

Meeting Notes

Project 2016-03 Cyber Security Supply Chain Risk Management Standards Drafting Team

June 30, 2017 | 10:00 a.m. - noon Eastern

Webex Meeting | 738 370 131

Administrative

1. Introductions

The meeting was brought to order by the Chair at 10:00 a.m. eastern on June 30, 2017. The following SDT members and staff observers were on the conference call. Various stakeholder observers were also on the call:

First Name	Last Name	Company	Member/ Observer
Christina	Alston	Georgia Transmission	M
James	Chuber	Duke Energy	M
Norm	Dang	IESO	M
Patricia	Eke	FERC	O
Chris	Evans	Southwest Power Pool	M
Brian	Gatus	SCE	M
David	Gayle	Dominion Resources	M
JoAnn	Murphy	PJM Interconnection	M
Mark	Olson	NERC	O
Skip	Peeples	Salt River Project	M
Corey	Sellers	Southern Company	M
Jason	Witt	East Kentucky Power Cooperative	M

2. Determination of Quorum

The rule for NERC Standard Drafting Team (SDT or team) states that a quorum requires two-thirds of the voting members of the SDT. Quorum was achieved as 10 of 11 members were present.

3. NERC Antitrust Compliance Guidelines and Public Announcement

NERC Antitrust Compliance Guidelines and public announcement were reviewed by Mark Olson. There were no questions raised.

4. Chair remarks. Corey Sellers stated that the objective of the call was to review the changes to the proposed standards and Implementation Plan in preparation for final ballot posting.

5. Review draft standards and Implementation Plan for posting

- a. The SDT accepted all of the proposed changes in the attached.
- b. The SDT agreed on revised wording for the Implementation Plan 'General Considerations' section to incorporate cooperative agreements. The SDT agreed that the same wording should be used in the rationale box for CIP-013-1.
- c. The SDT added a note to the CIP-013-1 Rationale for Requirement R3 to clarify that implementing a revised plan does not require renegotiation of contracts.
- d. Participants discussed the Violation Risk Factors (VRFs) associated with CIP-013-1. Participants considered stakeholder comments that recommended changing the VRF for R1 to *Lower*. The SDT agreed that the VRF of *Medium* was consistent with the NERC and FERC guidelines and did not support changing the VRF to *Lower* for the posting.

6. Discuss next steps and project schedule

- a. The SDT agreed to post the standards and Implementation Plan for final ballot. The SDT agreed that the Consideration of Comments would be circulated by email prior to posting.
- b. The SDT agreed that the Implementation Guidance did not need to be revised because the changes to CIP-013-1 were non-substantive. However, the SDT agreed to review proposed revisions to the Implementation Guidance that would incorporate the CIP-013-1 clarifications. The SDT also agreed to consider feedback from the Compliance Managers Group (CMG) and stakeholder comments from the June posting. Mark Olson will schedule a web meeting for this review.

7. The meeting adjourned at 11:55 a.m. eastern on June 30, 2017

Summary of changes

CIP-013-1

Revised rationale to address multi-party contracts

Added note to R3

Revised VSL for R2 to describe all 4 levels

CIP-005-6

Revised rationale to clarify that responsible entities do not need to implement processes if they do not allow remote access to applicable BES Cyber Systems

Revised VSL for R2 to include an additional level

CIP-010-3

Clarified in Part 1.6 that responsible entities are required to perform verifications **prior to** a change in baseline

Revised Measure 1.6 to include evidence that could apply to automated update systems

Added Guidelines and Technical Basis

Implementation Plan

Revised General Considerations section to address multi-party contracts and master agreements.

Adopted clearer wording for General Considerations section as recommended by commenters

Added statement to affirm applicability to high and medium impact BES Cyber Systems only

Added implementation timeframes for 'unplanned changes' consistent with CIP V5

Standard Development Timeline

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Description of Current Draft

This is the first draft of the proposed standard.

Completed Actions	Date
Standards Committee approved Standard Authorization Request (SAR) for posting	October 19, 2016
SAR posted for comment	October 20 - November 21, 2016
45-day formal comment period with ballot	January 19 - March 6, 2017

Anticipated Actions	Date
45-day formal comment period with ballot	May 2017
NERC Board (Board) adoption	August 2017

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. Terms used in the proposed standard that are already defined and are not being modified can be found in the *Glossary of Terms Used in NERC Reliability Standards*. The new or revised terms listed below will be presented for approval with the proposed standard. Upon Board adoption, this section will be removed.

Term(s): None

Upon Board adoption, the rationale boxes will be moved to the Supplemental Material Section.

A. Introduction

1. **Title:** Cyber Security - Supply Chain Risk Management
2. **Number:** CIP-013-1
3. **Purpose:** To mitigate cyber security risks to the reliable operation of the Bulk Electric System (BES) by implementing security controls for supply chain risk management of BES Cyber Systems.
4. **Applicability:**
 - 4.1. **Functional Entities:** For the purpose of the requirements contained herein, the following list of functional entities will be collectively referred to as “Responsible Entities.” For requirements in this standard where a specific functional entity or subset of functional entities are the applicable entity or entities, the functional entity or entities are specified explicitly.
 - 4.1.1. Balancing Authority
 - 4.1.2. Distribution Provider that owns one or more of the following Facilities, systems, and equipment for the protection or restoration of the BES:
 - 4.1.2.1. Each underfrequency Load shedding (UFLS) or undervoltage Load shedding (UVLS) system that:
 - 4.1.2.1.1. Is part of a Load shedding program that is subject to one or more requirements in a NERC or Regional Reliability Standard; and
 - 4.1.2.1.2. Performs automatic Load shedding under a common control system owned by the Responsible Entity, without human operator initiation, of 300 MW or more.
 - 4.1.2.2. Each Remedial Action Scheme (RAS) where the RAS is subject to one or more requirements in a NERC or Regional Reliability Standard.
 - 4.1.2.3. Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is subject to one or more requirements in a NERC or Regional Reliability Standard.
 - 4.1.3. Generator Operator
 - 4.1.4. Generator Owner
 - 4.1.5. Reliability Coordinator
 - 4.1.6. Transmission Operator
 - 4.1.7. Transmission Owner

- 4.2. Facilities:** For the purpose of the requirements contained herein, the following Facilities, systems, and equipment owned by each Responsible Entity in 4.1 above are those to which these requirements are applicable. For requirements in this standard where a specific type of Facilities, system, or equipment or subset of Facilities, systems, and equipment are applicable, these are specified explicitly.
- 4.2.1. Distribution Provider:** One or more of the following Facilities, systems and equipment owned by the Distribution Provider for the protection or restoration of the BES:
- 4.2.1.1. Each UFLS or UVLS System that:**
- 4.2.1.1.1.** Is part of a Load shedding program that is subject to one or more requirements in a NERC or Regional Reliability Standard; and
 - 4.2.1.1.2.** Performs automatic Load shedding under a common control system owned by the Responsible Entity, without human operator initiation, of 300 MW or more.
- 4.2.1.2.** Each RAS where the RAS is subject to one or more requirements in a NERC or Regional Reliability Standard.
- 4.2.1.3.** Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is subject to one or more requirements in a NERC or Regional Reliability Standard.
- 4.2.1.4.** Each Cranking Path and group of Elements meeting the initial switching requirements from a Blackstart Resource up to and including the first interconnection point of the starting station service of the next generation unit(s) to be started.
- 4.2.2. Responsible Entities listed in 4.1 other than Distribution Providers**
- 4.2.2.1.** All BES Facilities.
- 4.2.3. Exemptions:** The following are exempt from Standard CIP-013-1:
- 4.2.3.1.** Cyber Assets at Facilities regulated by the Canadian Nuclear Safety Commission.
 - 4.2.3.2.** Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters (ESPs).
 - 4.2.3.3.** 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.

- 4.2.3.4. For Distribution Providers, the systems and equipment that are not included in section 4.2.1 above.
- 4.2.3.5. Responsible Entities that identify that they have no BES Cyber Systems categorized as high impact or medium impact according to the identification and categorization process required by CIP-002-5, or any subsequent version of that Reliability Standard.

5. **Effective Date:** See Implementation Plan for Project 2016-03.

B. Requirements and Measures

Rationale for Requirement R1:

The proposed Requirement addresses Order No. 829 directives for entities to implement a plan(s) that includes processes for mitigating cyber security risks in the supply chain. The plan(s) is required to address the following four objectives (Order No. 829 at P. 45):

- (1) Software integrity and authenticity;
- (2) Vendor remote access;
- (3) Information system planning; and
- (4) Vendor risk management and procurement controls.

The cyber security risk management plan(s) specified in Requirement R1 apply to high and medium impact BES Cyber Systems.

Implementation of the cyber security risk management plan(s) does not require the Responsible Entity to renegotiate or abrogate existing contracts (including amendments to master agreements and purchase orders), consistent with Order No. 829 (P. 36).-

Requirement R1 Part 1.1 addresses the directive in Order No. 829 for identification and documentation of cyber security risks in the planning and development processes related to the procurement of BES Cyber Systems (P. 56). The security objective is to ensure entities consider cyber security risks to the BES from vendor products or services resulting from: (i) procuring and installing vendor equipment and software; and (ii) transitions from one vendor(s) to another vendor(s); and options for mitigating these risks when planning for BES Cyber Systems.

Requirement R1 Part 1.2 addresses the directive in Order No. 829 for procurement controls to address the provision and verification of security concepts in future contracts for BES Cyber Systems (P. 59). The objective of Part 1.2 is for entities to include these topics in their plans so that procurement and contract negotiation processes address the applicable risks. Implementation of elements contained in the entity's plan related to Part 1.2 may be accomplished through the entity's procurement and contract negotiation

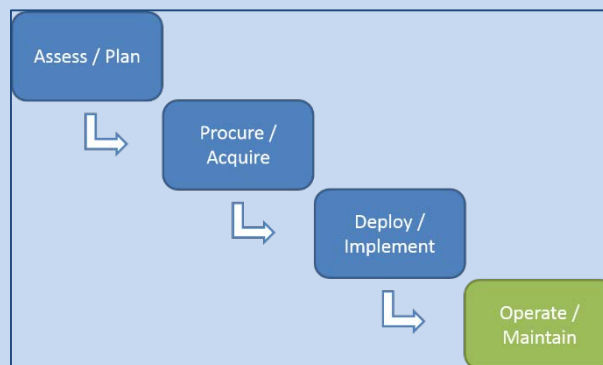
processes. For example, entities can implement the plan by including applicable procurement items from their plan in Requests for Proposals (RFPs), ~~and in~~ negotiations with vendors, or requests submitted to entities negotiating on behalf of the responsible entity in the case of multi-party procurement activities. Obtaining specific controls in the negotiated contract may not be feasible and is not considered failure to implement an entity's plan. Although the expectation is that Responsible Entities would enforce the security-related provisions in the contract based on the terms and conditions of that contract, such contract enforcement and vendor performance or adherence to the negotiated contract is not subject to this Reliability Standard.

The objective of verifying software integrity and authenticity (Part 1.2.5) is to help ensure that software installed on BES Cyber Systems is not modified prior to installation without the awareness of the software supplier and is not counterfeit. Part 1.2.5 is not an operational requirement for entities to perform such verification; instead, it requires entities to address the software integrity and authenticity issue in its contracting process to provide the entity the means by which to perform such verification under CIP-010-3.

The term *vendor(s)* as used in the standard is limited to those persons, companies, or other organizations with whom the Responsible Entity, or its affiliates, contract with to supply BES Cyber Systems and related services. It does not include other NERC registered entities providing reliability services (e.g., Balancing Authority or Reliability Coordinator services pursuant to NERC Reliability Standards). A *vendor*, as used in the standard, may include: (i) developers or manufacturers of information systems, system components, or information system services; (ii) product resellers; or (iii) system integrators.

Collectively, the provisions of CIP-013-1 address an entity's controls for managing cyber security risks to BES Cyber Systems during the planning, acquisition, and deployment phases of the system life cycle, as shown below.

Notional BES Cyber System Life Cycle



- R1.** Each Responsible Entity shall develop one or more documented supply chain cyber security risk management plan(s) for high and medium impact BES Cyber Systems. The plan(s) shall include: *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*
- 1.1.** One or more process(es) used in planning for the procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the Bulk Electric System from vendor products or services resulting from: (i) procuring and installing vendor equipment and software; and (ii) transitions from one vendor(s) to another vendor(s).
 - 1.2.** One or more process(es) used in procuring BES Cyber Systems that address the following, as applicable:
 - 1.2.1.** Notification by the vendor of vendor-identified incidents related to the products or services provided to the Responsible Entity that pose cyber security risk to the Responsible Entity;
 - 1.2.2.** Coordination of responses to vendor-identified incidents related to the products or services provided to the Responsible Entity that pose cyber security risk to the Responsible Entity;
 - 1.2.3.** Notification by vendors when remote or onsite access should no longer be granted to vendor representatives;
 - 1.2.4.** Disclosure by vendors of known vulnerabilities related to the products or services provided to the Responsible Entity;
 - 1.2.5.** Verification of software integrity and authenticity of all software and patches provided by the vendor for use in the BES Cyber System; and
 - 1.2.6.** Coordination of controls for (i) vendor-initiated Interactive Remote Access, and (ii) system-to-system remote access with a vendor(s).
- M1.** Evidence shall include one or more documented supply chain cyber security risk management plan(s) as specified in the Requirement.

- R2.** Each Responsible Entity shall implement its supply chain cyber security risk management plan(s) specified in Requirement R1. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

Note: Implementation of the plan does not require the Responsible Entity to renegotiate or abrogate existing contracts (including amendments to master agreements and purchase orders). Additionally, the following issues are beyond the scope of Requirement R2: (1) the actual terms and conditions of a procurement contract; and (2) vendor performance and adherence to a contract.

- M2.** Evidence shall include documentation to demonstrate implementation of the supply chain cyber security risk management plan(s), which could include, but is not limited to, correspondence, policy documents, or working documents that demonstrate use of the supply chain cyber security risk management plan.

Rationale for Requirement R3:

The proposed requirement addresses Order No. 829 directives for entities to periodically reassess selected supply chain cyber security risk management controls (P. 46).

Entities perform periodic assessment to keep plans up-to-date and address current and emerging supply chain-related concerns and vulnerabilities. Examples of sources of information that the entity could consider include guidance or information issued by:

- NERC or the E-ISAC
- ICS-CERT
- Canadian Cyber Incident Response Centre (CCIRC)

- R3.** Each Responsible Entity shall review and obtain CIP Senior Manager or delegate approval of its supply chain cyber security risk management plan(s) specified in Requirement R1 at least once every 15 calendar months. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*
- M3.** Evidence shall include the dated supply chain cyber security risk management plan(s) approved by the CIP Senior Manager or delegate(s) and additional evidence to demonstrate review of the supply chain cyber security risk management plan(s). Evidence may include, but is not limited to, policy documents, revision history, records of review, or workflow evidence from a document management system that indicate review of supply chain risk management plan(s) at least once every 15 calendar months; and documented approval by the CIP Senior Manager or delegate.

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority:

“Compliance Enforcement Authority” means NERC or the Regional Entity, or any entity as otherwise designated by an Applicable Governmental Authority, in their respective roles of monitoring and/or enforcing compliance with mandatory and enforceable Reliability Standards in their respective jurisdictions.

1.2. Evidence Retention:

The following evidence retention period(s) identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit.

The Responsible 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 Responsible Entity shall retain evidence of each requirement in this standard for three calendar years.
- If a Responsible Entity is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete and approved or for the time specified above, whichever is longer.
- The CEA shall keep the last audit records and all requested and submitted subsequent audit records.

1.3. Compliance Monitoring and Enforcement Program

As defined in the NERC Rules of Procedure, “Compliance Monitoring and Enforcement Program” refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated Reliability Standard.

