

# **FAC-008-AB-3/EOP-008-AB-1**

## **Lessons Learned**

December 1, 2020

## AESO ARS Compliance Monitoring team

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To share the lessons learned from the power system audits completed in Q1 ~ Q3/2020 so that the industry can:

- better understand the requirements
- understand what is expected to demonstrate compliance

This session will cover lessons learned on FAC-008-AB-3 from these audits including:

- Audit Findings
- AESO Expectations
- General Observations

This **reliability standard** applies to:

(a) the **legal owner** of a **transmission facility**:

(i) that is part of the **bulk electric system**, except for transformers that do not have a primary terminal and at least one (1) secondary terminal energized at 100 kV or higher;

## Audit Findings

- No evidence was provided for the facility rating of BES transmission lines
- Did not consider all transmission facilities owned and subject to the standard

## AESO Expectations

- Transmission facilities that are part of the bulk electric system are subject to the standard
  - Transformers that do not have a primary terminal and at least one (1) secondary terminal energized at 100 kV or higher are the only exception for transmission facilities

## General Observations

- Transmission facilities and applicable transmission equipment were clearly identified in the evidence

**R2.2** the underlying assumptions, design criteria, and methods used to determine the **equipment ratings** identified in requirement R2.1, including identification of how each of the following were considered:

- a) **equipment rating** standard(s) used in development of this method;
- b) ratings provided by equipment manufacturers or obtained from equipment manufacturer specifications;
- c) ambient conditions (for particular or average conditions or as they vary in real time);
- d) operating limitations; and
- e) both summer and winter season operations, where summer is defined as May 1st at 12:01 AM Mountain Time to October 31st at 12:00 midnight Mountain Time and winter is defined as November 1st at 12:01 AM Mountain Time to April 30th at 12:00 midnight Mountain Time;

**R3.2** the underlying assumptions, design criteria, and methods used to determine the **equipment ratings** identified in requirement R3.1, including identification of how each of the following were considered:

- a) **equipment rating** standard(s) used in development of this method;
- b) ratings provided by equipment manufacturers or obtained from equipment manufacturer specifications;
- c) ambient conditions (for particular or average conditions or as they vary in);
- d) operating limitations; and
- e) both summer and winter season operations, where summer is defined as May 1st at 12:01 AM Mountain Time to October 31st at 12:00 midnight Mountain Time and winter is defined as November 1st at 12:01 AM Mountain Time to April 30th at 12:00 midnight Mountain Time;



## Audit Findings

- No evidence to demonstrate the following considerations are identified:
  - Identification of ambient conditions are not consider
  - Identification of both summer and winter operations are not considered
  - Identification of equipment rating standard are not considered

## AESO Expectations

- Considerations as specified in R2.2 and R3.2 must be identified in the documented methodology

## General Observations

- Detailed criteria of how to delineate and define the facility rating are well defined
- Documented methodology for transmission lines are well defined
  - Ambient conditions are specified
  - Operating limitations are well considered

**R2.4** the process by which the **equipment ratings** of the equipment that comprises a facility are determined, where:

**R2.4.1** the scope of equipment that comprises the facility, addressed in accordance with requirement R2.4 must include (based on equipment ownership), but not be limited to, conductors, transformers, relay protective devices, terminal equipment, and series and shunt compensation devices;

**R3.4** the process by which the **equipment ratings** of the equipment that comprises a facility are determined, where:

**R3.4.1** the scope of equipment that comprises the facility, addressed in accordance with requirement R3.4, must include, but not be limited to, conductors, transformers, relay protective devices, terminal equipment, and series and shunt compensation devices;

## Audit Findings

- No evidence to demonstrate the scope includes relay protective devices

## AESO Expectations

- Evidence that relays were considered in the facility rating methodology
  - Thermal limitations of protective relay equipment
  - Relay settings (e.g. relay settings for PRC-023)

**R2.4.2** the scope of **equipment ratings** addressed in accordance with requirement R2.4 must include, as a minimum, both **normal ratings** and **emergency ratings**, such that:

**R2.4.2.2** the **emergency ratings** for transmission lines must be specified for a ten (10) minute duration.

**R3.4.2** the scope of **equipment ratings** addressed in accordance with requirement R3.4 must include, at a minimum, both **normal ratings** and **emergency ratings**, such that:

