

# Q1 2016 Update on Implementation Plan to Develop a Revised Loss Factor Rule in Compliance With Decision 790-D03-2013

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Milner Power Inc. and ATCO Power Ltd. Complaints Regarding ISO Transmission Loss  
Factor Rule and Loss Factor Methodology  
Proceeding 790 Phase 2 Module B

*Confidentiality: Public Document*

# Contents

- 1 Introduction..... 3**
- 2 Implementation Activities ..... 4**
  - 2.1 Assemble Input Data..... 4
    - 2.1.1 *EMMO Input Data* ..... 4
    - 2.1.2 *Load Input Data* ..... 5
  - 2.2 Create Topology Cases ..... 6
  - 2.3 Develop Software and Scripts ..... 6
- 3 Timeline ..... 8**
- 4 Approaches and Assumptions..... 9**
  - 4.1 Preliminary Assessment of Compliance of Existing Locations ..... 9
  - 4.2 Shift Factors and Expected Steps for the Loss Factor Calculation Methodology ..... 9

# 1 Introduction

1 On November 26, 2015, the Alberta Utilities Commission (“Commission”) issued Decision 790-D03-2015 (“Decision”) addressing *Complaints regarding the ISO Transmission Loss Factor Rule and Loss Factor Methodology*, including directions to the AESO to change Section 501.10 of the ISO rules, *Transmission Loss Factor Methodology and Requirements* (“Loss Factor Rule”), to implement the Commission’s findings in the Decision.

2 On February 1, 2016, the AESO filed its *Implementation Plan to Develop a Revised Loss Factor Rule in Compliance With Decision 790-D03-2015*<sup>1</sup> (“Implementation Plan”). In the Implementation Plan, the AESO proposed to file quarterly updates with the Commission, which would report progress on the implementation activities described in the Implementation Plan.<sup>2</sup>

3 On March 18, 2016, the Commission issued its ruling<sup>3</sup> approving the Implementation Plan (“Ruling”), subject to certain qualifications and clarification noted in the Ruling. In particular, the Commission found the AESO’s proposal for quarterly updates to be reasonable and consistent with the Decision.<sup>4</sup>

4 Accordingly, this submission is the Q1 2016 update (“Q1 Update”) on the Implementation Plan prepared by the AESO. This Q1 Update primarily provides information on the activities described in the Implementation Plan that were planned to take place by June 30, 2016. This Q1 Update only addresses information that supplements or changes information already placed on the record by the AESO in Proceeding 790 since the Decision was issued. That is, this Q1 Update does not repeat information that remains unchanged from information already provided in:

- the AESO’s *Request for Clarifications, and the AESO’s Proposed Approaches and Assumptions for the Implementation Plan*, dated January 15, 2016;<sup>5</sup>
- the Implementation Plan;
- the *Responses of the AESO to Submissions Regarding the AESO’s 15 January 2016 Letter to the Commission and the 01 February 2016 Implementation Plan*, dated February 23, 2016<sup>6</sup> (“Responses to Submissions”); and
- the *Notes from technical meeting, February 25, 2016*, issued by the Commission on March 9, 2016.<sup>7</sup>

This Q1 Update is organized in the same structure as the Implementation Plan, with sections addressing implementation activities, timeline, and approaches and assumptions to develop a revised Loss Factor Rule (“Revised Loss Factor Rule”) that implements the Commission’s findings in the Decision. Specific implementation matters that are progressing in accordance with information previously provided by the AESO may not be referenced in this Q1 Update.

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<sup>1</sup> Exhibit 790-X0452.

<sup>2</sup> Exhibit 790-X0452 at paragraph 44.

<sup>3</sup> Exhibit 790-X0467.

<sup>4</sup> Exhibit 790-X0467 at paragraph 44.

<sup>5</sup> Exhibit 790-X0445.

<sup>6</sup> Exhibit 790-X0463.

<sup>7</sup> Exhibit 790-X0463.

