

May 29, 2015

Wade Vienneau
Executive Director, Facilities Division
Alberta Utilities Commission
Fifth Avenue Place
400, 425 – 1st Street SW
Calgary, Alberta
T2P 3L8

Dear Mr. Vienneau:

**Re: Amendment to the Alberta Utilities Commission (Commission)
Wild Rose 1 and Wild Rose 2 Wind Energy Interconnection
Approval No. U2011-266(WR NID Approval)**

1. Pursuant to the relevant provisions of the *Electric Utilities Act*, S.A. 2003, c. E-5.1 (EUA) and the *Alberta Utilities Commission Act*, S.A. 2007, c. A-37.2 (AUCA), the Alberta Electric System Operator (AESO) is applying to the Commission for approval of certain amendments to the WR NID Approval, as more particularly described below (Application).

I. Organization of this Application

2. This Application is organized in the following manner:
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- Appendix B Wild Rose Amendment Connection Engineering Study Report
- Appendix C AESO Participant Involvement Program Summary
- Appendix D AESO Participant Involvement Program (PIP)
- Appendix E AltaLink confirmation that Commission Rule 007 NID 13 aspects are being addressed in the facility application

II. Background

WR NID Approval

3. On October 29, 2010, by Application No. 1606722, the AESO applied to the Commission for approval of the *Wild Rose 1 and Wild Rose 2 Wind Energy Connections Needs Identification Document (Wild Rose NID)*. The Commission approved the Wild Rose NID by way of *Decision 2011-352* and Approval No. U2011-266.

Project Evolution

4. In the Wild Rose NID, the requested in-service dates (ISD) were March 31, 2013 for the Wild Rose 1 (WR1) connection and July 1, 2013 for the Wild Rose 2 (WR2) connection.¹ The market participant subsequently delayed the ISD to 2015 for both WR1 and WR2 which, as further described in paragraphs 15-16, created the opportunity for a less costly WR1 connection.

¹ WR NID, Section 1.2

5. In the Wild Rose NID, the AESO described the capacity of WR1 and WR2 to be 200 MW each. The market participant subsequently proposed a change in turbines which resulted in a capacity of 210 MW for each of WR1 and WR2.
6. More recently, the market participant requested an ISD of July 2017 for WR1 and September 2016 for WR2 and advised the AESO that the capacity of WR2 was reduced to 189 MW.

III. Existing WR NID Approval Developments

7. The WR NID Approval describes specific transmission developments to connect each of WR1 and WR2 as shown below.

1. Interconnection of the Wild Rose 1 Power Plant:

- a) construction of a new Elkwater 264S switching station
- b) construction of a new 240-kilovolt (kV) single-circuit transmission line from Wild Rose 1 547S substation to Elkwater 264S substation designated as 978L
- c) construction of a new 240-kV single-circuit transmission line from Bowmanton 244S substation to Cypress 562S substation designated as 1009L
- d) rebuild of a portion of existing 138-kV single circuit transmission line 668L in the vicinity of Empress 394S substation
- e) alter Cypress 562S substation and Bowmanton 244S substation
- f) other associated equipment as more particularly described in the application

2. Interconnection of the Wild Rose 2 Power Plant:

- a) *construction of a new 240-kV single circuit transmission line from Eagle Butte 274S substation to Elkwater 264S substation designated as 1076L*
- b) *alteration of 240-kV double circuit transmission lines 964/983L to connect to Elkwater 264S switching station*
- c) *other associated equipment as more particularly described in the application*

IV. Proposed Amendments

8. For the reasons provided below, the AESO proposes to amend the WR NID Approval under the *1. Interconnection of the Wild Rose 1 Power Plant* heading in the following manner:

- a. Delete sub-paragraph a) and place it under the *2. Interconnection of the Wild Rose 2 Power Plant* heading (see below);
- b. Delete sub-paragraphs c) and d) in their entirety; and
- c. Delete sub-paragraph e) and replace with:

“alter Bowmanton 244S substation and Elkwater 264S switching station”.

9. For the reasons provided below, the AESO proposes to amend the WR NID Approval under the *2. Interconnection of the Wild Rose 2 Power Plant* heading in the following manner:

- a. Add:

“construction of a new Elkwater 264S switching station”; and

- b. Delete sub-paragraph b) and replace with:

“alteration of 240-kV transmission line 983L to connect to Elkwater 264S switching station”.

