AUC
Alberta Utilities Commission

Alberta Electric System Operator

Needs Identification Document Application
Hanna Region Transmission System Development

April 29, 2010

ALBERTA UTILITIES COMMISSION
Decision 2010-188: Alberta Electric System Operator
Needs Identification Document Application
Hanna Region Transmission System Development
Application No. 1605359
Proceeding ID. 278

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1 INTRODUCTION

1.1 Application

1. On August 14, 2009, the Alberta Electric System Operator (AESO) filed Application No. 1605359 (Application or NID) with the Commission pursuant to section 34 of the *Electric Utilities Act*, for reinforcement of the transmission system in the Hanna region.

2. The AESO stated that the Hanna region encompasses the southeast portion of the Alberta central planning region and includes the following AESO planning areas: Hanna (Area 42), Wainwright (Area 32), Alliance/Battle River (Area 36), Provost (Area 37), and Sheerness (Area 43).

3. The AESO stated in the NID that the need for transmission reinforcement in the Hanna region is driven by its load forecast, which is estimated to be 970 megawatts (MW) by 2017 and the need to connect the wind-powered generation forecast for the Hanna region, which is estimated to be 700 MW by 2017. The AESO stated that its system studies indicated that the Hanna region transmission system is close to its capacity and would be unable to supply additional loads in the region or interconnect any new major wind-powered generation projects.

4. The AESO considered three major alternatives to expand and enhance the Hanna region transmission system:

- A double 240-kV alternating current (AC) looped system (Alternative 1);
- A single reinforced 240-kV AC looped system (Alternative 2); and
- A single extended 240-kV AC looped system (Alternative 3)

5. The AESO proposed two stages of development for each of the three major alternatives. Stage I was proposed to be in service in 2012 and stage II was proposed to be in service in 2017.

6. The AESO evaluated alternatives 1, 2, and 3 based on technical, economic, land impact, and social factors. The AESO concluded that Alternative 3 was the best option and designated it as its preferred alternative.

7. Altalink Management Limited (Altalink) and ATCO Electric Limited (ATCO) conducted land impact assessments on behalf of the AESO which formed part of the NID. The AESO arranged for representatives of Altalink and ATCO to give evidence at the proceeding with respect to the land impact assessment.

1.2 Interventions

8. A group of interveners comprised of David McKinstry, Edward McKinstry, Gerald McKinstry, Terry Bale, Ken Helm and Jim Ness (the McKinstry Group) opposed the Application. It was the position of these interveners that the AESO's preferred option far exceeds what is appropriate given the needs identified. The McKinstry group asked the Commission to reject the Application.

9. TransCanada Energy Ltd. (TransCanada Energy) and TransCanada Keystone Pipeline GP Ltd. (TransCanada Keystone Pipeline or Keystone) supported approval of the NID.

10. A number of parties filed written submissions regarding the NID but did not appear at the hearing. A list of these parties is provided in Appendix D.

1.3 Notice

11. A Notice of Hearing was issued on November 2, 2009, advising that there would be a hearing on the Application starting Monday, February 22, 2010. The Notice of Hearing was distributed as follows:

- Mailed or emailed directly to interested parties;
- Mailed to registered land title holders within 900 meters of existing transmission lines and substations that could potentially be altered by Alternative 3 using a search of the Alberta Land Titles Spatial Information System;
- Mailed through Canada Post by postal code region to approximately 35,755 southeast Alberta residents. The postal code regions included the possible areas, identified by the AESO, which could be affected by all three alternatives set out in the Application;
- Published in 12 Hanna region newspapers;
- Published on the AUC website.

12. The AUC held information sessions in four southeastern Alberta locations from November 30 to December 3, 2009, as announced in the Notice of Hearing.

13. A Notice of Hearing update was issued on January 14, 2010, which clarified the filing schedule for the proceeding. The Notice of Hearing Update was distributed to the registered parties by email and regular mail. It was also made available on the AUC website.

1.4 Hearing

14. The hearing was held on February 22, 2010, in Stettler, Alberta at the Stettler Recreation Centre before a division of the Commission consisting of Tom McGee (Commissioner and Panel Chair), Anne Michaud (Commissioner), and Mark Kolesar (Commissioner). The Commission considers that the record for this proceeding closed on February 22, 2010. Those who appeared at the hearing are listed in Appendix C.

2 DECISION OVERVIEW

15. Having considered all of the evidence before it, the Commission has, in this Decision, approved the AESO Needs Identification Document including Alternative 3, the preferred transmission option. The Commission considers the AESO's assessment of the need to be correct in accordance with section 38(e) of the *Transmission Regulation*.

16. In reaching the determination set out within this Decision, the Commission has considered all relevant materials comprising the record of this proceeding, including the evidence and argument provided by each party. Accordingly, references in this Decision to specific parts of the record are intended to assist the reader in understanding the Commission's reasoning relating to a particular matter and should not be taken as an indication that the Commission did not consider all relevant portions of the record with respect to that matter.

3 THE PROCESS FOR NEW TRANSMISSION DEVELOPMENT IN ALBERTA

17. Two approvals from the Alberta Utilities Commission (AUC or Commission) are required to build new transmission in Alberta: an approval of the need to expand or enhance the system pursuant to section 34 of the *Electric Utilities Act* and a permit to construct and operate a transmission line pursuant to section 14 of the *Hydro and Electric Energy Act*.

