Transmission Rules/Towers Review Working Group

Meeting Minutes – April 29, 2014

Time: 9:30 am to 3:00 pm

Location: AESO Offices, 2500, 330 5th Ave SW; 25th Floor; Room 2538

Attendance List:

Attended	Name	Company	Email
X	[redacted]	AESO	[redacted]
		AESO	
X		AESO	
		AltaLink	
X		AltaLink	
		EPCOR	
		ENMAX	
		ENMAX	
X		ATCO Electric	
		ATCO Electric	
		ATCO Electric	
		TFCMC	
X		UCA	

CC = via Conference Call

1	**Agenda** • AESO ([redacted]) proposed a revision to the agenda as follows: 2. Review of Needs List, 3. Review of Galloping Reports, 4. [AESO] to update the WG on his presentation to the TFCMC. The WG agreed. • AESO ([redacted]) reiterated that the minutes will need to be clearly documented. AltaLink ([redacted]) made the recommendation for AESO's consideration that any major change should be backed up with a report. UCA ([redacted]) also suggested that the thought processes on the key decisions be documented. ACTION: [AESO] will take this away and propose changes in the next meeting.
2	**Review of Needs List** • Item 56: Update ID on Optimization - The acronym EDC is not an acronym. EDC is part of the name "EDC Associates". For clarity, item 56 declared complete. New action item added for last remaining action for this item (new item # 86) which is that [AESO] will review the ID document in regards to economic parameters to see if it can be further enhanced to highlight the parameters to be used for optimization studies. • Item 64: Review of 240kV 100C Requirement – Scope of work has been provided to the WG. Actual study now needs to be executed. Item declared complete. • Item 66: Transferring revisions to the ID – No update was brought forward. Item carried forward. • Item 68: AESO Regional Plans – AESO ([redacted]) gave an update to the WG. TDC has started the analysis. Regional plans provided by the AESO have been summarized into a spreadsheet with all 240kV additions noted. [AESO] will continue to engage AESO planners to further review the regional plans and determine a course of action to identify how many km's of transmission line and what capacities and implied conductor sizes have been identified in the AESO's regional plans. The due date of this item will be changed to "Ongoing". Item carried forward. • Item 73: Right of Way Width – No update was brought forward by AML. Item carried forward.

2500, 330-5th Avenue SW, Calgary, Alberta T2P 0L4 Phone: 403-539-2450 Fax: 403-539-2949
www.aeso.ca www.poweringalberta.com

	• Item 74: AltaLink's Definition of Waterfowl in regards to removal (or marking) Overhead Shield Wire – No update was brought forward by ATCO ([redacted]), he noted that ATCO's existing criteria were not at odds with the suggested wording. However, he reported the ATCO concern was more with the definition of wetlands than waterfowl and that their internal documents were more distinctive in that area. The WG had further discussion on this topic. AESO ([redacted]) questioned whether the discussion should go in the ID or the rule. After some discussion by the WG, UCA ([redacted]) responded that a pervious learning had taught them that including language in the ID with the intention of providing TFOs with some flexibility does not work, as the ID is not authoritative. Item carried forward to next meeting. • Item 76: Send out Scopes to WG - AESO ([redacted]) provided the scopes to the WG and the WG reviewed them. Item declared complete. • Item 77: AESO to Send Out the Rule and ID with Revisions-to-date – Item carried forward. • Item 78: New Language for Line Optimization and ACSS - No update was brought forward at this time by AML. Item carried forward. • Item 79: Galloping - Action item reworded to say: "AltaLink to have internal discussion with respect to galloping". Item declared complete. • Item 80: Galloping Analysis (with RC, RA, REA ellipse and CIGRE ellipse) – Item was discussed in section 3 below. Item declared complete. • Item 81: Draft Wording to Investigate Operational Experience with Outages Induced by Ice Unloading - No update was brought forward. Item carried forward. • Item 82: Revise ID regarding Shield Wire - Item will be covered in item 77. Item 82 declared complete. • Item 83: Update Section 19 with EPCOR's Proposal - No update was brought forward by AESO. Item carried forward. • Item 84: Propose Wording on Section 21.6 for Exemption of Insulator Strength on Slack Spans - No update was brought forward by AESO. Item carried forward.
3	**Review of Galloping Reports** [AESO] ([redacted]) presented draft reports on the galloping investigation (item 80) and highlighted the following findings: **Existing Towers – Is the AESO's Galloping Requirement a Governing Factor?** o Most aspects of the RA, RB, and RC tower heads are governed by operational and electrical clearance considerations. Galloping only affects the middle arm length (and, by shielding association, the length of the OHSW arm). o The RA and RB series towers exceed galloping clearance requirements of the AESO 502.2 requirements currently in place. Middle arm could be shortened by approximately 1m on both RA and RB towers and still meet 502.2 galloping requirements. The RC tower is marginally deficient, although the deficiency is very small and of little practical consequence. o REA galloping criteria were not met by any of the R series towers. o Cigre galloping criteria were not met by any of the R series towers for the case of maximum span. RA and RB towers met Cigre criteria when used with average span. RC towers could not meet Cigre galloping criteria. **How Extensive is Galloping in Alberta?** o Reviewed first map in the report showing outage events directly attributed to galloping from information taken out of morning reports from 2006 to 2014. Very few events were specifically attributed to galloping. o The second map was reviewed. It included outages whose cause was not specifically identified as galloping, but events which were:

