December 13, 2006

Alberta Energy and Utilities Board
640 – 5th Avenue SW
Calgary, Alberta
T2P 3G4

Attention: Jamie Cameron, Application Officer

Dear Jamie:

Re: Appendix D to AESO 2007 General Tariff Application
Application No. 1485517

Please find attached Appendix D to the 2007 General Tariff Application (GTA) of the Alberta Electric System Operator (AESO), containing additional analysis of bulk system data. The cover letter accompanying the AESO’s 2007 Application noted that the Application did not include Appendix D and that it would be provided later.

The AESO will be posting on its website the data workbooks used in the Appendix D analysis. The workbooks, when posted, will be available at www.aeso.ca by following the path Tariff Current Applications 2007 Tariff Application.

If you have any questions on this information, please contact me at (403) 539-2751 or by e-mail to heidi.kirrmaier@aeso.ca, or John Martin at (403) 539-2465 or by e-mail to john.martin@aeso.ca.

Sincerely,

Signed by Heidi Kirrmaier

Heidi Kirrmaier
Vice President, Regulatory

Attachments

cc: John Martin, Manager, Regulatory, AESO
D ADDITIONAL ANALYSIS OF BULK SYSTEM DATA

The 2006 Transmission Cost Causation Update provided quantitative and qualitative analysis of transmission system cost causation as discussed in section 4.3 of this Application. During consultation on the findings of the Update, some stakeholders suggested it is counter-intuitive, and therefore unacceptable, to conclude that recovering bulk system costs on a coincident peak basis cannot be justified. To review stakeholder concerns the AESO examined the bulk system data in more detail, as presented in this appendix.

The following pages provide a variety of graphs that illustrate the lack of coincidence between loads on individual bulk transmission system lines and system load in aggregate. The graphs rely on hourly metered data examined for the 2006 Transmission Cost Causation Update provided, namely, 8,760 hours of data for each of seventy-nine 240 kV lines for 2005, and 8,784 hours of similar data for 2004 (since 2004 was a leap year).

The graphs follow consistent conventions: thin black lines represent values for individual 240 kV lines, thick black lines represent values averaged over all 79 lines, and thick red lines represent Alberta Internal Load (AIL) data. Data values for individual lines are represented as percentages of the annual average load on the line or as percentages of the peak load on the line. Averages over all lines are weighted by line length.

The first series of 24 graphs shows hourly load on the day of peak AIL in each month for 2005 and 2004, with the actual hour of peak AIL indicated at the bottom of each graph. These graphs illustrate the following observations:

(a) In every hour of a peak day, many lines are near their average load while some are well above and others are well below their average load.

(b) On peak days, some lines have load profiles with significantly higher-than-average loading in the late afternoon and lower-than-average loading in the pre-dawn early morning while others have the reverse profile: higher-than-average loading in the pre-dawn early morning and lower-than-average loading in the daytime.

(c) On peak days, the weighted average line load profile is usually flatter than the AIL system load profile, and sometime the inverse of the AIL system load profile.

The next four graphs show average load by hour and by month, averaged over all days in for each hour in the former, and over all hours in each month in the latter. (The two 2005 graphs were provided on page 10 of section 4 of the Application.) These graphs illustrate the following observations:

(d) The average hourly loading graphs show that the loading on many lines varies in a very narrow band from about 90% to about 110% in every hour of the day, on average.

(e) There are excursions outside that band in almost every hour of the day. Some lines have profiles with significantly higher-than-average loading in the late afternoon and lower-
than-average loading in the pre-dawn early morning, while some lines have the reverse profile: higher-than-average loading in the pre-dawn early morning and lower-than-average loading in the daytime. Other lines have yet other profiles, for example, with highest loading in the pre-noon daytime hours.

(f) The monthly profiles are also very flat for many lines, although the variation is wider — from about 75% to about 125% of average loading. There are excursions above and below this range in every month of the year.

The final two graphs should load-duration curves over all hours of the year. The data for each line, for the average over all lines, and for the AIL are individually sorted in descending order. These graphs illustrate the following observations:

(g) The load-duration curves for individual lines differ markedly from that for the AIL system load. Individual lines generally have much steeper load duration curves over a much wider range of loads — averaging from 32% to 62% of maximum load for individual lines over the middle two-thirds of the graph, compared to from 73% to 87% of AIL system peak over the same range.

(h) Some lines are heavily loaded, with loads of 75% of their peaks or more for half the hours in the year or more. Other lines are more lightly loaded, with loads at 50% of their peaks or less for 90% or more of the hours in the year.

(i) The weighted average load-duration curve for 240 kV lines average just below 50% loading over all hours in the year, which is much lower than the AIL curve which averages about 80% of system peak over all hours in the year.

These observations further support the conclusion that system peak is not reflective of loading on individual bulk system transmission lines, and is therefore inappropriate as a basis for recovering the cost of those lines.
Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
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2005 May 16 Loading on 240 kV Lines

2005 Jun 30 Loading on 240 kV Lines

Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL Peak
Note:  Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
Appendix D — Additional Analysis of Bulk System Data

2005 Nov 30 Loading on 240 kV Lines

2005 Dec 5 Loading on 240 kV Lines

Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
2004 Jan 26 Loading on 240 kV Lines

2004 Feb 2 Loading on 240 kV Lines

Note:  Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
2004 May 18 Loading on 240 kV Lines

2004 Jun 28 Loading on 240 kV Lines

Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
Appendix D — Additional Analysis of Bulk System Data

2004 Jul 19 Loading on 240 kV Lines

AIL Peak: 2004 Jul 19 HE 17

2004 Aug 13 Loading on 240 kV Lines

AIL Peak: 2004 Aug 13 HE 15

Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
Note:  Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
2004 Nov 24 Loading on 240 kV Lines

2004 Dec 22 Loading on 240 kV Lines

Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = AIL
2005 Average Hourly Loading on 240 kV Lines

2005 Average Monthly Loading on 240 kV Lines

Note: Thin Black = individual 240 kV line   Thick Grey = weighted average of 240 kV lines   Thick Red = ALL
2004 Average Hourly Loading on 240 kV Lines

Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = All

2004 Average Monthly Loading on 240 kV Lines
2005 Load Duration Curves for 240 kV Lines

2004 Load Duration Curves for 240 kV Lines

Note: Thin Black = individual 240 kV line  Thick Grey = weighted average of 240 kV lines  Thick Red = All