

2006 Transmission Loss Factors Methodology

AESO Responses to Stakeholders' Questions on Rules Discussion Paper (Revision: 2005-03-14)

Contributors of Questions: AltaGas, ENMAX , EPCOR, TransAlta, TransCanada

1. *Please advise the AESO's position on the Transmission Development Policy Paper proposal to limit any one time change in loss factor to individual generators to not more than 1/2 of the system average losses.(EPCOR)*

Response: The Transmission Regulation does not include the principle listed above; therefore AESO is not proposing to use this principle. The Transmission Regulation requires loss factors not exceed two times system average losses for charges and one times system average for credits. An addition of a significant transmission facility could also result in a loss factor change for a particular generator which could exceed the 0.5 times system average. The proposed 500kV line from Edmonton to Calgary may result in a one year loss factor change which exceeds the value of half of the system average losses.

2. *Please provide the mechanism whereby market participants can access the loss factor model and do their own sensitivity or planning runs.(EPCOR)*

Response: The AESO will provide alternatives, for stakeholder access to the loss factor model, later this year. The AESO is working on developing budget numbers for each alternative and will provide the options with their budgeted costs (capital and operating) so that stakeholders can help AESO determine which option to proceed with. Implementation will not occur before 2006. AESO is interested in obtaining ideas from stakeholders to address this issue with a request for input by March 31 2005.

3. *Please confirm for which years loss factors will be calculated and posted, i.e 2006 and 2010 or other years also? (EPCOR)*

Response: Each fall (tentative date of November 1) the AESO will produce fixed loss factors for the coming year with all existing and new facilities. A forecasted set of loss factors for the fifth year out (i.e. loss factors for 2006 and a forecast set of loss factors for 2010) will also be produced.

4. *Please confirm that the AESO will not implement loss factor zones.(EPCOR)*

Response: The AESO will not create loss factor zones. The methodology has produced loss factors, for adjacent generators, which are very similar for both the 2005 calculated loss factors and for the 2010 estimated loss factors.

5. *Please confirm that all future years will be calculated using the 3 cases and 4 seasons model. (EPCOR)*

Response: The AESO will use twelve base cases for the load flows used in determining transmission losses. These twelve cases include the four seasons; winter, spring, summer, and fall and the three load scenarios; high, median, and low.

6. *Section 2.3 – Compressed Loss Factors (AltaGas)*

At page 7 of the Discussion Paper, the AESO describes the methodology that will be adopted if loss factor compression is required. The method described is to limit loss factors of all generators outside of the valid range to the valid range and to apply shift factors to the loss factors for all generators not on the limit with the first calculation. This appears to AltaGas to be inconsistent with the Transmission Regulation, which requires, in Section 19(2)(f), that “every loss factor must be multiplied by a common number in order to limit the loss factors as follows: . . . “ The concept of a shift factor to generators not on limit is inconsistent with this.

- *If it is impossible to develop a methodology that is consistent with the Regulation, it may be necessary to amend the Regulation to reflect the methodology that has been adopted.*

The description of the method for compressing loss factors given in the February 9, 2005 discussion paper is not detailed enough for us to determine whether this is changed from the January 26, 2005 recommendation. As was noted at the January 28, 2005 meeting the compression method may be in violation of the Regulation. TransAlta would like confirmation whether this is still the case and if so how does the AESO propose to deal with this issue. (TransAlta)

Response: Teshmont was unable to develop a compression methodology that

produced acceptable results and remained compliant with the Transmission Regulation. The proposed model for loss factor compression is the model recommended in the Teshmont Report “ Loss Factor Methodologies Evaluation Part 3 – Loss Factor Compression” dated January 26, 2005. The AESO will advise the Alberta Department of Energy that the AESO is proposing to use a compression methodology which is non-compliant with Section 19(2) (f).

7. Section 3.3.2 and Appendix A – Loss Factors for Opportunity Import/Export Service

It appears to AltaGas that the AESO’s thoughts around Imports and Exports need to be fleshed out further. In particular, AltaGas continues to be concerned that the proposed rules will not be compliant with the Transmission Regulation, which requires, in Section 22(2) that exports “must pay location-based loss charges that recover the full cost of losses required to provide this service.” [Emphasis added] AltaGas is concerned that if there is not an offsetting credit or similar mechanism, there may be double-counting of losses for exports. In addition, AltaGas does not believe that the current proposal deals appropriately with equal and opposite factors for counter-flows. (AltaGas)

There was a concern expressed that losses were being double counted with respect to exports. From what TransAlta can see in the February 9, 2005 discussion paper this concern has not yet been addressed and if necessary rectified by the AESO. (TransAlta)

Response: In the proposed methodology, the buses located at the border of Alberta’s jurisdiction (bus 90000 on 1201 Line at the Alberta - BC border and the McNeill 138 kV bus 1473 at the Alberta - Saskatchewan border) are modeled as generators (for exports, negative generators and for imports, positive generators). The methodology then calculates a loss factor just as it would for any generator on the system, based on the MW value assigned to the transaction. The loss factor calculated is the value of the impact of the transaction on system average losses the same as it calculates the loss impact for each generator on the system. Therefore the methodology does not double count losses for export or import transactions.