Violation Severity Levels

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	<p>The Responsible Entity developed one or more documented supply chain cyber security risk management plan(s) which include the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Part 1.1, and include the use of process(es) for procuring BES Cyber systems as specified in Part 1.2, but the plans do not include one of the elements-parts in Part 1.2.1 through Part 1.2.6.</p>	<p>The Responsible Entity developed one or more documented supply chain cyber security risk management plan(s) which include the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Part 1.1, and include the use of process(es) for procuring BES Cyber systems as specified in Part 1.2, but the plans do not include two or more of the elements-parts in Part 1.2.1 through Part 1.2.6.</p>	<p>The Responsible Entity developed one or more documented supply chain cyber security risk management plan(s), but the plan(s) did not include the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Part 1.1, or the plan(s) did not include the use of process(es) for procuring BES Cyber systems as specified in Part 1.2.</p>	<p>The Responsible Entity developed one or more documented supply chain cyber security risk management plan(s), but the plan(s) did not include the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Part 1.1, and the plan(s) did not include the use of process(es) for procuring BES Cyber systems as specified in Part 1.2.</p> <p>OR</p> <p>The Responsible Entity did not develop one or more documented supply chain cyber security risk management plan(s) as specified in the Requirement.</p>

<p>R2.</p>	<p><u>N/A The Responsible Entity implemented its supply chain cyber security risk management plan(s) including the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Requirement R1 Part 1.1, and including the use of process(es) for procuring BES Cyber systems as specified in Requirement R1 Part 1.2, but did not implement one of the parts in Requirement R1 Part 1.2.1 through Part 1.2.6.</u></p>	<p><u>N/A The Responsible Entity implemented its supply chain cyber security risk management plan(s) including the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Requirement R1 Part 1.1, and including the use of process(es) for procuring BES Cyber systems as specified in Requirement R1 Part 1.2, but did not implement two or more of the parts in Requirement R1 Part 1.2.1 through Part 1.2.6.</u></p>	<p><u>N/A The Responsible Entity implemented its supply chain cyber security risk management plan(s), but did not implement the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Requirement R1 Part 1.1, or did not implement the use of process(es) for procuring BES Cyber systems as specified in Requirement R1 Part 1.2.</u></p>	<p><u>The Responsible Entity implemented its supply chain cyber security risk management plan(s), but did not implement the use of processes in planning for procurement of BES Cyber Systems to identify and assess cyber security risk(s) to the BES as specified in Requirement R1 Part 1.1, and did not implement the use of process(es) for procuring BES Cyber systems as specified in Requirement R1 Part 1.2;</u> <u>OR</u> The Responsible Entity did not implement its supply chain cyber security risk management plan(s) specified in the requirement.</p>
<p>R3.</p>	<p>The Responsible Entity reviewed and obtained CIP Senior Manager or delegate approval of its supply chain cyber security risk management plan(s) but did</p>	<p>The Responsible Entity reviewed and obtained CIP Senior Manager or delegate approval of its supply chain cyber security risk management plan(s) but did</p>	<p>The Responsible Entity reviewed and obtained CIP Senior Manager or delegate approval of its supply chain cyber security risk management plan(s) but did</p>	<p>The Responsible Entity did not review and obtain CIP Senior Manager or delegate approval of its supply chain cyber security risk management plan(s) within</p>

	so more than 15 calendar months but less than or equal to 16 calendar months since the previous review as specified in the Requirement.	so more than 16 calendar months but less than or equal to 17 calendar months since the previous review as specified in the Requirement.	so more than 17 calendar months but less than or equal to 18 calendar months since the previous review as specified in the Requirement.	18 calendar months of the previous review as specified in the Requirement.
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D. Regional Variances

None.

E. Associated Documents

Link to the Implementation Plan and other important associated documents.

Version History

Version	Date	Action	Change Tracking
1	TBD	Respond to FERC Order No. 829.	NA

Standard Attachments

None

Guidelines and Technical Basis

Rationale

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT adoption, the text from the rationale text boxes was moved to this section.

A. Introduction

1. **Title:** Cyber Security — Electronic Security Perimeter(s)
2. **Number:** CIP-005-~~56~~
3. **Purpose:** To manage electronic access to BES Cyber Systems by specifying a controlled Electronic Security Perimeter in support of protecting BES Cyber Systems against compromise that could lead to misoperation or instability in the BES.
4. **Applicability:**
 - 4.1. **Functional Entities:** For the purpose of the requirements contained herein, the following list of functional entities will be collectively referred to as “Responsible Entities.” For requirements in this standard where a specific functional entity or subset of functional entities are the applicable entity or entities, the functional entity or entities are specified explicitly.
 - 4.1.1. **Balancing Authority**
 - 4.1.2. **Distribution Provider** that owns one or more of the following Facilities, systems, and equipment for the protection or restoration of the BES:
 - 4.1.2.1. Each underfrequency Load shedding (UFLS) or undervoltage Load shedding (UVLS) system that:
 - 4.1.2.1.1. is part of a Load shedding program that is subject to one or more requirements in a NERC or Regional Reliability Standard; and
 - 4.1.2.1.2. performs automatic Load shedding under a common control system owned by the Responsible Entity, without human operator initiation, of 300 MW or more.
 - 4.1.2.2. Each ~~Special Protection System or~~ Remedial Action Scheme where the ~~Special Protection System or~~ Remedial Action Scheme is subject to one or more requirements in a NERC or Regional Reliability Standard.
 - 4.1.2.3. Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is subject to one or more requirements in a NERC or Regional Reliability Standard.
 - 4.1.2.4. Each Cranking Path and group of Elements meeting the initial switching requirements from a Blackstart Resource up to and including the first interconnection point of the starting station service of the next generation unit(s) to be started.
 - 4.1.3. **Generator Operator**

4.1.4. Generator Owner

4.1.5. Interchange Coordinator or Interchange Authority

4.1.6. Reliability Coordinator

4.1.7. Transmission Operator

4.1.8. Transmission Owner

4.2. Facilities: For the purpose of the requirements contained herein, the following Facilities, systems, and equipment owned by each Responsible Entity in 4.1 above are those to which these requirements are applicable. For requirements in this standard where a specific type of Facilities, system, or equipment or subset of Facilities, systems, and equipment are applicable, these are specified explicitly.

4.2.1. Distribution Provider: One or more of the following Facilities, systems and equipment owned by the Distribution Provider for the protection or restoration of the BES:

4.2.1.1. Each UFLS or UVLS System that:

4.2.1.1.1. is part of a Load shedding program that is subject to one or more requirements in a NERC or Regional Reliability Standard; and

4.2.1.1.2. performs automatic Load shedding under a common control system owned by the Responsible Entity, without human operator initiation, of 300 MW or more.

4.2.1.2. Each ~~Special Protection System or~~ Remedial Action Scheme where the ~~Special Protection System or~~ Remedial Action Scheme is subject to one or more requirements in a NERC or Regional Reliability Standard.

4.2.1.3. Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is subject to one or more requirements in a NERC or Regional Reliability Standard.

4.2.1.4. Each Cranking Path and group of Elements meeting the initial switching requirements from a Blackstart Resource up to and including the first interconnection point of the starting station service of the next generation unit(s) to be started.

4.2.2. Responsible Entities listed in 4.1 other than Distribution Providers: All BES Facilities.

4.2.3. Exemptions: The following are exempt from Standard CIP-005-~~56~~:

- 4.2.3.1. Cyber Assets at Facilities regulated by the Canadian Nuclear Safety Commission.
- 4.2.3.2. Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters.
- 4.2.3.3. 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.
- 4.2.3.4. For Distribution Providers, the systems and equipment that are not included in section 4.2.1 above.
- 4.2.3.5. Responsible Entities that identify that they have no BES Cyber Systems categorized as high impact or medium impact according to the CIP-002-5 identification and categorization processes.

5. **Effective Dates:** See Implementation Plan for Project 2016-03

6. **Background:** Standard CIP-005-~~5~~ exists as part of a suite of CIP Standards related to cyber security which require the initial identification and categorization of BES Cyber Systems and require organizational, operational, and procedural controls to mitigate risk to BES Cyber Systems. ~~CIP-002-5 requires the initial identification and categorization of BES Cyber Systems. CIP-003-5, CIP-004-5, CIP-005-5, CIP-006-5, CIP-007-5, CIP-008-5, CIP-009-5, CIP-010-1, and CIP-011-1 require a minimum level of organizational, operational and procedural controls to mitigate risk to BES Cyber Systems. This suite of CIP Standards is referred to as the Version 5 CIP Cyber Security Standards.~~

Most requirements open with, “*Each Responsible Entity shall implement one or more documented [processes, plan, etc.] that include the applicable items in [Table Reference].*” The referenced table requires the applicable items in the procedures for the requirement’s common subject matter.

The term *documented processes* refers to a set of required instructions specific to the Responsible Entity and to achieve a specific outcome. This term does not imply any particular naming or approval structure beyond what is stated in the requirements. An entity should include as much as it believes necessary in their documented processes, but they must address the applicable requirements in the table.

The terms *program* and *plan* are sometimes used in place of *documented processes* where it makes sense and is commonly understood. For example, documented processes describing a response are typically referred to as *plans* (i.e., incident response plans and recovery plans). Likewise, a security plan can describe an approach involving multiple procedures to address a broad subject matter.

Similarly, the term *program* may refer to the organization’s overall implementation of its policies, plans and procedures involving a subject matter. Examples in the standards include the personnel risk assessment program and the personnel training program. The full implementation of the CIP Cyber Security Standards could also be referred to as a program. However, the terms *program* and *plan* do not imply any additional requirements beyond what is stated in the standards.

Responsible Entities can implement common controls that meet requirements for multiple high and medium impact BES Cyber Systems. For example, a single training program could meet the requirements for training personnel across multiple BES Cyber Systems.

Measures for the initial requirement are simply the documented processes themselves. Measures in the table rows provide examples of evidence to show documentation and implementation of applicable items in the documented processes. These measures serve to provide guidance to entities in acceptable records of compliance and should not be viewed as an all-inclusive list.

Throughout the standards, unless otherwise stated, bulleted items in the requirements and measures are items that are linked with an “or,” and numbered items are items that are linked with an “and.”

Many references in the Applicability section use a threshold of 300 MW for UFLS and UVLS. This particular threshold of 300 MW for UVLS and UFLS was provided in Version 1 of the CIP Cyber Security Standards. The threshold remains at 300 MW since it is specifically addressing UVLS and UFLS, which are last ditch efforts to save the Bulk Electric System. A review of UFLS tolerances defined within regional reliability standards for UFLS program requirements to date indicates that the historical value of 300 MW represents an adequate and reasonable threshold value for allowable UFLS operational tolerances.

“Applicable Systems” Columns in Tables: Each table has an “Applicable Systems” column to further define the scope of systems to which a specific requirement row applies. The CSO706 SDT adapted this concept from the National Institute of Standards and Technology (“NIST”) Risk Management Framework as a way of applying requirements more appropriately based on impact and connectivity characteristics. The following conventions are used in the “Applicable Systems” column as described.

- **High Impact BES Cyber Systems** – Applies to BES Cyber Systems categorized as high impact according to the CIP-002-5 identification and categorization processes.
- **High Impact BES Cyber Systems with Dial-up Connectivity** – Only applies to high impact BES Cyber Systems with Dial-up Connectivity.

- **High Impact BES Cyber Systems with External Routable Connectivity** – Only applies to high impact BES Cyber Systems with External Routable Connectivity. This also excludes Cyber Assets in the BES Cyber System that cannot be directly accessed through External Routable Connectivity.
- **Medium Impact BES Cyber Systems** – Applies to each BES Cyber Systems categorized as medium impact according to the CIP-002-5 identification and categorization processes.
- **Medium Impact BES Cyber Systems at Control Centers** – Only applies to medium impact BES Cyber Systems located at a Control Center.
- **Medium Impact BES Cyber Systems with Dial-up Connectivity** – Only applies to medium impact BES Cyber Systems with Dial-up Connectivity.
- **Medium Impact BES Cyber Systems with External Routable Connectivity** – Only applies to medium impact BES Cyber Systems with External Routable Connectivity. This also excludes Cyber Assets in the BES Cyber System that cannot be directly accessed through External Routable Connectivity.
- **Protected Cyber Assets (PCA)** – Applies to each Protected Cyber Asset associated with a referenced high impact BES Cyber System or medium impact BES Cyber System.
- **Electronic Access Points (EAP)** – Applies at Electronic Access Points associated with a referenced high impact BES Cyber System or medium impact BES Cyber System.

B. Requirements and Measures

- R1.** Each Responsible Entity shall implement one or more documented processes that collectively include each of the applicable requirement parts in *CIP-005-5-6 Table R1 – Electronic Security Perimeter*. [Violation Risk Factor: Medium] [Time Horizon: Operations Planning and Same Day Operations].
- M1.** Evidence must include each of the applicable documented processes that collectively include each of the applicable requirement parts in *CIP-005-5-6 Table R1 – Electronic Security Perimeter* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-005-5-6 Table R1 – Electronic Security Perimeter			
Part	Applicable Systems	Requirements	Measures
1.1	High Impact BES Cyber Systems and their associated: <ul style="list-style-type: none"> PCA Medium Impact BES Cyber Systems and their associated: <ul style="list-style-type: none"> PCA 	All applicable Cyber Assets connected to a network via a routable protocol shall reside within a defined ESP.	An example of evidence may include, but is not limited to, a list of all ESPs with all uniquely identifiable applicable Cyber Assets connected via a routable protocol within each ESP.
1.2	High Impact BES Cyber Systems with External Routable Connectivity and their associated: <ul style="list-style-type: none"> PCA Medium Impact BES Cyber Systems with External Routable Connectivity and their associated: <ul style="list-style-type: none"> PCA 	All External Routable Connectivity must be through an identified Electronic Access Point (EAP).	An example of evidence may include, but is not limited to, network diagrams showing all external routable communication paths and the identified EAPs.

CIP-005-~~5~~6 Table R1 – Electronic Security Perimeter

Part	Applicable Systems	Requirements	Measures
<p>1.3</p>	<p>Electronic Access Points for High Impact BES Cyber Systems</p> <p>Electronic Access Points for Medium Impact BES Cyber Systems</p>	<p>Require inbound and outbound access permissions, including the reason for granting access, and deny all other access by default.</p>	<p>An example of evidence may include, but is not limited to, a list of rules (firewall, access control lists, etc.) that demonstrate that only permitted access is allowed and that each access rule has a documented reason.</p>
<p>1.4</p>	<p>High Impact BES Cyber Systems with Dial-up Connectivity and their associated:</p> <ul style="list-style-type: none"> • PCA <p>Medium Impact BES Cyber Systems with Dial-up Connectivity and their associated:</p> <ul style="list-style-type: none"> • PCA 	<p>Where technically feasible, perform authentication when establishing Dial-up Connectivity with applicable Cyber Assets.</p>	<p>An example of evidence may include, but is not limited to, a documented process that describes how the Responsible Entity is providing authenticated access through each dial-up connection.</p>

CIP-005-5.6 Table R1 – Electronic Security Perimeter			
Part	Applicable Systems	Requirements	Measures
1.5	Electronic Access Points for High Impact BES Cyber Systems Electronic Access Points for Medium Impact BES Cyber Systems at Control Centers	Have one or more methods for detecting known or suspected malicious communications for both inbound and outbound communications.	An example of evidence may include, but is not limited to, documentation that malicious communications detection methods (e.g. intrusion detection system, application layer firewall, etc.) are implemented.

