September 10, 2019

To: Market Surveillance Administrator, Market Participants and Other Interested Parties ("Stakeholders")

Re: Stakeholder Comments on Letter for Feedback on the Requirements of the Proposed New Section 502.17 of the ISO Rules, *Voice Communication System Requirements* ("Section 502.17")

Pursuant to Section 5.2 of Alberta Utilities Commission Rule 017, *Procedures and Process for Development of ISO Rules and Filing of ISO Rules with the Alberta Utilities Commission*, written comments received from Stakeholders in response to the Alberta Electric System Operator's ("AESO") July 25, 2019 Letter of Notice for Feedback on the Requirements of the Proposed New Section 502.17 have been posted on the AESO website.

The following table is hyperlinked to provide assistance in directing Stakeholders to these written comments.

Section 502.17
AltaLink Management Ltd.
ATCO Electric Ltd.
ATCO Power Ltd.
Capital Power Corporation
ENMAX Energy Corporation and ENMAX Power Corporation Comments ENMAX Energy Corporation and ENMAX Power Corporation Diagram

Thank you to all Stakeholders who participated in this part of the Stakeholder consultation. All written comments received will be considered in the AESO's development of the proposed new Section 502.17.

Sincerely,

"Melissa Mitchell-Moisson"

Melissa Mitchell-Moisson
Regulatory Administrator
Phone: 403-539-2948
Email: melissa.mitchell-moisson@aeso.ca

Alberta Electric System Operator
Calgary Place, 2500, 330-5th Avenue SW Calgary, AB T2P 0L4
Phone: 403-539-2450 | Fax: 403-539-2949
www.aeso.ca
@theaeso

Stakeholder Comment Matrix for Additional Feedback

Period of Comment:	July 25, 2019 through September 5, 2019	**Contact:**	Jenette Yearsley
Comments From:	AltaLink	**Phone:**	403-387-8275
Date [yyyy/mm/dd]:	2019/09/05	**Email**:	Jenette.Yearsley@AltaLink.ca

Instructions:

1. **Please fill out the section above as indicated.**
2. **Please refer back to the *Letter of Notice of Proposed New and Amended ISO Rule* under the "Attachments" section to view the actual draft of the proposed new Section 502.17.**
3. **Please refer to the *Stakeholder Comment Matrix for Additional Feedback Attachment ("Attachment")* for further information regarding AESO assumptions and instructions for completing the sections below.**
4. **Please respond to the questions below and provide your specific comments, proposed revisions, and reasons for your position underneath, if any. Blank boxes will be interpreted as favourable comments.**
5. **Please be advised that general comments do not give the AESO any specific issue to consider and address, and results in a general response.**

Item #		Stakeholder comments
1	***AESO's Preferred Orderwire Architecture*** ***Cost and Timeline to implement and operate the mesh option orderwire architecture.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the AESO's preferred orderwire architecture mesh option using the assumptions and architecture provided in the Attachment. Please include all assumptions used for the list of variables provided in the Attachment. Where possible, provide a breakdown	AltaLink comments: The following estimates are for conceptual planning and general information purposes only at this stage.[1] If AltaLink assumes that downstream market participants are responsible for bringing the connecting infrastructure to the nearest network POP of the upstream MP, AltaLink estimates that the capital implementation cost for AltaLink is approximately $75,000-$150,000 per market participant (MP) connection. Exact numbers for an individual location could vary significantly based on the current state versus new infrastructure requirements. Additionally, AltaLink would need to upgrade the core voice infrastructure and

[1] AltaLink notes that as a result of the information currently known, it is difficult to provide accurate costs or implementation timelines.

Item #		Stakeholder comments
	of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☒ ***Operator of a transmission facility*** ☐ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	implement the compliance requirements as outlined in 502.17 and AltaLink estimates the cost to be $300,000. The complexity of the full mesh option could result in significant increases in cost and implementation timeline depending on vendor compatibility, testing requirements, and coordination efforts between MPs.
2	***Orderwire Architecture Options*** Which of the following orderwire architecture options do you support, if any: ☐ Mesh Option ☒ Operator of a Transmission Facility Hub Option ☒ AESO Hub Option ☐ Other (please provide details in the comments) The architecture for the first 3 options can be found in the Attachment. Please provide the rationale for your opinion or suggest an alternative option.	AltaLink submits that the best overall option is the TFO Hub option, limited to either AltaLink only or AltaLink and ATCO based on geography, number of directly connected MPs, operational efficiency, cost considerations, and ongoing sustainability. However, AltaLink notes that this preference is contingent on concerns that AltaLink has raised being addressed. See AltaLink's discussion in Question #8. AltaLink notes that while the AESO hub option is logical from a coordination and volume of interaction perspective, having all calls regardless of location within the province processed by AESO infrastructure may not be operationally practical. For example, in order for ATCO's control center to call someone in Ft McMurray, they would need to traverse most of AltaLink's network first prior to having the call processed by the AESO in Calgary, which results in an increase in points of failure. AltaLink considers this option feasible, but not ideal. AltaLink's submits that the full mesh option would likely introduce a significant amount of operational complexity and is not something AltaLink supports.

Item #		Stakeholder comments
3	***Stakeholder's Preferred Orderwire Architecture Option*** ***If you do not support the AESO's preferred mesh option, please provide the cost and timeline to implement and operate the orderwire architecture option you support.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the Orderwire architecture option. Please provide all assumptions used to determine the costs and timeline, including your assumptions for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☒ ***Operator of a transmission facility*** ☐ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	AltaLink comments: Please see response to Questions #1 and #2. The costs as described in Question #1 are estimates and as a result they can be applied here as well. Relative to each other, the full mesh option is incrementally more expensive than the TFO or AESO hub options and would also have a longer implementation timeline.
4	***Availability Requirements*** Whether you agree with the availability targets set out in subsection 8, *Performance and Maintenance of Primary and Backup Voice Communication Systems*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for	AltaLink submits that there are currently too many different availability targets in the draft Rule 502.17 across different MP connection types and primary versus backup. As the primary systems are generally the carrier networks such as Telus, no availability targets should be applied to these services in draft Rule 502.17 as these are not directly within the control of the market participant.

