



Alberta Electric System Operator

Needs Identification Document Application
Southwest Alberta 240-kV Transmission System
Development
Pincher Creek – Lethbridge Area
Addendum to Decision 2004-075

October 14, 2004

ALBERTA ENERGY AND UTILITIES BOARD

Decision 2004-087: Alberta Electric System Operator
Needs Identification Document Application
Southwest Alberta 240-kV Transmission System Development
Pincher Creek – Lethbridge Area
Addendum to Decision 2004-075
Application No. 1340849

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**ALBERTA ELECTRIC SYSTEM OPERATOR
NEEDS IDENTIFICATION DOCUMENT APPLICATION
SOUTHWEST ALBERTA 240-kV TRANSMISSION
SYSTEM DEVELOPMENT
PINCHER CREEK – LETHBRIDGE AREA
ADDENDUM TO DECISION 2004-075**

**Decision 2004-087
Application No. 1340849**

1 DECISION

On September 7, 2004, the Alberta Energy and Utilities Board in Decision 2004-075 decided to refer Application No. 1340849 back to the Alberta Electric System Operator (AESO) pursuant to section 34 (3) (b) of the *Electric Utilities Act*, (EUA) and requested AESO to:

- Perform a “Congestion Analysis” for the SW Alberta Transmission System using the same methodology as that used in the 500-kV north-south transmission development application (i.e. Figure 3-5 on page 26 of the North-South 500-kV Application No. 1346298). This analysis should be based on the 2006 forecast of hourly production data of the wind generators and loads in the area. The results should clearly indicate the percentage of time of congestion and/or the MWH of curtailed generation on an annual basis.
- Develop a transmission alternative or alternatives that meet the 95 per cent benchmark for expected economic wholesale transactions, so they can be realized without transmission congestion under abnormal operating conditions. This analysis is to include cost estimates for construction of the alternative(s).
- Assess the resulting system performance with the development option or each development option, if there is more than one possible option.
- For each development option, determine the generation constraint based on the 2006 forecast of hourly production data of wind generators and loads in the area. The results should clearly indicate the percentage of time of congestion and/or the MWH of curtailed generation on an annual basis.
- If more than one alternative is presented, AESO is to indicate and explain its preference among the development options.
- Prepare a comparative analysis of its proposed transmission solution with the alternative transmission solution. The analysis is to include system upgrade costs for each solution, and the estimated system constraint associated with each alternative at N-1 conditions.
- Provide its reasons as to which transmission solution should be approved by the Board. If AESO proposes the adoption of its initially proposed transmission solution, it is to provide justification for the development of a system that provides greater system access than contemplated by the TDP and the new Transmission Regulation.

The reasons for Decision 2004-075 are set out below.

2 INTRODUCTION

2.1 The Application

AESO filed Application No. 1340849 on April 5, 2004, requesting approval of the Needs Identification Document (NID) for 240-kV transmission system development in southwest Alberta (the SW Transmission System).

The proposed 240-kV expansion and enhancements would be developed according to one of two options. Option 1 would consist of a double-circuit, 240-kV, both-sides-strung transmission line from Pincher Creek substation 396S to Peigan substation 59S and a double-circuit, one-side-strung transmission line from Peigan substation 59S to North Lethbridge substation 370S. All substations currently exist. Option 2 would consist of a double-circuit, 240-kV, both-sides-strung transmission line from Pincher Creek substation 396S to proposed Mud Lake substation 116S and a double-circuit, one-side-strung transmission line from proposed Mud Lake substation 116S to North Lethbridge substation 370S.

The second circuit from either Peigan substation or proposed Mud Lake substation 116S to North Lethbridge substation 370S would be strung when and if the proposed Waterton Wind Farm is commissioned.

2.2 The Prehearing Meeting

The Board held a prehearing meeting in Lethbridge, Alberta, on May 18, 2004, before Board Members J. R. Nichol, P.Eng. (Presiding Member), J. D. Dilay, P.Eng., and G. J. Miller. The Board heard from a number of participants at the prehearing meeting and issued Decision 2004-044 on May 20, 2004 (Attachment A).

2.3 Hearing

Board Members J. R. Nichol, P.Eng. (Presiding Member), J. D. Dilay, P.Eng., and G. J. Miller considered the application at a public hearing held in Lethbridge from July 6 to July 8, 2004 and on July 12, 2004 in Calgary.

3 ISSUES

In EUB Decision 2004-044, the Board identified the following as the issues relevant to the hearing:

- The current state of the SW Alberta Transmission System
- The need for Enhancement and Expansion to the SW Transmission System
- What planning criteria and performance standards are appropriate for the proposed expansions or enhancements
- Whether the enhancements and expansions proposed are reasonable and in the public interest
- Related issues such as a high level examination of costs and impacts included in the NID

The Board continues to be of the view that these are the salient issues arising from this proceeding, but, for the reasons provided in section 6 below, the Board has re-grouped these issues as follows:

- What is the current state of the SW Transmission System and the need for expansion or enhancements?
- Are the enhancements and expansions proposed reasonable and in the public interest?

4 VIEWS OF AESO AND SUPPORTING PARTIES

AESO's application was supported by AltaLink Management Ltd. (AltaLink) and TransAlta Utilities Corporation (TransAlta). Both parties seated panels to testify in favour of the application. In addition, a number of other parties including ATCO Power, ATCO Electric, the Piikani First Nation, wind-power generators, The MD of Pincher Creek, the town of Pincher Creek, and the Pembina Institute for Appropriate Development (PIAD) voiced support for the project either through direct evidence or argument, or a combination of the two. For the purposes of this report, the supporting parties' views have been grouped together.

4.1 What is the Current State of the SW Transmission System and the Need for Expansion or Enhancements?

4.1.1 AESO

AESO indicated that the current SW Transmission System did not have sufficient capacity to interconnect new generation and that the state of the system had become a barrier to the development of new generation in the area. AESO performed a contingency analysis for the existing SW Transmission System in which it studied the following operating conditions with regard to system loading and area generation:

- Summer minimum load with full area generation and zero Alberta-B.C. interchange, and
- Winter peak load with zero area wind and hydro generation and zero Alberta-B.C. interchange

On the basis of this analysis, under the summer scenario, AESO predicted overloads of up to 113 per cent and 114 per cent¹, under normal conditions (all elements in service). Under N-1 Criteria², AESO predicted overloads up to 166 per cent³ for certain elements of the SW Transmission System. Under the winter scenario, with all elements in service, it predicted no elements to be overloaded. Under N-1 criteria, AESO predicted an overload of up to 132 per cent⁴ on one element of the system. AESO stated that there would also be additional system performance concerns. AESO concluded that its analysis demonstrated the inadequacy of the existing transmission system to serve the amount of generation that is reasonably anticipated for

¹ Transmission Line 170L (Kettles Tap to Peigan) and Magrath 225S 138/69-kV transformer.

