

**NERC**

NORTH AMERICAN ELECTRIC  
RELIABILITY CORPORATION

# Cyber Security — Information Protection

Technical Rationale and Justification for  
Reliability Standard CIP-011-X

March 2021

**RELIABILITY | RESILIENCE | SECURITY**



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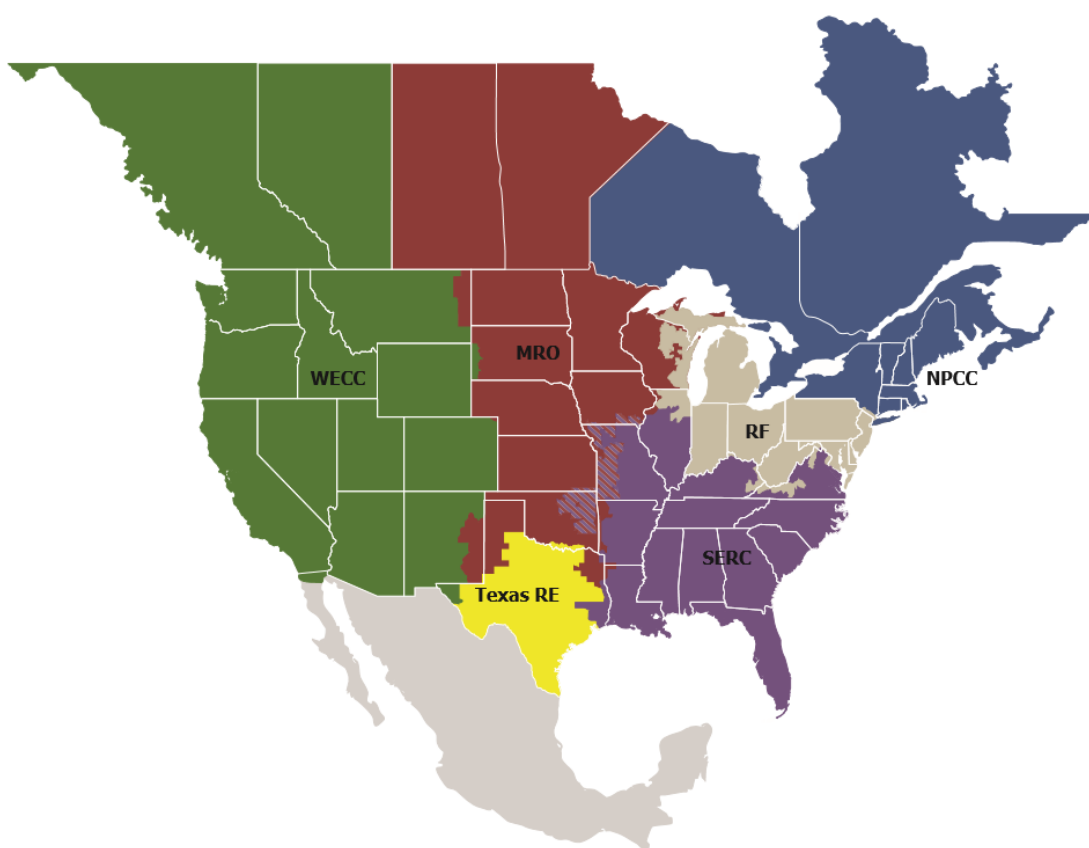
## Preface

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Electricity is a key component of the fabric of modern society and the Electric Reliability Organization (ERO) Enterprise serves to strengthen that fabric. The vision for the ERO Enterprise, which is comprised of the North American Electric Reliability Corporation (NERC) and the six Regional Entities (REs), is a highly reliable and secure North American bulk power system (BPS). Our mission is to assure the effective and efficient reduction of risks to the reliability and security of the grid.

Reliability | Resilience | Security  
*Because nearly 400 million citizens in North America are counting on us*

The North American BPS is divided into six RE boundaries as shown in the map and corresponding table below. The multicolored area denotes overlap as some load-serving entities participate in one Region while associated Transmission Owners/Operators participate in another.