**R3.4.2.2** the **emergency ratings** for transmission lines must be specified for a ten (10) minute duration.

### Audit Findings

- The emergency ratings for transmission lines were not specified for a ten (10) minute duration

### AESO Expectations

- The emergency ratings for transmission lines must be specified for a ten (10) minute duration
- If the emergency rating is equal to the normal rating this is still expected to be documented in the methodology based on the requirement 2.4.2.2/3.4.2.2

**R6** Each **legal owner** of a **transmission facility**, **legal owner** of a **generating unit** and **legal owner** of an **aggregated generating facility** must have **facility ratings** for its facilities that are consistent with:

- (a) the **facility ratings** methodology in accordance with requirements R2 or R3, for a **transmission facility**, a **generating unit** and an **aggregated generating facility**; and
- (b) the documentation in accordance with requirement R1, for a **generating unit** and an **aggregated generating facility**.

**Facility rating** is defined in the AESO Consolidated Authoritative Document Glossary

means, as determined by the **legal owner** of the facility, the most limiting applicable **equipment rating** of the individual equipment that comprises the facility

## Audit Findings

- The facility rating should have been lower as the most limiting element was not considered.
  - Facility rating included a large number of equipment (e.g. more than one generator)
  - Facility rating included multiple series path (e.g. parallel paths)
- Discrepancies between the applicable equipment rating evidence and facility rating evidence
- Evidence to support the equipment ratings did not align with the documentation or methodology or was not available

### AESO Expectations

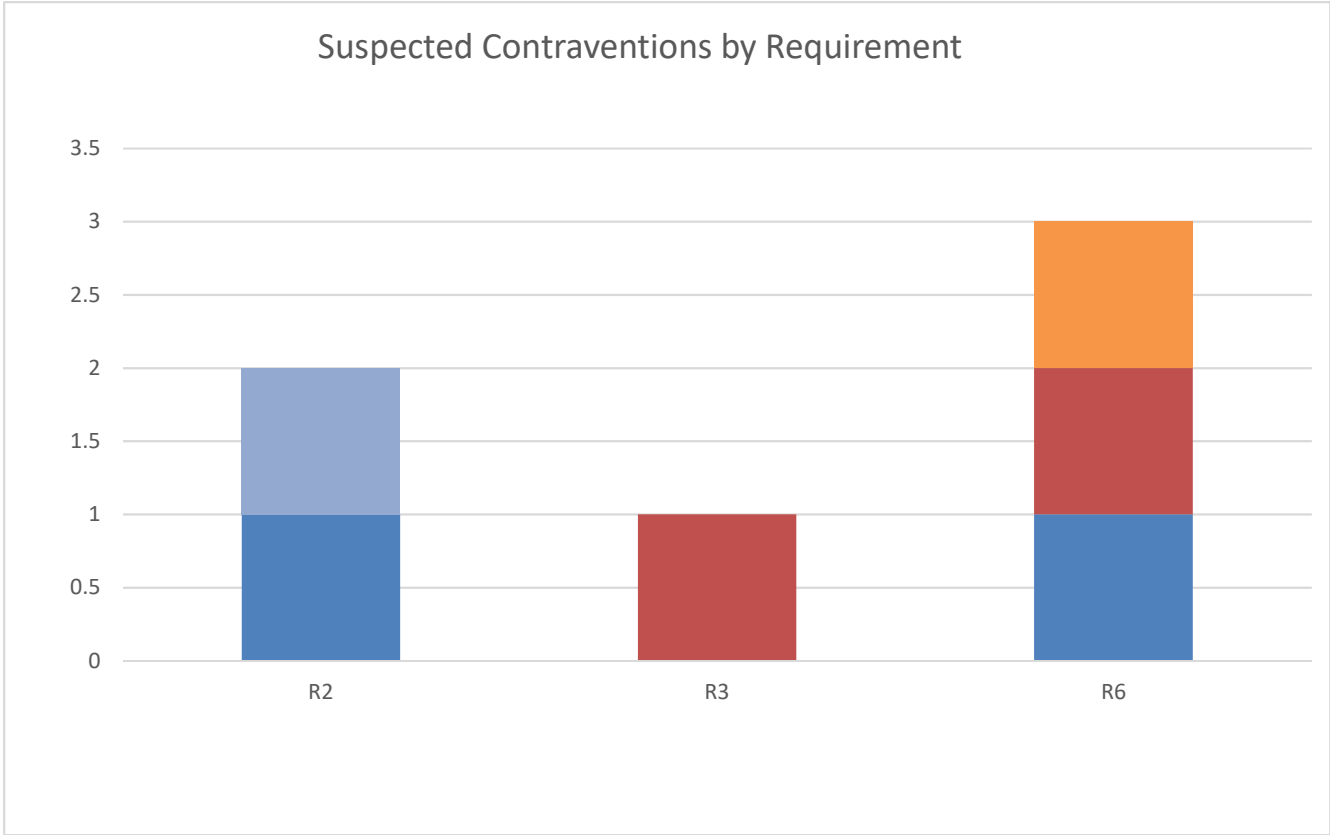
- Evidence that the facility rating was developed in accordance to the documentation in R1 or methodology in R2/R3
- Equipment ratings are provided for the scope of equipment included in the facility
- Evidence to support the applicable equipment ratings aligns with the documentation in R1 or the methodology in R2/R3