10. For clarity, a copy of the proposed amended WR NID Approval is attached as Appendix A.

V. Amendment Rationale

Elkwater 264S

11. Both WR1 and WR2 are planned to connect to the transmission system via the proposed Elkwater 264S switching station (“Elkwater 264S”) which is therefore a prerequisite to either connection. Since WR1 was initially proposed to connect several months in advance of WR2, the Wild Rose NID included construction of Elkwater 264S in the WR1 transmission developments.²
12. The market participant is now requesting that the WR2 transmission developments be in-service in advance of WR1. In effect, this requires transferring certain transmission developments proposed in the Wild Rose NID between WR1 and WR2. Specifically, construction of Elkwater 264S will now be required for the WR2 connection and the addition of a 240kV bus and related termination, telecommunication and protection and control equipment at Elkwater 264S is now required to accommodate the interconnection of WR1.³
13. Elkwater 264S was previously approved to connect to the transmission system via an in/out configuration to the double circuit transmission lines 964L/983L. As further described in Paragraph 18, the market participant has selected, and the AESO has agreed, to connect Elkwater 264S to the transmission system via a single line in/out configuration to transmission line 983L.
14. Therefore, the AESO is seeking the Commission’s approval to amend the WR NID Approval by transferring construction of Elkwater 264S to the WR2

² WR NID, sections 1.1 and 2.2

³ WR NID, Section 2.2

transmission developments, altering the Elkwater 264S connection and transferring modifications at Elkwater 264S to the WR1 developments.

Transmission Lines 1009L and 668L

15. Construction of the 240 kV transmission line 1009L, rebuild of a portion of 668L and modifications to the Cypress 562S substation were all originally required in the Wild Rose NID to connect WR1 to the transmission system prior to commissioning of the Cassils –Bowmanton – Whitla 240 kV line (CBW Line).⁴ The CBW Line has since been energized.
16. As described in Paragraph 6, WR2 is now expected to be in-service prior to WR1. The approved WR2 developments include “alteration of 240-kV double circuit transmissions lines 964/983L to connect Elkwater 264S substation”⁵, which form part of the CBW Line. Consequently, WR1 no longer requires additional facilities to connect to the transmission system. Therefore, the AESO is seeking the Commission’s approval to amend the WR NID Approval by deleting construction of 1009L, rebuilding a portion of 668L and modifications to the Cypress 562S substation.

VI. Technical Considerations

17. The market participant engaged a consultant to conduct the *Connection Engineering Study Report for AUC Application, NaturEner Wild Rose 1 and 2* (Study) to assess the impact of connecting WR1 and WR2 to the transmission system.
18. The Study includes power flow, transient stability and short circuit analyses to evaluate the impact of two alternative WR1 and WR2 connections on the transmission system. The alternatives differ only in the in/out configuration connecting Elkwater 264S to the transmission system, namely: Alternative 1

⁴ Approved as part of the Southern Alberta Transmission Reinforcement, U2014-461, Stage 1, Paragraph 5

⁵ WR NID Approval, Paragraph 2.b)

entails the approved in/out connection to the double circuit transmission lines 964/983L and Alternative 2 entails a single line in/out connection to transmission line 983L. The Study demonstrates that both alternatives meet Alberta Reliability Standards. Alternative 2 was selected for the WR1 and WR2 connections as it requires less modifications to Elkwater 264S and is therefore the lowest cost alternative. This Application reflects the technical considerations and costs related to Alternative 2.

19. Power flow analyses show no thermal constraints or voltage violations under Category A conditions (all elements in service). Under the studied Category B (single element out of service) contingencies, thermal constraint and voltage collapse were demonstrated in the Tilley 498S substation area which are pre-existing issues currently managed by a remedial action scheme (RAS). The WR1 and WR2 connections have immaterial effect on this pre-existing issue. The analyses also identify a minor thermal overload (less than the emergency rating) on transmission line 668L under Category B contingency following the combined connection of WR1 and WR2.
20. Analyses of Category C (two elements out of service) contingencies confirm an existing thermal constraint on transmission line 172L; this constraint was not present in the Study following connection of both WR1 and WR2. Thermal constraints and voltage violations were also demonstrated in the Empress/Medicine Hat area; these are existing issues that may be exacerbated by the WR1 and WR2 connections. The AESO will establish mitigation measures for Category C5 constraints as required.
21. The Study identified several transient stability issues, most importantly islanding in the Medicine Hat area under double contingency of the 240 kV double circuit 1034L/1035L between Bowmanton 244S substation and Cassils 324S substation. In its *Wild Rose 1 Wind Farm Connection Functional Specification* and *Wild Rose 2 Wind Power Facility Functional Specification*⁶, the AESO has

⁶ The AESO functional specifications will be filed as part of AltaLink's facility application for the *Wild Rose 1 & 2 Wind Farm Amendment (983/1074L Transmission Line Interconnection)*

directed AltaLink Management Ltd. (AltaLink), as the transmission facility owner, to install anti-islanding equipment at nearby substations.