² According to the N-1 planning criteria, the transmission system will have enough capacity to withstand the loss of a single power system component without the need to shed load and with remaining equipment continuing to operate within safe limits.

³ Magrath 225S 138/69-kV transformer with 170L Pincher Creek 396S to Peigan 59S out of service.

⁴ Drywood 415S 138/69-kV transformer with 185L Pincher Creek 396S to shell 379S out of service.

the area. AESO stated that it had not attempted to quantify the constraint or congestion being currently experienced on the SW Transmission System.

4.1.2 AltaLink

AltaLink concurred with AESO's assessment of need for substantial upgrades to the SW Transmission System. It argued that the current system is overburdened and that this put its equipment in a position of substantial risk. AltaLink also noted that the constraint on the current system was acting as a barrier to new generation development in the area.

4.1.3 TransAlta

TransAlta agreed with AESO's assessment of the need for enhancements or upgrades to the SW Transmission System. TransAlta indicated that transmission constraints in Southwest Alberta have worsened annually over the past several years resulting in greater reliance on increasingly complex Remedial Action Schemes (RAS)⁵ to ensure system operability. It contended that the southwest area will continue to experience generation growth and, as a result, substantial upgrades were required.

4.1.4 Piikani First Nations/ATCO Electric

The Piikani First Nations/ATCO Electric agreed with AESO's submission that it was necessary to expand and enhance the SW Transmission System. The Piikani emphasized that it may pursue generation development in the future and that upgrades to the system would facilitate this interest.

4.1.5 Canadian Hydro Developers (Canadian Hydro)

Canadian Hydro agreed with AESO's conclusion regarding the need for enhancements and expansion of the system and noted that constraint on the system had prevented it from developing additional wind generation projects in the area.

4.1.6 Town of Pincher Creek (The Town)

The Town submitted that future wind farm development in the area was impossible without the development of more transmission facilities, which would bring many benefits to the community.

4.1.7 MD of Pincher Creek (The MD)

The MD pointed out that a reinforcement of the SW Transmission System was critical to the construction of approved projects in its community. It further indicated that the ability of approved projects to operate was directly impacted by the capacity of the transmission system to handle wind farms energy production. The MD stated that 70 Megawatts (MW) of approved, "ready-to-go" development was waiting for additional capacity in the transmission system in order to proceed, and even if reinforcement of the system were approved, there would still be a two-year delay in bringing this about.

⁵ A protection scheme designed to mitigate overloading on transmission system elements by curtailing generation (GRAS) or load (LRAS). In this report, the term RAS is used to mean GRAS.

4.1.8 New Generation Producers (NGP)

NGP indicated its plan to build a state-of-the-art 5-MW power plant fueled by biogas from its meat processing plant in Pincher Creek. It submitted that these transmission facilities were essential for its plant to go ahead.

4.1.9 Pembina Institute for Appropriate Development (PIAD)

PIAD requested the Board to approve the application to remove the transmission constraint within the southwest Alberta because it would bring economic benefits to the area. PIAD also commented on the environmental and health impacts of the increased wind use in the province to generate electricity.

4.2 Are the Enhancements and Expansions Proposed Reasonable and in the Public Interest?

4.2.1 AESO

AESO argued that the proposed expansion and enhancements would result in a system that would be consistent with the EUA and the Government of Alberta's Transmission Development Policy (TDP). It stated that the proposed upgrades would address reliability concerns and accommodate the anticipated growth in generation in the southwest Alberta. It stated that the system proposed would be robust and provide a reliable and operable system in the area to accommodate long-term generation and load growth. It further asserted that the proposed upgrades were both reasonable and prudent.

AESO submitted that, at a minimum, proposed expansions or enhancements to the SW Transmission System must meet WECC⁶ and NERC⁷ planning and reliability standards and that the use of the N-1 criteria would be a standard for robustness and operational reliability for transmission system planning. It further submitted that the criteria had been proven in Alberta to provide high reliability and was consistent with planning practices in other North American jurisdictions.

AESO submitted that although it had not explicitly requested the Board to approve an N-1 planning criteria, it would be helpful to have the Board make a statement on the reasonableness of the N-1 criteria.

AESO noted that it had the responsibility to develop the transmission planning criteria and the Board had the responsibility to rule on the application of those criteria on an individual case basis. AESO suggested that the only public interest issue the Board should consider would be whether or not AESO had developed a healthy robust system that would perform appropriately on a day-to-day basis.

AESO stated that even though the Alberta Government had not yet approved the TDP, it believed that the TDP was consistent with the legislative scheme, and expected this policy would soon be reflected in government regulation. AESO urged the Board to give considerable weight to the TDP, to its purpose, its intent and its content.

⁶ Western Electric Coordinating Council

⁷ North America Electrical Reliability Council

AESO suggested that there were six objectives of the TDP relevant to this proceeding, namely:

1. A robust transmission system that would provide reliable and reasonably priced electricity and would support continued economic growth in Alberta;
2. AESO was directed to plan the capability of the integrated electric system in order to meet the current and future needs of all market participants;
3. The EUB was advised to take a comprehensive and longer-term view of need applications filed by AESO;
4. AESO was to establish operating standards and criteria to assure the reliability of the system which must, at minimum, meet the WECC and NERC planning and reliability standards;
5. In order that the competitive wholesale market can function effectively in Alberta, there should be relatively few instances of transmission constraint on the system; and
6. The transmission development in Alberta should remove most areas of congestion in the long run.

AESO confirmed that the proposed project would provide system access service for more than 95 per cent of expected economic wholesale transactions under abnormal conditions. However, AESO submitted that a study to assess the appropriate level of system access service to a certain percentage of economic wholesale transactions would be very complex. As well, AESO argued that it was not likely its mandate to determine what the acceptable percentage would be.

AESO submitted that although the government had not mandated N-1 criteria, the criteria were inferred by the TDP. AESO further noted that the N-1 criteria had historically been applied in Alberta except for radial-connected loads and generation facilities.

In developing its planning criteria, AESO stated that it considered the use of RAS in localized areas on a short-term basis depending on how fast facilities could be put into service. It indicated that there were situations where the use of RAS was practical due to the low expected frequency of the occurrence of the event compared to the higher cost of building or installing new facilities.

