

Draft - Tie Losses Assessment for 2007 T-REG

1.0 Introduction

The 2007 T-REG requires the losses associated with tie lines to be treated separately from the AIES losses. This leads to a different loss recovery processes for Tie lines and the AIES. This document discusses tie line losses and provides some possibilities for a losses recovery technique.

2.0 Alberta - Saskatchewan McNeil Converter Losses

Data used in the preparation of the converter station loss curves is supplied by ATCO Electric. The data represents 15 minute data taken from Mar 01, 2000 to January 01, 2001. Figures 1-2 show the converter station loss as a function of import from Saskatchewan and export to Saskatchewan.

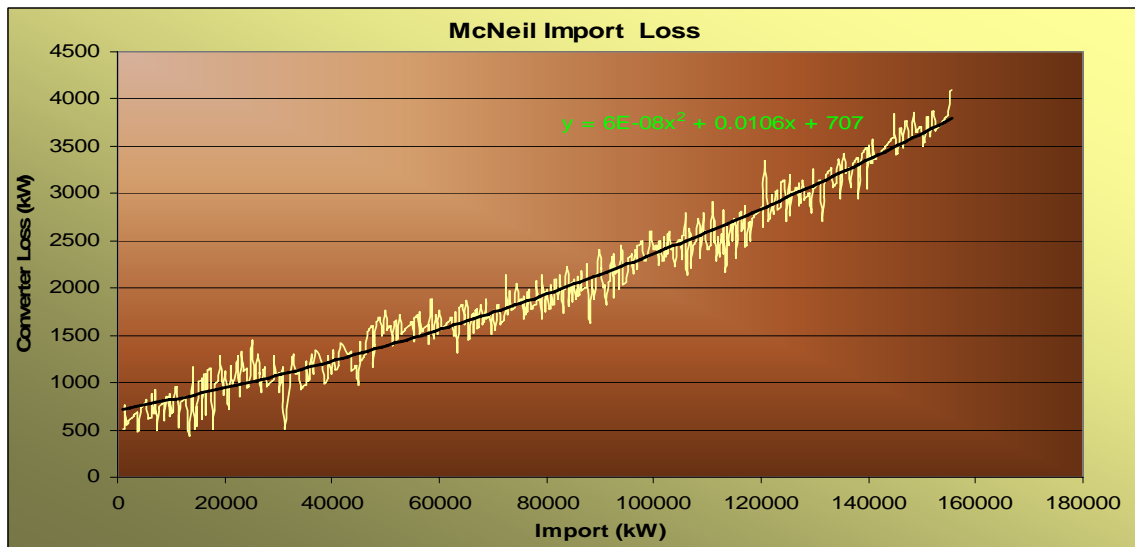


Figure 1: Converter loss vs. Saskatchewan import.

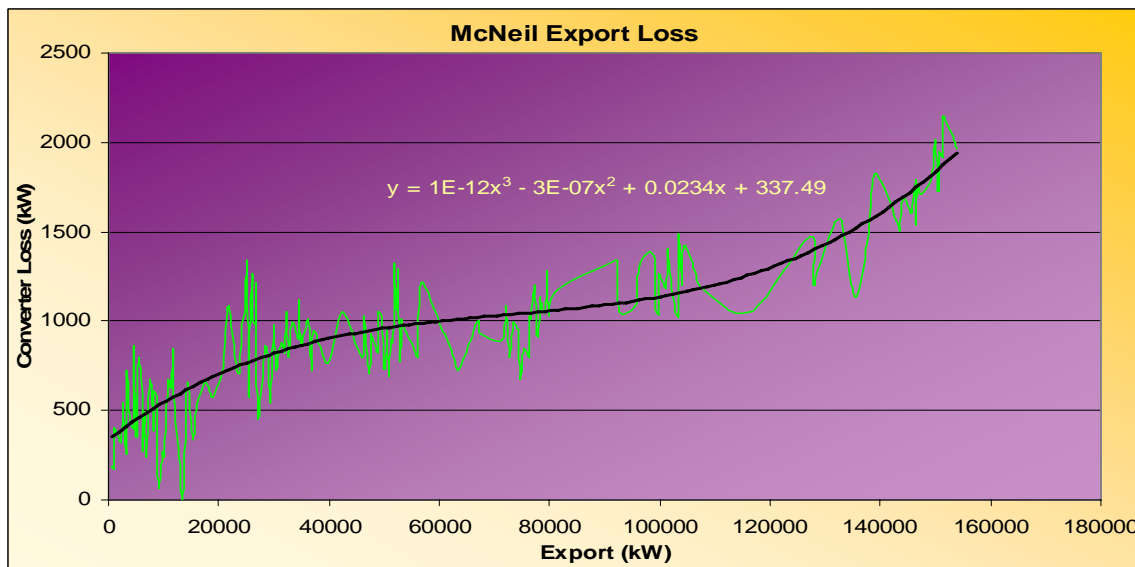


Figure 2: Converter loss vs. Saskatchewan export.