18. The AESO, also known as the Independent System Operator or ISO, is responsible for preparing a Needs Identification Document (NID or Need Application) for approval by the AUC pursuant to section 34 of the *Electric Utilities Act*. In Decision 2004-087, the Commission's predecessor, the Alberta Energy and Utilities Board (AEUB), described the NID process as follows:

> 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…
>
> 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 reasonable and in the public interest.[1]

19. Section 38 of the *Transmission Regulation* provides the following guidance to the Commission in the exercise of its jurisdiction in considering a Need Application:

> 38. When considering whether to approve a needs identification document under section 34(3) of the Act the Commission must:
>
> (a) have regard for the principle that it is in the public interest to foster
>
> (i) an efficient and competitive generation market,
>
> (ii) a transmission system that is flexible, reliable and efficient and preserves options for future growth, and

[1] EUB Decision 2004-087, Southwest Alberta 240 kV Transmission System Development Addendum to Decision 2004-075, pages 13-14.

> (iii) geographic separation for the purposes of ensuring reliability of the transmission system and efficient use of land, including the use of rights of way, corridors or other routes that already contain or provide for utility or energy infrastructure or the use of new rights of way, corridors or other routes, notwithstanding that geographic separation for the purposes of ensuring reliability of the transmission system or efficient use of land may result in additional costs,
>
> (b) have regard for the following matters when it considers an application for a transmission facility upgrade or expansion, or operations preparatory to the construction of a transmission facility, namely, the contribution of the proposed transmission facility:
>
> (i) to improving transmission system reliability;
>
> (ii) to a robust competitive market;
>
> (iii) to improvements in transmission system efficiency;
>
> (iv) to improvements in operational flexibility;
>
> (v) to maintaining options for long term development of the transmission system;
>
> (vi) to a project to which section 27 applies to provide system access service,
>
> (c) take into account the long term transmission system outlook document and the transmission system plan filed with the Commission,
>
> (d) take into account the ISO's responsibilities under the Act and regulations, and
>
> (e) consider the ISO's assessment of the need to be correct unless an interested person satisfies the Commission that
>
> (i) the ISO's assessment of the need is technically deficient, or
>
> (ii) to approve the needs identification document would not be in the public interest.

20. Section 34 of the *Electric Utilities Act* provides the Commission with three options for making a decision on a Needs Application. The Commission may approve the NID, deny the NID, or refer the NID back to the AESO with suggestions or directions for changes or additions. However, in accordance with section 38(e) of the *Transmission Regulation*, the Commission must consider the AESO's assessment of need to be correct unless an interested person satisfies the Commission that the AESO's assessment of need was technically deficient or that approval of the NID would not be in the public interest.

21. Facility applications are prepared by a transmission facility owner (TFO) assigned by the AESO. When considering an application for a transmission facility, the Commission must consider whether the proposed transmission line is in the public interest having regard for the social and economic effects of the transmission line and the effect of the transmission line on the environment.

22. Section 15.4 of the *Hydro and Electric Energy Act* allows the Commission to consider a NID and a facility application in a combined proceeding. In this proceeding, the Commission considered only the NID because no corresponding facility application was filed by a TFO.

4 ASSESSMENT OF THE NEED TO ENHANCE OR EXPAND THE HANNA REGION TRANSMISSION SYSTEM

4.1 Views of the AESO

23. The AESO stated that the need for transmission reinforcement in the Hanna region is driven predominantly by forecast load growth and the forecast development of wind-powered generation. The AESO forecasted that the regional load will increase from approximately 420 MW in 2008 to approximately 820 MW by the year 2012, and then to 970 MW by 2017. The AESO also predicted that up to 175 MW of wind-powered generation will be operating in the Hanna region by the year 2012 and a total 700 MW of wind-powered generation will be operating by 2017.

4.1.1 Load Growth

24. The AESO submitted that the starting point for its Hanna region study was the AESO 2007 corporate load forecast.[2] In response to an information request (IR), the AESO provided its 2008 corporate load forecast, which was published in January 2009. However, the AESO clarified that it had not used this forecast for the NID, because it was not available at the time of the study.[3] The AESO explained that adjustments to the 2007 forecast were then made to reflect up-to-date project information.[4] The AESO used the winter peak as the worst case scenario for its load adequacy study because the load in the Hanna region is highest at the winter peak.

25. The AESO explained that load growth in the Hanna region is primarily driven by demand from oil and gas pipelines that require a significant amount of power to operate pumping facilities.

26. The AESO's forecast growth rates for the forecast period 2008-2017 were 10.3% for the Hanna area, 14.3% for the Wainwright area and 5.9% for the Provost area. The AESO acknowledged that historical load growth for these three areas was 1.9%, 2.5% and 1.7% respectively.[5] The AESO also stated that the peak load growth rate forecasts in the Battle River and Sheerness areas were relatively low by comparison because there is no major industrial development foreseen for these two areas.