The AESO offered an option in the discussion paper which involved using a loss factor curve for opportunity imports and exports. This option is complex and cannot be readily accommodated by the AESO’s billing system. The AESO prefers to use the current process of calculating loss factors based on using the 80th percentile of the previous three month season’s transaction history to establish the seasonal loss factors. The AESO considered netting the offsetting

import and export transaction for any given hour and charging the net transaction with the loss factors posted for the then current season. An example of how this would work is as follows:

For hour 1 there was scheduled an import transaction of 80 MWs by party A, an export transaction of 100 MWs by party B and an export transaction of 50 MWs by party C. The net transaction of 70 MWs would be charged the then current export loss factor which for this example is assumed to be 3.5%. If the Pool Price for hour 1 was \$50/ MWhr, the billing for opportunity service losses for hour 1 would be calculated as follows:

Party A – no loss factor credits or charges

Party B – $100 / (100 + 50) \times 70 \text{ MW} \times 3.5\% \times \$50/\text{MWhr} = \$ 81.67$

Party C – $50 / (100 + 50) \times 70 \text{ MW} \times 3.5\% \times \$50/\text{MWhr} = \$ 40.83$

The limitation of the option is inter-tie siting signals are diluted by netting the transactions at the border.

Regarding section 22(2) and the identification of only charges to pay for the service, AESO requests The Department of Energy review the item and assist in the clarification.

8. TransAlta notes Section 3.3.4 of the February 9, 2005 discussion paper deals with loss factors for merchant transmission lines. As there are no merchant transmission lines presently in Alberta, is it necessary for the rule currently being drafted to include a definitive loss factor methodology for merchant transmission lines or would a more general approach be more appropriate at this time.?

Response: There are some stakeholders who have asked for a policy on transmission loss factors with respect to Merchant Lines. Therefore, the AESO believes it is obligated to provide rules governing loss factors for Merchant Lines.

9. The procedure the AESO uses to modify the 12 loss factor models from uncorrected to corrected is not mentioned in this report (AESO discussion paper).(TransCanada)

Response: The methodology that the AESO is proposing to use is the 'Corrected R matrix Area Load Adjustment 50%'. One of the options that Teshmont looked at was the 'Uncorrected R Matrix Area Load Adjustment 50%'. The difference in the two methodologies is that the uncorrected R Matrix version uses only topology and makes no corrections for bus voltages and power flows

on the network. This version was looked at because it could allow for stakeholder visibility without showing confidential generator information. The drawback is that it requires a sizeable shift factor.

10. The AESO should provide some information for the procedure used to convert the model by balancing the MVAR flow for each point of supply, transformer tap settings, capacitor bank and static VAR compensation. (TransCanada)

Response: AESO uses TASM_o as the repository of AIES information. Models developed from TASM_o as used as inputs to our power flow model in PSS/E. The balancing takes place based on voltage set points, facility limitations and historic seasonal adjustments.

11. The AESO should provide more information on the development of the peak, median, and light load base cases in the discussion document. The information provided should be similar to the report Loss Factor Methodologies Evaluation Part 2 – Conversion of Power to Energy Loss Factors which provided the mechanism of averaging for the high, mid, and low sections of the load duration curve. (TransCanada)

Response: AESO bases the peak, median, and low cases for determining loss factors on the AESO load forecast. The load cases are based on the 100th percentile, 50th percentile and 0th percentile levels. AESO presently uses an equal weighing methodology for the calculation of the seasonal average raw loss factors. The equal weighting method will be used in 2006 and beyond. Both AESO and Teshmont have independently arrived at the conclusion the weighted impact of the peak, median and low cases has been found to be similar to cases with equal weighting.

12. The AESO is proposing that customers with signed CCA agreements for a new or expanded point of delivery or supply be added to the loss factor models. TransCanada agrees with this process for loss factor forecast in future years. For the year in which the billable loss factors are to be determined, only points of delivery or supply with approved System Access Agreements should be added to the loss factor model. Additions to one or more of the 12 loss factor models should be based on the in service date in the System Access Agreement.

Response: The AESO agrees.

