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Andrew Skalski
Director – Major Projects and Partnerships
Regulatory Affairs

BY COURIER

March 12, 2014

Ms. Kirsten Walli
Secretary
Ontario Energy Board
Suite 2601, 2300 Yonge Street
P.O. Box 2319
Toronto, Ontario
M4P 1E4

Dear Ms. Walli:

EB-2013-0246 – Hydro One Networks Inc. Section 92 – Niagara Region Wind Generation Connection Project – Interrogatory Responses to Board Staff Interrogatories

Please find attached responses provided by Hydro One Networks Inc. to Interrogatories. Two (2) hard copies will be sent to the Board shortly.

An electronic copy of the Interrogatory Responses has been filed using the Board's Regulatory Electronic Submission System and the confirmation slip is enclosed.

Sincerely,

ORIGINAL SIGNED BY JOANNE RICHARDSON FOR ANDREW SKALSKI

Andrew Skalski

c. Parties to EB-2013-0246 (electronic only)

Ontario Energy Board (Board Staff) INTERROGATORY #1 List 1

Interrogatory

Ref: Letters of Comment

The Ontario Energy Board (the "Board") has received a number of letters of comment in relation to Hydro One's project. As a justification for why the project should not be approved by the Board, some of the letters of comment draw reference to a study, dated November 22, 2012 that was undertaken by Hydro One to assess the feasibility and effectiveness of shifting load from lines south of the Niagara escarpment to lines north of the Niagara escarpment, to accommodate the 230 MW output of the proposed wind farm (the "Feasibility Study").

Please review the related letters of comments and provide Hydro One's views and assessment of the concerns that have been noted in these letters specifically in relation to the findings of the Feasibility Study.

Response

Hydro One has reviewed the letters of comment that have been submitted and notes that there has been a misinterpretation with respect to the purpose of the feasibility study issued on November 22, 2012 (see Attachment 1). Some comments are drawing on the unfavourable report findings to indicate that Hydro One's proposal submitted to the OEB in this application has technical problems and compromises the reliability of Ontario's electricity grid to justify why this connection project should not be approved by the Board. However, the purpose of this study was to assess the feasibility and effectiveness of shifting load from lines south of the escarpment to lines north of the escarpment to accommodate the 230 MW output of the proposed wind farm (versus the proposed solution). This report was undertaken in response to a request received from the Mountainview Niagara Escarpment Community Association ("the Association") (see Attachments 2 and 3) and concluded that such an arrangement was not feasible and therefore the option was not pursued. This study did not assess the feasibility of the 25 km upgrade to the Q5G line.

The SIA and CIA reports filed in Exhibit B, Tab 6, Schedules 3 and 4 have assessed Hydro One's submitted proposal and have concluded that the proposed connection of the project as proposed in this Leave to Upgrade application, subject to the requirements specified in the reports, is expected to have no material adverse impact on the reliability of the integrated power system. The IESO has issued a Notification of Conditional Approval for Connection of the Niagara Region Wind Farm subject to the implementation of the requirements outlined in the reports.

For completeness of the record, Hydro One notes that Niagara Region Wind Corporation proposed changes to the Niagara Region Wind Farm (NRWF) and as such addendums to the final SIA and CIA were completed.

The changes to the NRWF included:

1. The 44 kV collector system being changed to a 34.5 kV collector system. Also, the collector system will change to a completely underground collector system;
2. There will be two collector substations where the 34.5 kV collection voltages are stepped up to 115 kV;
3. There will be several lengths of 115 kV underground cable required for the tap line and the circuit between two collector substations

The addendums to the CIA and SIA have been attached as Attachments 4 and 5 to this interrogatory response. The assessments concluded that:

- Proposed changes to the project would not result in new requirements for the connection of the project,
- Hydro One customers connected to this line will not be negatively impacted, and
- Short circuit levels and voltage variations are within acceptable limits

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John Sabiston
Manager, Transmission Planning
Transmission System Development Division

hydro one

November 22. 2012

Mr. Harald M. Thiel
Mountainview Niagara Escarpment Community Association
4152 Locust Lane
Beamsville, ON L0R 1B2

Dear Mr. Thiel:

Further to my letter to you dated October 3, 2012, we mentioned that "Hydro One will undertake studies to assess the feasibility and effectiveness of shifting load from lines south of the escarpment to lines north of the escarpment, to accommodate the 230 MW output of the proposed wind farm". Please find enclosed the feasibility study as promised.

If you have any questions or concerns, please contact me and I trust that this information helpful and useful.

Sincerely,

John Sabiston
Manager, Transmission Planning

Encl.

cc Mr. Mervin Croghan, Chairman and CEO
Niagara Region Wind Corporation

Ms. Nancy Mott-Allen, Senior Strategic Advisor
Niagara Escarpment Commission

Ms. Ann Louise Heron, Chief Administrative Officer
Town of Lincoln

483 Bay St., Toronto, Ontario M5G 2P5

John Sabiston,
Manager – Transmission Planning
Transmission System Development

November 13th, 2012

Re: Letter from Mountainview Niagara Escarpment Community Association

Feasibility Report

Background

The Niagara Region Wind Corporation (NRWC) is proposing to connect a 230 MW wind farm located in the Niagara Peninsula. The NRWC's Feed-In Tariff (FIT) contract with the Ontario Power Authority (OPA) designates a 115 kV connection to the grid at Hydro One's Beach Transformer Station (Beach TS) in Hamilton. The proposed solution to reach Beach TS – and subsequently fulfill the contract – is the construction of a new 115 kV circuit by NRWC to connect its substation northward, across the Niagara Escarpment to the idle Q5G transmission line, and utilize Q5G to access Beach TS.

The Niagara Escarpment Commission, during its hearing on June 21st, 2012, passed a motion requiring a third-party peer review of the proposed solution. A further requirement of the approved motion is to "identify options that do not require the installation of a power line down the face of the escarpment" by the peer review.

Mr. Harald Thiel and the Mountainview Niagara Escarpment Community Association has proposed the possibility of shifting or reducing the supply flow from the south of the escarpment to increase the flow north of the escarpment at either St. John's Valley or Rosedene Junctions. This could eliminate the need to connect to the Q5G circuit north of the escarpment. The following information is intended to assist in rendering the required peer view as complete as possible.

Feasibility Study

Scope

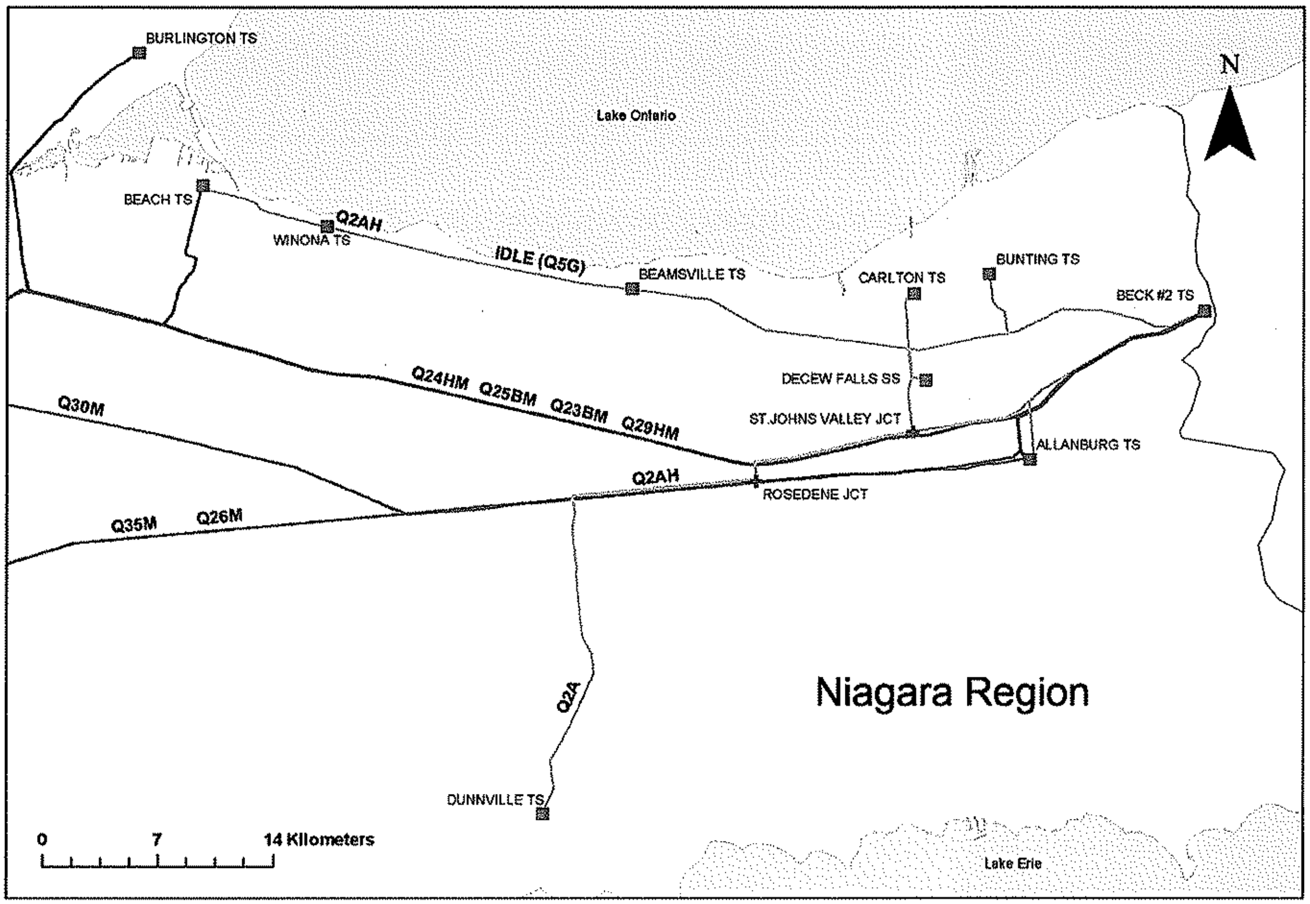
Hydro One will undertake a feasibility study to identify the possibility of shifting the supply flow from the south of the escarpment to the north of the escarpment to accommodate the 230 MW output of the proposed wind farm. If successful, this could negate the construction of a new HV line across the face of the Niagara Escarpment. This study will:

- Assess the current configuration of the HV lines in the Niagara Peninsula.
- Verify the practicability of shifting line flows at either St. John's Valley or Rosedene Junctions.
- Quantify the load shift required to accommodate the wind farm south of the escarpment.
- Identify significant issues that may occur due to shifting the current load.