<b>MRO</b>	Midwest Reliability Organization
<b>NPCC</b>	Northeast Power Coordinating Council
<b>RF</b>	ReliabilityFirst
<b>SERC</b>	SERC Reliability Corporation
<b>Texas RE</b>	Texas Reliability Entity
<b>WECC</b>	Western Electricity Coordinating Council

# Introduction

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## Background

This document explains the technical rationale and justification for the proposed Reliability Standard CIP-011-X. It provides stakeholders and the ERO Enterprise with an understanding of the technology and technical requirements in the Reliability Standard. It also contains information on the standard drafting team's (SDT's) intent in drafting the requirements. This Technical Rationale and Justification for CIP-011-X is not a Reliability Standard and should not be considered mandatory and enforceable.

On July 24, 2019, the North American Electric Reliability Corporation (NERC) Standards Committee accepted a Standard Authorization Request (SAR) approving an initiative to enhance BES reliability by creating increased choice, greater flexibility, higher availability, and reduced-cost options for entities to manage their BES Cyber System Information (BCSI), by providing a secure path towards utilization of modern third-party data storage and analysis systems. In addition, the project intended to clarify the protections expected when utilizing third-party solutions (e.g., cloud services).

In response to this SAR, the Project 2019-02 SDT drafted Reliability Standard CIP-011-X to require Responsible Entities to implement specific methods in Requirement R1 for administrative, technical, and physical controls related to BCSI during storage, handling and use including when utilizing vendor provided cloud services such as Software as a Service (SaaS), Infrastructure as a Service (IaaS), or Platform as a Service (PaaS).

# Requirement R1

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## General Considerations for Requirement R1

None

### Rationale for Modifications to Requirement R1:

Requirement R1 still specifies the need to implement one or more documented information protection program(s). The SDT does not intend that this requirement cover publicly available information, such as vendor manuals or information that is deemed to be publicly releasable. Information protection pertains to both digital and hardcopy information.

The SDT clarified the intent of protecting BCSI as opposed to protecting the BES Cyber System(s) and associated applicable systems which may contain BCSI. This was achieved by modifying the parent CIP-011-X R1 requirement language to include “for BES Cyber System Information (BCSI) pertaining to Applicable Systems”.

### Rationale for Modifications to Requirement R1, Part 1.1

Requirement R1, Part 1.1, is an objective level requirement focused on identifying BES Cyber System Information (BCSI). The intent of the SDT was to simplify the requirement language from CIP-011-2 Part 1.1.

### Rationale for Modifications to Requirement R1, Part 1.2

Requirement R1, Part 1.2, is an objective level requirement focused on protecting and securely handling BES Cyber System Information (BCSI) in order to mitigate risks of compromising confidentiality. The reference to different states of information such as “transit” or “storage” or “use” was removed. The intent is to reduce confusion of Responsible Entities attempting to interpret controls specific to different states of information, limiting controls to said states, overlapping controls between states, and reduce confusion from an enforcement perspective. By removing this language, methods to protect BCSI becomes explicitly comprehensive.

Requirement language revisions reflect consistency with other CIP requirements.

## Requirement R2

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### General Considerations for Requirement R2

None

#### **Rationale for Requirement R2:**

The intent of the BES Cyber Asset reuse and disposal process is to prevent the unauthorized dissemination of BCSI upon reuse or disposal.

This requirement allows for BES Cyber Systems to be removed from service and analyzed with their media intact, as that should not constitute a release for reuse.

The justification for this requirement is pre-existing from previous versions of CIP and is also documented in FERC Order No. 706 and its associated Notice of Proposed Rulemaking.

