



Alberta Utilities Commission
In the Matter of the Need for the
ATCO Power Heartland Generating Station 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
ATCO Power Heartland Generating Station Connection
Needs Identification Document

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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 *ATCO Power Heartland Generating Station Connection Needs Identification Document* (Application).

1.2 Application Overview – ATCO Power Canada Ltd. (ATCO Power) has requested system access service to connect the Heartland Generating Station² (the Facility) to be located in Strathcona County, near the City of Fort Saskatchewan (AESO Planning Area 33, Fort Saskatchewan). The Facility has an expected in-service date of November 1, 2019. ATCO Power’s request includes a new Rate STS, *Supply Transmission Service*, contract capacity of 510 MW and a new Rate DTS, *Demand Transmission Service*, contract capacity of 15 MW in the Fort Saskatchewan area. ATCO Power’s request can be met by modifying the existing Josephburg 410S substation, including adding a 240 kV circuit breaker, and by adding a 240 kV circuit to connect the Josephburg 410S substation to the Facility (the “Proposed Transmission Development”, as further described in Section 2.2). The scheduled in-service date for the Proposed Transmission Development is November 1, 2019.

This Application describes the need to respond to ATCO Power’s request for system access service. Having followed the AESO Connection Process,³ the AESO has determined that the Proposed Transmission Development provides a reasonable

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 Facility was originally approved by the Commission on September 3, 2014 in Decision 2014-253 and issued Power Plant Approval No. U2014-380.

³ For information purposes, refer to note iv of Part C of this Application for more information on the AESO’s Connection Process.

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opportunity for the market participant, in this case, ATCO Power, 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 Saskatchewan area. The AESO, in accordance with its responsibility to respond to requests for system access service, submits this Application to the Commission for approval.^{4,5}

1.3 AESO Directions to the TFO – During the AESO Connection Process, the AESO issued various directions to the legal owner of transmission facilities (TFO), in this case AltaLink Management Ltd., in its capacity as general partner of AltaLink, L.P., including direction to assist the AESO in preparing this Application.⁶

⁴ 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.

⁵ Note v of Part C of this Application describes the Application scope in more detail.

⁶ The directions are described in more detail in the following sections of this Application and in Part C, note vi.

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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 (in this case ATCO Power), a reasonable opportunity to exchange electric energy and ancillary services.

ATCO Power has requested system access service on the transmission system, thereby establishing the need for this Application. ATCO Power has made the appropriate applications to the AESO to obtain transmission system access service. The AESO, in collaboration with ATCO Power and the TFO, has determined that the Proposed Transmission Development is the preferred option to meet ATCO Power's request for system access service.

Through the AESO Connection Process, the AESO, ATCO Power, and the TFO have collaborated to determine the characteristics of the Proposed Transmission Development and to assess the impacts that the Proposed Transmission Development and the associated generation would have on the transmission system. The AESO has issued directions to the TFO to prepare a transmission facility proposal⁷ (Facility Proposal) to meet ATCO Power's request.

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

1. Add one 240 kV circuit to connect the existing Josephburg 410S substation to the Facility⁸ using a radial configuration;
2. Modify the existing Josephburg 410S substation, including adding one 240 kV circuit breaker; and

⁷ Also referred to as facility application, or FA, under AUC Rule 007.

⁸ The 240 kV circuit will connect to the Facility by ATCO Power's approved Lamont 400S substation.

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3. 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.⁹

2.3 Proposed Transmission Development Cost Estimate – The AESO directed the TFO to prepare a cost estimate for the Proposed Transmission Development. The TFO estimated the in-service cost of the Proposed Transmission Development, described in Section 2.2, to be approximately \$37 million.¹⁰ In accordance with the ISO tariff, the AESO has determined that there are no system-related costs associated with the Proposed Transmission Development.

2.4 Transmission Development Alternatives – In addition to the Proposed Transmission Development, the following transmission development alternatives were examined:

- A. Connect the Facility in an in-and-out configuration to the 240 kV transmission line 1120L near Amelia 108S – This involves connecting the Facility to the 240 kV transmission line 1120L (between the Amelia 108S substation and the Josephburg 410S substation) using an in-and-out configuration. This would require the addition of two 240 kV circuits, each approximately 4 km in length and the modification of the Facility, including the addition of two 240 kV breakers and associated equipment. This alternative was ruled out due to the increased

⁹ Details and configuration of equipment required for the Proposed Transmission Development, including substation single-line diagrams, are more specifically described in the AESO's Functional Specification included in the TFO's Facility Proposal. Also, further details will be determined as detailed engineering progresses and the market participant's operating requirements are finalized. Routing and/or siting of transmission facilities do not form part of this Application and are addressed in the TFO's Facility Proposal. The new 240 kV circuit is currently estimated to have a length of approximately 6 kilometres. This is subject to change as routing and/or siting is finalized by the TFO. Line numbering and substation names provided here are for ease of reference and are subject to change as engineering and design progresses. Market participant facilities that may subsequently be connected to the Proposed Transmission Development are the responsibility of the market participant and are not included in the Application.