Rationale for Requirement R2:

Proposed Requirement R2 Parts 2.4 and 2.5 addresses Order No. 829 directives for controls on vendor-initiated remote access to BES Cyber Systems covering both user-initiated and machine-to-machine vendor remote access (P. 51). The objective is to mitigate potential risks of a compromise at a vendor during an active remote access session with a Responsible Entity from impacting the BES.

The objective of Requirement R2 Part 2.4 is for entities to have visibility of active vendor remote access sessions (including Interactive Remote Access and system-to-system remote access) that are taking place on their system. The obligation in Part 2.4 requires entities to have a method to determine active vendor remote access sessions. While not required, a solution that identifies all active remote access sessions, regardless of whether they originate from a vendor, would meet the intent of this requirement as the objective of Part 2.4. The objective of Requirement R2 Part 2.5 is for entities to have the ability to rapidly disable active remote access sessions in the event of a system breach as specified in Order No. 829 (P. 52).

The scope of the revised requirement R2 is expanded from approved CIP-005-5 to address all remote access management, not just Interactive Remote Access. If an entity does not allow remote access (system to system or IRA) then the entity need not develop a process for each of the subparts in requirement R2. The entity could document that it does not allow remote access to meet the reliability objective.

The term *vendor(s)* as used in the standard is limited to those persons, companies, or other organizations with whom the Responsible Entity, or its affiliates, contracts with to supply BES Cyber Systems and related services. It does not include other

NERC registered entities providing reliability services (e.g., Balancing Authority or Reliability Coordinator services pursuant to NERC Reliability Standards). A *vendor*, as used in the standard, may include: (i) developers or manufacturers of information systems, system components, or information system services; (ii) product resellers; or (iii) system integrators.

- R2.** Each Responsible Entity ~~allowing Interactive Remote Access to BES Cyber Systems~~ shall implement one or more documented processes that collectively include the applicable requirement parts, where technically feasible, in *CIP-005-~~5-6~~ Table R2 – ~~Interactive Remote Access Management~~*. [Violation Risk Factor: Medium] [Time Horizon: Operations Planning and Same Day Operations].
- M2.** Evidence must include the documented processes that collectively address each of the applicable requirement parts in *CIP-005-~~5-6~~ Table R2 – ~~Interactive Remote Access Management~~* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-005- 5-6 Table R2 – Interactive Remote Access Management			
Part	Applicable Systems	Requirements	Measures
2.1	High Impact BES Cyber Systems and their associated: <ul style="list-style-type: none"> • PCA Medium Impact BES Cyber Systems with External Routable Connectivity and their associated: <ul style="list-style-type: none"> • PCA 	<u>For all Interactive Remote Access, Utilize an Intermediate System</u> such that the Cyber Asset initiating Interactive Remote Access does not directly access an applicable Cyber Asset.	Examples of evidence may include, but are not limited to, network diagrams or architecture documents.
2.2	High Impact BES Cyber Systems and their associated: <ul style="list-style-type: none"> • PCA Medium Impact BES Cyber Systems with External Routable Connectivity and their associated: <ul style="list-style-type: none"> • PCA 	For all Interactive Remote Access sessions, utilize encryption that terminates at an Intermediate System.	An example of evidence may include, but is not limited to, architecture documents detailing where encryption initiates and terminates.

CIP-005-5.6 Table R2 – Interactive Remote Access Management			
Part	Applicable Systems	Requirements	Measures
2.3	<p>High Impact BES Cyber Systems and their associated:</p> <ul style="list-style-type: none"> • PCA <p>Medium Impact BES Cyber Systems with External Routable Connectivity and their associated:</p> <ul style="list-style-type: none"> • PCA 	<p>Require multi-factor authentication for all Interactive Remote Access sessions.</p>	<p>An example of evidence may include, but is not limited to, architecture documents detailing the authentication factors used.</p> <p>Examples of authenticators may include, but are not limited to,</p> <ul style="list-style-type: none"> • Something the individual knows such as passwords or PINs. This does not include User ID; • Something the individual has such as tokens, digital certificates, or smart cards; or • Something the individual is such as fingerprints, iris scans, or other biometric characteristics.

CIP-005-5.6 Table R2 – Interactive Remote Access Management			
Part	Applicable Systems	Requirements	Measures
2.4	<p><u>High Impact BES Cyber Systems and their associated:</u></p> <ul style="list-style-type: none"> <u>PCA</u> <p><u>Medium Impact BES Cyber Systems with External Routable Connectivity and their associated:</u></p> <ul style="list-style-type: none"> <u>PCA</u> 	<ul style="list-style-type: none"> <u>Have one or more methods for determining active vendor remote access sessions (including Interactive Remote Access and system-to-system remote access).</u> 	<p>Examples of evidence may include, but are not limited to, <u>documentation of the methods used to determine active vendor remote access (including Interactive Remote Access and system-to-system remote access) such as:</u></p> <ul style="list-style-type: none"> <u>Methods for accessing logged or monitoring information to determine active vendor remote access sessions;</u> <u>Methods for monitoring activity (e.g. connection tables or rule hit counters in a firewall, or user activity monitoring) or open ports (e.g. netstat or related commands to display currently active ports) to determine active system to system remote access sessions; or</u> <u>Methods that control vendor initiation of remote access such as vendors calling and requesting a second factor in order to initiate remote access.</u>

CIP-005-5.6 Table R2 – Interactive Remote Access Management			
Part	Applicable Systems	Requirements	Measures
2.5	<p><u>High Impact BES Cyber Systems and their associated:</u></p> <ul style="list-style-type: none"> • <u>PCA</u> <p><u>Medium Impact BES Cyber Systems with External Routable Connectivity and their associated:</u></p> <ul style="list-style-type: none"> • <u>PCA</u> 	<p><u>Have one or more method(s) to disable active vendor remote access (including Interactive Remote Access and system-to-system remote access).</u></p>	<p><u>Examples of evidence may include, but are not limited to, documentation of the method(s) used to disable active vendor remote access (including Interactive Remote Access and system-to-system remote access), such as:</u></p> <ul style="list-style-type: none"> • <u>Methods to disable vendor remote access at the applicable Electronic Access Point for system-to-system remote access; or</u> • <u>Methods to disable vendor Interactive Remote Access at the applicable Intermediate System.</u>

C. Compliance

1. Compliance Monitoring Process:

1.1. Compliance Enforcement Authority: The Regional Entity shall serve as the Compliance Enforcement Authority (“CEA”) unless the applicable entity is owned, operated, or controlled by the Regional Entity. In such cases the ERO or a Regional Entity approved by FERC or other applicable governmental authority shall serve as the CEA.

1.2. Evidence Retention: The following evidence retention periods identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the CEA may ask an entity to provide other evidence to show that it was compliant for the full time period since the last audit

The Responsible Entity shall keep data or evidence to show compliance as identified below unless directed by its CEA to retain specific evidence for a longer period of time as part of an investigation:

- Each Responsible Entity shall retain evidence of each requirement in this standard for three calendar years.
- If a Responsible Entity is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete and approved or for the time specified above, whichever is longer.
- The CEA 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 Investigation
- Self-Reporting
- Complaint

1.4. Additional Compliance Information:

None.

Violation Severity Levels

R #	Time Horizon	VRF	Violation Severity Levels (CIP-005-5-6)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	Operations Planning and Same Day Operations	Medium			The Responsible Entity did not have a method for detecting malicious communications for both inbound and outbound communications. (1.5)	<p>The Responsible Entity did not document one or more processes for CIP-005-5-6 Table R1 – Electronic Security Perimeter. (R1)</p> <p>OR</p> <p>The Responsible Entity did not have all applicable Cyber Assets connected to a network via a routable protocol within a defined Electronic Security Perimeter (ESP). (1.1)</p> <p>OR</p> <p>External Routable Connectivity through the ESP was not through an identified EAP. (1.2)</p> <p>OR</p>

R #	Time Horizon	VRF	Violation Severity Levels (CIP-005-5.6)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
						<p>The Responsible Entity did not require inbound and outbound access permissions and deny all other access by default. (1.3)</p> <p>OR</p> <p>The Responsible Entity did not perform authentication when establishing dial-up connectivity with the applicable Cyber Assets, where technically feasible. (1.4)</p>
R2.	Operations Planning and Same Day Operations	Medium	The Responsible Entity does not have documented processes for one or more of the applicable items for Requirement Parts 2.1 through 2.3.	The Responsible Entity did not implement processes for one of the applicable items for Requirement Parts 2.1 through 2.3.	The Responsible Entity did not implement processes for two of the applicable items for Requirement Parts 2.1 through 2.3. <u>OR</u>	The Responsible Entity did not implement processes for three of the applicable items for Requirement Parts 2.1 through 2.3. <u>OR</u>

R #	Time Horizon	VRF	Violation Severity Levels (CIP-005-5.6)			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
					<p>The Responsible Entity did not have either: one or more method(s) for determining active vendor remote access sessions (including Interactive Remote Access and system-to-system remote access) (2.4); or one or more methods to disable active vendor remote access (including Interactive Remote Access and system-to-system remote access) (2.5).</p>	<p>The Responsible Entity did not have one or more method(s) for determining active vendor remote access sessions (including Interactive Remote Access and system-to-system remote access) (2.4) and one or more methods to disable active vendor remote access (including Interactive Remote Access and system-to-system remote access) (2.5).</p>

D. Regional Variances

None.

E. Interpretations

None.

F. Associated Documents

None.

Version History

Version	Date	Action	Change Tracking
1	1/16/06	R3.2 — Change “Control Center” to “control center.”	3/24/06
2	9/30/09	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. Changed compliance monitor to Compliance Enforcement Authority.	
3	12/16/09	Updated version number from -2 to -3 Approved by the NERC Board of Trustees.	
3	3/31/10	Approved by FERC.	
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.	Update
5	11/26/12	Adopted by the NERC Board of Trustees.	Modified to coordinate with other CIP standards and to revise format to use RBS Template.
5	11/22/13	FERC Order issued approving CIP-005-5.	

CIP-005-~~5~~-6 — Cyber Security – Electronic Security Perimeter(s)

<u>6</u>	<u>tbd</u>	<u>Modified to address certain directives in FERC Order No. 829.</u>	<u>Revised</u>
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Guidelines and Technical Basis

Section 4 – Scope of Applicability of the CIP Cyber Security Standards

Section “4. Applicability” of the standards provides important information for Responsible Entities to determine the scope of the applicability of the CIP Cyber Security Requirements.

Section “4.1. Functional Entities” is a list of NERC functional entities to which the standard applies. If the entity is registered as one or more of the functional entities listed in Section 4.1, then the NERC CIP Cyber Security Standards apply. Note that there is a qualification in Section 4.1 that restricts the applicability in the case of Distribution Providers to only those that own certain types of systems and equipment listed in 4.2. Furthermore,

Section “4.2. Facilities” defines the scope of the Facilities, systems, and equipment owned by the Responsible Entity, as qualified in Section 4.1, that is subject to the requirements of the standard. As specified in the exemption section 4.2.3.5, this standard does not apply to Responsible Entities that do not have High Impact or Medium Impact BES Cyber Systems under CIP-002-5’s categorization. In addition to the set of BES Facilities, Control Centers, and other systems and equipment, the list includes the set of systems and equipment owned by Distribution Providers. While the NERC Glossary term “Facilities” already includes the BES characteristic, the additional use of the term BES here is meant to reinforce the scope of applicability of these Facilities where it is used, especially in this applicability scoping section. This in effect sets the scope of Facilities, systems, and equipment that is subject to the standards.

Requirement R1:

CIP-005-~~5-6~~, Requirement R1 requires segmenting of BES Cyber Systems from other systems of differing trust levels by requiring controlled Electronic Access Points between the different trust zones. Electronic Security Perimeters are also used as a primary defense layer for some BES Cyber Systems that may not inherently have sufficient cyber security functionality, such as devices that lack authentication capability.

All applicable BES Cyber Systems that are connected to a network via a routable protocol must have a defined Electronic Security Perimeter (ESP). Even standalone networks that have no external connectivity to other networks must have a defined ESP. The ESP defines a zone of protection around the BES Cyber System, and it also provides clarity for entities to determine what systems or Cyber Assets are in scope and what requirements they must meet. The ESP is used in:

- Defining the scope of ‘Associated Protected Cyber Assets’ that must also meet certain CIP requirements.
- Defining the boundary in which all of the Cyber Assets must meet the requirements of the highest impact BES Cyber System that is in the zone (the ‘high water mark’).

The CIP Cyber Security Standards do not require network segmentation of BES Cyber Systems by impact classification. Many different impact classifications can be mixed within an ESP.

However, all of the Cyber Assets and BES Cyber Systems within the ESP must be protected at the level of the highest impact BES Cyber System present in the ESP (i.e., the “high water mark”) where the term “Protected Cyber Assets” is used. The CIP Cyber Security Standards accomplish the “high water mark” by associating all other Cyber Assets within the ESP, even other BES Cyber Systems of lesser impact, as “Protected Cyber Assets” of the highest impact system in the ESP.

For example, if an ESP contains both a high impact BES Cyber System and a low impact BES Cyber System, each Cyber Asset of the low impact BES Cyber System is an “Associated Protected Cyber Asset” of the high impact BES Cyber System and must meet all requirements with that designation in the applicability columns of the requirement tables.

If there is routable connectivity across the ESP into any Cyber Asset, then an Electronic Access Point (EAP) must control traffic into and out of the ESP. Responsible Entities should know what traffic needs to cross an EAP and document those reasons to ensure the EAPs limit the traffic to only those known communication needs. These include, but are not limited to, communications needed for normal operations, emergency operations, support, maintenance, and troubleshooting.

The EAP should control both inbound and outbound traffic. The standard added outbound traffic control, as it is a prime indicator of compromise and a first level of defense against zero day vulnerability-based attacks. If Cyber Assets within the ESP become compromised and attempt to communicate to unknown hosts outside the ESP (usually ‘command and control’ hosts on the Internet, or compromised ‘jump hosts’ within the Responsible Entity’s other networks acting as intermediaries), the EAPs should function as a first level of defense in stopping the exploit. This does not limit the Responsible Entity from controlling outbound traffic at the level of granularity that it deems appropriate, and large ranges of internal addresses may be allowed. The SDT’s intent is that the Responsible Entity knows what other Cyber Assets or ranges of addresses a BES Cyber System needs to communicate with and limits the communications to that known range. For example, most BES Cyber Systems within a Responsible Entity should not have the ability to communicate through an EAP to any network address in the world, but should probably be at least limited to the address space of the Responsible Entity, and preferably to individual subnet ranges or individual hosts within the Responsible Entity’s address space. The SDT’s intent is not for Responsible Entities to document the inner workings of stateful firewalls, where connections initiated in one direction are allowed a return path. The intent is to know and document what systems can talk to what other systems or ranges of systems on the other side of the EAP, such that rogue connections can be detected and blocked.

This requirement applies only to communications for which access lists and ‘deny by default’ type requirements can be universally applied, which today are those that employ routable protocols. Direct serial, non-routable connections are not included as there is no perimeter or firewall type security that should be universally mandated across all entities and all serial communication situations. There is no firewall or perimeter capability for an RS232 cable run

between two Cyber Assets. Without a clear ‘perimeter type’ security control that can be applied in practically every circumstance, such a requirement would mostly generate technical feasibility exceptions (“TFEs”) rather than increased security.

As for dial-up connectivity, the Standard Drafting Team’s intent of this requirement is to prevent situations where only a phone number can establish direct connectivity to the BES Cyber Asset. If a dial-up modem is implemented in such a way that it simply answers the phone and connects the line to the BES Cyber Asset with no authentication of the calling party, it is a vulnerability to the BES Cyber System. The requirement calls for some form of authentication of the calling party before completing the connection to the BES Cyber System. Some examples of acceptable methods include dial-back modems, modems that must be remotely enabled or powered up, and modems that are only powered on by onsite personnel when needed along with policy that states they are disabled after use. If the dial-up connectivity is used for Interactive Remote Access, then Requirement R2 also applies.

