January 10, 2019

To: Market Participants and Other Interested Parties

Re: Consultation Letter for Proposed New and Amended Alberta Reliability Standards:

1) Proposed new Alberta Reliability Standard PRC-025-AB-2, *Generator Load Reliability* ("new PRC-025-AB-2"); and
2) Amended Alberta Reliability Standard PRC-023-AB-4, *Transmission Relay Loadability* ("amended PRC-023-AB-4")

Section 19 of the *Transmission Regulation* requires the Alberta Electric System Operator ("AESO") to consult with market participants likely to be directly affected by the AESO's adoption or making of Alberta reliability standards, and also requires the AESO to forward the proposed Alberta reliability standards to the Alberta Utilities Commission ("AUC" or "Commission") for review along with the AESO's recommendation that the Commission approve or reject them.

Accordingly, the AESO is providing notice and seeking comments from market participants on the attached proposed new PRC-025-AB-2 and amended PRC-023-AB-4.

Applicability

The proposed new PRC-025-AB-2 is applicable to:

2.1 Inclusions

(a) the legal owner of a generating unit, including all electrical equipment that connects the stator windings of any generating unit to the transmission system, that is:

(i) directly connected to the bulk electric system, or that is part of an industrial complex that is directly connected to the bulk electric system, and has a maximum authorized real power rating greater than 18 MW;

(ii) within a power plant or industrial complex which:

(A) is not part of an aggregated generating facility;

(B) is directly connected to the bulk electric system; and

(C) has a combined maximum authorized real power rating greater than 67.5 MW;

(iii) a blackstart resource; or

(iv) material to this reliability standard and to the reliability of either the interconnected electric system or the City of Medicine Hat electric system as the AESO determines and publishes on the AESO website and may amend from time to time on notice to market participants in accordance with the process set out in Appendix 1;

(b) the legal owner of an aggregated generating facility that is:

(i) directly connected to the bulk electric system and has a maximum authorized real power rating greater than 67.5 MW;

(ii) within a power plant or industrial complex which:

(A) is directly connected to the bulk electric system; and

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(B) has a combined maximum authorized real power rating greater than 67.5 MW;

(iii) a blackstart resource; or

(iv) material to this reliability standard and to the reliability of either the interconnected electric system or the City of Medicine Hat electric system as the AESO determines and publishes on the AESO website and may amend from time to time on notice to market participants in accordance with the process set out in Appendix 1;

(c) the legal owner of a transmission facility that is:

(i) part of the bulk electric system; or

(ii) which the AESO determines is necessary for the reliable operation of either the interconnected electric system or the City of Medicine Hat electric system and publishes on the AESO website and may amend from time to time on notice to market participants in accordance with the process set out in Appendix 1.

2.2 Exclusions

This reliability standard does not apply to the following protection systems:

(a) any protection relay elements that are in-service only during startup of a generating unit;

(b) load-responsive components of a protection system that are armed only when the generating unit is disconnected from the interconnected electric system;

(c) phase fault detector protection relay elements employed to supervise other load-responsive phase protection distance relays, provided the phase distance relay is set in accordance with the criteria outlined in this reliability standard;

(d) protection relay elements that are only enabled when other protection elements fail;

(e) protection relay elements used only for remedial action schemes;

(f) protection systems that detect generating unit overloads that are designed to coordinate with the generating unit short time capability by using an extremely inverse characteristic set to operate no faster than 7 seconds at 218% of full-load current, and prevent operation below 115% of full-load current; and

(g) protection systems that detect transformer overloads and are designed only to respond in time periods which allow real time operating personnel 10 minutes or greater to respond to overload conditions.

The proposed amended PRC-023-AB-4 is applicable to:

(a) the legal owner of a transmission facility with load-responsive phase protection systems, as described in Appendix 1, applied at the terminals of any one or more of the following facilities:

(i) transmission lines operated at 200 kV and above, except system elements that are part of a radial circuit, including transmission step-up transformers and lines, that are only used to export energy directly from a generating unit or aggregated generating facility to a single system element on the networked transmission system;

(ii) transmission lines operated below 200 kV which the AESO identifies, as required in requirement R6.2, as essential to the reliability of the bulk electric system, except transmission lines that are part of a radial circuit that are only used to export energy directly from a generating unit or aggregated generating facility to a single system element on the networked transmission system;

(iii) transformers with low voltage terminals connected at 200 kV and above; or

(iv) transformers with low voltage terminals connected below 200 kV, which the AESO identifies in accordance with requirement R6.2, except transformers that are part of a radial circuit that are only used to export energy directly from a generating unit or

aggregated generating facility to a single system element on the networked transmission system;

