9.1 Transmission Loss Factors

9.1.1 Purpose of Rule

The purpose of this rule is to describe the means by which the ISO's determines annual transmission loss factors to result in the reasonable cost recovery of transmission line losses. As stated in Section 20(1) of the 2004 Transmission Regulation: 'The ISO must make rules with respect to the designation of loss factors in any place in Alberta where a generating unit is not located, and on request, determine a loss factor with respect to a generating unit that a person proposes to construct.'

9.1.2 Loss Factor Principles

- The loss factor methodology will provide a forward looking locational incentive for generators which; are long-term signals, relatively stable, and allows it to be factored into investment decisions.
- The same loss factor will apply to all generators connected to the same bus.
- The ISO will include in the ISO tariff, transmission system loss factors that will reasonably recover the cost of transmission system losses.
- Loss factors must apply for a period of one year except they may be revised when a system upgrade or enhancement to the transmission system materially affects system losses ,
- Loss factors may vary by location in Alberta but must be within a range of not more than 2 times system average loss factor for charges and not more than 1 times system average loss factor for credits.
- Loss factors must be a non-variable single number at each location.
- Owners of generation must pay location-based loss charges or receive credits.
- Loss factors in each location must be representative of the impact on average system losses by each representative generator.
- The loss factors may be adjusted annually by a calibration factor(s) to ensure that the actual cost of losses is recovered annually and actual costs not recovered within a year may be recovered in the following year.
- A person receiving transmission service under an interruptible service arrangement for load (DOS), import (IS), or export (ES) must pay location based loss charges that recover the full cost of losses required to provide this service.

9.1.3 Transmission Services Requiring Transmission Loss Factors

Persons receiving transmission services requiring loss factors are financially responsible for transmission losses. Loss factors are required for the following transmissions services:

Supply Transmission Service (STS)
Opportunity Import and Export Transmission Service (IS & ES)
Import Transmission Service (not currently existing)
Demand Opportunity Service (DOS)

Small Power Research and Development designated generating units are exempt from the financial responsibility for transmission losses and therefore do not require a loss factor.

9.1.4 Development of the Generic Staking Order (GSO)

A Generic Stacking Order (GSO) will be developed or modified each year by the ISO. A GSO will also be developed for a planning year five years forward.

9.1.5 Energy and Load Forecast

The ISO will annually produce twenty-year energy and load forecast. The internally approved forecast will be used to produce new load flow base cases for the development of loss factors and for revising the GSO.

9.1.6 Development of Load Flow Base Cases

The ISO will produce a single suite of load flow base cases for the forth coming year including four seasons, (winter, spring, summer, and fall). The seasonal base cases will include load profiles high, median, and low using the ISO's load forecast. The three base cases for each season will have identical topology.
A second set of base cases will be developed for the fifth year out (planning year) from the current year. These cases produce results that are non-binding and are considered as information only.

9.1.7 Calculation of Loss Factors For STS

The ISO will use the "Corrected R Matrix Area Load Adjustment 50%" to calculate the loss factors. System losses will be calculated in PSSE using the twelve base case load flows developed for the forecast year. The ISO will calculate the loss factors for each year using the base cases developed for Firm Service (STS) and the additional base cases developed by the ISO for Opportunity Services. For STS, the ISO will adjust the resulting generation dispatch according to the GSO to achieve a zero MW exchange at all inter-ties. The ISO will issue loss factors for the following year by the first Friday in November of each year.

9.1.8 Calculation of Loss Factors For Import and Export Opportunity Service

For opportunity import and export transmission service, two loss factors are calculated, on-peak and off-peak for each season. The levels are determined from the transfer values of the previous three month season. Loss factors are then calculated based on the 80th percentile of metered transfer level during that period.

9.1.9 Calculation of Loss Factors for Demand Opportunity Service

Loss Factor calculations for DOS loads are based on the DOS contract capacity. Calculations are made prior to the start of each season and utilize the system model applicable for that season.

9.1.10 Calculation of Loss Factors for Firm Import Service (not currently existing)

Determination of a loss factor for Firm Import Service will be calculated with the contracted value of the transaction (in MWs) represented as a generator located at the appropriate inter-tie border. This contract loss factor is will apply to all transactions not exceeding the contract limits for the party requesting firm import service.

9.1.11 Preliminary Loss Factors

A customer with a prospective generation project can approach the ISO requesting a preliminary estimate of a loss factor to assist in project economic assessment.
The ISO, through discussions with the customer, would add the new generator to the existing stacking order. 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. If the new unit is an addition to an existing plant using the same connection configuration, then it will receive the same loss factor as the existing units.

9.1.12 Loss Factor Compression

If necessary, loss factors for generators and firm and opportunity imports will be compressed so the resulting loss factors are within one times system average losses for credits and two times system average losses for charges. Export opportunity service and DOS loads will not be compressed.
The loss factors of all generators outside of the valid range will be limited to the valid range. A shift factor will be applied to the loss factors for all generators not on limit with the first calculation. If any loss factors lie outside the range as a result of the application of the shift factor, the loss factors of all of the generators that were not originally on limits would be ‘linearly compressed’.

9.1.13 Billing for Transmission Losses For STS

The ISO will bill each generator on a monthly basis, as part of the ISO's tariff, for transmission losses. The cost of losses associated with individual generators will be calculated for the billing period as the sum of the generator's hourly output in MWs, times the generator's loss factor (in percentile), times the pool price for the hour ($/MWhr).

9.1.14 Billing for Opportunity Transmission Service

The ISO will bill for each import and export transaction on a monthly basis, as part of the ISO's tariff, for transmission losses. The cost of losses associated with individual transactions will be calculated for the billing period as the sum of the hourly scheduled transactions in MWs, times the current import or export loss factor as appropriate (in percentile), times the pool price for the hour ($/MWhr).
The ISO will bill each Demand Opportunity Service on a monthly basis, as part of the ISO tariff, for transmission losses. The cost of losses associated with individual transactions will be calculated for the billing period as the sum of the hourly DOS load in MWs, times the current DOS loss factor (in percentile), times the pool price for the hour ($/MWhr).

9.1.15 Billing For Firm Import Transmission Service

The ISO will bill for each firm import transaction on a monthly basis, as part of the ISO's tariff, for transmission losses. The cost of losses associated with individual transactions will be calculated for the billing period as the sum of the hourly scheduled transactions in MWs, times the contract import loss factor (in percentile), times the pool price for the hour ($/MWhr).

9.1.16 Merchant Transmission Lines

Loss Factors for merchant transmission lines connected to the AIES, internally or intra-control area, will be treated the same as the existing inter-tie lines from Alberta to Saskatchewan and British Columbia. For merchant lines not connected to the AIES, no loss factors will be accrued.

9.1.17 Calibration Factor

The Transmission Regulation requires the ISO's tariff to recover the difference between the forecast and actual costs of transmission losses through a calibration factor. The calibration factor is a deferral account and will be described in the ISO's tariff as Rider E.

9.1.18 Posting of Loss Factors

The ISO will post on its website the loss factors for firm and opportunity transmission services by the end of the first week of November of each year. The effective dates and term of the loss factors will be included in the posting.

9.1.19 Loss Factor Methodology Amendment

The ISO may amend the loss factor methodology by posting a notice on its website of its intention to do so, not less than three (3) months prior to the proposed date of amendment. The amendment will follow the ISO's Rule Making Process.

9.1.20 Loss Factor Modeling and Assumption Details

A description of the loss factor methodology and the assumptions used to calculate loss factors are described in a document titled "Transmission Loss Factor Methodology and Assumptions". This document can be found in Part Four Appendices of the ISO Rules.