November 17, 2005

To: Loss Factor Stakeholder Team

Re: Description of Changes in the Penultimate Loss Factors on November 10 2005 vs. Version 5 Estimates, February 2005

Some stakeholders have requested more detailed information regarding the penultimate loss factors published on November 10, 2005. The following items are examples meant to illustrate the main reasons for the changes from the Version 5 (V5) Loss Factors released in February 2005 and the Penultimate loss factor values released on November 10 2005. Final 2006 loss factors will be posted on November 18, 2005.

1. *Generation Levels.* In the Version 5 cases and in fact in all loss factor calculations up to 2005, Supply Transmission Service levels were used as the basis for the calculation of loss factors. The 2004 Generic Stacking Order was used to populate the base cases for the Version 5 estimates. The 2006 loss factors uses average actual generation levels to determine loss factors based on the AESO Rule. Please see the Appendix #1 for a sample comparison. In the north central and northwest areas, for example, generation levels in the fall peak Version 5 case were dispatched 200 MW or 80% higher than in the Penultimate cases. Also, the three Rossdale units were dispatched at 150 MW to maintain interchange of 0 MW's, where as in the Penultimate cases, Rossdale was not dispatched.
2. *Additions and Decommissioning of Generation.* In the determination of Version 5 loss factors, Genesee 3 was evaluated at 0 MW's as it was not commissioned until March of 2005. The four units comprising the Cloverbar plant were removed in the final base cases. In the Version 5 fall peak case for example, Cloverbar plant was dispatched at 470 MW in order to float the inter-ties. Therefore the Cloverbar plant had a large effect on the Version 5 determinations. The netting of the Cloverbar decommissioning against the Genesee 3 addition has resulted in higher loss factors for Genesee and Keephills. Further, the addition of wind powered generation has served to increase loss factors in the southwest.
3. *ISD Equivalents.* In the V5 cases, ISDs (Industrial System Designation) were not entirely reduced to equivalent net to grid models. For example, in the fall peak Version 5 case, ISD's accounted for 11.7 MW of a total loss accumulation of 332 MW or 3.5% of the total system losses. These ISD losses are shared among all loss factor participants in V5. Referring to Appendix 1, even though losses do increase in some cases as generation levels increase, overall losses are decreased (on average by 3.1 MW) compared to the Version 5 cases partially due to the equivalency of the ISD's. Starting with the 2006 loss factors, reduced ISD's are being used in the determination of loss factors based on the AESO Rule.

4. *Topology*. In the Version 5 cases, information up to early 2005 was used in the determination of loss factors. In the 2006 cases, additions during 2005 and expected additions in 2006 have been added. Major components include:

- Cordel to Metiskow transmission line, 2005
- Part of 2006 includes the southwest 240 kV upgrade
- High voltage capacitor additions in the Calgary area, 2006 (Sarcee, Janet, and East Calgary stations)

5. *Average System Losses and Shift Factor*. Average system losses are 5.41% for 2006. The higher average losses are a result of AESO's 2006 GTA forecasted submission of 3.18 TW.hr's of losses. With this estimate of losses, the average losses have increased, adding about 0.9% to the shift factor. The 0.9% addition has effectively increased all loss factors by about the same amount. Please refer to Table 1 to see the effects of the increased average losses.

Table 1 – V5 vs. 2006 Penultimate Loss Factors

	Version 5	2006 Penultimate
System average loss	4.81%	5.41%
Shift Factor	0.96%	1.90%
Loss Recovered by RLF	3.85%	3.51%

6. *Differences for Battle River and Sheerness*. There are several reasons Battle River and Sheerness increased in charge over the V5 estimate. First, the output has increased at Sheerness from the V5 to Penultimate case by an average of 35 MW annually. Further, the average increased output, the change in load distribution, and the change in generation distribution (output of Cloverbar and Rossdale in V5 for example) results in higher raw loss factors in the area. Comparing the V5 case to the Penultimate case, the output of Sheerness increases 50 MW in the fall peak case. In the penultimate case, the Sheerness output increases 50 MW from the summer peak to the fall peak. This increase and the change in load pattern results in higher losses (4.2 MW) on the Anderson to West Brooks lines alone.