Requirement 2 has remained unchanged. The requirements are focused more on the reuse and disposal of BCS rather than BCSI. While acknowledging that such BCS and other applicable systems may have BCSI residing on them, the original intent of the requirement is broader than addressing BCSI. This is a lifecycle issue concerning the applicable systems. CIP-002 focuses on the beginning of the BCS lifecycle but not an end. The potential end of the applicable systems lifecycle is absent from CIP-011 to reduce confusion with reuse and disposal of BCSI. The 2019 BCSI Access Management project did not include modification of CIP-002 in the scope of the SAR. This concern has been communicated for future evaluation.

## Attachment 1: Technical Rationale for Reliability Standard CIP-011-2

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*This section contains a “cut and paste” of the Technical Rationale components of the former Guidelines and Technical Basis (GTB) as-is of from CIP-011-2 standard to preserve any historical references. Similarly, former GTB content providing compliance guidance can be found in a separate Implementation Guidance document for this standard.*

### **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:**

Responsible Entities are free to utilize existing change management and asset management systems.

However, the information contained within those systems must be evaluated, as the information protection requirements still apply.

The justification for this requirement is pre-existing from previous versions of CIP and is also documented in FERC Order No. 706 and its associated Notice of Proposed Rulemaking.

This requirement mandates that BES Cyber System Information be identified. The Responsible Entity has flexibility in determining how to implement the requirement. The Responsible Entity should explain the method for identifying the BES Cyber System Information in their information protection program. For example, the Responsible Entity may decide to mark or label the documents. Identifying separate classifications of BES Cyber System Information is not specifically required. However, a Responsible Entity maintains the flexibility to do so if they desire. As long as the Responsible Entity’s information protection program includes all applicable items, additional classification levels (e.g., confidential, public, internal use only, etc.) can be created that go above and beyond the requirements. If the entity chooses to use classifications, then the types of classifications used by the entity and any associated labeling should be documented in the entity’s BES Cyber System Information Program.

The Responsible Entity may store all of the information about BES Cyber Systems in a separate repository or location (physical and/or electronic) with access control implemented. For example, the Responsible Entity’s program could document that all information stored in an identified repository is considered BES Cyber System Information, the program may state that all information contained in an identified section of a specific repository is considered BES Cyber System Information, or the program may document that all hard copies of information are stored in a secured area of the building. Additional methods for implementing the requirement are suggested in the measures section. However, the methods listed in measures are not meant to be an exhaustive list of methods that the entity may choose to utilize for the identification of BES Cyber System Information.

The SDT does not intend that this requirement cover publicly available information, such as vendor manuals that are available via public websites or information that is deemed to be publicly releasable. Information protection pertains to both digital and hardcopy information. Requirement R1 Part 1.2 requires one or more procedures for the protection and secure handling BES Cyber System Information, including storage, transit, and use. This includes information that may be stored on Transient Cyber Assets or Removable Media.

The entity's written Information Protection Program should explain how the entity handles aspects of information protection including specifying how BES Cyber System Information is to be securely handled during transit in order to protect against unauthorized access, misuse, or corruption and to protect confidentiality of the communicated BES Cyber System Information. For example, the use of a third-party communication service provider instead of organization-owned infrastructure may warrant the use of encryption to prevent unauthorized disclosure of information during transmission. The entity may choose to establish a trusted communications path for transit of BES Cyber System Information. The trusted communications path would utilize a logon or other security measures to provide secure handling during transit. The entity may employ alternative physical protective measures, such as the use of a courier or locked container for transmission of information. It is not the intent of this standard to mandate the use of one particular format for secure handling during transit.

A good Information Protection Program will document the circumstances under which BES Cyber System Information can be shared with or used by third parties. The organization should distribute or share information on a need-to-know basis. For example, the entity may specify that a confidentiality agreement, non-disclosure arrangement, contract, or written agreement of some kind concerning the handling of information must be in place between the entity and the third party. The entity's Information Protection Program should specify circumstances for sharing of BES Cyber System Information with and use by third parties, for example, use of a non-disclosure agreement. The entity should then follow their documented program. These requirements do not mandate one specific type of arrangement.



