

## Standard Development Timeline

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

### Development Steps Completed

1. SAR posted for comment (March 20, 2008).
2. SC authorized moving the SAR forward to standard development (July 10, 2008).
3. First posting for 60-day formal comment period and concurrent ballot (November 2011).
4. Second posting for 40-day formal comment period and concurrent ballot (April 2012).

### Description of Current Draft

This is the ~~second~~third posting of Version 5 of the CIP Cyber Security Standards for a ~~40~~30-day formal comment period. An initial concept paper, Categorizing Cyber Systems — An Approach Based on BES Reliability Functions, was posted for public comment in July 2009. An early draft consolidating CIP-002 – CIP-009, numbered CIP-010-1 and CIP-011-1, was posted for public informal comment in May 2010. A first posting of Version 5, which reverted to the original organization of the standards with some changes, was posted in November 2011 for a 60-day comment period and ~~first~~ ballot. ~~– A second posting of Version 5 reverts to the original organization of the standards with some changes and was posted in April 2012 for a 40-day comment period and ballot.~~ Version 5 addresses the balance of the FERC directives in its Order No. 706 approving Version 1 of the standards. This posting for formal comment and parallel successive ballot addresses the comments received from the ~~first~~second posting and ballot.

Anticipated Actions	Anticipated Date
<del>40</del> <u>30</u> -day Formal Comment Period with Parallel Successive Ballot	<del>April</del> <u>September</u> 2012
Recirculation ballot	<del>June</del> <u>November</u> 2012
BOT adoption	<del>June</del> <u>December</u> 2012

## Effective Dates

1. **24 Months Minimum** – ~~The Version 5 CIP Cyber Security Standards, except for CIP-003-5, Requirement R2, CIP-010-1~~ shall become effective on the later of July 1, 2015, or the first calendar day of the ninth calendar quarter after the effective date of the order providing applicable regulatory approval. ~~CIP-003-5, Requirement R2 shall become effective on the later of July 1, 2016, or the first calendar day of the 13th calendar quarter after the effective date of the order providing applicable regulatory approval. Notwithstanding any order to the contrary, CIP-002-4 through CIP-009-4 do not become effective, and CIP-002-3 through CIP-009-3 remain in effect and are not retired until the effective date of the Version 5 CIP Cyber Security Standards under this implementation plan.~~<sup>1</sup>
2. In those jurisdictions where no regulatory approval is required, ~~the Version 5 CIP Cyber Security Standards, except for CIP-003-5, Requirement R2, CIP-010-1~~ shall become effective on the first day of the ninth calendar quarter following Board of Trustees' approval, ~~and CIP-003-5, Requirement R2 shall become effective on the first day of the 13th calendar quarter following Board of Trustees' approval,~~ or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities.

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<sup>1</sup> ~~In jurisdictions where CIP-002-4 through CIP-009-4 have not yet become effective according to their implementation plan (even if approved by order), this implementation plan and the Version 5 CIP Cyber Security Standards supersede and replace the implementation plan and standards for CIP-002-4 through CIP-009-4.~~

## Version History

Version	Date	Action	Change Tracking
1	TBD	Developed to define the configuration <u>change</u> management and vulnerability assessment requirements in coordination with other CIP standards and to address the balance of the FERC directives in its Order 706.	

### **Definitions of Terms Used in Standard**

*See the associated “Definitions of Terms Used in Version 5 CIP Cyber Security Standards,” which consolidates and includes all newly defined or revised terms used in the proposed Version 5 CIP Cyber Security Standards.*

*When this standard has received ballot approval, the text boxes will be moved to the “Guidelines and Technical Basis” section of the Standard.*

