Section 502.2 of the ISO Rules, *Bulk Transmission Line Technical Requirements*
Technical Work Group Review
November 22, 2017 Meeting Minutes

Location: AESO offices
Room 2538

Time: 9:30 am – 3:00 pm

Attendees	
Industry Participants	**AESO**
[redacted] – ATCO Electric Ltd.	[redacted] AESO – Chair
[redacted] (via teleconference) – ATCO Electric Ltd.	[redacted] AESO – Consultant
[redacted] – AltaLink Management Ltd.	[redacted] AESO – Regulatory Analyst
[redacted] – AltaLink Management Ltd.	
[redacted] – ENMAX Energy Corporation	
[redacted] (via teleconference) – EPCOR Distribution & Transmission Inc.	
[redacted] (via teleconference) – Independent Consultant	

Agenda Item A: Call to Order and Introductions

- The Chair called the meeting to order at 9:30 am and called for introductions.
- Purpose of the final technical work group (TWG) meeting was to review of the most current draft of the Section 502.2 of the ISO rules, *Bulk Transmission Line Technical Requirements* (Section 502.2) and the draft Information Document (Information Document).
- The group discussed the process to be used to review the latest draft Rule and Information Document. The TWG elected to step through draft Section 502.2 first, item by item, followed by the Information Document.
- The group briefly discussed the anticipated process which will follow after the last TWG meeting. The Chair informed the group that the next steps are a formal industry consultation followed by a submission to the AUC for approval.

Agenda Item B: Rule Review

- The Chair walked the group through a "Summary of Key Amendments" matrix ("Matrix") which summarized changes to the draft Section 502.2 document and the rationale behind the changes (copy provided as an attachment to these meeting minutes). The following captures discussion on each of the matrix items:

1. Subsections 1 through 3 [Applicability, Bulk Transmission Lines with Functional Specifications issued prior to January 1, 2012, and Bulk Transmission Lines with Functional Specifications issued between January 1, 2012 and the Effective Date]:

    - No concerns were noted by the TWG.

2. Subsection 4 [Bulk Transmission Lines with Functional Specifications issued on or after the Effective Date]

    AltaLink: Will functional specifications for projects already in the queue be revised to include the new version of Section 502.2 as this could lead to increased project costs..

    ATCO: Other ISO rules require changes to be made retroactively.

    AESO Response: It is not the intent of the draft Section 502.2 to require changes to projects currently in progress and incomplete after issue of the Functional Specification. This could add prohibitive cost to many projects. AESO Rules which have retroactive requirements only apply

where such changes are critical for system coordination (protection, etc.) and where the cost impacts are much lower. The AESO will inform the MP when revisions are made to functional specifications; however, it is the MP's responsibility to review revised functional specifications.

No Further Discussion.

3. Subsection 5 [Project Design, Construct and Operate Any Extension, Tap or Addition to Any Bulk Transmission Line]:

   AltaLink: AltaLink continues to support a change to this subsection for short additions to increase flexibility. AltaLink would prefer a percentage in subsection 5(a) and (b) instead of 1,500 meters. Rather than placing a 1.5 km limiting length before the draft Section 502.2 applies, this should be a percentage of the length of the existing facility.

   AESO Response: The AESO position is that exposure to risk increases with absolute length, not percentage of original line length. The AESO does not support this proposed change to the draft Section 502.2. If there are specific projects of concern, the facility owner has the ability to request an exemption and present their case for it. The AESO observed that, to date, the number of requests for such an exemption have been minimal, and is prepared to continue with the existing process.

   No Further Discussion.

4. Subsections 6, 7 and 8 [Amendments to Functional Specification or Issuance of a New Functional Specification by the ISO, Functional Specification, and Successor to Prior Requirements]

   AESO: The only changes to these sections since the previous version of draft Section 502.2 were minor wording changes to increase clarity.

   No comments have been received from the TWG members. TWG representatives were invited to table any new comments. No comments were made at this time.

   No Further Discussion.

5. Subsection 9 [Other Code Requirements]

   Independent Consultant: Suggested that subsection 9(2) be amended to include the terminology "more stringent of" when referring to conflicts between the *Alberta Electric Utility Code* (AEUC) and the draft Section 502.2.

