :00. All surveys, measurements, and reports are based on Clock Hour periods unless specifically noted.
Cogeneration [Archive]		2/8/2005	3/16/2007	Production of electricity from steam, heat, or other forms of energy produced as a by-product of another process.
Compliance Monitor [Archive]		2/8/2005	3/16/2007	The entity that monitors, reviews, and ensures compliance of responsible entities with reliability standards.
Confirmed Interchange [Archive]		5/2/2006	3/16/2007	The state where the Interchange Authority has verified the Arranged Interchange.
Congestion Management Report [Archive]		2/8/2005	3/16/2007	A report that the Interchange Distribution Calculator issues when a Reliability Coordinator initiates the Transmission Loading Relief procedure. This report identifies the transactions and native and network load curtailments that must be initiated to achieve the loading relief requested by the initiating Reliability Coordinator.
Consequential Load Loss [Archive]		8/4/2011		All Load that is no longer served by the Transmission system as a result of Transmission Facilities being removed from service by a Protection System operation designed to isolate the fault.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Constrained Facility [Archive]		2/8/2005	3/16/2007	A transmission facility (line, transformer, breaker, etc.) that is approaching, is at, or is beyond its System Operating Limit or Interconnection Reliability Operating Limit.
Contingency [Archive]		2/8/2005	3/16/2007	The unexpected failure or outage of a system component, such as a generator, transmission line, circuit breaker, switch or other electrical element.
Contingency Reserve [Archive]		2/8/2005	3/16/2007	The provision of capacity deployed by the Balancing Authority to meet the Disturbance Control Standard (DCS) and other NERC and Regional Reliability Organization contingency requirements.
Contract Path [Archive]		2/8/2005	3/16/2007	An agreed upon electrical path for the continuous flow of electrical power between the parties of an Interchange Transaction.
Control Performance Standard [Archive]	CPS	2/8/2005	3/16/2007	The reliability standard that sets the limits of a Balancing Authority's Area Control Error over a specified time period.
Corrective Action Plan [Archive]		2/7/2006	3/16/2007	A list of actions and an associated timetable for implementation to remedy a specific problem.
Cranking Path [Archive]		5/2/2006	3/16/2007	A portion of the electric system that can be isolated and then energized to deliver electric power from a generation source to enable the startup of one or more other generating units.
Critical Assets [Archive]		5/2/2006	1/18/2008	Facilities, systems, and equipment which, if destroyed, degraded, or otherwise rendered unavailable, would affect the reliability or operability of the Bulk Electric System.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Critical Cyber Assets [Archive]		5/2/2006	1/18/2008	Cyber Assets essential to the reliable operation of Critical Assets.
Curtailment [Archive]		2/8/2005	3/16/2007	A reduction in the scheduled capacity or energy delivery of an Interchange Transaction.
Curtailment Threshold [Archive]		2/8/2005	3/16/2007	The minimum Transfer Distribution Factor which, if exceeded, will subject an Interchange Transaction to curtailment to relieve a transmission facility constraint.
Cyber Assets [Archive]		5/2/2006	1/18/2008	Programmable electronic devices and communication networks including hardware, software, and data.
Cyber Security Incident [Archive]		5/2/2006	1/18/2008	Any malicious act or suspicious event that: • Compromises, or was an attempt to compromise, the Electronic Security Perimeter or Physical Security Perimeter of a Critical Cyber Asset, or, • Disrupts, or was an attempt to disrupt, the operation of a Critical Cyber Asset.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Delayed Fault Clearing [Archive]		11/1/2006	12/27/2007	Fault clearing consistent with correct operation of a breaker failure protection system and its associated breakers, or of a backup protection system with an intentional time delay.
Demand [Archive]		2/8/2005	3/16/2007	1. The rate at which electric energy is delivered to or by a system or part of a system, generally expressed in kilowatts or megawatts, at a given instant or averaged over any designated interval of time. 2. The rate at which energy is being used by the customer.
Demand-Side Management [Archive]	DSM	2/8/2005	3/16/2007	The term for all activities or programs undertaken by Load-Serving Entity or its customers to influence the amount or timing of electricity they use.
Direct Control Load Management [Archive]	DCLM	2/8/2005	3/16/2007	Demand-Side Management that is under the direct control of the system operator. DCLM may control the electric supply to individual appliances or equipment on customer premises. DCLM as defined here does not include Interruptible Demand.
Dispatch Order [Archive]		08/22/2008	11/24/2009	A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, each generator is ranked by priority.
Dispersed Load by Substations [Archive]		2/8/2005	3/16/2007	Substation load information configured to represent a system for power flow or system dynamics modeling purposes, or both.
Distribution Factor [Archive]	DF	2/8/2005	3/16/2007	The portion of an Interchange Transaction, typically expressed in per unit that flows across a transmission facility (Flowgate).

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Distribution Provider [Archive]	DP	2/8/2005	3/16/2007	Provides and operates the "wires" between the transmission system and the end-use customer. For those end-use customers who are served at transmission voltages, the Transmission Owner also serves as the Distribution Provider. Thus, the Distribution Provider is not defined by a specific voltage, but rather as performing the Distribution function at any voltage.
Disturbance [Archive]		2/8/2005	3/16/2007	1. An unplanned event that produces an abnormal system condition. 2. Any perturbation to the electric system. 3. The unexpected change in ACE that is caused by the sudden failure of generation or interruption of load.
Disturbance Control Standard [Archive]	DCS	2/8/2005	3/16/2007	The reliability standard that sets the time limit following a Disturbance within which a Balancing Authority must return its Area Control Error to within a specified range.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Disturbance Monitoring Equipment [Archive]	DME	8/2/2006	3/16/2007	Devices capable of monitoring and recording system data pertaining to a Disturbance. Such devices include the following categories of recorders[2]: • Sequence of event recorders which record equipment response to the event • Fault recorders, which record actual waveform data replicating the system primary voltages and currents. This may include protective relays. • Dynamic Disturbance Recorders (DDRs), which record incidents that portray power system behavior during dynamic events such as low-frequency (0.1 Hz – 3 Hz) oscillations and abnormal frequency or voltage excursions
Dynamic Interchange Schedule or Dynamic Schedule [Archive]		2/8/2005	3/16/2007	A telemetered reading or value that is updated in real time and used as a schedule in the AGC/ACE equation and the integrated value of which is treated as a schedule for interchange accounting purposes. Commonly used for scheduling jointly owned generation to or from another Balancing Authority Area.
Dynamic Transfer [Archive]		2/8/2005	3/16/2007	The provision of the real-time monitoring, telemetering, computer software, hardware, communications, engineering, energy accounting (including inadvertent interchange), and administration required to electronically move all or a portion of the real energy services associated with a generator or load out of one Balancing Authority Area into another.

