

In the Matter of the Need for the Suncor Base Plant Cogeneration Facility Connection

And in the matter of the *Electric Utilities Act*, S.A. 2003, c. E-5.1, the *Alberta Utilities* Commission Act, S.A. 2007, c. A-37.2, the Hydro and Electric Energy Act, R.S.A. 2000, c. H-16, the Regulations made thereunder, and Alberta Utilities Commission Rule 007

Application of the Alberta Electric System Operator for Approval of the Suncor Base Plant Cogeneration Facility Connection **Needs Identification Document**

Date: October 30, 2020

PART A - APPLICATION

1 Introduction

- 1.1 Application Pursuant to Section 34(1)(c) of the *Electric Utilities Act* (Act), and in accordance with further provisions set out in legislation,¹ the Alberta Electric System Operator (AESO) applies to the Alberta Utilities Commission (Commission) for approval of the *Suncor Base Plant Cogeneration Facility Connection Needs Identification Document* (Application). This application is submitted in accordance with AUC Rule 007, Section 6.2.2, ISO *Abbreviated Needs Identification Document Application Information Requirements for System Access Service Requests by Generators*.
- 1.2 Application Overview Suncor Energy Inc. (market participant), has requested system access service to connect its approved Suncor Base Plant Cogeneration Facility² (the Facility) to the transmission system in the Fort McMurray area (AESO Planning Area 25, Fort McMurray). The Facility is part of the approved Suncor Base Plant Industrial Complex.³ The Facility includes the Inglis Island Power Plant, which is comprised of two 403 MW cogeneration units. The market participant expects the Facility to be commercially operational in Q3 2024.

The market participant's request includes a request for a Rate STS, *Supply Transmission Service*, contract capacity increase of 815 MW, from 450 MW to 1,265 MW in the Fort McMurray area. The market participant's request can be met by adding two 240 kV circuits to connect the existing Voyageur 29EDD-94 and the existing Thickwood Hills 951S substations, modification of the Thickwood Hills 951S substation and upgrades to the existing 240 kV transmission lines 29PL9-1 and 29PL9-2 (the Proposed Transmission

¹ The *Alberta Utilities Commission Act*, S.A. 2007, c. A-37.2, the *Hydro and Electric Energy Act*, R.S.A. 2000, c. H-16, the Regulations made thereunder, and Alberta Utilities Commission Rule 007 (AUC Rule 007).

² The Suncor Base Plant Cogeneration Facility was originally approved by the Commission in Decision 23957-D01-2019 on March 1, 2019.

³ Suncor Energy Inc.'s request to have its Industrial System Designation (ISD) amended was originally approved by the Commission in Decision 25744-D01-2020 on September 24, 2020.

Development, as further described in Section 2.2). The scheduled in-service date for the Proposed Transmission Development is July 1, 2022.

This Application describes the need to respond to the market participant's request for system access service, and the AESO's determination of the manner in which to respond to the request. Having followed the AESO Connection Process,⁴ the AESO has determined that the Proposed Transmission Development provides a reasonable opportunity for the market participant to exchange electric energy and ancillary services. The Proposed Transmission Development is consistent with the AESO's long-term plans for the Northeast Planning Region, which includes the Fort McMurray area. The AESO submits this Application to the Commission for approval in accordance with the AESO's responsibility to respond to requests for system access service and having determined that transmission development is required and is in the public interest.^{5,6}

1.3 AESO Directions to the TFO – During the AESO Connection Process, the AESO issued various directions to the legal owners of transmission facilities (TFOs), in the applicable service areas, including directions to assist the AESO in preparing this Application.⁷ In this case, the TFOs were ATCO Electric Ltd. (ATCO) and AltaLink Management Ltd., in its capacity as general partner of AltaLink, L.P. (AltaLink). The AESO also requested Alberta Power Line (APL), as a TFO, to assist the AESO in preparing this Application.

⁴ For information purposes, refer to note iv of Part C of this Application for more information on the AESO Connection Process.

⁵ For information purposes, some of the legislative provisions relating to the AESO's planning duties and duty to provide system access service are referenced in notes i and ii of Part C of this Application.

