

Information Documents are not authoritative. Information Documents are for information purposes only and are intended to provide guidance. In the event of any discrepancy between an Information Document and any Authoritative Document(s)<sup>1</sup> in effect, the Authoritative Document(s) governs.

## 1 Purpose

This Information Document relates to the following Authoritative Documents:

- (a) Section 304.7 of the ISO rules, *Event Reporting* (“Section 304.7”);
- (b) Section 304.8 of the ISO rules, *Event Analysis* (“Section 304.8”);
- (c) Section 305.4 of the ISO rules, *System Security* (“Section 305.4”); and
- (d) Alberta Reliability Standard PRC-004-WECC-AB1-1, *Protection System and Remedial Action Scheme Misoperation* (“PRC-004-WECC-AB1-1”).

The purpose of this Information Document is to provide guidance to market participants on providing information to the AESO regarding event reporting, event analysis and misoperation reporting. This Information Document is likely of most interest to market participants that own or operate transmission systems, generating facilities and distribution systems, and to providers of ancillary services.

## 2 Notification, Reporting and Analysis of Events

Notifications to the AESO under Section 305.4 are made in real time, and are intended to ensure that the AESO is aware of circumstances that have adversely affected or may adversely affect the transmission system or transmission system control facilities.

An event report under Section 304.7 is provided after an event has occurred and is intended to assist the AESO in facilitating Alberta electric industry awareness of such events in order to allow potentially impacted parties to prepare for and possibly mitigate any associated reliability risk associated with a future event. Event reports also provide the AESO with information to identify emerging patterns of reliability concerns.

An event analysis may be carried out following an event on the Alberta interconnected electric system in accordance with Section 304.8. The event analysis process is intended to promote self-critical review and analysis by the AESO or a market participant, and allows the AESO to identify and disseminate valuable information to owners, operators, and users of the Alberta interconnected electric system to promote reliable operation.

## 3 System Security – Notifications

Section 305.4 requires a market participant to advise the AESO of any circumstances that could adversely affect system security or the ability of the Alberta interconnected electric system to deliver energy.

A notification to the AESO under subsection 3 of Section 305.4 is made by real time verbal communication to the AESO system controller. These notifications are intended to communicate conditions that are unplanned or differ from the planned conditions for the Alberta interconnected electric system. Such notifications provide situational awareness to the AESO system controller with respect to the real time condition of the Alberta interconnected electric system. Accordingly, market participants are encouraged to provide as much information as is available at the time a notification is submitted to the AESO, including but not limited to:

- (a) a description of the conditions; and

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<sup>1</sup> “Authoritative Documents” is the general name given by the AESO to categories of documents made by the AESO under the authority of the *Electric Utilities Act* and regulations, and that contain binding legal requirements for either market participants or the AESO, or both. Authoritative Documents include: the ISO rules, the Alberta reliability standards, and the ISO tariff.

- (b) the anticipated duration of the conditions.

The following are examples of situations in which a market participant may consider notifying the AESO system controller of a circumstance under subsection 3 of Section 305.4:

- (a) any change or potential change in the status of transmission lines and substations that could affect the reliability of the Alberta interconnected electric system. This may include, but is not limited to, a change in the status of line and substation equipment, protection systems, outage duration, remedial action schemes or communication capability;
- (b) events or circumstances relating to the market participant's facilities that could affect the reliability of the Alberta interconnected electric system. This may include, but is not limited to, adverse weather conditions, fires or bomb threats; and
- (c) forced outages on transmission lines or substation equipment that could affect the reliability of the Alberta interconnected electric system.

Events giving rise to a notification under Section 305.4 may also be the subject of an event report under Section 304.7 or event analysis under Section 304.8.

Note that notifications of planned outages are submitted to the AESO under Section 306.4 of the ISO rules, *Transmission Planned Outage Reporting and Coordination* or Section 306.5 of the ISO rules, *Generation Outage Reporting and Coordination*.