   TWG: Consensus that "more stringent" should govern.

   Action Item: The AESO will revise subsection 9(2) to ensure the "more stringent of" will apply in the case of conflict.

6. Subsection 10 [Weather Loading Return Periods]

   AESO: Subsection 6(4) in existing Section 502.2, is redundant in view of the content of subsection 7(2) of the draft Section 502.2. As such, the content of existing subsection 6(4) has been removed. The legal owner may specify exclusions from specific subsections in creation of the functional specification, subject to AESO approval.

   No concerns were raised by the TWG.

   No Further Discussion.

7. Subsections 11 through 13 [Weather Loading for Wind, Weather Loading for Wet Snow and Wind, and Weather Loading for Vertical Loading Alone]

   AESO: Changes to subsections 11 through 13 are considered minor, to remove unnecessary wording and to promote clarity.

The TWG was asked if they had any concerns with the revised subsections. No concerns were tabled.

No Further Discussion.

8. Subsection 14 [Failure Containment Loading]

   AESO: The content of subsection 14 was previously found in subsection 10 in existing Section 502.2. With draft additions to subsection 14(2) the content of existing subsection 10(4) is redundant and was not carried forward into the draft Section 502.2.

   The TWG was asked if they had any concerns with these changes. No concerns were raised.

   No Further Discussion.

9. Subsection 15 [Overload and Strength Factors for Reliability Based Loadings]

   ATCO: Some additional clarity may be needed in subsection 15(4). For example, what happens if the coefficient of variance (COV) is less than 10%? Does the material then default to wood pole strength factors? This is not clear in the subsection.

   AltaLink: Perhaps reference CSA/IEC calculation methods for strength factor based upon experimental COV.

   AESO: For purposes of draft Section 502.2, the AESO would prefer defaulting to the wood strength factor so that the onus is placed on the manufacturer and legal owner to make a case for a more favorable strength factor based on testing results and quality control systems.

   TWG Recommendation: Default to wood strength factor is a good approach; legal owner can make the case for higher values.

   Action Item: The AESO will revise subsection 15(2) to specifically state that, if the COV is less than 10%, then the wood strength factor will apply.

10. Subsection 16 [Conductor Selection]

    AltaLink: What is the expectation of the AESO on follow-up as specifics of the project change? Throughout the regulatory and siting process, changes are made which will sub-optimize conductors selected on some criteria which have changed as the project evolves.

    ATCO: Has been experiencing resistance from AESO project managers when opting for lower capital cost conductor alternatives when the difference in optimization results are very small; applying the rule absolutely without due regard for the accuracy of the analysis.

    AltaLink: What level of review is meant subsection 16(1)(g)? Does this require a meeting to discuss the results?

    AESO: The AESO recognizes that projects evolve through time and that a conductor which was thought to be optimal in the early stages may be found sub-optimized by subsequent commitments made during the regulatory process. The intent of subsection 16 is to ensure that the project is at least starting with an optimal conductor. Subsequent project changes may justify changes to the conductor, but the legal owner should be able to document and justify this change.

    One concern which the AESO is attempting to address with subsection 16 is the incentive for market participants to install conductors based on lowest initial capital cost, disregarding longer term losses which are then imposed on the rate payer or facility operator.

    A meeting or conference call with the AESO would be an efficient method for the facility owner to meet the requirements of 16(1)(g).

TWG Recommendation: No recommendations.

No Further Discussion.

11. Subsection 17 [Sequence of Failure]

    AltaLink: This remains one of the more contentious sections of Section 502.2. It makes more sense as a philosophy to try to achieve but not a "must achieve".

    ATCO: Raised similar concerns as AltaLink.

    EPCOR: Notes that the phrase "target sequence of failure" in the existing Section 502.2 have been replaced with "must be designed to fail in the following sequential order…" in the draft Section 502.2.

    Independent Consultant: Sequence of failure is a common design consideration in many other jurisdictions, including both Canadian and European.

    AESO: Most new revisions to subsection 17 were made in order to provide exceptions to the sequence of failure requirement. The AESO acknowledges that there may be instances where the imperative requirement is not practical, or possible, to achieve.