Item #		Stakeholder comments
	your suggestion.	This is one reason a backup voice system wholly owned and operated by market participants has been listed by the AESO as a reason to implement the changes in Rule. AltaLink proposes that as the 2 major TFOs are responsible for the majority of the systems and interconnections, the availability of the backup voice system should match the TFO requirements for SCADA availability, 98%, which is what links are designed to achieve as a default minimum due to the breadth of SCADA deployment. This 98% should apply across the board for backup communications via orderwire regardless of MP type. Any additional availability requirements over 98% may require a significant assessment period and upgrade of existing infrastructure, leading to drastically higher costs to deploy.
5	***Extended Power Outage Requirements*** Whether you agree with the requirements for market participants during extended power outages of its facilities set out in subsection 9, *Extended Power Outage*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	AltaLink proposes that subsection 9(2) wording be clarified to only apply to control centers versus all "facilities". AltaLink proposes the 72 hour requirement be reduced to 48 hours. In subsection 7(1), AltaLink proposes the requirement only apply to field voice communication systems between market participant control centers and market participant owned field voice communication sites. AltaLink uses collocated mobile radio locations for covering areas of the province where AltaLink does not have sufficient presence to provide adequate coverage. These collocated sites may not allow AltaLink to deploy sufficient battery backup to meet 8 hours. Alternatively this could be accommodated through a written exception and not specifically outlined in 502.17.
6	***Operational Requirements*** Whether you agree that the proposed new Section 502.17 effectively captures the ongoing operational requirements of the proposed architecture. Please explain why or why not. If you do	AltaLink does not believe ongoing operational requirements are captured in the draft Rule 502.17 beyond the AESO's expected availability numbers, periodic testing, communication expectations, and architecture or voice system

Item #		Stakeholder comments
	not agree, please provide suggested changes and the rationale for your suggestion.	connection type required per MP category. Though not an exhaustive list, there are a number of responsibilities where it is not clear who will be maintaining, such as satellite phone number lists and service providers, market participant list by category for a common reference point, and expectations for new connecting MPs that they are responsible for the infrastructure build to the nearest upstream MP's POP. AltaLink also requests clarification on backup control center requirements and the intent of the "other backup locations" component of 5(1). For example, if a TFO connects to a 300MW generator, and both have primary and backup control centers, is orderwire required from both TFO primary and backup to both generator primary and backup? Does this also include the AESO primary and backup? There may be significant infrastructure gaps among MPs for orderwire to many backup control centers which was not considered in the cost estimate and obviously has potential for significant cost impact.
7	***Utility Orderwire Description*** Whether you agree with the AESO's description of "utility orderwire" as: (a) a service that is independent of external commercial telecommunication services such that continued operation, during an extended power outage, can be assured and restoration activities are internally controlled; (b) being able to leverage the existing utility telecommunication network infrastructure, including fibre, microwave, routers, and phone switches; and (c) including, if applicable, leased assets, such as dark fibre and tower access from 3rd party providers, where the active telecommunication equipment (router, radio, batteries, etc.) is controlled by the market participant.	AltaLink agrees with this definition. In some collocated sites, the definition is possibly only applicable to mobile radio service as power may be provided by the site owner and not the TFO. This can be covered by a written exception and does not need to change the definition of orderwire or necessarily be accommodated within the standard itself.[2]

[2] This information has only been included for additional context.

Item #		Stakeholder comments
8	***Other*** Please provide any other feedback or suggestions you have on the proposed new Section 502.17. Please provide the rationale for your suggestion.	AltaLink filed its 2019-2021 GTA with the AUC in August 2018 and in July 2019 AltaLink reached a negotiated settlement with interveners. At present, no capital or operational funding is in place to enable work on Rule 502.17 planning or implementation during this GTA period. As a result, the commencement of implementation of the requirements of Rule 502.17 through a GTA funded project could commence, pending budget approval, in early 2022. Approximate implementation timeline would be 1-2 years, depending on the complexity of the chosen solution and the level of coordination and collaboration among the various MPs. For example, it would be difficult for AltaLink to coordinate all MP interconnections simultaneously, so a phased approach would be required which hinges on different MPs being available at staggered times throughout the year(s) on a schedule primarily driven by AltaLink as the hub. A non-staggered approach would drive higher costs and more complexity in implementation. AltaLink's submits that a direct assign project is more suitable for implementing this rule. The rationale for this position is that AltaLink and ATCO, as the 2 primary TFOs based on geography, have considerably more obligations than any other MPs for the successful implementation and operation of Rule 502.17. This represents a capacity increase for the associated systems and net new requirements being formally deployed for the first time, which will require considerable enhancements to the existing system. It is likely that AltaLink and ATCO will need to coordinate and lead the deployment on behalf of other MPs due to being primary infrastructure and potentially voice system owner/operators. AltaLink will require that a separate agreement be in place for each MP as this is a separate service the TFO will be providing. These agreements would also address the liability and other contractual terms between AltaLink and each MP. AltaLink submits that there should be a reasonable fee charged to the generator, who is a non-regulated entity, to cover TFO operating costs.

<u>Information Document</u> - The AESO intends to develop an information document to accompany the proposed new Section 502.17. At a minimum, the AESO suggests that such an information document would contain descriptions of a utility orderwire and a control room for generators. Please provide your views on the type of content that should be included in an information document associated with the proposed new Section 502.17. Please provide the rationale for your suggestion.

None.

Stakeholder Comment Matrix for Additional Feedback

Period of Comment:	July 25, 2019	through	September 5, 2019	**Contact:**	Dan Bamber
Comments From:	ATCO Electric Ltd			**Phone:**	780-918-0986
Date [yyyy/mm/dd]:	2019/09/05			**Email**:	dan.bamber@atco.com

Instructions:

1. **Please fill out the section above as indicated.**
2. **Please refer back to the *Letter of Notice of Proposed New and Amended ISO Rule* under the "Attachments" section to view the actual draft of the proposed new Section 502.17.**
3. **Please refer to the *Stakeholder Comment Matrix for Additional Feedback Attachment ("Attachment")* for further information regarding AESO assumptions and instructions for completing the sections below.**
4. **Please respond to the questions below and provide your specific comments, proposed revisions, and reasons for your position underneath, if any. Blank boxes will be interpreted as favourable comments.**
5. **Please be advised that general comments do not give the AESO any specific issue to consider and address, and results in a general response.**