## A. Introduction

1. **Title:** Cyber Security — Configuration Change Management and Vulnerability Assessments
2. **Number:** CIP-010-1
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 BES.
4. **Applicability:**
  - 4.1. **Functional Entities:** ~~\_\_\_\_\_~~ For the purpose of the requirements contained herein, the following list of ~~Functional Entities~~functional entities will be collectively referred to as “Responsible Entities.” For requirements in this standard where a specific ~~Functional Entity~~functional entity or subset of ~~Functional Entities~~functional entities are the applicable entity or entities, the ~~Functional Entity~~functional entity or ~~Entities~~entities are specified explicitly.
    - 4.1.1 **Balancing Authority**
      - ~~4.1.2~~ **Distribution Provider** that owns ~~Facilities described in 4.2.2~~
      - ~~4.1.3~~ **Generator Operator**
      - ~~4.1.4~~ **Generator Owner**
      - ~~4.1.5~~ **Interchange Coordinator**
      - ~~4.1.6~~ **Load-Serving Entity that owns Facilities described in 4.2.1**
      - ~~4.1.7~~ **Reliability Coordinator**
      - ~~4.1.8~~ **Transmission Operator**
      - ~~4.1.9~~ **Transmission Owner**
    - 4.2. **Facilities:**
      - ~~4.2.1~~ **Load-Serving Entity:** ~~One~~one or more of the ~~UFLS or UVLS Systems that are part of a Load shedding program required by a NERC or Regional Reliability Standard~~following Facilities, systems, and that perform automatic load shedding under a common control system, without human operator initiation, of 300 MW or more.
      - ~~4.2.24.1.2~~ **Distribution Provider:** ~~One or more of the Systems or programs designed, installed, and operated~~equipment for the protection or restoration of the BES:

**4.1.2.1** ~~A~~ Each underfrequency Load shedding (UFLS) or undervoltage Load shedding (UVLS-System) system that:

**4.1.2.1.1** is part of a Load shedding program ~~required by~~ that is subject to one or more requirements in a NERC or Regional Reliability Standard; and ~~that~~

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

• **4.1.2.3** ~~A~~ Each Protection System (excluding UFLS and UVLS) that applies to Transmission where the Protection System is ~~required by~~ 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.

**4.2.34.2.2 Responsible Entities listed in 4.1 other than Distribution Providers and Load Serving Entities: All BES Facilities.:**

All BES Facilities.

**4.2.44.2.3 Exemptions:** The following are exempt from Standard CIP-~~002-5~~010-1:

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

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

4.2.4.34.2.3.3 In nuclear plants, the SystemsThe 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. Background:

Standard CIP-010-1 exists as part of a suite of CIP Standards related to cyber security. 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 at the requirement’s common subject matter.

The SDT has incorporated within this standard a recognition that certain requirements should not focus on individual instances of failure as a sole basis for violating the standard. In particular, the SDT has incorporated an approach to empower and enable the industry to identify, assess, and correct deficiencies in the implementation of certain requirements. The intent is to change the basis of a violation in those requirements so that they are not focused on whether there is a deficiency, but on identifying, assessing, and correcting deficiencies. It is presented in those requirements by modifying “implement” as follows:

Each Responsible Entity shall implement, in a manner that identifies, assesses, and corrects deficiencies, . . .

~~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. A numbered list in the measure means the evidence example includes all of the items in the list. In contrast, a bulleted list provides multiple options of acceptable evidence. These measures serve to provide guidance to entities in acceptable records of compliance and should not be viewed as an all-inclusive list.~~

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 they feel it believes necessary in their documented processes, but they must address the applicable requirements in the table. The documented processes themselves are not required to include the “. . . identifies, assesses, and corrects deficiencies, . . .” elements described in the preceding paragraph, as those aspects are related to the manner of implementation of the documented processes and could be accomplished through other controls or compliance management activities.

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.

#### **Applicability Columns in Tables:**

Each table row 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 ~~applicability~~ “Applicable Systems” column to further define the scope of systems to which a specific requirement row applies ~~to BES Cyber Systems and associated Cyber Assets.~~ The CS0706 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 identification and categorization processes.
- **Medium Impact BES Cyber Systems** – Applies to BES Cyber Systems categorized as medium impact according to the CIP-002-5 identification and categorization processes.
- ~~Associated~~ **Electronic Access Control or Monitoring Systems –(EACMS)–** Applies to each Electronic Access Control or Monitoring System associated with a ~~corresponding~~ referenced high impact BES Cyber System or medium impact BES Cyber System ~~in the applicability column~~. Examples include, but are not limited to firewalls, authentication servers, and log monitoring and alerting systems.