(b) the legal owner of a generating unit, that also owns the associated switch yard, with load- responsive phase protection systems, as described in Appendix 1, applied at the terminals of any one or more of the following facilities:

(i) transmission lines operated at 200 kV and above, except transmission lines that are part of a radial circuit that are only used to export energy directly from a generating unit to a single system element on the networked transmission system;

(ii) transmission lines operated below 200 kV which the AESO identifies, as required in requirement R6.2, as essential to the reliability of the bulk electric system, except transmission lines that are part of a radial circuit that are only used to export energy directly from a generating unit to a single system element on the networked transmission system;

(iii) transformers with low voltage terminals connected at 200 kV and above; or

(iv) transformers with low voltage terminals connected below 200 kV which the AESO identifies in accordance with requirement R6.2, except transformers that are part of a radial circuit that are only used to export energy directly from a generating unit to a single system element on the networked transmission system;

(c) the legal owner of an aggregated generating facility, that also owns the associated switch yard, with load-responsive phase protection systems, as described in Appendix 1, applied at the terminals of any one or more of the following facilities:

(i) transmission lines operated at 200 kV and above, except transmission lines that are part of a radial circuit that are only used to export energy directly from an aggregated generating facility to a single system element on the networked transmission system;

(ii) transmission lines operated below 200 kV which the AESO identifies, as required in requirement R6.2, as essential to the reliability of the bulk electric system, except transmission lines that are part of a radial circuit that are only used to export energy directly from an aggregated generating facility to a single system element on the networked transmission system; or

(iii) transformers with low voltage terminals connected below 200 kV which the AESO identifies in accordance with requirement R6.2, except transformers that are part of a radial circuit that are only used to export energy directly from an aggregated generating facility to a single system element on the networked transmission system; and

(d) the AESO.

Background Proposed New PRC-025-AB-2

The purpose of proposed new PRC-025-AB-2 is to set load-responsive protection relays associated with generation facilities at a level to prevent unnecessary tripping of a generating unit or an aggregated generating facility during a disturbance for conditions that do not pose a risk of damage to the associated equipment.

The North American Electric Reliability Corporation (“NERC”) has analyzed many of the major disturbances in the last 25 years on the North American interconnected power system and has determined that generating units have tripped for conditions that did not pose a direct risk to those generating units and associated equipment within the time period when the tripping occurred. This tripping was often determined to have expanded the scope and/or extended the duration of the disturbances. This was a serious issue during the North American continent black out event that occurred in August 2003.

During the recoverable phase of a disturbance, the disturbance may exhibit a “voltage disturbance” behavior pattern, where system voltage may be widely depressed and may fluctuate. In order to support the system during this transient phase of a disturbance, proposed new PRC-025-AB-2 establishes criteria for setting load-responsive protective relays such that individual generating units and aggregated generating facilities may provide reactive power within their dynamic capability to help the system recover from the voltage disturbance. Improperly set load-responsive protection relays resulting in the premature or unnecessary tripping of generating units and aggregated generating facilities resulting in the removal of dynamic reactive power exacerbates the severity of the voltage disturbance, and as a result, changes the character of the system disturbance. In addition, the loss of real power could initiate or exacerbate a frequency disturbance.

Background Proposed Amended PRC-023-AB-4

The purpose of proposed amended PRC-023-AB-4 is to ensure the protection relay settings do not limit transmission loadability, do not interfere with an operator’s ability to take remedial action to protect the reliability of the transmission system, and are set to reliably detect all fault conditions and protect the electrical network from these faults.

PRC-023-AB-2 is already in effect in Alberta. Proposed amended PRC-023-AB-4 is being revised at this time to remove content that overlaps with proposed new PRC-025-AB-2, to permit either a mho function or a load encroachment function within phase protection relays, and to align with reliability standard FAC-008-AB-3, *Facility Ratings*, all as described below. The AESO is of the opinion that the latter two proposed enhancements to existing PRC-023-AB-2 provide sufficient benefit to warrant an earlier effective date than proposed new PRC-025-AB-2.

Summary of Proposed Changes

In developing the proposed new PRC-025-AB-2 and amended PRC-023-AB-4 the AESO determined that certain Alberta variances and administrative amendments were required in order to ensure that the NERC PRC-025-2, *Generator Relay Loadability* (“NERC PRC-025-2”) and the NERC PRC-023-4, *Transmission Relay Loadability* (“NERC PRC-023-4”) are capable of being applied in Alberta and do not require a material change in the framework for the market for electric energy. A summary of these Alberta variances and administrative amendments are as follows:

Proposed New PRC-025-AB-2

The proposed new PRC-025-AB-2 is in alignment with the NERC PRC-025-2 and no Alberta variances have been taken.

