

**Location:** Room 2509

**Time:** 10:00 am – 12:10 pm

Attendees	
Industry Participants	AESO
ATCO Electric (“ATCO”): <ul style="list-style-type: none"> <li>• [REDACTED] (via teleconference)</li> </ul> AltaLink Management Ltd. (“AltaLink”) <ul style="list-style-type: none"> <li>• [REDACTED]</li> <li>• [REDACTED]</li> </ul> ENMAX <ul style="list-style-type: none"> <li>• [REDACTED] (via teleconference)</li> </ul> EPCOR <ul style="list-style-type: none"> <li>• [REDACTED] (via teleconference)</li> </ul> Independent Consultant <ul style="list-style-type: none"> <li>• [REDACTED] (via teleconference)</li> </ul>	[AESO] – Chair [AESO] – AESO Consultant

#### Agenda Item A: Call to Order and Introductions

- The Chair called the meeting to order at 9:30am and called for introductions.
- Purpose of the meeting was a final Technical Working Group (TWG) meeting to review of the most current draft of the Section 502.2 Bulk Transmission Line Technical Requirements (Rules). The Information Document, Bulk Transmission Technical Requirements (ID) was not proposed for review during this meeting.
- Discussed the “technical” and “administrative” drafts for the Rules. The “technical” draft document contained only the changes to clauses proposed by the TWG. The “administrative” document contained those changes in the “technical” document plus numerous changes requested by the AESO for administrative or legal reasons to other sections. The TWG agreed to focus on the “technical” document.
- As a process for the meeting, the TWG agreed to step through the “technical” document, focusing on those clauses most impacted by changes. Some had been re-worded significantly since the last TWG meeting in November 2017.

#### Agenda Item B: Section 502.2 Review

The Chair walked the group through the changes to the Rules document and the rationale behind the changes (copy of Rules attached). The following captures discussion on each of the changed clauses:

##### 1. Section 5, Other Code Requirements

**AESO:** Chair was advised by the AESO legal representatives that many of the listed documents were already legally required by legislation and, to avoid a “double jeopardy” situation they should be moved to the ID document. Chair noted that, although this was more of an administrative change, it was potentially significant and wished to have this discussed by the TWG. Sub clauses (d) and (e) were retained since it was not clear that there was a legal requirement for them elsewhere.

**Independent Consultant:** Believes there may be a legal requirement for item (e) “Obstruction Marking” standard, but it is likely deeply buried in other legislation.

TWG consensus was that it is probably best to include it for clarity if legal requirements are not clearly defined and communicated elsewhere.

**No further discussion.**

2. Section 10, Failure Containment Loading

**AltaLink:** Reference to “transverse face” in clause 10(6) might be misinterpreted; requested TWG consideration for clarity.

**ATCO:** Although technically correct, it was possible that the wording could result in confusion. Could be clarified with a diagram in the ID document.

**Action Item:** The AESO will include a diagram in the ID clarifying the terms “transverse face” and “longitudinal face”.

**No Further Discussion.**

3. Section 11, Load and Strength Factors for Reliability Based Loadings

**AESO:** Re-titled section 11 and its contents to remove references to “overload factors” and replaced them with “load factors”.

**AltaLink:** Fully supports this change; the reference to overload factors is no longer used.

**No Further Discussion.**

4. Section 12, Conductor Selection

**AltaLink:** A few references to ACSR rather than the fully expanded definition, aluminum conductor steel reinforced, were noted.

**AltaLink:** Also noted that clauses 12(1)(a) and 12(1)(b) are virtually identical to 12(3) and 12(4).

**Action Item:** The AESO will review section 12 to remove ACSR abbreviations and to remove the redundancy noted by AltaLink.

**AltaLink:** Expressed concern with clause 12(1)(f) in that early optimization studies would have to contain many assumptions; ultimately the line optimization must incorporate many parameters other than economic factors. Examples include landowner concerns, even geotechnical conditions.

**AESO:** The AESO accepts that many parameters are unknown at such a preliminary stage of a major transmission project but considers the early optimization a means to establish a benchmark which can be compared to subsequent changes. Importantly, it also provides early indication of the need to develop a new tower or transmission structure type so that the facility owner is not compelled to use sub-optimal towers (for example) due to late identification of the need for a new design which can no longer be achieved due to project timelines.

No Further Discussion.

5. Section 13, Sequence of Failure

**AltaLink:** Subsection 13(6) exempts latticed steel towers from the requirement to design foundations to be stronger than the tower rather than actual line usage. Why so specific, should this exemption also include tubular steel poles?

**AESO:** Tubular steel poles are not usually pre-designed in families because their design has been automated to the extent that design cost for custom structures is very small relative to their material cost. As a result, angle and dead-end structures are usually custom designed for their specific usage so there should be no need for such an exemption in this case.