Item #		Stakeholder comments
	AESO's Preferred Orderwire Architecture ***Cost and Timeline to implement and operate the mesh option orderwire architecture.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the AESO's preferred orderwire architecture mesh option using the assumptions and architecture provided in the Attachment. Please include all assumptions used for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☒ ***Operator of a transmission facility*** ☐ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	Implementation Cost: $236,000 Implementation Timeline: 18-24 months, depending on amount of discussion required between stakeholders. Operation Cost: $180k/year, including head-end 24/7 vendor support, and regular system O&M. Assumptions: 1. A new PBX will be deployed to support the Utility Orderwire, and in the future will be expanded to extend VOIP to all network-connected AET substations. 2. One new PRI-based connection to the AESO will be deployed, via Altalink's network. 3. One new PRI-based connection to Altalink will be deployed. 4. Two new connections to ISDs (Syncrude Mildred Lake, Suncor Millennium) assumed. 5. Two new connections to operators of generating facilities (Battle River, Sheerness) assumed. 6. One new connection to operators of aggregated generating facilities (Sharp Hills) assumed. 7. Unknown 8. No variances to 502.17 requirements assumed. 9. -

Item #		Stakeholder comments
2	***Orderwire Architecture Options*** Which of the following orderwire architecture options do you support, if any: ☐ Mesh Option ☐ Operator of a Transmission Facility Hub Option ☒ AESO Hub Option ☐ Other (please provide details in the comments) The architecture for the first 3 options can be found in the Attachment. Please provide the rationale for your opinion or suggest an alternative option.	AE supports the AESO Hub Option, because it combines the minimal complexity of the TFO Hub Option (single connections between participants) with the improved reliability of the Mesh Option (Altalink PBX is not a single point of failure).

Item #		Stakeholder comments
3	***Stakeholder's Preferred Orderwire Architecture Option*** ***If you do not support the AESO's preferred mesh option, please provide the cost and timeline to implement and operate the orderwire architecture option you support.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the Orderwire architecture option. Please provide all assumptions used to determine the costs and timeline, including your assumptions for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☒ ***Operator of a transmission facility*** ☐ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	Implementation Cost: $240,000 Implementation Timeline: 18-24 months, depending on amount of discussion required between stakeholders. Operation Cost: $180k/year, including head-end 24/7 vendor support, and regular system O&M. Assumptions: 1. A new PBX will be deployed to support the Utility Orderwire, and in the future will be expanded to extend VOIP to all network-connected AET substations. 2. One new PRI-based connection to the AESO will be deployed, via Altalink's network. 3. No new connections to adjacent TFOs are assumed. 4. Two new connections to ISDs (Syncrude Mildred Lake, Suncor Millennium) assumed. 5. Two new connections to operators of generating facilities (Battle River, Sheerness) assumed. 6. One new connection to operators of aggregated generating facilities (Sharp Hills) assumed. 7. Unknown 8. No variances to 502.17 requirements assumed. 9. -

<table>
<tr><th>Item #</th><th></th><th>Stakeholder comments</th></tr>
<tr><td>4</td><td>Availability Requirements

Whether you agree with the availability targets set out in subsection 8, Performance and Maintenance of Primary and Backup Voice Communication Systems, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.</td><td>AE does not agree with the requirements proposed in subsection 8, for the following reason. TFO communication systems today generally are designed to satisfy the availability requirements identified in either Section 502.8 for SCADA communications, or in Section 502.3 for protection communications. These requirements in turn influence design factors such as redundancy and diversity. The AESO is proposing to introduce a third set of requirements that are quite similar to those in Section 502.3, but slightly different:

<table>
<tr><th></th><th colspan="2">Minimum Availability</th></tr>
<tr><th></th><th>502.8 SCADA</th><th>502.17 draft</th></tr>
<tr><td>Generator, MARP <50MW</td><td>98.0%</td><td>95.0%</td></tr>
<tr><td>Generator, MARP 50MW - 300MW</td><td>98.0%</td><td>99.0%</td></tr>
<tr><td>Gen, MARP >300 MW</td><td>99.8%</td><td>99.5%</td></tr>
<tr><td>TFO, RAS elements</td><td>99.8%</td><td>99.5%</td></tr>
</table>

AE believes that the differences are not significant enough to be meaningful to network or circuit design, and therefore recommends that the availability requirements in Section 502.17 be made the same as those identified in Section 502.8.</td></tr>
<tr><td></td><td>Extended Power Outage Requirements

Whether you agree with the requirements for market participants during extended power outages of its facilities set out in subsection 9, Extended Power Outage, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.</td><td>AE does not agree with the requirements proposed in subsection 9, because the section as written suggests that the specified requirement applies equally to the endpoint control centers and all intermediate network sites in between. It should be rewritten to separately identify the requirements of each.</td></tr>
<tr><td>6</td><td>Operational Requirements

Whether you agree that the proposed new Section 502.17 effectively captures the ongoing operational requirements of the proposed architecture. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.</td><td>AE does not agree. As written the draft Section does not identify which parts of the overall orderwire system are the responsibility of each involved party. These responsibilities and the demarcations between them should be defined in the Section.</td></tr>
</table>

Item #		Stakeholder comments
7	***Utility Orderwire Description*** Whether you agree with the AESO's description of "utility orderwire" as: (a) a service that is independent of external commercial telecommunication services such that continued operation, during an extended power outage, can be assured and restoration activities are internally controlled; (b) being able to leverage the existing utility telecommunication network infrastructure, including fibre, microwave, routers, and phone switches; and (c) including, if applicable, leased assets, such as dark fibre and tower access from 3rd party providers, where the active telecommunication equipment (router, radio, batteries, etc.) is controlled by the market participant.	AE agrees with the AESO's description but believes that greater clarity could be provided if in item (a) the '*service*' were further described as a '*telephony-based service*' to distinguish it from available orderwire products which are not telephony-based and mitigate inter-operability concerns arising from that issue.
8	***Other*** Please provide any other feedback or suggestions you have on the proposed new Section 502.17. Please provide the rationale for your suggestion.	AE has no further suggestions.

<u>Information Document</u> - The AESO intends to develop an information document to accompany the proposed new Section 502.17. At a minimum, the AESO suggests that such an information document would contain descriptions of a utility orderwire and a control room for generators. Please provide your views on the type of content that should be included in an information document associated with the proposed new Section 502.17. Please provide the rationale for your suggestion.

AE believes that this document should include identification of the areas of responsibility for the overall system and the demarcations between them. In particular, what are the TFOs responsible for and what are the MPs responsible for. AE further believes that the demarcation between TFO responsibility and MP responsibility should be at the fence outside the substation the MP is connected to.