## 2 Implementation Activities

5 The activities described in the Implementation Plan that were planned to take place by June 30, 2016 include assembling input data, creating topology cases, confirming reconfigurations, and developing software and scripts. The following subsections provide updates on those activities.

6 At this time the AESO has no updates to the later activities included in the Implementation Plan, namely, submitting the Revised Loss Factor Rule, calculating loss factors, or issuing loss factors. Those activities are expected to proceed as described in the Implementation Plan and other information already on the record in Proceeding 790. The AESO remains of the view that it is possible to implement the Commission's findings and develop the Revised Loss Factor Rule in order to achieve a January 1, 2017 effective date for implementation of revised loss factors.

### 2.1 Assemble Input Data

7 The Revised Loss Factor Rule requires two main sets of input data: (i) 8,760 hours of energy market merit order ("EMMO") volumes, and (ii) 8,760 hours of load volumes. Both sets of input data are in the final stages of compilation.

#### 2.1.1 EMMO Input Data

8 The AESO has completed the initial assembly of 8,760 hours of EMMO volumes for all energy sources on the transmission system based on historical data from January to December of 2015.

9 The historical data includes source assets and export assets in the following order:

- (a) metered energy volumes for all energy sources that are not dispatchable (primarily aggregated wind generating facilities);
- (b) price-quantity offer blocks for all energy sources that are dispatchable;
- (c) scheduled export volumes for each intertie;
- (d) contingency reserve volumes for ancillary service sources; and
- (e) unscheduled available transfer capacity for each intertie.

10 The order of source assets provided above resembles the dispatch order of source assets used in the real-time operation of the transmission system. The historical data also includes export assets.

11 The AESO expects to post the 8,760 hours of EMMO input data on its website in early April. The AESO will notify the Commission and stakeholders when the EMMO input data has been posted by filing a letter in Proceeding 790 with links to the data posting. The AESO notes that the EMMO input data is a comma-separated values file over 300 MB in size. It is not practical to use Microsoft Excel to access a file of that size and more specialized software should be used.

12 The EMMO input data omits the two hours ending 08 and 09 on January 13, 2015, due to an IT system failure to capture on-demand EMMO information in the AESO's database for those hours. There were no significant market events recorded during those hours and the AESO considers that omitting those two hours will have minimal impact on loss factor calculations. The AESO does not consider the significant manual effort that would be required to extract the two hours of data from other system or to reconstruct the two hours of data from paper records is justified based on the negligible impact of omitting those two hours.

13 The AESO expects to update the EMMO input data with additional information to reflect the following:

- (a) new generation projects in the AESO project queue with in-service dates in 2016 or 2017, following completion of the AESO's review of the criteria to be used to determine when a new project should be included in the EMMO input data;
- (b) metered energy volumes for flows onto the transmission system from distribution-connected generating units that do not offer into the energy market;
- (c) adjustments to reflect flows onto the transmission system from generating units that offer on a gross basis within industrial systems; and
- (d) allocation of Bow River Hydro System offers to the individual generating facilities that comprise that system.

14 As well, the EMMO input data does not currently reflect any aggregations of existing generating units, as the AESO has not yet received any requests for aggregation. If any aggregation requests are received and accepted, they will also be incorporated into an update of the EMMO input data. The AESO continues to work towards addressing unresolved matters related to the criteria to be eligible for aggregation as discussed in the Ruling.<sup>8</sup>

### 2.1.2 Load Input Data

15 The AESO has completed the initial assembly of 8,760 hours of load volumes for all energy sinks on the transmission system based on historical data from January to December of 2015.

16 The load input data includes volumes for:

- (a) points of demand that received service under Rate DTS, *Demand Transmission Service*, during 2015;
- (b) points of demand that received service under Rate DOS, *Demand Opportunity Service*, during 2015;
- (c) new loads in the AESO project queue that are in Stages 3 to 6 of the connection process and that have in-service dates in 2016 or 2017, profiled over 8,760 hours based on the average profile of all Rate DTS loads in 2015 with the requested capacity of the new load as the peak demand in the profile; and
- (d) all volumes for 2015 Rate DTS points of demand included in (a) above, increased proportionately such that total energy, in MWh, for loads in (a), (b), and (c) above is consistent with the AESO's forecast of energy for Rate DTS and Rate DOS energy in 2017.