    TWG Recommendation: Resolution of the industry concerns with subsection 17 are unlikely to be resolved in the TWG. Recommendation was to table discussion on subsection 17. Concerns or feedback will be submitted in the formal consultation process.

12. Subsection 18 [Overhead Shield Wires]

    TWG: General discussion was had by the TWG, but no major concerns or changes were proposed.

    No Further Discussion.

13. Subsections 19 and 20 [Aeolian Vibration Control and Voltage Values for Electrical Clearance]

    AESO: Revisions to subsections 19 and 20 were considered minor to remove unnecessary wording and to promote clarity.

    The TWG was asked if they had any concerns with these changes. No concerns were raised.

    No Further Discussion.

14. Subsection 21 [Basic Design Clearances]

    ATCO: Noted that at 138 kV the draft Section 502.2 does not permit optimized design for loads as it must be designed to 100 deg. C. Why is this?

    AESO Response: Based on a report by [AESO], the TWG found that there were instances where the 100 deg C requirement could sub-optimize conductors on 240 kV lines. Accordingly, the exemption from the 100 deg C requirement was extended from just 500 kV to include 240 kV in the draft Section 502.2. But little benefit was seen in extending it to line construction primarily composed of wood poles at 138kV. There may be instances where an exemption should be considered on a specific project. In these events, the legal owner should consider applying for such an exemption from the AESO.

    TWG Recommendation: No recommendations.

    No Further Discussion.

15. Subsections 22 to 25 [Clearance Under Differential Loading, Clearances to Edge of Right of Way, Fall Free Spacing and Insulators]

AESO: Changes to subsections 22-25 were considered minor, to remove unnecessary wording and to promote clarity. Subsection 23 had more extensive changes, but these were accepted by the TWG.

The TWG was asked if they had any concerns with the revised subsections. No concerns were raised.

No Further Discussion.

16. Subsection 26 [Static Thermal Ratings Methodology]

    ATCO: There are many common approaches and standards that use values for solar absorption and emissivity which differ from those in the draft Section 502.2. Perhaps consideration should be given to revising the values.

    AESO Response: Agreed that there are many variations on these values in common use. As such, the AESO felt it necessary to standardize the approach and chose values currently used by Alberta utilities.

    ATCO: Acknowledged that the small changes considered to these parameters would really make very little difference to the result.

    TWG Recommendation: No recommendations.

    No further discussion, no changes proposed.

17. Subsection 27 [Conductor Emergency Thermal Ratings Methodology]

    AESO: Changes to subsection 27 were made to align with the new Alberta Reliability Standard FAC-008-AB-3, *Facility Ratings*.

    The TWG was asked if they had any concerns with the revised subsection. No concerns were raised.

    No Further Discussion.

18. Subsection 28 [Galloping]

    AESO: Minor changes to wording for clarification.

    TWG: Comments and feedback on subsection 28 would most likely be submitted through the formal consultation process.

    No Further Discussion.

19. Subsection 29 [Subsection 29, Hardware Requirements]

    ATCO: Energy absorption should not be limited to conductor attachment. Recommendation was made to include overhead shield wire attachment systems.

    TWG Recommendation: Addition of "…and shield wire" after the word "conductor" into subsection 29(2).

    Action Item: The AESO to revise subsection 29(2) to include shield wire hardware in the energy absorption requirement.

20. Subsection 30 [Provisions for Maintenance]

    AESO: Minor changes to wording for clarification.

    The TWG was asked if they had any concerns with the revised subsection. No concerns were tabled.

    No Further Discussion.

Agenda Item C: ID 2010-005R Review

Upon completion of the review of the Rules document, the TWG opted to step through the draft Information Document (ID). This review follows as designated by section:

Section 11 – Wind Loading

Open terrain and wind flow was discussed. Ultimately, no changes were proposed.

TWG Recommendation: no change.

Section 14 – Failure Containment Loading

TWG Recommendation: To remove reference to -30 deg C if it is not common practice in Alberta

ATCO: Last paragraph in Section 14 of the draft ID retains reference to "wood structure". The draft Section 502.2 was revised to reference "direct embedded pole structures". The draft ID required updating to align with Section 502.2.