## 4 Event Reporting

Section 304.7 requires a market participant to report events to the AESO, the NERC and other organizations as appropriate, that have impacted the operation of the transmission system or generating units.

### 4.1 Transient vs Sustained Forced Outage

A forced outage generally results from the removal of a system element or a facility from the Alberta interconnected electric system due to circumstances such as defective equipment, adverse weather, adverse environment or a system condition. A forced outage may or may not cause an interruption of service to customers, depending on the transmission system configuration.

Subsection (a) of Appendices 1 and 4 of Section 304.7 refers to a "sustained outage". The following definitions published by the Canadian Electricity Association may provide guidance in determining whether a forced outage is sustained or transient (momentary):

**"Sustained Forced Outage:** A transmission line related forced outage the duration of which is one minute or more. It does, therefore, not include automatic reclosure events.

**Transient Forced Outage:** A transmission line forced outage the duration of which is less than one minute and is therefore, recorded as zero. It covers only automatic reclosure events."<sup>2</sup>

### 4.2 Protection System Failure

Examples of protection system failures that may impact the transmission system for the purposes of Appendix 1(f) include, but are not limited to, the failure of:

- (a) a protection system, excluding the related telecommunications, that protects a transmission facility greater than 200 kV, regardless of whether or not a functionally equivalent protection system remains in service;
- (b) a protection system, excluding the related telecommunications, that protects a transmission facility where a functionally equivalent protection system is not available;

<sup>2</sup> Canadian Electricity Association, *2012 Annual Report (2008-2012 data): Forced Outage Performance of Transmission Equipment; Equipment Reliability Information System*, at p. 4.

- (c) a teleprotection communication channel, where there is an equivalent backup teleprotection communication channel, and where the failure lasts for more than 24 consecutive hours; or
- (d) a teleprotection communication channel, where there is no equivalent backup teleprotection communication channel, and where the failure lasts for more than 10 consecutive minutes.

#### 4.3 Event Reporting Form

Events under Section 304.7 are reported to the AESO using the [Event Reporting Form Template](#), located on the AESO website. A market participant provides information regarding the impact of the event on its own facilities in the *Event Reporting Form Template*.

The form may be emailed to:

- (a) [opsevents@aeso.ca](mailto:opsevents@aeso.ca) for all events, except for those events described under (b) below; or
- (b) [security@aeso.ca](mailto:security@aeso.ca) for:
  - (i) damage or destruction that results from actual or suspected intentional human action;
  - (ii) physical threats which have the potential to degrade normal operation of a control centre; or
  - (iii) a suspicious device or activity.

#### 5 Misoperation Reporting

Reports to the AESO under requirement R3 of PRC-004-WECC-AB1-1 are provided following the misoperation of a protection system or remedial action scheme to confirm that the legal owner has analyzed and mitigated the misoperation of protection systems or remedial action schemes on transmission paths.

Such misoperations are reported to the AESO by email at: [opsevents@aeso.ca](mailto:opsevents@aeso.ca).

#### 6 Event Analysis

The purpose of Section 304.8 is to promote a structured and consistent approach to performing event analyses in Alberta, which aligns with the NERC's Electric Reliability Organization Event Analysis Process.<sup>3</sup> An event analysis involves identifying what happened, why it happened and what can be done to prevent a reoccurrence of such events on the Alberta interconnected electric system.

##### 6.1 Event Analysis – Event Categories

In accordance with subsection 2(3) of Section 304.8, when the AESO conducts an event analysis, the AESO may categorize the event using the highest applicable category in Appendix 1, where Category 1 is the lowest and Category 5 is the highest. The AESO categorizes an event that is listed in Appendix 1 as applicable. However, the events listed in Appendix 1 are not exhaustive and the AESO categorizes events based on the impact of the event on the reliability of the Alberta interconnected electric system.