	▪ At the right time of year ▪ Attributed to Ice, Snow, or Weather These points showed a clear prevalence to occurrences from Calgary East to the Saskatchewan boundary. However, it also showed occurrences as far North as Ft. McMurray. o Discussion of the report by the committee took place. If galloping was to be removed from the requirements, what would take its place? [AESO] noted that [AESO] did a SAPS analysis on a theoretical 30-span model to determine the effect of ice unloading at one span in the middle. In this case, the lower phase would actually rise to a steady state location 1m above the middle phase. General consensus was that some horizontal offset is necessary. o Suggestion made that minimum horizontal should include phase-to-phase air gap including switching surge and overvoltage; also some allowance for differential movement. [UCA] noted that this condition could persist for a week or more based on past experience. o Action: [AESO] was requested to put together a proposal for additional work to investigate recommended minimum spacing for ice unloading to compare to the existing galloping criteria, rough estimation of tower weight saving if arm length could be reduced accordingly (with the removal of galloping criterion but allowance for ice shedding) and inclusion of RD tower in analysis. Estimation of tower weight saving with shorter arms was to be done carefully to avoid inappropriate credit for re-optimizing the tower. o Action: [AESO] to review report to consider organizing tower costing around: ▪ Zone C: Shorten arm to differential ice spacing ▪ Zone A, B: Shorten arm to a) AESO 502.2 spacing for galloping b) Differential ice spacing o Action: [AESO] was to provide [AESO] with RD tower drawings and tower model. o Discussion of the galloping maps proceeded. Consensus was that there was a clear prevalence from Calgary East to the Saskatchewan boundary. It was also noted that there were some incidents as far North as Ft. McMurray. o ATCO ([redacted]) explained that, due to the remote location of much of the ATCO system, clear identification of outage causes is virtually impossible. o AESO ([redacted]) observed that the map would not account for the galloping mitigation measures undertaken by AltaLink and that, without them, the galloping frequency East of Calgary would likely show much worse than it already does. Also noted that outage records exist back to the early 90's and further review of this info might provide additional insight. Consensus of group was to wait until cost saving analysis of the towers was done; might not be worth doing. o Some discussion of using either an HW tower or L tower as a starting point for weight saving comparison rather than R series towers. After a general discussion, it was concluded that there would not be a fair comparison; these other towers are not designed for the electrical and operational clearances of the R series towers. Comparing apples and oranges, etc.
4	Presentation to the TFCMC • AESO ([redacted]) shared with the WG his presentation to TFCMC. The WG had no specific comments or concerns.
5	Other Items: • ACTION: AESO ([redacted]) to schedule the next meeting 3 weeks from today. The WG advised of dates they will be away that should be avoided.