Stakeholder Comment Matrix for Additional Feedback

Period of Comment: July 25, 2019 through September 5, 2019 **Comments From:** ATCO Power Canada Ltd. **Date [yyyy/mm/dd]:** 2019/09/05	**Contact:** Kurtis Glasier **Phone:** (587) 228-9617 **Email**: Kurtis.Glasier@atco.com

Instructions:

1. **Please fill out the section above as indicated.**
2. **Please refer back to the *Letter of Notice of Proposed New and Amended ISO Rule* under the "Attachments" section to view the actual draft of the proposed new Section 502.17.**
3. **Please refer to the *Stakeholder Comment Matrix for Additional Feedback Attachment ("Attachment")* for further information regarding AESO assumptions and instructions for completing the sections below.**
4. **Please respond to the questions below and provide your specific comments, proposed revisions, and reasons for your position underneath, if any. Blank boxes will be interpreted as favourable comments.**
5. **Please be advised that general comments do not give the AESO any specific issue to consider and address, and results in a general response.**

Item #		Stakeholder comments
	AESO's Preferred Orderwire Architecture ***Cost and Timeline to implement and operate the mesh option orderwire architecture.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the AESO's preferred orderwire architecture mesh option using the assumptions and architecture provided in the Attachment. Please include all assumptions used for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17	

Item #		Stakeholder comments
	requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☐ ***Operator of a transmission facility*** ☒ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	
2	***Orderwire Architecture Options*** Which of the following orderwire architecture options do you support, if any: ☒ Mesh Option ☐ Operator of a Transmission Facility Hub Option ☐ AESO Hub Option ☐ Other (please provide details in the comments) The architecture for the first 3 options can be found in the Attachment. Please provide the rationale for your opinion or suggest an alternative option.	If an orderwire is needed at this time, ATCO Power is supportive of the Mesh Option proposed by the AESO. The advantage of the Mesh Option is that it does not rely on single points of failure. Rather, multiple connections between networks allow for reliability in the event of concurrent contingency events.
3	***Stakeholder's Preferred Orderwire Architecture Option*** ***If you do not support the AESO's preferred mesh option, please provide the cost and timeline to implement and operate the orderwire architecture option you support.*** Please provide: (a) the implementation cost and implementation timeline; and	Not applicable as ATCO Power supports the Mesh Option.

Item #		Stakeholder comments
	(b) the operational cost; of the Orderwire architecture option. Please provide all assumptions used to determine the costs and timeline, including your assumptions for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☐ ***Operator of a transmission facility*** ☒ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	
4	***Availability Requirements*** Whether you agree with the availability targets set out in subsection 8, *Performance and Maintenance of Primary and Backup Voice Communication Systems*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	The availability requirements do not specify the time period over which the requirement will be measured or applied. By way of example for generating units greater than or equal to 300MW of maximum authorized real power, the minimum availability for the primary voice communication systems is 98%. This requirement should specify that this is an annual minimum availability, by which a 98% availability means the primary voice communication system is available for at least 8,584.8 hours over the year.
5	***Extended Power Outage Requirements*** Whether you agree with the requirements for market participants during extended power outages of its facilities set out in subsection 9, *Extended Power Outage*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide	

Item #		Stakeholder comments
	suggested changes and the rationale for your suggestion.	
6	***Operational Requirements*** Whether you agree that the proposed new Section 502.17 effectively captures the ongoing operational requirements of the proposed architecture. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	
7	***Utility Orderwire Description*** Whether you agree with the AESO's description of "utility orderwire" as: (a) a service that is independent of external commercial telecommunication services such that continued operation, during an extended power outage, can be assured and restoration activities are internally controlled; (b) being able to leverage the existing utility telecommunication network infrastructure, including fibre, microwave, routers, and phone switches; and (c) including, if applicable, leased assets, such as dark fibre and tower access from 3rd party providers, where the active telecommunication equipment (router, radio, batteries, etc.) is controlled by the market participant.	ATCO Power does not agree with the AESO's decision to implement an orderwire service structure. The AESO should first consult on whether an orderwire structure is necessary, rather than accepting an orderwire structure and consulting on which structure to implement. ATCO Power recommends further consultation on whether an orderwire structure is necessary as there are significant costs to new equipment and satellite contracts that would be considered stranded. Only after consultation on whether an orderwire is a necessary development should the AESO then consult on the preferred architecture option. ATCO Power is not satisfied that 300 MWs is the appropriate threshold to dicate that an orderwire must be used. As a general principle ATCO Power supports a level paying field among generators, any bright line test must be appropriately justified. Further, ATCO Power believes a more succinct definition of "utility orderwire" would be "a dedicated, non-commercial, communication channel". It does not seem necessary to have the nuanced and specific definition that the AESO is suggesting.

Item #		Stakeholder comments
8	***Other*** Please provide any other feedback or suggestions you have on the proposed new Section 502.17. Please provide the rationale for your suggestion.	In the proposed Section 502.17, subsection 2(1) it states the "ISO may require a market participant to comply with any additional requirements of this section 502.17 if the ISO determines that such a compliance is necessary for the safe and reliable operation of the interconnected electric system." ATCO Power does not believe this is a reasonable inclusion within an ISO Rule. The ISO Rules should contain all requirements that a market participant will be bound by during its operation in the interconnected electric system. If the ISO requires the discretion to create requirements specific to individual circumstances, then it should have to outline this process to ensure it is done in a transparent and fair way. Proper governance of AESO requirements mean that every mandatory requirement must be a part of a ISO Rule and go through the AUC approval process.

<u>Information Document</u> - The AESO intends to develop an information document to accompany the proposed new Section 502.17. At a minimum, the AESO suggests that such an information document would contain descriptions of a utility orderwire and a control room for generators. Please provide your views on the type of content that should be included in an information document associated with the proposed new Section 502.17. Please provide the rationale for your suggestion.

Please see ATCO Power's comment to question 7 above regarding the description of a "utility orderwire".