The standard adds a requirement to detect malicious communications for Control Centers. This is in response to FERC Order No. 706, Paragraphs 496-503, where ESPs are required to have two distinct security measures such that the BES Cyber Systems do not lose all perimeter protection if one measure fails or is misconfigured. The Order makes clear that this is not simply redundancy of firewalls, thus the SDT has decided to add the security measure of malicious traffic inspection as a requirement for these ESPs. Technologies meeting this requirement include Intrusion Detection or Intrusion Prevention Systems (IDS/IPS) or other forms of deep packet inspection. These technologies go beyond source/destination/port rule sets and thus provide another distinct security measure at the ESP.

Requirement R2:

See Secure Remote Access Reference Document (see remote access alert).

Rationale

During the development of this standard, references to prior versions of the CIP standards and rationale for the requirements and their parts were embedded within the standard. Upon BOT approval, that information was moved to this section.

Rationale for R1:

The Electronic Security Perimeter (“ESP”) serves to control traffic at the external electronic boundary of the BES Cyber System. It provides a first layer of defense for network based attacks as it limits reconnaissance of targets, restricts and prohibits traffic to a specified rule set, and assists in containing any successful attacks.

Summary of Changes: CIP-005, Requirement R1 has taken more of a focus on the discrete Electronic Access Points, rather than the logical “perimeter.”

CIP-005 (V1 through V4), Requirement R1.2 has been deleted from V5. This requirement was definitional in nature and used to bring dial-up modems using non-routable protocols into the scope of CIP-005. The non-routable protocol exclusion no longer exists as a blanket CIP-002 filter for applicability in V5, therefore there is no need for this requirement.

CIP-005 (V1 through V4), Requirement R1.1 and R1.3 were also definitional in nature and have been deleted from V5 as separate requirements but the concepts were integrated into the definitions of ESP and Electronic Access Point (“EAP”).

Reference to prior version: (Part 1.1) CIP-005-4, R1

Change Rationale: (Part 1.1)

Explicitly clarifies that BES Cyber Assets connected via routable protocol must be in an Electronic Security Perimeter.

Reference to prior version: (Part 1.2) CIP-005-4, R1

Change Rationale: (Part 1.2)

Changed to refer to the defined term Electronic Access Point and BES Cyber System.

Reference to prior version: (Part 1.3) CIP-005-4, R2.1

Change Rationale: (Part 1.3)

Changed to refer to the defined term Electronic Access Point and to focus on the entity knowing and having a reason for what it allows through the EAP in both inbound and outbound directions.

Reference to prior version: (Part 1.4) CIP-005-4, R2.3

Change Rationale: (Part 1.4)

Added clarification that dial-up connectivity should perform authentication so that the BES Cyber System is not directly accessible with a phone number only.

Reference to prior version: (Part 1.5) CIP-005-4, R1

Change Rationale: (Part 1.5)

Per FERC Order No. 706, Paragraphs 496-503, ESPs need two distinct security measures such that the Cyber Assets do not lose all perimeter protection if one measure fails or is misconfigured. The Order makes clear this is not simple redundancy of firewalls, thus the SDT has decided to add the security measure of malicious traffic inspection as a requirement for these ESPs.

Rationale for R2:

Registered Entities use Interactive Remote Access to access Cyber Assets to support and maintain control systems networks. Discovery and announcement of vulnerabilities for remote access methods and technologies, that were previously thought secure and in use by a number of electric sector entities, necessitate changes to industry security control standards. Currently, no requirements are in effect for management of secure remote access to Cyber Assets to be afforded the NERC CIP protective measures. Inadequate safeguards for remote access can allow unauthorized access to the organization's network, with potentially serious consequences. Additional information is provided in **Guidance for Secure Interactive Remote Access** published by NERC in July 2011.

Remote access control procedures must provide adequate safeguards through robust identification, authentication and encryption techniques. Remote access to the organization's network and resources will only be permitted providing that authorized users are authenticated, data is encrypted across the network, and privileges are restricted.

The Intermediate System serves as a proxy for the remote user. Rather than allowing all the protocols the user might need to access Cyber Assets inside the Electronic Security Perimeter to traverse from the Electronic Security Perimeter to the remote computer, only the protocol required for remotely controlling the jump host is required. This allows the firewall rules to be much more restrictive than if the remote computer was allowed to connect to Cyber Assets within the Electronic Security Perimeter directly. The use of an Intermediate System also protects the Cyber Asset from vulnerabilities on the remote computer.

The use of multi-factor authentication provides an added layer of security. Passwords can be guessed, stolen, hijacked, found, or given away. They are subject to automated attacks including brute force attacks, in which possible passwords are tried until the password is found, or dictionary attacks, where words and word combinations are tested as possible passwords. But if a password or PIN must be supplied along with a one-time password supplied by a token, a fingerprint, or some other factor, the password is of no value unless the other factor(s) used for authentication are acquired along with it.

Encryption is used to protect the data that is sent between the remote computer and the Intermediate System. Data encryption is important for anyone who wants or needs secure data transfer. Encryption is needed when there is a risk of unauthorized interception of transmissions on the communications link. This is especially important when using the Internet as the communication means.

Summary of Changes: This is a new requirement to continue the efforts of the Urgent Action team for Project 2010-15: Expedited Revisions to CIP-005-3.

Reference to prior version: (Part 2.1) New

Change Rationale: (Part 2.1)

This is a new requirement to continue the efforts of the Urgent Action team for Project 2010-15: Expedited Revisions to CIP-005-3.

Reference to prior version: (Part 2.2) CIP-007-5, R3.1

Change Rationale: (Part 2.2)

This is a new requirement to continue the efforts of the Urgent Action team for Project 2010-15: Expedited Revisions to CIP-005-3. The purpose of this part is to protect the confidentiality and integrity of each Interactive Remote Access session.

Reference to prior version: (Part 2.3) CIP-007-5, R3.2

Change Rationale: (Part 2.3)

This is a new requirement to continue the efforts of the Urgent Action team for Project 2010-15: Expedited Revisions to CIP-005-3. The multi-factor authentication methods are also the same as those identified in the Homeland Security Presidential Directive 12 (HSPD-12), issued August 12, 2007.

Standard Development Timeline

This section is maintained by the drafting team during the development of the standard and will be removed when the standard is adopted by the NERC Board of Trustees (Board).

Description of Current Draft

Completed Actions	Date
Standards Committee approved Standard Authorization Request (SAR) for posting	October 19, 2016
SAR posted for comment	October 20 - November 21, 2016

Anticipated Actions	Date
45-day formal comment period with ballot	May 2017
NERC Board (Board) adoption	August 2017

New or Modified Term(s) Used in NERC Reliability Standards

This section includes all new or modified terms used in the proposed standard that will be included in the *Glossary of Terms Used in NERC Reliability Standards* upon applicable regulatory approval. Terms used in the proposed standard that are already defined and are not being modified can be found in the *Glossary of Terms Used in NERC Reliability Standards*. The new or revised terms listed below will be presented for approval with the proposed standard. Upon Board adoption, this section will be removed.

Term(s):

None

Upon Board adoption, the rationale boxes will be moved to the Supplemental Material Section.

A. Introduction

1. **Title:** Cyber Security — Configuration Change Management and Vulnerability Assessments
2. **Number:** CIP-010-3
3. **Purpose:** To prevent and detect unauthorized changes to BES Cyber Systems by specifying configuration change management and vulnerability assessment requirements in support of protecting BES Cyber Systems from compromise that could lead to misoperation or instability in the Bulk Electric System (BES).
4. **Applicability:**
 - 4.1. **Functional Entities:** For the purpose of the requirements contained herein, the following list of functional entities will be collectively referred to as “Responsible Entities.” For requirements in this standard where a specific functional entity or subset of functional entities are the applicable entity or entities, the functional entity or entities are specified explicitly. For the purpose of the requirements contained herein, the following list of functional entities will be collectively referred to as “Responsible Entities.” For requirements in this standard where a specific functional entity or subset of functional entities are the applicable entity or entities, the functional entity or entities are specified explicitly.
 - 4.1.1. **Balancing Authority**
 - 4.1.2. **Distribution Provider** that owns one or more of the following Facilities, systems, and equipment for the protection or restoration of the BES:
 - 4.1.2.1. Each underfrequency Load shedding (UFLS) or undervoltage Load shedding (UVLS) system that:
 - 4.1.2.1.1. is part of a Load shedding program that is subject to one or more requirements in a NERC or Regional Reliability Standard; and
 - 4.1.2.1.2. performs automatic Load shedding under a common control system owned by the Responsible Entity, without human operator initiation, of 300 MW or more.
 - 4.1.2.2. Each Remedial Action Scheme (RAS) where the RAS is subject to one or more requirements in a NERC or Regional Reliability Standard.
 - 4.1.2.3. Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is subject to one

or more requirements in a NERC or Regional Reliability Standard.

- 4.1.2.4. Each Cranking Path and group of Elements meeting the initial switching requirements from a Blackstart Resource up to and including the first interconnection point of the starting station service of the next generation unit(s) to be started.

4.1.3. Generator Operator

4.1.4. Generator Owner

4.1.5. Interchange Coordinator or Interchange Authority

4.1.6. Reliability Coordinator

4.1.7. Transmission Operator

4.1.8. Transmission Owner

- 4.2. **Facilities:** For the purpose of the requirements contained herein, the following Facilities, systems, and equipment owned by each Responsible Entity in Section 4.1 above are those to which these requirements are applicable. For requirements in this standard where a specific type of Facilities, system, or equipment or subset of Facilities, systems, and equipment are applicable, these are specified explicitly.

- 4.2.1. **Distribution Provider:** One or more of the following Facilities, systems and equipment owned by the Distribution Provider for the protection or restoration of the BES:

- 4.2.1.1 Each UFLS or UVLS System that:

- 4.2.1.1.1 is part of a Load shedding program that is subject to one or more requirements in a NERC or Regional Reliability Standard; and

- 4.2.1.1.2 performs automatic Load shedding under a common control system owned by the Responsible Entity, without human operator initiation, of 300 MW or more.

- 4.2.1.2 Each RAS where the RAS is subject to one or more requirements in a NERC or Regional Reliability Standard.

- 4.2.1.3 Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is subject to one or more requirements in a NERC or Regional Reliability Standard.

- 4.2.1.4 Each Cranking Path and group of Elements meeting the initial switching requirements from a Blackstart Resource up to and

including the first interconnection point of the starting station service of the next generation unit(s) to be started.

4.2.2. Responsible Entities listed in 4.1 other than Distribution Providers:

All BES Facilities.

4.2.3. Exemptions: The following are exempt from Standard CIP-010-3:

4.2.3.1. Cyber Assets at Facilities regulated by the Canadian Nuclear Safety Commission.

4.2.3.2. Cyber Assets associated with communication networks and data communication links between discrete Electronic Security Perimeters (ESPs).

4.2.3.3. 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.

4.2.3.4. For Distribution Providers, the systems and equipment that are not included in section 4.2.1 above.

5. Effective Date:

See Implementation Plan for Project 2016-03.

6. Background: Standard CIP-010 exists as part of a suite of CIP Standards related to cyber security, which require the initial identification and categorization of BES Cyber Systems and require a minimum level of organizational, operational and procedural controls to mitigate risk to BES Cyber Systems.

Most requirements open with, “*Each Responsible Entity shall implement one or more documented [processes, plan, etc.] that include the applicable items in [Table Reference].*” The referenced table requires the applicable items in the procedures for the requirement’s common subject matter.

The term *documented processes* refers to a set of required instructions specific to the Responsible Entity and to achieve a specific outcome. This term does not imply any particular naming or approval structure beyond what is stated in the requirements. An entity should include as much as it believes necessary in its documented processes, but it must address the applicable requirements in the table.

The terms *program* and *plan* are sometimes used in place of *documented processes* where it makes sense and is commonly understood. For example, documented processes describing a response are typically referred to as *plans* (i.e., incident response plans and recovery plans). Likewise, a security plan can describe an approach involving multiple procedures to address a broad subject matter.

Similarly, the term *program* may refer to the organization’s overall implementation of its policies, plans, and procedures involving a subject matter. Examples in the standards include the personnel risk assessment program and the personnel training

program. The full implementation of the CIP Cyber Security Standards could also be referred to as a program. However, the terms *program* and *plan* do not imply any additional requirements beyond what is stated in the standards.

Responsible Entities can implement common controls that meet requirements for multiple high and medium impact BES Cyber Systems. For example, a single training program could meet the requirements for training personnel across multiple BES Cyber Systems.

Measures for the initial requirement are simply the documented processes themselves. Measures in the table rows provide examples of evidence to show documentation and implementation of applicable items in the documented processes. These measures serve to provide guidance to entities in acceptable records of compliance and should not be viewed as an all-inclusive list.

Throughout the standards, unless otherwise stated, bulleted items in the requirements and measures are items that are linked with an “or,” and numbered items are items that are linked with an “and.”

Many references in the Applicability section use a threshold of 300 MW for UFLS and UVLS. This particular threshold of 300 MW for UVLS and UFLS was provided in Version 1 of the CIP Cyber Security Standards. The threshold remains at 300 MW since it is specifically addressing UVLS and UFLS, which are last ditch efforts to save the BES. A review of UFLS tolerances defined within regional reliability standards for UFLS program requirements to date indicates that the historical value of 300 MW represents an adequate and reasonable threshold value for allowable UFLS operational tolerances.

“Applicable Systems” Columns in Tables:

Each table has an “Applicable Systems” column to further define the scope of systems to which a specific requirement row applies. The CSO706 SDT adapted this concept from the National Institute of Standards and Technology (“NIST”) Risk Management Framework as a way of applying requirements more appropriately based on impact and connectivity characteristics. The following conventions are used in the applicability column as described.

- **High Impact BES Cyber Systems** – Applies to BES Cyber Systems categorized as high impact according to the CIP-002-5.1 identification and categorization processes.
- **Medium Impact BES Cyber Systems** – Applies to BES Cyber Systems categorized as medium impact according to the CIP-002-5.1 identification and categorization processes.
- **Electronic Access Control or Monitoring Systems (EACMS)** – Applies to each Electronic Access Control or Monitoring System associated with a referenced high impact BES Cyber System or medium impact BES Cyber System. Examples

may include, but are not limited to, firewalls, authentication servers, and log monitoring and alerting systems.

- **Physical Access Control Systems (PACS)** – Applies to each Physical Access Control System associated with a referenced high impact BES Cyber System or medium impact BES Cyber System with External Routable Connectivity.
- **Protected Cyber Assets (PCA)** – Applies to each Protected Cyber Asset associated with a referenced high impact BES Cyber System or medium impact BES Cyber System.

B. Requirements and Measures

Rationale for Requirement R1:

Proposed requirement R1 Part 1.6 addresses directives in Order No. 829 for verifying software integrity and authenticity prior to installation in BES Cyber Systems (P. 48).

The objective of verifying software integrity and authenticity is to ensure that the software being installed in the BES Cyber System was not modified without the awareness of the software supplier and is not counterfeit.