[2] Phasor Measurement Units and any other equipment that meets the functional requirements of DMEs may qualify as DMEs.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Economic Dispatch [Archive]		2/8/2005	3/16/2007	The allocation of demand to individual generating units on line to effect the most economical production of electricity.
Electrical Energy [Archive]		2/8/2005	3/16/2007	The generation or use of electric power by a device over a period of time, expressed in kilowatthours (kWh), megawatthours (MWh), or gigawatthours (GWh).
Electronic Security Perimeter [Archive]	ESP	5/2/2006	1/18/2008	The logical border surrounding a network to which Critical Cyber Assets are connected and for which access is controlled.
Element [Archive]		2/8/2005	3/16/2007	Any electrical device with terminals that may be connected to other electrical devices such as a generator, transformer, circuit breaker, bus section, or transmission line. An element may be comprised of one or more components.
Emergency or BES Emergency [Archive]		2/8/2005	3/16/2007	Any abnormal system condition that requires automatic or immediate manual action to prevent or limit the failure of transmission facilities or generation supply that could adversely affect the reliability of the Bulk Electric System.
Emergency Rating [Archive]		2/8/2005	3/16/2007	The rating as defined by the equipment owner that specifies the level of electrical loading or output, usually expressed in megawatts (MW) or Mvar or other appropriate units, that a system, facility, or element can support, produce, or withstand for a finite period. The rating assumes acceptable loss of equipment life or other physical or safety limitations for the equipment involved.
Emergency Request for Interchange [Archive]	Emergency RFI	10/29/2008	12/17/2009	Request for Interchange to be initiated for Emergency or Energy Emergency conditions.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Energy Emergency [Archive]		2/8/2005	3/16/2007	A condition when a Load-Serving Entity has exhausted all other options and can no longer provide its customers' expected energy requirements.
Equipment Rating [Archive]		2/7/2006	3/16/2007	The maximum and minimum voltage, current, frequency, real and reactive power flows on individual equipment under steady state, short-circuit and transient conditions, as permitted or assigned by the equipment owner.
Existing Transmission Commitments [Archive]	ETC	08/22/2008	11/24/2009	Committed uses of a Transmission Service Provider's Transmission system considered when determining ATC or AFC.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Facility [Archive]		2/7/2006	3/16/2007	A set of electrical equipment that operates as a single Bulk Electric System Element (e.g., a line, a generator, a shunt compensator, transformer, etc.)
Facility Rating [Archive]		2/8/2005	3/16/2007	The maximum or minimum voltage, current, frequency, or real or reactive power flow through a facility that does not violate the applicable equipment rating of any equipment comprising the facility.
Fault [Archive]		2/8/2005	3/16/2007	An event occurring on an electric system such as a short circuit, a broken wire, or an intermittent connection.
Fire Risk [Archive]		2/7/2006	3/16/2007	The likelihood that a fire will ignite or spread in a particular geographic area.
Firm Demand [Archive]		2/8/2005	3/16/2007	That portion of the Demand that a power supplier is obligated to provide except when system reliability is threatened or during emergency conditions.
Firm Transmission Service [Archive]		2/8/2005	3/16/2007	The highest quality (priority) service offered to customers under a filed rate schedule that anticipates no planned interruption.
Flashover [Archive]		2/7/2006	3/16/2007	An electrical discharge through air around or over the surface of insulation, between objects of different potential, caused by placing a voltage across the air space that results in the ionization of the air space.
Flowgate [Archive]		2/8/2005	3/16/2007	A designated point on the transmission system through which the Interchange Distribution Calculator calculates the power flow from Interchange Transactions.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Flowgate [Archive]		08/22/2008	11/24/2009	1.) A portion of the Transmission system through which the Interchange Distribution Calculator calculates the power flow from Interchange Transactions. 2.) A mathematical construct, comprised of one or more monitored transmission Facilities and optionally one or more contingency Facilities, used to analyze the impact of power flows upon the Bulk Electric System.
Flowgate Methodology [Archive]		08/22/2008	11/24/2009	The Flowgate methodology is characterized by identification of key Facilities as Flowgates. Total Flowgate Capabilities are determined based on Facility Ratings and voltage and stability limits. The impacts of Existing Transmission Commitments (ETCs) are determined by simulation. The impacts of ETC, Capacity Benefit Margin (CBM) and Transmission Reliability Margin (TRM) are subtracted from the Total Flowgate Capability, and Postbacks and counterflows are added, to determine the Available Flowgate Capability (AFC) value for that Flowgate. AFCs can be used to determine Available Transfer Capability (ATC).
Forced Outage [Archive]		2/8/2005	3/16/2007	1. The removal from service availability of a generating unit, transmission line, or other facility for emergency reasons. 2. The condition in which the equipment is unavailable due to unanticipated failure.
Frequency Bias [Archive]		2/8/2005	3/16/2007	A value, usually expressed in megawatts per 0.1 Hertz (MW/0.1 Hz), associated with a Balancing Authority Area that approximates the Balancing Authority Area's response to Interconnection frequency error.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Frequency Bias Setting [Archive]		2/8/2005	3/16/2007	A value, usually expressed in MW/0.1 Hz, set into a Balancing Authority ACE algorithm that allows the Balancing Authority to contribute its frequency response to the Interconnection.
Frequency Deviation [Archive]		2/8/2005	3/16/2007	A change in Interconnection frequency.
Frequency Error [Archive]		2/8/2005	3/16/2007	The difference between the actual and scheduled frequency. (F_A – F_S)
Frequency Regulation [Archive]		2/8/2005	3/16/2007	The ability of a Balancing Authority to help the Interconnection maintain Scheduled Frequency. This assistance can include both turbine governor response and Automatic Generation Control.
Frequency Response [Archive]		2/8/2005	3/16/2007	(Equipment) The ability of a system or elements of the system to react or respond to a change in system frequency. (System) The sum of the change in demand, plus the change in generation, divided by the change in frequency, expressed in megawatts per 0.1 Hertz (MW/0.1 Hz).