Administrative amendments:

- the NERC PRC-025-2 "Applicability" section has been redrafted, in order to correctly identify the applicable entities in Alberta.

Proposed Amended PRC-023-AB-4

NERC PRC-023-4 Alberta variances:

- requirement R1 has been amended to permit the use of either a mho function or a load encroachment function within phase protection relays used to protect transmission lines to meet requirement R1(a) and R1(b); and
- requirement R1.2 has been amended to revise the duration of emergency ratings from 15 minutes to 10 minutes to align with emergency rating duration as specified in reliability standard FAC-008-AB-3, *Facility Ratings* for application in Alberta.

Administrative amendments:

- proposed amended PRC-023-AB-2 is being renamed PRC-023-AB-4; and
- removed overlapping content with proposed new PRC-025-AB-2, specifically:

- requirement R1.6 protection setting criteria for transmission line relays, applied on transmission lines connected to generation stations remote to load, that are susceptible to load; and

- the application of PRC-023-AB-4 to phase protection relays on transmission lines that are part of a radial circuit that are only used to export energy directly from a generating unit or aggregated generating facility to a single system element on the networked transmission system.

Retirement of Requirement R1.6 overlapping provisions:

- Appendix 3 outlines the retirement of requirement R1.6 of proposed amended PRC-023-AB-4 as of midnight the day before the effective date of reliability standard PRC-025-AB-2.

In addition, the AESO made amendments to ensure consistent use of defined terms as included in the AESO's *Consolidated Authoritative Document Glossary* ("CADG"). Administrative changes, such as formatting and grammatical corrections, have also been made in the proposed new PRC-025-AB-2 and amended PRC-023-AB-4.

Defined Terms

When reviewing the attached proposed new PRC-025-AB-2 and amended PRC-023-AB-4 market participants should note that all defined terms appear **bolded**. Market participants and other interested parties are encouraged to refer to the AESO's CADG when reviewing proposed Alberta reliability standards to ensure they have an accurate understanding of those defined terms.

Implementation of Alberta Reliability Standards

In accordance with Section 19 of the *Transmission Regulation*, the reliability standards that apply in Alberta are those of the Electric Reliability Organization ("ERO") or any other reliability standards, to the extent that such reliability standards are adopted by the AESO after consultation with market participants and after receipt of Commission approval. The NERC was certified as the ERO for the United States by the Federal Energy Regulatory Commission under the US *Energy Policy Act* of 2005. Further, the NERC was recognized as the ERO by the Minister of Energy in Alberta.

Alberta reliability standards and definitions proposed for approval or rejection by the AESO are developed:

(a) based on the reliability standards and definitions of the NERC; or

(b) to amend, supplement or replace the NERC reliability standards or definitions.

For more information on the AESO's reliability standards, visit the AESO website at www.aeso.ca and follow the path Rules, Standards and Tariff > Alberta Reliability Standards.

Request for Comment

Please use the attached Market Participant Comment Matrix when submitting comments to the AESO. Only written comments will be considered in finalizing proposed new PRC-025-AB-2 and amended PRC-023-AB-4. Market participants should ensure that comments provided represent all interests within their organization. The scope of comments is limited to proposed new PRC-025-AB-2 and amended PRC-023-AB-4. Any comments received that are outside of this scope will not be considered by the AESO.

Market participants are asked to provide comments no later than **January 31, 2019** to ars_comments@aeso.ca. Adherence to deadlines is essential to the integrity of the Alberta reliability standard comment process. As such, any market participant comments received after January 31, 2019 may not be published, replied to, or otherwise considered by the AESO.

The AESO will be publishing all comments received for industry review in February, 2019. The AESO expects to publish replies to the comments with the final proposed new PRC-025-AB-2 and amended PRC-023-AB-4 in February 2019.

If the AESO does not receive comments regarding proposed new PRC-025-AB-2 and amended PRC-023-AB-4, the AESO expects to forward the proposed new PRC-025-AB-2 and amended PRC-023-AB-4 to the Commission in March 2019, along with its recommendation that the Commission approve the proposed new PRC-025-AB-2 to become effective the first day of the calendar quarter that follows 20 full calendar quarters after approval by the Commission and amended PRC-023-AB-4, to become effective the first day of the calendar quarter that follows 3 full calendar quarters after approval by the Commission.

Attachments to Consultation Letter

The following documents are attached:

1. Market Participant Comment Matrix for proposed new PRC-025-AB-2;
2. Clean copy of proposed new PRC-025-AB-2;
3. Market Participant Comment Matrix for proposed amended PRC-023-AB-4; and
4. Blackline and clean copies of proposed amended PRC-023-AB-4.

Sincerely,

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Attachments