⁶ Note v of Part C of this Application describes the Application scope in more detail.

⁷ The directions are described in more detail in the following sections of this Application and in Part C, note vi.

2 Need Overview and Proposed Transmission Development

2.1 Duty to Provide Transmission System Access Service – The AESO, pursuant to its responsibilities under Section 29 of the Act, must provide system access service on the transmission system in a manner that gives all market participants a reasonable opportunity to exchange electric energy and ancillary services.

The AESO, in consultation with the market participant and the TFOs, has determined that the Proposed Transmission Development is the preferred option to provide the market participant with a reasonable opportunity to exchange electric energy and ancillary services. In accordance with Section 34 of the Act, the AESO has determined that the Proposed Transmission Development will result in an expansion or enhancement of the transmission system thereby establishing the need for this Application. The market participant has made the appropriate applications to the AESO to obtain transmission system access service.

Through the AESO Connection Process, the AESO, in consultation with the market participant and the TFOs, has determined the Proposed Transmission Development and has assessed the impacts that the Proposed Transmission Development and the associated generation would have on the Alberta interconnected electric system (AIES). The AESO has issued directions to ATCO to prepare a transmission facility proposal⁸ (Facility Proposal) that corresponds with this Application.^{9,10}

2.2 Proposed Transmission Development – The Proposed Transmission Development involves connecting the Facility to the transmission system, and consists of the following elements:

⁸ Also referred to as facility application, or FA, under AUC Rule 007.

⁹ AltaLink has advised the AESO that its scope of work will not require a preparation of a Facility Proposal. As a result, the AESO did not direct AltaLink to prepare a Facility Proposal for this scope of work.

¹⁰ APL has advised the AESO that its scope of work will not require a preparation of the Facility Proposal. As a result, the AESO did not direct APL to prepare a Facility Proposal for this scope of work.

A. Proposed ATCO Development

- Add two 240 kV circuits, approximately 37 kilometers each in length, with a minimum line rating of 703 MVA for each circuit, to connect the existing Voyageur 29EDD-94 substation and the existing Thickwood Hills 951S substation;¹¹
- 2. Modify the Thickwood Hills 951S substation, including adding three 240 kV circuit breakers;
- 3. Upgrade the existing 240 kV transmission lines 29PL9-1 and 29PL9-2, between the existing Ruth Lake 848S and Millennium 29EDD-1 substations by replacing the existing 240 kV conductor with a 240 kV conductor of higher capacity;¹² and
- 4. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.

B. Proposed AltaLink Developments¹³

- Add two relays and telecom equipment at the existing Sunnybrook 510S substation; and
- Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.

¹¹ The two 240 kV circuits will connect to the market participant's existing Voyageur 29EDD-94 substation, which is part of its approved ISD. ATCO has estimated that the 240 kV circuits will have a length of approximately 37 kilometers each. This is subject to change as routing and/or siting is finalized by ATCO.

¹² This work will primarily be completed within the approved ISD by the market participant. ATCO has confirmed that its associated scope of work is limited to modifying the Ruth Lake 848S substation, including connecting the higher capacity conductors.

¹³ AltaLink has advised that this is the scope of work that would be required to meet the AESO's Functional Specification. Since AltaLink will not be providing a Facility Proposal, an additional level of detail has been provided for the AltaLink scope of work.

C. Proposed APL Developments¹⁴

- Add two relays and telecom equipment at both the Thickwood Hills 951S substation and the existing Livock 939S substation; and
- Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.
- 2.3 Proposed Transmission Development Cost Estimate The AESO directed ATCO and AltaLink to prepare cost estimates for the Proposed Transmission Development, described in Section 2.2. ATCO has estimated the cost of its scope of work to be approximately \$102 million. In addition, APL has estimated the cost of its scope of work to be approximately \$1 million. In accordance with the ISO tariff, the AESO has determined that all costs associated with the Proposed Transmission Development will be classified as participant-related.
- **2.4 Transmission Development Alternatives –** In addition to the Proposed Transmission Development, the AESO, in consultation with the market participant and ATCO, identified six other transmission development alternatives to respond to the market participant's request for system access service:
 - Connect the Voyageur 29EDD-94 substation and the Thickwood Hills 951S substation with two 240 kV circuits, add a third circuit between Ruth Lake
 848S and Millennium 29EDD-1 substations This alternative involves adding

¹⁴ APL has advised that this is the scope of work that would be required to meet the AESO's Functional Specification. Since APL will not be providing a Facility Proposal, an additional level of detail has been provided for the APL scope of work.

