ISO Rule Section 502.11 (Substation) Workgroup meeting minutes – Finalized on March 31, 2016

Date: February 18th, 2016
Time: 10:00 am – 3:00 pm
Location: AESO Boardroom 2539P, 25th floor of Calgary Place building

Attended	Name	Company
X	[redacted]	AESO
X	[redacted]	AESO
	[redacted]	AESO
X	[redacted]	AESO
X	[redacted]	AltaLink
X	[redacted]	AltaLink
	[redacted]	ATCO Electric
	[redacted]	ATCO Electric
	[redacted]	EPCOR
X	[redacted]	EPCOR
X	[redacted]	ENMAX
X	[redacted]	ENMAX
X	[redacted]	Fortis Alberta
X	[redacted]	CANA

1. Welcome and review minutes of meetings (November 19, 2015 and December 17, 2015)

   Amendment to November 19, 2015 meeting minutes

   - [AESO] tabled amended meeting minutes for the November 19, 2015 meeting based on clarifications and comments received at the January 21, 2016 meeting
   - WG accepted amended meeting minutes for the November 19, 2015 meeting
   - [AESO] to send WG members the finalized meeting minutes

   Amendment to December 17, 2015 meeting minutes

   - [AESO] tabled amended meeting minutes for the December 17, 2015 meeting based on clarifications and comments received at the January 21, 2016 meeting
   - WG accepted revised meeting minutes of the December 17, 2015 meeting
   - [AESO] to send WG members the finalized meeting minutes

   Draft January 21, 2016 meeting minutes

   - [AESO] tabled draft meeting minutes of the January 21, 2016 meeting
   - WG accepted draft meeting minutes of the January 17, 2016 meeting with the following amendments. [AESO] is to send revised meeting minutes to WG members.
     - Clarification to the "*All surge arresters should be placed as close as possible to the transformer bushings*" bullet. Furthermore, an Action Item for the AESO: The AESO is to

merge this bullet with the "*All power transformer terminals shall be protected with surge arresters with adequate protective margins*" bullet into one statement

- Clarification to the "*Should we require FCBN (Full Capacity Below Nominal) for all 240/138 and 500/240 kV autotransformers*?" bullet. WG agreed that FCBN should be required of all and any power transformers.
- Clarification to the "*Should we require LTC on every power transformer*?" bullet to indicate the exceptional situations where DETC transformers are required
- It is clarified that not all TFOs use the IEEE C57.120 standard in evaluating transformer losses. Action Item for the AESO: AltaLink is to send to the AESO of BC Hydro's loss evaluation methodology, and the AESO is to review the difference between BC Hydro's methodology and the IEEE C57.120 standard.

2. Action Items from the January 21, 2016 meeting:

Action #1 for the AESO: The AESO is to discuss internally about the appropriate wording respecting overloading capability for certain power transformers (e.g. >1000 MVA)

[AESO] spoke on AESO's position on this item – the AESO is currently not contemplating to explicitly set the minimum overloading capability for each and every power transformer in the rule. However, the AESO will continue to require, as necessary, specific overloading capability for certain large transformers based on system needs.

WG had discussions on how typical overloading capabilities of transformers are calculated. Some TFO requests heat-run or load cycle tests to be performed on most new transformers to determine their overloading capabilities. Some TFO only specifies overloading requirement in the equipment specifications by providing a load cycle profile, to comply with the AESO's Functional Spec.

The AESO also provided information on the development progress of the ARS FAC-008 in which TFOs and GFOs will be required to document the methodology for calculating the ratings of equipment, including power transformers.

Action Item for EPCOR: [EPCOR] is to provide EPCOR's technical specifications respecting transformer overloading capabilities to the AESO for information purposes.

Action #2 for the AESO: The AESO will discuss internally respecting the need to include transformer testing requirement (for BIL and SIL levels) in the rule

[AESO] tabled the AESO's position on this item. At this moment, the AESO does not contemplate to mandate on how testing on BIL/SIL must be done. The AESO will continue to set the minimum BIL requirements, and it is up to the TFOs to test the equipment to ensure the insulation strength.

WG agreed on the following:

- It's TFO's responsibility to ensure that proper insulation testing is performed on all equipment to ensure the insulation strength
- It's the TFO's decision to choose the appropriate testing methods on insulation strength. The

substation rule should allow various methods, including Design Test (Type Test), on the BIL/SIL levels on equipment as the TFO sees appropriate

Action #3 for the AESO: The AESO to check with G/L standard and 502.1 rule and other rules for the minimum voltage range requirements.

[AESO] tabled the current AESO's effective G/L standard and the 502.1 rule. Only one place in the G/L standard mentioned the minimum voltage regulation range for the tap changers. Section 3.1 of the G/L standard states that a GSU transformer connecting a generator to the transmission system must, at a minimum, be capable of a ±5% voltage range in 2.5% increments.

WG agreed to the following as a minimum requirement of all power transformers:

- The tap changer on a power transformer must, at a minimum, be capable of ±10% voltage range, unless the AESO specifies otherwise.

Action #4 for the AESO: The AESO is to discuss internally about need for monitoring equipment (such as online DGA analyzer, mechanical monitoring equipment, etc.).

At this moment, the AESO does not intend to require additional monitoring equipment in the rule to those already included in other rules such as 502.3. Installation of necessary monitoring devices and systems in the transformers is always part of good utility practice.

Action #5 for AltaLink: AltaLink to review this, and bring to next meeting recommended wording for dealing with snow/icing/wind limits in the design of substations, to be potentially included in the Information Document

AltaLink presented and explained their snow/icing/wind limits in their existing design standard to the WG for information. The AESO will develop wording in the ID for the consideration of snow/wind/ice limits.

Action #6 for AltaLink:: AltaLink is to check into CSA C88 and recommends appropriate wording about this (FCBN) requirement

AltaLink presented excerpts from CSA C88 regarding FCBN requirement. The WG agreed on the following:

- All 240/138 and 500/240 kV autotransformers are required to be FCBN (Full Capacity Below Nominal).

3. Presentation from [CANA]

[redacted] delivered a PowerPoint presentation on the minimum technical requirements for transmission substations of 50+ ISOs/RTOs/TFOs in USA and Canada.

WG agreed with including or considering the following requirements in the substation rule:

- In the circuit breaker section, the circuit breaker duty cycle must be, at a minimum, able to perform an O-C-O sequence after 8 hours of power loss

- All circuit breakers must be tested in accordance with C37.09 or the corresponding IEC standard
- Minimum illumination level be considered for security lighting purposes
- The substation rule does not need to include provisions for mobile transformer connections
- Action for the AESO: The AESO is to review NERC's definition on CIP (5 source line terminations?), and determine if the WG needs to review the "Type 1" substation definition

Meeting adjourned at 3:00pm

Next meeting (tentatively) on March 17, 2016 at the AESO Office