13. *The report states that planning generators can be added when needed. In TransCanada's opinion, planning generators can be added as required in forecast modeling in future years but should be specified within the summary of changes to the model with reasons as to why the generators were added. No planning generators should be added to the models for the billable loss factors.*

Response: The AESO agrees.

14. *Using the 100th percentile on marginal MW in the generation stacking order (GSO) is not consistent with the average method used in determining the seasonal capacity. It is our understanding that the average method for determining the seasonal peak as per figure 3 in the report Loss factor methodologies Evaluation – Part 2 – Conversion of Power to Energy Loss Factors. In this report, the peak is the average of the 66th to 100th percentile, median 33rd to 66th and low 0 to 33rd percentile on the load duration curve for the season. TranCanada would recommend that the average method be used to determine the seasonal capacity also be used to develop the GSO. The AESO would produce 12 generator outputs in the GSO table for each generator that corresponds to the 12 loss factor models. This recommendation provides for greater consistency within the approach taken by the AESO and better conforms to the Transmission Regulation, Section 19(2)(d) that “the loss factor in each location must be representative of the impact on the average system losses by each respective generating unit or group of generating units relative to load”.*

Response: Please refer to Question 11 regarding the averaging method. Regarding the Generic Stacking order, the GSO process has not yet been finalized. Generator blocks, historic pricing signals, and so on have yet to be determined.

15. *Loss Factor models should be provided in October for the upcoming year to allow stakeholders to agree on the assumptions and loss factor modeling changes. Once the loss factor modeling changes have been vetted by stakeholders, the final loss factors should be published by the AESO in November.(TransCanada)*

Response: The AESO will provide loss factors based on three of the four seasons by August each year for stakeholder comment. Any changes to the assumptions would have to be identified and agreed to prior to mid-September to allow the AESO to finalize the loss factors for the upcoming year by the beginning of November. In order to better coordinate the vetting of information,

AESO will provide by mid-March an assumed time line in which items should be completed to meet overall schedules.

16. Modeling of new generators should be similar to the modeling of existing generators. Since the historical output of the new generator is zero, assumptions should be made by comparing the historical operation of similar generators with some allowance for commissioning requirements and planned operation of the generator. STS contract levels should not be used to model new generator output. Assumptions for new generators should be provided by AESO in the GSO tables and loss factor Models.(TransCanada)

Response: Any new generators for which a historical record is not available will be dispatched according to the AESO's analysis of the generator technology. Its power output would be based on its Incapability Factor. The Incapability Factor (ICBF) = 1 – Available Capacity Factor (ACF) is a standard used by the Canadian Electricity Association reflecting industry averages for each type of generation technology. The AESO will review with each individual developer, the proposed operation of the new generator and determine the best forecast for the output of the unit in its initial year of operation.

17. TransCanada would like the AESO to consider having one annual loss factor for export and import. Since it is not clear from the information provided that the accuracy of the loss factor would be acceptable at an annualized level, TransCanada would like to see how much accuracy is lost if annual loss factors were used. From the document provided by the AESO, Intertie Loss Factors, it appears that the extreme export loss factors of 15% to 25% would not occur with the new loss factor methodology and would be more in the range of less than 6%. Assuming this is the case, these smaller loss charges may allow for some averaging to simplify the import and export tariffs, the AESO could use historical export and import capacity. For each hour, the net export or import would be determined by setting the peak as the average of the 66th to 100th percentile, median 33rd to 66th and low 0 to 33rd percentile of the import or export load duration curve. Exports would be modeled as negative generation and as such would be modeled in the opposite manner to generators (low exports would be modeled with high load and high generation in Alberta and high exports would be modeled with low Alberta load and low generation). TransCanada would suggest that AESO calculate import and export loss factors using the 12 average export and import capacities to determine if the loss factors are reasonably stable for all seasons of the year. This would be the basis to determine if loss factors can be simplified into an annualize amount, which in turn would be consistent with how generators are assessed losses.

Response: The AESO will continue to use seasonal loss factors for Opportunity import and export transactions. If the new methodology produces loss factors that do not significantly change over the course of a couple of years, then the AESO will consider using an annual Loss Factor.

18. TransCanada requests that the AESO consider the merits of redoing the twelve cases after a given year based on actual generation, load levels, and export and import levels. These losses that are based on actual inputs would then be compared to the forecast amounts charged to customers and the difference would be refunded or charged as appropriate to each customer. This approach would eliminate material errors caused by unplanned maintenance or forced outages, material changes in import or export levels and changes in dispatch order that affect losses. Another advantage would be that these losses based on actual inputs would inform the AESO of potential improvements in your forecast model. Any differences between losses based on actual inputs applied to the twelve cases and metered losses would then be adjusted through the calibration factor.