##### 6.2 Event Analysis – Reports

Depending on the nature of the event, the AESO may request a brief report or an event analysis report or both from a market participant, pursuant to subsection 3 of Section 304.8. For such requests, the AESO includes the event category and type of report to be provided to the AESO.

When a Responsible Entity requests that the AESO provide an extension to the timeframes indicated in subsection 4(1) of Section 304.8, the AESO provides a written response to the extension request.

<sup>3</sup> Materials relating to the NERC's Electric Reliability Organization Event Analysis Process are available on the NERC website at the following link: <http://www.nerc.com/pa/rmm/ea/Pages/EA-Program.aspx>. Please note that this link may change periodically.

Where multiple Responsible Entities are involved in an event, or if portions of the event apply only to the AESO, the AESO may prepare a brief report or event analysis report which summarizes information received from Responsible Entities, pursuant to subsection 6(1) of Section 304.8.

### 6.3 Event Analysis – Brief Report

Upon the AESO's request, a Responsible Entity prepares a brief report using the [Brief Report Template](#) located on the NERC's website.

A Responsible Entity may consider the following guidance when completing the Brief Report Template:

1. **Reported Event Title**

Title used to further identify the event (provided by the AESO in its request), including the date of the event (YYYYMMDD), entity name, substation name or location as appropriate.

2. **Submittal Date**

Date brief report was first submitted.

3. **Subsequent Submittal Date**

Date brief report was updated, if applicable.

4. **Entity Name (Item 1)**

Responsible Entity submitting the report.

5. **Brief Description (Item 4)**

A brief summary of what happened, when it happened and where it happened, as applicable. The brief summary does not describe the causes and conditions surrounding the event.

6. **Proposed Event Categorization (e.g. 1a, 2b)**

See the list of categories in Appendix 1 of Section 304.8.

7. **Items 6 -12**

If the event did not involve generation, frequency, transmission facilities or load, items 6 - 12 may be left blank.

8. **Generation Tripped Off-line (Item 6)**

Total MW loss (gross) and names of the units that tripped off-line due to the event.

9. **Outage/Restoration Time (Item 12)**

Total outage time for each affected transmission facility, generating unit, or load, or a time estimate of pending restoration.

10. **Sequence of Events (Item 13)**

A chronological timeline of the events that took place leading up to and through the event for the purpose of causal analysis. This timeline does not include potential causes or narratives identifying the impact of various activities throughout the event.

11. **Narrative (Item 17)**

A detailed description of the event using the sequence of events, single-line diagrams, available data and any assumptions, as necessary. The narrative explains the "what", "when", "how" and "where" aspects of the event in detail, as well as the impact. The narrative describes the potential causes of the event, preventive measures that could

have prevented the event, corrective measures taken after the event, and any extent of the conditions identified.

## 6.4 Event Analysis – Event Analysis Report

An event analysis report will typically be requested by the AESO for more significant events (Category 3 and above), but may be requested for lower category events.

Upon the AESO's request, a Responsible Entity prepares an event analysis report using the [Event Analysis Report Template](#) located on the NERC's website.

A Responsible Entity may consider the following guidance when completing the Event Analysis Report Template:

### 1. Report Cover Sheet

- a. Reported Event Title used to further identify the event (provided by the AESO in its request), including the date of the event (YYYYMMDD), entity name, substation name or location as appropriate.);
- b. Date of Report;
- c. Responsible Entity Name; and
- d. Individual Author's Name.

### 2. Table of Contents

### 3. Executive Summary

### 4. Event Overview

A description of the pertinent facts related to the event, including pre and post event periods.

### 5. Sequence of Events

A sequence of events includes the date, time and duration (until restoration) of the event . This timeline is a building block for all other aspects of the analysis and is a starting point for the root cause analysis.

### 6. Root Cause Analysis

- a. A list of the causal factors of the event. The root cause analysis is a factual record to support the conclusions in the report; and
- b. Assign cause code (assigned by the Responsible Entity).