AESO also submitted that RAS arrangements connecting Magrath and Summerview wind farms to the system were currently in place. AESO stated that it was not aware of any negative impacts of the RAS arrangements on these projects. AESO further stated that it was possible for these two projects to operate on the long term without negative impacts were the proposed transmission development not be built.

AESO stated that it chose N-1 criteria for generation to avoid discriminatory access for generators. It stated that it was obligated to give customers who wanted to participate in the energy market a reasonable chance to do so. AESO emphasized that in a competitive market it was up to the generator to decide when to produce and how much to produce. AESO further stated that it would be inappropriate for it to make assumptions about the value of the output.

With respect to the issue of discrimination, AESO submitted that its position was to treat all generators equally and consistently. When questioned why the Board should treat the generators equally in the case when they were not equal in terms of generation capacity factors, AESO

stated that it did not believe that its mandate to provide system access and the extent of service to be provided would take into consideration the capacity factor of the generating facilities.

AESO stated that it complied with the Directive 28 requirement for an economic analysis, but did not do a cost-benefit assessment for constraints that would be alleviated by the proposed development. AESO pointed out that the transmission system must be robust, operative, safe, and must enable a reasonable level of service to transmission customers. AESO argued that IPCAA's approach to provide the minimum amount of system development to connect wind farms might not be appropriate.

With respect to the City of Lethbridge's concerns regarding any impact of the proposed project on its electrical system, AESO stated that it would address the issue as part of the Southeast 240-kV system development which would be applied for at later date.

4.2.2 AltaLink

AltaLink urged the Board to approve the NID and argued that the proposed upgrades were reasonable and prudent. It contended that the applied-for upgrades would appropriately address the need identified by AESO and would satisfy both the legal requirements of the EUA and the policy directions contained in the TDP. AltaLink submitted that the TDP must be followed since it was government policy. It maintained that, at a high level, adherence to the TDP would ensure that there was an efficient transmission system and that there was an effective energy market.

AltaLink submitted that, in an effective deregulated energy market, generators should have a reasonable level of non-discriminatory and robust transmission service. AltaLink stated that the debate was between using congestion management tools or having proper transmission development. AltaLink further stated that the government had approved a policy that envisioned transmission development without discrimination and the Board and stakeholders should respect that policy, which meant that the same criteria should be applied to all generators.

AltaLink submitted that AESO was mandated by legislation to plan the Alberta transmission system, and therefore clearly had the responsibility to develop planning criteria and maintain a robust transmission system capable of meeting current and future needs. AltaLink was of the opinion that the WECC and NERC planning and reliability standards should always be applied regardless of the situation. It further submitted that transmission planning was not about just planning for the obvious, but planning for a reasonable worst case scenario.

AltaLink proposed that, in view of the higher reliability standards triggered by the significant power outage last year in the Eastern U.S. and Canada, the system should be designed for no constraints under an N-1 event. AltaLink's position was that any curtailment under an N-1 situation was unacceptable because, in its view, conditions should remain normal under N-1 situations. AltaLink argued that even negligible constraints could give rise to safety concerns related to the system or the public.

AltaLink claimed that its system might be overloaded under normal conditions and N-1 situations with new generation based on AESO studies with future wind farm projects in place. AltaLink considered that even if a negligible amount of MWH were curtailed under an N-1 situation, it would discourage new generation.

AltaLink pointed out that a number of wind farms would be under short-term RAS until the system was upgraded and that there were a number of RAS included in its assets in other parts of the province. Notwithstanding the existence of RAS, AltaLink stated that it was not in favour of RAS for the southwest part of the province. AltaLink considered that deploying RAS in the area on a long-term basis would be very complex compared to its present RAS arrangements elsewhere in the province. AltaLink noted that if IPCAA's status quo option were used, it would result in a proliferation of RAS under several N-1 scenarios.

AltaLink testified that once AESO assigned it a project, it would proceed with designing and constructing it to meet AESO's requirements on a cost-conscious basis. Notwithstanding the above, AltaLink stated that it would do all that was necessary to maintain the safety of its equipment.

4.2.3 TransAlta

TransAlta argued that outages due to maintenance and other unforeseen situations were part of the normal operating conditions of the transmission system, so planning under N-1 criteria would simply reflect reality and therefore AESO and WECC members were correct in applying these criteria.

TransAlta was of the view that a robust transmission system had provided good value to the public, and the TDP sought to ensure that the system maintained this level of service. TransAlta further submitted that any decision of the Board that did not effectively restore the robustness of the system in the shortest possible time was neither in the public interest nor in accordance with the TDP.

TransAlta considered that the TDP rejected a policy that tried to manage congestion. It stated that the TDP provided the legislative framework to develop the Alberta transmission system in a timely and efficient manner. TransAlta submitted that the necessary transmission development had not yet happened in southwest Alberta. It pointed out that a transmission tight approach would fail the TDP measure of being prudently in advance of projected needs and could discourage current and future wind projects. TransAlta also submitted that the TDP supported a robust and congestion-free system, which would promote the well being of an active, competitive power pool, and a single pool price model.

TransAlta pointed out that transmission system outages occur regularly. Therefore, constraints due to rolling RAS would be unacceptable. It argued that IPCAA's proposal would lead to a proliferation of RAS on the SW Transmission System, which would contradict the objectives of the TDP (i.e. that temporary congestion may be necessary but would not be acceptable on a long-term basis).

TransAlta testified that it operated a number of wind farms in the southwest area through its VisionQuest subsidiary. It stated that there was currently a number of existing wind projects under temporary RAS and consequently new wind projects were effectively denied access to the system under the present circumstances. TransAlta stated that all the most recent projects had been subject to increasingly more complex and costly RAS, thus giving rise to significant uncertainty and risk being borne by the generators. TransAlta stated that the wind farm developers had been led to believe that the RAS protection associated with their projects would

be initiated to respond to N-1 conditions and would be removed following the reinforcement of the SW Transmission System.

TransAlta indicated that there was a general perception that RAS were very cheap and a simple solution. However, in its opinion RAS were complex and could affect its wind turbines, as tripping of its turbines by RAS would shorten their lifespan. TransAlta submitted that it would like to avoid as many RAS trips as possible or preferably eliminate them altogether in order to get the full life expectancy from the wind turbine generators.

