Transmission Rules/Towers Review Working Group

Meeting Minutes – September 3, 2014

Time: 9:30 am to 3:00 pm

Location: AESO Offices, 240 4th Ave SW, 6th Floor, Main Boardroom or via Conference Call

Attendance List:

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

CC = via Conference Call

1	Review of Needs List • Item 68: AESO Regional Plans - Item should have been marked complete at the last meeting. Item declared complete. • Item 73: Right of Way Width - Item is being addressed in item 103. For clarity, item 73 marked complete. • Item 86: Addition of Economic Parameters in the ID - AESO ([redacted]) has put the last sentence back in the ID. The WG agreed that the word "lattice" should be added to the sentence for clarity. [AESO] will add the word lattice. Item declared complete. • Item 87: Proposal for Investigation Minimum Spacing for Ice Unloading - AESO ([redacted]) has received RD tower information and has also received feedback from TFOs. Item declared complete. • Item 89: RD Tower Drawings - AESO ([redacted]) has given [AESO] the requested information. Item declared complete. • Item 92: ATCO to propose revisions to rule with regard to the use of lightning arrestors when unable to use overhead shield wires – ATCO ([redacted]) sent out his proposed revisions to the WG. The WG had further discussion on this topic. ATCO ([redacted]) will propose new language based on the WG's discussions at the next meeting. Item carried forward. Extensive discussion of this issue included: ▪ ATCO's currently proposed revision is very open – opinion expressed that, as worded, it would not require any provision for lightning protection in its current form. ▪ Intent: shield wire is default; proposed revision to provide an option in special circumstances where shield wire is not a good solution (ie: wetlands where avian mortality is possible issue; slackspans to substations; corners; line crossings; etc.). ▪ Possible limitations: limit number of spans to four; provide examples in ID document of where this is appropriate. Should address vast majority of exceptions. ▪ TFOs can always gain an exception to the use of shield wire by requesting exemption from

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AESO if some other protection scheme (ie: lightning arrestors) is preferred.

- Item 93: Regarding Line Optimization - AESO ([redacted]) gave an update to the WG that he will be engaging the AESO Cost Allocation Committee. Item carried forward.
- Item 95: Request to TFOs to investigate operational experience with outages induced by ice unloading on transmission lines – AESO ([redacted]) received some responses from the WG members. General consensus achieved - it should be given consideration in the design of towers if galloping considerations are removed since there have been a number of known events where ice unloading has occurred. Item 95 declared complete.
- Item 96: Wording for section 21.6 (exemption of insulator strength on slackspans) – AESO ([redacted]) sent out proposed rewording of this section but hasn't yet received any feedback. [AESO] will email a reminder to the WG. Item is declared complete.
- Item 97: Documentation and Minutes – AESO ([redacted]) hasn't received any comments thus far.
- Item 99: Galloping Outages – AltaLink ([redacted]) let the WG know that there is still ongoing internal discussion. Item carried forward.
- Item 102: AESO Regional Plans – The information requested was provided. Item declared complete.
- Item 103: Right of Way Standards – ATCO and AltaLink are still discussing this item internally. AESO ([redacted]) requested that ATCO and AltaLink bring forward suggested updates at the next meeting. Item carried forward. ACTION: AESO ([redacted]) will also propose new language in the ID recognizing unique situations where full swing may not be reasonable (long river crossings, etc.) for the next meeting.
- Item 104: FTP Access – AESO ([redacted]) has sent out instructions on accessing the TR/TR working group FTP site. Some WG members are experiencing difficulty in accessing due to internal IT policies but are working to resolve the issues. Anyone who is ultimately unable to get access can contact [AESO] for assistance or alternate delivery of information.
- Item 105: Loading Cost Comparison Draft Report – AESO ([redacted]) received comments from UCA ([redacted]) but has not received any comments from any other WG members thus far.