- ~~Associated~~ **Physical Access Control Systems (PACS)** — Applies to each Physical Access Control System associated with a ~~corresponding~~referenced high impact BES Cyber System or medium impact BES Cyber System with External Routable Connectivity ~~in the applicability column.~~
- ~~Associated~~ **Protected Cyber Assets (PCA)** — Applies to each Protected Cyber Asset associated with a ~~corresponding~~referenced high impact BES Cyber System or medium impact BES Cyber System ~~in the applicability column.~~

## B. Requirements and Measures

### Rationale – R1:

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

- R1.** Each Responsible Entity shall implement, in a manner that identifies, assesses, and corrects deficiencies, one or more documented processes that collectively include each of the applicable items requirement parts in *CIP-010-1 Table R1 – Configuration Change Management*. [*Violation Risk Factor: ~~Lower~~Medium*] [*Time Horizon: Operations Planning*].
- M1.** Evidence must include each of the applicable documented processes that collectively include each of the applicable items requirement parts in *CIP-010-1 Table R1 – Configuration Change Management* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-010-1 Table R1 – Configuration Change Management			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
1.1	<p>High Impact BES Cyber Systems <u>and their associated:</u></p> <ol style="list-style-type: none"> <li><u>1. EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol> <p>Medium Impact BES Cyber Systems: <u>and their associated:</u></p> <p><del>Associated Physical Access Control Systems</del></p> <p><del>Associated Electronic Access Control or Monitoring Systems</del></p> <ol style="list-style-type: none"> <li><u>1. Associated Protected Cyber Assets</u><u>EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol>	<p>Develop a baseline configuration, <u>individually or by group</u>, which shall include the following <del>for each Cyber Asset identified, individually or by group</del> <u>items:</u></p> <ol style="list-style-type: none"> <li>1.1.1. Operating system(s) (including version) or firmware where no independent operating system exists;</li> <li>1.1.2. Any commercially available or open-source application software (including version) intentionally installed <del>on the BES Cyber Asset;</del></li> <li>1.1.3. Any custom software <del>developed for the entity</del> <u>installed;</u></li> <li>1.1.4. Any logical network accessible ports; and</li> <li>1.1.5. Any security patches <u>applied.</u></li> </ol>	<p><del>Evidence</del> <u>Examples of evidence</u> may include, but <del>is</del> <u>are</u> not limited to:</p> <ul style="list-style-type: none"> <li>• A spreadsheet identifying the required items of the baseline configuration for each Cyber Asset, <u>individually or by group;</u> or</li> <li>• A record in an asset management system that identifies the required items of the baseline configuration for each Cyber Asset, <u>individually or by group.</u></li> </ul>
<p><b>Reference to prior version:</b></p> <p><i>New Requirement</i></p>		<p><b>Change Rationale:</b> <i>The baseline configuration requirement was incorporated from the DHS Catalog for Control Systems Security. The baseline requirement is also intended to clarify precisely when a change management process must be invoked and which elements of the configuration must be examined.</i></p>	

CIP-010-1 Table R1 – Configuration Change Management			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
1.2	<p>High Impact BES Cyber Systems <u>and their associated:</u></p> <ol style="list-style-type: none"> <li><u>1. EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol> <p>Medium Impact BES Cyber Systems <del>and their associated:</del></p> <p><del>Associated Physical Access Control Systems</del></p> <p><del>Associated Electronic Access Control or Monitoring Systems</del></p> <ol style="list-style-type: none"> <li><del>1. Associated Protected Cyber Assets</del><u>EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol>	<p>Authorize and document changes that deviate from the existing baseline configuration.</p>	<p><del>Evidence</del><u>Examples of evidence</u> may include, but <del>is</del><u>are</u> not limited to:</p> <ul style="list-style-type: none"> <li>• 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</li> <li>• Documentation that the change was performed in accordance with the requirement.</li> </ul>
<p><b>Reference to prior version:</b> CIP-007-3, R9; CIP-003-3, R6</p>		<p><b>Change Rationale:</b> <i>The SDT added requirement to explicitly authorize changes. This requirement was previously implied by CIP-003-3, Requirement R6.</i></p>	