27. The recorded Hanna winter regional peak load in 2008 was approximately 420 MW. The AESO forecast the Hanna winter regional peak load to grow from 420 MW in 2008 to 820 MW by the year 2012, an increase of 400 MW. The AESO forecast load to grow to 974 MW by 2017, a further increase of 154 MW.[6] A summary of the historical and forecast area winter peak loads for the Hanna region for the years 2008, 2012 and 2017 are presented in the following table:[7]

---

2 AESO NID Application, Section 2.2.1, page 7; the AESO 2007 corporate load forecast was published in December 2007.
3 MCKGRP-AESO-1 R4; Transcripts, page 43.
4 MCKGRP-AESO-1 R2; The adjustments reflecting the up-to-date project information were described in MCKGRP-AESO-1 R3.
5 AESO NID Application, Section 2.2.1, Table 2.2-1, page 8.
6 AESO NID Application, Section 2.2.1, Table 2.2-2, page 8.
7 AESO NID Application, Section 2.2.1, Table 2.2-2, page 8.

Table 1. Hanna Region Historical and Forecast Area Winter Peak Load

In MW	Hanna Area	Wainwright Area	Battle River Area	Provost Area	Sheerness Area	Hanna Region Regional Peak	Growth Relative to 2008 Load for Hanna Region
2008 Actual	156.6	94.4	34.6	125.5	25.1	419.6	
2012 Forecast	300.2	266.1	51.6	178.0	45.4	820.0	+400.4
2017 Forecast	377.0	314.1	51.6	210.5	46.4	974.3	+554.7 (+154.3 vs. 2012)

28. The AESO projected significant growth for the Hanna region for 2009 in its 2007 corporate load forecast. The AESO explained this predicted growth as follows "the 44% increase from 2008 to 2009 winter load and 38% increase between 2008 and 2009 summer load in Table 2.2-2 are a result of the estimated in-service dates of known projects".[8]

29. In the Application, the AESO projected total load to increase to 605.6 MW for the Hanna region in 2009. However, in an IR response, the AESO provided updated historical load for 2009, which indicated that the regional winter peak load for the Hanna region only reached 409.0 MW for 2009.

30. The AESO provided a partial reconciliation of the predicted load growth of 196.6 MW for 2009 relative to what has occurred in 2009, based on more recent estimates.[9] The AESO noted that, based on in-service dates in late 2009 to early 2010, TransCanada Keystone Pipeline is expected to add 50 MW of load, while two other new pipeline projects are expected to add 21 MW of load. In addition, the AESO stated that generator standby load for that period is expected to be 30 MW while normal load growth is projected to add another 15 MW. Further, the AESO stated that the second stage of the Keystone pipeline will add 75 MW in additional load requirements.[10] The AESO also noted that an additional 50 MW of future load related to further expansion of the Keystone pipeline is also anticipated.[11] Finally, the AESO noted that its forecast also included 37 MW of normal load growth.[12] The AESO concluded that the known load growth for the Hanna region could be as high as 280 MW by 2012.

31. The AESO based its forecast of pipeline demand load growth on an evaluation of the current production forecast for oil sands bitumen and the expected need to move that product to market.[13] Based on its assessment, the AESO forecast that 105 MW appeared to be a reasonable estimate of the additional pipeline load requirements by the year 2012. The AESO confirmed that this estimate of 105 MW represented unknown incremental growth within its forecast because it was not based on any known pipeline additions, but rather on the forecast of bitumen export potential. The AESO acknowledged that this forecast may have been optimistic for the 2012 time frame. However, the AESO was confidant that the need for new export pipeline

[8] MCKGRP-AESO-3 R1.

[9] For the ASEO's purposes the 2009 winter season ends on April 30 so it did not have a complete picture of the 2009 winter load.

[10] Transcripts, pages 44-47 and pages 52-55.

[11] Transcripts, pages 59-60; TransCanada Evidence, page 2, footnote 1. Note that Keystone's estimate of an additional 50 MW of load is for the period of expansion beyond 2013.

[12] Transcripts, page 59.

[13] The AESO's oilsands production forecast was based on a June 2008 projection of Alberta oilsands production made by the Canadian Association of Petroleum Producers (CAPP).

capacity in the Hanna region would arise in the foreseeable future to transport future oil-sands production to U.S. markets.[14]

32. From 2012 to 2017, the AESO forecast load growth totaling 154.3 MW for the Hanna region.[15] Of this total load growth, 123 MW of load growth was attributable to assumed unknown future pipeline projects.[16] Again, similar to the assumptions that it made for its 2012 load forecast, the AESO compared pipeline capacity in the Hanna region with forecast production estimates of oil sands, bitumen and conventional oil, and export potential, based on oil sands market fundamentals.[17] It stated that, while some of the forecast load for unknown projects may be delayed, that would not materially affect the need for the proposed upgrades.

33. The AESO also stated that the current transmission system is unable to supply the 60 MW of load that is now required for the first phase of the Keystone project.

4.1.2 Generation forecast

34. The AESO estimated that approximately 700 MW of new wind-powered generation would be located in the Hanna region by 2017. The AESO stated that, while its generation forecast anticipates only 175 MW of wind-powered generation by 2012, its plan will allow approximately 500 MW of wind–powered generation to operate in the Hanna region by 2012.