### General Observations

- Facility rating and the most limiting applicable equipment were clearly identified in the evidence
- Facility rating values (V, A, MVA, MW, MVar) were specified in accordance to ID 2017-004RS FAC-008 Facility Ratings
- Evidence to support the applicable equipment ratings was provided in the initial evidence submission resulting in fewer IRs
- Evidence to support the applicable equipment ratings was clearly identified for the individual equipment or each equipment type, if appropriate

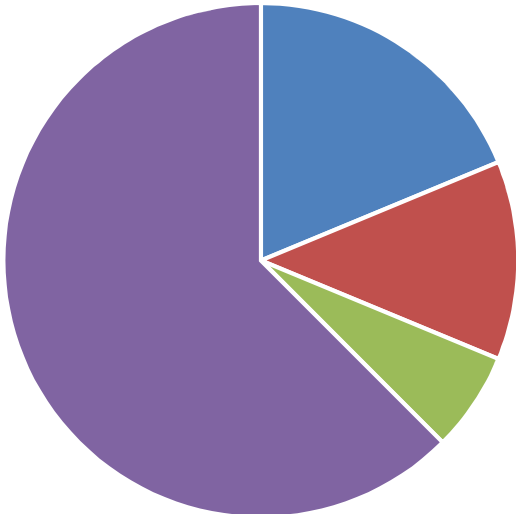
# Suspected contraventions



# Information Requests



Number of IR Questions



■ FAC-008, R1 ■ FAC-008, R2 ■ FAC-008, R3 ■ FAC-008, R6

<b>FAC-008, R1</b>	IRs Issued	Number of Questions
	<b>3</b>	<b>3</b>
<b>FAC-008, R2</b>	IRs Issued	Number of Questions
	<b>2</b>	<b>2</b>
<b>FAC-008, R3</b>	IRs Issued	Number of Questions
	<b>1</b>	<b>1</b>
<b>FAC-008, R6</b>	IRs Issued	Number of Questions
	<b>4</b>	<b>10</b>

- The AESO is evaluating updates to FAC-008 ID based on the audit findings
- In the event that you need further information regarding the requirements of an existing Authoritative Document, please refer to:
  - ID #2017-001, Requests for Information Regarding Authoritative Documents

# EOP-008-AB-1 Lessons Learned

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To share the lessons learned from the power system audits completed in 2020 so that the industry can:

- Better understand the requirements
- Better understand what is expected to demonstrate compliance

This session will cover lessons learned from 2020 audits including:

- Audit Findings
- AESO Expectations
- General Observations



**R1** The **ISO** and each **operator** of a **transmission facility** must have a current operating plan describing the manner in which it continues to meet its functional obligations with regard to the reliable operations of the **bulk electric system** in the event that its primary **control centre** functionality is lost.

This operating plan for backup functionality must include the following, at a minimum:

- (a) the location and method of implementation for providing backup functionality; ...