A load flow study will be executed to determine the required load shift to accommodate connecting the NRWC wind farm south of the escarpment. This study will examine reconfiguring Hamilton-area circuits and transferring load from the south to the north, thus freeing capacity along the south to accommodate the wind farm.

Findings

The main transmission corridor in the Niagara Peninsula, referred to as the Queenston Flow West (QFW) interface, is composed of five 230 kV circuits that run from Beck #2 TS to Middleport TS, Beach TS and Burlington TS. This corridor is heavily utilized due to the zone's generation, primarily from the two Sir Adam Beck generating stations, and imports on the NY Niagara interconnection. Approximately 400 MW of the zone's load is located east of St. John's Valley and Rosedene junctions. There are also 115 kV transmission circuits both north and south of the escarpment. These are used to supply local load and to connect generation located at Decew Falls GS and part of the Beck complex. These circuits are not connected to the Hamilton load centre for technical reasons.[1]



All of the QFW circuits, as well as most of the 115 kV circuits, are located south of the escarpment. With the exception of the circuits that supply Niagara-on-the-Lake and St. Catharines, the only circuit north of the escarpment is Q2AH – a long radial 115 kV line. In theory, additional load in the Hamilton area can be connected to the Q2AH so that the output of the NRWC will be utilized locally.

To quantify the load shift, it must be hypothetically assumed that Q2AH can be forced to operate in its closed configuration. This will allow industrial loads west of Beach TS to be supplied via Q2AH by closing Q2AH between Beamsville and Winona and by disconnecting the three Beach TS 115/230 kV auto transformers. This configuration changes the load supply from a double circuit supply to a single radial circuit

---

[1] Connecting the Niagara 115 kV circuits to the Hamilton load centre results in the following: a direct violation of Q2AH/ Winona TS Operating Restriction, affecting the Allanburg and Beck's remote protection operations; it creates a circular flow from Niagara to Hamilton to Winona, reducing the efficiency of the system in the area; it increases the susceptibility to faults for customers supplied by the circuits; it creates possible overloading and voltage support concerns in the Allanburg area.

The study concludes that approximately 120 MW of additional load can be transferred in this arrangement, which is not enough to offset the 230 MW of generation from NRWC.

Even though approximately 120 MW of load can be transferred to the single radial circuit, this is not a feasible or recommended practice. The security and reliability of power to the additional industrial loads, from a double circuit supply to a single circuit supply, is greatly compromised. In addition, the fault susceptibility for all load customers on the circuit is significantly increased.

<u>Conclusions</u>

1. The QFW interface circuits south of the escarpment are heavily utilized and cannot accommodate the 230 MW output of the NRWC wind farm.

2. The only HV circuit north of the escarpment, Q2AH, is operated in a normally-open configuration so that Winona TS and Beamsville TS are both supplied on a single radial circuit to reduce fault susceptibility, improve line utilization and customer reliability.

3. The only means of shifting load to Q2AH is to operate it in a normally closed configuration, which violates operating restrictions, protection schemes and reduces the efficiently and security of the area.

4. A maximum of 120 MW of industrial Hamilton load can be supplied by Q2AH before continuous voltage requirements are violated and the area becomes more susceptible to a voltage stability issues. This does not free enough capacity on the QFW interface to accommodate the 230 MW wind farm.

Therefore, the possibility of shifting or reducing the supply flow from the south of the escarpment to increase the flow north of the escarpment at either St. John's Valley or Rosedene Junctions is not a feasible solution to negate the construction of a 115 kV line across the face of the Niagara Escarpment.

Prepared by:

Mitchell Dellandrea
Engineering Grad
Transmission System Development

Approved by:

Gene Ng, P.Eng
Network Management Engineer
Transmission System Development

HIDDEN BENCH

Date: AUG 15th, 2012

To: HYDRO ONE NETWORKS

Fax: 1-416-345-5424

Attention: MR JOHN SABISTON, MANAGER TRANSMISSION PLANN

From: MOUNTAINVIEW NIAGARA ESCARPMENT ASSOCIATION

3 PAGES INCLUDING COVER

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Mountainview Niagara Escarpment Community Association
4152 Locust Lane, Beamsville, Ontario, L0R1B2
Tel: 905-563-8700 Fax: 905-563-8705

August 14, 2012

Hydro One Networks Inc.
483 Bay Street, North Tower
15th Floor
Toronto, Ontario M5G 2P5

Att: Mr. John Sabiston
Manager, Transmission Planning
Western Ontario

Dear Sir,

We are writing you today to seek additional information as well as clarification on some of the points brought forward in your letter to Niagara Region Wind Corporation dated June 13th, 2012. As you most likely know the Niagara Escarpment Commission during its hearing of June 21st passed a motion requiring a "3rd party peer review" of the 115Kv high transmission line routing required to connect the NRWC 230Mw wind farm to the grid. A further requirement of the approved motion was that the peer review "Identify options that do not require the installation of a power line down the face of the escarpment". In view of the foregoing and in an attempt to make this peer review as complete as possible we respectfully request that you provide the information requested in this letter and respond to the following inquiries:

1) Please provide a copy of the feasibility study that was completed on August 3rd, 2011. Was this study completed by Hydro One or by NRWC? Who was responsible for the costs associated with the preparation of this feasibility study?

2) In the preparation of the referenced feasibility study was the usage of the lines from the Nanticoke generating plant (which we understand will be decommissioned in 2014) considered? If this option was not considered can you please provide a rationale and justification why this option was not considered? It goes without saying that connecting at the Jarvis or the Nanticoke transfer stations would provide for less line loss and be more energy efficient which is one of the underlying principles of the Green Energy Act.

3) In the preparation of the referenced feasibility study was consideration given to permitting NRWC to connect to the 230Kv grid? If this connection option was made available to NRWC would there still be a need to construct a high voltage transmission line that crosses the Niagara Escarpment and if so why? Please provide a justification and rationale why connection to the 230kv grid was not permitted.

4) In the preparation of the referenced feasibility study was consideration given to shifting current load from the HV lines South of the Escarpment to those North of the escarpment at either St John's Valley or Rosedene Junction? This load shift could preclude the need to construct a HV line that

needs to cross the escarpment and be relatively inexpensive and additionally would provide a point of access to the grid which is closer to the actual generation area which would be more energy efficient. If this option was not considered can you please provide the rationale and justification why it was not considered?

5) We note that your letter of June the 13th does not address the availability of additional capacity that would be available for connection to the grid if the Niagara Reinforcement Project (Q32m/Q 26M) started in 2005 was complete. If this project was to be completed would there be enough capacity South of the escarpment to connect to the grid for the NRWC project and avoid the need to cross the Niagara escarpment? It seems from our research that one of the primary justifications for the 2004 116 million capital expenditure allocation for this project was to increase access for Niagara generating capacity.

6) The second paragraph of your letter of June 13th refers to the option of the "A8G line" not being able to "meet the required time lines"; Can you please explain what timelines your are referring to and why these timelines cannot be extended in order to protect the Niagara Escarpment, a world biosphere reserve? Can you also please provide an estimate how longer the implementation of the A8G line would take? Can you also please provide your best estimate as to what the capital cost of upgrades would be to use this "A8G" routing for the NRWC connection?

We realize that the information requested and the questions being asked may require Hydro One to revisit the status quo and relook at the feasibility study already done, but as citizens of Ontario we all have an obligation to preserve the Niagara Escarpment, a World Biosphere site and to protect one of Ontario key tourism and cultural assets. Perhaps with your assistance we can find an alternative routing for the 115kv connection line that does not cross the Niagara Escarpment we will give us a win/win solution as a number of our association members are also strong proponents of Green energy and are supporters of the NRWC project. We thank you in advance for your prompt attention to our request for information and we look forward to your early response.

Harald M. Thiel
Mountainview Niagara Escarpment Community Association

CC: Nancy Mott-Allen, Senior Strategic Advisor, Niagara Escarpment Commission
Ann Louise Heron, CAO, Town of Lincoln

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John Sabiston
Manager, Transmission Planning - Western Ontario
Transmission System Development Division

hydro one

October 3, 2012

Mr. Harold M. Thiel
Mountainview Niagara Escarpment Community Association
4152 Locust Lane
Beamsville, ON L0R 1B2

Dear Mr. Thiel:

Thank you for your letter dated August 14, 2012 seeking additional information regarding the connection of the proposed Niagara Region Wind Corporation (NRWC) renewable energy project to the provincial transmission grid. I apologize for the delay in responding.

I am unable to provide a copy of the requested feasibility study, dated August 3, 2011, prepared by Hydro One as NWRC has refused our request to release the report to you.

NRWC was responsible for the costs associated with the preparation of this study. Cost responsibility for connections and network transmission facilities is governed by Ontario's Transmission System Code. Hydro One applies the principles of the Code to identify costs for which a customer is responsible.

The customer's Feed-In Tariff (FIT) contract with the Ontario Power Authority (OPA) designates a 115 kilovolt (kV) connection to the grid at Hydro One's Beach Transformer Station (TS) in Hamilton
Hydro One's Nanticoke lines are operated at 230 kV and 500 kV, and do not provide a physical or economic path for transmitting power from NRWC's site south of Beamsville to the designated connection point at Hydro One's Beach TS located on the east side of Hamilton.