¹⁵ The cost is in nominal dollars using a base year of 2020 with escalation considered. Further details of this cost estimate, which has an accuracy level of +20%/-10%, can be found in Appendix B.

¹⁶ AltaLink's cost estimate was not available at the time of filing.

¹⁷ The cost is in nominal dollars using a base year of 2020 with escalation considered. Further details of this cost estimate, which has an accuracy level of +20%/-10%, can be found in Appendix B.

two 240 kV circuits, approximately 37 kilometers each in length, to connect the existing Voyageur 29EDD-94 substation and the Thickwood Hills 951S substation. This alternative also involves adding one 240 kV circuit, approximately 5 kilometers in length, between the existing Ruth Lake 848S and the existing Millennium 29EDD-1 substations, modifying the Thickwood Hills 951S substation including adding three 240 kV circuit breakers, and modifying the Ruth Lake 848S substation, including adding one 240 kV circuit breaker. This alternative was ruled out due to increased transmission development, and hence overall increased cost, compared to the Proposed Transmission Development.

- 2. Connect the Voyageur 29EDD-94 substation and the Thickwood Hills 951S substation with two 240 kV circuits, add a third circuit between Ruth Lake 848S and Voyageur 29EDD-94 substations This alternative involves adding two 240 kV circuits, approximately 37 kilometers each in length, to connect the Voyageur 29EDD-94 substation and the Thickwood Hills 951S substation. This alternative also involves adding one 240 kV circuit, approximately 3 kilometers in length, between the Ruth Lake 848S and Voyageur 29EDD-94 substations and modifying the Thickwood Hills 951S substation, including adding three 240 kV circuit breakers. This alternative was ruled out after ATCO and the market participant determined that the transmission line between the Voyageur and Ruth Lake substations would not be constructible due to siting constraints.
- 3. Connect the Black Fly 934S substation to the 240 kV transmission line 29PL9-12 via an in and out configuration This alternative involves connecting the existing Black Fly 934S substation to the existing 240 kV transmission line 29PL9-12 in an in-and-out configuration, by adding two 240 kV circuits approximately 4 kilometers each in length. This alternative also involves modifying the Black Fly 934S substation including adding two 240 kV circuit breakers. This alternative requires upgrading the 240 kV transmission lines 29PL9-1 and 29PL9-2, approximately 5 kilometers in length each, with a 240 kV conductor of a higher capacity. This alternative was ruled out as the market participant determined that

the transmission lines would not be constructible within its Industrial System Designation (ISD).

- 4. Connect the 29EDD-65 substation and the Black Fly 934S substation with two 240 kV circuits This alternative involves the addition of two 240 kV circuits, approximately 19 kilometers in length each, to connect the existing 29EDD-65 substation to the existing Black Fly 934S substation. This alternative also involves modifying the Black Fly 934S substation including the addition of two 240 kV circuit breakers. This alternative requires upgrading the 240 kV transmission lines 29PL9-1 and 29PL9-2, approximately 5 kilometers in length each, with a 240 kV conductor of a higher capacity. This alternative was ruled out as the market participant determined that the transmission lines would not be constructible within its ISD.
- 5. Connect the Facility to Thickwood Hills 951S substation with two 240 kV circuits This alternative involves the addition of two 240 kV circuits, approximately 40 kilometers each in length, to connect the Facility to the Thickwood Hills 951S substation. This alternative also involves modifying the Thickwood Hills 951S substation including the addition of three 240 kV circuit breakers. This alternative was ruled out as it would not meet the market participant's request to serve load within its ISD prior to exporting surplus generation to the AIES.
- 6. Connect the Facility to Black Fly 934S substation with two 240 kV circuits This alternative involves the addition of two 240 kV circuits, approximately 33 kilometers each in length, to connect the Facility to the existing Black Fly 934S substation. This alternative also involves modifying the Black Fly 934S substation including the addition of two 240 kV circuit breakers. This alternative was ruled out as it would not meet the market participant's request to serve load within its ISD prior to exporting surplus generation to the AIES.