[Guidance and examples are provided in the Guidelines and Technical Basis Section of this standard.](#)

- R1.** Each Responsible Entity shall implement one or more documented process(es) that collectively include each of the applicable requirement parts in *CIP-010-3 Table R1 – Configuration Change Management*. *[Violation Risk Factor: Medium]*
[Time Horizon: Operations Planning].
- M1.** Evidence must include each of the applicable documented processes that collectively include each of the applicable requirement parts in *CIP-010-3 Table R1 – Configuration Change Management* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-010-3 Table R1 – Configuration Change Management			
Part	Applicable Systems	Requirements	Measures
1.1	<p>High Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA <p>Medium Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA 	<p>Develop a baseline configuration, individually or by group, which shall include the following items:</p> <ol style="list-style-type: none"> 1.1.1. Operating system(s) (including version) or firmware where no independent operating system exists; 1.1.2. Any commercially available or open-source application software (including version) intentionally installed; 1.1.3. Any custom software installed; 1.1.4. Any logical network accessible ports; and 1.1.5. Any security patches applied. 	<p>Examples of evidence may include, but are not limited to:</p> <ul style="list-style-type: none"> • A spreadsheet identifying the required items of the baseline configuration for each Cyber Asset, individually or by group; or • A record in an asset management system that identifies the required items of the baseline configuration for each Cyber Asset, individually or by group.

CIP-010-3 Table R1 – Configuration Change Management			
Part	Applicable Systems	Requirements	Measures
1.2	<p>High Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA <p>Medium Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA 	<p>Authorize and document changes that deviate from the existing baseline configuration.</p>	<p>Examples of evidence may include, but are not limited to:</p> <ul style="list-style-type: none"> • A change request record and associated electronic authorization (performed by the individual or group with the authority to authorize the change) in a change management system for each change; or • Documentation that the change was performed in accordance with the requirement.

CIP-010-3 Table R1 – Configuration Change Management			
Part	Applicable Systems	Requirements	Measures
1.3	<p>High Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA <p>Medium Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA 	<p>For a change that deviates from the existing baseline configuration, update the baseline configuration as necessary within 30 calendar days of completing the change.</p>	<p>An example of evidence may include, but is not limited to, updated baseline documentation with a date that is within 30 calendar days of the date of the completion of the change.</p>
1.4	<p>High Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA <p>Medium Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA 	<p>For a change that deviates from the existing baseline configuration:</p> <ol style="list-style-type: none"> 1.4.1. Prior to the change, determine required cyber security controls in CIP-005 and CIP-007 that could be impacted by the change; 1.4.2. Following the change, verify that required cyber security controls determined in 1.4.1 are not adversely affected; and 1.4.3. Document the results of the verification. 	<p>An example of evidence may include, but is not limited to, a list of cyber security controls verified or tested along with the dated test results.</p>

CIP-010-3 Table R1 – Configuration Change Management			
Part	Applicable Systems	Requirements	Measures
1.5	High Impact BES Cyber Systems	<p>Where technically feasible, for each change that deviates from the existing baseline configuration:</p> <p>1.5.1. Prior to implementing any change in the production environment, test the changes in a test environment or test the changes in a production environment where the test is performed in a manner that minimizes adverse effects, that models the baseline configuration to ensure that required cyber security controls in CIP-005 and CIP-007 are not adversely affected; and</p> <p>1.5.2. Document the results of the testing and, if a test environment was used, the differences between the test environment and the production environment, including a description of the measures used to account for any differences in operation between the test and production environments.</p>	<p>An example of evidence may include, but is not limited to, a list of cyber security controls tested along with successful test results and a list of differences between the production and test environments with descriptions of how any differences were accounted for, including of the date of the test.</p>

CIP-010-3 Table R1 – Configuration Change Management			
Part	Applicable Systems	Requirements	Measures
1.6	<p>High Impact BES Cyber Systems</p> <p>Medium Impact BES Cyber Systems</p> <p>Note: Implementation does not require the Responsible Entity to renegotiate or abrogate existing contracts (including amendments to master agreements and purchase orders). Additionally, the following issues are beyond the scope of Part 1.6: (1) the actual terms and conditions of a procurement contract; and (2) vendor performance and adherence to a contract.</p>	<p>For <u>Prior to</u> a change that deviates from the existing baseline configuration associated with baseline items in Parts 1.1.1, 1.1.2, and 1.1.5, and when the method to do so is available to the Responsible Entity from the software source:</p> <p>1.6.1. Verify the identity of the software source; and</p> <p>1.6.2. Verify the integrity of the software obtained from the software source.</p>	<p>An example of evidence may include, but is not limited to a change request record that demonstrates the verification of identity of the software source and integrity of the software was performed during <u>prior to</u> the baseline change <u>or a process which documents the mechanisms in place that would automatically ensure the authenticity and integrity of the software.</u></p>

- R2.** Each Responsible Entity shall implement one or more documented process(es) that collectively include each of the applicable requirement parts in *CIP-010-3 Table R2 – Configuration Monitoring*. [Violation Risk Factor: Medium] [Time Horizon: Operations Planning].
- M2.** Evidence must include each of the applicable documented processes that collectively include each of the applicable requirement parts in *CIP-010-3 Table R2 – Configuration Monitoring* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-010-3 Table R2 – Configuration Monitoring			
Part	Applicable Systems	Requirements	Measures
2.1	High Impact BES Cyber Systems and their associated: <ol style="list-style-type: none"> 1. EACMS; and 2. PCA 	Monitor at least once every 35 calendar days for changes to the baseline configuration (as described in Requirement R1, Part 1.1). Document and investigate detected unauthorized changes.	An example of evidence may include, but is not limited to, logs from a system that is monitoring the configuration along with records of investigation for any unauthorized changes that were detected.

- R3.** Each Responsible Entity shall implement one or more documented process(es) that collectively include each of the applicable requirement parts in *CIP-010-3 Table R3– Vulnerability Assessments*. *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning and Operations Planning]*
- M3.** Evidence must include each of the applicable documented processes that collectively include each of the applicable requirement parts in *CIP-010-3 Table R3 – Vulnerability Assessments* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-010-3 Table R3 – Vulnerability Assessments			
Part	Applicable Systems	Requirements	Measures
3.1	<p>High Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA <p>Medium Impact BES Cyber Systems and their associated:</p> <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA 	<p>At least once every 15 calendar months, conduct a paper or active vulnerability assessment.</p>	<p>Examples of evidence may include, but are not limited to:</p> <ul style="list-style-type: none"> • A document listing the date of the assessment (performed at least once every 15 calendar months), the controls assessed for each BES Cyber System along with the method of assessment; or • A document listing the date of the assessment and the output of any tools used to perform the assessment.

CIP-010-3 Table R3 – Vulnerability Assessments			
Part	Applicable Systems	Requirements	Measures
3.2	High Impact BES Cyber Systems	<p>Where technically feasible, at least once every 36 calendar months:</p> <p>3.2.1 Perform an active vulnerability assessment in a test environment, or perform an active vulnerability assessment in a production environment where the test is performed in a manner that minimizes adverse effects, that models the baseline configuration of the BES Cyber System in a production environment; and</p> <p>3.2.2 Document the results of the testing and, if a test environment was used, the differences between the test environment and the production environment, including a description of the measures used to account for any differences in operation between the test and production environments.</p>	<p>An example of evidence may include, but is not limited to, a document listing the date of the assessment (performed at least once every 36 calendar months), the output of the tools used to perform the assessment, and a list of differences between the production and test environments with descriptions of how any differences were accounted for in conducting the assessment.</p>

CIP-010-3 Table R3 – Vulnerability Assessments			
Part	Applicable Systems	Requirements	Measures
3.3	High Impact BES Cyber Systems and their associated: <ol style="list-style-type: none"> 1. EACMS; 2. PCA 	Prior to adding a new applicable Cyber Asset to a production environment, perform an active vulnerability assessment of the new Cyber Asset, except for CIP Exceptional Circumstances and like replacements of the same type of Cyber Asset with a baseline configuration that models an existing baseline configuration of the previous or other existing Cyber Asset.	An example of evidence may include, but is not limited to, a document listing the date of the assessment (performed prior to the commissioning of the new Cyber Asset) and the output of any tools used to perform the assessment.
3.4	High Impact BES Cyber Systems and their associated: <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA Medium Impact BES Cyber Systems and their associated: <ol style="list-style-type: none"> 1. EACMS; 2. PACS; and 3. PCA 	Document the results of the assessments conducted according to Parts 3.1, 3.2, and 3.3 and the action plan to remediate or mitigate vulnerabilities identified in the assessments including the planned date of completing the action plan and the execution status of any remediation or mitigation action items.	An example of evidence may include, but is not limited to, a document listing the results or the review or assessment, a list of action items, documented proposed dates of completion for the action plan, and records of the status of the action items (such as minutes of a status meeting, updates in a work order system, or a spreadsheet tracking the action items).

R4. Each Responsible Entity, for its high impact and medium impact BES Cyber Systems and associated Protected Cyber Assets, shall implement, except under CIP Exceptional Circumstances, one or more documented plan(s) for Transient Cyber Assets

and Removable Media that include the sections in Attachment 1. *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning and Operations Planning]*

- M4.** Evidence shall include each of the documented plan(s) for Transient Cyber Assets and Removable Media that collectively include each of the applicable sections in Attachment 1 and additional evidence to demonstrate implementation of plan(s) for Transient Cyber Assets and Removable Media. Additional examples of evidence per section are located in Attachment 2. If a Responsible Entity does not use Transient Cyber Asset(s) or Removable Media, examples of evidence include, but are not limited to, a statement, policy, or other document that states the Responsible Entity does not use Transient Cyber Asset(s) or Removable Media.

C. Compliance

1. Compliance Monitoring Process

1.1. Compliance Enforcement Authority: “Compliance Enforcement Authority” means NERC or the Regional Entity, or any entity as otherwise designated by an Applicable Governmental Authority, in their respective roles of monitoring and/or enforcing compliance with mandatory and enforceable Reliability Standards in their respective jurisdictions.

1.2. Evidence Retention: The following evidence retention period(s) identify the period of time an entity is required to retain specific evidence to demonstrate compliance. For instances where the evidence retention period specified below is shorter than the time since the last audit, the Compliance Enforcement Authority may ask an entity to provide other evidence to show that it was compliant for the full-time period since the last audit.

The applicable 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 Responsible Entity shall retain evidence of each requirement in this standard for three calendar years.
- If a Responsible Entity is found non-compliant, it shall keep information related to the non-compliance until mitigation is complete and approved or for the time specified above, whichever is longer.
- The CEA shall keep the last audit records and all requested and submitted subsequent audit records.

1.3. Compliance Monitoring and Enforcement Program: As defined in the NERC Rules of Procedure, “Compliance Monitoring and Enforcement Program” refers to the identification of the processes that will be used to evaluate data or information for the purpose of assessing performance or outcomes with the associated Reliability Standard.

Violation Severity Levels

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
R1.	The Responsible Entity has documented and implemented a configuration change management process(es) that includes only four of the required baseline items listed in 1.1.1 through 1.1.5. (1.1)	The Responsible Entity has documented and implemented a configuration change management process(es) that includes only three of the required baseline items listed in 1.1.1 through 1.1.5. (1.1)	<p>The Responsible Entity has documented and implemented a configuration change management process(es) that includes only two of the required baseline items listed in 1.1.1 through 1.1.5. (1.1)</p> <p>OR</p> <p>The Responsible Entity has a process to verify the identity of the software source (1.6.1) but does not have a process to verify the integrity of the software provided by the software source when the method to do so is available to the Responsible Entity from the software source (1.6.2)</p>	<p>The Responsible Entity has not documented or implemented any configuration change management process(es). (R1)</p> <p>OR</p> <p>The Responsible Entity has documented and implemented a configuration change management process(es) that includes only one of the required baseline items listed in 1.1.1 through 1.1.5. (1.1)</p> <p>OR</p> <p>The Responsible Entity does not have a process(es) that requires authorization and documentation of changes that deviate from the existing baseline configuration. (1.2)</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>OR</p> <p>The Responsible Entity does not have a process(es) to update baseline configurations within 30 calendar days of completing a change(s) that deviates from the existing baseline configuration.(1.3)</p> <p>OR</p> <p>The Responsible Entity does not have a process(es) to determine required security controls in CIP-005 and CIP-007 that could be impacted by a change(s) that deviates from the existing baseline configuration. (1.4.1)</p> <p>OR</p> <p>The Responsible Entity has a process(es) to determine required security controls in CIP-005 and CIP-007 that could be impacted by a change(s) that deviates from the existing baseline</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>configuration but did not verify and document that the required controls were not adversely affected following the change. (1.4.2 & 1.4.3)</p> <p>OR</p> <p>The Responsible Entity does not have a process for testing changes in an environment that models the baseline configuration prior to implementing a change that deviates from baseline configuration. (1.5.1)</p> <p>OR</p> <p>The Responsible Entity does not have a process to document the test results and, if using a test environment, document the differences between the test and production environments. (1.5.2)</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>OR</p> <p>The Responsible Entity does not have a process to verify the identity of the software source and the integrity of the software provided by the software source when the method to do so is available to the Responsible Entity from the software source (1.6)</p>
R2.	N/A	N/A	N/A	<p>The Responsible Entity has not documented or implemented a process(es) to monitor for, investigate, and document detected unauthorized changes to the baseline at least once every 35 calendar days. (2.1)</p>
R3.	<p>The Responsible Entity has implemented one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has performed a vulnerability</p>	<p>The Responsible Entity has implemented one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has performed a vulnerability</p>	<p>The Responsible Entity has implemented one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has performed a vulnerability</p>	<p>The Responsible Entity has not implemented any vulnerability assessment processes for one of its applicable BES Cyber Systems. (R3)</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>assessment more than 15 months, but less than 18 months, since the last assessment on one of its applicable BES Cyber Systems. (3.1)</p> <p>OR</p> <p>The Responsible Entity has implemented one or more documented active vulnerability assessment processes for Applicable Systems, but has performed an active vulnerability assessment more than 36 months, but less than 39 months, since the last active assessment on one of its applicable BES Cyber Systems. (3.2)</p>	<p>assessment more than 18 months, but since the last assessment on one of its applicable BES Cyber Systems. (3.1)</p> <p>OR</p> <p>The Responsible Entity has implemented one or more documented active vulnerability assessment processes for Applicable Systems, but has performed an active vulnerability assessment more than 39 months, but less than 42 months, since the last active assessment on one of its applicable BES Cyber Systems. (3.2)</p>	<p>assessment more than 21 months, but less than 24 months, since the last assessment on one of its applicable BES Cyber Systems. (3.1)</p> <p>OR</p> <p>The Responsible Entity has implemented one or more documented active vulnerability assessment processes for Applicable Systems, but has performed an active vulnerability assessment more than 42 months, but less than 45 months, since the last active assessment on one of its applicable BES Cyber Systems. (3.2)</p>	<p>OR</p> <p>The Responsible Entity has implemented one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has performed a vulnerability assessment more than 24 months since the last assessment on one of its applicable BES Cyber Systems. (3.1)</p> <p>OR</p> <p>The Responsible Entity has implemented one or more documented active vulnerability assessment processes for Applicable Systems, but has performed an active vulnerability assessment more than 45 months since the last active assessment on one of its applicable BES Cyber Systems.(3.2)</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				<p>OR</p> <p>The Responsible Entity has implemented and documented one or more vulnerability assessment processes for each of its applicable BES Cyber Systems, but did not perform the active vulnerability assessment in a manner that models an existing baseline configuration of its applicable BES Cyber Systems. (3.3)</p> <p>OR</p> <p>The Responsible Entity has implemented one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has not documented the results of the vulnerability assessments, the action plans to remediate or</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
				mitigate vulnerabilities identified in the assessments, the planned date of completion of the action plan, and the execution status of the mitigation plans. (3.4)
R4.	<p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to manage its Transient Cyber Asset(s) according to CIP-010-3, Requirement R4, Attachment 1, Section 1.1. (R4)</p> <p>OR</p> <p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to document the Removable Media sections according to CIP-010-3, Requirement R4,</p>	<p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to implement the Removable Media sections according to CIP-010-3, Requirement R4, Attachment 1, Section 3. (R4)</p> <p>OR</p> <p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media plan, but failed to document mitigation of software vulnerabilities, mitigation for the introduction of</p>	<p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to authorize its Transient Cyber Asset(s) according to CIP-010-3, Requirement R4, Attachment 1, Section 1.2. (R4)</p> <p>OR</p> <p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to implement mitigation of software vulnerabilities, mitigation for the introduction of</p>	<p>The Responsible Entity failed to document or implement one or more plan(s) for Transient Cyber Assets and Removable Media according to CIP-010-3, Requirement R4. (R4)</p>

R #	Violation Severity Levels			
	Lower VSL	Moderate VSL	High VSL	Severe VSL
	<p>Attachment 1, Section 3. (R4)</p> <p>OR</p> <p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to document authorization for Transient Cyber Assets managed by the Responsible Entity according to CIP-010-3, Requirement R4, Attachment 1, Section 1.2. (R4)</p>	<p>malicious code, or mitigation of the risk of unauthorized use for Transient Cyber Assets managed by the Responsible Entity according to CIP-010-3, Requirement R4, Attachment 1, Sections 1.3, 1.4, and 1.5. (R4)</p> <p>OR</p> <p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to document mitigation of software vulnerabilities or mitigation for the introduction of malicious code for Transient Cyber Assets managed by a party other than the Responsible Entity according to CIP-010-3, Requirement R4, Attachment 1, Sections 2.1, 2.2, and 2.3. (R4)</p>	<p>malicious code, or mitigation of the risk of unauthorized use for Transient Cyber Assets managed by the Responsible Entity according to CIP-010-3, Requirement R4, Attachment 1, Sections 1.3, 1.4, and 1.5. (R4)</p> <p>OR</p> <p>The Responsible Entity documented its plan(s) for Transient Cyber Assets and Removable Media, but failed to implement mitigation of software vulnerabilities or mitigation for the introduction of malicious code for Transient Cyber Assets managed by a party other than the Responsible Entity according to CIP-010-3, Requirement R4, Attachment 1, Sections 2.1, 2.2, and 2.3. (R4)</p>	

D. Regional Variances

None.