35. The AESO forecast of wind-powered generation in the Hanna region was based on the fact that, at the beginning of 2009, it had received nineteen system access applications from wind developers in the Hanna region, for a total wind-powered generation capacity of 2,283.5 MW.[18]

4.1.3 Existing System Capacity in the Hanna Region

36. The AESO stated that, by 2012, the transmission system in the Hanna region will be prone to voltage collapse under several contingencies that could cause parts of the transmission system to temporarily come out of service, due to a lack of reactive power sources and transmission capacities, assuming its forecast load growth and considering its power flow analysis and transfer-out capability assessment of the existing transmission system.

37. The AESO pointed out that most of the contingencies that it identified will result in a number of overloads across all transmission voltage levels in several locations. The AESO further stated that it is not feasible to connect the forecast 175 MW of wind-powered generation reliably by 2012, without reinforcements to the regional grid.

38. The AESO concluded that the existing transmission facilities in the Hanna region will not meet the required reliability criteria and argued that transmission reinforcements are necessary to meet projected load growth and the interconnection of the forecast wind-powered generation.

[14] Transcripts, pages 58-59.
[15] AESO NID Application, Section 2.2.1, Table 2.2-2, page 8.
[16] Revised AUC Table 2. This AUC derived table summarized forecast load growth for the Hanna region based on the AESO's adjustments that it made to its 2007 load forecast, based on forecast incremental load growth related to known and unknown pipelines as discussed in the errata to MCKGRP-AESO-1 R3.
[17] Transcripts, page 62.
[18] Table 2.2-4 of the Hanna NID application.

4.2 Views of Keystone

39. Keystone explained that there are three hubs for the gathering of crude oil in Alberta: Fort McMurray, Edmonton, and Hardisty. Keystone noted that, over the past decade, Hardisty has become the supply hub for the Western Canadian sedimentary basin because oil destined to go south or east is gathered there. Keystone added that Hardisty is now a marketplace for buyers and sellers to exchange their product.[19] Keystone elaborated that there had been tremendous recent growth in Hardisty and that a number of new pipelines in that area had already been built or expanded.

40. Keystone submitted that it is already a significant load customer in the Hanna region, given its power requirements at its existing pump stations for the Keystone pipeline. Keystone stated that its load requirements will increase as the Keystone pipeline is expanded in 2010. Keystone noted that it is also proposing to construct the Keystone XL pipeline in the Hanna region and, as a result, its load requirements in the area will greatly increase by mid-2012.

41. Keystone explained that, while temporary measures are being explored to serve the load requirements of the expanded Keystone pipeline starting in 2010, the transmission reinforcements proposed by the AESO are needed to provide a long term, reliable power supply. Keystone added that the AESO has advised Keystone that, without the proposed reinforcements, Keystone will be unable to connect to the transmission system to supply power to the Keystone XL pumping stations.

42. Keystone stated that it requires significant additional electric energy to run the pumping stations for its Keystone project. It set out its future electricity needs as follows:

- Keystone Phase 1 60 MW
- Keystone Phase 2 25 MW
- Keystone XL Phase 1 75 MW
- Keystone XL Phase 2 50 MW
- Total Keystone 210 MW

43. Keystone explained that Keystone Phase 1 is already operational and that Keystone Phase 2 will be operational by the end of 2010. Keystone anticipated that the in-service date for its XL project is the fourth quarter of 2012 and that XL Phase 2 will potentially be operational in 2015.

4.3 Views of the McKinstry Group

44. The McKinstry Group filed no evidence in the proceeding. However, it did pose a number of information requests to the AESO on its load forecast and cross-examined the AESO on this issue at the hearing. In argument the McKinstry Group submitted that the AESO had not demonstrated why a 144-kV looped system would not meet the need identified.

[19] Transcripts pages 110-111.

4.4 Commission Findings

45. It was the AESO's evidence that the transmission system in the Hanna region must be upgraded to accommodate the substantial load and generation growth forecast for that region. The Commission notes that the McKinstry Group did not dispute the need for transmission upgrades in the Hanna region but disagreed with the AESO's proposed solution to address that need.

46. The AESO's load forecast was premised upon the likely energy requirements of existing and future pipelines for the transport of crude oil and bitumen, including both known and unknown pipeline projects. The Commission understands that, when forecasting these energy requirements, the AESO relied heavily upon growth forecasts for oilsands bitumen prepared by the Canadian Association of Petroleum Producers. The AESO estimated the portion of that production that would likely be exported through Hardisty and the Hanna region during the NID forecast period, and estimated the energy required to move the forecast oil sands exports.

47. The Commission finds that the AESO's process for forecasting load was generally reasonable. However, the Commission considers that the accuracy of future load forecasts for the region could be augmented by also considering whether the forecast pipeline growth in the Hanna region could reasonably be built within the forecast period. Nonetheless, the Commission also finds that the AESO's evidence was substantially corroborated by Keystone's evidence regarding its own energy requirements in the region and its opinion of the future of exports and pipeline expansion in the Hanna region. Having regard to all of the above, the Commission finds that there is a reasonable likelihood that the forecast load growth arising from increases in pipeline capacity will occur in the foreseeable future, although potentially beyond the forecast horizon in the NID.

48. The AESO's generation forecast was premised largely on forecast volumes of wind-powered generation that are expected to be interconnected to the Alberta Integrated Electric System (AIES) in the Hanna region. The Commission notes that there are currently twelve wind-powered generation interconnection applications before the AESO, with a total capacity of 1,443.5 MW. The Commission also notes that it recently approved a 150 MW wind-powered generation project in the Hanna region and three other parties have filed facility applications with the AUC for wind-powered generation in the region, with a total capacity of 260 MW. Having regard to the foregoing, the Commission finds that the AESO generation forecast for the Hanna region is reasonable.