The Proposed Transmission Development was selected as the preferred transmission alternative and forms the basis for the cost estimates and the connection assessment described herein.

2.5 Connection Assessment – Power flow, transient stability, and short-circuit studies were conducted to assess the impact that the Proposed Transmission Development and the associated generation would have on the transmission system. Power flow and short-circuit studies were conducted prior to and following connection of the Proposed Transmission Development, and transient stability studies were performed following connection of the Proposed Transmission Development.¹⁸

The pre-connection assessment identified system performance issues. Under certain Category B conditions, thermal criteria violations were observed. The pre-connection system performance issues can be managed using real-time operational practices.

The post-connection assessment identified several system performance issues. No Reliability Criteria violations were observed under the Category A condition. Thermal criteria violations were observed under certain Category B conditions. A new remedial action scheme and real-time operational practices can be used to mitigate the post-connection system performance issues under Category B conditions.

- **2.6 Transmission Dependencies –** The Proposed Transmission Development does not require the completion of any other AESO plans to expand or enhance the transmission system prior to connection.
- 2.7 AESO Participant Involvement Program The AESO directed ATCO to assist the AESO in conducting the AESO's participant involvement program (PIP). Between August 2019 and September 2020, ATCO and the AESO used various methods to notify stakeholders about the need for development and the AESO's preferred option to respond to the system access service request. This included a notification to market participants that may be affected by the Proposed Transmission Development. The AESO has responded to the questions and concerns raised by two stakeholders.

¹⁸ The connection assessment is included as Appendix A.

Apart from the inquiries above, there are no outstanding concerns or objections regarding the need for the Proposed Transmission Development or the AESO's preferred option to respond to the system access service request. In September 2020, the AESO notified stakeholders of its intention to file this Application with the Commission.¹⁹

- **2.8 Environmental and Land Use Effects** The AESO has been advised that ATCO's Facility Proposal addresses the environmental and land use effects requirements of AUC Rule 007, Section 6.2.2, NID23(3).²⁰ In consideration of this fact, and as the filing of the Application is combined with ATCO's Facility Proposal, the AESO has not undertaken a separate assessment of the sort contemplated in AUC Rule 007, Section 6.2.2, NID23(3).
- 2.9 Confirmation Date In the event that the proposed facilities are not in service by July 1, 2022 which is the scheduled in-service date of the Project, the AESO will determine if the need to expand or enhance the transmission system described in this Application continues, and if the technical solution described in this Application continues to be the AESO's preferred technical solution. In addition, in the event that the AESO believes that the in-service date will not be met, and such delay will have a material impact on this Application, the AESO will advise the Commission of the same.

The AESO has been advised that ATCO's Facility Proposal addresses the requirements of AUC Rule 007, Section 6.2.2, NID25(2).²¹ In consideration of this fact, and as the filing of this Application is combined with the TFO's Facility Proposal, the AESO has not undertaken an implementation schedule of the sort contemplated in AUC Rule 007, Section 6.2.2, NID25(2).

¹⁹ Further information regarding the AESO's PIP for this Application is included in Appendix C.

²⁰ Please refer to the letter included as Appendix D of this Application.

²¹ Ibid

2.10 Approval is in the Public Interest – Having regard to the following:

- the transmission planning duties of the AESO as described in Sections 29, 33 and 34 of the Act;
- the market participant's request for system access service and the AESO's assessment thereof;
- the AESO's connection assessment;
- the TFOs' cost estimates for the Proposed Transmission Development;
- ATCO's confirmation that it has addressed AUC Rule 007, Section 6.2.2, NID23(3);
- information obtained from AESO PIP activities; and
- the AESO's long-term transmission system plans;

it is the conclusion of the AESO that the Proposed Transmission Development provides a reasonable opportunity for the market participant to exchange electric energy and ancillary services. In consideration of these factors, the AESO submits that approval of this Application is in the public interest.