E. Associated Documents

None.

Version History

Version	Date	Action	Change Tracking
1	11/26/12	Adopted by the NERC Board of Trustees.	Developed to define the configuration change management and vulnerability assessment requirements in coordination with other CIP standards and to address the balance of the FERC directives in its Order 706.
1	11/22/13	FERC Order issued approving CIP-010-1. (Order becomes effective on 2/3/14.)	
2	11/13/14	Adopted by the NERC Board of Trustees.	Addressed two FERC directives from Order No. 791 related to identify, assess, and correct language and communication networks.
2	2/12/15	Adopted by the NERC Board of Trustees.	Replaces the version adopted by the Board on 11/13/2014. Revised version addresses remaining directives from Order No. 791 related to transient devices and low impact

CIP-010-3 – Cyber Security — Configuration Change Management and Vulnerability Assessments

Version	Date	Action	Change Tracking
			BES Cyber Systems.
2	1/21/16	FERC Order issued approving CIP-010-3. Docket No. RM15-14-000	
3	tbd	Modified to address certain directives in FERC Order No. 829.	Revised

CIP-010-3 - Attachment 1

Required Sections for Plans for Transient Cyber Assets and Removable Media

Responsible Entities shall include each of the sections provided below in their plan(s) for Transient Cyber Assets and Removable Media as required under Requirement R4.

Section 1. Transient Cyber Asset(s) Managed by the Responsible Entity.

- 1.1.** Transient Cyber Asset Management: Responsible Entities shall manage Transient Cyber Asset(s), individually or by group: (1) in an ongoing manner to ensure compliance with applicable requirements at all times, (2) in an on-demand manner applying the applicable requirements before connection to a BES Cyber System, or (3) a combination of both (1) and (2) above.
- 1.2.** Transient Cyber Asset Authorization: For each individual or group of Transient Cyber Asset(s), each Responsible Entity shall authorize:
 - 1.2.1.** Users, either individually or by group or role;
 - 1.2.2.** Locations, either individually or by group; and
 - 1.2.3.** Uses, which shall be limited to what is necessary to perform business functions.
- 1.3.** Software Vulnerability Mitigation: Use one or a combination of the following methods to achieve the objective of mitigating the risk of vulnerabilities posed by unpatched software on the Transient Cyber Asset (per Transient Cyber Asset capability):
 - Security patching, including manual or managed updates;
 - Live operating system and software executable only from read-only media;
 - System hardening; or
 - Other method(s) to mitigate software vulnerabilities.
- 1.4.** Introduction of Malicious Code Mitigation: Use one or a combination of the following methods to achieve the objective of mitigating the introduction of malicious code (per Transient Cyber Asset capability):
 - Antivirus software, including manual or managed updates of signatures or patterns;
 - Application whitelisting; or
 - Other method(s) to mitigate the introduction of malicious code.
- 1.5.** Unauthorized Use Mitigation: Use one or a combination of the following methods to achieve the objective of mitigating the risk of unauthorized use of Transient Cyber Asset(s):

- Restrict physical access;
- Full-disk encryption with authentication;
- Multi-factor authentication; or
- Other method(s) to mitigate the risk of unauthorized use.

Section 2. Transient Cyber Asset(s) Managed by a Party Other than the Responsible Entity.

2.1 Software Vulnerabilities Mitigation: Use one or a combination of the following methods to achieve the objective of mitigating the risk of vulnerabilities posed by unpatched software on the Transient Cyber Asset (per Transient Cyber Asset capability):

- Review of installed security patch(es);
- Review of security patching process used by the party;
- Review of other vulnerability mitigation performed by the party; or
- Other method(s) to mitigate software vulnerabilities.

2.2 Introduction of malicious code mitigation: Use one or a combination of the following methods to achieve the objective of mitigating malicious code (per Transient Cyber Asset capability):

- Review of antivirus update level;
- Review of antivirus update process used by the party;
- Review of application whitelisting used by the party;
- Review use of live operating system and software executable only from read-only media;
- Review of system hardening used by the party; or
- Other method(s) to mitigate malicious code.

2.3 For any method used to mitigate software vulnerabilities or malicious code as specified in 2.1 and 2.2, Responsible Entities shall determine whether any additional mitigation actions are necessary and implement such actions prior to connecting the Transient Cyber Asset.

Section 3. Removable Media

3.1. Removable Media Authorization: For each individual or group of Removable Media, each Responsible Entity shall authorize:

- 3.1.1.** Users, either individually or by group or role; and
- 3.1.2.** Locations, either individually or by group.

- 3.2.** Malicious Code Mitigation: To achieve the objective of mitigating the threat of introducing malicious code to high impact or medium impact BES Cyber Systems and their associated Protected Cyber Assets, each Responsible Entity shall:
- 3.2.1.** Use method(s) to detect malicious code on Removable Media using a Cyber Asset other than a BES Cyber System or Protected Cyber Assets; and
 - 3.2.2.** Mitigate the threat of detected malicious code on Removable Media prior to connecting the Removable Media to a high impact or medium impact BES Cyber System or associated Protected Cyber Assets.

CIP-010-3 - Attachment 2

Examples of Evidence for Plans for Transient Cyber Assets and Removable Media

- Section 1.1: Examples of evidence for Section 1.1 may include, but are not limited to, the method(s) of management for the Transient Cyber Asset(s). This can be included as part of the Transient Cyber Asset plan(s), part of the documentation related to authorization of Transient Cyber Asset(s) managed by the Responsible Entity or part of a security policy.
- Section 1.2: Examples of evidence for Section 1.2 may include, but are not limited to, documentation from asset management systems, human resource management systems, or forms or spreadsheets that show authorization of Transient Cyber Asset(s) managed by the Responsible Entity. Alternatively, this can be documented in the overarching plan document.
- Section 1.3: Examples of evidence for Section 1.3 may include, but are not limited to, documentation of the method(s) used to mitigate software vulnerabilities posed by unpatched software such as security patch management implementation, the use of live operating systems from read-only media, system hardening practices or other method(s) to mitigate the software vulnerability posed by unpatched software. Evidence can be from change management systems, automated patch management solutions, procedures or processes associated with using live operating systems, or procedures or processes associated with system hardening practices. If a Transient Cyber Asset does not have the capability to use method(s) that mitigate the risk from unpatched software, evidence may include documentation by the vendor or Responsible Entity that identifies that the Transient Cyber Asset does not have the capability.
- Section 1.4: Examples of evidence for Section 1.4 may include, but are not limited to, documentation of the method(s) used to mitigate the introduction of malicious code such as antivirus software and processes for managing signature or pattern updates, application whitelisting practices, processes to restrict communication, or other method(s) to mitigate the introduction of malicious code. If a Transient Cyber Asset does not have the capability to use method(s) that mitigate the introduction of malicious code, evidence may include documentation by the vendor or Responsible Entity that identifies that the Transient Cyber Asset does not have the capability.
- Section 1.5: Examples of evidence for Section 1.5 may include, but are not limited to, documentation through policies or procedures of the method(s) to restrict physical access; method(s) of the full-disk encryption solution along with the authentication protocol; method(s) of the multi-factor authentication solution; or documentation of other method(s) to mitigate the risk of unauthorized use.

Section 2.1: Examples of evidence for Section 2.1 may include, but are not limited to, documentation from change management systems, electronic mail or procedures that document a review of installed security patch(es); memoranda, electronic mail, policies or contracts from parties other than the Responsible Entity that identify the security patching process or vulnerability mitigation performed by the party other than the Responsible Entity; evidence from change management systems, electronic mail, system documentation or contracts that identifies acceptance by the Responsible Entity that the practices of the party other than the Responsible Entity are acceptable; or documentation of other method(s) to mitigate software vulnerabilities for Transient Cyber Asset(s) managed by a party other than the Responsible Entity. If a Transient Cyber Asset does not have the capability to use method(s) that mitigate the risk from unpatched software, evidence may include documentation by the Responsible Entity or the party other than the Responsible Entity that identifies that the Transient Cyber Asset does not have the capability.

Section 2.2: Examples of evidence for Section 2.2 may include, but are not limited to, documentation from change management systems, electronic mail or procedures that document a review of the installed antivirus update level; memoranda, electronic mail, system documentation, policies or contracts from the party other than the Responsible Entity that identify the antivirus update process, the use of application whitelisting, use of live of operating systems or system hardening performed by the party other than the Responsible Entity; evidence from change management systems, electronic mail or contracts that identifies the Responsible Entity's acceptance that the practices of the party other than the Responsible Entity are acceptable; or documentation of other method(s) to mitigate malicious code for Transient Cyber Asset(s) managed by a party other than the Responsible Entity. If a Transient Cyber Asset does not have the capability to use method(s) that mitigate the introduction of malicious code, evidence may include documentation by the Responsible Entity or the party other than the Responsible Entity that identifies that the Transient Cyber Asset does not have the capability.

Section 2.3: Examples of evidence for Section 2.3 may include, but are not limited to, documentation from change management systems, electronic mail, or contracts that identifies a review to determine whether additional mitigations are necessary and that they have been implemented prior to connecting the Transient Cyber Asset managed by a party other than the Responsible Entity.

Section 3.1: Examples of evidence for Section 3.1 may include, but are not limited to, documentation from asset management systems, human resource management systems, forms or spreadsheets that shows authorization of Removable Media. The documentation must identify Removable Media, individually or by group of Removable Media, along with the authorized users,

either individually or by group or role, and the authorized locations, either individually or by group.

Section 3.2: Examples of evidence for Section 3.2 may include, but are not limited to, documented process(es) of the method(s) used to mitigate malicious code such as results of scan settings for Removable Media, or implementation of on-demand scanning. Documented process(es) for the method(s) used for mitigating the threat of detected malicious code on Removable Media, such as logs from the method(s) used to detect malicious code that show the results of scanning and that show mitigation of detected malicious code on Removable Media or documented confirmation by the entity that the Removable Media was deemed to be free of malicious code.

Guidelines and Technical Basis

Section 4 – Scope of Applicability of the CIP Cyber Security Standards

Section “4. Applicability” of the standards provides important information for Responsible Entities to determine the scope of the applicability of the CIP Cyber Security Requirements.

Section “4.1. Functional Entities” is a list of NERC functional entities to which the standard applies. If the entity is registered as one or more of the functional entities listed in Section 4.1, then the NERC CIP Cyber Security Standards apply. Note that there is a qualification in Section 4.1 that restricts the applicability in the case of Distribution Providers to only those that own certain types of systems and equipment listed in 4.2.

Section “4.2. Facilities” defines the scope of the Facilities, systems, and equipment owned by the Responsible Entity, as qualified in Section 4.1, that is subject to the requirements of the standard. As specified in the exemption section 4.2.3.5, this standard does not apply to Responsible Entities that do not have High Impact or Medium Impact BES Cyber Systems under CIP-002-5.1’s categorization. In addition to the set of BES Facilities, Control Centers, and other systems and equipment, the list includes the set of systems and equipment owned by Distribution Providers. While the NERC Glossary term “Facilities” already includes the BES characteristic, the additional use of the term BES here is meant to reinforce the scope of applicability of these Facilities where it is used, especially in this applicability scoping section. This in effect sets the scope of Facilities, systems, and equipment that is subject to the standards.

Requirement R1:

Baseline Configuration

The concept of establishing a Cyber Asset’s baseline configuration is meant to provide clarity on requirement language found in previous CIP standard versions. Modification of any item within an applicable Cyber Asset’s baseline configuration provides the triggering mechanism for when entities must apply change management processes.

Baseline configurations in CIP-010 consist of five different items: Operating system/firmware, commercially available software or open-source application software, custom software, logical network accessible port identification, and security patches. Operating system information identifies the software and version that is in use on the Cyber Asset. In cases where an independent operating system does not exist (such as for a protective relay), then firmware information should be identified. Commercially available or open-source application software identifies applications that were intentionally installed on the cyber asset. The use of the term “intentional” was meant to ensure that only software applications that were determined to be necessary for Cyber Asset use should be included in the baseline configuration. The SDT does not intend for notepad, calculator, DLL, device drivers, or other applications included in an operating system package as commercially available or open-source application software to be included. Custom software installed may include scripts developed for local entity functions or

other custom software developed for a specific task or function for the entity's use. If additional software was intentionally installed and is not commercially available or open-source, then this software could be considered custom software. If a specific device needs to communicate with another device outside the network, communications need to be limited to only the devices that need to communicate per the requirement in CIP-007-6. Those ports which are accessible need to be included in the baseline. Security patches applied would include all historical and current patches that have been applied on the cyber asset. While CIP-007-6 Requirement R2, Part 2.1 requires entities to track, evaluate, and install security patches, CIP-010 Requirement R1, Part 1.1.5 requires entities to list all applied historical and current patches.

Further guidance can be understood with the following example that details the baseline configuration for a serial-only microprocessor relay:

Asset #051028 at Substation Alpha

- R1.1.1 – Firmware: [MANUFACTURER]-[MODEL]-XYZ-1234567890-ABC
- R1.1.2 – Not Applicable
- R1.1.3 – Not Applicable
- R1.1.4 – Not Applicable
- R1.1.5 – Patch 12345, Patch 67890, Patch 34567, Patch 437823

Also, for a typical IT system, the baseline configuration could reference an IT standard that includes configuration details. An entity would be expected to provide that IT standard as part of their compliance evidence.

Cyber Security Controls

The use of cyber security controls refers specifically to controls referenced and applied according to CIP-005 and CIP-007. The concept presented in the relevant requirement sub-parts in CIP-010 R1 is that an entity is to identify/verify controls from CIP-005 and CIP-007 that could be impacted for a change that deviates from the existing baseline configuration. The SDT does not intend for Responsible Entities to identify/verify all controls located within CIP-005 and CIP-007 for each change. The Responsible Entity is only to identify/verify those control(s) that could be affected by the baseline configuration change. For example, changes that affect logical network ports would only involve CIP-007 R1 (Ports and Services), while changes that affect security patches would only involve CIP-007 R2 (Security Patch Management). The SDT chose not to identify the specific requirements from CIP-005 and CIP-007 in CIP-010 language as the intent of the related requirements is to be able to identify/verify any of the controls in those standards that are affected as a result of a change to the baseline configuration. The SDT believes it possible that all requirements from CIP-005 and CIP-007 may be identified for a major change to the baseline configuration, and therefore, CIP-005 and CIP-007 was cited at the standard-level versus the requirement-level.