49. Having reviewed the AESO's contingency analysis, the Commission agrees with the AESO that the existing transmission system in Hanna region does not have adequate transmission capacities, reactive power sources, and incremental transfer out capability to satisfy the predicted load growth and generation interconnection. The Commission also accepts that one consequence of inadequate transmission in the Hanna region will be the inability to supply increasing load demand and integrate wind-powered generation into the AIES without violation of the AESO reliability criteria. The Commission therefore concludes that increased system capacity is required to ensure the continued development of a fair, open and competitive marketplace.

50. Having regard to all of the foregoing, Commission finds that the AESO's load and generation forecasts for the Hanna region are reasonable and concludes that there is a need for transmission upgrades in the Hanna region.

5 RESONABLENESS OF THE PROPOSED ENHANCEMENT MEASURES AND RELATED PUBLIC INTEREST CONSIDREATIONS

5.1 Views of the AESO

51. The AESO stated that it initially considered both 240-kV-AC and 144-kV-AC options for developing transmission reinforcements in the Hanna region. The AESO explained that it eliminated the 144-kV option for four reasons.

52. First, the AESO stated that a 144-kV system would have insufficient load carrying capability. The AESO claimed that, based on surge impedance loading, the load carrying capability of 144-kV lines is typically limited to about 150 MW. The AESO argued that this was insufficient, given that the predicted peak loads in the Hanna area and Hanna region are projected to be well over 370 MW and 970 MW respectively by 2017.[20]. In addition, the AESO noted that the wind-powered generation forecast in this region is 2,283.5 MW[21] with some of the individual projects rated at 200 MW. The AESO stated that it will not be feasible to connect such large wind farms directly to a 144-kV system without further system reinforcements.

53. Second, the AESO stated that a 144-kV option lacked the necessary voltage support. The AESO observed that, under normal and heavy load conditions, the reactive power demand of 144-kV lines is higher and consequently requires significant reactive power support equipment to maintain voltages in the normal operating range. The AESO stated that this problem with 144-kV lines is exacerbated, especially in the Hanna region, because the 144-kV lines will have to supply predominantly inductive pipeline loads, causing additional reactive power burden on the system. Furthermore, the AESO noted that the Hanna region transmission system could be subject to voltage instability during contingencies, that may temporarily take part of the transmission system out of service, because of the weaknesses in the 144-kV system.

54. Third, the AESO stated that a 240-kV option is more efficient than a 144-kV system. The AESO argued, in support of this contention, that transmission losses on 144-kV lines are higher than 240-kV lines, resulting in lower transmission efficiency and higher operating costs.

55. Fourth, the AESO argued that a 144-kV system would be inconsistent with its mandate to plan a robust and flexible transmission system to serve the long-term load and generation needs of Alberta.

56. The AESO concluded that the incremental capacity available to the existing system by upgrading the terminal equipment in the existing substations is not sufficient to meet the long-term needs of the system and the AESO does not consider upgrading the existing 144-kv system to be a viable option for the region's long-term needs. Accordingly, the AESO did not conduct any land impact assessment studies, produce a capital cost estimate for the 144-kV option, or otherwise compare the impacts of double circuit 240-kV lines with wood-pole 144-kV lines.

[20] Table 2.2-2 of the Hanna NID application.
[21] Table 2.2-4 of the Hanna NID application.

57. The AESO stated that the three proposed 240-kV lines from Hansman Lake to Pemukan, from Pemukan to Lanfine, and from Lanfine to Oakland, along with the existing lines will form a strong 240-kV loop in the Hanna planning area. The AESO further provided that these three proposed 240-kV lines are essential to reliably serve the pipeline loads along the eastern Hanna area transmission corridor. The AESO contended that these three lines are the minimum transmission development required to meet the planning criteria.

58. The AESO stated that Alternatives 1, 2, and 3 were evaluated based on technical, economic, land impact, and social factors. A power flow analysis was completed for all three alternatives to evaluate their ability to serve high load growth and integrate 700 MW of wind-powered generation in the Hanna region. Transient stability, reactive power margin, and short circuit analysis were also performed for Alternative 3 to test its adequacy.

59. The AESO concluded that Alternative 3 is preferred based on the overall results of the above alternative comparisons, as summarized below:

Alternative	Alternative 1	Alternative 2	Alternative 3
Technical Factors			
Meeting Reliability Criteria	Yes	Yes	Yes
Future Expandability (Using Existing ROW)	Excellent	Limited	Very good
Economic Factor			
Capital Cost	Very high	High	Low
System Losses	Low	Lowest	High
Societal Factors			
Land Impact Assessment	Most	Moderate	less
Stakeholder/Public Feedback	No preference	No preference	No preference

60. The AESO submitted that, while all three alternatives meet the reliability criteria, Alternative 3 has the lowest capital cost, the least land impact, and provides very good potential for future expandability.

61. The AESO stated that it consulted with the public on the double-circuit 240-kV AC option by holding twelve open house meetings in the Hanna region. It explained that poster boards displaying the 240-kV AC option were displayed at the open houses. The AESO pointed out that these open house poster boards also explained that the 144-kV AC option had been considered but was found to be technically inadequate.

