

**System Impact Study for
MacLaren's OASIS No. 344081,
Five Year Export on the
BCHA × EAL Path**

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**Network Performance Planning Department
T&D Engineering**



Executive Summary

MacLaren Energy submitted an OASIS request to BC Hydro Transmission & Distribution (T&D) for Long Term Firm Point-to-Point transmission service under the Wholesale Transmission Service (WTS) tariff to export 32 MW on the BCHA × EAL Path from 1 January 2003 to 31 December 2007.

This System Impact Study identifies system constraints and redispatch options, additional Direct Assignment Facilities or Network Upgrades required to provide the requested service. The base conditions for the study are the BC Hydro native load requirements from 2003 to 2007, and prior export commitments on the BCHA × EAL path throughout the whole time period. Power flow and transient stability studies were performed to examine whether the MacLaren Energy transmission request can be accomplished in compliance with the BC Hydro, Western Systems Co-ordinating Council (WSCC), and North American Electric Reliability Council (NERC) reliability criteria. This System Impact Study only addresses the capability of the BC Hydro system and does not consider capabilities of adjacent systems.

The System Impact Study concluded that the available transfer capability (ATC) on the existing BCHA × EAL path is 0 MW. The MacLaren 32 MW transmission service request could not be accomplished without significant Network Upgrades to the system. The restriction and option for removing this restriction can be summarized as follows:

South Interior East Bulk Transmission – Thermal Limitation

This restriction will be in effect for the entire requested period. Adding a 230 kV circuit from Selkirk to Cranbrook would alleviate the thermal constraint and accommodate the total amount of the Transmission Service request.

There are no Direct Assignment Facilities associated with this request for Transmission Service, as this System Impact Study does not include an Interconnection Study.

As noted above, the full 32 MW of export request cannot be met unless a new 230 kV circuit from Selkirk to Cranbrook is placed in service. A Facilities Study would be required to consider this Network Upgrade.

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1. Introduction

MacLaren Energy submitted an OASIS request (No. 344081) to BC Hydro Transmission and Distribution (T&D) for Long-Term Firm Point-to-Point Transmission Service for 32 MW on the BCHA × EAL for the period 1 January 2003 to 31 December 2007.

Pursuant to the WTSA, T&D determined that a System Impact Study was required for the Application.

Power flow and transient stability studies were performed to examine whether the MacLaren Energy transmission request can be accomplished in compliance with the BC Hydro, Western Systems Co-ordinating Council (WSCC), and North American Electric Reliability Council (NERC) reliability criteria.

2. Terms of Reference

A summary of the Terms of Reference is provided below.

- (a) T&D will use its existing planning and operating criteria, standards and procedures which conform with WSCC Reliability Criteria.
- (b) Specifically, the following studies will be done:
 - Thermal, transient, and voltage stability studies to determine the system capability to permit the 32 MW transfer.
 - Identify system transmission constraints and any network upgrades.
 - Identify available partial service capability, if full service is not available.
- (c) The study will assess the generation reserve issues as required by the WSCC.
- (d) The above technical studies will be done for the following system conditions:
 - The system configuration will be based on the resource allocations from the 10 year Recommended Resource Plan, network loads, and reserved and pending Long-Term Firm Point-to-Point Transmission service for the terms of this request.
 - High stress system conditions, including but not restricted to the freshet and winter peak load cases.
- (e) The studies will not identify any constraints on neighbouring systems as it is the Transmission Customer's responsibility to ensure that any neighbouring utility limitations are addressed.

3. System Study Conditions

The conditions for the study are the BC Hydro native load requirements from 2003 to 2007, and prior import commitments on the BCHA × EAL path throughout the whole time period.

The system transmission upgrades identified for this transmission request are incremental to requirements for native load and existing Point to Point Service obligations. The incremental requirements are based on the additional generation resources as specified in the MacLaren Energy Application.

3.1. Resources for Transmission Request

The Point-of-Receipt (POR) for the transmission service is BC Hydro's Illecillewaet Substation. The resource is a new Independent Power Producer (IPP).

3.2. Transmission System Assumptions for Transmission Request

Transmission System assumptions for this Transmission Service request are contained in Appendix A.

4. System Requirements for Transmission Request

Planning studies were performed as per T&D's Transmission System Planning Criteria and Study Methodology.

Only those portions of BC Hydro's transmission system that require reinforcements have been addressed below.

4.1. South Interior East Bulk Transmission

When 5L92 is not in service (e.g. for maintenance), the power that can be transferred to Cranbrook (and thus to the firm local loads) is limited by the thermal capability of 2L293 and 2L294. This limitation defines the allowable firm exports on the BC to Alberta path. 0 MW long-term firm ATC exists on the BCHA × EAL path due to this thermal constraint.

A new Selkirk to Cranbrook 230 kV circuit with a lead time of 4 to 6 years would have to be built to accommodate the requested firm transfer. Redispatch was determined not to be a feasible option.

5. Conclusions

The System Impact Study concluded that the MacLaren 32 MW import request could not be accomplished without significant Network Upgrades to the system.

The full 32 MW of export request cannot be met unless a new 230 kV circuit from Selkirk to Cranbrook is placed in service. A Facilities Study is required to consider this Network Upgrade.

There are no Direct Assignment Facilities associated with this request for Transmission Service, as this System Impact Study does not include an Interconnection Study.

Appendix A.

Transmission System Assumptions for Transmission Request

A.1 Prior Uncompleted Firm Point-to-Point Requests

There are no uncompleted Firm Point-to-Point Requests on the BCHA × EAL Path.

A.2 Modifications to the Power-Flow Base Cases

The following were added in the power-flow base cases:

- All existing Transmission Service reservations were included. However, since Counter-Flow Scheduling on a bi-directional path will not increase the amount of Firm Transfer Capability on the path, transfers have been set to zero with the following exceptions:
 - The transfers for Transmission Reservation #s 141206, 311564, and 311565 are included.

Appendix B.

System Requirements for Transmission Request

B.1 South Interior East Transmission and BCHA × EAL Path

The system must be transiently stable after loss of a single element and the remaining system must be within thermal and voltage stability limits. Remedial Action Schemes (RAS) are allowed as long as there is no loss of load. Since the Path is considered radial (the transfer capabilities of the parallel 138 kV circuits are insignificant compared to the 500 kV circuit), loss of transfer is permitted for loss of a single element on the Path.

B.1.1 Thermal Limit

When 5L92 is not in service (e.g. for maintenance), the power that can be transferred to Cranbrook (and thus to the firm local loads) is limited by the thermal capability of 2L293 and 2L294. This limitation defines the allowable firm exports on the BC to Alberta path.

An alternative to provide the required firm transfer service would be to build a new Selkirk to Cranbrook 230 kV circuit with a lead time of 4 to 6 years.

B.1.2 Transient Stability Limit

Previous studies have shown that there will be no transient stability problem for the Transmission Service request.

B.1.3 Voltage Stability Limit

Previous studies have shown that there will be no voltage stability problem for the Transmission Service request.

B.2 South Interior West Bulk Transmission

The Transmission Service request is not limited by this portion of the bulk transmission network.