Test Environment

The Control Center test environment (or production environment where the test is performed in a manner that minimizes adverse effects) should model the baseline configuration, but may have a different set of components. For instance, an entity may have a BES Cyber System that runs a database on one component and a web server on another component. The test environment may have the same operating system, security patches, network accessible ports, and software, but have both the database and web server running on a single component instead of multiple components.

Additionally, the Responsible Entity should note that wherever a test environment (or production environment where the test is performed in a manner that minimizes adverse effects) is mentioned, the requirement is to “model” the baseline configuration and not duplicate it exactly. This language was chosen deliberately in order to allow for individual elements of a BES Cyber System at a Control Center to be modeled that may not otherwise be able to be replicated or duplicated exactly; such as, but not limited to, a legacy map-board controller or the numerous data communication links from the field or to other Control Centers (such as by ICCP).

Software Integrity and Authenticity

The concept of verifying software integrity and authenticity is a key control in preventing the introduction of malware or counterfeit software. This objective is intended to reduce the likelihood that an attacker could exploit legitimate vendor patch management processes to deliver compromised software updates or patches to a BES Cyber System. The intent of the SDT is to provide controls for verifying the baseline elements that are updated by vendors. It is important to note that this is not limited to only security patches. ~~That is why the requirement was not placed in CIP-007 – Security Patch Management.~~

NIST SP-800-161 includes a number of security controls, which, when taken together, reduce the probability of a successful “Watering Hole” or similar cyber attack in the industrial control system environment and thus could assist in addressing this objective. For example, in the System and Information Integrity (SI) control family, control SI-7 suggests that the integrity of information systems and obtaining software directly from the developer. In the Configuration Management (CM) control family, control CM-5(3) requires that the information system prevent the installation of firmware ~~or~~ software without the verification that the component has been digitally signed to ensure that the hardware and software components are genuine and valid. NIST SP-800-161, while not meant to be definitive, provides examples of controls for addressing this objective. Other controls also could meet this objective.

~~It is not the intent of the SDT to require a verification of each source or software update at the time it is obtained. It is sufficient to establish the reliable source and software update once. This will allow automated solutions to be implemented to obtain frequent updates such as patches.~~

In implementing Requirement R1 Part 1.6, the responsible entity should consider their existing CIP cyber security policies and controls in addition to the following:

- Processes used to deliver software and appropriate control(s) that will verify the integrity and authenticity of the software delivered through these processes. To the extent that

the responsible entity utilizes automated systems such as a subscription service to download and distribute software including updates, consider how software integrity and authenticity can be verified through those processes.

- Coordination of the responsible entity's integrity and authenticity control(s) with other cyber security policies and controls, including change management and patching processes, procurement controls, and incident response plans.
- Use of a secure central software repository after software authenticity and integrity have been validated, so that authenticity and integrity checks do not need to be performed before each installation.
- Additional controls such as examples outlined in the Software, Firmware, and Information Integrity (SI-7) section of NIST Special Publication 800-53 Revision 4, or similar guidance.
- Additional controls such as those defined in FIPS-140-2, FIPS 180-4, or similar guidance, to ensure the cryptographic methods used are acceptable to the responsible entity.

Responsible entities may use various methods to verify the integrity of software obtained from the software source. Examples include, but are not limited to, the following:

- Verify that the software has been digitally signed and validate the signature to ensure that the software's integrity has not been compromised.
- Use public key infrastructure (PKI) with encryption to ensure that the software is not modified in transit by enabling only intended recipients to decrypt the software.
- Require software sources to provide fingerprints or cipher hashes for all software and verify the values prior to installation on a BES Cyber System to ensure the integrity of the software. Consider using a method for receiving the verification values that is different from the method used to receive the software from the software source.
- Use trusted/controlled distribution and delivery options to reduce supply chain risk (e.g., requiring tamper-evident packaging of software during shipping.)

Requirement R2:

The SDT's intent of R2 is to require automated monitoring of the BES Cyber System. However, the SDT understands that there may be some Cyber Assets where automated monitoring may not be possible (such as a GPS time clock). For that reason, automated technical monitoring was not explicitly required, and a Responsible Entity may choose to accomplish this requirement through manual procedural controls.

Requirement R3:

The Responsible Entity should note that the requirement provides a distinction between paper and active vulnerability assessments. The justification for this distinction is well-documented in FERC Order No. 706 and its associated Notice of Proposed Rulemaking. In developing their vulnerability assessment processes, Responsible Entities are strongly encouraged to include at least the following elements, several of which are referenced in CIP-005 and CIP-007:

Paper Vulnerability Assessment:

1. Network Discovery - A review of network connectivity to identify all Electronic Access Points to the Electronic Security Perimeter.
2. Network Port and Service Identification - A review to verify that all enabled ports and services have an appropriate business justification.
3. Vulnerability Review - A review of security rule-sets and configurations including controls for default accounts, passwords, and network management community strings.
4. Wireless Review - Identification of common types of wireless networks (such as 802.11a/b/g/n) and a review of their controls if they are in any way used for BES Cyber System communications.

Active Vulnerability Assessment:

1. Network Discovery - Use of active discovery tools to discover active devices and identify communication paths in order to verify that the discovered network architecture matches the documented architecture.
2. Network Port and Service Identification – Use of active discovery tools (such as Nmap) to discover open ports and services.
3. Vulnerability Scanning – Use of a vulnerability scanning tool to identify network accessible ports and services along with the identification of known vulnerabilities associated with services running on those ports.
4. Wireless Scanning – Use of a wireless scanning tool to discover wireless signals and networks in the physical perimeter of a BES Cyber System. Serves to identify unauthorized wireless devices within the range of the wireless scanning tool.

In addition, Responsible Entities are strongly encouraged to review NIST SP800-115 for additional guidance on how to conduct a vulnerability assessment.

Requirement R4:

Because most BES Cyber Assets and BES Cyber Systems are isolated from external public or untrusted networks, Transient Cyber Assets and Removable Media are a means for cyber-attack. Transient Cyber Assets and Removable Media are often the only way to transport files to and from secure areas to maintain, monitor, or troubleshoot critical systems. To protect the BES Cyber Assets and BES Cyber Systems, entities are required to document and implement a plan for how they will manage the use of Transient Cyber Assets and Removable Media. The approach of defining a plan allows the Responsible Entity to document the processes that are supportable within its organization and in alignment with its change management processes.

Transient Cyber Assets and Removable Media are those devices connected temporarily to: (1) a BES Cyber Asset, (2) a network within an ESP, or (3) a Protected Cyber Asset. Transient Cyber Assets and Removable Media do not provide BES reliability services and are not part of the BES Cyber Asset to which they are connected. Examples of these temporarily connected devices include, but are not limited to:

- Diagnostic test equipment;
- Packet sniffers;
- Equipment used for BES Cyber System maintenance;
- Equipment used for BES Cyber System configuration; or
- Equipment used to perform vulnerability assessments.

Transient Cyber Assets can be one of many types of devices from a specially-designed device for maintaining equipment in support of the BES to a platform such as a laptop, desktop, or tablet that may just interface with or run applications that support BES Cyber Systems and is capable of transmitting executable code. Removable Media in scope of this requirement can be in the form of floppy disks, compact disks, USB flash drives, external hard drives, and other flash memory cards/drives that contain nonvolatile memory.

While the definitions of Transient Cyber Asset and Removable Media include a conditional provision that requires them to be connected for 30 days or less, Section 1.1 of Attachment 1 allows the Responsible Entity to include provisions in its plan(s) that allow continuous or on-demand treatment and application of controls independent of the connected state. Please note that for on-demand treatment, the requirements only apply when Transient Cyber Assets and Removable Media are being connected to a BES Cyber System or Protected Cyber Asset. Once the transient device is disconnected, the requirements listed herein are not applicable until that Transient Cyber Asset or Removable Media is to be reconnected to the BES Cyber Asset or Protected Cyber Asset.

The attachment was created to specify the capabilities and possible security methods available to Responsible Entities based upon asset type, ownership, and management.

With the list of options provided in Attachment 1 for each control area, the entity has the discretion to use the option(s) that is most appropriate. This includes documenting its approach for how and when the entity manages or reviews the Transient Cyber Asset under its control or under the control of parties other than the Responsible Entity. The entity should avoid implementing a security function that jeopardizes reliability by taking actions that would negatively impact the performance or support of the Transient Cyber Asset, BES Cyber Asset, or Protected Cyber Asset.

Vulnerability Mitigation

The terms “mitigate”, “mitigating”, and “mitigation” are used in the sections in Attachment 1 to address the risks posed by malicious code, software vulnerabilities, and unauthorized use when connecting Transient Cyber Assets and Removable Media. Mitigation in this context does not require that each vulnerability is individually addressed or remediated, as many may be unknown or not have an impact on the system to which the Transient Cyber Asset or Removable Media is connected. Mitigation is meant to reduce security risks presented by connecting the Transient Cyber Asset.

Per Transient Cyber Asset Capability

As with other CIP standards, the requirements are intended for an entity to use the method(s) that the system is capable of performing. The use of “per Transient Cyber Asset capability” is to eliminate the need for a Technical Feasibility Exception when it is understood that the device cannot use a method(s). For example, for malicious code, many types of appliances are not capable of implementing antivirus software; therefore, because it is not a capability of those types of devices, implementation of the antivirus software would not be required for those devices.

Requirement R4, Attachment 1, Section 1 - Transient Cyber Asset(s) Managed by the Responsible Entity

Section 1.1: Entities have a high level of control for the assets that they manage. The requirements listed herein allow entities the flexibility to either pre-authorize an inventory of devices or authorize devices at the time of connection or use a combination of these methods. The devices may be managed individually or by group.

Section 1.2: Entities are to document and implement their process(es) to authorize the use of Transient Cyber Assets for which they have direct management. The Transient Cyber Assets may be listed individually or by asset type. To meet this requirement part, the entity is to document the following:

- 1.2.1 User(s), individually or by group/role, allowed to use the Transient Cyber Asset(s). This can be done by listing a specific person, department, or job function. Caution: consider whether these user(s) must also have authorized electronic access to the applicable system in accordance with CIP-004.
- 1.2.2 Locations where the Transient Cyber Assets may be used. This can be done by listing a specific location or a group of locations.
- 1.2.3 The intended or approved use of each individual, type, or group of Transient Cyber Asset. This should also include the software or application packages that are authorized with the purpose of performing defined business functions or tasks (e.g., used for data transfer, vulnerability assessment, maintenance, or troubleshooting purposes), and approved network interfaces (e.g., wireless, including near field communication or Bluetooth, and wired connections). Activities, and software or application packages, not specifically listed as acceptable should be considered as prohibited. It may be beneficial to educate individuals through the CIP-004 Security Awareness Program and Cyber Security Training Program about authorized and unauthorized activities or uses (e.g., using the device to browse the Internet or to check email or using the device to access wireless networks in hotels or retail locations).

Entities should exercise caution when using Transient Cyber Assets and ensure they do not have features enabled (e.g., wireless or Bluetooth features) in a manner that would allow the device to bridge an outside network to an applicable system. Doing so would cause the Transient

Cyber Asset to become an unauthorized Electronic Access Point in violation of CIP-005, Requirement R1.

Attention should be paid to Transient Cyber Assets that may be used for assets in differing impact areas (i.e., high impact, medium impact, and low impact). These impact areas have differing levels of protection under the CIP requirements, and measures should be taken to prevent the introduction of malicious code from a lower impact area. An entity may want to consider the need to have separate Transient Cyber Assets for each impact level.

Section 1.3: Entities are to document and implement their process(es) to mitigate software vulnerabilities posed by unpatched software through the use of one or more of the protective measures listed. This needs to be applied based on the capability of the device. Recognizing there is a huge diversity of the types of devices that can be included as Transient Cyber Assets and the advancement in software vulnerability management solutions, options are listed that include the alternative for the entity to use a technology or process that effectively mitigates vulnerabilities.

- Security patching, including manual or managed updates provides flexibility to the Responsible Entity to determine how its Transient Cyber Asset(s) will be used. It is possible for an entity to have its Transient Cyber Asset be part of an enterprise patch process and receive security patches on a regular schedule or the entity can verify and apply security patches prior to connecting the Transient Cyber Asset to an applicable Cyber Asset. Unlike CIP-007, Requirement R2, there is no expectation of creating dated mitigation plans or other documentation other than what is necessary to identify that the Transient Cyber Asset is receiving appropriate security patches.
- Live operating system and software executable only from read-only media is provided to allow a protected operating system that cannot be modified to deliver malicious software. When entities are creating custom live operating systems, they should check the image during the build to ensure that there is not malicious software on the image.
- System hardening, also called operating system hardening, helps minimize security vulnerabilities by removing all non-essential software programs and utilities and only installing the bare necessities that the computer needs to function. While other programs may provide useful features, they can provide "back-door" access to the system, and should be removed to harden the system.
- When selecting to use other methods that mitigate software vulnerabilities to those listed, entities need to have documentation that identifies how the other method(s) meet the software vulnerability mitigation objective.

Section 1.4: Entities are to document and implement their process(es) to mitigate malicious code through the use of one or more of the protective measures listed. This needs to be applied based on the capability of the device. As with vulnerability management, there is diversity of the types of devices that can be included as Transient Cyber Assets and the advancement in malicious code protections. When addressing malicious code protection, the Responsible Entity

should address methods deployed to deter, detect, or prevent malicious code. If malicious code is discovered, it must be removed or mitigated to prevent it from being introduced into the BES Cyber Asset or BES Cyber System. Entities should also consider whether the detected malicious code is a Cyber Security Incident.

- Antivirus software, including manual or managed updates of signatures or patterns, provides flexibility just as with security patching, to manage Transient Cyber Asset(s) by deploying antivirus or endpoint security tools that maintain a scheduled update of the signatures or patterns. Also, for devices that do not regularly connect to receive scheduled updates, entities may choose to scan the Transient Cyber Asset prior to connection to ensure no malicious software is present.
- Application whitelisting is a method of authorizing only the applications and processes that are necessary on the Transient Cyber Asset. This reduces the opportunity that malicious software could become resident, much less propagate, from the Transient Cyber Asset to the BES Cyber Asset or BES Cyber System.
- Restricted communication to limit the exchange of data to only the Transient Cyber Asset and the Cyber Assets to which it is connected by restricting or disabling serial or network (including wireless) communications on a managed Transient Cyber Asset can be used to minimize the opportunity to introduce malicious code onto the Transient Cyber Asset while it is not connected to BES Cyber Systems. This renders the device unable to communicate with devices other than the one to which it is connected.
- When selecting to use other methods that mitigate the introduction of malicious code to those listed, entities need to have documentation that identifies how the other method(s) meet the mitigation of the introduction of malicious code objective.

Section 1.5: Entities are to document and implement their process(es) to protect and evaluate Transient Cyber Assets to ensure they mitigate the risks that unauthorized use of the Transient Cyber Asset may present to the BES Cyber System. The concern addressed by this section is the possibility that the Transient Cyber Asset could be tampered with, or exposed to malware, while not in active use by an authorized person. Physical security of the Transient Cyber Asset is certainly a control that will mitigate this risk, but other tools and techniques are also available. The bulleted list of example protections provides some suggested alternatives.