Additional Requests for Information:

- Also requested was the reason there are two loss factors at Sheerness (with two MP_ID's) when plants like Sundance have six generators (and six MP_ID's) receiving the same loss factor. Sheerness is connected through separate paths to the Anderson switching station, a short distance away. At Anderson, the 240 kV buses are merged. Even though the Sheerness configuration is slightly different than Sundance, AESO will report the two Sheerness units with one loss factor, 4.25% normalized and compressed, and calculated at the Anderson 240 kV bus on November 18. The changes at Sheerness will affect the overall shift factor by a small amount. These small changes will be reflected in all loss factors on November 18.
- Battle River presently have two loss factors; one loss factor for units 3 and 4, and one for unit 5. As units 3 and 4 are connected at 144 kV and unit 5 is connected at 240 kV, no changes to the configuration and reporting of loss factors will be made at this station.
- The Rossdale units in the final loss factor list have all been evaluated at the same bus instead of different buses.

- Regarding Appendix #1, the twelve Version 5 and the Penultimate cases are compared to provide an overview of the information used in the determination of loss factors.
- Regarding the Map, several items are illustrated. First, loss factors for 2006 are shown relative to major areas in the province. Further, actual average monthly flows predominantly on the 240 kV system for 2005 are highlighted. Finally, the map can be used to estimate loss factors on the system prior to consulting AESO on specific project details in 2006.

Yours truly,

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Operations Forecasting, AESO

Attachments:

- Appendix #1
- AESO Loss Factor Map

Appendix #1

Winter Peak Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	8976.0	8202.14	394.9	8597.04	22.2	354.5	-	-
Penultimate	9153.4	8412.35	373.9	8786.25	20	347.2	-	0.1
Penultimate - V5	**177.3**	**210.2**	**-21.0**	**189.2**	**-2.2**	**-7.3**		

Winter Medium Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	8026.7	7301.7	400.5	7702.2	22.4	302.1	-	0.3
Penultimate	8283.6	7564.55	384.7	7949.25	20.2	314.2	-	1
Penultimate - V5	**256.9**	**262.9**	**-15.8**	**247.1**	**-2.2**	**12.1**		

Winter Low Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	6804.3	6123.6	391.2	6514.8	22.7	266.8	-	-
Penultimate	7295.0	6657.7	373.9	7031.6	20.2	243.2	0.7	-
Penultimate - V5	**490.8**	**534.1**	**-17.3**	**516.8**	**-2.5**	**-23.6**		

Spring Peak Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	8895.9	8166.79	373.5	8540.29	22.4	333.2	0.2	-
Penultimate	8480.9	7690.32	455	8145.32	20.1	315.4	-	0.9
Penultimate - V5	**-415.0**	**-476.5**	**81.5**	**-395.0**	**-2.3**	**-17.8**		

Spring Medium Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	7704.2	6994	405.6	7399.6	22.4	282.2	-	0.3
Penultimate	8219.4	7457.68	445.8	7903.48	20.2	295.7	-	1
Penultimate - V5	**515.1**	**463.7**	**40.2**	**503.9**	**-2.2**	**13.5**		

Spring Low Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	6520.1	5900.2	368.8	6269	22.5	228.7	-	0.2
Penultimate	7391.3	6664.25	454.9	7119.15	20.1	252	-	0.2
Penultimate - V5	**871.2**	**764.1**	**86.1**	**850.2**	**-2.4**	**23.3**		

Summer Peak Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	8730.9	8016	374.2	8390.2	22.4	318.3	-	0.4
Penultimate	8728.8	7956.16	475.6	8431.76	20.2	276.9	-	0.1
Penultimate - V5	**-2.0**	**-59.8**	**101.4**	**41.6**	**-2.2**	**-41.4**		