Stakeholder Comment Matrix for Additional Feedback

Period of Comment:	July 25, 2019	through	September 5, 2019	**Contact:**	Colin Robb
Comments From:	Capital Power Corporation			**Phone:**	(780) 392-5169
Date [yyyy/mm/dd]:	2019/09/05			**Email**:	cmrobb@capitalpower.com

Instructions:

1. **Please fill out the section above as indicated.**
2. **Please refer back to the *Letter of Notice of Proposed New and Amended ISO Rule* under the "Attachments" section to view the actual draft of the proposed new Section 502.17.**
3. **Please refer to the *Stakeholder Comment Matrix for Additional Feedback Attachment ("Attachment")* for further information regarding AESO assumptions and instructions for completing the sections below.**
4. **Please respond to the questions below and provide your specific comments, proposed revisions, and reasons for your position underneath, if any. Blank boxes will be interpreted as favourable comments.**
5. **Please be advised that general comments do not give the AESO any specific issue to consider and address, and results in a general response.**

Item #		Stakeholder comments
1	***AESO's Preferred Orderwire Architecture*** ***Cost and Timeline to implement and operate the mesh option orderwire architecture.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the AESO's preferred orderwire architecture mesh option using the assumptions and architecture provided in the Attachment. Please include all assumptions used for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☐ ***Operator of a transmission facility*** ☒ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	Capital Power Corporation ("Capital Power") does not support the proposed Section 502.17 Voice Communication System Requirements. Specifically, Capital Power has concerns with the requirements, as set out in *Appendix 1 – Requirements for Primary and Backup Voice Communication Systems with the ISO*, requiring generating units or aggregate generating facilities greater than 300 megawatts ("MW") to have a utility orderwire as a backup communication system. Capital Power submits that, consistent with other jurisdictions in North America, Alberta should follow an approach to implementation for communication standards that focuses on capability, as opposed to prescribing specific hardware requirements. The AESO notes their concerns with satellite network communication and considers it to be sufficient rationale for selecting utility orderwire for certain market participants. Capital Power does not agree with the AESO that the issues noted are impediments to having an effective backup voice communication system for market participants, nor is sufficient evidence provided to support their decision. Based on the information provided to date, Capital Power submits that the costs associated with the installation of orderwire outweighs the incremental benefits that would be achieved over satellite communication systems. Capital Power is concerned that the AESO proposal lacks appropriate justification for requirements that would impose significant costs on certain market participants with marginal improvements in reliability. Further, the requirements as proposed require a significant investment for generating units or aggregate facilities greater than 300 MW. In a competitive market, this incremental cost imposed only on large facilities creates an unlevel playing field, and therefore, does not support a fair, efficient, and openly competitive market. <u>Other Jurisdictions</u> In establishing the requirements for voice communication systems in Alberta, the AESO is consolidating existing requirements from ISO rules and related reliability standards. In doing so, however, the AESO is proposing requirements that exceed, or are inconsistent in approach, to

		what is required in most other jurisdictions. Capital Power supports the AESO's objectives, however, it should reconsider the prescriptive requirements for utility orderwire, and re-engage with stakeholders to find an appropriate compromise. Capital Power submits that the AESO should focus on establishing appropriate thresholds for capability of communication equipment. A focus on capability of equipment is similar to the approach taken by FERC and NERC, and would allow market participants greater discretion to implement a system which supports the reliability of the grid in manner that is appropriate to their circumstances. <u>Implementation Cost</u> In selecting a preferred utility orderwire architecture, the AESO assessed a variety of configurations and, among other things, determined that the increased cost of the Mesh Option would be relatively small. Due to the commercial sensitivity of the requested cost information, Capital Power is not prepared to provide detailed information on the public record. High level estimates are provided to give the AESO a general perspective. Should the AESO wish to discuss this further, Capital Power will provide the information with the assurance that the information will remain confidential. **Capital Expenditures** – Capital Power estimates that the cost of capital expenditures associated with backup communication systems at all facilities in our portfolio greater than 300MW, operating independently of the primary system and without a single point of failure, could exceed several million dollars. Cost will be incurred to trench, install fiber or microwave links, and install new communication systems. **Operational Expenditures** – Across Capital Power's portfolio, costs for operating expenditures related to backup voice communication systems using an orderwire infrastructure could exceed tens of thousands of dollars per month. Cost will be incurred to lease, maintain, and operate the communication infrastructure. **Commercial Costs** – Commercial costs related to the Mesh Option are uncertain, however, they are expected to be material. The cost associated with managing the interface between Capital Power's communication system and that of the TFOs will require comprehensive

		commercial arrangements. These arrangements will be required to cover, among other things, the responsibilities for interoperability, testing, maintenance, performance and liability associated with the proposed availability requirements. Costs will include both upfront and ongoing internal commercial management expertise, external legal counsel, and other associated costs for negotiation and management of the arrangements. Any disputes arising from the commercial arrangements would potentially add significant costs. **Implementation Timelines** – The proposed implementation timelines will be difficult to achieve. From the time a proposed rule is approved, Capital Power estimates that implementation could be achieved, under an optimistic scenario, within two years. Key considerations for timing relate to design, procurement, commercial negotiations both with the vendor and other market participants, construction, implementation, and testing. Additional variables that will impact implementation timing include construction seasons and timing of outages.
2	***Orderwire Architecture Options*** Which of the following orderwire architecture options do you support, if any: ☐ Mesh Option ☐ Operator of a Transmission Facility Hub Option ☐ AESO Hub Option ☐ Other (please provide details in the comments) The architecture for the first 3 options can be found in the Attachment. Please provide the rationale for your opinion or suggest an alternative option.	Capital Power does not take a position on the optimal configuration between the various options the AESO proposes for the orderwire architecture. Capital and operating expenses under all scenarios will not vary significantly. It is expected, however, that the AESO's preferred mesh option will be the most complex and will impose on market participants the greatest cost burden relating to commercial management and implementation. Based on Capital Power's understanding of the proposed architecture options, the AESO is best suited to manage some of the cost, coordination, and implementation risks. The AESO taking a more central role in coordination and implementation could reduce a portion of the costs associated with the multitude of interfaces that will exist between generators, TFOs, DFOs, the AESO and other impacted parties.
3	***Stakeholder's Preferred Orderwire Architecture Option*** ***If you do not support the AESO's preferred mesh option, please provide the cost and timeline to implement and operate the orderwire architecture***	See previous comments. Capital Power does not take a position on the preferred architecture for orderwire infrastructure. In all scenarios, Capital Power submits that the requirement for generating units or aggregate facilities greater than 300 MW to install orderwire for backup