22. The Study also identified potential transient stability issues under the Category B contingency of the single circuit 978L between the Bowmanton 244S substation and Elkwater 264S. Energization of the proposed 240 kV transmission line between the Journault 260S and Whitlea 251S substations⁷ in 2017 will alleviate this stability issue. Until such time, the AESO will develop a RAS to run back or remove the WR1 and/or WR2 generation from the system as system constraints require.

Study Updates

23. Following completion of the Study, the ISDs for WR1 and WR2 were delayed to 2017 and 2016, respectively and the capacity of WR2 was reduced to 189 MW from 210 MW. The AESO has reviewed the changes in ISD and capacity and concludes that these changes do not affect the results of the Study.
24. In addition, the load forecasts used in the Study reflect the AESO 2012 Long-term Outlook which predates the AESO's most recently published load forecast, the AESO 2014 Long-term Outlook. The AESO has reviewed the differences in load forecasts, which are between -3% and 1%, and concludes that there would be no material effect to the Study results.
25. The Study, prefaced by the AESO's assessment and acceptance of the Study, is attached in Appendix B.

VII. Cost Estimate

26. In the Wild Rose NID, AltaLink Management Ltd, (AltaLink), as the transmission facility owner, estimated the cost of the WR1 transmission developments to be in the order of \$83 million and the cost of the WR2 transmission developments

⁷ Southern Alberta Transmission Reinforcement Approval No. U2014-461, Stage II, paragraph 7 (Journault Sub "C", Whitlea Sub "D")

to be in the order of \$11 million, for a total of \$94 million (+20/-10%, 2013\$), including estimated system related costs of \$5 million.⁸

27. AltaLink currently estimates the cost of the amended WR1 transmission developments to be in the order of \$54 million and the cost of the WR2 transmission developments to be in the order of \$18 million, for a total of \$72 million (+20/-10%, 2016/2017\$), including estimated system related costs of \$6 million. A copy of the AltaLink estimates is included in Appendix C.

VIII. AESO Participant Involvement Program

28. The AESO directed AltaLink to assist the AESO in conducting a participant involvement program (PIP) in accordance with requirement NID14 and Appendix A2 of Commission Rule 007. Between November 2012 and May 2015, the AESO and AltaLink used various methods to notify occupants, residents and landowners in the area where transmission facilities could be installed and in the area where transmission facilities were no longer planned to be installed.⁹ No concerns have been raised regarding this Application.

29. A report summarizing the AESO's PIP is attached to this Application as Appendix D.

IX. Environmental and Socio-economic Overview

30. As set out in the attached Appendix E, the AESO has been advised that the AltaLink's facility application will contain information in respect of Commission Rule 007, Section 6.1 – NID13. The AESO understands that AltaLink considered potential environmental effects of the WR1 and WR2 transmission developments, as amended, and in identifying the transmission line routes. As potential environmental effects are related to siting, routing and on-going operations, the AESO has not undertaken a separate environmental and socio-

⁸ WR NID, sections 2.3 and 2.4

⁹ Primarily along the previously approved 1009L and 668L as shown in bold in Paragraph 7

economic assessment of the sort contemplated in Commission Rule 007, Section 6.1 – NID13.

X. Request for Approval

31. For all of the above reasons, and in reliance upon the following:

- the relevant provisions of the EJA and the AUCA and the *Transmission Regulation*;
- the Study;
- the AESO's PIP; and
- the AESO's long-term transmission system plans,

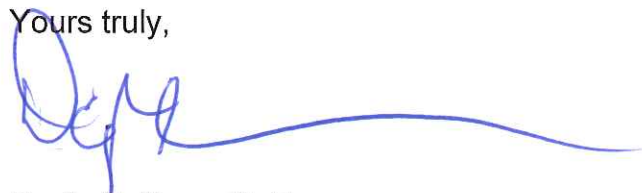
the AESO has concluded that its assessment of the proposed amendments is complete and is in the public interest.

32. The AESO respectfully requests that the Commission approve the amendments identified in this Application, and grant such further relief as may be necessary to give effect to such approval.

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Yours truly,



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