Based on the information above, tie line losses can be estimated based on the expected flow of power.

3.0 Alberta – British Columbia Tie Line Loss

The 2007 base cases used for the draft calculation of the 2009 T-Reg scenario is considered for the BC tie flows and losses. The 2007 base case uses historical data from June 01, 2005 to May 31, 2007. BC tie flows and losses are presented in Table 1. Subsequent analysis is provided in Table 2.

Table 1: BC Tie Flows and Losses and Seasonal Load Duration Hours.

BC Tie	Winter			Spring			Summer			Fall		
	High	Medium	Low	High	Medium	Low	High	Medium	Low	High	Medium	Low
Tie Flow (MW)	-395.3	-110.8	69.9	-165.9	-144.4	-22.2	-330.1	-23.5	297.5	-381.4	-222.5	104.6
Loss (MW)	3.7	1.4	1.4	1.2	1.5	1.3	3	1	2	3.6	2.4	1.5
Duration (Hrs)	125	1150	885	50	1150	1007	25	2075	108	75	1075	1035

Table 2 in the next Section shows the tie flow netted off Export and Import and calculated from historical metered data and used in the 2007 loss factor calculation. The –ve sign means net import to Alberta.

The weighted average annual flow and loss can be calculated using the following equation:

$$\text{Average flow or loss} = \frac{\sum_{12 \text{ scenarios}} \text{absolute}(\text{Tie Flow or Loss} \times \text{Duration})}{\sum_{12 \text{ scenarios}} \text{Duration}}$$

4.0 Results

Table 2 shows the weighted average annual BC tie flow and the line losses netted for export or import.

Table 2: Weighted Average Annual BC Tie Flow and Loss.

	BC Tie
Avg Tie Flow (MW)	102.80
Avg Loss (MW)	1.50

Table 2 can be used as an example for recovering tie losses in the tie lines between Alberta and British Columbia. The average tie flow of 102.8 MW causes a loss of 1.50 MW of loss in the BC tie. The result can be used in two ways –

1. Apply 1.50 MW of loss to any and every AB-BC tie transaction, or
2. Apply a ratio of 1.50/102.8 to any AB-BC tie transaction.

Table 3 shows average historical McNeil Converter station loss.

Table 3: Average SK Tie Loss at the McNeil Converter station.

	Avg Loss
Avg Import	2.5%
Avg Export	2.3%

5.0 Assumptions

The following assumptions should be noted –

1. The document provides a guideline for understanding loss estimates on the tie paths.
2. Export will have no loss factor but it will pay for tie path losses.
3. Import will have loss factor in addition to the tie path loss payment.
4. Average path loss will be used for tie path loss estimation.
5. BC Tie Flow consists of three line flows –
 - a. 500 kV line between Langdon (Bus 158) and BC Border (Bus 90000).
 - b. 138 kV line between Pocaterra (Bus 329) and Britt Tap (Bus 819).
 - c. 138 kV line between Coleman (Bus 232) and Natal (Bus 1501).
6. AESO tariff must recover tie line losses on the BC ties to the Alberta / BC border.

6.0 Next Steps

The AESO suggests for the Alberta to BC inter-tie:

- The tie losses to BC be monitored on the 500 kV line and 138 kV lines
- The losses be charged at a rate of 1.50 MW/102.80 MW of transfer

The AESO suggests for the Alberta to Saskatchewan inter-tie:

- The tie losses to Saskatchewan be charged based on Table 3

For the Alberta tie lines, the data used will be gathered the same as the historical data accrued for generators (i.e. from June 1 to May 31 of the previous year.) If necessary, meters be configured (or added) so the flow at (a) Langdon and at the BC border, and (b) on the 138 kV AIES side of the McNeill station and the Saskatchewan border can be taken for purposes of gathering tie line average losses.