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Generator Operator [Archive]	GOP	2/8/2005	3/16/2007	The entity that operates generating unit(s) and performs the functions of supplying energy and Interconnected Operations Services.
Generator Owner [Archive]	GO	2/8/2005	3/16/2007	Entity that owns and maintains generating units.
Generator Shift Factor [Archive]	GSF	2/8/2005	3/16/2007	A factor to be applied to a generator's expected change in output to determine the amount of flow contribution that change in output will impose on an identified transmission facility or Flowgate.
Generator-to-Load Distribution Factor [Archive]	GLDF	2/8/2005	3/16/2007	The algebraic sum of a Generator Shift Factor and a Load Shift Factor to determine the total impact of an Interchange Transaction on an identified transmission facility or Flowgate.
Generation Capability Import Requirement [Archive]	GCIR	11/13/2008	11/24/2009	The amount of generation capability from external sources identified by a Load-Serving Entity (LSE) or Resource Planner (RP) to meet its generation reliability or resource adequacy requirements as an alternative to internal resources.
Host Balancing Authority [Archive]		2/8/2005	3/16/2007	1. A Balancing Authority that confirms and implements Interchange Transactions for a Purchasing Selling Entity that operates generation or serves customers directly within the Balancing Authority's metered boundaries. 2. The Balancing Authority within whose metered boundaries a jointly owned unit is physically located.
Hourly Value [Archive]		2/8/2005	3/16/2007	Data measured on a Clock Hour basis.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Implemented Interchange [Archive]		5/2/2006	3/16/2007	The state where the Balancing Authority enters the Confirmed Interchange into its Area Control Error equation.
Inadvertent Interchange [Archive]		2/8/2005	3/16/2007	The difference between the Balancing Authority's Net Actual Interchange and Net Scheduled Interchange. ($I_A - I_S$)
Independent Power Producer [Archive]	IPP	2/8/2005	3/16/2007	Any entity that owns or operates an electricity generating facility that is not included in an electric utility's rate base. This term includes, but is not limited to, cogenerators and small power producers and all other nonutility electricity producers, such as exempt wholesale generators, who sell electricity.
Institute of Electrical and Electronics Engineers, Inc. [Archive]	IEEE	2/7/2006	3/16/2007	
Interchange [Archive]		5/2/2006	3/16/2007	Energy transfers that cross Balancing Authority boundaries.
Interchange Authority [Archive]	IA	5/2/2006	3/16/2007	The responsible entity that authorizes implementation of valid and balanced Interchange Schedules between Balancing Authority Areas, and ensures communication of Interchange information for reliability assessment purposes.
Interchange Distribution Calculator [Archive]	IDC	2/8/2005	3/16/2007	The mechanism used by Reliability Coordinators in the Eastern Interconnection to calculate the distribution of Interchange Transactions over specific Flowgates. It includes a database of all Interchange Transactions and a matrix of the Distribution Factors for the Eastern Interconnection.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Interchange Schedule [Archive]		2/8/2005	3/16/2007	An agreed-upon Interchange Transaction size (megawatts), start and end time, beginning and ending ramp times and rate, and type required for delivery and receipt of power and energy between the Source and Sink Balancing Authorities involved in the transaction.
Interchange Transaction [Archive]		2/8/2005	3/16/2007	An agreement to transfer energy from a seller to a buyer that crosses one or more Balancing Authority Area boundaries.
Interchange Transaction Tag or Tag [Archive]		2/8/2005	3/16/2007	The details of an Interchange Transaction required for its physical implementation.
Interconnected Operations Service [Archive]		2/8/2005	3/16/2007	A service (exclusive of basic energy and transmission services) that is required to support the reliable operation of interconnected Bulk Electric Systems.
Interconnection [Archive]		2/8/2005	3/16/2007	When capitalized, any one of the three major electric system networks in North America: Eastern, Western, and ERCOT.
Interconnection Reliability Operating Limit [Archive]	IROL	2/8/2005	3/16/2007 Retired 12/27/2007	The value (such as MW, MVar, Amperes, Frequency or Volts) derived from, or a subset of the System Operating Limits, which if exceeded, could expose a widespread area of the Bulk Electric System to instability, uncontrolled separation(s) or cascading outages.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Interconnection Reliability Operating Limit [Archive]	IROL	11/1/2006	12/27/2007	A System Operating Limit that, if violated, could lead to instability, uncontrolled separation, or Cascading Outages that adversely impact the reliability of the Bulk Electric System.
Interconnection Reliability Operating Limit T_v [Archive]	IROL T_v	11/1/2006	12/27/2007	The maximum time that an Interconnection Reliability Operating Limit can be violated before the risk to the interconnection or other Reliability Coordinator Area(s) becomes greater than acceptable. Each Interconnection Reliability Operating Limit's T_v shall be less than or equal to 30 minutes.
Intermediate Balancing Authority [Archive]		2/8/2005	3/16/2007	A Balancing Authority Area that has connecting facilities in the Scheduling Path between the Sending Balancing Authority Area and Receiving Balancing Authority Area and operating agreements that establish the conditions for the use of such facilities
Interruptible Load or Interruptible Demand [Archive]		11/1/2006	3/16/2007	Demand that the end-use customer makes available to its Load-Serving Entity via contract or agreement for curtailment.
Joint Control [Archive]		2/8/2005	3/16/2007	Automatic Generation Control of jointly owned units by two or more Balancing Authorities.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Limiting Element [Archive]		2/8/2005	3/16/2007	The element that is 1.)Either operating at its appropriate rating, or 2,) Would be following the limiting contingency. Thus, the Limiting Element establishes a system limit.
Load [Archive]		2/8/2005	3/16/2007	An end-use device or customer that receives power from the electric system.
Load Shift Factor [Archive]	LSF	2/8/2005	3/16/2007	A factor to be applied to a load's expected change in demand to determine the amount of flow contribution that change in demand will impose on an identified transmission facility or monitored Flowgate.
Load-Serving Entity [Archive]	LSE	2/8/2005	3/16/2007	Secures energy and transmission service (and related Interconnected Operations Services) to serve the electrical demand and energy requirements of its end-use customers.
Long-Term Transmission Planning Horizon [Archive]		8/4/2011		Transmission planning period that covers years six through ten or beyond when required to accommodate any known longer lead time projects that may take longer than ten years to complete.
Market Flow [Archive]		11/4/2010	4/21/2011	The total amount of power flowing across a specified Facility or set of Facilities due to a market dispatch of generation internal to the market to serve load internal to the market.
Minimum Vegetation Clearance Distance [Archive]	MVCD	11/3/2011		The calculated minimum distance stated in feet (meters) to prevent flash-over between conductors and vegetation, for various altitudes and operating voltages.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Misoperation [Archive]		2/7/2006	3/16/2007	• Any failure of a Protection System element to operate within the specified time when a fault or abnormal condition occurs within a zone of protection. • Any operation for a fault not within a zone of protection (other than operation as backup protection for a fault in an adjacent zone that is not cleared within a specified time for the protection for that zone). • Any unintentional Protection System operation when no fault or other abnormal condition has occurred unrelated to on-site maintenance and testing activity.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Native Load [Archive]		2/8/2005	3/16/2007	The end-use customers that the Load-Serving Entity is obligated to serve.
Near-Term Transmission Planning Horizon [Archive]		1/24/2011	11/17/2011	The transmission planning period that covers Year One through five.
Net Actual Interchange [Archive]		2/8/2005	3/16/2007	The algebraic sum of all metered interchange over all interconnections between two physically Adjacent Balancing Authority Areas.
Net Energy for Load [Archive]		2/8/2005	3/16/2007	Net Balancing Authority Area generation, plus energy received from other Balancing Authority Areas, less energy delivered to Balancing Authority Areas through interchange. It includes Balancing Authority Area losses but excludes energy required for storage at energy storage facilities.
Net Interchange Schedule [Archive]		2/8/2005	3/16/2007	The algebraic sum of all Interchange Schedules with each Adjacent Balancing Authority.
Net Scheduled Interchange [Archive]		2/8/2005	3/16/2007	The algebraic sum of all Interchange Schedules across a given path or between Balancing Authorities for a given period or instant in time.
Network Integration Transmission Service [Archive]		2/8/2005	3/16/2007	Service that allows an electric transmission customer to integrate, plan, economically dispatch and regulate its network reserves in a manner comparable to that in which the Transmission Owner serves Native Load customers.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Non-Consequential Load Loss [Archive]		8/4/2011		Non-Interruptible Load loss that does not include: (1) Consequential Load Loss, (2) the response of voltage sensitive Load, or (3) Load that is disconnected from the System by end-user equipment.
Non-Firm Transmission Service [Archive]		2/8/2005	3/16/2007	Transmission service that is reserved on an as-available basis and is subject to curtailment or interruption.
Non-Spinning Reserve [Archive]		2/8/2005	3/16/2007	1. That generating reserve not connected to the system but capable of serving demand within a specified time. 2. Interruptible load that can be removed from the system in a specified time.
Normal Clearing [Archive]		11/1/2006	12/27/2007	A protection system operates as designed and the fault is cleared in the time normally expected with proper functioning of the installed protection systems.
Normal Rating [Archive]		2/8/2005	3/16/2007	The rating as defined by the equipment owner that specifies the level of electrical loading, usually expressed in megawatts (MW) or other appropriate units that a system, facility, or element can support or withstand through the daily demand cycles without loss of equipment life.
Nuclear Plant Generator Operator [Archive]		5/2/2007	10/16/2008	Any Generator Operator or Generator Owner that is a Nuclear Plant Licensee responsible for operation of a nuclear facility licensed to produce commercial power.
Nuclear Plant Off-site Power Supply (Off-site Power) [Archive]		5/2/2007	10/16/2008	The electric power supply provided from the electric system to the nuclear power plant distribution system as required per the nuclear power plant license.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Nuclear Plant Licensing Requirements [Archive]	NPLRs	5/2/2007	10/16/2008	Requirements included in the design basis of the nuclear plant and statutorily mandated for the operation of the plant, including nuclear power plant licensing requirements for: 1) Off-site power supply to enable safe shutdown of the plant during an electric system or plant event; and 2) Avoiding preventable challenges to nuclear safety as a result of an electric system disturbance, transient, or condition.
Nuclear Plant Interface Requirements [Archive]	NPIRs	5/2/2007	10/16/2008	The requirements based on NPLRs and Bulk Electric System requirements that have been mutually agreed to by the Nuclear Plant Generator Operator and the applicable Transmission Entities.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Off-Peak [Archive]		2/8/2005	3/16/2007	Those hours or other periods defined by NAESB business practices, contract, agreements, or guides as periods of lower electrical demand.
On-Peak [Archive]		2/8/2005	3/16/2007	Those hours or other periods defined by NAESB business practices, contract, agreements, or guides as periods of higher electrical demand.
Open Access Same Time Information Service [Archive]	OASIS	2/8/2005	3/16/2007	An electronic posting system that the Transmission Service Provider maintains for transmission access data and that allows all transmission customers to view the data simultaneously.
Open Access Transmission Tariff [Archive]	OATT	2/8/2005	3/16/2007	Electronic transmission tariff accepted by the U.S. Federal Energy Regulatory Commission requiring the Transmission Service Provider to furnish to all shippers with non-discriminating service comparable to that provided by Transmission Owners to themselves.
Operating Plan [Archive]		2/7/2006	3/16/2007	A document that identifies a group of activities that may be used to achieve some goal. An Operating Plan may contain Operating Procedures and Operating Processes. A company-specific system restoration plan that includes an Operating Procedure for black-starting units, Operating Processes for communicating restoration progress with other entities, etc., is an example of an Operating Plan.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Operating Procedure [Archive]		2/7/2006	3/16/2007	A document that identifies specific steps or tasks that should be taken by one or more specific operating positions to achieve specific operating goal(s). The steps in an Operating Procedure should be followed in the order in which they are presented, and should be performed by the position(s) identified. A document that lists the specific steps for a system operator to take in removing a specific transmission line from service is an example of an Operating Procedure.
Operating Process [Archive]		2/7/2006	3/16/2007	A document that identifies general steps for achieving a generic operating goal. An Operating Process includes steps with options that may be selected depending upon Real-time conditions. A guideline for controlling high voltage is an example of an Operating Process.
Operating Reserve [Archive]		2/8/2005	3/16/2007	That capability above firm system demand required to provide for regulation, load forecasting error, equipment forced and scheduled outages and local area protection. It consists of spinning and non-spinning reserve.
Operating Reserve – Spinning [Archive]		2/8/2005	3/16/2007	The portion of Operating Reserve consisting of: • Generation synchronized to the system and fully available to serve load within the Disturbance Recovery Period following the contingency event; or • Load fully removable from the system within the Disturbance Recovery Period following the contingency event.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Operating Reserve – Supplemental [Archive]		2/8/2005	3/16/2007	The portion of Operating Reserve consisting of: • Generation (synchronized or capable of being synchronized to the system) that is fully available to serve load within the Disturbance Recovery Period following the contingency event; or • Load fully removable from the system within the Disturbance Recovery Period following the contingency event.
Operating Voltage [Archive]		2/7/2006	3/16/2007	The voltage level by which an electrical system is designated and to which certain operating characteristics of the system are related; also, the effective (root-mean-square) potential difference between any two conductors or between a conductor and the ground. The actual voltage of the circuit may vary somewhat above or below this value.
Operational Planning Analysis [Archive]		10/17/2008	3/17/2011	An analysis of the expected system conditions for the next day's operation. (That analysis may be performed either a day ahead or as much as 12 months ahead.) Expected system conditions include things such as load forecast(s), generation output levels, and known system constraints (transmission facility outages, generator outages, equipment limitations, etc.).
Outage Transfer Distribution Factor [Archive]	OTDF	8/22/2008	11/24/2009	In the post-contingency configuration of a system under study, the electric Power Transfer Distribution Factor (PTDF) with one or more system Facilities removed from service (outaged).