¹⁰ The cost is in nominal dollars using a base year of 2016 with escalation considered. Further details of this cost estimate, which has an accuracy level of +20%/-10%, can be found in Appendix B.

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transmission developments and hence, increased costs compared to the Proposed Transmission Development.

- B. Connect the Facility in an in-and-out configuration to the 240 kV transmission line 1120L near Josephburg 410S – This involves connecting the Facility to the 240 kV transmission line 1120L (between the Amelia 108S substation and the Josephburg 410S substation) using an in-and-out configuration. This would require the addition of two 240 kV circuits, each approximately 4 km in length and the modification of the Facility, including the addition of two 240 kV breakers and associated equipment. This alternative was ruled out due to the increased transmission developments and hence, increased cost compared to the Proposed Transmission Development.

The Proposed Transmission Development was selected as the preferred transmission alternative and forms the basis of the cost estimates and 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.¹¹ Power flow and short circuit studies were conducted prior to and following connection of the Facility, and transient stability studies were performed following connection of the Facility.

The pre-connection assessment identified system performance issues. Under certain Category B conditions, thermal criteria violations were observed. Real-time operational practices and the reconfiguration of the 138 kV transmission system between the North Calder 37S substation and the Clyde 150S substation can be used to mitigate the pre-connection system performance issues until the capacity of 898L and 792L is increased as part of the *AESO 2015 Long-term Transmission Plan (2015 LTP)*.

¹¹ The connection assessment is included as Appendix A.

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The post-connection assessment included a post-connection baseline assessment and a post-connection assessment which included certain components of the 2015 LTP.

The post-connection baseline assessment identified the same system performance issues that were identified in the pre-connection assessment, as well as additional system performance issues. Under certain Category B conditions, most of the thermal criteria violations that were observed in the pre-connection assessment were intensified and two new thermal criteria violations were observed. Real-time operational practices and the reconfiguration of the 138 kV transmission system between the North Calder 37S substation and the Clyde 150S substation can be used to mitigate the post-connection system performance issues.

The post-connection assessment with 2015 LTP components did not identify any of the system performance issues that were identified in the pre-connection assessment. The post-connection assessment including the 2015 LTP components, identified the same new system performance issues that were identified in the post-connection baseline assessment. These new system performance issues occur under certain Category B conditions, and result in two thermal criteria violations. Real-time operational practices can be used to mitigate these system performance issues.

2.6 AESO Forecast and Transmission System Plans – The AESO’s corporate forecast for the region is consistent with the generation associated with the Proposed Transmission Development.¹² The AESO’s corporate forecasts are used by the AESO to assess the adequacy of the regional transmission system and as a basis for identifying the need for transmission system expansion or enhancement. Therefore, the need associated with the Proposed Transmission Development is consistent with the AESO’s long-term plans for the region.

¹² Section 5.0 of the *AESO 2016 Long-term Outlook* discusses the Northeast Planning Region, which includes the Proposed Transmission Development area.

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2.7 Transmission Dependencies – The Proposed Transmission Development does not require the completion of any AESO plans to expand or enhance the transmission system prior to connection.

2.8 AESO Participant Involvement Program – The AESO directed the TFO to assist the AESO in conducting a participant involvement program (PIP). Between September 2014 and March 2017, the TFO 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. In April 2017, the AESO notified stakeholders of its intention to file this Application with the Commission. The AESO is not aware of any concerns or objections that have been raised regarding the need for the Proposed Transmission Development or the AESO’s preferred option to respond to the system access service request.¹³

2.9 Information Regarding AUC Rule 007, Section 6.2.2, NID23(3) – The AESO has been advised that the TFO’s Facility Proposal addresses the requirements of AUC Rule 007, Section 6.2.2, NID23(3).¹⁴ In consideration of that fact, and as the filing of the Application is combined with the TFO’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).

2.10 Confirmation Date – In the event that the proposed facilities are not in service by May 1, 2020, which is six months following the scheduled in-service date of November 1, 2019, the AESO will inform the Commission in writing if the need to expand or enhance the transmission system described in this Application continues, and if the technical solution described in this Application approval continues to be the AESO’s preferred technical solution.¹⁵

¹³ Further information regarding the AESO’s PIP for this Application is included in Appendix C.

¹⁴ Please refer to the letter included as Appendix D of this Application.

¹⁵ A detailed project schedule, which includes potential limitations or constraints as contemplated in AUC Rule 007, NID25(2), can be found in the TFO’s Facility Proposal.