Hydro One will undertake studies to assess the feasibility and effectiveness of shifting load, as you suggested, from lines south of the escarpment to lines north of the escarpment, to accommodate the 230 MW output of the proposed wind farm. These assessments are expected to take about 2 months to complete.

Hydro One's Niagara Reinforcement Project, may provide sufficient transmission capacity south of the escarpment to accommodate the output of the proposed wind farm. However this alternative was not examined as construction of the line has been stalled for seven years. Although Hydro One has had discussions with First Nations' representatives, no firm re-start or completion date has been established, and this transmission line is unavailable to NWRC.

.../2

hydro one

NRWC has advised that they require connection to Beach TS by spring 2014 in order to meet their contractual Commercial Operation Date stipulated in their OPA FIT contract. Extensive work would be required to refurbish circuit A8G including widening the right-of-way and constructing new towers in the Railway Junction to Beach TS portion which also crosses the NEC lands This work cannot be completed to meet the customer's timelines.

Mr. Thiel, thank you again for your thoughtful questions and I trust you will find this information helpful.

Sincerely,

John Sabiston
Manager, Transmission Planning

cc Mr. Mervin Croghan, Chairman and CEO
Niagara Region Wind Corporation

Ms. Nancy Mott-Allen, Senior Strategic Advisor
Niagara Escarpment Commission

Ms. Ann Louise Heron, Chief Administrative Officer
Town of Lincoln

REPORT

Power to Ontario.
On Demand.

System Impact Assessment Report

CONNECTION ASSESSMENT & APPROVAL PROCESS

Addendum

CAA ID: **2012-466**
Project: **Niagara Region Wind Farm**
Applicant: **Niagara Region Wind Corporation**

Market Facilitation Department
Independent Electricity System Operator

Date: September 23, 2013

PUBLIC

Document Name	System Impact Assessment Report
Issue	Addendum
Reason for Issue	First Issue
Effective Date	September 23, 2013

System Impact Assessment Report

Acknowledgement

The IESO wishes to acknowledge the assistance of Hydro One in completing this assessment.

Disclaimers

IESO

This report has been prepared solely for the purpose of assessing whether the connection applicant's proposed connection with the IESO-controlled grid would have an adverse impact on the reliability of the integrated power system and whether the IESO should issue a notice of conditional approval or disapproval of the proposed connection under Chapter 4, section 6 of the Market Rules.

Conditional approval of the proposed connection is based on information provided to the IESO by the connection applicant and Hydro One at the time the assessment was carried out. The IESO assumes no responsibility for the accuracy or completeness of such information, including the results of studies carried out by Hydro One at the request of the IESO. Furthermore, the conditional approval is subject to further consideration due to changes to this information, or to additional information that may become available after the conditional approval has been granted.

If the connection applicant has engaged a consultant to perform connection assessment studies, the connection applicant acknowledges that the IESO will be relying on such studies in conducting its assessment and that the IESO assumes no responsibility for the accuracy or completeness of such studies including, without limitation, any changes to IESO base case models made by the consultant. The IESO reserves the right to repeat any or all connection studies performed by the consultant if necessary to meet IESO requirements.

Conditional approval of the proposed connection means that there are no significant reliability issues or concerns that would prevent connection of the proposed project to the IESO-controlled grid. However, the conditional approval does not ensure that a project will meet all connection requirements. In addition, further issues or concerns may be identified by the transmitter(s) during the detailed design phase that may require changes to equipment characteristics and/or configuration to ensure compliance with physical or equipment limitations, or with the Transmission System Code, before connection can be made.

This report has not been prepared for any other purpose and should not be used or relied upon by any person for another purpose. This report has been prepared solely for use by the connection applicant and the IESO in accordance with Chapter 4, section 6 of the Market Rules. The IESO assumes no responsibility to any third party for any use, which it makes of this report. Any liability which the IESO may have to the connection applicant in respect of this report is governed by Chapter 1, section 13 of the Market Rules. In the event that the IESO provides a draft of this report to the connection applicant, the connection applicant must be aware that the IESO may revise drafts of this report at any time in its sole discretion without notice to the connection applicant. Although the IESO will use its best efforts to advise you of any such changes, it is the responsibility of the connection applicant to ensure that the most recent version of this report is being used.

Hydro One

The results reported in this report are based on the information available to Hydro One, at the time of the study, suitable for a System Impact Assessment of this connection proposal.

The short circuit and thermal loading levels have been computed based on the information available at the time of the study. These levels may be higher or lower if the connection information changes as a result of, but not limited to, subsequent design modifications or when more accurate test measurement data is available.

This study does not assess the short circuit or thermal loading impact of the proposed facilities on load and generation customers.

In this report, short circuit adequacy is assessed only for Hydro One circuit breakers. The short circuit results are only for the purpose of assessing the capabilities of existing Hydro One circuit breakers and identifying upgrades required to incorporate the proposed facilities. These results should not be used in the design and engineering of any new or existing facilities. The necessary data will be provided by Hydro One and discussed with any connection applicant upon request.

The ampacity ratings of Hydro One facilities are established based on assumptions used in Hydro One for power system planning studies. The actual ampacity ratings during operations may be determined in real-time and are based on actual system conditions, including ambient temperature, wind speed and project loading, and may be higher or lower than those stated in this study.

The additional facilities or upgrades which are required to incorporate the proposed facilities have been identified to the extent permitted by a System Impact Assessment under the current IESO Connection Assessment and Approval process. Additional project studies may be necessary to confirm constructability and the time required for construction. Further studies at more advanced stages of the project development may identify additional facilities that need to be provided or that require upgrading.

Table of Contents

Executive Summary

Notification of Conditional Approval

Niagara Region Wind Corporation (the "connection applicant") has proposed the following changes to Niagara Region Wind Farm (the "project"), whose original SIA was finalized in July 27, 2012:

(1) The 44 kV collector system has been changed to a 34.5 kV collector system. In addition, the collector system will change from a combination underground and overhead system to a completely underground collector system;
(2) There will be two collector substations where the 34.5 kV collection voltages are stepped up to 115 kV;
(3) There will be several lengths of 115 kV underground cable required for the tap line and the circuit between two collector substations.

This assessment concluded that the proposed changes to the project would not result in new requirements for the connection of the project. The connection of the project, operating up to 230 MW, subject to the requirements specified in the original SIA report, is expected to have no material adverse impact on the reliability of the integrated power system. It is recommended that a *Notification of Conditional Approval for Connection* be issued for the Niagara Region Wind Farm subject to the implementation of the requirements outlined in the original SIA report.

Rationale for Conditional Approval for Connection

We have analyzed the changes to the project on the system reliability of the IESO-controlled grid, and based on our study results, we have identified that:

1. Based on the proposed connection configuration at Beach TS for the project, under the outage of 115 kV breaker H3H5, H5H7, or "New CB" (breaker designation to be assigned by Hydro One during facility registration) at Beach TS, the project would have to curtail its output unless a local special protection scheme (SPS) monitoring the status of 115 kV breakers at Beach TS is implemented.
2. There will be no short circuit concern after the incorporation of the project.
3. The reactive capability of the project will be able to meet the Market Rules based on the equivalent collector impedance parameters provided by the connection applicant.
4. Thermal and voltage assessment results in the original SIA are not expected to change.
5. The Wind Turbine Generators (WTG) of the project and the power system are expected to be transiently stable following recognized fault conditions.
6. The proposed WTGs will be capable of remaining connected to the grid for recognized system contingencies which do not remove the project by configuration.

– End of Section –

1. Introduction

In 2012, Niagara Region Wind Corporation (the "connection applicant") submitted an SIA application for the 230 MW wind farm located in West Lincoln and Haldimand County, Ontario, to be known as Niagara Region Wind Farm (NRWF, the "project"). The project had been awarded a Power Purchase Agreement under the Feed-In Tariff (FIT) program with the Ontario Power Authority. It was expected that full commercial operation would start on February 23, 2014.

The IESO completed the SIA study for the project and issued the final SIA report at July 27, 2012. The connection applicant recently submitted material changes to the original application, therefore further assessment of the connection proposal was required. The changes primarily include:

(1) The 44 kV collector system has been changed to a 34.5 kV collector system. In addition, the collector system will change from a combination underground and overhead system to a completely underground collector system;

(2) There will be two collector substations where the 34.5 kV collection voltages are stepped up to 115 kV;

(3) There will be several lengths of 115 kV underground cable required for the tap line and the circuit between two collector substations.

Additionally some of Enercon E-101 FT wind turbines have been replaced by other Enercon E-101 models FTS or FTQS to meet the reactive power requirements of the Market Rules. The modified project is described as below:

Wind Turbine Generators

The WTGs will a mix of Enercon E-101 FT, FTS, and FTQS, rated 3 MW each. The primary voltage of generator's step-up transformers has been changed from 44 kV to 34.5 kV. The project will be composed of 77 WTGs, totaling 231 MW.

Collector System

The WTGs will be arranged into 9 collectors. There will be two collector substations: North and South substations. The North Substation will consist of 5 collectors (Collector 4, 5, 6, 7, and 8) with 9 WTGs (3 FT, 2 FTS, and 4 FTQS) on each collector. The South Substation will consist of 4 collectors (Collector 1, 2, 3, and 9) with 8 WTGs (4 FT, 2 FTS, and 2 FTQS) on each. Each collector will be connected to a 34.5 kV bus via a circuit breaker at either North or South substation. Each substation will include one 34.5/115kV main step-up transformer with a circuit breaker at both sides to connect the 34.5 kV bus to the 115 kV bus.

Transmission Facilities

The 115 kV circuit between the two substations will be a mix of 9 km overhead line and 1.29 km underground cable. There will be a circuit breaker at each end. The North Substation will be connected to the connection point via a tap line combining a 30.75 km overhead line and a 4.31 km underground cable. There will be a circuit breaker and two motorized disconnect switches on the tap line at the connection point. The connection point will be on Hydro One's de-commissioned 115 kV circuit, former Q5G, approximately 25 km from Beach TS, which will be returned to service by adding a new circuit breaker to the loop bus configuration at Beach 115 kV.