62. The AESO explained that the preferred Alternative 3 would be implemented in two stages. Stage I of the development would enable the Hanna region transmission system to supply the forecast regional load of 820 MW (a 400 MW increase from 2008) and to connect 500 MW of wind-powered generation by the year 2012 (a 500 MW increase from 2008). Stage II of the development would enable the Hanna region transmission system to supply the forecast regional load of 970 MW (a 150 MW increase from 2012) and to connect the forecast 700 MW of wind-powered generation by the year 2017 (a 200 MW increase from 2012).

63. The AESO confirmed that the need for stage I already exists, based upon the combination of known pipeline projects (primarily Keystone) and the anticipated additional wind-powered generation in the Hanna region. However, the AESO recognized that the need for stage II is largely a function of unknown, but foreseeable, load and generation growth.

64. The AESO stated that the planned 2017 date for stage II is flexible and that implementation of the second stage could be accelerated or postponed, depending upon the realized load and generation development in the region. The AESO explained that it used a milestone approach in its southern Alberta needs application because of the widely distributed wind-powered generation projects proposed for that area. However, the AESO chose not to implement a milestone monitoring process for the second stage of development in the Hanna region. Instead, it proposed that it would be closely monitoring load growth and generation development in the region and would make decisions regarding the direct assignment of stage II in accordance with its normal planning processes.

5.2 Views of the McKinstry Group

65. As noted above, the McKinstry Group filed no evidence in the proceeding, choosing instead to provide information requests to the AESO, cross-examine witnesses at the hearing, and file final argument.

66. The McKinstry Group argued that the development proposed in the AESO's application far exceeds what is necessary given the needs identified. The McKinstry Group argued that the proposed development is an imprudent expenditure and that it will unnecessarily take land out of farm production. It also argued that the proposed development will cause unnecessary environmental damage to farm land and native grasslands, and that it is an unfair burden on the local people due to the disruption and visual impact caused by the large transmission lines proposed.

67. The McKinstry Group stated that the AESO did not adequately consider the extent to which agricultural, environmental and visual impacts could be avoided if single-pole 144-kV lines were used wherever possible, instead of defaulting to the use of double-circuit 240-kV towers, as proposed by the AESO's three major alternatives.

68. The McKinstry Group pointed out that the line ratings of some existing transmission lines were limited by the connections at the end of the lines, such as switches and current transformers (CTs). It contended that transmission capacity increases could be achieved by upgrading those switches and CTs at substations to eliminate these limitations. The McKinstry Group asserted that upgrading within the substations would have less land impact, whereas building new lines will have significant impact on the people living in the Hanna area.

69. As an alternative, the McKinstry Group suggested that the forecast load in the region east of Hanna may be supplied by building radial lines from the existing 240-kV substations to the Keystone pump stations, instead of building the 240-kV looped-system proposed by the AESO. The McKinstry Group noted that, when cross examined, the AESO agreed that some of the 2012 overloading contingencies identified by the AESO could be addressed by using radial lines. The McKinstry Group suggested that the cost of a radial line alternative would be less than the proposed alternative.

70. The McKinstry Group further argued that the AESO had not satisfied the requirements of public consultation because it failed to inform the public of alternatives which would avoid or minimize the need for new rights-of-way.

71. The McKinstry Group concluded that the AUC should reject the Application because the development proposed is imprudent, fails to properly consider impacts on land use, and was developed through a disingenuous public consultation process.

5.3 Findings of the Commission

72. To ensure the ongoing efficiency of the AIES, the AESO is mandated to plan a transmission system that is flexible and forward looking and reasonably anticipates load increases and new generation. These obligations are set out in sections 5, 17 and 33 of the *Electric Utilities Act* and section 38 of the *Transmission Regulation*. The AESO's obligations regarding reliability are set out in section 15 of the *Transmission Regulation*. The AESO must make arrangements for system expansion or enhancement so that all anticipated in-merit electric energy can be dispatched without constraint under normal operating conditions.

73. The Commission observes that the 144-kV option was eliminated by the AESO from the alternatives considered in the Hanna region because of the inadequacy of its load carrying capability, voltage support ability, transmission efficiency, and its lack of long-term robustness and flexibility.

74. The Commission agrees with the AESO that, by the year 2017, forecast power flow on the proposed 240-kV lines in the Hanna region, under winter peak conditions, could not be handled by a radial or loop 144-kV system and also satisfy the AESO transmission reliability criteria. Further, the Commission agrees with the AESO that a 144-kV option is not feasible, given the high reactive power demand, high losses, and the low efficiency of the 144-kV system.

75. While upgrading the existing line ratings and connecting radial lines to pump stations, as proposed by the McKinstry Group, may address some of the overloading issues identified in the AESO's power flow study, the Commission finds that a 144-kV option is technically inadequate given the forecast long-term transmission needs in the Hanna region.

76. The AESO's participant involvement program included two rounds of open houses in eleven communities within the Hanna region, meetings with ten counties and municipal districts, and two postal code mail-outs within the Hanna region with information about the project. The Commission finds that the publically distributed materials developed by the AESO for the need application were clear and comprehensive and that the AESO's participant involvement program met the Commission's requirements in *AUC Rule 007*. Consequently, the Commission finds that the AESO satisfied the requirements of public consultation.