## Audit Findings

- Absence of operating plan that meets the intent of **R1**
- Absence of operating plan that includes all the specified information per **R1(a-f)**

## AESO Expectations

- Operating plan meets the intent of **R1**
  - Addresses the purpose of R1
    - “continues to meet its functional obligations with regard to the reliable operations of the **bulk electric system** in the event that its primary **control centre** functionality is lost.*

- Operating plan meets minimum content requirements per **R1(a-f)**
  - Content requirements per **R1(a-f)** serves as the foundation for addressing the rest of the EOP-008 requirements and meeting the purpose of this standard
  - R1 is about the documented plan, not implementation
- Operating plan is current (i.e. in effect during the audit period)
- Operating plan may consist of multiple documents
  - Clearly identified by the market participant as their operating plan for backup functionality
  - Information found in other documents considered part of the plan should be clearly referenced in the plan

## General Observations

- Effective dates are clearly indicated in the operating plan documents

**R2** The **ISO** and each **operator** of a **transmission facility** must have a copy of its current operating plan for backup functionality available at its primary **control centre** and at the location providing backup functionality.

### Audit Findings

- No evidence demonstrating that copies of document(s) considered as part of the operating plan was available at the primary control centre and at the location providing backup functionality during the audit period
- No secondary location providing backup functionality (i.e. having a copy of the operating plan at the backup functionality location was not possible)

### AESO Expectations

- Copies of operating plan documents (identified per **R1**) are available at the following locations:
  - The primary control centre
  - The location providing backup functionality (identified per **R1(a)**)
- Dated evidence of compliance during the audit period

### General Observations

- Evidence clearly indicates operating plan documents' effective dates and the dates when they were made available at the specified locations

**R4** Each **operator** of a transmission facility must, when control has been transferred to the backup functionality location, have backup functionality provided either through:

- (a) a facility staffed by operators that are certified in accordance with any applicable **reliability standards**; or
- (b) contracted services staffed by operators that are certified in accordance with any applicable **reliability standards**

that includes monitoring, control, logging, and alarming sufficient for maintaining compliance with all **reliability standards** that depend on the **operator** of a **transmission facility's** primary **control centre** functionality...

## Audit Findings

- No secondary location providing backup functionality (i.e. transfer of control to backup functionality location during the audit period was not possible)

## AESO Expectations

- When triggered, backup functionality is provided through **R4(a)** or **R4(b)**
  - Supported by appropriate certification documents



- Backup functionality provided:
  - Includes monitoring, control, logging, and alarming
  - Is sufficient for maintaining compliance with all ARS that depend on the entity's primary control centre functionality
  - Allows the entity to continue to meet its functional obligations with regard to the reliable operations of the BES in the event that its primary control centre functionality is lost (as implied in **R1**)
  - Is supported by the items identified per **R1(b)**:
    - (i) *tools and applications to ensure that system operators have situational awareness of the **bulk electric system**;*
    - (ii) *data communications;*
    - (iii) *voice communications;*
    - (iv) *power source(s); and*
    - (v) *physical and cyber security;*

## General Observations

- Identification of operators who were involved in providing backup functionality were supported by appropriate certification documents
- Backup functionality provided meets the intent of **R4**

**R5** The **ISO** and each **operator** of a **transmission facility** must annually review and approve its operating plan for backup functionality.

**R5.1** An update and approval of the operating plan for backup functionality must take place within sixty (60) **days** of identifying any necessary changes to any part of the operating plan described in requirement R1.

### Audit Findings

- Absence of an operating plan that meets the intent of **R1**
  - If not addressed, places entities at risk of being in contravention of **R5**

## AESO Expectations

- Initial review and approval of operating plan done within 12 months of effective date of EOP-008 (i.e. July 1, 2019)
  - Not required until July 1, 2020; first assessment will be in Q4-2020 (audit period ending September 30, 2020)
- Subsequent review and approval of operating plan done annually
- Update and approval of operating plan in accordance with **R5.1**
- Dated evidence of compliance during the audit period

## General Observations

- R5 not yet assessed

**R6** The **ISO** and each **operator** of a **transmission facility** must have primary and backup functionality that do not depend on each other for the **control centre** functionality required to maintain compliance with **reliability standards**.