TWG Recommendation: AESO to check wording in the draft Section 502.2 and update the ID.

Action Item: The AESO will revise wording in the draft ID as needed.

Section 15 – Load and Strength Factors for Reliability Based Loading

ATCO: Paragraph 5, starting "As an alternative…" is redundant and does not enhance clarity. Suggest removal.

TWG Recommendation: After review, the TWG agreed with this assessment and recommended removal of paragraph 5 in Section 15 of the draft ID.

Action Item: The AESO will remove paragraph 5 in Section 15 of the draft ID beginning with "As an alternative…".

ATCO: Discussed the value of the section on Construction and Maintenance Loads contained in the existing ID but not transferred into the draft ID. . The content of this section is commonly quoted to designers and external parties to clarify the intent of subsection 15 in the existing Section 502.2.

EPCOR: Agrees fully with ATCO.

TWG Recommendation: AESO to incorporate content on Construction and Maintenance Loads into the draft ID.

Action Item: The AESO to take the recommendation back for discussion.

Section 16 – Conductor Selection

AltaLink: The content in the paragraph of the existing ID containing, "…the risk associated with the wrong guess…" is very helpful and instructive. It was recommended this content be included in the draft ID.

TWG Recommendation: After review, the TWG agreed with this assessment and recommended content of this paragraph be included in the draft ID.

Action Item: The AESO to take the recommendation, to incorporate the paragraph 6 of Section 16 in the existing ID, back for discussion.

Sections 17 to 19 – Sequence of Failure, Overhead Shieldwires and Aeolian Vibration Control

TWG: Reviewed and discussed at some length. Ultimately, no changes were proposed.

TWG Recommendation: No change.

Section 21 – Basic Design Clearances

ATCO: Aside from the published Alberta Transportation map of high load corridors, it is recommended that the facility owner should also consult directly with Alberta Transportation as there are often designated zones or planned future high load corridors not illustrated on the published Alberta Transportation map.

TWG Recommendation: Include wording in Section 21 of the draft ID recommending consultation with Alberta Transportation.

Action Item: The AESO will take the recommendation back and incorporate wording around consultation with Alberta Transportation.

Sections 22 and 23 – Clearances Under Differential Loading and Clearances to Edge of Right of Way

TWG: The TWG reviewed content and no concerns were raised.

TWG Recommendation: No change.

Section 24 – Fall Free Spacing

ATCO: Fall free spacing does not discuss transmission line crossings. Is this a concern to the TWG?

TWG Recommendation: After discussion, the TWG recommended this section should be left as-is. The section was intended to deal with line parallels, not with transmission line crossings.

Sections 25 to 27 – Insulators, Conductor Static Thermal Ratings Methodology and Conductor Emergency Thermal Ratings Methodology

TWG: The TWG reviewed content and no concerns were raised.

TWG Recommendation: no recommendations for change.

Section 28 – Galloping

ATCO: Figure 2 in the draft ID is “fuzzy” and difficult to read, can a better figure be produced for inclusion in the ID?

AESO Response: This chart was obtained from a report by Dr. Havard, not created independently. However, the AESO we look at reproducing it.

Action Item: The AESO to reproduce Figure 2 to improve quality.

Sections 29 and 30 – Hardware Requirements and Provisions for Maintenance

TWG: The TWG reviewed content. There was some discussion however, no major concerns were raised.

TWG Recommendation: No change.

Other Important Considerations

ATCO: The section on transposition structures specifies voltage unbalance to be less than 1% of the nominal voltage. Is this still current? Is the AESO still reviewing this?

AESO Response: Not clear on the status of the investigation.

Action Item: The AESO will inquire as to the status of the AESO investigation and determine if 1% imbalance remains current.

Other Discussion

ATCO: Aside from Figure 2 in the draft ID, the figures in the Appendix of the draft Section 502.2 are also poor quality. What can be done to improve these?

TWG Recommendation: Find a way to improve quality of drawings.

Action Item: AESO will investigate to determine if the original sketches can be obtained and, if not, whether the figures can be reproduced.

Meeting adjourned at 2:35 pm