77. Having regard to the foregoing, the Commission concludes that the approach to transmission planning advocated by the McKinstry Group does not accord with the legislative direction provided by the *Electric Utilities Act* and the *Transmission Regulation*. The Commission finds that the McKinstry Group has not persuaded the Commission that the AESO's assessment of the need is technically deficient or that approval of the NID is not in the public interest. To the contrary, the Commission concludes that the AESO's proposed upgrades to the transmission system are consistent with the objectives of section 5 of the *Electric Utilities Act* and the AESO's planning duties pursuant to section 17 of that Act. The Commission also finds that alternatives proposed by the AESO accord with the planning and performance requirements of section 15 of the *Transmission Regulation*.

78. The Commission is satisfied that stage I of the proposed project is required primarily to satisfy known load and generation requirements for the Hanna region. Because stage II of the project is proposed for a future date, it is governed by section 11(4) of the *Transmission Regulation*, which requires the AESO to be reasonably certain that these additional transmission facilities will be needed. In such circumstances, the AESO may, at its discretion, establish milestones for the purpose of determining the certainty of the forecast need.

79. The AESO chose not to implement a milestone process for stage II of this project and instead proposed to closely monitor load growth and generation development in the region and make decisions regarding the direct assignment of stage II in accordance with its normal planning processes. The Commission accepts the AESO's evidence that the need for the stage II facilities is reasonably certain, and finds the internal monitoring process proposed by the AESO to be reasonable.

6 CONCLUSION

80. Subsection 38 of the *Transmission Regulation* instructs the Commission on the factors that it must consider when considering a NID filed by the AESO.

81. Having regard to subsection 38(a) of the *Transmission Regulation*, the Commission finds that the development of Alternative 3 will contribute to an efficient and competitive generation market by allowing all existing and reasonably foreseeable new electric energy generation in the Hanna region to be transmitted without constraint.

82. The Commission agrees that, by using double-circuit towers and initially stringing one circuit, the system capacity of lines can be increased by stringing a second circuit onto the double-circuit towers when required, without the need for any new rights-of-way. Therefore, the approval of the NID will contribute to a transmission system in the Hanna region that is flexible and preserves options for future growth, without incurring any unnecessary additional environmental impacts in the future.

83. Considering subsection 38(b) of the *Transmission Regulation*, the Commission is satisfied that Alternative 3 will satisfy the AESO's transmission reliability criteria pertaining to system planning and will improve system reliability in the Hanna region. The Commission also finds that, by providing for the interconnection of significant new wind-powered generation in the Hanna region, approval of Alternative 3 will further contribute to the competitive electricity market in Alberta. The Commission also finds that alternative 3 will contribute to system efficiency by accommodating new generation and reducing the need to curtail wind-powered generation through remedial action schemes or other means. Further, the Commission is satisfied that Alternative 3 will improve operational flexibility and maintain options for future development of the transmission system by virtue of its staged approach.

84. Regarding subsections 38(b) and (c) of the *Transmission Regulation*, the Commission finds that the need identified by the AESO in the NID is consistent with that identified in its 2009 Long-Term Transmission System Plan documents which were filed with the Commission. The Commission also finds that the NID is reflective of the AESO's duties pursuant to section 17 of the *Electric Utilities Act* and consistent with the planning requirements prescribed by section 15 of the *Transmission Regulation*. Consequently, the Commission is satisfied that approval of the NID will contribute to a fair, open and competitive electricity market in Alberta.

85. Finally, with respect to subsection 38(e) of the *Transmission Regulation*, the Commission concludes that no interested person has satisfied it that the AESO's assessment of the need to expand and enhance the transmission system in the Hanna region to address congestion, increase efficiency, improve reliability, meet load demand, and to allow for the interconnection of reasonably foreseeable new generation in the region is technically deficient or not in the public interest.

86. Having regard to all of the foregoing, the Commission is satisfied that it must approve the NID. In coming to this decision, the Commission had specific regard for the evidence and argument of the parties and the clear direction provided in subsections 38(a) through (e) of the *Transmission Regulation*. The Commission therefore approves the NID and the preferred option, Alternative 3, as filed by the AESO. The approval, which will be set out in this decision as Appendix E, will be distributed separately.

Dated on April 29, 2010.

ALBERTA UTILITIES COMMISSION

(original signed by)

Thomas McGee
Chair

(original signed by)