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Overlap Regulation Service [Archive]		2/8/2005	3/16/2007	A method of providing regulation service in which the Balancing Authority providing the regulation service incorporates another Balancing Authority's actual interchange, frequency response, and schedules into providing Balancing Authority's AGC/ACE equation.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Participation Factors [Archive]		8/22/2008	11/24/2009	A set of dispatch rules such that given a specific amount of load to serve, an approximate generation dispatch can be determined. To accomplish this, generators are assigned a percentage that they will contribute to serve load.
Peak Demand [Archive]		2/8/2005	3/16/2007	1. The highest hourly integrated Net Energy For Load within a Balancing Authority Area occurring within a given period (e.g., day, month, season, or year). 2. The highest instantaneous demand within the Balancing Authority Area.
Performance-Reset Period [Archive]		2/7/2006	3/16/2007	The time period that the entity being assessed must operate without any violations to reset the level of non compliance to zero.
Physical Security Perimeter [Archive]	PSP	5/2/2006	1/18/2008	The physical, completely enclosed (“six-wall”) border surrounding computer rooms, telecommunications rooms, operations centers, and other locations in which Critical Cyber Assets are housed and for which access is controlled.
Planning Assessment [Archive]		8/4/2011		Documented evaluation of future Transmission system performance and Corrective Action Plans to remedy identified deficiencies.
Planning Authority [Archive]	PA	2/8/2005	3/16/2007	The responsible entity that coordinates and integrates transmission facility and service plans, resource plans, and protection systems.
Planning Coordinator [Archive]	PC	8/22/2008	11/24/2009	See Planning Authority.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Point of Delivery [Archive]	POD	2/8/2005	3/16/2007	A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction leaves or a Load-Serving Entity receives its energy.
Point of Receipt [Archive]	POR	2/8/2005	3/16/2007	A location that the Transmission Service Provider specifies on its transmission system where an Interchange Transaction enters or a Generator delivers its output.
Point to Point Transmission Service [Archive]	PTP	2/8/2005	3/16/2007	The reservation and transmission of capacity and energy on either a firm or non-firm basis from the Point(s) of Receipt to the Point(s) of Delivery.
Postback [Archive]		08/22/2008	Not approved; Modification directed 11/24/09	Positive adjustments to ATC or AFC as defined in Business Practices. Such Business Practices may include processing of redirects and unscheduled service.
Power Transfer Distribution Factor [Archive]	PTDF	08/22/2008	11/24/2009	In the pre-contingency configuration of a system under study, a measure of the responsiveness or change in electrical loadings on transmission system Facilities due to a change in electric power transfer from one area to another, expressed in percent (up to 100%) of the change in power transfer
Pro Forma Tariff [Archive]		2/8/2005	3/16/2007	Usually refers to the standard OATT and/or associated transmission rights mandated by the U.S. Federal Energy Regulatory Commission Order No. 888.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Protection System [Archive]		2/7/2006	3/17/2007 Will be retired 4/1/2013	Protective relays, associated communication systems, voltage and current sensing devices, station batteries and DC control circuitry.
Protection System[3] [Archive] [Implementation Plan]		11/19/2010	2/3/2012	Protection System – • Protective relays which respond to electrical quantities, • Communications systems necessary for correct operation of protective functions • Voltage and current sensing devices providing inputs to protective relays, • Station dc supply associated with protective functions (including batteries, battery chargers, and non-battery-based dc supply), and • Control circuitry associated with protective functions through the trip coil(s) of the circuit breakers or other interrupting devices.
Pseudo-Tie [Archive]		2/8/2005	3/16/2007	A telemetered reading or value that is updated in real time and used as a "virtual" tie line flow in the AGC/ACE equation but for which no physical tie or energy metering actually exists. The integrated value is used as a metered MWh value for interchange accounting purposes.

