

NOVA SCOTIA POWER INC.
CUSTOMER OPERATIONS
TRANSMISSION & DISTRIBUTION ENGINEERING DEPARTMENT



INTERCONNECTION FACILITIES REPORT
FOR
ESTABLISHING A 230 kV SYSTEM CONNECTION
FOR A NEW 50 MW WIND POWERED GENERATING FACILITY
AT DALHOUSIE MOUNTAIN IN PICTOU COUNTY, NOVA SCOTIA

Rev. 0

Prepared by: Ron Tutty 2009/02/20
Project Engineer Date

Approved by: Jim Leopold 2009/02/20
Director, T&D Assets Date



W.O.no.: _____ Page 4 of 50

Project: Dalhousie Mountain Wind

Date: 2009-01-28 Rev. no.: 0

Facilities Study Infra-Structure Report

| System | Description |
|--------|---|
| 1.0 | <p>SUMMARY</p> <p>This project provides for the establishment of a 230 kV system connection for a 50 MW wind powered generation facility (IR084) located at Dalhousie Mountain, Pictou County, Nova Scotia. This generating facility is comprised of thirty-four GE wind turbine generators each rated at 1.5 MW. Each wind powered generator will be interconnected to a 34.5 kV collection system via a 575V/34.5 kV transformer. The 34.5 kV collection feeders will be tied to the 34.5 kV switchgear side of one 30/40/50 MVA, 34.5/230 kV step-up transformer at the interconnection substation at the point of interconnection (POI). The proposed wind powered generation facility will be interconnected to the Nova Scotia Power transmission system via a 230 kV three breaker ring substation connected to the existing line L-7004 between the 67N Onslow and the 3C Port Hastings substations. The new 230 kV interconnection substation will be located approximately 29.6 km from the 67N Onslow substation. A one-line diagram of the proposed interconnection is shown in Appendix B – One Line Diagram of System Connection.</p> <p>The system connection will consist of a 230 kV three breaker ring substation connected to L-7004 between 67N Onslow and 3C Port Hastings such that L-7004 is split into two lines, each terminating at the new Nova Scotia Power Dalhousie Mountain interconnection substation. One node of this 230 kV substation will be connected to the customer's interconnection substation which consists of one 230 kV motor operated disconnect switch, one 230 kV to 34.5 kV, 30/40/50 MVA transformer, one load break switch on the LV side of the step-up transformer, a 7.5 MVAR capacitor bank on the 34.5 kV bus and two breakers connecting thirty-four wind turbines to the interconnection substation via two 34.5 kV collector circuits. The system connection will also include modifications to the protection and control circuitry at the 67N Onslow and 3C Port Hastings substations. These modifications will ensure the line protection schemes at the remote terminals are compatible with the protection schemes at the new 230 kV substation. Intertrip and block close logic will also be included to ensure that the generating facility is not islanded with any portion of the Nova Scotia Power system. In addition, the interconnection of the generating facility at Dalhousie Mountain is considered a Bulk Power Supply system element and therefore it shall be designed to comply with NPCC/NERC requirements for redundancy and reliability.</p> |

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| Transmission Engineering | prepared by: <u>Ron Tutty, P. Eng.</u> | Department | approved by: _____ |
| Customer Operations | checked by: _____ | Division | approved by: _____ |



Facilities Study Infra-Structure Report

| System | Description | | | | | | | | |
|---------------|--|------------------|---------------------|------------------|-----------------|-------------|--------|-----------|------------|
| 1.1 | <p>The point of interconnection will be the terminals on the Nova Scotia Power side of the transformer 230 kV disconnect switch.</p> <p>The estimated cost of the Nova Scotia Power portion of the project and the estimated scheduled in-service date are as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Cost Estimate</th> <th>Annual Licence Cost</th> <th>Project Duration</th> <th>In-Service Date</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">\$7,266,085</td> <td style="text-align: center;">\$1480</td> <td style="text-align: center;">10 months</td> <td style="text-align: center;">2009-12-28</td> </tr> </tbody> </table> <p>The above in-service date assumes a connection with a 50 MW wind turbine, generating facility complete with protection, transfer trips, status, SCADA and revenue metering.</p> <p>The project in-service date is dependent upon the starting date, which cannot commence until the following condition is met:</p> <ul style="list-style-type: none"> the customer delivers to Nova Scotia Power secured funding, in accordance with Article 11.5 of the Generation Interconnection Agreement, for the entire estimated cost outlined in this Interconnection Facilities Report. <p>Construction on the interconnection substation and line tap cannot begin until the customer provides Nova Scotia Power with a legally binding easement in the form acceptable to Nova Scotia Power for any land that the 230 kV substation and associated line tap require.</p> <p>ESTIMATED COSTS</p> <p>The estimated cost for Nova Scotia Power to provide a 230 kV interconnection to the Dalhousie Mountain wind powered generating facility is \$7,266,085. This cost estimate is summarized in Table 1 – Dalhousie Mountain Cost Estimate:</p> | Cost Estimate | Annual Licence Cost | Project Duration | In-Service Date | \$7,266,085 | \$1480 | 10 months | 2009-12-28 |
| Cost Estimate | Annual Licence Cost | Project Duration | In-Service Date | | | | | | |
| \$7,266,085 | \$1480 | 10 months | 2009-12-28 | | | | | | |

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