The single-line diagram of the project is shown in Figure 1.

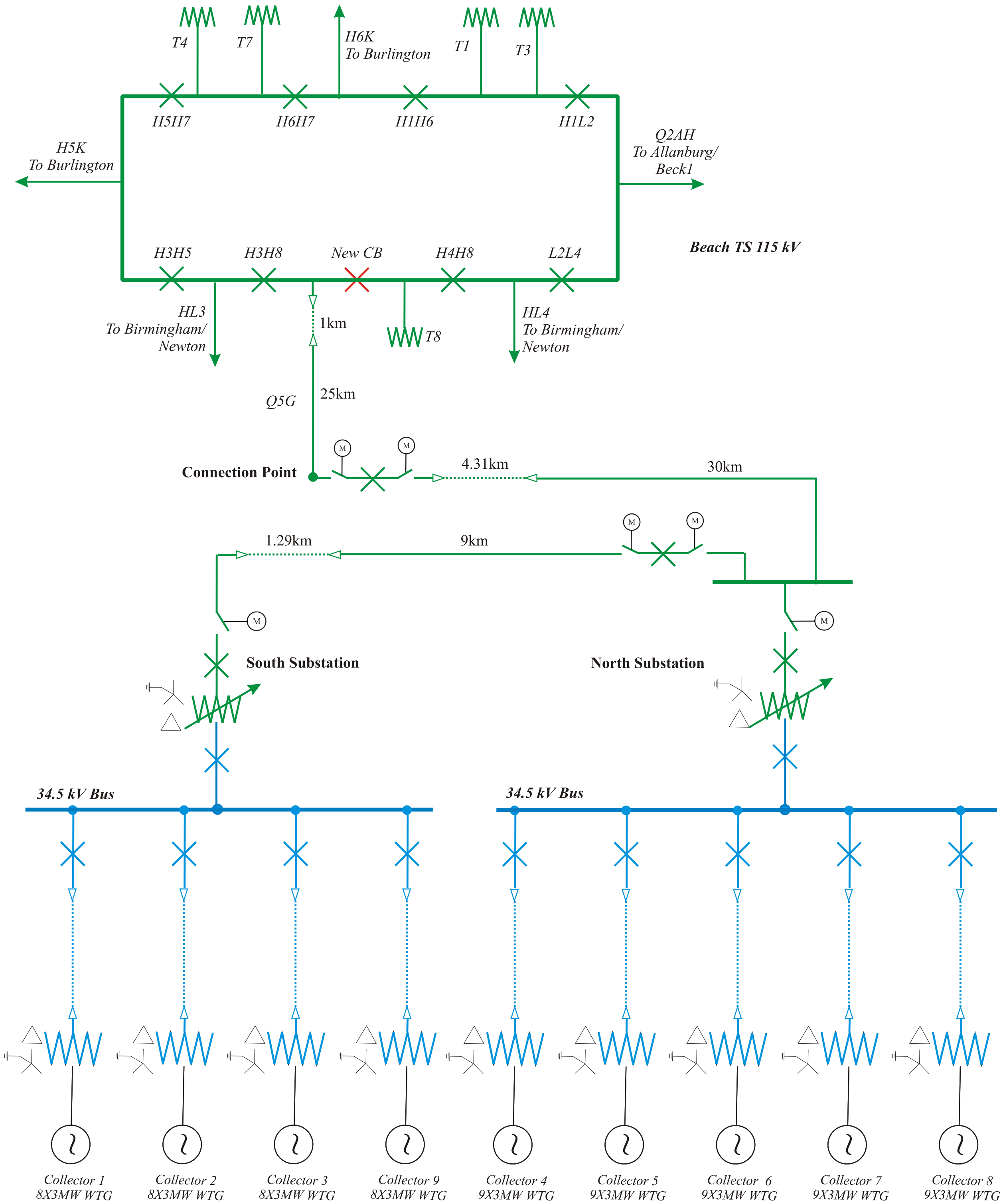

Figure 1: Revised single line diagram of the project

– End of Section –

2. Data Verification

2.1 Connection Arrangement

With all elements in-service, the connection arrangement of the project shown in Figure 1 is not expected to reduce the level of reliability of the integrated power system and is, therefore, acceptable to the IESO.

However, under some outage condition of one 115 kV breaker at Beach TS, there is a probability two breakers at Beach 115 kV are lost at the same time. Specially, the loss of breakers H3H5 and “New CB” would occur when the system is subject to Beach T8 contingency under the outage of breaker H3H5, or circuit H5K contingency under the outage of breaker “New CB”; and the loss of breakers H5H7 and “New CB” would occur for Beach T8 contingency under the outage of breaker H5H7, or Beach T7 contingency under the outage of breaker “New CB”.

When breaker H3H5 and “New CB” are lost, the project would be radially connected to circuit HL3 only, and the power output of the project would flow into the system through two transformers and the low-voltage bus of each station on circuits HL3/HL4, as shown in Figure 2. This may result in reverse flow through the transformers on circuit HL4. Similarly, the loss of breakers H5H7 and “New CB” may result in reverse flow through transformers on circuit H6K as well.

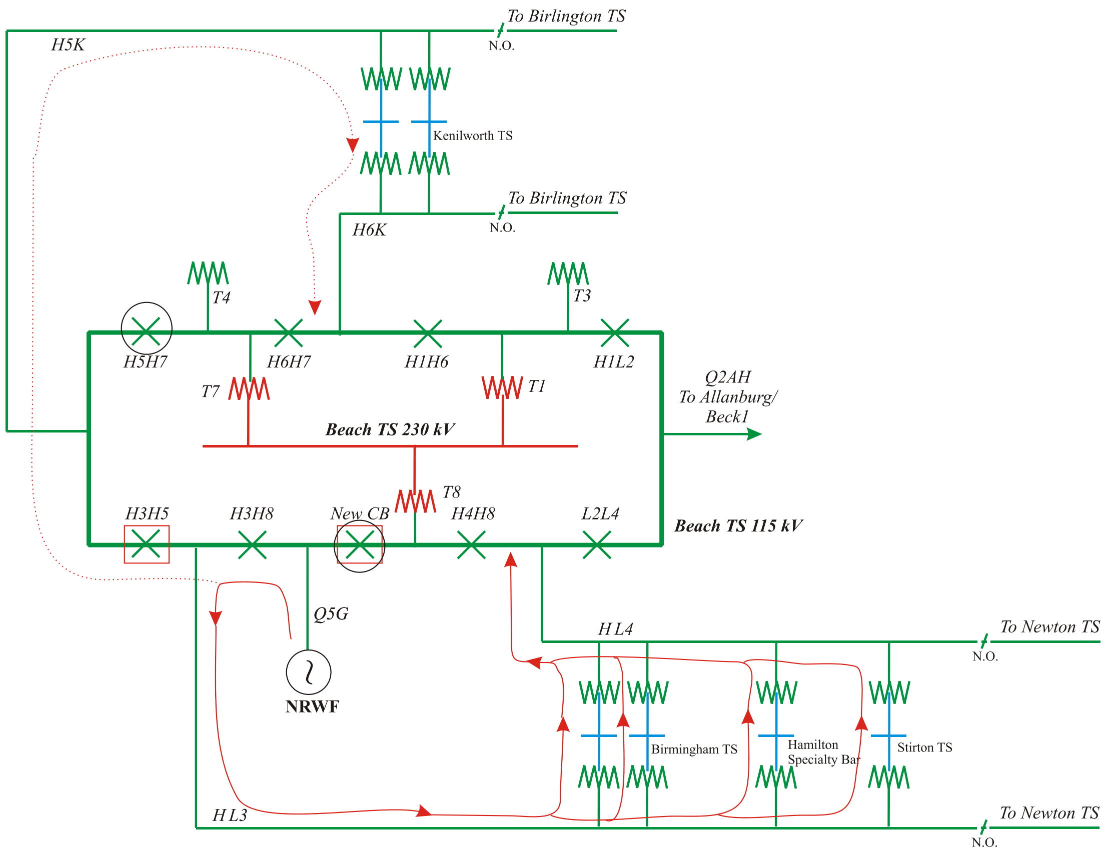

Figure 2: Connection of the project to the system for loss of two Beach 115 kV breakers

Hydro One confirmed that some transformers at the stations on HL3/HL4 and H5K/ H6K have no reverse flow capability. To prevent reverse flow through these transformers, the project will have to curtail its output under the outage of breaker H3H5, H5H7, or "New CB". Alternatively, a local special protection scheme (SPS) monitoring status of these breakers at Beach TS could be implemented. The SPS would be normally armed and would reject the project's output upon detection of radial connection of the project to circuit HL3 or circuits HL3 and H5K.

2.2 Wind Turbine Generators

The WTGs to be used will be Enercon E-101 FT, FTS and FTQS. Each WTG is a three bladed, variable pitch, variable speed, and full conversion WTG system. Their specifications are shown in Table 1.

Table 1: Specifications of proposed WTGs

Type	Rated Voltage	Rated MVA	Rated MW	GSU Transformer			Q_{max} (Mvar)	Q_{min} (Mvar)	I_d" (pu)
				MVA	R	X			
E-101 FT/FTS	400 V	3.5	3	3.5	-	6%	1.7	-1.7	1.249
E-101 FTQS	400 V	3.8	3	3.8	-	6%	2.2	-2.2	1.363

E-101 FTS and FTQS WTGs are wind turbines adopting the STATCOM option, as shown in Figure 3, which enables a WTG to provide full reactive capability at low generating output.