  Extensive committee discussion of the draft report included:

  - Observation that single pole 138kV on road allowance may be more common than H-frame; should be included in report.
  - Alternatives are available if heavy H-class poles are not:
    - Suggest switch to tubular steel construction.
    - Shorten spans (cost impact – more structures).
    - Truss top configurations would allow lighter poles.
  - AltaLink ([redacted]) noted that H-class poles may be more available than widely thought based on recent conversations with major wood pole supplier.
  - AESO 502.2 does not exempt tubular steel from failure containment loadings but does exempt wood subject to analysis checks (clause 10(8)). Suggestion that the exemption should apply to pole structures (steel or wood) or be expanded to direct embedded structures.
  - Observed that in recent projects, tubular steel cost was not as sensitive to gradation as wood poles; for example, little difference in cost between a class H4 and H7 pole as tubular steel costs are more driven by fabrication costs than raw material costs.
  - If pushed to caissons the foundation costs far outweigh tubular steel costs; Enmax ([redacted]) noted that tubular steel can be direct embedded even for deadends and angles if done to sufficient depth. Caissons may be over-used.

  ACTION: [AESO] to formulate a change order for addition of single pole 138kV to the study. ACTION: [AESO] will revise report based upon addition of single pole and on the WG's discussion on sequence of failure. Will have it out 1 week before next meeting. ACTION: [AESO] will send out a clean copy of revised rules to the WG members. ACTION: [AESO] will formulate a separate action item in the Project

	Needs List for each of the four approved studies. • Item 106: AESO ([redacted]) will respond to [CCA]'s request to attend a meeting with the TR/TR Working Group. Will be collaborative meeting, identify areas for review. Will require topics in advance so TFOs can bring to the meeting personnel deemed appropriate. Guest attendees to be limited to members of the Cost Monitoring Group. Guest attendees must declare who they are representing prior to attendance and their desired outcomes for the meeting. ACTION: AESO ([redacted]) will arrange a mutually acceptable date with [CCA]. Prefer sometime in Sept. UCA ([redacted]) will advise [AESO] of his availability. AESO ([redacted]) will attempt to obtain and distribute discussion topics next week.
2	Update on Studies • S2: Loading Cost Comparison Draft Report – Discussed under Needs List Item 105. • S1: Galloping Cost Impact Report – AESO ([redacted]) gave an update on this report to the WG. ACTION: [AESO] will make updates to the report based on the WG's discussion. He will keep the report as a draft until the WG has a final review. Discussion points were: ▪ Several internal references were incorrect and needed updating ▪ Executive Summary needed updating ▪ Discussion on what governed length of middle arm on RA and RB towers; AltaLink ([redacted]) observed that an earlier version of the tower design criteria specified CIGRE galloping. This was consistent with [AESO]'s recollections. No changes required of report (speculation). ▪ UCA ([redacted]) requested weight savings (kg) be included, not just % ▪ AESO ([redacted]) requested TFO representatives to review the air gap calculations in Appendix C as they contain a number of assumptions which could be challenged. UCA ([redacted]) suggested that air gaps should be standardized into 502.2 since this is an issue of concern for many designers; many interpretations being used, particularly for phase-to-phase. ▪ Description of the conventions used in sketches of Appendix A, ie: what do the circles and lines signify – not clear to persons unfamiliar with tower conceptual design. • S3: 240kV Conductor Sizing Report – AESO ([redacted]) has not yet progressed with this planning study as he has focused more on other 2 reports. The delivery date for this report has been pushed back. Progress to date: AESO Planning has provided a listing of short, medium, and long term developments. These have been reviewed to select 5 projects, short or medium term, with sufficient length to justify tower development if they use a smaller conductor configuration than those chosen for the R-series tower development. Planners have provided load flows for these projects. [AESO] noted that his understanding of the scope of the study may not be consistent with the scope now envisioned by AESO ([redacted]). ACTION: [AESO] will contact [AESO] to review the scope. ACTION: [AESO] and [AESO] will bring a summary on the 5 selected line projects for analysis to the next meeting. • S4: Phase 1, Optimized Conductor – AESO ([redacted]) has not yet started this as it is dependent on the conductor selection of S3.
	Other Items Discussed • ACTION: AESO ([redacted]) to schedule the next meeting 4 weeks from today. [AESO] will also schedule 1 meeting per month until December.