[3] This term becomes effective on April 1, 2013.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Purchasing-Selling Entity [Archive]	PSE	2/8/2005	3/16/2007	The entity that purchases or sells, and takes title to, energy, capacity, and Interconnected Operations Services. Purchasing-Selling Entities may be affiliated or unaffiliated merchants and may or may not own generating facilities.
Ramp Rate or Ramp [Archive]		2/8/2005	3/16/2007	(Schedule) The rate, expressed in megawatts per minute, at which the interchange schedule is attained during the ramp period. (Generator) The rate, expressed in megawatts per minute, that a generator changes its output.
Rated Electrical Operating Conditions [Archive]		2/7/2006	3/16/2007	The specified or reasonably anticipated conditions under which the electrical system or an individual electrical circuit is intend/designed to operate
Rating [Archive]		2/8/2005	3/16/2007	The operational limits of a transmission system element under a set of specified conditions.
Rated System Path Methodology [Archive]		08/22/2008	11/24/2009	The Rated System Path Methodology is characterized by an initial Total Transfer Capability (TTC), determined via simulation. Capacity Benefit Margin, Transmission Reliability Margin, and Existing Transmission Commitments are subtracted from TTC, and Postbacks and counterflows are added as applicable, to derive Available Transfer Capability. Under the Rated System Path Methodology, TTC results are generally reported as specific transmission path capabilities.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Reactive Power [Archive]		2/8/2005	3/16/2007	The portion of electricity that establishes and sustains the electric and magnetic fields of alternating-current equipment. Reactive power must be supplied to most types of magnetic equipment, such as motors and transformers. It also must supply the reactive losses on transmission facilities. Reactive power is provided by generators, synchronous condensers, or electrostatic equipment such as capacitors and directly influences electric system voltage. It is usually expressed in kilovars (kvar) or megavars (Mvar).
Real Power [Archive]		2/8/2005	3/16/2007	The portion of electricity that supplies energy to the load.
Reallocation [Archive]		2/8/2005	3/16/2007	The total or partial curtailment of Transactions during TLR Level 3a or 5a to allow Transactions using higher priority to be implemented.
Real-time [Archive]		2/7/2006	3/16/2007	Present time as opposed to future time. (From Interconnection Reliability Operating Limits standard.)
Real-time Assessment [Archive]		10/17/2008	3/17/2011	An examination of existing and expected system conditions, conducted by collecting and reviewing immediately available data
Receiving Balancing Authority [Archive]		2/8/2005	3/16/2007	The Balancing Authority importing the Interchange.
Regional Reliability Organization [Archive]	RRO	2/8/2005	3/16/2007	1. An entity that ensures that a defined area of the Bulk Electric System is reliable, adequate and secure. 2. A member of the North American Electric Reliability Council. The Regional Reliability Organization can serve as the Compliance Monitor.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Regional Reliability Plan [Archive]		2/8/2005	3/16/2007	The plan that specifies the Reliability Coordinators and Balancing Authorities within the Regional Reliability Organization, and explains how reliability coordination will be accomplished.
Regulating Reserve [Archive]		2/8/2005	3/16/2007	An amount of reserve responsive to Automatic Generation Control, which is sufficient to provide normal regulating margin.
Regulation Service [Archive]		2/8/2005	3/16/2007	The process whereby one Balancing Authority contracts to provide corrective response to all or a portion of the ACE of another Balancing Authority. The Balancing Authority providing the response assumes the obligation of meeting all applicable control criteria as specified by NERC for itself and the Balancing Authority for which it is providing the Regulation Service.
Reliability Adjustment RFI [Archive]		10/29/2008	12/17/2009	Request to modify an Implemented Interchange Schedule for reliability purposes.
Reliability Coordinator [Archive]	RC	2/8/2005	3/16/2007	The entity that is the highest level of authority who is responsible for the reliable operation of the Bulk Electric System, has the Wide Area view of the Bulk Electric System, and has the operating tools, processes and procedures, including the authority to prevent or mitigate emergency operating situations in both next-day analysis and real-time operations. The Reliability Coordinator has the purview that is broad enough to enable the calculation of Interconnection Reliability Operating Limits, which may be based on the operating parameters of transmission systems beyond any Transmission Operator's vision.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Reliability Coordinator Area [Archive]		2/8/2005	3/16/2007	The collection of generation, transmission, and loads within the boundaries of the Reliability Coordinator. Its boundary coincides with one or more Balancing Authority Areas.
Reliability Coordinator Information System [Archive]	RCIS	2/8/2005	3/16/2007	The system that Reliability Coordinators use to post messages and share operating information in real time.
Remedial Action Scheme [Archive]	RAS	2/8/2005	3/16/2007	See "Special Protection System"
Reportable Disturbance [Archive]		2/8/2005	3/16/2007	Any event that causes an ACE change greater than or equal to 80% of a Balancing Authority's or reserve sharing group's most severe contingency. The definition of a reportable disturbance is specified by each Regional Reliability Organization. This definition may not be retroactively adjusted in response to observed performance.
Request for Interchange [Archive]	RFI	5/2/2006	3/16/2007	A collection of data as defined in the NAESB RFI Datasheet, to be submitted to the Interchange Authority for the purpose of implementing bilateral Interchange between a Source and Sink Balancing Authority.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Reserve Sharing Group [Archive]	RSG	2/8/2005	3/16/2007	A group whose members consist of two or more Balancing Authorities that collectively maintain, allocate, and supply operating reserves required for each Balancing Authority's use in recovering from contingencies within the group. Scheduling energy from an Adjacent Balancing Authority to aid recovery need not constitute reserve sharing provided the transaction is ramped in over a period the supplying party could reasonably be expected to load generation in (e.g., ten minutes). If the transaction is ramped in quicker (e.g., between zero and ten minutes) then, for the purposes of Disturbance Control Performance, the Areas become a Reserve Sharing Group.
Resource Planner [Archive]	RP	2/8/2005	3/16/2007	The entity that develops a long-term (generally one year and beyond) plan for the resource adequacy of specific loads (customer demand and energy requirements) within a Planning Authority Area.
Response Rate [Archive]		2/8/2005	3/16/2007	The Ramp Rate that a generating unit can achieve under normal operating conditions expressed in megawatts per minute (MW/Min).
Right-of-Way [Archive]	ROW	2/7/2006	3/16/2007	A corridor of land on which electric lines may be located. The Transmission Owner may own the land in fee, own an easement, or have certain franchise, prescription, or license rights to construct and maintain lines.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Right-of-Way [Archive]	ROW	11/3/2011		The corridor of land under a transmission line(s) needed to operate the line(s). The width of the corridor is established by engineering or construction standards as documented in either construction documents, pre-2007 vegetation maintenance records, or by the blowout standard in effect when the line was built. The ROW width in no case exceeds the Transmission Owner's legal rights but may be less based on the aforementioned criteria.
Right-of-Way [Archive]	ROW	5/9/12		The corridor of land under a transmission line(s) needed to operate the line(s). The width of the corridor is established by engineering or construction standards as documented in either construction documents, pre-2007 vegetation maintenance records, or by the blowout standard in effect when the line was built. The ROW width in no case exceeds the applicable Transmission Owner's or applicable Generator Owner's legal rights but may be less based on the aforementioned criteria.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Scenario [Archive]		2/7/2006	3/16/2007	Possible event.
Schedule [Archive]		2/8/2005	3/16/2007	(Verb) To set up a plan or arrangement for an Interchange Transaction. (Noun) An Interchange Schedule.
Scheduled Frequency [Archive]		2/8/2005	3/16/2007	60.0 Hertz, except during a time correction.
Scheduling Entity [Archive]		2/8/2005	3/16/2007	An entity responsible for approving and implementing Interchange Schedules.
Scheduling Path [Archive]		2/8/2005	3/16/2007	The Transmission Service arrangements reserved by the Purchasing-Selling Entity for a Transaction.
Sending Balancing Authority [Archive]		2/8/2005	3/16/2007	The Balancing Authority exporting the Interchange.
Sink Balancing Authority [Archive]		2/8/2005	3/16/2007	The Balancing Authority in which the load (sink) is located for an Interchange Transaction. (This will also be a Receiving Balancing Authority for the resulting Interchange Schedule.)
Source Balancing Authority [Archive]		2/8/2005	3/16/2007	The Balancing Authority in which the generation (source) is located for an Interchange Transaction. (This will also be a Sending Balancing Authority for the resulting Interchange Schedule.)