## Audit Findings

- No sufficient evidence to demonstrate that the entity had primary and backup functionality that do not depend on each other for the control centre functionality required to maintain compliance with reliability standards
- No secondary location providing backup functionality (i.e. having a primary and backup functionality that do not depend on each other for the control centre functionality required to maintain compliance with reliability standards was not possible)

## AESO Expectations

- Physical backup functionality location
  - The intent of EOP-008 is to have a physical backup functionality location (supported by **R1(a)**, **R2** and **R4** language)
  - For the purpose of **R6**, a manual process does not meet the intent of a backup control centre functionality required to maintain compliance with reliability standards



- Primary and backup functionality that do not depend on each other for the control centre functionality required to maintain compliance with ARS
  - “*do not depend on each other*” does not pertain to the location/ physical separation of the control centres; means that in the absence of either primary or backup functionality, the other can still perform all the control centre functionality required to maintain compliance with ARS
  - **R4** implies that control centre functionality (primary and backup) as used in **R6** includes monitoring, control, logging, and alarming employed to meet ARS requirements

## General Observations

- Good understanding of the entity's control centre functionalities required to maintain compliance with ARS and how independence is met
- Diagrams provided demonstrate independence of functionalities

**R7** The **ISO** and each **operator** of a **transmission facility** must conduct and document results of an annual test of its operating plan that demonstrates:

**R7.1** The transition time between the decision to transfer functionality to the backup **control centre** following the simulated loss of primary **control centre** functionality and the time to fully implement the backup functionality; and

**R7.2** The backup functionality for a minimum of two (2) continuous hours.

## Audit Findings

- Absence of an operating plan that meets the intent of **R1**
  - If not addressed, places entities at risk of being in contravention of **R7**

## AESO Expectations

- Initial test and documentation done within 12 months of effective date of EOP-008 (i.e. July 1, 2019)
  - Not required until July 1, 2020; first assessment will be in Q4-2020 (audit period ending September 30, 2020)

- Subsequent test and documentation done annually
  - Documentation of results must be done at the time of the test thus, both test and documentation must be done annually
- Test and documentation demonstrating **R7.1** (consistent with **R1(e)**) and **R7.2**
  - **R1(e)** pertains to the transition period which should be less than or equal to 2 hours
  - **R7.2** pertains to the minimum of 2 continuous hours that the backup functionality should be demonstrated during the annual test and reflected in the results documentation
- Dated evidence of compliance during the audit period

## General Observations

- R7 not yet assessed

**R8** The following requirements apply in the event of a loss of primary or backup functionality that is anticipated to last for more than six (6) months:

**R8.1** Where the **operator** of a **transmission facility** loses primary or backup functionality as described in requirement R8, it must provide a plan to the **ISO** within six (6) **months** of the date when the functionality is lost, showing how it will re-establish primary or backup functionality;