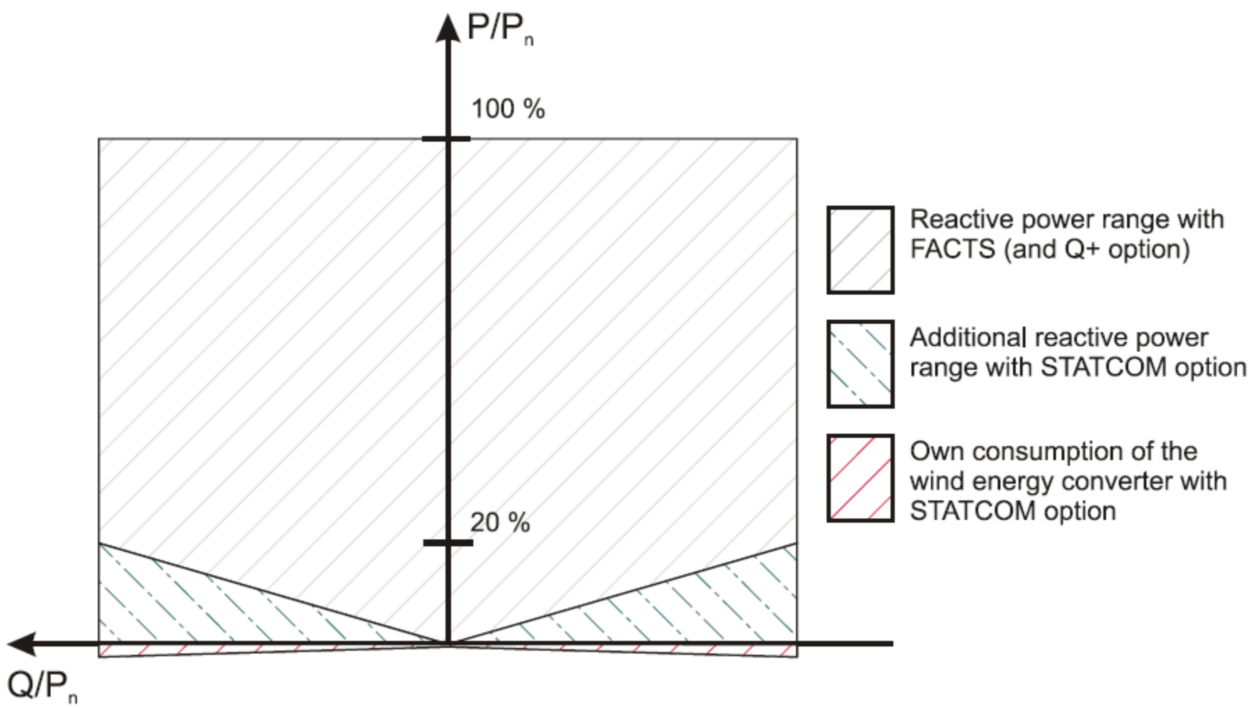

Figure 3: P/Q diagram of an ENERCON WTG with the STATCOM option

2.2.1 Voltage Ride-Though Capability

The Enercon E-101 FT, FTS or FTQS wind turbine provides a voltage ride-through capability. During a voltage drop/raise, the minimum time for a WTG to remain online is shown in Table 2.

Table 2: WTG voltage ride-through capability

Voltage Range (% of base voltage)	Minimum time for WTGs to Remain Online (s)
V<80	5
0.9<V<120	Continuous
V>120	0.09

The low voltage ride-through (LVRT) capability of the proposed WTGs was verified by performing transient stability studies as detailed in Section 3.5.

2.2.2 Frequency Ride-Through Capability

The Enercon E-101 FT, FTS, or FTQS wind turbine is capable of continuous operation within the frequency band of 53 Hz to 67 Hz. Based on the model provided by the connection applicant, the WTG can operate continuously within the range of 57 Hz to 60.7 Hz.

The Market Rules state that the generation project directly connecting to the IESO-controlled grid shall operate continuously between 59.4 Hz and 60.6 Hz and for a limited period of time in the region above straight lines on a log-linear scale defined by the points (0.0 s, 57.0 Hz), (3.3 s, 57.0 Hz), and (300 s, 59.0 Hz).

The frequency ride-through capability of the proposed WTGs meets the Market Rules' requirements.

2.3 Main Step-Up Transformers

Table 3: Main step-up transformer data

TS	Nominal Voltage (kV)	Rating (MVA) (ONAN/ONAF /ONAF)	Positive Sequence Impedance (pu) S_B= 75 MVA	Configuration		Zero Sequence Impedance (pu) S_B= 100 MVA	Tap
				HV	LV		
North	115/34.5	85/113/150	j0.1175	Yg	Δ	N/A	ULTC at HV ±15%, 33 steps
South	115/34.5	65/86/115	j0.088	Yg	Δ	N/A	ULTC at HV ±15%, 33 steps

2.4 Collector System

Table 4: Equivalent impedance and numbers of WTGs of collectors

Substation	Collector	Unit#			MW	Positive-Sequence Impedance (pu, S_B=100 MVA)			Zero-Sequence Impedance (pu, S_B=100 MVA)		
		FT	FTS	FTQS		R	X	B	R	X	B
South	C1	4	2	2	24	0.1022	0.0788	0.01635	0.344	0.1332	0.01635
	C2	4	2	2	24	0.0516	0.055	0.00685	0.1927	0.0634	0.00685
	C3	4	2	2	24	0.0543	0.0336	0.00833	0.1788	0.0683	0.00833

	C9	4	2	2	24	0.0735	0.0401	0.01094	0.2278	0.0998	0.01094
North	C4	3	2	4	27	0.0445	0.033	0.01224	0.188	0.076	0.01224
	C5	3	2	4	27	0.0758	0.0455	0.01599	0.2358	0.0986	0.01599
	C6	3	2	4	27	0.0993	0.0808	0.01873	0.33	0.1229	0.01873
	C7	3	2	4	27	0.0892	0.0959	0.0222	0.3472	0.1164	0.0222
	C8	3	2	4	27	0.0654	0.0564	0.01341	0.2596	0.0967	0.01341

2.5 Connection Equipment

2.5.1 115 kV Switches

No change.

2.5.2 115 kV Circuit Breakers

No change.

2.5.3 115 kV Circuits

Table 5: Parameters of 115 kV circuits

Circuit	Positive-Sequence Impedance (pu, S_B=100 MVA, V_B=118 kV)			Zero-Sequence Impedance (pu, S_B=100 MVA, V_B=118 kV)		
	R	X	B	R	X	B
Beach TS to Connection Point	0.00748	0.0748	0.01431	0.0449	0.21223	0.01065
Connection Point to North Sub	0.00609	0.06817	0.14769	0.05308	0.23557	0.13334
North Sub to South Sub	0.00358	0.03996	0.02202	0.0311	0.13794	0.01992

2.6 Wind Farm Control System

No change.

-End of Section-

3. Assessments

3.1 Short Circuit Assessments

Fault level studies were updated by the transmitter to examine the effects of the project on fault levels at existing facilities close to the project. Table 6 summarizes the fault levels at facilities near the project.

Table 6: Fault levels at facilities near the project

Station	Before the Project		After the Project		Lowest Rated Circuit Breaker (kA)
	3-phase	L-G	3-Phase	L-G	
*Symmetrical Fault (kA)**					
BEACH 115 kV	27.39	32.57	27.52	32.74	39.3
BEACH 230 kV	38.06	35.78	38.63	36.34	41.1
BURLINGTON 115 kV	40.33	43.82	40.42	43.91	40 (existing)/50 (New)**
BURLINGTON 230 kV	52.63	44.24	52.99	44.46	63
TRAFALGAR 230 kV	65.00	62.86	65.17	62.96	80
BECK 2 230 kV	58.57	65.29	58.64	65.34	69.5
BECK1 115 kV	24.71	29.37	24.71	29.37	36
ALLANBURG 115 kV	35.86	40.15	35.87	40.16	40 (existing)/50 (New)**
NRWF PCC 115 kV	6.05	3.84	7.23	5.54	20
*Asymmetrical Fault (kA)**					
BEACH 115 kV	33.84	42.24	34.07	42.51	45.5
BEACH 230 kV	45.20	45.94	45.93	46.67	50
BURLINGTON 115 kV	49.58	56.40	49.71	56.52	45.5 (existing)/60 (New)**
BURLINGTON 230 kV	63.56	56.85	63.99	57.12	75.6
TRAFALGAR 230 kV	84.86	86.92	85.06	87.05	92
BECK 2 230 kV	80.52	**92.92**	80.59	**92.98**	81.5
BECK1 115 kV	30.05	37.41	30.05	37.41	39
ALLANBURG 115 kV	43.20	50.15	43.21	50.16	45.5 (existing)/60 (New)**
NRWF PCC 115 kV	6.50	6.28	7.92	5.85	20

* Based on a pre-fault voltage level of 550 kV for 500 kV buses, 250 kV for 230 kV buses, and 127 kV for 115 kV buses.

**As per the CAA ID 2006-EX299 & 2011-EX542 the 115 kV breakers at this station will be upgraded before the project comes in service.

As stated in the original SIA report, the asymmetrical fault level at Beck 2 230 kV switchyard exceeds the interrupting capability of the existing breakers before the connection of the project. Hydro One ensures that the current fault levels at the existing facilities are within the interrupting capabilities of the existing breakers and is continuously monitoring the fault levels with every new confirmed generation facility that connects to the Hydro One system. Hydro One has confirmed that mitigation measures are available such as opening the bus ties to effectively address the short circuit violation at Beck 2 230 kV switchyard if necessary.

With the exception of circuit breakers at Beck 2 230 kV, the interrupting capability of the lowest rated circuit breakers near the project will not be exceeded after the incorporation of the project, and the interrupting capability of the 115 kV circuit breakers of the project are adequate for the anticipated fault levels.

3.2 Reactive Power Compensation

Appendix 4.2 of the Market Rules require that generators inject or withdraw reactive power continuously (i.e. dynamically) at a connection point up to 33% of its rated active power at all levels of active power output except where a lesser continually available capability is permitted by the IESO. A generating unit with a power factor range of 0.90 lagging and 0.95 leading at rated active power connected via impedance between the generator and the connection point not greater than 13% based on rated apparent power provides the required range of dynamic reactive capability at the connection point.