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Special Protection System (Remedial Action Scheme) [Archive]	SPS	2/8/2005	3/16/2007	An automatic protection system designed to detect abnormal or predetermined system conditions, and take corrective actions other than and/or in addition to the isolation of faulted components to maintain system reliability. Such action may include changes in demand, generation (MW and Mvar), or system configuration to maintain system stability, acceptable voltage, or power flows. An SPS does not include (a) underfrequency or undervoltage load shedding or (b) fault conditions that must be isolated or (c) out-of-step relaying (not designed as an integral part of an SPS). Also called Remedial Action Scheme.
Spinning Reserve [Archive]		2/8/2005	3/16/2007	Unloaded generation that is synchronized and ready to serve additional demand.
Stability [Archive]		2/8/2005	3/16/2007	The ability of an electric system to maintain a state of equilibrium during normal and abnormal conditions or disturbances.
Stability Limit [Archive]		2/8/2005	3/16/2007	The maximum power flow possible through some particular point in the system while maintaining stability in the entire system or the part of the system to which the stability limit refers.
Supervisory Control and Data Acquisition [Archive]	SCADA	2/8/2005	3/16/2007	A system of remote control and telemetry used to monitor and control the transmission system.
Supplemental Regulation Service [Archive]		2/8/2005	3/16/2007	A method of providing regulation service in which the Balancing Authority providing the regulation service receives a signal representing all or a portion of the other Balancing Authority's ACE.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Surge [Archive]		2/8/2005	3/16/2007	A transient variation of current, voltage, or power flow in an electric circuit or across an electric system.
Sustained Outage [Archive]		2/7/2006	3/16/2007	The deenergized condition of a transmission line resulting from a fault or disturbance following an unsuccessful automatic reclosing sequence and/or unsuccessful manual reclosing procedure.
System [Archive]		2/8/2005	3/16/2007	A combination of generation, transmission, and distribution components.
System Operating Limit [Archive]	SOL	2/8/2005	3/16/2007	The value (such as MW, MVar, Amperes, Frequency or Volts) that satisfies the most limiting of the prescribed operating criteria for a specified system configuration to ensure operation within acceptable reliability criteria. System Operating Limits are based upon certain operating criteria. These include, but are not limited to: • Facility Ratings (Applicable pre- and post-Contingency equipment or facility ratings) • Transient Stability Ratings (Applicable pre- and post-Contingency Stability Limits) • Voltage Stability Ratings (Applicable pre- and post-Contingency Voltage Stability) • System Voltage Limits (Applicable pre- and post-Contingency Voltage Limits)
System Operator [Archive]		2/8/2005	3/16/2007	An individual at a control center (Balancing Authority, Transmission Operator, Generator Operator, Reliability Coordinator) whose responsibility it is to monitor and control that electric system in real time.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Telemetering [Archive]		2/8/2005	3/16/2007	The process by which measurable electrical quantities from substations and generating stations are instantaneously transmitted to the control center, and by which operating commands from the control center are transmitted to the substations and generating stations.
Thermal Rating [Archive]		2/8/2005	3/16/2007	The maximum amount of electrical current that a transmission line or electrical facility can conduct over a specified time period before it sustains permanent damage by overheating or before it sags to the point that it violates public safety requirements.
Tie Line [Archive]		2/8/2005	3/16/2007	A circuit connecting two Balancing Authority Areas.
Tie Line Bias [Archive]		2/8/2005	3/16/2007	A mode of Automatic Generation Control that allows the Balancing Authority to 1.) maintain its Interchange Schedule and 2.) respond to Interconnection frequency error.
Time Error [Archive]		2/8/2005	3/16/2007	The difference between the Interconnection time measured at the Balancing Authority(ies) and the time specified by the National Institute of Standards and Technology. Time error is caused by the accumulation of Frequency Error over a given period.
Time Error Correction [Archive]		2/8/2005	3/16/2007	An offset to the Interconnection's scheduled frequency to return the Interconnection's Time Error to a predetermined value.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
TLR Log [Archive]		2/8/2005	3/16/2007	Report required to be filed after every TLR Level 2 or higher in a specified format. The NERC IDC prepares the report for review by the issuing Reliability Coordinator. After approval by the issuing Reliability Coordinator, the report is electronically filed in a public area of the NERC Web site.
Total Flowgate Capability [Archive]	TFC	08/22/2008	11/24/2009	The maximum flow capability on a Flowgate, is not to exceed its thermal rating, or in the case of a flowgate used to represent a specific operating constraint (such as a voltage or stability limit), is not to exceed the associated System Operating Limit.
Total Transfer Capability [Archive]	TTC	2/8/2005	3/16/2007	The amount of electric power that can be moved or transferred reliably from one area to another area of the interconnected transmission systems by way of all transmission lines (or paths) between those areas under specified system conditions.
Transaction [Archive]		2/8/2005	3/16/2007	See Interchange Transaction.
Transfer Capability [Archive]		2/8/2005	3/16/2007	The measure of the ability of interconnected electric systems to move or transfer power *in a reliable manner* from one area to another over all transmission lines (or paths) between those areas under specified system conditions. The units of transfer capability are in terms of electric power, generally expressed in megawatts (MW). The transfer capability from "Area A" to "Area B" is *not g*enerally equal to the transfer capability from "Area B" to "Area A."

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Transfer Distribution Factor [Archive]		2/8/2005	3/16/2007	See Distribution Factor.
Transmission [Archive]		2/8/2005	3/16/2007	An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to other electric systems.
Transmission Constraint [Archive]		2/8/2005	3/16/2007	A limitation on one or more transmission elements that may be reached during normal or contingency system operations.
Transmission Customer [Archive]		2/8/2005	3/16/2007	1. Any eligible customer (or its designated agent) that can or does execute a transmission service agreement or can or does receive transmission service. 2. Any of the following responsible entities: Generator Owner, Load-Serving Entity, or Purchasing-Selling Entity.
Transmission Line [Archive]		2/7/2006	3/16/2007	A system of structures, wires, insulators and associated hardware that carry electric energy from one point to another in an electric power system. Lines are operated at relatively high voltages varying from 69 kV up to 765 kV, and are capable of transmitting large quantities of electricity over long distances.
Transmission Operator [Archive]	TOP	2/8/2005	3/16/2007	The entity responsible for the reliability of its “local” transmission system, and that operates or directs the operations of the transmission facilities.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Transmission Operator Area [Archive]		08/22/2008	11/24/2009	The collection of Transmission assets over which the Transmission Operator is responsible for operating.
Transmission Owner [Archive]	TO	2/8/2005	3/16/2007	The entity that owns and maintains transmission facilities.
Transmission Planner [Archive]	TP	2/8/2005	3/16/2007	The entity that develops a long-term (generally one year and beyond) plan for the reliability (adequacy) of the interconnected bulk electric transmission systems within its portion of the Planning Authority Area.
Transmission Reliability Margin [Archive]	TRM	2/8/2005	3/16/2007	The amount of transmission transfer capability necessary to provide reasonable assurance that the interconnected transmission network will be secure. TRM accounts for the inherent uncertainty in system conditions and the need for operating flexibility to ensure reliable system operation as system conditions change.
Transmission Reliability Margin Implementation Document [Archive]	TRMID	08/22/2008	11/24/2009	A document that describes the implementation of a Transmission Reliability Margin methodology, and provides information related to a Transmission Operator's calculation of TRM.
Transmission Service [Archive]		2/8/2005	3/16/2007	Services provided to the Transmission Customer by the Transmission Service Provider to move energy from a Point of Receipt to a Point of Delivery.
Transmission Service Provider [Archive]	TSP	2/8/2005	3/16/2007	The entity that administers the transmission tariff and provides Transmission Service to Transmission Customers under applicable transmission service agreements.