	option you support. Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the Orderwire architecture option. Please provide all assumptions used to determine the costs and timeline, including your assumptions for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☐ ***Operator of a transmission facility*** ☐ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	communications is not supported by the AESO's materials.
4	***Availability Requirements*** Whether you agree with the availability targets set out in subsection 8, *Performance and Maintenance of Primary and Backup Voice Communication Systems*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	Capital Power submits the availability requirements proposed by the AESO are at a level that may not be achievable. Further to this concern, additional clarification is required on how the availability requirements would be measured, and over what period it must be met. These details are necessary to ensure legal owners of generating units or aggregate facilities can appropriately meet their obligations to self-report in instances where the standards cannot be achieved. Finally, it is likely that the availability standards could precipitate significant commercial negotiations to ensure obligations to meet the standards are clearly understood by all counterparties. Clearly defining

		the requirements would facilitate this process.
5	***Extended Power Outage Requirements*** Whether you agree with the requirements for market participants during extended power outages of its facilities set out in subsection 9, *Extended Power Outage*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	Capital Power submits that the extended power outage requirements are stringent and potentially costly. Additional clarification is required to understand the acceptable options for meeting this requirement. Specifically, for satellite or cellular phones, what does the AESO consider to be an appropriate solution to achieve 36 hours of uninterrupted operability. In considering circumstances where this requirement is not met, and a power outage impacts the operation of a backup communication system. Where the point of failure is outside of Capital Power's control, accountability should rest with the TFO and Capital Power should not be considered out of compliance.
6	***Operational Requirements*** Whether you agree that the proposed new Section 502.17 effectively captures the ongoing operational requirements of the proposed architecture. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	Capital Power has no additional comments on proposed operational requirements.
7	***Utility Orderwire Description*** Whether you agree with the AESO's description of "utility orderwire" as: (a) a service that is independent of external commercial telecommunication services such that continued operation, during an extended power outage, can be assured and restoration activities are internally controlled;	Capital Power submits the definition for utility orderwire is acceptable.

	(b) being able to leverage the existing utility telecommunication network infrastructure, including fibre, microwave, routers, and phone switches; and (c) including, if applicable, leased assets, such as dark fibre and tower access from 3rd party providers, where the active telecommunication equipment (router, radio, batteries, etc.) is controlled by the market participant.	
8	***Other*** Please provide any other feedback or suggestions you have on the proposed new Section 502.17. Please provide the rationale for your suggestion.	Section 5(6) of the proposed ISO rule requires that market participations, where the backup voice communication system is a satellite network telephone, must use the same network system as the ISO. Capital Power submits that the requirements are unnecessary and increases risk due to reliance on a single provider. Capital Power requests that this requirement be removed from the draft rule.

<u>Information Document</u> - The AESO intends to develop an information document to accompany the proposed new Section 502.17. At a minimum, the AESO suggests that such an information document would contain descriptions of a utility orderwire and a control room for generators. Please provide your views on the type of content that should be included in an information document associated with the proposed new Section 502.17. Please provide the rationale for your suggestion.

Capital Power has no comments at this time on the proposed information document. Additional consultation is required on the proposed rule to fully understand the rationale behind orderwire requirements for generating units and aggregate facilities greater than 300 MW. Following this clarification, it would then be appropriate to consider the contents of an information document.

Stakeholder Comment Matrix for Additional Feedback

Period of Comment: July 25, 2019 through September 5, 2019 **Comments From:** ENMAX Energy Corporation (EEC), ENMAX Power Corporation (EPC) **Date [yyyy/mm/dd]:** September 3, 2019	**EEC:** **Contact:** **Pavel Petkov** **Phone:** 587-899-6667 **Email:** **ppetkov@enmax.com** **EPC:** **Contact:** Robert Rothstein **Phone:** 403-689-6507 **Email:** rrothsein@enmax.com

Instructions:

1. **Please fill out the section above as indicated.**
2. **Please refer back to the *Letter of Notice of Proposed New and Amended ISO Rule* under the "Attachments" section to view the actual draft of the proposed new Section 502.17.**
3. **Please refer to the *Stakeholder Comment Matrix for Additional Feedback Attachment ("Attachment")* for further information regarding AESO assumptions and instructions for completing the sections below.**
4. **Please respond to the questions below and provide your specific comments, proposed revisions, and reasons for your position underneath, if any. Blank boxes will be interpreted as favourable comments.**
5. **Please be advised that general comments do not give the AESO any specific issue to consider and address, and results in a general response.**

Item #		Stakeholder comments

	AESO's Preferred Orderwire Architecture ***Cost and Timeline to implement and operate the mesh option orderwire architecture.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the AESO's preferred orderwire architecture mesh option using the assumptions and architecture provided in the Attachment. Please include all assumptions used for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☒ ***Operator of a transmission facility*** ☒ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	The implementation cost and implementation timeline are listed below: **Please refer to ENMAX Orderwire - September 2019.vsdx for a visual representation of the orderwire design.** **EEC estimated implementation cost:** **Capital:** • SBC equipment & installation - $140,000 • SIP enabled phones - $570 • DMZ Switch Stack - $24,000 • Firewall - $20,000 • New Fiber - $100,000 **Total: $284,570** **EEC estimated operational cost:** **Annual OPEX:** • Fiber maintenance - $15,000 • .50 FTE technical resource - $50,000 • Telephone SBC Maintenance - $10,000 • Switch Maintenance - $5,000 • Firewall Maintenance - $5,000 **Total: $85,000** **EPC estimated implementation cost:** **Capital** • SBC equipment & installation - $140,000 • SIP enabled phones - $570 • DMZ Switch Stack - $24,000 • Firewall - $20,000 **Total: $184,570**

Item #		Stakeholder comments
		EPC estimated operational cost: **Annual OPEX:** • .50 FTE technical resource - $50,000 • Telephone SBC Maintenance - $10,000 • Switch Maintenance - $5,000 • Firewall Maintenance - $5,000 **Total: $70,000** **ENMAX Total:** **CAPEX $469,140** **OPEX: $155,000** Timeline: 12-20 months from effective date (aligning with budgetary cycles) • project execution 6-8 months • budget planning cycle 6-12 months (from rule effective date) Fully meshed solution: A physical fiber connection would need to be established between ENMAX and the AESO in addition to connecting to AltaLink. The capital costs can range between $100,000 to $500,000 dependent on connection endpoints and architecture decisions. Assumptions: • In order for the mesh option to be implemented, full physically redundant paths would be required at a substantially increased cost. • There is no fiber from an EPC substation to the AESO control centre. • Preliminary design has not been coordinated with AltaLink.

Item #		Stakeholder comments
		Stakeholders: EEC is an Operator of a generating unit. EPC is an Operator of a transmission facility.