TransAlta stated that it was willing to operate with RAS on a temporary basis until the system was reinforced sufficiently to do away with all RAS. TransAlta further stated that if the reinforcement of the SW Transmission System did not occur, “intelligent” RAS would need to be put in place. TransAlta listed three criteria for those intelligent RAS, namely: it should be incumbent upon the transmission system to supply the capital for the RAS, it should ensure that the RAS rules are very clear and that the operators understand the risk, and it should invoke a compensatory program for operators when they are unable to have access to the market place.

TransAlta supported the positions of AESO and AltaLink with respect to discrimination. It urged the adoption of a planning approach that allowed equal access to all forms of generation. It argued that such an approach was consistent with the tenets of the TDP.

It was TransAlta’s view that AESO was not proposing to provide generator system access regardless of cost. It stated that AESO had exercised the needed good judgment to rectify backlogged transmission access to restore a robust transmission system in the southwest part of the province. TransAlta argued that it should have access to the system 100 per cent of the time since every other generator in the province had access to the system 100 per cent of the time. It submitted that whenever wind energy was offered in the spot energy market, it had probably put downward pressure on the pool price. Though it did not have a view on pool prices, TransAlta contested that the potential influences on the pool price due to the price-taking practice of wind-powered energy producers should be taken into consideration when assessing the cost effectiveness of the transmission system to connect wind farms.

4.2.4 ATCO Power Ltd. (ATCO Power)

ATCO Power noted that section 5(b) of the EUA stated that one of the purposes of the Act was to allow all persons wishing to exchange electric energy to do so on non-discriminatory terms. It stated that the introduction of congestion in one area of the Alberta Interconnected Electric System (AIES) would be discriminatory and suggested that this would be contrary to the Board’s governing legislation.

4.2.5 Piikani First Nation and ATCO Electric

The Piikani submitted that a \$68 million transmission development would not cause rate shock to customers and at least in this present case, would have significant benefits by encouraging new and innovative forms of generation in Alberta’s deregulated market.

5 VIEWS OF IPCAA AND THE CITY OF LETHBRIDGE

5.1 What is the Current State of the SW Transmission System and the Need for Expansion or Enhancements?

5.1.1 IPCAA

IPCAA agreed that generators in southwest Alberta were subject to transmission congestion. However, IPCAA emphasized that AESO had not actually determined the level of congestion being experienced currently by generators in that area of the province, nor had it estimated what congestion or constraint would remain following the upgrades proposed in the NID. IPCAA argued that it was this lack of analysis that prompted it to develop the transmission expansion and enhancement alternatives it presented.

5.1.2 City of Lethbridge (The City)

The City submitted that AESO had not meaningfully considered impacts on the Lethbridge service area in this application. It was the city's position that needs for transmission in southwest Alberta should not and cannot be considered in isolation of their impacts on the City's transmission facilities.

5.2 Are the Enhancements and Expansions Proposed Reasonable and in the Public Interest?

5.2.1 IPCAA

IPCAA argued that since the TDP did not require that congestion be eliminated under N-1 conditions, the N-1 planning criteria should not be used in all cases for planning the transmission system to connect generation. With respect to the transmission upgrades proposed for southwest Alberta, IPCAA argued that it would not be appropriate or cost effective to provide the same degree of reliability to wind generation as to thermal plants, which have much higher capacity factors.

IPCAA submitted that section 34 (1) of the EUA described the requirements of an NID. IPCAA stated that under this section, AESO had to describe the transmission system constraint, to assess the extent to which the constraint should be alleviated, and to indicate the means to achieve the proposed alleviation. IPCAA suggested that in order for the Board to approve AESO's needs application, it must agree with these three requirements.

In IPCAA's view, the TDP explicitly addressed how system congestion should be dealt with. IPCAA argued that AESO had not specifically described the amount of curtailed energy that the wind generators would face when connected to the transmission system in the southwest area of the province with or without the proposed development. IPCCCA pointed out that the TDP prescribed that the system must be relatively congestion free such that under normal operating conditions, virtually all economic wholesale transactions could be completed and under abnormal conditions about 95 per cent of all wholesale transactions could be completed without transmission congestion. IPCAA contended that AESO had not presented evidence to show to what extent the proposed development would alleviate the access constraint in southwest Alberta. On the basis of the above reasons, IPCCCA concluded that AESO's NID for the proposed development was incomplete.

IPCAA proposed a Minimum Capital Cost Option A (MCCA) and a Minimum Capital Cost Option B (MCCB) to develop the SW Transmission System. In its proposal, IPCCCA adopted a probabilistic approach using recorded annual statistical data for wind-powered energy and transmission line outages, together with a RAS arrangement. IPCCCA claimed that its proposed development would provide system access to wind generators with less additional transmission facilities, no constraint under N-0 conditions, and negligible constraint of the wind-powered energy under N-1 conditions using the same type of RAS that AESO used. As well, IPCCCA stated that its proposal would satisfy the requirements for both loads and generation as specified in the TDP and by the WECC.

IPCAA indicated that the assertion made by some parties that its proposal was deficient because it relied on RAS could also apply to AESO's proposal as it also relied on RAS. IPCCCA also submitted that it did not interpret that the TDP was imposing a ban on the utilization of RAS in southwest Alberta since, although the TDP referred to RAS as a short-term solution not to be a substitute for transmission facilities, it also acknowledged the importance of RAS to allow interties to maintain export capability. IPCCCA explained that the RAS included in its MCCA and MCCB alternatives were relatively simple, which was justified due to the low magnitude of expected curtailment and the high cost of otherwise adding transmission facilities.

IPCCCA emphasized that its proposal was not discriminatory against wind generation because it was not suggesting that wind generation would receive a lesser degree of access reliability than other generators. What IPCCCA contended was that the modeling needed to recognize that the same degree of reliable access to thermal generation could be provided to wind generation with less transmission capacity because probabilistically wind-powered generators operated below 90 per cent of rated capacity for 96 per cent of the time.

IPCAA was of the view that AESO was required to assess the probability of wind generators being constrained and the resulting expected cost of such constraints. Following such analysis, IPCCCA argued, AESO would then be in a position to propose alternative transmission development comparable or lower in cost to alleviate the constraints. IPCCCA advocated that while allowing generators access to the transmission system was important, the overall economics should not be ignored and cost-effective solutions could prevail without jeopardizing reliability of the transmission system. IPCCCA maintained that AESO did not make such an economically viable alternative for the development and further submitted that it was AESO's responsibility to determine and supply such required information.