**AltaLink:** Although this is not common, there have been times where families have been pre-designed for special cases.

**AESO:** In such an unusual case, there is provision under 3(2) of the Rules for the facility owner to request an exemption and this should be easy to justify in this case.

**TWG General Consensus:** Can be dealt with by exception under 3(2).

6. Section 14, Overhead Shieldwires

**AESO:** Reviewed changes allowing removal of shield wires in certain cases. TWG was asked if any concerns.

No concerns were presented by the TWG.

No Further Discussion.

7. Section 15, Aeolian Vibration Control

**Independent Consultant:** Notes that tension limits are specified for conductors, but nothing is specified for shield wires. Should this be added?

**AESO Consultant:** Alberta experience has been satisfactory using the same limits as for conductor. Galvanized steel has greater tolerance to vibration (less subject to fatigue) than aluminum conductor.

**AltaLink:** The CSA C22.3 No 1 contains reduced tensions for galvanized steel shield wire under every-day loading. Not sure how this would affect specified limits.

**Action Item:** The Independent Consultant and AESO Consultant will investigate CSA requirements and will propose tension limits for shield wire for addition in Section 15.

**AltaLink:** Subclause 15(6) refers to standard ACSR but does not specifically refer to ACSR/TW. Should it have the same limits. AltaLink is aware of a recent publication on the behavior of trapezoidal stranding under aeolian vibration.

**Action Item:** AltaLink and the AESO Consultant will investigate the recent research publication and propose tension limits for ACSR/TW as well (or accept regular ACSR tension limits for both) and revise 15(6) accordingly.

No Further Discussion.

#### 8. Section 17, Basic Design Clearances

**ATCO:** Subsections 17(2)(a) and (b) refer to ACSS but do not refer to ACSR/TW. Shouldn't this also be exempted from the 100°C provision?

**Action Item:** AESO agrees; will update 17(2) accordingly.

**ATCO:** Subsection 17(8) appears to have redundant language.

**Action Item:** AESO will investigate and update 17(8) as required to remove redundancy.

No Further Discussion.

#### 9. Section 19, Clearances to Edge of Right of Way

**AESO:** Section 19 has been largely re-written from the original Rules. While no comments have been received, the AESO wanted to review with the TWG to ensure consensus.

**TWG:** General consensus that this revised section is good, no further revision required.

No Further Discussion.

#### 10. Section 22, Conductor Static Thermal Ratings Methodology

**EPCOR:** Questions the use of 100°C temperature limit for static rating when most manufacturers will say that annealing of the aluminum can occur anywhere above 75°C and this could result in loss of conductor strength.

**AltaLink:** The 100°C temperature limit is a common standard used for line rating. Lines are not operated at their maximum capacity for long periods. It would take a very long time at temperatures under 100°C to result in any significant loss of strength.

**Independent Consultant:** Hydro One, for example, permits operation of their lines for short periods up to 150°C for a limited number of hours over their lifetime. Annealing is a cumulative phenomenon.

**TWG:** No further concerns or objections expressed, no revision required.

No Further Discussion

#### 11. Section 23, Conductor Emergency Thermal Ratings Methodology

**AESO:** Subsection 23(1) has been updated to replace the 30-minute time period with a 10-minute time period. While no comments have been received, the AESO wanted to review with the TWG to ensure consensus.

**TWG:** No concerns or objections expressed, no further revision required.

No Further Discussion

#### 12. Section 25, Hardware Requirements

**Independent Consultant:** The wording of section 25(1) “...conductor and shield wire attachment hardware...” seems to imply that charpy requirements would not apply to hardware at the cold end of the string, normally referred to as “insulator hardware”. Also, is this intended to apply to guy hardware?

**AESO:** It was intended to apply to insulator hardware as defined by the Independent Consultant as well as conductor or shield wire attachment hardware. As currently written, it does not apply to guy hardware.

**TWG Recommendation:** Section 25(1) needs clarification.

**Action Item:** AESO will clarify wording of 25(1) to include insulator attachment hardware. AESO will follow up with TWG representatives to determine if this should also apply to guying hardware.

#### 13. Appendix 1:

AltaLink: Spelling error “envelope”.

**Action Item:** AESO will fix spelling error.

#### 14. General:

**AltaLink:** Requested TWG members be updated when the Rules are issued for consultation.

**Action Item:** AESO will arrange one further meeting of the TWG to review changes to the Information Document once the Rules are finalized. AESO will also issue an update to the TWG members when the Rules document is issued for consultation.

**No Further Discussion.**

Meeting adjourned at 12:10 pm