17 As discussed in the Responses to Submissions and during the technical meeting, and as considered reasonable by the Commission in the Ruling,<sup>9</sup> the AESO will treat the 8,760 hours of load input data as confidential. The AESO will make the following subset of information from the load input data available to stakeholders:

- (a) 144 sample hours from the load input data, comprising 12 hours from each calendar month with four hours randomly selected in each month from (i) the quartile of hours with highest system demand in the month, (ii) the quartile of hours with lowest system demand in the month, and (iii) all other hours in the month;

<sup>8</sup> Exhibit 790-X0467 at paragraphs 53 through 58.

<sup>9</sup> Exhibit 790-X0467 at paragraph 32.

- (b) high-level annual characteristics of each point of demand included in the load input data; and
- (c) all hourly data for points of demand that received service under Rate DOS, as loss factors will apply to those services and be calculated on an hourly basis as part of the loss factor methodology.

18 The AESO expects to post the subset from the load input data on its website in early April. The AESO will notify the Commission and stakeholders when the subset from the load input data has been posted by filing a letter in Proceeding 790 with links to the data posting.

19 The AESO may update the load input data with additional information to reflect the following:

- (a) new loads in the AESO project queue with in-service dates in 2016 or 2017, if changes result from completion of the AESO's review of the criteria to be used to determine when a new load should be included in the load input data; and
- (b) changes to the proration of volumes for 2015 Rate DTS points of demand to reflect any changes that occur to the AESO's forecast of energy for Rate DTS and Rate DOS energy in 2017.

## 2.2 Create Topology Cases

20 The AESO has begun preparation of twelve monthly topology cases for 2017. The AESO expects the topology cases to be completed near the end of May, consistent with the timeline in the Implementation Plan.

21 The AESO will post the topology cases on its website when they are ready and will notify the Commission and stakeholders that the topology cases have been posted by filing a letter in Proceeding 790 with links to the posting.

## 2.3 Develop Software and Scripts

22 Some approaches to implementing the incremental loss factor methodology through software and scripts have been tested, although software development is still in early stages.

23 In contrast to the discussion documented in the notes from the technical meeting,<sup>10</sup> the AESO has determined that, based on the EMMO input data and load input data discussed above, there will be sufficient supply in every hour to balance load when any generating facility is disconnected as part of the loss factor calculation methodology, with no aggregation of generating units. As well, there will be sufficient supply in every hour to balance load even if the two largest generating units on the system are aggregated. Based on the input data, supply will become insufficient to balance load only when three of the largest generating units on the system are aggregated, and even then will likely only occur in on about 100 hours.

24 A different approach may be used to rebalance supply and load after a generating facility is disconnected than was used in the incremental loss factor calculations previously submitted in Proceeding 790. Previously, the Alberta-BC intertie was used as the swing bus with supply or load adjusted to return the intertie flow to an initial value through iterative solution simulations. Initial testing has suggested that a solution simulation within tolerance may be more directly determined using PSS/E software by setting the Alberta-BC intertie to the flow in the EMMO input data, dispatching up the merit order to determine the marginal generator needed to balance load, and using that marginal generator as the swing bus. The AESO will further investigate this approach during development of the software and scripts for the loss factor calculation methodology.

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<sup>10</sup> Exhibit 790-X0466 at section 3.