IPCAA concluded that purely deterministic or purely probabilistic transmission planning standards would not always lead to the right decision and therefore transmission system additions to connect wind farms, which have low capacity factors, must be cost effective to be in the public interest. IPCCCA suggested that if the application was returned to AESO, it should be instructed to reassess the need for development having regard for economics, the addition of more wind generation, and the cost to generators.

5.2.2 City of Lethbridge

The City submitted that AESO failed to study and communicate potential impacts to Lethbridge's transmission system from the southwest Alberta transmission development. It further submitted that this type of practice was inefficient, wasteful, and not in the best interest of consumers in general who would ultimately pay for this inefficiency in their rates.

6 VIEWS OF THE BOARD

6.1 Introduction

The Board recognizes the difficulties faced by all hearing participants in the inaugural consideration of a NID application pursuant to section 34 of the EUA. For the reasons expressed below, the Board has decided to refer the application back to AESO with suggestions for changes and additions to the NID. However, the Board emphasizes that this decision is primarily a function of the novelty of the application and the fact that participants had no precedent upon which to prepare their submissions. The Board acknowledges the efforts of all the participants in the proceeding and appreciates their assistance with respect to this challenging application.

As stated in Decision 2004-048⁸, the Board is of the view that “AESO bears the primary responsibility to assess needs of market participants and to plan the transmissions system to ensure that those participants have a reasonable, non-discriminatory opportunity to exchange electric energy over the transmission system.”⁹ The Board wishes to reemphasize this position and, in this decision, seeks to provide additional guidance to AESO and other interested parties as to how the Board perceives its duties and obligations pursuant to section 34.

6.2 Legislative Framework, Planning Criteria, Reliability, and Performance Benchmarks

The Board understands that AESO and market participants require clear direction with respect to how it will assess section 34 applications. In the Board’s view, it is necessary that it develop an approach that accords with the legislative framework, that is sufficiently flexible to account for regional transmission needs, and that may be consistently applied. The Board believes that the approach that it has adopted in this regard may be applied consistently, and is in accordance with its governing legislation while providing reasonable flexibility to account for regional transmission needs, including the nature of local generation.

The Board finds that the legislative framework provided by the EUA provides clear direction as to what information must be included in an NID application, and what factors or criteria the Board must consider when making a decision on such an application. The Board is further of the view that, for this application, it must have regard for the TDP when considering AESO’s NID for the SW Transmission System. The Board notes that the Transmission Regulation came into force on August 12, 2004, following the close of the hearing. The Board emphasizes that the analytical approach developed below does not incorporate the provisions of the Transmission Regulation except where it has noted that a provision in the Regulation mirrors a principle or criterion described in the TDP.

The issue of how the Board should interpret its governing legislation and the TDP when considering the NID was also discussed by the parties to the proceeding. Upon review of the record, the Board was, in fact, surprised by the degree to which participants concurred upon the principles that should be considered by the Board in the context of a section 34 application. While the Board has not specifically referred to the views of the parties in the following analysis,

⁸ Alberta Electric System Operator, Needs Identification Document Application, Edmonton-Calgary, 500-kV Electric Transmission Facilities.

⁹ EUB Decision 2004-048, page 3.

it is confident that the framework developed below is consistent with the views of all participants.

Section 34 of the EUA provides the legislative requirements for the preparation and consideration of a NID. It reads in part as follows:

34(1) When the Independent System Operator determines that an expansion or enhancement of the capability of the transmission system is required to meet the needs of the market participants¹⁰, the independent System operator must prepare and submit to the Board for approval a needs identification document that

- (a) describes the constraint or condition affecting the operation or performance of the transmission system and indicates the means by which or the manner in which the condition or constraint could be alleviated,
- (b) describes a need for improved efficiency of the transmission system, including the means to reduce losses on the interconnected electric system, or
- (c) describes a need to respond to requests for system access service.

The information requirements detailed in Section 34 are elaborated upon in EUB Directive 28. In essence, Directive 28 provides a detailed description of the background and technical information that should be included in an NID. Directive 28 requires that an NID:

- Describe the nature of the conditions or constraint affecting the operation of the existing transmission system,
- Provide comparisons between alternatives considered and the proposed expansion or enhancement, and
- Explain AESO's recommendation of the preferred alternative.

It is the Board's view that section 34 contemplates a two-stage consideration of an NID. In the first stage, the Board must determine whether an expansion or enhancement of the capability of the transmission system is necessary to alleviate constraint, improve efficiency, or respond to a request for system access. With respect to constraint concerns arising pursuant to subsection 34(1) (a), it is necessary to determine the nature of the constraint being experienced and to understand the practical implications of that constraint to the transmission system, including the likelihood of the resultant congestion, and the potential costs associated with that congestion. Likewise with respect to subsection (b), it is necessary to identify inefficient elements of the transmission system and describe the resultant impacts of their continued operation. Finally, with respect to subsection (c), a determination of the need to provide appropriate system access must also take into account a consideration of both potential constraint and an assessment of system performance that may result from providing the requested access.

If it is determined that expansion or enhancement of the system is required to address constraint, inefficiency, system access requests, or any combination thereof, the Board must then assess, in the second stage, whether enhancement or expansion measures proposed by AESO are

¹⁰ "market participant" is defined in subsection 1(1)(ee) of the EUA as "any person that supplies, generates, transmits, distributes, trades, exchanges, purchases or sells electricity, electric energy, electricity services or ancillary services".

reasonable and in the public interest. The Board considers that both the EUA and the TDP provide guidance in this regard.

Section 5 of the EUA delineates its purposes and reads in part as follows:

5 The purposes of this Act Are

- (b) to provide for a competitive power pool so that an efficient market for electricity based on fair and open competition can develop, where all persons wishing to exchange electric energy through the power pool may do so on non-discriminatory terms and may make financial arrangements to manage financial risk associated with the pool price
- (c) to provide for rules that an efficient market for electricity based on fair and open competition can develop in which neither the market nor the structure of the Alberta Electric industry is distorted by unfair advantages of government-owned participants or any other participant
- (d) to continue a flexible framework so that decisions of electric industry about the need for and investment in generation of electricity are guided by competitive market forces,

Sections 16 and 17 of the EUA establish the role and duties of the ISO. Those sections respectively read as follows:

16 The Independent System Operator must exercise its powers and carry out its duties, responsibilities and functions in a timely manner that is fair and responsible to provide for the safe, reliable and economic operation of the interconnected electric system and promote a fair, efficient and openly competitive market for electricity.