3 Request to Combine this Application with the Facility Proposal for Consideration in a Single Process

- 3.1 Pursuant to Subsection 35(1) of the Act, the AESO has directed ATCO to prepare a Facility Proposal corresponding to this Application. The AESO understands that ATCO's Facility Proposal will be filed shortly.²² The AESO requests, and expects ATCO will request, that this Application be combined with the Facility Proposal for consideration by the Commission in a single process. This request is consistent with Section 15.4 of *Hydro and Electric Energy Act* and Section 6 of AUC Rule 007.
- 3.2 While it is believed that this Application and the Facility Proposal will be materially consistent, the AESO respectfully requests that in its consideration of each, the Commission be mindful of the fact that the documents have been prepared separately and for different purposes. The purpose of this Application is to obtain approval of the need to respond to the market participant's request for system access service and provide a preliminary description of the manner proposed to meet that need, having regard for the AESO's determination that the Proposed Transmission Development is required to provide the market participant with a reasonable opportunity to exchange electric energy and ancillary services. In contrast, the Facility Proposal will contain more detailed engineering and designs for the Proposed Transmission Development and seek approval for the construction and operation of specific facilities.

²² The AESO understands that ATCO intends to file a Facility Proposal relating to this Application to be titled the Thickwood to Voyageur Transmission Project.

4 Relief Requested

4.1 The AESO submits that its assessment of the need to meet the market participant's request for system access service is technically complete and that approval is in the public interest.

4.2 For the reasons set out herein, and pursuant to Section 34 of the Act, the AESO requests that the Commission approve this Application, including issuing an approval of the need to respond to the market participant's request for system access service, and to connect the Facility to the transmission system, by means of the following transmission development:

A. Add two 240 kV circuits to connect the existing Voyageur 29EDD-94 substation and the existing Thickwood Hills 951S substation;

B. Modify the Thickwood Hills 951S substation, including adding three 240 kV circuit breakers;

C. Upgrade the existing 240 kV transmission lines 29PL9-1 and 29PL9-2, between the existing Ruth Lake 848S and Millennium 29EDD-1 substations by replacing the existing 240 kV conductor with a 240 kV conductor of higher capacity;²³ and

D. Modify, alter, add or remove equipment, including switchgear, and any operational, protection, control and telecommunication devices required to undertake the work as planned and ensure proper integration with the transmission system.

All of which is respectfully submitted this 30th day of October 2020.

Alberta Electric System Operator

"Electronically Submitted by"

Robert Davidson, P.Eng. Director, Customer Grid Access

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²³ This work will primarily be completed within the approved ISD by the market participant. ATCO has confirmed that its associated scope of work is limited to modifying the Ruth Lake 848S substation, including connecting the higher capacity conductors.

PART B - APPLICATION APPENDICES

The following appended documents support the Application (Part A).

APPENDIX A Connection Assessment – Appendix A contains the AESO Engineering Connection Assessment –Suncor Base Plant Cogeneration Facility Connection that assesses the transmission system performance prior to and following the connection of the Proposed Transmission Development. As part of the AESO Connection Process, the AESO defined the study scope, and provided the system models and study assumptions to the market participant who engaged a consultant to conduct the connection assessment studies. The AESO reviewed the results of the connection assessment studies prepared by the consultant and found the results acceptable for the purposes of assessing the impacts of the Proposed Transmission Development on the transmission system.

APPENDIX B TFO Capital Cost Estimates – Appendix B contains detailed cost estimates corresponding to the Proposed Transmission Development. These estimates have been prepared by the TFOs at the direction and request of the AESO, to an accuracy level of +20%/-10%, which exceeds the accuracy required by AUC Rule 007, NID24. Cost estimates from AltaLink were not available at the time of filing.