**Requirement R2:**

This requirement allows for BES Cyber Systems to be removed from service and analyzed with their media intact, as that should not constitute a release for reuse. However, following the analysis, if the media is to be reused outside of a BES Cyber System or disposed of, the entity must take action to prevent the unauthorized retrieval of BES Cyber System Information from the media.

The justification for this requirement is pre-existing from previous versions of CIP and is also documented in FERC Order No. 706 and its associated Notice of Proposed Rulemaking.

If an applicable Cyber Asset is removed from the Physical Security Perimeter prior to action taken to prevent the unauthorized retrieval of BES Cyber System Information or destroying the data storage media, the Responsible Entity should maintain documentation that identifies the custodian for the data storage media while the data storage media is outside of the Physical Security Perimeter prior to actions taken by the entity as required in Requirement R2.

Media sanitization is the process used to remove information from system media such that reasonable assurance exists that the information cannot be retrieved or reconstructed. Media sanitization is generally classified into four categories: Disposal, clearing, purging, and destroying. For the purposes of this requirement, disposal by itself, with the exception of certain special circumstances, such as the use of strong encryption on a drive used in a SAN or other media, should never be considered acceptable. The use of clearing techniques may provide a suitable method of sanitization for media that is to be reused, whereas purging techniques may be more appropriate for media that is ready for disposal. The following information from NIST SP800-88 provides additional guidance concerning the types of actions that an entity might take to prevent the unauthorized retrieval of BES Cyber System Information from the Cyber Asset data storage media:

**Clear:** One method to sanitize media is to use software or hardware products to overwrite storage space on the media with non-sensitive data. This process may include overwriting not only the logical storage location of a file(s) (e.g., file allocation table) but also may include all addressable locations. The security goal of the overwriting process is to replace written data with random data. Overwriting cannot be used for media that are damaged or not rewriteable. The media type and size may also influence whether overwriting is a suitable sanitization method [SP 800-36].

**Purge:** Degaussing and executing the firmware Secure Erase command (for ATA drives only) are acceptable methods for purging. Degaussing is exposing the magnetic media to a strong magnetic field in order to disrupt the recorded magnetic domains. A degausser is a device that generates a magnetic field used to sanitize magnetic media. Degaussers are rated based on the type (i.e., low energy or high energy) of magnetic media they can purge. Degaussers operate using either a strong permanent magnet or an electromagnetic coil. Degaussing can be an effective method for purging damaged or inoperative media, for purging media with exceptionally large storage capacities, or for quickly purging diskettes. [SP 800-36] Executing the firmware Secure Erase command (for ATA drives only) and degaussing are examples of acceptable methods for purging. Degaussing of any hard drive assembly usually destroys the drive as the firmware that manages the device is also destroyed.

**Destroy:** There are many different types, techniques, and procedures for media destruction. Disintegration, Pulverization, Melting, and Incineration are sanitization methods designed to completely destroy the media. They are typically carried out at an outsourced metal destruction or licensed incineration facility with the specific capabilities to perform these activities effectively, securely, and safely. Optical mass storage media, including compact disks (CD, CDRW, CD-R, CD-ROM), optical disks (DVD), and MO disks, must be destroyed by pulverizing, crosscut shredding or burning. In some cases such as networking equipment, it may be necessary to contact the manufacturer for proper sanitization procedure.

It is critical that an organization maintain a record of its sanitization actions to prevent unauthorized retrieval of BES Cyber System Information. Entities are strongly encouraged to review NIST SP800-88 for guidance on how to develop acceptable media sanitization processes.

**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 of Trustees approval, the text from the rationale text boxes was moved to this section.

**Rationale for Requirement R1:**

The SDT's intent of the information protection program is to prevent unauthorized access to BES Cyber System Information.

**Rationale for Requirement R2:**

The intent of the BES Cyber Asset reuse and disposal process is to prevent the unauthorized dissemination of BES Cyber System Information upon reuse or disposal.