Item #		Stakeholder comments
2	***Orderwire Architecture Options*** Which of the following orderwire architecture options do you support, if any: ☐ Mesh Option ☒ Operator of a Transmission Facility Hub Option ☐ AESO Hub Option ☐ Other (please provide details in the comments) The architecture for the first 3 options can be found in the Attachment. Please provide the rationale for your opinion or suggest an alternative option.	ENMAX supports the Operator of a Transmission Facility Hub Option as it does not require additional fiber to the AESO, reducing costs. This option does increase reliance on AltaLink as the connection hub for the EPC to AESO link.

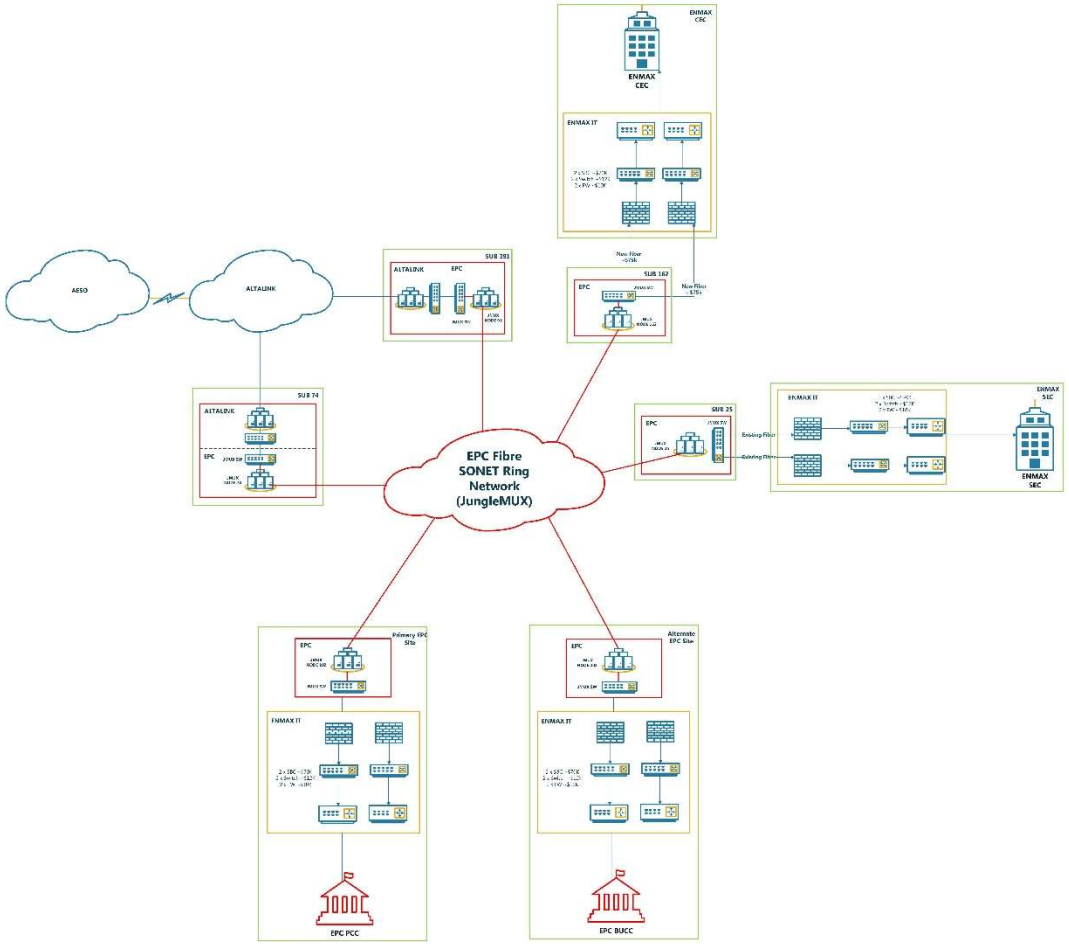
Item #		Stakeholder comments
3	***Stakeholder's Preferred Orderwire Architecture Option*** ***If you do not support the AESO's preferred mesh option, please provide the cost and timeline to implement and operate the orderwire architecture option you support.*** Please provide: (a) the implementation cost and implementation timeline; and (b) the operational cost; of the Orderwire architecture option. Please provide all assumptions used to determine the costs and timeline, including your assumptions for the list of variables provided in the Attachment. Where possible, provide a breakdown of the cost and implementation timing by proposed new Section 502.17 requirements. If you are unable to provide the costs and timeline of complying with a proposed new Section 502.17 requirement, please state that requirement and why you are unable to provide the information at this time. Please list any issues related to budgetary cycles separately. ***Please indicate which type of stakeholder you are:*** ☒ ***Operator of a transmission facility*** ☒ ***Operator of a generating unit or operator of an aggregated generating facility with a maximum authorized real power ("MARP") of 5 MW or greater*** ☐ ***Other (please specify in the comments)***	The mesh option requires full physically redundant paths at a substantially increased cost. There is no fiber currently from EPC substation to AESO network. **Transmission Facility Hub Option** Timeline: 12-20 months from effective date (aligning with budgetary cycles) • Project execution 6-8 months • Budget planning cycle 6-12 months (from rule effective date) Note that the proposed design has been confirmed with AltaLink. Yearly maintenance cost expected is ~$150,000 **Stakeholders:** EEC is an Operator of a generating unit. EPC is an Operator of a transmission facility.
4	***Availability Requirements*** Whether you agree with the availability targets set out in subsection 8, *Performance and Maintenance of Primary and Backup Voice Communication Systems*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	EEC/EPC agree that the availability requirements are reasonable.