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2.11 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 request for system access service;
- the connection assessment;
- the cost estimate for the Proposed Transmission Development;
- 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.

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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 the TFO to prepare a Facility Proposal to meet the need identified. The AESO understands that the TFO's Facility Proposal will be filed shortly.¹⁶ The AESO requests, and expects the TFO 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 the *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 both, 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 ATCO Power's request for system access service and provide a preliminary description of the manner proposed to meet that need. 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.

¹⁶ The AESO understands that the TFO intends to file a Facility Proposal relating to this Application to be titled *ATCO Power Heartland Generating Station Interconnection*.

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4 Relief Requested

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

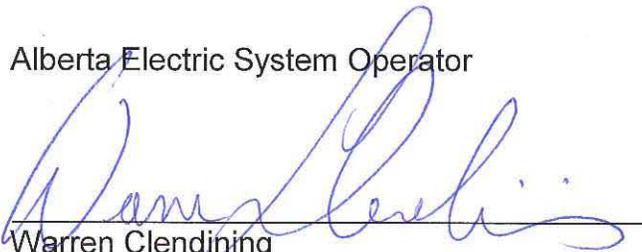
4.2 In the event that the proposed facilities are not in service by May 1, 2020, which is six months following the scheduled in-service date of November 1, 2019, the AESO will inform the Commission in writing if the need to expand or enhance the transmission system described in this Application continues, and if the technical solution described in this Application approval continues to be the AESO's preferred technical solution.

4.3 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, as follows:

- A. Add one 240 kV circuit to connect the existing Josephburg 410S substation to the Facility using a radial configuration;
- B. Modify the existing Josephburg 410S substation, including adding one 240 kV circuit breaker; and
- C. 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 24th day of April 2017.

Alberta Electric System Operator



Warren Clendinning
Manager, Transmission Regulation Projects

Alberta Electric System Operator

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PART B – APPLICATION APPENDICES

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

APPENDIX A **Connection Assessment** – Appendix A contains the *Connection Engineering Study Report for AUC Application – ATCO Heartland Generating Station* that assesses the transmission system performance prior to and following the connection of the Facility.

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 TFO at the direction of the AESO, to an accuracy level of +20%/-10%, which exceeds the accuracy required by AUC Rule 007, NID24.

APPENDIX C **AESO PIP** – Appendix C contains a summary of the PIP activities conducted, in accordance with requirement 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.

APPENDIX D **TFO Information Regarding AUC Rule 007, Section 6.2.2, NID23(3)** – Appendix D contains a letter provided by the TFO confirming that the requirements of AUC Rule 007, NID23(3) will be addressed within the TFO’s Facility Proposal.

APPENDIX E **AESO Transmission Planning Criteria – Basis and Assumptions** – Appendix F contains the *Transmission Planning Criteria – Basis and Assumptions*, Version 1, which includes the applicable thermal and voltage limits in support of the Transmission Planning (TPL) standards.¹⁷ Planning studies that are included in this Application meet the relevant performance requirements of the specified TPL standards (TPL-001-AB-0 and TPL-002-AB-0).

¹⁷ TPL Standards are included in the current Alberta Reliability Standards.

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PART C – REFERENCES

- i. **AESO Planning Duties and Responsibilities** – Certain aspects of AESO 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.¹⁸ 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 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 [ATCO Power in this case] wishing to exchange electric energy and ancillary services a reasonable opportunity to do so.”
- iii. **AESO Planning Criteria** – 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 at:¹⁹
<https://www.aeso.ca/rules-standards-and-tariff/alberta-reliability-standards/>
In addition, the AESO’s *Transmission Planning Criteria – Basis and Assumptions* is included in Appendix E.
- iv. **AESO Connection Process** – For information purposes, the AESO Connection Process, which changes from time to time, is generally described at: <https://www.aeso.ca/grid/connecting-to-the-grid/connection-process/>²⁰

¹⁸ 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.

¹⁹ This link is provided for ease of reference and does not form part of this Application.

²⁰ This link is provided for ease of reference and does not form part of this Application.

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- 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*. 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 TFO** – Pursuant to Subsection 35(1) of the Act, the AESO has directed the TFO, 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 TFO has also been directed by the AESO under Section 39 of the Act to prepare a proposal to provide services to address the need for the Proposed Transmission Development. The AESO has also directed the TFO, pursuant to Section 39 of the Act and Section 14 of the *Transmission Regulation*, to assist in the preparation of the AESO’s Application.
- vii. **Capital Cost Estimates** – The provision of capital costs estimates in the Application is for the purposes of relative comparison and context only. The AESO’s responsibilities in respect of project cost reporting are described in the *Transmission Regulation*, including Section 25, and in Section 504.5 of the ISO rules.