

System Impact Study for

OASIS 72401305

Long-term Point to Point Transmission Service

Request

On the LM – BPAT Path

1 January 2011 – 1 January 2016

Report No: SPPA2009-113
May 2009

DISCLAIMER

This report was prepared by the British Columbia Transmission Corporation (“**BCTC**”) or, as the case may be, on behalf of BCTC by persons or entities including, without limitation, persons or entities who are or were employees, agents, consultants, contractors, subcontractors, professional advisers or representatives of, or to, BCTC (individually and collectively, “**BCTC Personnel**”).

This report is to be read in the context of the methodology, procedures and techniques used, BCTC’s or BCTC’s Personnel’s assumptions, and the circumstances and constraints under which BCTC’s mandate to prepare this report was performed. This report is written solely for the purpose expressly stated in this report. Accordingly, this report is suitable only for such purpose, and is subject to any changes arising after the date of this report. This report is meant to be read as a whole, and accordingly no section or part of it should be read or relied upon out of context.

Unless otherwise expressly agreed by BCTC:

1. any assumption, data or information (whether embodied in tangible or electronic form) supplied by, or gathered from, any source (including, without limitation, any consultant, contractor or subcontractor, testing laboratory and equipment suppliers, etc.) upon which BCTC’s opinion or conclusion as set out in this report is based (individually and collectively, “**Information**”) has not been verified by BCTC or BCTC’s Personnel; BCTC makes no representation as to its accuracy or completeness and disclaims all liability with respect to the Information;
2. except as expressly set out in this report, all terms, conditions, warranties, representations and statements (whether express, implied, written, oral, collateral, statutory or otherwise) are excluded to the maximum extent permitted by law and, to the extent they cannot be excluded, BCTC disclaims all liability in relation to them to the maximum extent permitted by law;
3. BCTC does not represent or warrant the accuracy, completeness, merchantability, fitness for purpose or usefulness of this report, or any information contained in this report, for use or consideration by any person or entity. In addition BCTC does not accept any liability arising out of reliance by a person or entity on this report, or any information contained in this report, or for any errors or omissions in this report. Any use, reliance or publication by any person or entity of this report or any part of it is at their own risk; and
4. in no event will BCTC or BCTC’s Personnel be liable to any recipient of this report for any damage, loss, cost, expense, injury or other liability that arises out of or in connection with this report including, without limitation, any indirect, special, incidental, punitive or consequential loss, liability or damage of any kind.

COPYRIGHT NOTICE

Copyright and all other intellectual property rights in, and to, this report are the property of, and are expressly reserved to, BCTC. Without the prior written approval of BCTC, no part of this report may be reproduced, used or distributed in any manner or form whatsoever.

Executive Summary

The following application for Firm Transmission Services for wheeling power from Powell River station in the Lower Mainland in British Columbia to BPA on the LM x BPAT Path was submitted to British Columbia Transmission Corporation (BCTC):

OASIS #	Time Stamp	Path	Amount	Term
72401305	Aug 5 2008	LM-BPAT	82 MW	5 year (1 Jan 2011 – 1 Jan 2016)

This study was based on the assumption that the maximum net transfer from the 132 kV Powell River (POW) station into the BCTC grid is 82 MW. Because the POD for this request is BC.US Border, its impact on the LM-BPAT Path must be studied to ensure that there is adequate capacity along the transmission path and to identify if any network reinforcement is required.

This study analyzed the BCTC system only and did not evaluate the transfer capability of the Customer's and the neighbouring systems. The Customer requesting this service is responsible for obtaining transmission service from the respective Transmission Service Providers.

This study concluded that OASIS 72401305 for the period between January 1, 2011 and January 1, 2016 can be accommodated without Network Upgrade.

Table of Contents

DISCLAIMER.....	ii
Executive Summary.....	iv
Table of Contents.....	v
1. <i>Introduction.....</i>	<i>1</i>
2. <i>Terms of Reference</i>	<i>1</i>
3. <i>Resources for Transmission Request</i>	<i>2</i>
4. <i>System Study Condition.....</i>	<i>2</i>
5. <i>Study Assumptions</i>	<i>2</i>
6. <i>Analysis.....</i>	<i>2</i>
7. <i>Study Findings</i>	<i>3</i>
8. <i>Conclusion</i>	<i>3</i>

1. Introduction

The following Firm Point-to-Point service request for wheeling power from the 132 kV Powell River (POW) station in the Lower Mainland (LM) to BC.US Border was submitted in accordance with BCTC's OATT.

OASIS #	Time Stamp	Path	Amount	Term
72401305	August 5 2008	LM-BPAT	82 MW	5 year (1 Jan 2011 – 1 Jan 2016)

Because the POD for this request is at the BC.US Border, its impact on the LM-BPAT path must be studied to ensure that there is adequate capacity along the transmission path and to identify if any network reinforcement is required.