Dynamic reactive compensation (e.g. D-VAR or SVC) is required for a generating project which cannot provide a reactive power range of 0.90 lagging power factor and 0.95 leading power factor at rated active power. For a wind farm with impedance between the generator and the connection point greater than 13% based on rated apparent power, provided the WTGs have the capability to provide a reactive power range of 0.90 lagging power factor and 0.95 leading power factor at rated active power, the IESO accepts that the wind farm compensates for excessive reactive losses in the collector system of the project with static shunts (e.g. capacitors and reactors).

In addition, a wind farm is expected to inject or withdraw its full reactive power requirement for a 10% voltage change at the connection point, without provision for tap changer action. The response time is expected to be similar to that of a synchronous generator that meets the minimum Market Rules' requirements, outlined in Appendix 4.2 of the Market Rules, which is in the order of a few seconds.

The connection applicant shall be able to confirm this capability during the commission tests.

3.2.1 Dynamic Reactive Power Capability

The Enercon E-101 FT, FTS and FTQS generators can deliver IESO's required dynamic reactive power to the generator terminal at rated power and at rated voltage. Thus, there is no need to install any additional dynamic reactive power compensation device.

3.2.2 Static Reactive Power Capability

A generating facility shall inject or withdraw reactive power at the connection point up to 33% of its rated active power at all levels of active power output, which is **76.7 MVAr** for this project.

(1) Maximum Power Output Level

To justify the need for static capacitive compensation under maximum power output of the project, studies were performed with the following simulations:

- Typical low voltage of 120.4 kV at the connection point;
- Terminal voltage limit of WTGs assumed 1.2 pu;
- Both main step-up transformers set to a tap position of 127 kV;
- Voltage limits at 115 kV buses and collector buses at South and North substation assumed 133 kV and 38 kV, respectively;

The project could supply a maximum reactive power of **79.8 MVAr** at the connection point, meeting the Market Rules' requirements.

(2) Low Power Output Level

To justify the need for static capacitive compensation under low power output of the project, studies were performed with the following simulations:

- Zero power output from WTGs;
- Typical low voltage of 120.4 kV at the connection point;
- Terminal voltage limit of WTGs assumed 1.2 pu;
- Both main step-up transformers set to a tap position of 127 kV;
- Voltage limits at 115 kV buses and collector buses at South and North substation assumed 133 kV and 38 kV, respectively;

The project could inject a maximum reactive power of **110.2 MVAr** at the connection point, meeting the Market Rules' requirements.

Studies were also performed with the following simulations for the need of inductive compensation:

- Zero power output from WTGs;
- Typical high voltage of 123.5 kV at the connection point;
- Terminal voltage limit of WTGs assumed 0.9 pu;
- Both main step-up transformers set to a tap position of 115.6 kV;

The project could absorb a maximum reactive power of **76.8 MVAr** at the connection point, meeting the Market Rules' requirements.

Table 7 shows the voltage results of 115 kV and collector buses of substations of the project corresponding the above three scenarios. The IESO's reactive power calculation used the equivalent electrical model for the WTGs and collector feeders as provided by the connection applicant. It is very important that the project has a proper internal design to ensure that the WTG are not limited in their capability to produce active and reactive power due to terminal voltage limits or other project's internal limitations. For example, it is expected that the transformation ratio of the WTG step up transformers will be set in such a way that it will offset the voltage profile along the collector, and all the WTG would be able to contribute to the reactive power production of the project in a shared amount.

Table 7: Project's reactive power capability at the connection point

Operation	Q_{PCC} (MVAr)	V_{PCC} (kV)	Tap of Main Transformers (kV)	V_{115kV_Bus} North (kV)	V_{115kV_Bus} South (kV)	Voltage at Collector Bus -North (kV)	Voltage at Collector Bus -South (kV)
P=Max, Lagging PF	**79.8**	120.4	127	128.8	131.0	37.7	38.0
P=0, Lagging PF	**110.2**	120.4	127	128.5	130.0	37.5	37.1
P=0, Leading PF	**-76.8**	123.5	115.6	115.6	114.1	32.5	32.9

(3) High Wind Conditions

The connection applicant confirmed that under high wind conditions, the proposed WTGs would start pitching out the blades dynamically to continue injecting power into the grid and would not simply shut down. Thus, it is not expected any adverse impact of the project on the system under such conditions.

(4) Fixed Taper Changer Action

Studies were performed for the voltage at the connection point changing from 108 kV to 127 kV with a fixed tap position of both step-up transformers set to 119 kV. Simulation results show (i) at rated power output and the voltage of 108 kV, the project could supply **78.1 MVAr** reactive power at the connection point and (ii) at zero power output and the voltage of 127 kV, the project could absorb **75.3 MVAr** reactive power at the connection point. Therefore, the project is expected to inject or withdraw its full reactive power requirement for a 10% voltage change at the connection point, without relying on the tap changer action.

3.2.3 Alternate DVAR Solution

The connection applicant also proposed for the assessment an alternate reactive compensation solution of installing a DVAR device instead of adopting the STATCOM option for some of its wind turbines and requested a minimum size for the DVAR device.

Additional simulations indicate that provided the DVAR device is installed at the 34.5 kV bus of the North Substation, the continuous rating of the DVAR device would be at least **+52/-92 MVAr** so that the project meets the reactive power requirements of the Market Rules.

The DVAR device shall be integrated into the wind farm control system for automatic voltage control in coordination with the wind turbines.

3.3 Steady-State Assessments

Since the proposed changes to the project will not change the active power injection that was studied in the original SIA, thermal and voltage assessment results are not expected to change. Therefore, thermal assessment and voltage assessment in the original SIA report were not re-performed.

3.4 Transient Stability Performance

Transient stability simulations were completed to determine if the power system will be transiently stable with the incorporation of the project for recognized fault conditions. In particular, rotor angles of generators at Beck 2, Thorold, Decew Falls, Bruce, Pickering, and Halton Hills, and voltages close to the project were monitored.

The 2014 summer peak load base case was used with the following assumptions:

(1) The base case included all existing, committed and under-construction transmission facilities expected to be in-service in 2014;

(2) The base case included all existing, committed and under-construction generation facilities expected to be in-service in 2014. Specifically, the study assumed:

- Units at Lambton, Nanticoke, Lennox were out of service;
- All committed and existing generation in the Southwest and Bruce areas were maximized including 8 Bruce units;
- Gas generation, in conjunction with maximum wind generation, in the West area was dispatched to maximize the NBLIP transfer while avoid pre-contingency thermal violation in Niagara area before the project was incorporated;
- Generator in Niagara area was maximized including two Thorold units;
- Generation in the Greater Toronto area included four Darlington units, one Pickering unit, three Halton Hills units, and three Portland units. Specially, thermal constraint of GTA

southwest transmission system was ignored to obtain a highest transfer through Trafalgar-Richview corridor for transient stability study.

(3) The Ontario primary demand was approximately 26840 MW with major interface flows shown in Table 8.

Table 8: Interface Flows under 2014 Summer Peak Load Base Case (MW)

System Demand	NBLIP	FABC	FETT	QFW	FS	FIO
26840	1368	6385	7170	1393	1200	1556

Transient stability analyses were performed considering recognized faults in Southwest, GTA, and Niagara areas. Five contingencies were simulated as shown in Table 9.

Table 9: Simulated contingencies for transient stability

ID	Contingency	Location	Fault Type	Fault Clearing Time (ms)		SPS Action (ms)
				Local	Remote	LRSS**
SC1	B560V+B561M	Willow Creek Junction	LLG	66	91	124
SC2	M585M+V586M	Middleport TS	3 phase*	75	100	-
SC3	B18H+B20H	Beach TS	3 phase*	83	108	-
SC4	R14T+R17T	Trafalgar TS	3 phase*	83	108	-
SC5	Collector Bus of North Substation	The Project	3 phase	Un-cleared		-

* 3-phase fault was simulated instead of LG or LLG fault as required by the ORTAC, as the system is stable under the fault which is more conservative.
** LRSS refers to Longwood Reactor Switching Scheme.

Figures 4 to 13, Appendix A show the transient responses of the major generator rotor angles and bus voltages close to the project. The transient responses show that the generators remain synchronized to the power system and the oscillations are sufficiently damped following all simulated contingencies. It can be concluded that, with the project on-line, none of the simulated contingencies caused transient instability or un-damped oscillations.

3.5 Voltage Ride-Through Capability

The IESO requires that the wind turbine generators and associated equipment with the project be able to withstand transient voltages and remain connected to the IESO-controlled grid following a recognized contingency unless the generators are removed from service by configuration. This requirement is commonly referred to as the low voltage ride-through (LVRT) capability.

The LVRT capability of the proposed WTGs, as shown in Table 2, was assessed based on the terminal voltages of the WTGs under simulated contingencies in Table 10, which include the simulated contingency involving Beach TS from Table 9 and one additional contingency of a 3-phase fault on 115 kV circuit HL3 at Beach TS. The 2014 summer base case defined in Section 3.4 was used for dynamic simulations to obtain the terminal voltage responses of the WTGs.

Table 10: Simulated contingencies for LVRT

ID	Contingency	Location	Fault Type	Fault Clearing Time (ms)	
				Local	Remote
SC3	B18H+B20H	Beach TS	3 phase*	83	108
SC6	HL3	Beach TS	3 phase	83	-

* 3-phase fault was simulated instead of LG or LLG fault as required by the ORTAC, as the system is stable under the fault which is more conservative.

Figures 14 to 15, Appendix A show that the terminal voltages of the WTGs remain below 0.3 pu for less than 100 ms, and recover to 0.9 pu in less than 200 ms after the fault inception. As compared with the LVRT capability of Enercon E-101 FT, FTS and FTQS, the proposed WTGs are able to remain connected to the grid for recognized system contingencies that do not remove the project by configuration.

