Alberta Reliability Standard
Cyber Security – BES Cyber System Categorization
CIP-002-AB-5.1

A. Introduction

1. Title: Cyber Security – BES Cyber System Categorization

2. Number: CIP-002-AB-5.1

3. Purpose: To identify and categorize **BES cyber systems** and their associated **BES cyber assets** for the application of cyber security requirements commensurate with the adverse impact that loss, compromise, or misuse of those **BES cyber systems** could have on the reliable operation of the **bulk electric system**. Identification and categorization of **BES cyber systems** support appropriate protection against compromises that could lead to misoperation or instability in the **bulk electric system**.

4. Applicability:

   4.1. For the purpose of the requirements contained herein, the following list of entities will be collectively referred to as "Responsible Entities". For requirements in this **reliability standard** where a specific entity or subset of entities are the applicable entity or entities, the entity or entities are specified explicitly.

      4.1.1. [Intentionally left blank.]

      4.1.2. a **legal owner** of an **electric distribution system** that owns one or more of the following facilities, systems, and equipment for the protection or restoration of the **bulk electric system**:

         4.1.2.1. each **underfrequency load shedding** or **under voltage load shed** system that:

            4.1.2.1.1. is part of a load shedding program that is subject to one or more requirements in a **reliability standard**; and

            4.1.2.1.2. performs automatic load shedding under a common control system owned by the entity in subsection 4.1.2., without human operator initiation, of 300 MW or more;

         4.1.2.2. each **remedial action scheme** where the **remedial action scheme** is subject to one or more requirements in a **reliability standard**;

         4.1.2.3. each **protection system** (excluding **underfrequency load shedding** and **under voltage load shed**) that applies to transmission where the **protection system** is subject to one or more requirements in a **reliability standard**; and

         4.1.2.4. each **cranking path** and group of elements meeting the initial switching requirements from a contracted **blackstart resource** up to and including the first **point of supply** and/or **point of delivery** of the next **generating unit** or **aggregated generating facility** to be started;

      4.1.3. the **operator** of a **generating unit** and the **operator** of an **aggregated generating facility**;

      4.1.4. the **legal owner** of a **generating unit** and the **legal owner** of an **aggregated generating facility**;

      4.1.5. [Intentionally left blank.]

4.1.6. [Intentionally left blank.]

4.1.7. the **operator** of a **transmission facility**;

4.1.8. the **legal owner** of a **transmission facility**; and

4.1.9. the **ISO**.

4.2. For the purpose of the requirements contained herein, the following facilities, systems, and equipment owned by each Responsible Entity in subsection 4.1 above are those to which these requirements are applicable. For requirements in this **reliability 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. One or more of the following facilities, systems and equipment that operate at, or control elements that operate at, a nominal voltage of 25 kV or less and are owned by a **legal owner** of an **electric distribution system** or a **legal owner** of a **transmission facility** for the protection or restoration of the **bulk electric system**:

4.2.1.1. each **underfrequency load shedding** or **under voltage load shed** system that:

4.2.1.1.1. is part of a load shedding program that is subject to one or more requirements in a **reliability standard**; and

4.2.1.1.2. performs automatic load shedding under a common control system owned by one or more of the entities in subsection 4.2.1, without human operator initiation, of 300 MW or more;

4.2.1.2. each **remedial action scheme** where the **remedial action scheme** is subject to one or more requirements in a **reliability standard**;

4.2.1.3. each **protection system** (excluding **underfrequency load shedding** and **under voltage load shed**) that applies to transmission where the **protection system** is subject to one or more requirements in a **reliability standard**; and

4.2.1.4. each **cranking path** and group of elements meeting the initial switching requirements from a contracted **blackstart resource** up to and including the first **point of supply** and/or **point of delivery** of the next **generating unit** or **aggregated generating facility** to be started;

4.2.2. Responsible Entities listed in subsection 4.1 other than a **legal owner** of an **electric distribution system** are responsible for:

4.2.2.1. each **transmission facility** that is part of the **bulk electric system** except each **transmission facility** that:

4.2.2.1.1. is a transformer with fewer than 2 windings at 100 kV or higher and does not connect a contracted **blackstart resource**;

4.2.2.1.2. radially connects only to load;

4.2.2.1.3. radially connects only to one or more **generating units** or **aggregated generating facilities** with a combined **maximum authorized real power** of less than or equal to 67.5 MW and does not connect a contracted **blackstart resource**; or

4.2.2.1.4. radially connects to load and one or more **generating units** or **aggregated generating facilities** that have a combined **maximum authorized real power** of less than or equal to 67.5 MW and does not connect a contracted **blackstart resource**;

