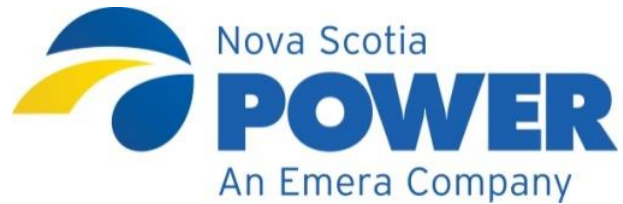


NOVA SCOTIA POWER INC.

TRANSMISSION & DISTRIBUTION ENGINEERING DEPARTMENT



**FACILITIES STUDY INFRA-STRUCTURE REPORT Rev.2
FOR
IR#461 - ESTABLISHING A 69 kV SYSTEM INTERCONNECTION
FOR A NEW 16.45 MW WIND POWERED GENERATING FACILITY
AT ELLERSHOUSE, NOVA SCOTIA**

***Prepared by: R.L. Johnson. P.Eng.
Rev. 1: December 19, 2014
Rev. 2: February 10, 2015***



Facilities Study Report

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Department	approved by: _____	Division approved by: _____



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Project: Ellershouse Wind Power Project

Date: 2015-02 Rev. no.: 2

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	<p>Appendix C – Appendix 4 to GIP: Interconnection Facilities Study Agreement & Attachments A & B of Appendix 4 of the Standard Generator Interconnection Procedures</p> <p>Appendix D – Revenue Metering</p> <p>Appendix E -Standard Generator System Impact Study Results and Meeting Minutes & Customer’s Questions arising from SIS Report</p> <p>Appendix F: Project Cost Estimate (Nova Scotia Power Portion)</p>

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<p>1.0</p>	<p>INTRODUCTION:</p> <p>This project provides for the establishment of a 69 kV system connection at 17V-St. Croix Substation for a new 16.45 MW wind powered generating facility consisting of 7 – 2.350 MW, Enercon E-92 wind energy converters located in Ellershouse, NS.</p> <p>The Point of Interconnection will be to the existing 69kV bus at the Nova Scotia Power 17V-St. Croix Substation via a new 69kV transmission line (System # to be L-5060) approx. 4.75km from the wind farm substation (System # to be 102V-Ellershouse).</p> <p>The one line diagram, as provided by the Interconnection Customer (IC), for the interconnection to Nova Scotia Power’s substation is shown in Appendix A – St. Croix Wind Farm Project: Single Line Diagram.</p> <p>The cost estimates provided here-in are good faith best estimates based on the scope of work defined in this Facility Study Report, however, the Interconnection Customer will be responsible to pay Nova Scotia Power for the entire incurred cost associated with this project, be it higher or lower than the estimate provided here-in.</p> <p>This Interconnection Facilities Report is based on the Revised Standard Generator Interconnection Procedures as approved by the UARB February 10, 2010. The interconnection service is designated Network Resource Interconnection Service (NRIS)</p>
<p>2.0</p>	<p>SUMMARY:</p> <p>This section includes the understanding of ownership, project estimate (Transmission provider costs and network upgrade costs) along with a preliminary schedule for Nova Scotia Power’s scope of work.</p>
<p>2.1</p>	<p>Ownership:</p> <p>Ownership, maintenance and other commercial operating arrangements will be</p>

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	<p>covered separately in more detail in the Generator Interconnection Agreement between Nova Scotia Power and the Interconnection Customer.</p> <p>For the purposes of this Facilities Study, the Point of Change of Ownership will be Adjacent to the Point of Interconnection at the 17V-St. Croix Substation as proposed on the single line diagram attached in Appendix A.</p> <p>To be specific, this Point of Ownership is identified as being at the first (dead-end) structure immediately outside of the 17V-St. Croix Substation. Nova Scotia Power will own all of the required 69kV equipment inside the St. Croix Substation out to and including the first (dead-end) structure immediately outside the substation. This would also include the connecting jumpers on the dead-end structure.</p> <p>Nova Scotia Power shall have sole operational authority & control of the disconnect switches and circuit breaker inside the St. Croix Substation.</p> <p>It is currently the understanding that communications between Nova Scotia Power and the IC's substation will be by fibre-optic cable supplied and installed by the IC. This fibre-optic cable will be brought to the last dead-end structure (assuming the fibre-optic cable will be underbuilt on the transmission line) outside the fence at St. Croix Substation and terminated in a weather proof termination cabinet provided by the IC. The IC has subsequently agreed to supply and install the fibre optic cable from the deadend structure into NSPI's substation control building. Nova Scotia Power will install the necessary conduit to extend the communication connection into the substation control building.</p> <p>The telecommunications equipment in Nova Scotia Power's substation and out to the termination cabinet will be owned by Nova Scotia Power. The fibre optic cable between the IC's substation and the termination cabinet just outside of the 17V St. Croix substation will be owned by the IC however, NSPI will requires 8 fibres (1 pair each for SCADA, Revenue metering, Protection and Spare).</p> <p>Nova Scotia Power shall also own the revenue metering system to be located in the customer's Interconnection Substation. This includes a dedicated set of revenue metering class potential and current transformers (i.e. not embedded in</p>