### 7. Detailed System Analysis

- a. System conditions prior to the event;
- b. Generation outage summary (relevant outage, planned or unplanned);
- c. Transmission outage summary (relevant outage, planned or unplanned);
- d. Effect on other entities and customers
  1. MW lost, in each of the following categories:
    - a) Load (both DOS and DTS): include the number of customers affected and how long they were without service if this information is available; and
    - b) Remedial action schemes, including the number of generators and customers affected, and the duration of interrupted service, if available;

- e. Event response
  - 1. Frequency excursions: frequency plot, from T-0 until the frequency reached steady-state;
  - 2. Under-frequency load shed (UFLS): details of operation, including what blocks were shed and the MW per block;
  - 3. Voltage excursions: voltage plots, from T-0 until the voltage reached steady-state;
  - 4. Digital fault recording<sup>4</sup>;
  - 5. Protection schemes (including remedial action schemes): operation with respect to design;
  - 6. Details of any equipment malfunction that contributed to the disturbance, or equipment damage resulting from the disturbance; and
  - 7. SCADA information; and
- f. Restoration observations.

## 8. Findings, Conclusions, and Recommendations

- a. Specific findings and conclusions;
- b. Recommendations including corrective actions, lessons learned and good industry practices; and
- c. A lesson learned is knowledge or understanding gained by experience that has a significant impact for an organization. The experience may be either positive or negative. Successes are also sources of lessons learned.

## 9. Appendices

Responsible Entities are encouraged to include the following in an event analysis report:

- a. Single-line diagrams;
- b. Graphic representations (see event response in 7(e) above);
- c. Team members contributing in the report preparation; and
- d. Other relevant data.

### 6.5 Event Analysis – Cause Code

An event analysis report uses cause codes to identify characteristics and attributes of events. The purpose of cause coding is to provide a structured, measurable, and continuously improvable approach to rationally characterize the causes of reportable events which can be used to identify trends and develop actionable transmission system risk reduction knowledge.

Responsible Entities are encouraged to use the NERC's [Cause Code Quick Reference](#) located on the NERC website. These codes may be updated from time to time to align with the NERC's cause codes.

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<sup>4</sup> In most cases printed traces from digital fault recording are adequate. However, if digital files are provided it is recommended that, to the extent possible, the disturbance data be reported in a format capable of being viewed, read and analyzed with a generic COMTRADE (IEEE C37.111-XXXX Standard Common Format for Transient Data Exchange for Power Systems) analysis tool, and that the data files be named in conformance with the IEEE C37.232-XXXX Recommended Practice for Naming Time Sequence Data Files.

For further information on cause codes, Responsible Entities may review the *NERC Cause Code Assignment Process* and *Root Cause Analysis Methods for NERC, Regional Entities, and Registered Entities*<sup>5</sup>, available on the [NERC website](#).

## 6.6 Event Analysis – Lessons Learned

The AESO may determine, as a result of an event analysis, that a lessons learned document should be prepared and shared with the industry to facilitate the reliability of the Alberta interconnected electric system. The AESO prepares Lessons Learned documents using the NERC template.

The lessons learned document is reviewed by the AESO and the Responsible Entities involved in the event for completeness prior to posting on the AESO website.

## 6.7 Close of Event Analysis

The AESO closes the event analysis upon completion of its event analysis, or upon providing a brief report, an event analysis report or a lessons learned document to the NERC and the WECC.

## Revision History

Posting Date	Description of Changes
2018-04-30	Addition of section 6, Event Analysis
2017-12-12	Clarifying revisions to section 4.2 and administrative revisions
2016-08-30	Initial release

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<sup>5</sup> Please note that the links to the *NERC Cause Code Assignment Process* and the *Root Cause Analysis Methods for NERC, Regional Entities, and Registered Entities* may change periodically.