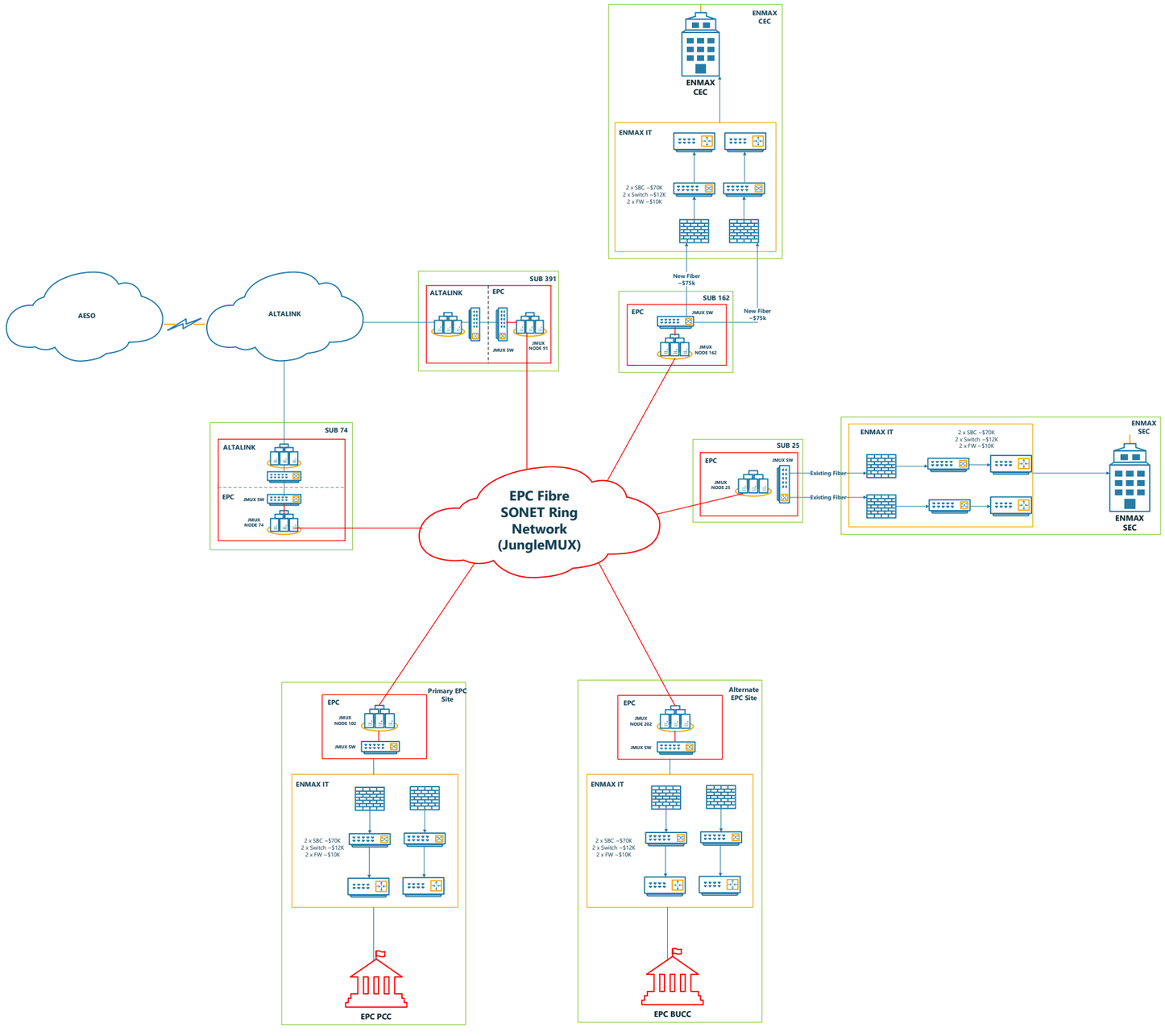
Item #		Stakeholder comments
5	***Extended Power Outage Requirements*** Whether you agree with the requirements for market participants during extended power outages of its facilities set out in subsection 9, *Extended Power Outage*, of the proposed new Section 502.17. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	>36 hours is reasonable for facilities (EPC site 1 and site 2, ENMAX Shepard Energy Centre, Calgary Energy Centre) with diesel generators. >36 hours is reasonable for EPC Substations is reasonable as well.
6	***Operational Requirements*** Whether you agree that the proposed new Section 502.17 effectively captures the ongoing operational requirements of the proposed architecture. Please explain why or why not. If you do not agree, please provide suggested changes and the rationale for your suggestion.	ENMAX believes the proposed new Section 502.17 has the following limitation: • Dependability on AltaLink based on the proposed architecture
7	***Utility Orderwire Description*** Whether you agree with the AESO's description of "utility orderwire" as: (a) a service that is independent of external commercial telecommunication services such that continued operation, during an extended power outage, can be assured and restoration activities are internally controlled; (b) being able to leverage the existing utility telecommunication network infrastructure, including fibre, microwave, routers, and phone switches; and (c) including, if applicable, leased assets, such as dark fibre and tower access from 3rd party providers, where the active telecommunication equipment (router, radio, batteries, etc.) is controlled by the market participant.	ENMAX is in agreement with the suggested description of orderwire as described. However, please note that for (b), in order to build out the proposed solution in full, additional equipment needs to be procured as well as utilizing the existing utility infrastructure.

Item #		Stakeholder comments
8	***Other*** Please provide any other feedback or suggestions you have on the proposed new Section 502.17. Please provide the rationale for your suggestion.	ENMAX suggests exploring other satellite phone alternatives as they could potentially provide greater availability as a backup communication system. Despite the known voice delay and quality issues, Satellite phone still can serve as a low cost, highly available backup communication system.

<u>Information Document</u> - The AESO intends to develop an information document to accompany the proposed new Section 502.17. At a minimum, the AESO suggests that such an information document would contain descriptions of a utility orderwire and a control room for generators. Please provide your views on the type of content that should be included in an information document associated with the proposed new Section 502.17. Please provide the rationale for your suggestion.

Attachments:




ENMAX CEC
ENMAX CEC
ENMAX IT
2 x SBC ~$70K
2 x Switch ~$12K
2 x FW ~$10K
New Fiber ~$75k
New Fiber ~$75k
AESO
ALTALINK
SUB 391
ALTALINK
EPC
JMUX SW
JMUX NODE 91
SUB 162
EPC
JMUX SW
JMUX NODE 162
SUB 74
ALTALINK
EPC
JMUX SW
JMUX NODE 74
EPC Fibre SONET Ring Network (JungleMUX)
SUB 25
EPC
JMUX SW
JMUX NODE 25
Existing Fiber
Existing Fiber
ENMAX IT
2 x SBC ~$70K
2 x Switch ~$12K
2 x FW ~$10K
ENMAX SEC
ENMAX SEC
Primary EPC Site
EPC
JMUX NODE 102
JMUX SW
ENMAX IT
2 x SBC ~$70K
2 x Switch ~$12K
2 x FW ~$10K
EPC PCC
Alternate EPC Site
EPC
JMUX NODE 202
JMUX SW
ENMAX IT
2 x SBC ~$70K
2 x Switch ~$12K
2 x FW ~$10K
EPC BUCC