4.2.2.2. a **reactive power** resource that is dedicated to supplying or absorbing **reactive power** that is connected at 100 kV or higher, or through a dedicated transformer with a high-side voltage of 100 kV or higher, except those **reactive power** resources operated by an end-use customer for its own use;

4.2.2.3. a **generating unit** that is:

4.2.2.3.1. directly connected to the **bulk electric system** and has a **maximum authorized real power** rating greater than 18 MW unless the **generating unit** is part of an industrial complex;

4.2.2.3.2. within a power plant which:

4.2.2.3.2.1. is not part of an **aggregated generating facility**;

4.2.2.3.2.2. is directly connected to the **bulk electric system**; and

4.2.2.3.2.3. has a combined **maximum authorized real power** rating greater than 67.5 MW unless the power plant is part of an industrial complex;

4.2.2.3.3. within an industrial complex with **supply transmission service** greater than 67.5 MW; or

4.2.2.3.4. a contracted **blackstart resource**;

4.2.2.4. an **aggregated generating facility** that is:

4.2.2.4.1. directly connected to the **bulk electric system** and has a **maximum authorized real power** rating greater than 67.5 MW unless the **aggregated generating facility** is part of an industrial complex;

4.2.2.4.2. within an industrial complex with **supply transmission service** greater than 67.5 MW; or

4.2.2.4.3. a contracted **blackstart resource**;

and

4.2.2.5. **control centres** and backup **control centres**.

4.2.3. The following are exempt from this **reliability standard**:

4.2.3.1. [Intentionally left blank.]

4.2.3.2. **cyber assets** associated with communication networks and data communication links between discrete **electronic security perimeters**.

4.2.3.3. [Intentionally left blank.]

4.2.3.4. for the **legal owner** of an **electric distribution system**, the systems and equipment that are not included in subsection 4.2.1 above.

5. [Intentionally left blank.]
6. [Intentionally left blank.]

B. Requirements and Measures

R1. Each Responsible Entity shall implement a process that considers each of the following assets for purposes of parts 1.1 through 1.3:

(i) **control centres** and backup **control centres**;

(ii) transmission stations and substations;

(iii) **generating units** and **aggregated generating facilities**;

(iv) systems and facilities critical to system restoration, including contracted **blackstart resources** and **cranking paths** and initial switching requirements;

(v) **remedial action schemes** that support the reliable operation of the **bulk electric system**; and

(vi) for the **legal owner** of an **electric distribution system** or **legal owner** of a **transmission facility**, **protection systems** specified in Applicability subsection 4.2.1 above.

1.1. Identify each of the high impact **BES cyber systems** according to Attachment 1, Section 1, if any, at each asset;

1.2. Identify each of the medium impact **BES cyber systems** according to Attachment 1, Section 2, if any, at each asset; and

1.3. Identify each asset that contains a low impact **BES cyber system** according to Attachment 1, Section 3, if any (a discrete list of low impact **BES cyber systems** is not required).

M1. Acceptable evidence includes, but is not limited to, dated electronic or physical lists required by requirement R1, and Parts 1.1 and 1.2.

R2. The Responsible Entity shall:

2.1. review the identifications in requirement R1 and its parts (and update them if there are changes identified) at least once every 15 **months**, even if it has no identified items in requirement R1, and

2.2. have its **CIP senior manager** or delegate approve the identifications required by requirement R1 at least once every 15 **months**, even if it has no identified items in requirement R1.

M2. Acceptable evidence includes, but is not limited to, electronic or physical dated records to demonstrate that the Responsible Entity has reviewed and updated, where necessary, the identifications required in requirement R1 and its parts, and has had its **CIP senior manager** or delegate approve the identifications required in requirement R1 and its parts at least once every 15 **months**, even if it has none identified in requirement R1 and its parts, as required by requirement R2.

Attachments

Attachment 1 – *Impact Rating Criteria*

Revision History

Date	Description
2017-10-01	Initial release.

CIP-002-AB-5.1 Attachment 1

Impact Rating Criteria

The criteria defined in Attachment 1 do not constitute stand-alone compliance requirements, but are criteria characterizing the level of impact and are referenced by requirements.

1. High Impact Rating (H)

Each **BES cyber system** used by and located at any of the following:

1.1. the **ISO**'s **control centre** and backup **control centre**;

1.2. [Intentionally left blank.]

1.3. each **control centre** or backup **control centre** used to perform the functional obligations of an **operator** of a **transmission facility** for one or more of the assets that meet criterion 2.2, 2.4, 2.5, 2.8, 2.9, or 2.10; and

1.4. each **control centre** or backup **control centre** used to perform the functional obligations of the **operator** of a **generating unit** or the **operator** of an **aggregated generating facility** for one or more of the assets that meet criterion 2.1, 2.3, 2.6, 2.8, or 2.9.