CIP-010-1 Table R1 – Configuration Change Management			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
1.3	<p>High Impact BES Cyber Systems <u>and their associated:</u></p> <ol style="list-style-type: none"> <li><u>1. EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol> <p>Medium Impact BES Cyber Systems <del>and their associated:</del></p> <p><del>Associated Physical Access Control Systems</del></p> <p><del>Associated Electronic Access Control or Monitoring Systems</del></p> <ol style="list-style-type: none"> <li><del>1. Associated Protected Cyber Assets</del><u>EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol>	<p>For a change that deviates from the existing baseline configuration, update the baseline configuration <del>and other documentation required by CIP-005 and CIP-007</del> as necessary within 30 calendar days of completing the change.</p>	<p><del>Evidence</del><u>An example of evidence</u> may include, but is not limited to, updated baseline documentation <del>for changes that impacted CIP-005 or CIP-007 documentation, and relevant CIP-005 or CIP-007 documentation,</del> with a date that is within 30 <u>calendar</u> days of the date of the completion of the change.</p>
<p><b>Reference to prior version:</b> CIP-007-3, R9; CIP-005-3, R5</p>		<p><b>Change Rationale:</b> <i>Document maintenance requirement due to a BES Cyber System change is equivalent to the requirements in the previous versions of the standard.</i></p>	

CIP-010-1 Table R1 – Configuration Change Management			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
1.4	<p>High Impact BES Cyber Systems <u>and their associated:</u></p> <ol style="list-style-type: none"> <li><u>1. EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol> <p>Medium Impact BES Cyber Systems <del>and their associated:</del></p> <p><del>Associated Physical Access Control Systems</del></p> <p><del>Associated Electronic Access Control or Monitoring Systems</del></p> <p><del>Associated Protected Cyber Assets</del></p> <ol style="list-style-type: none"> <li><u>1. EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol>	<p>For a change that deviates from the existing baseline configuration:</p> <p>1.4.1. Prior to the change, determine required cyber security controls <del>identified</del> in CIP-005, <del>CIP-006,</del> and CIP-007 that could be impacted by the change;</p> <p>1.4.2. Following the change, verify <del>these that</del> required <u>cyber security</u> controls <del>determined</del> in 1.4.1 <del>and the BES Cyber System availability</del> are not adversely affected; and</p> <p>1.4.3. Document the results of the verification.</p>	<p><del>Evidence</del> <u>An example of evidence</u> may include, but is not limited to, a list of cyber security controls verified or tested along with the dated test results.</p>
<p><b>Reference to prior version:</b> CIP-007-3, R1</p>		<p><b>Change Rationale:</b> <i>The SDT attempted to provide clarity on when testing must occur and removed requirement for specific test procedures because it is implicit in the performance of the requirement.</i></p>	

CIP-010-1 Table R1 – Configuration Change Management			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
1.5	High Impact BES Cyber <del>System</del> <u>Systems</u>	<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 <del>(or, or test the changes</del> in a production environment where the test is performed in a manner that minimizes adverse effects<del>)</del>, that models the baseline configuration to ensure that required cyber security controls <u>in CIP-005 and CIP-007</u> 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><del>Evidence</del><u>An example of evidence</u> 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-010-1 Table R1 – Configuration Change Management			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
	Reference to prior version: <i>CIP-007-3, R1</i>	<p><b>Change Rationale:</b> <i>This requirement provides clarity on when testing must occur and requires additional testing to ensure that accidental consequences of planned changes are appropriately managed.</i></p> <p><i>This change addresses FERC Order No. 706, Paragraphs 397, 609, 610, and 611.</i></p>	