Continent-wide Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Vegetation [Archive]		2/7/2006	3/16/2007	All plant material, growing or not, living or dead.
Vegetation Inspection [Archive]		2/7/2006	3/16/2007	The systematic examination of a transmission corridor to document vegetation conditions.
Vegetation Inspection [Archive]		11/3/2011		The systematic examination of vegetation conditions on a Right-of-Way and those vegetation conditions under the Transmission Owner's control that are likely to pose a hazard to the line(s) prior to the next planned maintenance or inspection. This may be combined with a general line inspection.
Vegetation Inspection [Archive]		5/9/12		The systematic examination of vegetation conditions on a Right-of-Way and those vegetation conditions under the applicable Transmission Owner's or applicable Generator Owner's control that are likely to pose a hazard to the line(s) prior to the next planned maintenance or inspection. This may be combined with a general line inspection.
Wide Area [Archive]		2/8/2005	3/16/2007	The entire Reliability Coordinator Area as well as the critical flow and status information from adjacent Reliability Coordinator Areas as determined by detailed system studies to allow the calculation of Interconnected Reliability Operating Limits.
Year One [Archive]		1/24/2011	11/17/2011	The first twelve month period that a Planning Coordinator or a Transmission Planner is responsible for assessing. For an assessment started in a given calendar year, Year One includes the forecasted peak Load period for one of the following two calendar years. For example, if a Planning Assessment was started in 2011, then Year One includes the forecasted peak Load period for either 2012 or 2013.

Reliability*First* Regional Definitions

The following definitions were developed for use in Reliability*First* Regional Standards.

RFC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Resource Adequacy [Archive]		08/05/2009	03/17/2011	The ability of supply-side and demand-side resources to meet the aggregate electrical demand (including losses)
Net Internal Demand [Archive]		08/05/2009	03/17/2011	Total of all end-use customer demand and electric system losses within specified metered boundaries, less Direct Control Management and Interruptible Demand
Peak Period [Archive]		08/05/2009	03/17/2011	A period consisting of two (2) or more calendar months but less than seven (7) calendar months, which includes the period during which the responsible entity's annual peak demand is expected to occur
Wind Generating Station [Archive]		11/03/2011		A collection of wind turbines electrically connected together and injecting energy into the grid at one point, sometimes known as a "Wind Farm."
Year One [Archive]		08/05/2009	03/17/2011	The planning year that begins with the upcoming annual Peak Period

NPCC Regional Definitions

The following definitions were developed for use in NPCC Regional Standards.

NPCC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Current Zero Time [Archive]		11/04/2010	10/20/2011	The time of the final current zero on the last phase to interrupt.
Generating Plant [Archive]		11/04/2010	10/20/2011	One or more generators at a single physical location whereby any single contingency can affect all the generators at that location.

WECC Regional Definitions

The following definitions were developed for use in WECC Regional Standards.

WECC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Area Control Error† [Archive]	ACE	3/12/2007	6/8/2007	Means the instantaneous difference between net actual and scheduled interchange, taking into account the effects of Frequency Bias including correction for meter error.
Automatic Generation Control‡ [Archive]	AGC	3/12/2007	6/8/2007	Means equipment that automatically adjusts a Control Area's generation from a central location to maintain its interchange schedule plus Frequency Bias.
Automatic Time Error Correction [Archive]		3/26/2008	5/21/2009	A frequency control automatic action that a Balancing Authority uses to offset its frequency contribution to support the Interconnection's scheduled frequency.
Average Generation‡ [Archive]		3/12/2007	6/8/2007	Means the total MWh generated within the Balancing Authority Operator's Balancing Authority Area during the prior year divided by 8760 hours (8784 hours if the prior year had 366 days).
Business Day‡ [Archive]		3/12/2007	6/8/2007	Means any day other than Saturday, Sunday, or a legal public holiday as designated in section 6103 of title 5, U.S. Code.
Disturbance‡ [Archive]		3/12/2007	6/8/2007	Means (i) any perturbation to the electric system, or (ii) the unexpected change in ACE that is caused by the sudden loss of generation or interruption of load.

WECC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Extraordinary Contingency‡ [Archive]		3/12/2007	6/8/2007	Shall have the meaning set out in Excuse of Performance, section B.4.c. language in section B.4.c: *means any act of God, actions by a non-affiliated third party, labor disturbance, act of the public enemy, war, insurrection, riot, fire, storm or flood, earthquake, explosion, accident to or breakage, failure or malfunction of machinery or equipment, or any other cause beyond the Reliability Entity's reasonable control; provided that prudent industry standards (e.g. maintenance, design, operation) have been employed; and provided further that no act or cause shall be considered an Extraordinary Contingency if such act or cause results in any contingency contemplated in any WECC Reliability Standard (e.g., the "Most Severe Single Contingency" as defined in the WECC Reliability Criteria or any lesser contingency).*
Frequency Bias‡ [Archive]		3/12/2007	6/8/2007	Means a value, usually given in megawatts per 0.1 Hertz, associated with a Control Area that relates the difference between scheduled and actual frequency to the amount of generation required to correct the difference.
Generating Unit Capability‡ [Archive]		3/12/2007	6/8/2007	Means the MVA nameplate rating of a generator.
Non-spinning Reserve‡ [Archive]		3/12/2007	6/8/2007	Means that Operating Reserve not connected to the system but capable of serving demand within a specified time, or interruptible load that can be removed from the system in a specified time.
Normal Path Rating‡		3/12/2007	6/8/2007	Is the maximum path rating in MW that has been demonstrated to WECC through study results or actual operation, whichever

WECC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
[Archive]				is greater. For a path with transfer capability limits that vary seasonally, it is the maximum of all the seasonal values.
Operating Reserve‡ [Archive]		3/12/2007	6/8/2007	Means that capability above firm system demand required to provide for regulation, load-forecasting error, equipment forced and scheduled outages and local area protection. Operating Reserve consists of Spinning Reserve and Nonspinning Reserve.
Operating Transfer Capability Limit‡ [Archive]	OTC	3/12/2007	6/8/2007	Means the maximum value of the most critical system operating parameter(s) which meets: (a) precontingency criteria as determined by equipment loading capability and acceptable voltage conditions, (b) transient criteria as determined by equipment loading capability and acceptable voltage conditions, (c) transient performance criteria, and (d) post-contingency loading and voltage criteria.
Primary Inadvertent Interchange [Archive]		3/26/2008	5/21/2009	The component of area (n) inadvertent interchange caused by the regulating deficiencies of the area (n).
Secondary Inadvertent Interchange [Archive]		3/26/2008	5/21/2009	The component of area (n) inadvertent interchange caused by the regulating deficiencies of area (i).
Spinning Reserve‡ [Archive]		3/12/2007	6/8/2007	Means unloaded generation which is synchronized and ready to serve additional demand. It consists of Regulating reserve and Contingency reserve (as each are described in Sections B.a.i and ii).