However, when the project is incorporated into the IESO-controlled grid, if actual operation shows that the WTGs trip for contingencies for which they are not removed by configuration, the IESO will require the voltage ride-through capability be enhanced by the applicant to prevent such tripping.

The voltage ride-through capability must also be demonstrated during commissioning by monitoring several variables under a set of IESO specified field tests and the results should be verifiable using the PSS/E model.

-End of Section-

Appendix A: Transient Stability Results

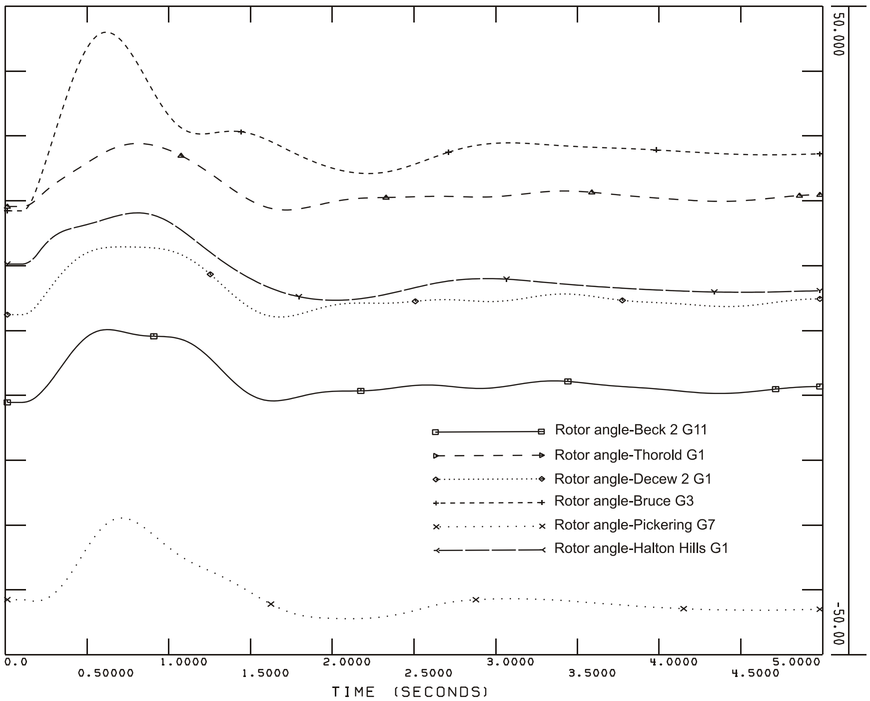

Figure 4: Major generator angle responses following a LLG fault on circuits B560V/B561M at Willow Creek Junction

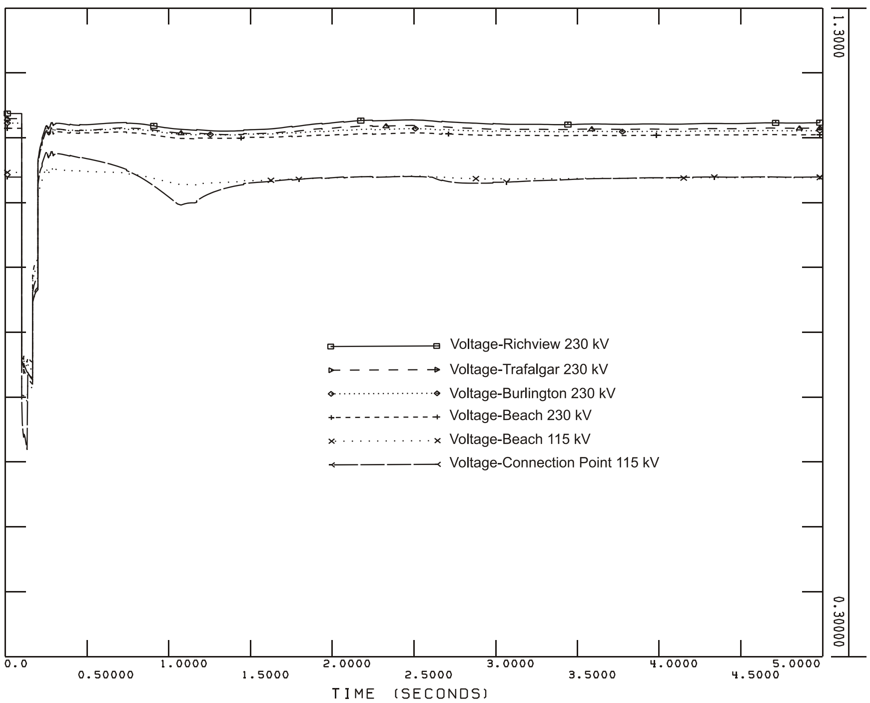

Figure 5: Major voltage responses following a LLG fault on circuits B560V/B561M at Willow Creek Junction

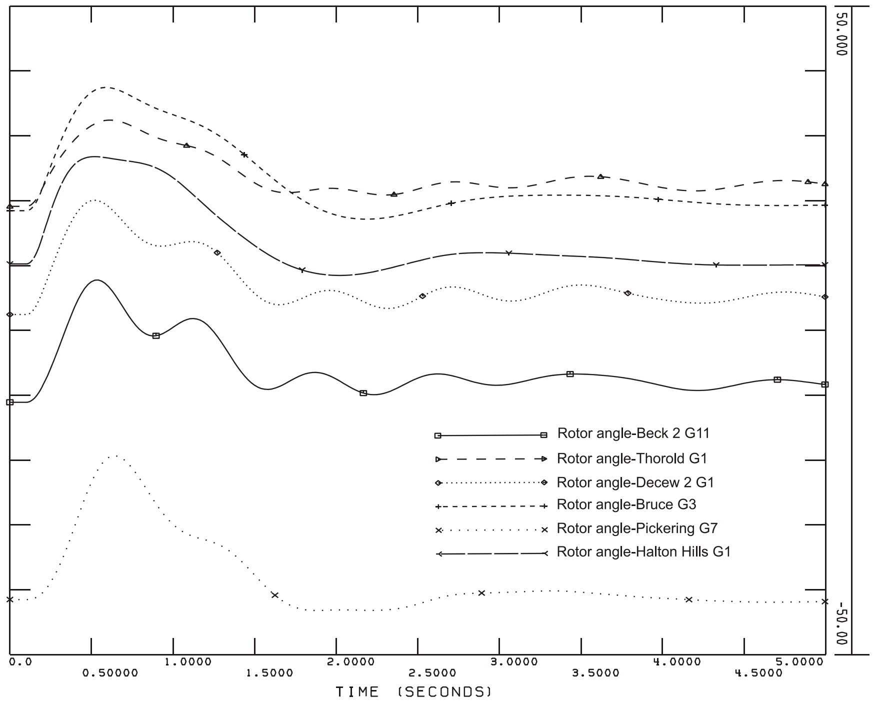

Figure 6: Major generator angle responses following a 3-phase fault on circuits M585M/V586M at Middleport TS

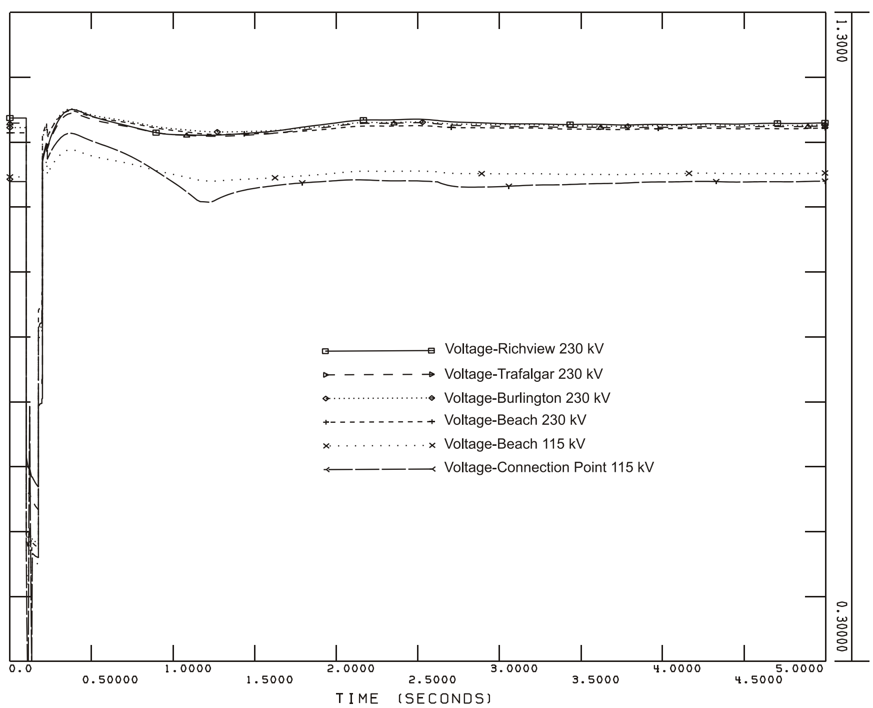

Figure 7: Major voltage responses following a 3-phase fault on circuits M585M/V586M at Middleport TS