**Rationale – R2:**

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

- R2.** Each Responsible Entity shall implement, in a manner that identifies, assesses, and corrects deficiencies, one or more documented processes that collectively include each of the applicable ~~items~~requirement parts in *CIP-010-1 Table R2 – Configuration Monitoring*. [Violation Risk Factor: ~~Lower~~Medium] [Time Horizon: *Operations Planning*].
- M2.** Evidence must include each of the applicable documented processes that collectively include each of the applicable ~~items~~requirement parts in *CIP-010-1 Table R2 – Configuration Monitoring* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-010-1 Table R2 – Configuration Monitoring

Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
2.1	<p>High Impact BES Cyber Systems <u>and their associated:</u></p> <p><del>Associated Physical Access Control Systems</del></p> <p><del>Associated Electronic Access Control or Monitoring Systems</del></p> <p><u>1. Associated Protected Cyber Assets</u> <u>EACMS; and</u></p> <p><u>2. PCA</u></p>	<p><del>Where technically feasible, monitor continuously or periodically, not to exceed</del> <u>Monitor at least</u> once every 35 calendar days, for changes to the baseline configuration (as <del>defined per CIP-010</del> <u>described in Requirement R1, Part 1.1)</u> <u>and document</u>). <u>Document</u> and investigate detected unauthorized changes.</p>	<p><del>Evidence</del> <u>An example of evidence</u> may include, but is not limited to, logs from a system that is monitoring the configuration <del>of the BES Cyber System</del> along with records of investigation for any unauthorized changes that were detected <del>by the system</del>.</p>
<p><b>Reference to prior version:</b></p> <p><i>New Requirement</i></p>		<p><b>Change Rationale:</b> <i>The monitoring of the configuration of the BES Cyber System provides an express acknowledgement of the need to consider malicious actions along with intentional changes.</i></p> <p><i>This requirement was added after review of the DHS Catalog of Control System Security and to address FERC Order No. 706, Paragraph 397.</i></p> <p><i>Thirty-five Calendar days allows for a “once-a-month” frequency with slight flexibility to account for months with 31 days or for beginning or endings of months on weekends.</i></p>	

**Rationale – 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.

- R3.** Each Responsible Entity shall implement one or more documented processes that collectively include each of the applicable items requirement parts in *CIP-010-1 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 items requirement parts in *CIP-010-1 Table R3 – Vulnerability Assessments* and additional evidence to demonstrate implementation as described in the Measures column of the table.

CIP-010-1 Table R3 – Vulnerability Assessments			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
3.1	<p>High Impact BES Cyber Systems <u>and their associated:</u></p> <ol style="list-style-type: none"> <li><u>1. EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol> <p>Medium Impact BES Cyber Systems <u>and their associated:</u></p> <p><del>Associated Physical Access Control Systems</del></p> <p><del>Associated Electronic Access Control or Monitoring Systems</del></p> <ol style="list-style-type: none"> <li><u>1. Associated Protected Cyber Assets</u><u>EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol>	<p>At least once every <del>calendar year, not to exceed</del> 15 calendar months <del>between assessments</del>, conduct a paper or active vulnerability assessment <del>to determine the extent to which the cyber security controls identified in CIP-005, CIP-006, and CIP-007 are implemented correctly and operating as designed.</del></p>	<p><del>Evidence</del><u>Examples of evidence</u> may include, but <del>is</del><u>are</u> not limited to:</p> <ul style="list-style-type: none"> <li>• A document listing the date of the assessment (performed at least once every <del>calendar year, not to exceed</del> 15 calendar months <del>between assessments</del>), the controls assessed for each BES Cyber System along with the method of assessment, <del>and the individuals who performed the assessment;</del> or</li> <li>• A document listing the date of the assessment and the output of <del>the</del><u>any</u> tools used to perform the assessment.</li> </ul>
<p><b>Reference to prior version:</b> CIP-005-4, R4; CIP-007-4, R8</p>		<p><b>Change Rationale:</b> <i>As suggested in FERC Order No. 706, Paragraph 644, the details for what should be included in the assessment are left to guidance.</i></p>	