17 The Independent System Operator has the following duties

- (h) to direct the safe, reliable and economic operation of the interconnected electric system;
- (i) to assess the current and future needs of market participants and plan the capability of the transmission system to meet those needs;
- (j) to make arrangements for the expansion and enhancement to the transmission system

Finally, section 33 of the EUA provides direction to the Independent System Operator with respect to transmission system planning. Section 33 states

33 The Independent System Operator must forecast the need of market participants and develop plans for the transmission system to provide efficient, reliable and non-discriminatory system access service and the timely implementation of required transmission system expansions and enhancements.

In addition to the EUA, the TDP is also instructive with respect to the principles the Board must consider when assessing the ISO's application. While the Board does not consider the TDP to be binding, it is of the view that it expressly represents the Alberta Government's guiding principles

for transmission development and, as a result, it warrants regard by the Board. The Board notes, in that respect, that this is an interpretation that the parties to the proceeding, including IPCAA, urged the Board to adopt.

The TDP states that its fundamental goal is to ensure that customers are served with reliable, reasonably priced electricity and to support continued economic growth in Alberta. The TDP emphasizes that this goal is underpinned by a number of foundation principles, including

- Transmission service must be provided using a non-discriminatory and open-access scheme.
- Transmission planning must be proactive in nature and therefore lead load growth and generation development.
- Transmission must serve and facilitate a competitive wholesale market.
- Transmission development should eliminate the need for transmission must run contracts and remove most congestion areas in the long run.
- Bulk transmission plans and facilities will, at a minimum, adhere to WECC and NERC standards and criteria to assure overall system reliability.
- Transmission internal to Alberta should be reinforced so that under normal conditions the existing inter-ties can import and export power on a continuous basis in accordance with their design capacity.
- Transmission internal to Alberta should be reinforced so that about 95 per cent of expected economic wholesale transactions can be realized without transmission congestion.

Basis of the above, it is the Board's view that any expansion or enhancement proposed by AESO to the Alberta transmission system must meet the following planning criteria (hereinafter referred to as the "planning criteria")

- It must provide for the safe, and reliable operation of the transmission system;
- It must be robust,
- It must be economic and efficient;
- It must provide fair, non-discriminatory open access to the transmission system;
- It must be proactive, and account for present and future generation needs;
- It must serve and facilitate a competitive wholesale market; and
- It must adhere to WECC and NERC standards.

Further, the Board finds that the TDP sets the following benchmarks for transmission system reliability and performance (hereinafter referred to as the "reliability and performance benchmarks").

- The starting point for planning criteria with respect to bulk transmission system will be N-G-1;
- Under normal (or N-0) operating conditions, all economic wholesale transactions can be realized; and
- Under abnormal operating conditions (or N-1) conditions approximately 95 per cent, or more, of all economic wholesale transactions can be realized.

The Board further understands that the TDP intended to incorporate some flexibility in the application of these benchmarks and expressly stated that the ISO may exercise discretion in meeting the reliability criteria.

The Board finds these benchmarks to be consistent with the overall legislative scheme established by the EUA. Without such performance goals, the Board believes that it would be difficult to establish the fair, efficient, non-discriminatory and openly competitive market for electricity that is mandated by the EUA. In the Board's view, the approval of an operating system that did not meet the benchmarks provided in the TDP could serve as a disincentive to new generation and may result in inadequate service to load.

It is the Board's view that its public interest mandate extends to its consideration of section 34 applications for expansion or enhancement of the Alberta transmission system. On the basis of the above analysis, the Board concludes that its public interest mandate will be satisfied if the transmission upgrades proposed by AESO meet the planning criteria and the reliability and performance benchmarks discussed above.

With respect to the issue of discrimination, the Board is of the view that the planning criteria and the reliability and performance benchmarks above clearly establish the standards to which system upgrades must be planned and the level of system access that must be available to generators. This is not to say, however, that the specific nature of local generators should be ignored when AESO is planning upgrades to the AIES. To the contrary, the Board finds that AESO's assessment of need must take into consideration the nature of generation that will be served by the upgrades proposed. Such an approach is consistent with section 33 of the EUA which requires AESO to forecast the need of market participants, including generators. Further, the Board finds that planning local upgrades to address area generation needs will further enhance the safe, reliable, and efficient operation of the AEIS and will ensure the availability of non-discriminatory system access.

Regarding the use of RAS when planning upgrades to the system, the Board is of the view that such consideration must be made on a case-by-case basis. While the Board believes that RAS should not be used as a substitute for transmission upgrades when such improvements are clearly appropriate, it considers that the use of RAS may be acceptable in certain circumstances. Specifically, RAS may be considered if the resultant system meets the planning criteria and the reliability and performance benchmarks (i.e. a safe, reliable, robust system that provides non-discriminatory access and allows for 95 per cent of economic wholesale transactions). For example, AESO's proposal in the NID application to use RAS to address potential overload to the 396S 240/138-kV transformer. AESO incorporated RAS in this situation rather than add a second transformer because of the low expected frequency of outages to the transformer and the relatively high cost of adding a transformer. In the Board's view, such an approach is appropriate and in the public interest.

Having described its analytical approach for section 34 applications, the Board shall now apply the planning criteria and benchmarks to its consideration of the SW Transmission System NID.

6.3 Need for Expansion or Enhancement of the Capability of the SW Alberta Transmission System

The Board notes that all parties agreed that the SW Transmission System requires expansion and/or enhancement to alleviate existing constraint, to increase system efficiency and to provide system access. The Board concurs with hearing participants that an expansion or enhancement of the system is necessary. However, the Board is of the view that it does not have a sufficient understanding of the conditions or constraints that are currently affecting the SW Transmission System. Specifically, the Board would like to understand the level of congestion or the amount of curtailed energy (MWH/year) that would be curtailed under the existing transmission configuration. In the Board's view, an understanding of the impacts of the constraint experienced is required before a determination can be made regarding the appropriate means to alleviate the constraint described.

The Board believes that any analysis of constraint or congestion must take into account the regional transmission needs including a consideration of the nature of generation and load in the area. The Board finds that, given the inherently intermittent nature of wind generation, it is necessary to specifically identify the circumstances under which congestion will actually occur. While the Board believes that the existing contingency analysis conducted by AESO is indicative of the congestion or constraint that may be experienced on the current system, it is of the view that such analysis must be supplemented by an examination of actual constraint or congestion experienced by area generators. The Board finds that an informed decision about potential upgrades to the system requires AESO to specifically consider when and how often such congestion occurs. Further, AESO should also understand what the specific impacts of the resultant congestion are upon the generators in question. Such analysis is absent from AESO's current application. On the basis of the above, the Board finds that AESO's assessment of the extent and nature of the constraint was not sufficiently robust to enable the Board to get a true understanding of existing/projected constraint or congestion.