Response: The Transmission Regulation requires the AESO to:

Section 19(1) (d) provide a means by which, annually, a determination will be made of the difference between the anticipated transmission line losses and the actual transmission line losses;

(e) subject to section 21, provides a means through the application of a calibration factor to adjust the amounts paid by the application of the loss factor described in clause (c) so that the owners of generating units pay the actual transmission line losses or receive a credit for overpayment.

21(1) In accordance with the rules, loss factors may be adjusted by a calibration factor to ensure that the actual cost of losses is reasonably recovered through charges and credits under the ISO tariff on an annual basis.

(2) If the actual cost of losses is over or under recovered in one year, the over or under recovery must be collected or refunded in the next year or subsequent years.

The AESO believes that the Regulation's intent is that all generators will be treated the same with respect to over or under collection of funds to cover the cost of losses. The use of a Calibration Factor was not intended to produce winners and losers with respect to the deferral account for losses. The AESO's treatment of the Calibration Factor is that of a rate rider in the tariff filing. The overall objective is for the AESO to collect the funds required to cover the costs of transmission losses and to ensure that the cost recovery is a forward looking approach so that generators can fairly recover their costs for losses. AESO recognizes the intent of the request and will consider its application within AESO to better reflect the forecast and billing of losses.

19. *In the Discussion Paper, the AESO outlines the following two options for loss factor treatment of export service:*

- *Proposal A contemplates the AESO levying the appropriate party a charge or credit for the losses based on a net import/export transaction. Under this proposal, loss factors for exports would be dependent upon aggregated exports and the loss factor would be calculated on an ex post basis.*
- *Proposal B assigns a single loss factor value based on the 80th percentile of the transactions conducted in the previous three month season. Proposal B appears to be less accurate than Proposal A but does provide visibility to the loss factor prior to export.*

ENMAX believes that it is essential for exporters to understand the credits and charges that they will incur prior to transacting, and believes that improved accuracy is also important; therefore ENMAX is proposing a combination of Proposal A and B.

Proposal C is to utilize Proposal B, and in order to improve the accuracy of Proposal B a separate reconciliation process for import and export losses could be considered. Over and under-collections for export/import losses could be added or subtracted from the export loss factor for the next adjustment period. This would result in exporters as a group paying the correct amount for losses over time. ENMAX notes that this plan would likely require Rider E, as contemplated in the AESO 2006 General Tariff Application, to be amended. In addition, calculating a separate loss factor for on-peak and off-peak periods would increase the accuracy over a single loss factor for all periods. (ENMAX)

Response: The AESO does not believe that it is practical to modify Rider E such that the deferral account is reconciled every three months. We would suggest that ENMAX make their request regarding this issue through the current AESO tariff application currently before the AEUB.

20. *In order to provide generators with the ability to verify the loss factor calculations and to have the ability to produce ‘what if’ scenarios for future generation development, the AESO has contemplated either:*

- 1. Licensing a third party consultant to provide this service; or,*
- 2. Providing special web access to allow generators direct access to the loss factor model.*

Based on discussions with the AESO, ENMAX understands that a full implementation of either of these two solutions would be costly and will likely take significant time to implement.

Most generators have the capability to verify their losses factors and produce ‘what if’ scenarios if they are given the underlying power flow models used to calculate losses and if they are provided with the ability to extract and process relevant information from these models to aid in applying the corrected loss matrix adjustment. As an alternative to the two proposed solutions, ENMAX recommends that these power flow models and extraction/processing routines be provided to generators as soon as they are available. (ENMAX)

Response: Solution 1 may not be very expensive. Providing each generator with the model and all the base cases is likely to be very expensive considering the development costs, and licencing fees. The AESO will provide to stakeholders later this year, proposals for access to the model along with budgets detailing operating and capital costs. AESO invites additional suggestions on options to provide the ‘what if’ scenarios by March 31, 2005.

21. *The AESO has still not adequately responded to the concerns brought forward by Carl Fuchshuber of ATCO Power with respect to the “50% Area Load Adjustment Methodology”. TransAlta believes that the AESO should be able to respond to the concerns expressed by ATCO by either using the simple example proposed by Carl to verify that the proposed methodology is appropriate or in the alternate by explaining why the simple example is not appropriate and cannot be used to validate the method. (TransAlta)*

Response: AESO continues to pursue resolution on the matters raised by ATCO Power, and would like to discuss the issues based on evidence presented the existing proposal is incorrect or misleading. AESO may revisit the proposal once evidence has been provided indicating the solution is not acceptable. AESO and its consultant have provided answers to the questions provided, and believes the simple two bus model is not representative of the Alberta system.

AESO would also entertain a regular review process to ensure the loss factor methodology remains relevant and applicable by adding such a clause in the rules process.