APPENDIX C AESO PIP – Appendix C contains a summary of the PIP activities conducted, in accordance with requirements of NID27 and Appendix A2 of AUC Rule 007, regarding the need to respond to the market participant's request for system access service. Copies of the relevant materials distributed during the PIP are attached for reference.

<u>APPENDIX D</u> Information Regarding AUC Rule 007, Section 6.2.2, NID23(3) and NID25(2) – Appendix D contains a letter provided by ATCO confirming that the requirements of AUC Rule 007, NID23(3) and NID25(2) will be addressed within the TFO's Facility Proposal.

PART C - REFERENCES

- i. AESO Planning Duties and Responsibilities Certain aspects of the AESO's duties and responsibilities with respect to planning the transmission system are described in the Act. For example, Section 17, Subsections (g), (h), (i), and (j), describe the general planning duties of the AESO.²⁴ Section 33 of the Act states that the AESO "must forecast the needs of Alberta 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." Where, as in this case, the market participant (refer to note ii below) is requesting system access service, and the AESO has determined that the request requires or may require the expansion or enhancement of the capability of the transmission system, the AESO must prepare and submit for Commission approval, as per Section 34(1)(c), a needs identification document that describes the need to respond to requests for system access service, including the assessments undertaken by the AESO regarding the manner proposed to address that need. Other aspects of the AESO's transmission planning duties and responsibilities are set out in Sections 8, 10, 11, and 15 of the *Transmission Regulation*.
- ii. Duty to Provide Transmission System Access Section 29 of the Act states that the AESO "must provide system access service on the transmission system in a manner that gives all market participants [Suncor Energy Inc. in this case] wishing to exchange electric energy and ancillary services a reasonable opportunity to do so."
- iii. AESO Transmission Planning Criteria In accordance with the Act, the AESO is required to plan a transmission system that satisfies applicable reliability standards. Transmission Planning (TPL) standards are included in the Alberta Reliability Standards, and are generally described on the AESO website.
 - In addition, the AESO's *Transmission Planning Criteria Basis and Assumptions* is included in Appendix A.
- iv. **AESO Connection Process** For information purposes, the AESO Connection Process, which changes from time to time, is generally described on the AESO website.
- v. Application for Approval of the Need to Respond to a Request for System Access
 Service This Application is directed solely to the question of the need to respond to a request for system access service, as more fully described in the Act and the *Transmission Regulation*

²⁴ The legislation and regulations refer to the Independent System Operator or ISO. "AESO" and "Alberta Electric System Operator" are the registered trade names of the Independent System Operator.

and the AESO's determination of the manner in which to respond to the request. This Application does not seek approval of those aspects of transmission development that are managed and executed separately from the needs identification document approval process. Other aspects of the AESO's responsibilities regarding transmission development are managed under the appropriate processes, including the ISO rules, Alberta reliability standards and the ISO tariff, which are also subject to specific regulatory approvals. While the Application or its supporting appendices may refer to other processes or information from time to time, the inclusion of this information is for context and reference only.

Any reference within the Application to market participants or other parties and/or the facilities they may own and operate or may wish to own and operate, does not constitute an application for approval of such facilities. The responsibility for seeking such regulatory or other approval remains the responsibility of the market participants or other parties.

- vi. **Directions to the TFOs** Pursuant to Subsection 35(1) of the Act, the AESO has directed ATCO, in whose service territories the need is located, to prepare a Facility Proposal to meet the need identified. The Facility Proposal is also submitted to the Commission for approval. The AESO has also directed ATCO, pursuant to Section 39 of the Act and Section 14 of the *Transmission Regulation*, to assist in the preparation of the AESO's Application. ATCO and AltaLink have also been directed by the AESO under Section 39 of the Act to prepare service proposals to address the need for the Proposed Transmission Development.
- vii. **Capital Cost Estimates** The provision of capital costs estimates in the Application is for the purposes of relative comparison and context only. The requirements applicable to cost estimates that are used for transmission system planning purposes are set out in Section 25 of the *Transmission Regulation*, AUC Rule 007, and Section 504.5 of the ISO rules, *Service Proposals and Cost Estimating*.