



December 12, 2005

Loss Factor Stakeholder Committee

Re: Modification of Opportunity Service Loss Factors

The AESO recently received a request from a stakeholder to review the opportunity service loss factors for 2006. The AESO and Teshmont reviewed the request and determined that the opportunity service component in the loss factor application software contained a programming error. The net effect of the error was that changes in system losses attributed to opportunity service were effectively counted twice. Please refer to 'Appendix A - Detailed Description of the Opportunity Service Change' for further information.

The programming change will only affect the opportunity service loss factors. No generator loss factors are being changed. The methodology itself has not changed – only the program implementing the methodology has been corrected. Teshmont will be updating Part 4 of the loss factor report as a result of this correction.

We will continue to ensure that the new methodology is being implemented as quickly and efficiently as possible. Although the programming error was not detected during our testing phase, for the reasons described in 'Appendix A', we will implement more comprehensive testing during future development.

We apologize for any inconvenience that this may have caused and thank you for your ongoing support of the loss factor initiative. Please call me at 403 539 –2614 if you have any further questions.

Yours truly,

Robert Baker, P.Eng.
Operations Forecasting, AESO

Appendix A - Detailed Description of the Opportunity Service Change:

Background

The AESO recently received a request from a stakeholder to review the opportunity service loss factors for 2006. The stakeholder was developing a load flow based methodology to calculate generator and export loss factors to allow them to apply the proposed methodology to their own 'what-if' calculations. They requested that the AESO review their calculations to confirm their understanding of the methodology.

The AESO and Teshmont reviewed the request and determined that the opportunity service component in the loss factor application software contained a programming error. The stakeholder calculations of generator loss factors compared favorably to the AESO loss factors but their export loss factors were approximately 50 per cent of the AESO loss factors. Their actual load flow results compared favorably with the AESO virtual load flows with exports but there was a significant difference in calculated export loss factors prompting further examination of the software. It was through this review that the programming error was discovered.

Description of the Software Error

The opportunity service loss factor software was originally designed using distributed generation to balance the virtual load flow. This involved calculating a factor which when multiplied by the change in base case generator output would balance the change in opportunity service activity as well as the resulting change in system losses. The product of the change in generator output and the adjusted raw loss factor for that generator represents the losses that would be recovered from each generator in the system as a result of the opportunity service transaction. To avoid 'double dipping', the total recovered change in losses was subtracted from the actual change in losses to establish the losses that are due to the opportunity service.

When the methodology was changed to use distributed load as the basis for balancing the virtual load flow, a correction factor was calculated which when multiplied by each load in the system would also balance the change in opportunity service activity as well as the resulting change in losses. This factor was inadvertently multiplied by the base case generation and the resultant impact of that incorrect change in generation was subtracted from the actual change in losses to establish losses to be recovered by the AESO for opportunity service. As the correction factor was determined based on load but applied to generation, the net effect was to charge the opportunity services for not only the direct change in losses resulting from the opportunity service but also a component with a comparable magnitude that was due to a change in generation that did not occur.

This resulted in overestimating the increase or reduction in losses due to each opportunity service transaction by almost a factor of two, consequently the raw loss factors were approximately twice what they should have been.

The error was not discovered during validation due to a failure to fully test the system after the change in methodology for opportunity service from distributed generation to distributed load was implemented. Prior to the change, the opportunity service loss factors were validated by:

- a) Comparing virtual load flow results to full system load flow results

- b) Transferring the change case results into a spreadsheet and comparing the opportunity service loss factors determined using the spreadsheet analysis with the opportunity services loss factors using the software.

After changing the methodology, only the virtual load flows were validated. A comparison of the resultant software loss factors with an alternate calculation tool was not carried out. It was decided that since the remaining code had not been changed it would not be necessary to be validated again. This reasoning was flawed.

Validation of Changes and Impacts

The software has been revised and the opportunity service loss factors have been re-calculated with the revised software. The virtual load flow results have been reviewed again and are confirmed to be correct. The virtual load flow results have been transferred into a spreadsheet and all opportunity service loss factors have been re-calculated using the spreadsheet. The spreadsheet and AESO software results agree within numerical truncation and rounding accuracy. Further, an expanded bandwidth of imports and exports were tested on the system to reveal either trending of the loss factors and stability in the results. The expanded results have proved to show the trending was as expected.

The change in the software will have an indirect affect on generator loss factors. The impact on all generators is within the range of 0.0025 % to 0.06 %. Generator loss factors will not be changed as a result of the opportunity service adjustments. Export and DOS load loss factors are reduced by about 4 %. Import loss factors increase by close to 4 %, from a credit position to a small charge.