As such, the Board requests AESO to perform a "congestion analysis" for the SW Transmission System using the same methodology used by AESO in its 500-kV Application. This analysis should be based on the 2006 forecast hourly production of the wind generators and loads in the area. The Board requests that the results clearly indicate the percentage of time congestion will occur and the MWH of curtailed generation on annual basis.

The Board is of the view that conducting such analysis and incorporating it into system design will not result in discriminatory access to the transmission system. The Board believes that this will allow AESO to more fully assess the nature and extent of system upgrades necessary to ensure non-discriminatory access. For example, congestion analysis may demonstrate that portions of the transmission system have historically been subject to minimal congestion whereas other sections are more prone to such concerns. In areas where congestion is minimal and outages have been historically infrequent, solutions such as RAS may be considered. Such an approach is consistent with AESO's determination to use RAS to address overload to the 396s 240/138-kV transformer.

6.4 Are the Means Proposed by AESO to Expand or Enhance the SW Transmission System Reasonable in the Circumstances and in the Public Interest?

As noted above, it is the Board's opinion that participants did not differ significantly with respect to what criteria should be utilized when considering an NID. Where parties' opinions did diverge was how the criteria should be applied. It was not seriously disputed by any party that the proposed enhancements and expansion described in the NID would result in a safe, reliable, robust system that provided for non-discriminatory access and facilitated a competitive market. However, there was significant disagreement between IPCAA and other parties to the proceeding as to whether the proposed upgrades would give rise to a transmission system that was economic and efficient.

In final argument, IPCAA posited that the crux of the proceeding was the extent to which constraint in southwest Alberta must be alleviated. It suggested that the costs to load of the proposed upgrades were not justified by the net benefits to generators. IPCAA argued that virtually unconstrained access to the SW Transmission System by generators could be achieved at a much lower cost to load through the application of a probabilistic planning approach, as illustrated by the IPCAA alternative.

As noted earlier, it is the Board's view that the planning and reliability benchmarks proposed by the TDP are reasonable and consistent with the principles expressed in the EUB's governing legislation. The Board finds that these benchmarks represent an appropriate minimum reliability standard for the alleviation of transmission congestion. In the Board's view, they represent a complete answer to IPCAA's question regarding the necessary degree of constraint alleviation. The Board notes, in that regard, that these standards have been included in the Transmission Regulation and, as such, will form a requirement in future section 34 applications. The Board finds adoption of such criteria for the proposed SW Transmission System updates will ensure that the resultant system will be safe, robust, and reliable and will provide for non-discriminatory access to the system.

However, the Board emphasizes that these are not the only factors that must be assessed when determining whether proposed upgrades will be in the public interest. In addition to the reliability criteria, the upgraded system must account for future load and generation needs and be efficient and economic. The Board understands that assessment by AESO of these latter criteria will require the consideration of less objective variables and it recognizes the challenges inherent in such a task.

The Board is comfortable that the upgrades proposed in the NID will result in a transmission system in southwest Alberta that is safe, reliable, and robust, provides for non-discriminatory system access, will facilitate an openly competitive market, and accounts for future transmission needs in the area. However, after a review of the evidence, the Board is not convinced that it has sufficient information to make a determination as to whether the proposed upgrades will result in an economic and efficient transmission system, particularly in the absence of a full understanding of the congestion/constraint that would be alleviated by the proposed system upgrades. As a result, the Board finds that additional information is required in order to make a determination in that regard.

The Board notes that the system proposed by AESO appears to allow 100 per cent of wholesale economic transactions to occur at N-1 conditions. The Board is concerned that this benefit may

come at an unnecessarily high price to the load customers who must ultimately bear the cost of the upgrades. The Board would like to understand the implications of the increased reliability inherent in the AESO proposal, for local wind generators. (i.e. would the increased reliability give rise to tangible benefits or are the benefits likely to be unrealized?) Further, the Board would like to know what the incremental cost would be of achieving 100 per cent reliability at N-1 conditions for generation versus achieving 95 per cent reliability.

As such, the Board requests AESO to prepare an alternative proposal (or proposals) for the expansion and enhancement of the SW Transmission System. The alternative(s) must meet the planning criteria and the reliability and performance benchmarks. The Board believes that the preparation of the alternative(s) must take into account the congestion/constraint information requested above. The Board expects that AESO will provide cost estimates for the construction of the alternative upgrades and requests AESO to assess system performance for each alternative developed. Further, the Board asks that AESO conduct congestion or constraint analysis for each alternative developed. This analysis should identify generation constraint based upon 2006 forecast of hourly production data of wind generators and loads in the area. The results should, to the extent possible or reasonable, indicate the percentage of time congestion is likely to incur, when such congestion is likely to occur and should also identify the MWh of curtailed energy on an annual basis.

Next, the Board asks that AESO provide analysis comparing the alternative (or alternatives) with the current expansions and enhancements described in the NID. The analysis must describe system upgrade costs for each solution as well as the estimated system constraint associated with each alternative at N-1 conditions.

Finally, the Board asks AESO to indicate which of the alternatives described should be approved. AESO should provide justification in support of its preferred option, or options, including a discussion of the advantages and disadvantages of each system from the perspective of safety, reliability, economics, current and future access and capacity, and cost.

The Board wishes to emphasize that it is not of the view that the expansion and enhancements initially proposed in the NID are not viable options. However, it believes that its public interest mandate requires that it ensure the upgrades approved represent viable options that best fulfill the criteria defined by the legislation. In the Board's view, the information requested herein will allow it to make an informed decision and will ensure the economic and efficient operation of a proactively planned transmission system in southwest Alberta.

Dated in Calgary, Alberta on October 14, 2004.

ALBERTA ENERGY AND UTILITIES BOARD

(original signed by)

J. R. Nichol, P.Eng.
Presiding Board Member

(original signed by)

J. D. Dilay, P.Eng.
Board Member

(original signed by)

Gordon J. Miller
Board Member

APPENDIX A – THOSE WHO APPEARED AT THE HEARING

Principals and Representatives (Abbreviations Used in Report)

Witnesses

Alberta Electric System Operator (AESO)

J. Smellie

N. Millar, P. Eng.
N. Brausen, P. Eng.
J. Billinton, P. Eng.

AltaLink Management Ltd. (AltaLink)

Z. Lazic

T. Rutkunas, P. Eng.
D. Walters
C. Barton

TransAlta Utilities Corporation (TransAlta)

T. Dalgleish, Q.C.

K. Van Koughnett, P. Eng.
F. Gallagher
J. Leskiw

Industrial Power Consumers Association of Alberta (IPCAA)

D. Davies

D. Macnamara
R. Gallant
M Drazen
of Drazen Consulting Group
R. Mikkelsen
of Drazen Consulting Group
P. Kos, P. Eng.
of Power System Solutions Inc.