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2.2	<p>any other piece of equipment) certified by Measurement Canada for 3 element metering, the revenue meter and all associated wiring. (Including the wiring to the communication-cabinet in the Customer's control building.)</p> <p>Subsequent to the issuance of Rev. 1 of this study in Dec., 2014, it has been determined that the IC shall own the transmission line and associated fibre optic cable up to the last deadend structure just outside of the 17V- St. Croix Substation.</p> <p>Hence, there are no cost estimates associated with the design and construction of the transmission line between the IC's substation (102V) and 17V- St. Croix. in this Facilities Study.</p> <p>Estimated Costs:</p> <p>The estimated cost for Nova Scotia Power's scope of work to provide a 69 kV interconnection to the Ellershouse Wind Power Project is <u>\$836,048. (including AO, HST excluded)</u>. This cost estimate is summarized in Appendix F: Project Cost Estimate (Nova Scotia Power Portion).</p> <p>This cost estimate in the appendix is based on the scope of work outlined in Section 4.0 of this Facilities Study Report.</p> <p>The above estimate includes the Transmission Provider Interconnection Facilities (TPIF) costs. There are no system upgrade costs associated with this project.</p> <p>TPIF: <u>\$836,048</u> (including AO, HST excluded)</p> <p>Strict accounting of costs during the project will insure the accurate split between TPIF costs and Network Upgrade costs.</p> <p>The acquisition and the clearing of the right of way for this line work is NOT included in the cost estimate provided as it is not included in the scope of work</p>

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<p>2.3</p>	<p>for Nova Scotia Power.</p> <p>The transmission line is to be built and owned by the customer up to the last dead-end structure before entering the Nova Scotia Power 17V-St. Croix Substation. As such, it is understood that the transmission line will be designed and constructed to CSA standards and all costs of this line are excluded from this facilities study.</p> <p>The cost estimate in this report is valid for 180 days.</p> <p>Nova Scotia Power will not start any work on this project prior to receiving of the executed GIA and secured funding from the Customer, in accordance with Article 11.5 of the Generation Interconnection Agreement for the applicable estimated cost.</p> <p>Estimated Schedule:</p> <p>The schedule herein is predicated on the IC's expected requirement for power by Sept. 1st, 2015 and an executed GIA by Dec. 31st, 2015.</p> <p>The total project duration (estimated at 8 months) is based on a preliminary project schedule in Appendix B. This schedule assumes a start date of <u>JAN 5th, 2015</u> based on the stated commercial operation date of <u>October 1st, 2015</u> in Attachment 'B' of the Standard Interconnection Procedures Interconnection Facilities Study Agreement (attached as Appendix C).</p> <p>The key milestone dates are as follows:</p> <p>JAN 5th, 2015: the Customer delivers to Nova Scotia Power either an executed Engineering and Procurement Agreement with associated deposit or the executed GIA and secured funding, in accordance with Article 11.5 of the Generation Interconnection Agreement, for the applicable estimated cost outlined in this Interconnection Facilities Report. This date defines when Nova Scotia Power will begin detailed engineering, material procurement and RFPs for services.</p>

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<p>3.0</p>	<p>May 1st, 2015: Expected start of civil construction in and around St. Croix Substation</p> <p>Aug.1st, 2015: Commissioning within the St. Croix Substation to begin</p> <p>Sept. 1st, 2015: Nova Scotia Power ready to energize L-5060.</p> <p>DESIGN:</p> <p>Nova Scotia Power will be responsible for the engineering and drawing production for all aspects of the scope of work at 17V-St. Croix Substation described in Section 4.0 of this report. This will include: the 69 kV additions, the protection and control design, the additions to the telecommunications system, the SCADA RTU additions at 17V- St. Croix, as well as the review of the Protection and Control design at the IC's 102V-Ellershouse Wind Generating Facility as it pertains to the interconnection to the system and not the Customer's supply side.</p> <p>Nova Scotia Power will only review and comment on the portion of the protection design that will affect the Nova Scotia Power system. The Customer is responsible for a complete protection and control design for the interconnection substation.</p> <p>The Customer is responsible for the engineering design of the interconnection substation and the transmission line as described in Section 4.0 of this report. This includes all aspects of the generating facility on the Customer's side of the Point of Change of Ownership shown in Appendix A – Single Line Diagram of Interconnection Substation.</p>
<p>4.0</p> <p>4.1</p>	<p>SCOPE OF WORK BY Nova Scotia Power:</p> <p>Single Line & Primary Equipment</p>

<p>Transmission Engineering</p> <p>Department</p>	<p>Prepared by: <u>R.L. Johnson, P.Eng.</u></p> <p>approved by: _____</p>	<p>Customer Operations</p> <p>checked by: _____</p> <p>Division approved by: _____</p>
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