CIP-010-1 Table R3 – Vulnerability Assessments			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
3.2	High Impact BES Cyber Systems	<p>Where technically feasible, at least once every 36 calendar months <del>between assessments;</del></p> <p><u>3.2.1 Perform an active vulnerability assessment in a test environment, or</u> perform an active vulnerability assessment in a <del>test environment (or in a</del> production environment where the test is performed in a manner that minimizes adverse effects); <del>that models the baseline configuration of the BES Cyber System in a production environment.</del> <u>if;</u> <u>and</u></p> <p><u>3.2.2 Document the results of the testing and, if</u> a test environment was used, <del>document</del> 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><del>Evidence</del> <u>An example of evidence</u> may include, but is not limited to, a document listing the date of the assessment (performed at least once every 36 calendar months <del>between assessments</del>), 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-010-1 Table R3 – Vulnerability Assessments			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
<b>Reference to prior version:</b> <i>New Requirement</i>		<b>Change Rationale:</b> <i>FERC Order No. 706, Paragraphs 541, 542, 543, 544, 545, and 547.</i> <i>As suggested in FERC Order No. 706, Paragraph 644, the details for what should be included in the assessment are left to guidance.</i>	
3.3	High Impact BES Cyber Systems <u>and their associated:</u> <del>Associated Electronic Access Control or Monitoring Systems</del> 1. <del>Associated Protected Cyber Assets</del> <u>EACMS;</u> 2. <u>PCA</u>	<del>Except</del> <u>Prior to adding a new Cyber Asset to a production environment, perform an active vulnerability assessment of the new Cyber Asset, except</u> for CIP Exceptional Circumstances and like replacements <del>(of the</del> same type of Cyber Asset with a baseline configuration that models an existing baseline configuration of the previous or other existing <del>BES Cyber Asset), prior to adding a new Cyber Asset perform an active vulnerability assessment of the new Cyber Asset.</del> <u>Cyber Asset.</u>	<del>Evidence</del> <u>An example of evidence</u> 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 <del>the any</del> tools used to perform the assessment.
<b>Reference to prior version:</b> <i>New Requirement</i>		<b>Change Rationale:</b> <i>FERC Order No. 706, Paragraphs 541, 542, 543, 544, 545, and 547.</i>	

CIP-010-1 Table R3 – Vulnerability Assessments			
Part	Applicable <del>BES Cyber Systems and associated Cyber Assets</del>	Requirements	Measures
3.4	<p>High Impact BES Cyber Systems <u>and their associated:</u></p> <ol style="list-style-type: none"> <li><u>1. EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol> <p>Medium Impact BES Cyber Systems <u>and their associated:</u></p> <p><del>Associated Physical Access Control Systems</del></p> <p><del>Associated Electronic Access Control or Monitoring Systems</del></p> <ol style="list-style-type: none"> <li><del>1. Associated Protected Cyber Assets</del><u>EACMS;</u></li> <li><u>2. PACS; and</u></li> <li><u>3. PCA</u></li> </ol>	<p>Document the results of the assessments <u>conducted according to Parts 3.1, 3.2, and 3.3</u> 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.</p>	<p><del>Evidence</del><u>An example of evidence</u> 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).</p>
<p><b>Reference to prior version:</b></p> <p><i>CIP-005-3, R4.5; CIP-007-3, R8.4</i></p>		<p><b>Change Rationale:</b></p> <p><i>Added a requirement for an entity planned date of completion as per the directive in FERC Order No. 706, Paragraph 643.</i></p>	

## 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~~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 ~~Compliance Enforcement Authority~~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 ~~data or~~ evidence ~~for~~of each requirement in this standard for three calendar years ~~or for the duration of any regional or Compliance Enforcement Authority investigation; whichever is longer.~~
- 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 ~~duration~~time specified above, whichever is longer.
- ~~The Compliance Enforcement Authority~~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