- 25 During the technical meeting, the AESO said that in the event that there is insufficient supply in the energy market merit order to replace a removed generating facility, it intended to take the following steps: (i) dispatch ancillary services market, (ii) curtail DOS, (iii) curtail exports, and (iv) call on available transfer capability over interties.<sup>11</sup> To be consistent with the supply shortfall management steps provided in AESO Information Document #2012-006R, *Adequacy and Supply Shortfall*, the AESO should have stated the order of the steps to be taken as follows: (i) curtail exports, (ii) curtail DOS, (iii) dispatch ancillary services market, and (iv) call on available transfer capability over interties.
- 26 The AESO will post the software and scripts on its website when they are completed and will notify the Commission and stakeholders that the software and scripts have been posted by filing a letter in Proceeding 790 with links to the posting.

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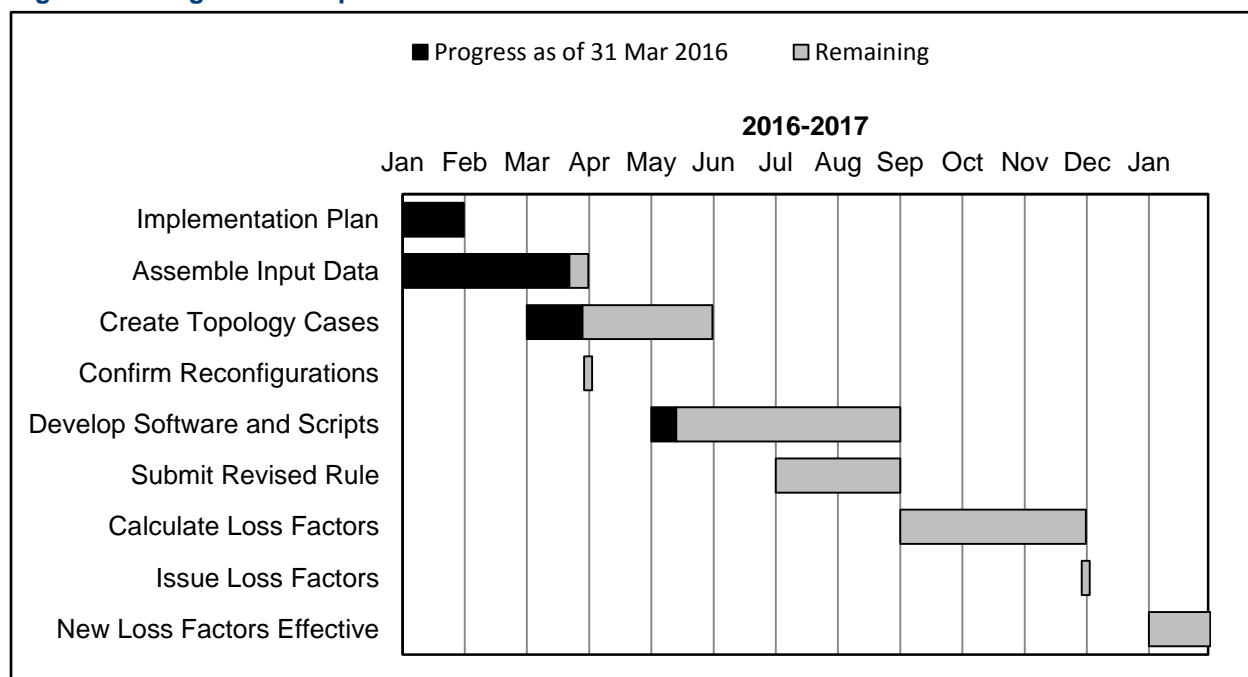
<sup>11</sup> Exhibit 790-X0466 at section 10.

### 3 Timeline

27 In the Implementation Plan, the AESO provided a high-level timeline of activities and noted a certain amount of flexibility in starting and ending activities in the timeline. The AESO's progress on activities is generally on track. No barriers have been identified to date that would prevent achieving a January 1, 2017 effective date for implementation of revised loss factors.