Mark Kolesar
Commissioner

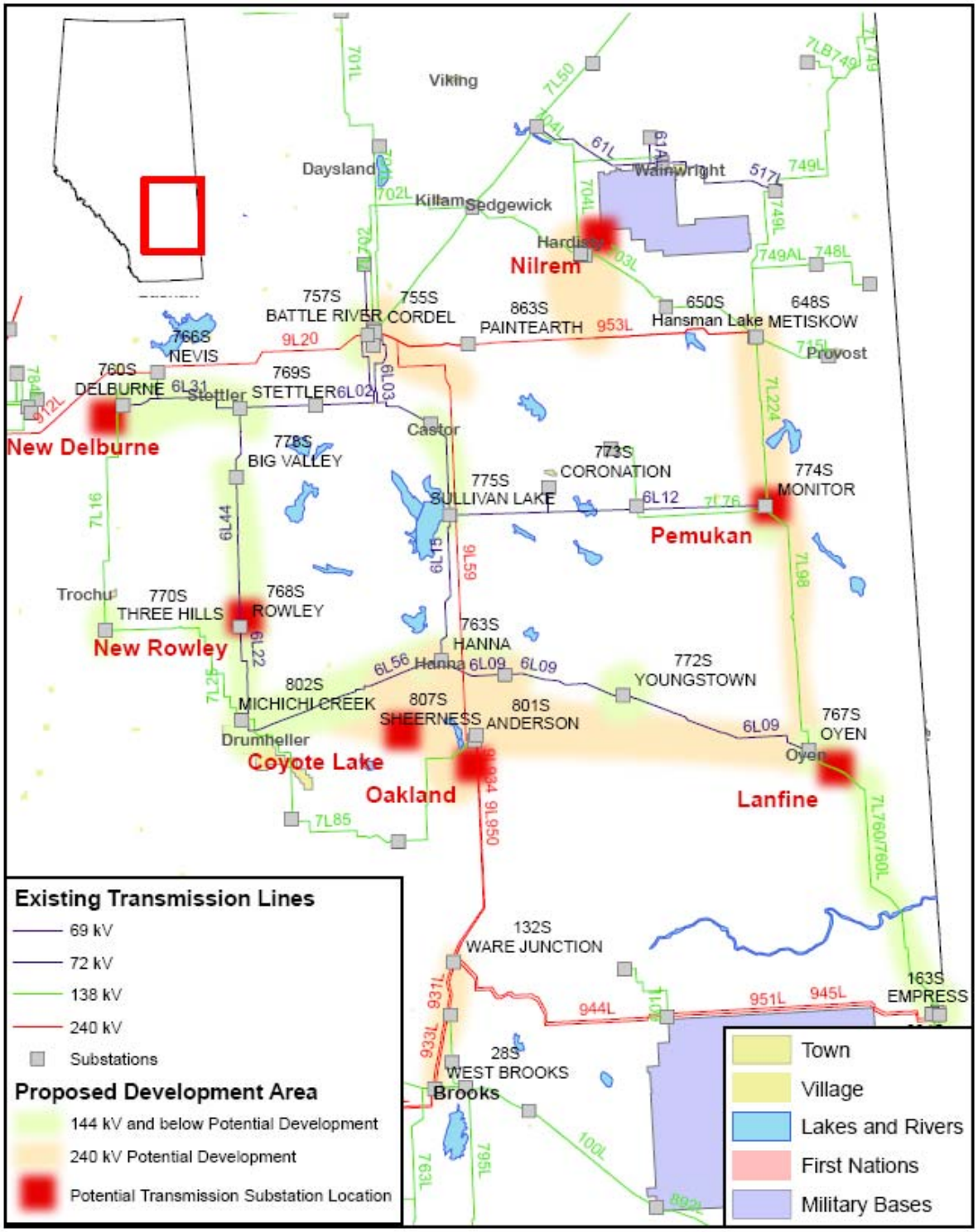
(original signed by)

Anne Michaud
Commissioner

APPENDIX A – ACRONYMS AND ABBREVIATIONS

AC	Alternating Current
AESO	Alberta Electric System Operator (also the ISO)
AIES	Alberta Integrated Electric System
AUC	Alberta Utilities Commission
ISO	Independent System Operator (also AESO)
kV	Kilovolt
MW	Megawatt
NID	Needs Identification Document
PIP	Participation Involvement Program
SVC	Static Var Compensation
TFO	Transmission Facility Owner

APPENDIX B – HANNA REGION TRANSMISSION DEVELOPMENT PROPOSED ALTERNATIVE 3



APPENDIX C – ORAL HEARING – REGISTERED APPEARANCES

Name of Organization (Abbreviation) Counsel or Representative (APPLICANTS)	Witnesses
Alberta Electric System Operator (AESO or ISO) J. Cusano	N. LeBlanc D. Downs N. Brausen Dr. R. Divi L. Papworth D. Michaud P. Bothwell Dr. C. Palylyk R. Desrosiers
AltaLink Management Ltd. (AltaLink) P. Feldberg	
ATCO Electric Ltd. (ATCO) D. Sheehan	
TransCanada Energy Ltd. (TransCanada) R. Stevens	
TransCanada Keystone Pipeline GP Ltd. (Keystone) R. Stevens	R. Jones
McKinstry Group (McKinstry) D. McKinstry J. Ness	

Alberta Utilities Commission

Commission Panel
- T. McGee, Panel Chair
- A. Michaud, Commissioner
- M. Kolesar, Commissioner

Commission Staff
- J. P. Mousseau (Commission Counsel)
- P. Khan (Commission Counsel)
- T. Chan
- K. Yang
- D. Lam
- R. Litt
- L. Charest

APPENDIX D – PROCEEDING PARTICIPANTS THAT DID NOT PARTICIPATE IN HEARING

Name of Organization (Abbreviation) Counsel or Representative (APPLICANTS)
Suncor Energy Inc. (Suncor)
Nexen Inc. (Nexen)
Industrial Power Consumers Association of Alberta (IPCAA)
S. Armstrong
H. Abbie
D. Garstad
R. G. Jorgenson
Hanna & District Landowners Association (HDLA)