2. Medium Impact Rating (M)

Each **BES cyber system**, not included in Section 1 above, associated with any of the following:

2.1. commissioned generation, by each group of **generating units** or **aggregated generating facilities** at a single plant location, with an aggregate **maximum authorized real power** rating of each of the generating units minus the station service load equal to or exceeding 1500 MW in a single **Interconnection**. For each group of **generating units** or **aggregated generating facilities**, the only **BES cyber systems** that meet this criterion are those shared **BES cyber systems** that could, within 15 minutes, adversely impact the reliable operation of any combination of **generating units** and/or **aggregated generating facilities** that in aggregate equal or exceed 1500 MW in a single **Interconnection**;

2.2. each **bulk electric system** reactive resource or group of resources at a single location (excluding **generating units** and **aggregated generating facilities**) with an aggregate maximum **reactive power** nameplate rating of 1000 MVAR or greater(excluding those at generating units or aggregated generating facilities). The only **BES cyber systems** that meet this criterion are those shared **BES cyber systems** that could, within 15 minutes, adversely impact the reliable operation of any combination of resources that in aggregate equal or exceed 1000 MVAR;

2.3. each **generating unit** and **aggregated generating facility** that the **ISO** designates, and informs the **legal owner** of the **generating unit** or **legal owner** of the **aggregated generating facility**, as necessary to avoid an **adverse reliability impact** in the planning horizon of more than one year;

2.4. **transmission facilities** operated at 500 kV or higher;

2.5. **transmission facilities** that are operating between 200 kV and 499 kV at a single station or substation, where the station or substation is connected at 200 kV or higher voltages to three or more other transmission stations or substations and has an "aggregate weighted value" exceeding 3000 according to the table below. The "aggregate weighted value" for a single station or substation is determined by summing the "weight value per line" shown in the table below for each incoming and each outgoing **bulk electric system** transmission line that is connected to another transmission station or substation;

Voltage Value of a Line	Weight Value per Line
Less than 200 kV (not applicable)	(not applicable)
200 kV to 299 kV	700
300 kV to 499 kV	1300
500 kV and above	0

2.6. **generating units** at a single plant location, **aggregated generating facilities** or **transmission facilities** at a single station or substation location that are identified by the **ISO** as critical to the derivation of **interconnection reliability operating limits** and their associated contingencies;

2.7. [Intentionally left blank.]

2.8. **transmission facilities** and switchyards associated with **generating units** or **aggregated generating facilities** that connect the generator output to the **transmission system** that, if destroyed, degraded, misused, or otherwise rendered unavailable, would result in the loss of a **generating unit** or an **aggregated generating facility** identified by any **legal owner** of a **generating unit** or any **legal owner** of an **aggregated generating facility** as a result of its application of Attachment 1, criterion 2.1 or 2.3;

2.9. each **remedial action scheme**, or automated switching system that operates **system element(s)** of the **bulk electric system**, that, if destroyed, degraded, misused or otherwise rendered unavailable, would cause one or more **interconnection reliability operating limits** (**IROLs**) violations for failure to operate as designed or cause a reduction in one or more **IROLs** if destroyed, degraded, misused, or otherwise rendered unavailable;

2.10. each system or group of element(s) that performs automatic load shedding under a common control system, without human operator initiation, of 300 MW or more implementing **under voltage load shed** or **underfrequency load shedding** under a load shedding program that is subject to one or more requirements in a **reliability standard;**

2.11. each **control centre** or backup **control centre**, not already included in High Impact Rating (H) above, used to perform the functional obligations of the **operator** of a **generating unit** or the **operator** of an **aggregated generating facility** for an aggregate highest rated net **real power** capability of the preceding 12 **months** equal to or exceeding 1500 MW; and

2.12. each **control centre** or backup **control centre** used to perform the functional obligations of the **operator** of a **transmission facility** not included in High Impact Rating (H), above, with

the exception of the **operator** of a transmission facility whose only transmission facility is a radial connection from either a **generating unit**, **aggregated generating facility** or industrial complex to either the **transmission system** or to **transmission facilities** within the City of Medicine Hat.

2.13. [Intentionally left blank.]

3. Low Impact Rating (L)

BES cyber systems not included in sections 1 or 2 above that are associated with any of the following assets and that meet the applicability qualifications in subsection 4.2 of this **reliability standard**:

3.1. **control centres** and backup **control centres;**

3.2. transmission stations and substations;

3.3. **generating units** and **aggregated generating facilities**;

3.4. systems and facilities critical to system restoration, including contracted **blackstart resources** and **cranking paths** and initial switching requirements;

3.5 **remedial action schemes** that support the reliable operation of the **bulk electric system**; and

3.6. for a **legal owner** of an **electric distribution system** or **legal owner** of a **transmission facility**, **protection systems** specified in subsection 4.2.1 of this **reliability standard**.