

ISO Rule Section 502.11 (Substation) Workgroup Meeting – Proposed Agenda

Meeting Date: November 19, 2015 from 10:00 am to 3:00 pm

Meeting Place: EPCOR Office, 12116 107 St SW, Edmonton

Agenda Item	Time	Presenter
1. Welcome and finalization of Oct 29 meeting minutes	10:00	[AESO]
2. Updates on the following items: <ul style="list-style-type: none"> • AESO’s definition of critical substations for black start purposes – [AESO] • Review of insulation levels for GIS equipment – [AESO] • Existing TFO’s snow, icing and wind limits used in their substation design – AltaLink, ATCO, ENMAX, EPCOR 	10:10 – 11:00 [AESO] / All	
3. Discussions on what will be included in the substation rule 502.11 <ul style="list-style-type: none"> • Station power supply & control building • Bus arrangement • Power transformers • Switchgears 	11:00 – 12:00	All
5. Lunch break	12:00 – 1:00	All
6. Continue discussions on substation rule 502.11	1:00 – 2:50	All
7. Summarize and next meeting	2:50 – 3:00	[AESO]

Station power supply & control building

Currently, all substations have some form of DC power supply. Most substations in Alberta have a control building in the form of either pre-engineered trailer or building.

Should the following be part of 502.11 minimum requirements (Note: WG members may have more items to be included in 502.11)

- (a) For all substations
 - Must have one battery bank
 - Maximum charge time from zero to full for battery charger is 24 (or 12?) hours
 - Minimum discharge time of 8 hours for the batteries
 - Station service power PT should be allowed for 240 kV or below
 - All secondary AC and DC boards must have automatic transfer switch
 - AC boards 1 and 2 must be on opposite sides of the building
 - DC boards 1 and 2 must be located in separate rooms and opposite sides of the building
 - a control building to be constructed in each and every transmission substation
 - all protective replaying panels and cabinets for alternative line equipment must be installed on alternative sides of the aisle/walkway
 - Control building must be with either a floating floor or trenches, or with a basement, and no other forms

(b) For “Type 1” Substations

- Must have dual station service power supplies, one of which being battery
- Minimum discharge time of 12 hours for the batteries or emergency generation
- The sizing of each station service should be 100% of the station load
- sufficient space must be planned and designed for major substations for future expansion, in the first place

Bus Layout

Currently, all substations have some form of DC power supply. Most substations in Alberta have a control building in the form of either pre-engineered trailer or building.

Should the following be part of 502.11 minimum requirements (Note: WG members may have more items to be included in 502.11)

(a) For all substations

- Should we require a disconnect switch for every termination, regardless of line termination or transformer termination?
- Simple bus
 - Under what condition do we require a tie breaker?
- Double breaker, breaker-and-half or breaker-and-third
 - Under what condition do we require 2 breakers, 1.5 breakers and 1.3 breakers?
 - Should breaker-and-half be disallowed in 138 kV connections?
- Ring bus
 - Should we limit the number of terminations to six or less?

(b) For GIS substation

- Do we have any special requirements?

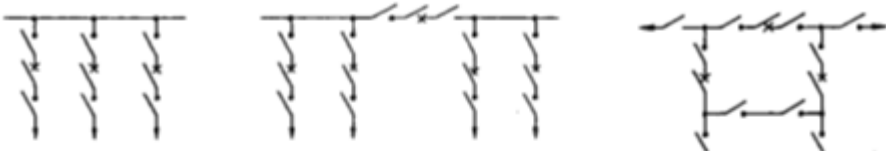
(c) Bus construction and ampacity

- Under what condition do we require rigid bus vs. flexible bus?
- Ampacity determination – should we determine the ampacity of bus and breakers based on “one breaker plus a bus out”

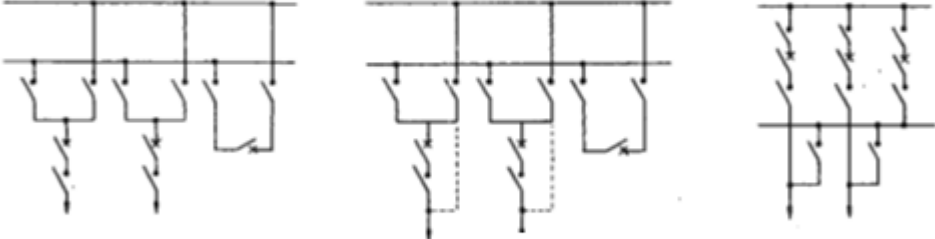
(d) For “Type 1” Substations

- We need to address the extendibility of a substation, where initially design as a simple bus, but will ultimately be a breaker-and-half or other layout. We need to require that the initial layout be such that it can be converted into other layout economically with minimal disruption.

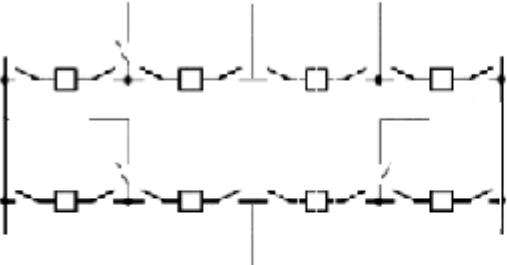
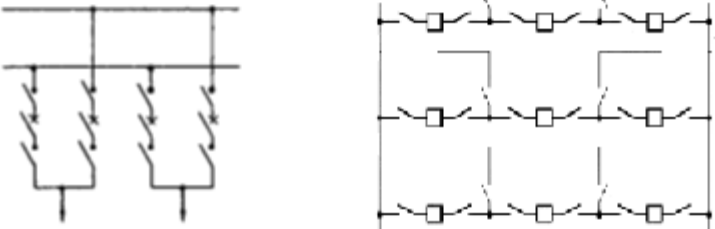
Simple bus



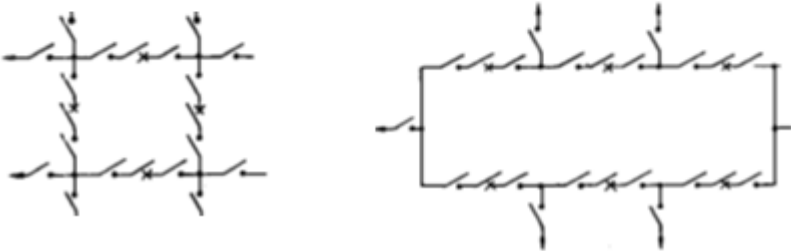
Double bus



Two breaker, 1.5 breakers & 1.3 breakers buses



Ring bus



Power transformers

The following will be discussed:

- (a) Transformer rating – under normal condition and contingencies, overloading capability
- (b) Tap changer – type and range
- (c) Transformer impedance and losses
- (d) Short circuit withstand
- (e) Parallel operation
- (f) Any other points by WG members

Circuit Breakers

The following will be discussed:

- (a) Breaker rating – seasonal ratings, overloading capability
- (b) Drive system – should we exclude certain breakers from the transmission system?
- (c) POW capability
- (d) Single pole tripping and reclosing requirement
- (e) GIS switchgears – How should we allow GIS switchgear to be used?
- (f) Metalclad switchgears
- (g) Any other points by WG members