Piikani First Nation and Piikani Utilities Corporation

ATCO Electric Ltd. (Piikani/ATCO Group)

R. Jeerakathil

N. Sanderson

City of Lethbridge (the City)

J. Sparkes

Pembina Institute for Appropriate Development (PIAD)

J. Row

ATCO Power Ltd. (ATCO Power)

R. Lowe

Municipal District of Pincher Creek (the MD)

D. Hammond

D. Hammond

Principals and Representatives
(Abbreviations Used in Report)

Witnesses

Town of Pincher Creek (the Town)

A. Bonertz

A. Bonertz

New Generation Processors (NGP)

B. Mowat

B. Mowat

Canadian Hydro Developers (Canadian Hydro)

J. Keating, CA

Alberta Energy and Utilities Board Staff

J. P. Mousseau, Board Counsel

T. Chan, P.Eng.

K. G. Gladwyn

R. Guzman

J. Wang

**ATTACHMENT A - PREHEARING MEETING DECISION REPORT
(DECISION 2004-044)**



"Attachment A -
Decision 2004-044.doc

(Consists of 5 pages)



Alberta Electric System Operator

Needs Identification Document Application
Southwest Alberta 240-kV Transmission Facilities
Pincher Creek – Lethbridge Area

Prehearing Conference

May 20, 2004

ALBERTA ENERGY AND UTILITIES BOARD
Decision 2004-044: Alberta Electric System Operator
Needs Identification Document Application
Southwest Alberta 240-kV Transmission Facilities
Pincher Creek - Lethbridge Area
Application No. 1340849

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ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

ALBERTA ELECTRIC SYSTEM OPERATOR NEEDS IDENTIFICATION DOCUMENT APPLICATION SOUTHWEST ALBERTA 240-KV FACILITIES PREHEARING CONFERENCE

**Decision 2004-044
Application No. 1340849**

The Alberta Energy and Utilities Board (Board) held a prehearing meeting in Lethbridge, Alberta, on May 18, 2004 with respect to the upcoming hearing into Application No. 1340849 filed by the Alberta Electric System Operator (AESO) for approval of a Needs Identification Document for Southwest Alberta transmission system development.

By Notice of Prehearing Meeting issued on April 30, 2004, the Board invited interested parties to provide their views on the issues to be examined at the hearing, the scope of the hearing, the interest of the interveners with respect to the application, the proposed schedule for hearing incorporated in the notice of prehearing meeting, and any other preliminary matter that participants wished to address in relation to the hearing of the application. The Board heard submissions on these points from the participants listed in Appendix A.

This hearing will be the first hearing on an application pursuant to section 34 of the *Electric Utilities Act*, which reads as follows:

When the Independent System Operator determines that an expansion or enhancement of the capability of the transmission system is required to meet the needs of market participants, the Independent System Operator must prepare and submit to the Board for approval a needs identification document that:

- (a) describes the constraint or condition affecting the operation or performance of the transmission system and indicates the means by which or the manner in which the constraint or condition could be alleviated,
- (b) describes a need for improved efficiency of the transmission system, including means to reduce losses on the interconnected electric system, or
- (c) describes a need to respond to requests for system access service.

The Board has considered the views of the parties in light of the above legislative provision and in light of the requirements of Board Directive 28: *Applications for Power Plants, Substations, Transmission Lines, and Industrial System Designations* to determine the appropriate scope of the hearing and the issues properly within the scope of the hearing.

The Board confirms that it will examine the Needs Identification Document filed by the AESO and determine whether it can approve the document with or without changes or conditions, or reject it. This means that the issues relevant to this hearing will include the following:

- the current state of the electric transmission system in Southwest Alberta,
- the need to improve and upgrade that system,
- planning criteria and performance standards,
- the need for the facilities identified for that purpose in the application, and

- any related issue such as a high level examination of costs and impacts included in the Needs Identification Document.

The Board will not decide on any specific option proposed by the AESO in the Needs Identification Document nor address site-specific impacts that the proposed facilities may have on land use except at a very high level. Should the Needs Identification Document be approved, issues involving economics, routing, environmental concerns, etc. would be dealt with in a subsequent transmission facility owner (TFO) application for a specific project filed under the *Hydro and Electric Energy Act*.

The hearing of the application will proceed as scheduled at 9:00 a.m. on July 6, 2004, at the Lethbridge Lodge Hotel. The Board has modified the schedule proposed in the Prehearing Meeting Notice to provide an opportunity for interveners to file rebuttal submissions if necessary.

Therefore the Board approved schedule for the hearing of the application is as follows:

Proposed Hearing Schedule

Information Requests (IR) to Applicant	May 25, 2004
Responses from Applicant to IRs	June 8, 2004
Intervener Evidence	June 14, 2004
IRs to Interveners	June 18, 2004
Intervener Responses	June 25, 2004
Intervener Rebuttal Evidence, if any	June 28, 2004
Applicant Rebuttal Evidence, if any	June 30, 2004
Hearing	July 6, 2004

Dated in Calgary, Alberta on May 20, 2004.

ALBERTA ENERGY AND UTILITIES BOARD

(original signed by)

J. R. Nichol, P.Eng.
Presiding Member

(original signed by)

J. D. Dilay, P.Eng.
Member

(original signed by)

Gordon J. Miller
Member

APPENDIX A – THOSE WHO APPEARED AT THE PREHEARING MEETING

Principals and Representatives
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AltaLink Management Ltd. Z. Lazic
TransAlta Corporation T. Dalglish, Q.C.
Benign Energy Canada Inc. R. Davidson
Piikani First Nation and Piikani Utilities/ATCO Electric Ltd. F. Martin
Pembina Institute for Appropriate Development J. Rowe
City of Lethbridge O. Lenz
Melcor Developments Ltd. N. Johnson
Industrial Power Consumers Association of Alberta D. Macnamara
Charities & Benevolent Organisations of Alberta D. Jenkins
Wind Power Inc. D. Johnson
Alberta Energy and Utilities Board Staff L. Lacasse, Board Counsel T. Y. K. Chan, P.Eng. K. Gladwyn J. Wang