28 Figure 1 illustrates the progress on the activities in the timeline as of March 31, 2016.

**Figure 1 – Progress on Implementation Timeline for Revised Loss Factor Rule**



29 In its Responses to Submissions, the AESO proposed to hold technical meetings with stakeholders at appropriate points during the implementation activities, in order to ensure transparency of any technical decisions the AESO makes and to provide an opportunity for stakeholders to comment. The AESO currently expects to hold a technical meeting by the beginning of June to review activities at that date. The AESO will provide the date and location of the meeting in an invitation to stakeholders submitted in Proceeding 790 and posted on the AESO website, after details and subject matter for the meeting have been finalized by the AESO.



## 4 Approaches and Assumptions

### 4.1 Preliminary Assessment of Compliance of Existing Locations

30 The AESO included a Preliminary Assessment of Compliance of Existing Locations workbook<sup>12</sup> as an Appendix to the Implementation Plan, to assist the Commission and stakeholders in understanding the impact of the AESO's approaches and assumptions regarding the location direction<sup>13</sup> in the Decision.

31 During the technical meeting, discussion occurred regarding the AESO's preliminary assessment that generating facilities within the City of Medicine Hat are currently non-compliant with the location criteria and requirements set out in the Decision.<sup>14</sup> The City of Medicine has since provided additional information to the AESO supporting the treatment of the Cancarb generating facility ("CCMH") as a distribution-connected generator within the City of Medicine Hat, such that a loss factor would not apply to the Cancarb generating facility. Such treatment would result in the other generating facilities within the City of Medicine Hat being compliant with the location criteria and requirements. The AESO considers the treatment proposed by the City to be reasonable and will adopt it in the implementation activities going forward.

32 The AESO notes that the workbook should have included the potential aggregation of the Genesee 1 and Genesee 2 generating facilities, as discussed during the technical meeting.<sup>15</sup>

### 4.2 Shift Factors and Expected Steps for the Loss Factor Calculation Methodology

33 In the Implementation Plan, the AESO indicated that it would apply a single shift factor after calculating a volume-weighted average loss factor for each source asset. The AESO further addressed the use of a single annual shift factor, rather than hourly shift factors, in response to EEC-4 in the Responses to Submissions:

*...Based on examination of EEC's examples, the same annual final loss factors will result from an initial set of hourly raw loss factors whether the raw loss factors are first shifted hourly and then averaged, or averaged first and then shifted. Accordingly, the AESO considers that a single annual shift factor appropriately reflects the raw loss factors determined through the proposed incremental loss factor methodology (when the averaging includes appropriate volume-weighting as proposed by the AESO).*

34 During the technical meeting, the topic of annual versus hourly shift factors was further discussed<sup>16</sup> and the AESO's intent to explore the issue further with ENMAX was noted in the Ruling.<sup>17</sup>

35 After discussing this matter with ENMAX following the technical meeting and undertaking a further examination of additional examples, the AESO has concluded that different loss factors will result if hourly shift factors are applied compared to a single annual shift factor. Consequently, the AESO considers it appropriate to use hourly shift factors in the calculation of raw loss factors. The AESO proposes to revise the methodology originally set out in section 3.11(p) of the Implementation Plan, as follows:

- (a) calculate raw loss factors for each source asset in each of 8,760 hours, discarding hours with insufficient supply or that are unsolvable;

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<sup>12</sup> Exhibit 790-X0453.

<sup>13</sup> Decision 790-D03-2015 at paragraph 5(c).

<sup>14</sup> Exhibit 790-X0466 at section 13.

<sup>15</sup> Exhibit 790-X0466 at section 13.

<sup>16</sup> Exhibit 790-X0466 at section 11.

<sup>17</sup> Exhibit 790-X0467 at paragraph 62.

- (b) apply an hourly shift factor to all raw loss factors in each hour to ensure recovery of the calculated transmission system losses in that hour;
- (c) calculate the volume-weighted average loss factor for each source asset;
- (d) apply an annual shift factor to all average loss factors to ensure recovery of the forecast annual transmission system losses; and
- (e) use an iterative clip and shift process to ensure loss factors are within the collars specified in the *Transmission Regulation*.