- For restricted physical access, the intent is that the Transient Cyber Asset is maintained within a Physical Security Perimeter or other physical location or enclosure that uses physical access controls to protect the Transient Cyber Asset.
- Full disk encryption with authentication is an option that can be employed to protect a Transient Cyber Asset from unauthorized use. However, it is important that authentication be required to decrypt the device. For example, pre-boot authentication, or power-on authentication, provides a secure, tamper-proof environment external to the operating system as a trusted authentication layer. Authentication prevents data from being read from the hard disk until the user has confirmed they have the correct password or other credentials. By performing the

- authentication prior to the system decrypting and booting, the risk that an unauthorized person may manipulate the Transient Cyber Asset is mitigated.
- Multi-factor authentication is used to ensure the identity of the person accessing the device. Multi-factor authentication also mitigates the risk that an unauthorized person may manipulate the Transient Cyber Asset.
 - In addition to authentication and pure physical security methods, other alternatives are available that an entity may choose to employ. Certain theft recovery solutions can be used to locate the Transient Cyber Asset, detect access, remotely wipe, and lockout the system, thereby mitigating the potential threat from unauthorized use if the Transient Cyber Asset was later connected to a BES Cyber Asset. Other low tech solutions may also be effective to mitigate the risk of using a maliciously-manipulated Transient Cyber Asset, such as tamper evident tags or seals, and executing procedural controls to verify the integrity of the tamper evident tag or seal prior to use.
 - When selecting to use other methods that mitigate the risk of unauthorized use to those listed, entities need to have documentation that identifies how the other method(s) meet the mitigation of the risk of unauthorized use objective.

Requirement R4, Attachment 1, Section 2 - Transient Cyber Asset(s) Managed by a Party Other than the Responsible Entity

The attachment also recognizes the lack of control for Transient Cyber Assets that are managed by parties other than the Responsible Entity. However, this does not obviate the Responsible Entity's responsibility to ensure that methods have been deployed to deter, detect, or prevent malicious code on Transient Cyber Assets it does not manage. The requirements listed herein allow entities the ability to review the assets to the best of their capability and to meet their obligations.

To facilitate these controls, Responsible Entities may choose to execute agreements with other parties to provide support services to BES Cyber Systems and BES Cyber Assets that may involve the use of Transient Cyber Assets. Entities may consider using the Department of Energy Cybersecurity Procurement Language for Energy Delivery dated April 2014.¹ Procurement language may unify the other party and entity actions supporting the BES Cyber Systems and BES Cyber Assets. CIP program attributes may be considered including roles and responsibilities, access controls, monitoring, logging, vulnerability, and patch management along with incident response and back up recovery may be part of the other party's support. Entities should consider the "General Cybersecurity Procurement Language" and "The Supplier's Life Cycle Security Program" when drafting Master Service Agreements, Contracts, and the CIP program processes and controls.

Section 2.1: Entities are to document and implement their process(es) to mitigate software vulnerabilities through the use of one or more of the protective measures listed.

- Conduct a review of the Transient Cyber Asset managed by a party other than the Responsible Entity to determine whether the security patch level of the device is adequate to mitigate the risk of software vulnerabilities before connecting the Transient Cyber Asset to an applicable system.
- Conduct a review of the other party's security patching process. This can be done either at the time of contracting but no later than prior to connecting the Transient Cyber Asset to an applicable system. Just as with reviewing the security patch level of the device, selecting to use this approach aims to ensure that the Responsible Entity has mitigated the risk of software vulnerabilities to applicable systems.
- Conduct a review of other processes that the other party uses to mitigate the risk of software vulnerabilities. This can be reviewing system hardening, application whitelisting, virtual machines, etc.
- When selecting to use other methods to mitigate software vulnerabilities to those listed, entities need to have documentation that identifies how the other method(s) meet mitigation of the risk of software vulnerabilities.

¹ <http://www.energy.gov/oe/downloads/cybersecurity-procurement-language-energy-delivery-april-2014>

Section 2.2: Entities are to document and implement their process(es) to mitigate the introduction of malicious code through the use of one or more of the protective measures listed.

- Review the use of antivirus software and signature or pattern levels to ensure that the level is adequate to the Responsible Entity to mitigate the risk of malicious software being introduced to an applicable system.
- Review the antivirus or endpoint security processes of the other party to ensure that their processes are adequate to the Responsible Entity to mitigate the risk of introducing malicious software to an applicable system.
- Review the use of application whitelisting used by the other party to mitigate the risk of introducing malicious software to an applicable system.
- Review the use of live operating systems or software executable only from read-only media to ensure that the media is free from malicious software itself. Entities should review the processes to build the read-only media as well as the media itself.
- Review system hardening practices used by the other party to ensure that unnecessary ports, services, applications, etc. have been disabled or removed. This will limit the chance of introducing malicious software to an applicable system.

Section 2.3: Determine whether additional mitigation actions are necessary, and implement such actions prior to connecting the Transient Cyber Asset managed by a party other than the Responsible Entity. The intent of this section is to ensure that after conducting the selected review from Sections 2.1 and 2.2, if there are deficiencies that do not meet the Responsible Entity's security posture, the other party is required to complete the mitigations prior to connecting their devices to an applicable system.

Requirement R4, Attachment 1, Section 3 - Removable Media

Entities have a high level of control for Removable Media that are going to be connected to their BES Cyber Assets.

Section 3.1: Entities are to document and implement their process(es) to authorize the use of Removable Media. The Removable Media may be listed individually or by type.

- Document the user(s), individually or by group/role, allowed to use the Removable Media. This can be done by listing a specific person, department, or job function. Authorization includes vendors and the entity's personnel. Caution: consider whether these user(s) must have authorized electronic access to the applicable system in accordance with CIP-004.
- Locations where the Removable Media may be used. This can be done by listing a specific location or a group/role of locations.

Section 3.2: Entities are to document and implement their process(es) to mitigate the introduction of malicious code through the use of one or more method(s) to detect malicious code on the Removable Media before it is connected to a BES Cyber Asset. When using the method(s) to detect malicious code, it is expected to occur from a system that is not part of the

BES Cyber System to reduce the risk of propagating malicious code into the BES Cyber System network or onto one of the BES Cyber Assets. If malicious code is discovered, it must be removed or mitigated to prevent it from being introduced into the BES Cyber Asset or BES Cyber System. Entities should also consider whether the detected malicious code is a Cyber Security Incident. Frequency and timing of the methods used to detect malicious code were intentionally excluded from the requirement because there are multiple timing scenarios that can be incorporated into a plan to mitigate the risk of malicious code. The entities must use the method(s) to detect malicious code on Removable Media before it is connected to the BES Cyber Asset. The timing dictated and documented in the entity's plan should reduce the risk of introducing malicious code to the BES Cyber Asset or Protected Cyber Asset.

As a method to detect malicious code, entities may choose to use Removable Media with on-board malicious code detection tools. For these tools, the Removable Media are still used in conjunction with a Cyber Asset to perform the detection. For Section 3.2.1, the Cyber Asset used to perform the malicious code detection must be outside of the BES Cyber System or Protected Cyber Asset.

Rationale

During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon Board adoption, the text from the rationale text boxes was moved to this section.

Rationale for Requirement R1:

The configuration change management processes are intended to prevent unauthorized modifications to BES Cyber Systems.

Rationale for Requirement R2:

The configuration monitoring processes are intended to detect unauthorized modifications to BES Cyber Systems.

Rationale for Requirement R3:

The vulnerability assessment processes are intended to act as a component in an overall program to periodically ensure the proper implementation of cyber security controls as well as to continually improve the security posture of BES Cyber Systems.

The vulnerability assessment performed for this requirement may be a component of deficiency identification, assessment, and correction.

Rationale for R4:

Requirement R4 responds to the directive in FERC Order No. 791, at Paragraphs 6 and 136, to address security-related issues associated with Transient Cyber Assets and Removable Media used on a temporary basis for tasks such as data transfer, vulnerability assessment, maintenance, or troubleshooting. These tools are potential vehicles for transporting malicious code into a facility and subsequently into Cyber Assets or BES Cyber Systems. To mitigate the risks associated with such tools, Requirement R4 was developed to accomplish the following security objectives:

- Preventing unauthorized access or malware propagation to BES Cyber Systems through Transient Cyber Assets or Removable Media; and
- Preventing unauthorized access to BES Cyber System Information through Transient Cyber Assets or Removable Media.

Requirement R4 incorporates the concepts from other CIP requirements in CIP-010 and CIP-007 to help define the requirements for Transient Cyber Assets and Removable Media.

Summary of Changes: All requirements related to Transient Cyber Assets and Removable Media are included within a single standard, CIP-010. Due to the newness of the requirements and definition of asset types, the SDT determined that placing the requirements in a single standard would help ensure that entities were able to quickly identify the requirements for these asset types. A separate standard was considered for these requirements. However, the SDT determined that these types of assets would be used in relation to change management and vulnerability assessment processes and should, therefore, be placed in the same standard as those processes.

Implementation Plan

Project 2016-03 Cyber Security Supply Chain Risk Management Reliability Standard ~~CIP-013-1~~

Applicable Standard(s)

CIP-005-6 — Cyber Security — Electronic Security Perimeters

CIP-010-3 — Configuration Change Management and Vulnerability Assessments

CIP-013-1 — Cyber Security — Supply Chain Risk Management

Requested Retirement(s)

CIP-005-5 — Cyber Security — Electronic Security Perimeters

CIP-010-2 — Configuration Change Management and Vulnerability Assessments

Prerequisite Standard(s)

None

Applicable Entities

- Balancing Authority
- Distribution Provider that owns one or more of the following Facilities, systems, and equipment for the protection or restoration of the BES:
 - Each underfrequency Load shedding (UFLS) or undervoltage Load shedding (UVLS) system that:
 - Is part of a Load shedding program that is subject to one or more requirements in a NERC or Regional Reliability Standard; and
 - Performs automatic Load shedding under a common control system owned by the Responsible Entity, without human operator initiation, of 300 MW or more.
 - Each Remedial Action Scheme (RAS) where the RAS is subject to one or more requirements in a NERC or Regional Reliability Standard.
 - Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is subject to one or more requirements in a NERC or Regional Reliability Standard.
- Generator Operator
- Generator Owner
- Reliability Coordinator

- Transmission Operator
- Transmission Owner

Reliability Standards CIP-005-6, CIP-010-3, and CIP-013-1 apply only to BES Cyber Systems categorized as high impact or medium impact according to the identification and categorization process required by CIP-002-5, or any subsequent version of that Reliability Standard.

Background

On July 21, 2016, the Federal Energy Regulatory Commission (FERC) issued Order No. 829 directing NERC to develop a new or modified Reliability Standard that addresses supply chain risk management for industrial control system hardware, software, and computing and networking services associated with Bulk Electric System (BES) operations. Order No. 829 (at P 2) states:

[The Commission directs] NERC to develop a forward-looking, objective-based Reliability Standard to require each affected entity to develop and implement a plan that includes security controls for supply chain management for industrial control system hardware, software, and services associated with bulk electric system operations. The new or modified Reliability Standard should address the following security objectives, [discussed in detail in the Order]: (1) software integrity and authenticity; (2) vendor remote access; (3) information system planning; and (4) vendor risk management and procurement controls.

FERC directed NERC to submit the new or modified Reliability Standard(s) within one year of the effective date of Order No. 829, i.e., by September 27, 2017.

General Considerations

Consistent with the directive to develop a forward-looking Reliability Standard, the implementation of Reliability Standards in Project 2016-03 do not require the abrogation or re-negotiation of contracts (including amendments to master agreements and purchase orders) with vendors, suppliers or other entities executed as of the effective date of the proposed Reliability Standards (See FERC Order No. 829, P. 36).

In implementing CIP-013-3, responsible entities are expected to use their Supply Chain Cyber Security Risk Management Plans in procurement processes (e.g., Request for Proposal, ~~or~~ requests to entities negotiating on behalf of the responsible entity in the case of cooperative purchase agreements, master agreements that the responsible entity negotiates after the effective date, or direct procurements covered under the responsible entity's plan) that begin on or after the effective date of CIP-013-1. ~~Contracts entering the Responsible Entity's procurement process (e.g. through Request for Proposals) on or after the effective date are within scope of CIP-013-1.~~ Contract effective date, commencement date, or other activation dates specified in ~~the a~~ contract do not determine whether the contract is procurement action is within scope of CIP-013-1.

Effective Date

For all Reliability Standards in Project 2016-03 — CIP-005-6, CIP-010-3, and CIP-013-1

Where approval by an applicable governmental authority is required, the Reliability Standard shall become effective on the first day of the first calendar quarter that is 18 months after the effective date of the applicable governmental authority's order approving the Reliability Standard, or as otherwise provided for by the applicable governmental authority.

Where approval by an applicable governmental authority is not required, the Reliability Standard shall become effective on the first day of the first calendar quarter that is 18 months after the date the Reliability Standard is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction.

-Initial Performance of Periodic Requirements

CIP-013-1 Requirement R3

The initial review and approval of supply chain cyber security risk management plans by CIP Senior Manager or Delegate pursuant to Requirement R3 must be completed on or before the effective date of CIP-013-1.

Planned or Unplanned Changes Resulting in a Higher Categorization

Compliance timelines with CIP-005-6, CIP-010-3, and CIP-013-1 for planned or unplanned changes in categorization are consistent with the Implementation Plan associated with Project 2008-06 Cyber Security Order 706 Version 5 CIP Standards.

Planned changes refer to any changes of the electric system or BES Cyber System as identified through the annual assessment under CIP-002-5 (or any subsequent version of that Reliability Standard) which were planned and implemented by the responsible entity.

For example, if an automation modernization activity is performed at a transmission substation, whereby Cyber Assets are installed that meet the criteria in CIP-002-5, Attachment 1, then the new BES Cyber System has been implemented as a result of a planned change, and must, therefore, be in compliance with standards in Project 2016-03.

In contrast, unplanned changes refer to any changes of the electric system or BES Cyber System, as identified through the annual assessment under CIP-002-5, Requirement R2, which were not planned by the responsible entity. Consider the scenario where a particular BES Cyber System at a transmission substation does not meet the criteria in CIP-002-5, Attachment 1, then, later, an action is performed outside of that particular transmission substation; such as, a transmission line is constructed or retired, a generation plant is modified, changing its rated output, and that unchanged BES Cyber System may become a medium impact BES Cyber System based on the CIP-002-5, Attachment 1, criteria.

For planned changes resulting in a higher categorization, the responsible entity shall comply with all applicable requirements in CIP-005-6, CIP-010-3, and CIP-013-1 on the update of the identification and categorization of the affected BES Cyber System.

For unplanned changes resulting in a higher categorization, the responsible entity shall comply with all applicable requirements in CIP-005-6, CIP-010-3, and CIP-013-1 according to the following timelines, following the identification and categorization of the affected BES Cyber System.

<u>Scenario of Unplanned Changes After the Effective Date</u>	<u>Compliance Implementation</u>
<u>New high impact BES Cyber System</u>	<u>12 Months</u>
<u>New medium impact BES Cyber System</u>	<u>12 Months</u>
<u>Newly categorized high impact BES Cyber System from medium impact BES Cyber System</u>	<u>12 months for requirements not applicable to Medium-Impact BES Cyber Systems</u>
<u>Newly categorized medium impact BES Cyber System</u>	<u>12 Months</u>
<u>Responsible entity identifies first medium impact or high impact BES Cyber System (i.e., the responsible entity previously had no BES Cyber Systems categorized as high impact or medium impact according to the CIP-002-5 identification and categorization processes)</u>	<u>24 Months</u>

Definition

None

Retirement Date

Standards listed in the **Requested Retirement(s)** section shall be retired immediately prior to the effective date in the particular jurisdiction in which the revised standards are becoming effective.

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