WECC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
WECC Table 2[†] [Archive]		3/12/2007	6/8/2007	Means the table maintained by the WECC identifying those transfer paths monitored by the WECC regional Reliability coordinators. As of the date set out therein, the transmission paths identified in Table 2 are as listed in Attachment A to this Standard.
Functionally Equivalent Protection System [Archive]	FEPS	10/29/2008	4/21/2011	A Protection System that provides performance as follows: • Each Protection System can detect the same faults within the zone of protection and provide the clearing times and coordination needed to comply with all Reliability Standards. • Each Protection System may have different components and operating characteristics.
Functionally Equivalent RAS [Archive]	FERAS	10/29/2008	4/21/2011	A Remedial Action Scheme ("RAS") that provides the same performance as follows: • Each RAS can detect the same conditions and provide mitigation to comply with all Reliability Standards. • Each RAS may have different components and operating characteristics.
Security-Based Misoperation [Archive]		10/29/2008	4/21/2011	A Misoperation caused by the incorrect operation of a Protection System or RAS. Security is a component of reliability and is the measure of a device's certainty not to operate falsely.
Dependability-Based Misoperation [Archive]		10/29/2008	4/21/2011	Is the absence of a Protection System or RAS operation when intended. Dependability is a component of reliability and is the measure of a device's certainty to operate when required.

WECC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Commercial Operation [Archive]		10/29/2008	4/21/2011	Achievement of this designation indicates that the Generator Operator or Transmission Operator of the synchronous generator or synchronous condenser has received all approvals necessary for operation after completion of initial start-up testing.
Qualified Transfer Path Curtailment Event [Archive]		2/10/2009	3/17/2011	Each hour that a Transmission Operator calls for Step 4 or higher for one or more consecutive hours (See Attachment 1 IRO-006-WECC-1) during which the curtailment tool is functional.
Relief Requirement [Archive]		2/10/2009	3/17/2011	The expected amount of the unscheduled flow reduction on the Qualified Transfer Path that would result by curtailing each Sink Balancing Authority's Contributing Schedules by the percentages listed in the columns of WECC Unscheduled Flow Mitigation Summary of Actions Table in Attachment 1 WECC IRO-006-WECC-1.
Transfer Distribution Factor [Archive]	TDF	2/10/2009	3/17/2011	The percentage of USF that flows across a Qualified Transfer Path when an Interchange Transaction (Contributing Schedule) is implemented. [See the WECC Unscheduled Flow Mitigation Summary of Actions Table (Attachment 1 WECC IRO-006-WECC-1).]
Contributing Schedule [Archive]		2/10/2009	3/17/2011	A Schedule not on the Qualified Transfer Path between a Source Balancing Authority and a Sink Balancing Authority that contributes unscheduled flow across the Qualified Transfer Path.
Qualified Transfer Path [Archive]		2/10/2009	3/17/2011	A transfer path designated by the WECC Operating Committee as being qualified for WECC unscheduled flow mitigation.

WECC Regional Term	Acronym	BOT Approved Date	FERC Approved Date	Definition
Qualified Controllable Device [Archive]		2/10/2009	3/17/2011	A controllable device installed in the Interconnection for controlling energy flow and the WECC Operating Committee has approved using the device for controlling the USF on the Qualified Transfer Paths.

Endnotes

[†] FERC approved the WECC Tier One Reliability Standards in the Order Approving Regional Reliability Standards for the Western Interconnection and Directing Modifications, 119 FERC ¶ 61,260 (June 8, 2007). In that Order, FERC directed WECC to address the inconsistencies between the regional definitions and the NERC Glossary in developing permanent replacement standards. The replacement standards designed to address the shortcomings were filed with FERC in 2009.

Exhibit C

Informational Summary of Each Reliability Standard Approved by FERC

CIP-002-4 - NERC Standards CIP-002-4 through CIP-009-4 provide a cyber security framework for the identification and protection of Critical Cyber Assets to support reliable operation of the Bulk Electric System.

These standards recognize the differing roles of each entity in the operation of the Bulk Electric System, the criticality and vulnerability of the assets needed to manage Bulk Electric System reliability, and the risks to which they are exposed.

Business and operational demands for managing and maintaining a reliable Bulk Electric System increasingly rely on Cyber Assets supporting critical reliability functions and processes to communicate with each other, across functions and organizations, for services and data. This results in increased risks to these Cyber Assets.

Standard CIP-002-4 requires the identification and documentation of the Critical Cyber Assets associated with the Critical Assets that support the reliable operation of the Bulk Electric System. These Critical Assets are to be identified through the application of the criteria in Attachment 1.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-002-4 was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-002-4 was approved by the Federal Energy Regulatory Commission.

CIP-003-4 - Standard CIP-003-4 requires that Responsible Entities have minimum security management controls in place to protect Critical Cyber Assets. Standard CIP-003-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-003-4 was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-003-4 was approved by the Federal Energy Regulatory Commission.

CIP-004-4 - Standard CIP-004-4 requires that personnel having authorized cyber or authorized unescorted physical access to Critical Cyber Assets, including contractors and service vendors, have an appropriate level of personnel risk assessment, training, and security awareness. Standard CIP-004-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-004-4 was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-004-4 was approved by the Federal Energy Regulatory Commission.

CIP-005-4a - Standard CIP-005-4a requires the identification and protection of the Electronic Security Perimeter(s) inside which all Critical Cyber Assets reside, as well as all access points on the perimeter. Standard CIP-005-4a should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-005-4a was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-005-4a was approved by the Federal Energy Regulatory Commission.

CIP-006-4c - Standard CIP-006-4c is intended to ensure the implementation of a physical security program for the protection of Critical Cyber Assets. Standard CIP-006-4c should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-006-4c was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-006-4c was approved by the Federal Energy Regulatory Commission.

CIP-007-4 - Standard CIP-007-4 requires Responsible Entities to define methods, processes, and procedures for securing those systems determined to be Critical Cyber Assets, as well as the other (non-critical) Cyber Assets within the Electronic Security Perimeter(s). Standard CIP-007-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-007-4 was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-007-4 was approved by the Federal Energy Regulatory Commission.

CIP-008-4 - Standard CIP-008-4 ensures the identification, classification, response, and reporting of Cyber Security Incidents related to Critical Cyber Assets. Standard CIP-008-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-008-4 was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-008-4 was approved by the Federal Energy Regulatory Commission.

CIP-009-4 - Standard CIP-009-4 ensures that recovery plan(s) are put in place for Critical Cyber Assets and that these plans follow established business continuity and disaster recovery techniques and practices. Standard CIP-009-4 should be read as part of a group of standards numbered Standards CIP-002-4 through CIP-009-4.

- Reliability Coordinator.
- Balancing Authority.
- Interchange Authority.
- Transmission Service Provider.
- Transmission Owner.
- Transmission Operator.
- Generator Owner.
- Generator Operator.
- Load Serving Entity.
- NERC.
- Regional Entity.

The standard was approved by the registered ballot body by an 80.56% affirmative vote.
On January 24, 2011, CIP-009-4 was adopted by the NERC Board of Trustees.
On April 19, 2012, CIP-009-4 was approved by the Federal Energy Regulatory Commission.

EOP-003-2 - A Balancing Authority and Transmission Operator operating with insufficient generation or transmission capacity must have the capability and authority to shed load rather than risk an uncontrolled failure of the Interconnection.

- Transmission Operators.
- Balancing Authorities.

The standard was approved by the registered ballot body by an 81.72% affirmative vote.
On November 4, 2012, EOP-003-2 was adopted by the NERC Board of Trustees.
On May 7, 2012, EOP-003-2 was approved by the Federal Energy Regulatory Commission.

PRC-006-1 - To establish design and documentation requirements for automatic underfrequency load shedding (UFLS) programs to arrest declining frequency, assist recovery of frequency following underfrequency events and provide last resort system preservation measures.

- Planning Coordinators
- UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:
    - Transmission Owners
    - Distribution Providers
- Transmission Owners that own Elements identified in the UFLS program established by the Planning Coordinators.

The standard was approved by the registered ballot body by an 81.72% affirmative vote.
On November 4, 2010, PRC-006-1 was adopted by the NERC Board of Trustees.
On May 7, 2012, PRC-006-1 was approved by the Federal Energy Regulatory Commission.