**Table of Compliance Elements**

R-#	Time Horizon	VRF	Violation Severity Levels			
			Lower-VSL	Moderate-VSL	High-VSL	Severe-VSL
<b>R1</b>	<b>Operations Planning</b>	<b>Medium</b>	N/A	N/A	<p>The Responsible Entity has established a configuration management program, but failed to authorize any changes to the baseline configuration and to document those changes.</p> <p>OR</p> <p>The Responsible Entity updated the baseline configuration, but failed to update the required documentation within 30 days of the change being completed.</p>	<p>The Responsible Entity has not established any configuration management programs.</p> <p>OR</p> <p>The Responsible Entity did not implement a configuration management program</p> <p>OR</p> <p>The Responsible Entity has established a configuration management program, but failed to establish a documented baseline</p> <p>OR</p> <p>The Responsible Entity has established a configuration management program, but with respect to the</p>

R-#	Time Horizon	VRF	Violation Severity Levels			
			Lower-VSL	Moderate-VSL	High-VSL	Severe-VSL
						changes in the baseline configuration, did not determine the required cyber security controls identified in CIP-005, CIP-006, and CIP-007 that could be impacted by the changes; or did not verify that the controls were not adversely affected when the change was implemented.
<b>R2</b>	<b>Operations Planning</b>	<b>Medium</b>	N/A	N/A	N/A	<p>The Responsible Entity has not established a configuration monitoring process for changes to the baseline.</p> <p>OR</p> <p>The Responsible Entity has not investigated a detected unauthorized change to the baseline configuration.</p>

R-#	Time Horizon	VRF	Violation Severity Levels			
			Lower-VSL	Moderate-VSL	High-VSL	Severe-VSL
						<p>OR</p> <p>The Responsible Entity has established a configuration monitoring process for changes to the baseline but failed to document a detected unauthorized change.</p>
<b>R3</b>	<b>Long-term Planning and Operations Planning</b>	<b>Medium</b>	<p>The Responsible Entity has established one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has performed a vulnerability assessment more than 15 months, but less than 18 months, since the last assessment on one of its applicable BES Cyber Systems.</p>	<p>The Responsible Entity has established one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has not performed an active vulnerability assessment on a new Cyber Asset prior to adding it to an applicable BES Cyber System.</p> <p>OR</p>	<p>The Responsible Entity has established one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has performed a vulnerability assessment more than 21 months, but less than 24 months, since the last assessment on one of its applicable BES Cyber Systems.</p>	<p>The Responsible Entity has established 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.</p> <p>OR</p>

R-#	Time Horizon	VRF	Violation Severity Levels			
			Lower-VSL	Moderate-VSL	High-VSL	Severe-VSL
				<p>The Responsible Entity has established one or more documented vulnerability assessment processes for each of its applicable BES Cyber Systems, but has performed a vulnerability assessment more than 18 months, but less than 21, months since the last assessment on one of its applicable BES Cyber Systems.</p>		<p>The Responsible Entity has not established any vulnerability assessment processes for one of its applicable BES Cyber Systems.</p> <p>OR</p> <p>The Responsible Entity has established and documented one or more vulnerability assessment processes for each of its applicable BES Cyber Systems, but failed to perform an active vulnerability assessment in a test environment (or in a production environment where the test is performed in a manner that minimizes adverse effects) that models the baseline</p>

R-#	Time Horizon	VRF	Violation Severity Levels			
			Lower-VSL	Moderate-VSL	High-VSL	Severe-VSL
						<p>configuration of its applicable BES Cyber Systems.</p> <p>OR</p> <p>The Responsible Entity has established 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 mitigate vulnerabilities identified in the assessments, and the execution status of the mitigation plans.</p>

**D. Regional Variances**

None.

**E. Interpretations**

None.

**F. Associated Documents**

None.

## 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:**

#### **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-007-5. 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-007-5 R2.1 requires entities to track, evaluate, and install security patches, CIP-010 R1.1.5 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).

### **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~~ 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.