### Audit Findings

- None – No events triggered **R8**

## AESO Expectations

- Dated evidence of plan provision to the ISO in accordance with **R8.1**

## General Observations

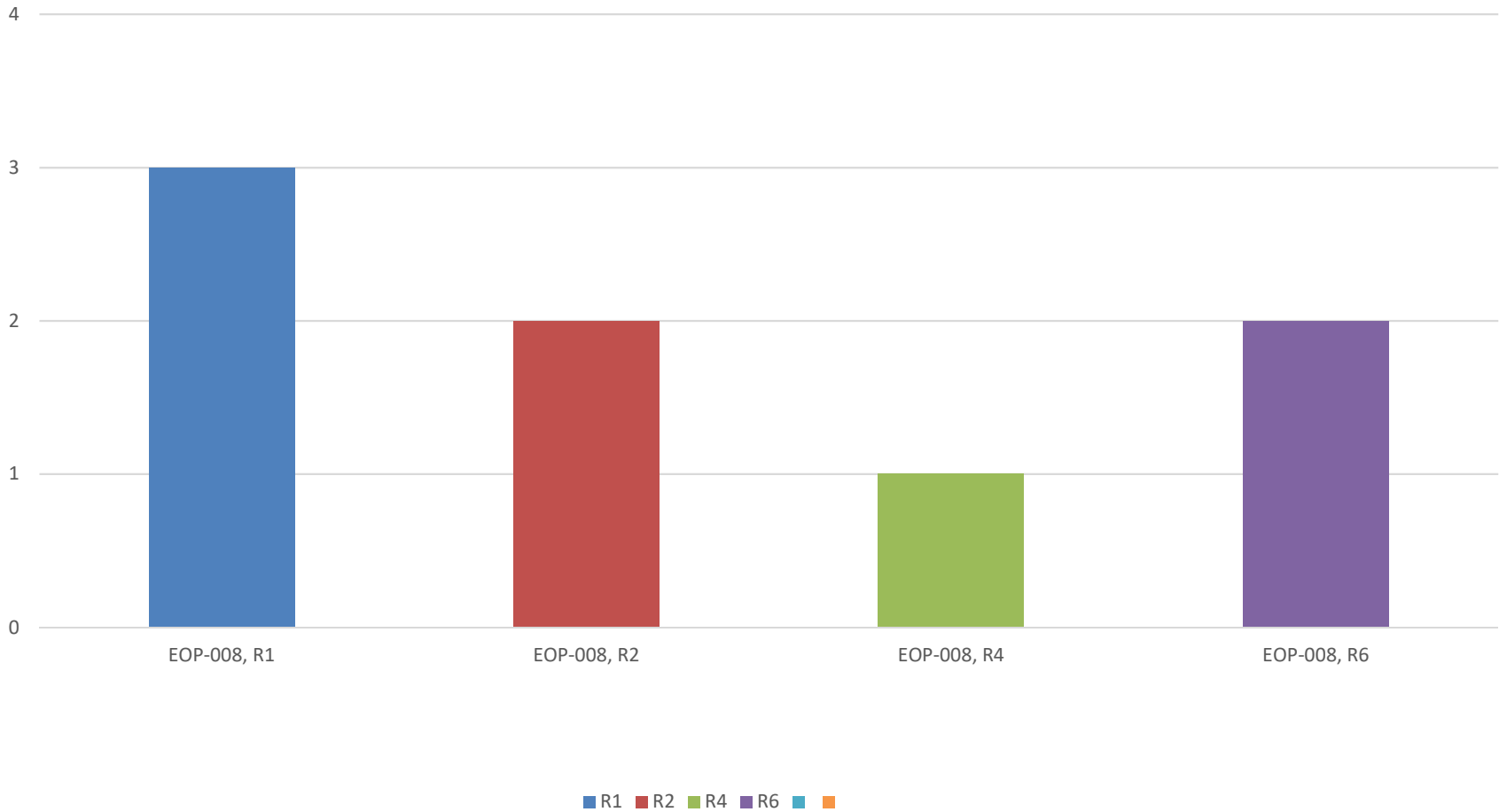
- None – No events triggered **R8**



# Suspected contraventions



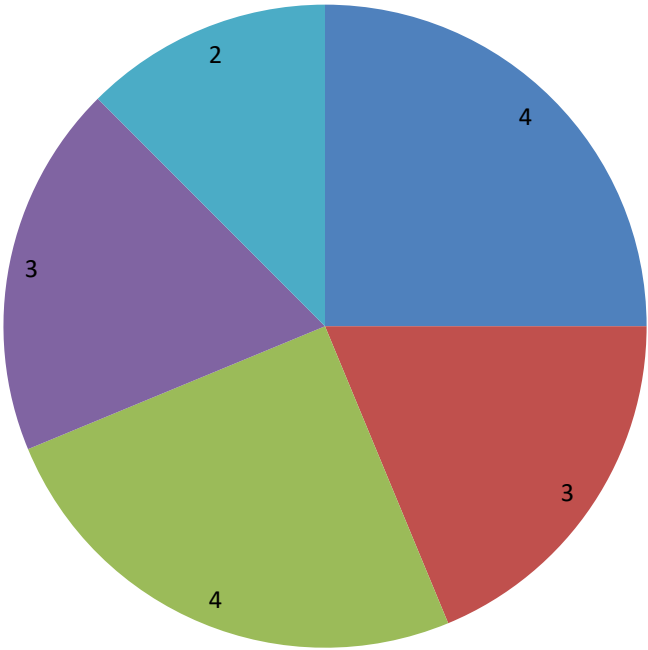
Suspected Contraventions by Requirement



# Information Requests



Number of IR Questions



EOP-008	IRs Issued	Number of Questions
	6	16

■ EOP-008, R1 ■ EOP-008, R2 ■ EOP-008, R4 ■ EOP-008, R6 ■ EOP-008, R8.1

- No updates to IDs are planned as a result of the 2020 audits for EOP-008
- In the event that you need further information regarding the requirements of an existing Authoritative Document, please refer to:
  - ID #2017-001, Requests for Information Regarding Authoritative Documents

**Q&A**

- Any further questions regarding the content of the presentation or ARS compliance monitoring program can be sent to:
  - [rscompliance@aeso.ca](mailto:rscompliance@aeso.ca)
- Questions regarding standards or requirements can be submitted through the formal AESO RFI process:
  - ID #2017-001, Requests for Information Regarding Authoritative Documents

**Thank you**