2. Terms of Reference

A review of the submitted OASIS request and a System Impact Study were conducted as follow:

- (a) BCTC used its existing planning and operating criteria, standards and procedures which conform to NERC Mandatory Reliability Standards, to determine necessary transmission system reinforcements and re-dispatch requirements.
- (b) Specifically, the following studies were performed:
 - Thermal and voltage stability studies to determine the system capability to accommodate the transfer.
 - Identifying system transmission constraints and any network upgrades.
 - Investigation of any load shedding, generator shedding and re-dispatch options, tie-line transfer limits and network curtailment remedial action schemes required for the reliable operation of the inter-connected system.
- (c) This study analyzed the BCTC system only. The evaluation of the transfer capability of the Customer's and neighbouring systems is beyond the study scope for this Long-term Point-to-Point service. The Customer requesting this service is responsible for obtaining corresponding transmission services from the neighbouring Transmission Service Providers.
- (d) The above technical studies were done for the following system conditions:
 - The system configuration was based on the resource allocations and Network Loads from the NITS Service Agreements, and the reserved and pending Long-Term Firm Point-to-Point Transmission services for the terms of these requests.
 - High stress system conditions, including but not restricted to the winter peak load and summer light load cases.

3. Resources for Transmission Request

For this OASIS request, the Point-of-Receipt (POR) is the 132 kV Powell River station in the BCTC-controlled system and the Point-of-Delivery (POD) is BC-US Border.

4. System Study Condition

- Review of this OASIS request was based on the following network conditions: 2010-2011-HW (heavy winter), 2011-2012 HW, LS (light summer) and HS (heavy summer), 2014-2015 HS, LS and HW base cases;
- Existing firm commitments and pending requests;
- Transmission Reliability Margin (TRM) on the BCTC x BPAT path: 50 MW.

5. Study Assumptions

- With the development of the East Toba (ETA) and Montrose (MOT) project (IPP), the existing 1L48 line originally built for 230 kV and currently operated at 132 kV will be converted to a 230 kV transmission line for the section between the existing 500 kV Malaspina (MSA) substation and the new 230 kV Saltery Bay (SAY) substation. The converted line section is renamed 2L48, and the remaining 132 kV 1L48 circuit between SAY and POW is still named 1L48. The existing 1L33 will loop into SAY and becomes two circuits 1L37 (MSA-SAY) and 1L33 (SAY- POW).
- Section of circuit 1L33 between Powell River and Forestview (FVW) stations will remain open as it has traditionally been under normal system conditions. Therefore, Powell River is radially connected to the grid via circuit 1L48.
- Circuit 5L83 (NIC-MDN) in-service date is October 2014.

6. Analysis

There is a mixed of generation and load facilities at Powell River station. The existing operation of these facilities results in flow of power on 1L48 normally from the station Grief Point (GPT) to Forestview to Powell River direction.

This OASIS Request is for Point-to-Point service of 82 MW from Powell River to the BC-US Border via the LM x BPAT Path. If the maximum net transfer from the Powell River station into BCTC grid is 82 MW for supporting the requested Point-to-Point transfer, there should be excess generation in the Powell River area, which will be adequate to reverse the normal direction of power flow on 1L48 between Powell River and Grief Point.

Normal mode of operation in this part of the network is Powell River connecting to the grid via 1L48 with a section of 1L33 between Powell River and Forestview

normally open. 1L48 thermal rating is at least 2.5 times greater than that of 1L33. This study assumes that 1L33 between Powell River and Forestview will remain opened. Should there be an outage of 1L48, this radially connected Point-to-Point transfer of 82 MW cannot be switched over to 1L33 without overloading the circuit. Therefore, the power transfer must be curtailed.

Load flow studies were performed on each of the base case conditions during system normal and single contingency conditions. The contingencies include loss of each of the major circuits comprising the ILM path (5L41, 5L42, 5L81, 5L82 and 5L45). Loadings on transmission elements and voltage performance at key stations were monitored. For each of these studied conditions, the study result shows a solved power flow case with acceptable voltage profile and no equipment overloaded in both the system normal and single contingency conditions.

7. Study Findings

For the 82 MW Point-to-Point transmission service from Powell River station to the BC-US Border, this system impact study based on the assumptions outlined in sections 4 and 5 did not reveal any equipment overload nor voltage violation within the BCTC system. No system reinforcement requirement was identified in the study.

8. Conclusion

OASIS #72401305 (82 MW Long-term Firm Point-to-Point service on LM x BPAT path) can be accommodated without Network Upgrade, but is subjected to curtailment when its radial connection via 1L48 to the grid is opened.