Summer Medium Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	7433.4	6752.1	374.2	7126.3	22.1	285.1	0.2	-
Penultimate	7796.3	7038.15	464.2	7502.35	20.1	273.8	-	0.4
Penultimate - V5	**362.8**	**286.0**	**90.0**	**376.0**	**-2.0**	**-11.3**		

Summer Low Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	6225.7	5622	371	5993	22.8	210	0.1	-
Penultimate	7096.0	6345.41	478	6823.41	20.1	252.5	-	1.4
Penultimate - V5	**870.3**	**723.4**	**107.0**	**830.4**	**-2.7**	**42.5**		

Fall Peak Case

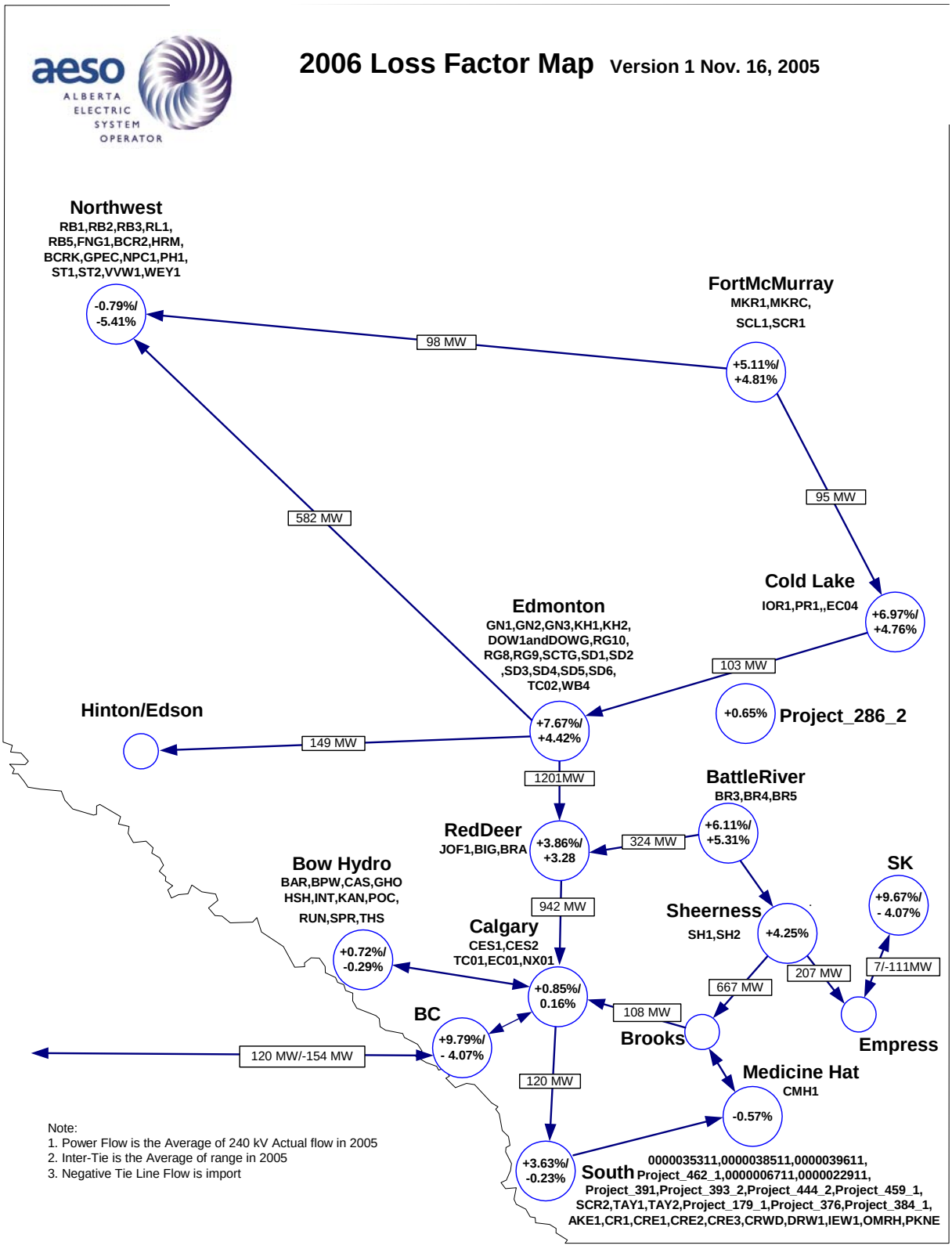
	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	8877.9	8157.59	365.9	8523.49	22.3	332.1	-	0.2
Penultimate	8818.6	7996.5	475.3	8471.8	20.3	326.5	-	1.9
Penultimate - V5	**-59.3**	**-161.1**	**109.4**	**-51.7**	**-2.0**	**-5.6**		

Fall Medium Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	7809.7	7118.8	364.4	7483.2	22	304.4	0.3	-
Penultimate	8182.6	7411.04	471	7882.04	20.1	280.5	0.3	-
Penultimate - V5	**372.9**	**292.2**	**106.6**	**398.8**	**-1.9**	**-23.9**		

Fall Low Case

	Generation (MW)	Load (MW)				Loss (MW)	Import (MW)	Export (MW)
		Static	Motor	Total	Shunt			
V5	6463.1	5842.3	366.8	6209.1	22.7	231.2	-	0.2
Penultimate	7190.3	6467.99	472.7	6940.69	20.4	229.2	-	0.1
Penultimate - V5	**727.2**	**625.7**	**105.9**	**731.6**	**-2.3**	**-2.0**		


2006 Loss Factor Map Version 1 Nov. 16, 2005
Northwest
RB1,RB2,RB3,RL1,
RB5,FNG1,BCR2,HRM,
BCRK,GPEC,NPC1,PH1,
ST1,ST2,VVW1,WEY1
-0.79%/
-5.41%
98 MW
FortMcMurray
MKR1,MKRC,
SCL1,SCR1
+5.11%/
+4.81%
95 MW
582 MW
Cold Lake
IOR1,PR1,,EC04
+6.97%/
+4.76%
Edmonton
GN1,GN2,GN3,KH1,KH2,
DOW1andDOWG,RG10,
RG8,RG9,SCTG,SD1,SD2
,SD3,SD4,SD5,SD6,
TC02,WB4
103 MW
Hinton/Edson
+7.67%/
+4.42%
+0.65%
Project_286_2
149 MW
1201MW
BattleRiver
BR3,BR4,BR5
+6.11%/
+5.31%
RedDeer
JOF1,BIG,BRA
+3.86%/
+3.28
324 MW
Bow Hydro
BAR,BPW,CAS,GHO
HSH,INT,KAN,POC,
RUN,SPR,THS
SK
+9.67%/
- 4.07%
942 MW
Sheerness
SH1,SH2
+4.25%
Calgary
CES1,CES2
TC01,EC01,NX01
+0.72%/
-0.29%
7/-111MW
207 MW
667 MW
+0.85%/
0.16%
108 MW
BC
Brooks
Empress
+9.79%/
- 4.07%
120 MW/-154 MW
Medicine Hat
CMH1
120 MW
-0.57%
+3.63%/
-0.23%
South
0000035311,0000038511,0000039611,
Project_462_1,0000006711,0000022911,
Project_391,Project_393_2,Project_444_2,Project_459_1,
SCR2,TAY1,TAY2,Project_179_1,Project_376,Project_384_1,
AKE1,CR1,CRE1,CRE2,CRE3,CRWD,DRW1,IEW1,OMRH,PKNE
Note:
1. Power Flow is the Average of 240 kV Actual flow in 2005
2. Inter-Tie is the Average of range in 2005
3. Negative Tie Line Flow is import