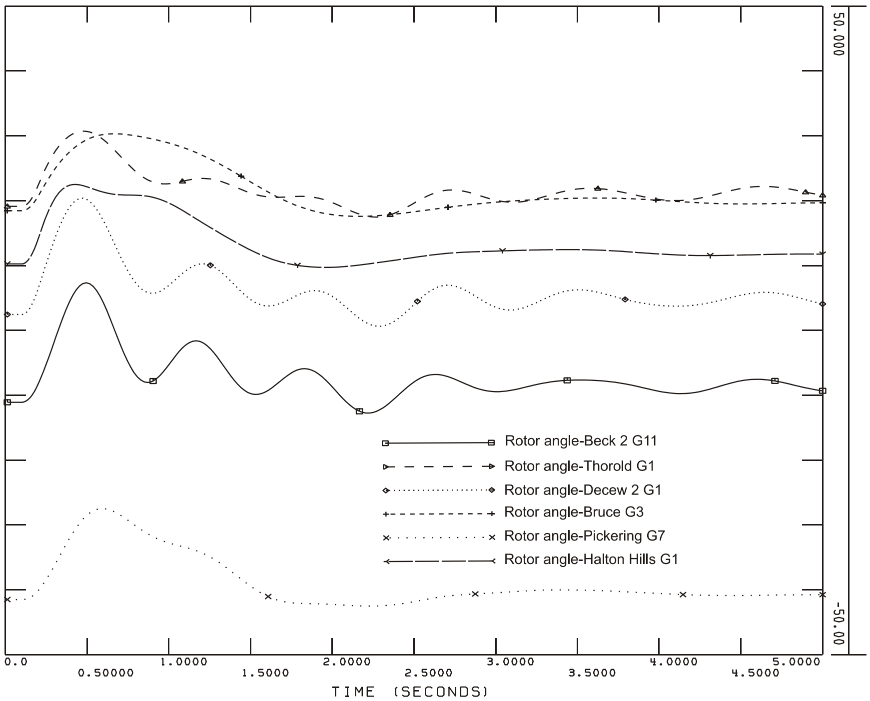

Figure 8: Major generator angle responses following a 3-phase fault on circuits B18H/B20H at Beach TS

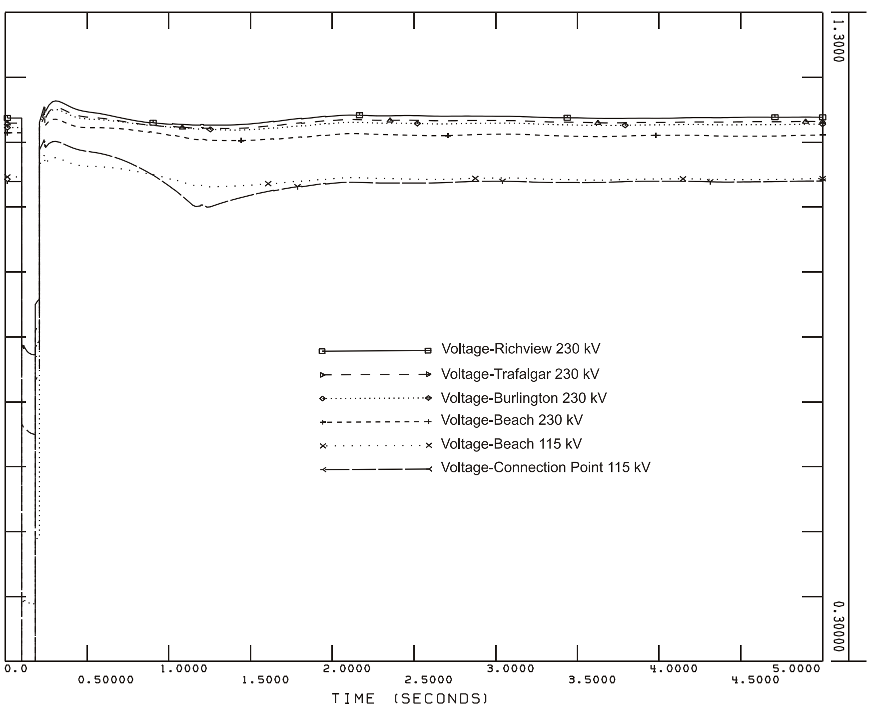

Figure 9: Major voltage responses following a 3-phase fault on circuits B18H/B20H at Beach TS

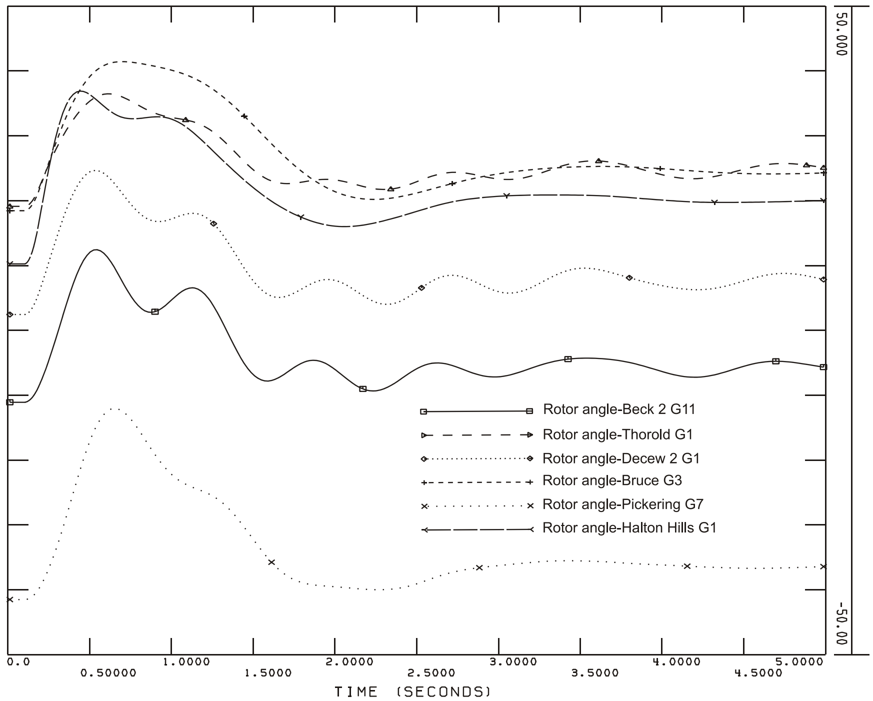

Figure 10: Major generator angle responses following a 3-phase fault on circuits R14T/R17T at Trafalgar TS

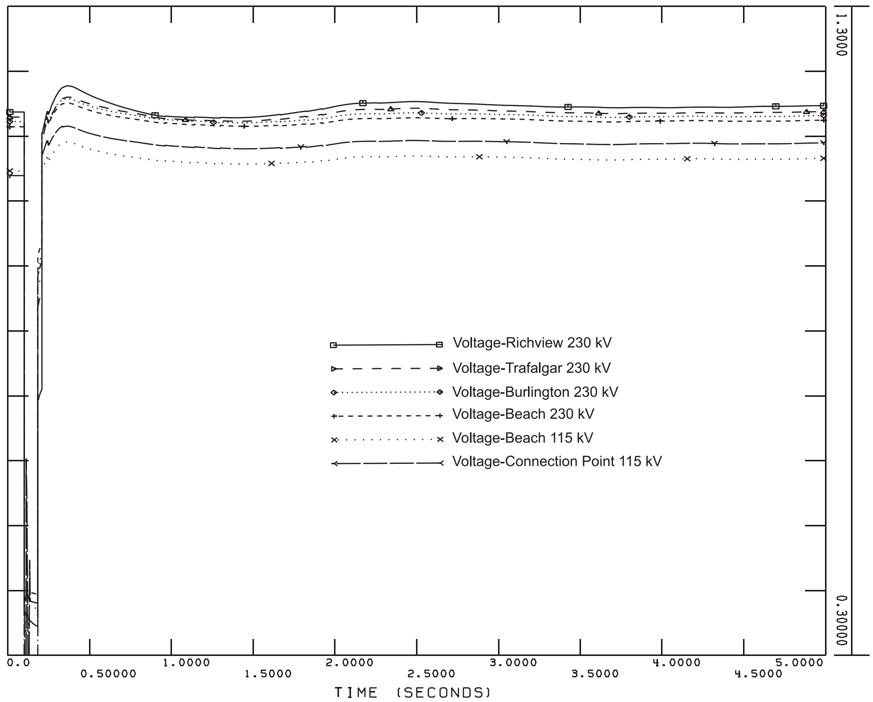

Figure 11: Major voltage responses following a 3-phase fault on circuits R14T/R17T at Trafalgar TS

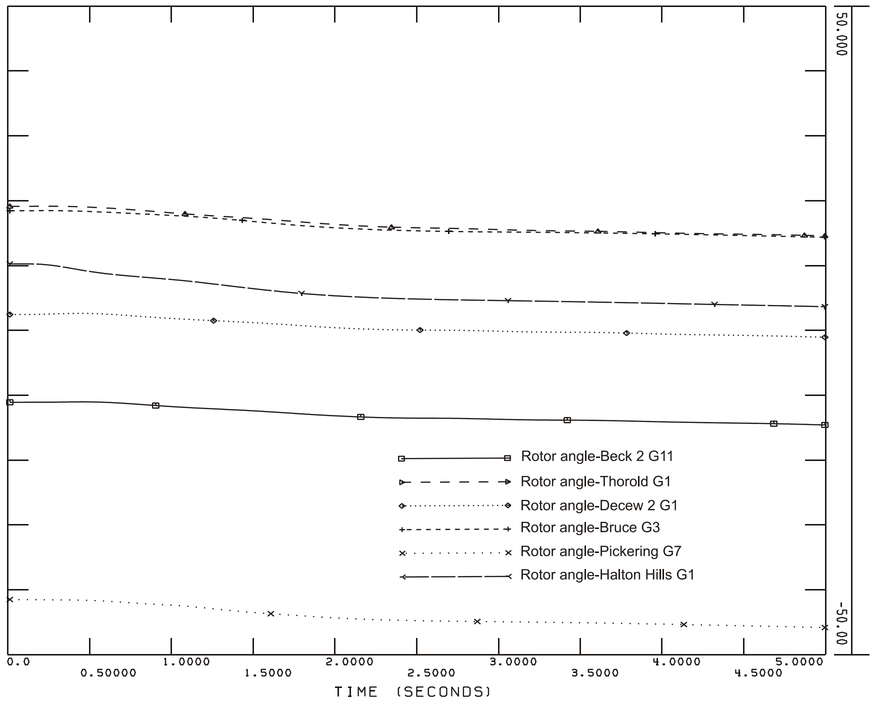

Figure 12: Major generator angle responses following an un-cleared 3-phase fault on the collector bus of North Substation of the project

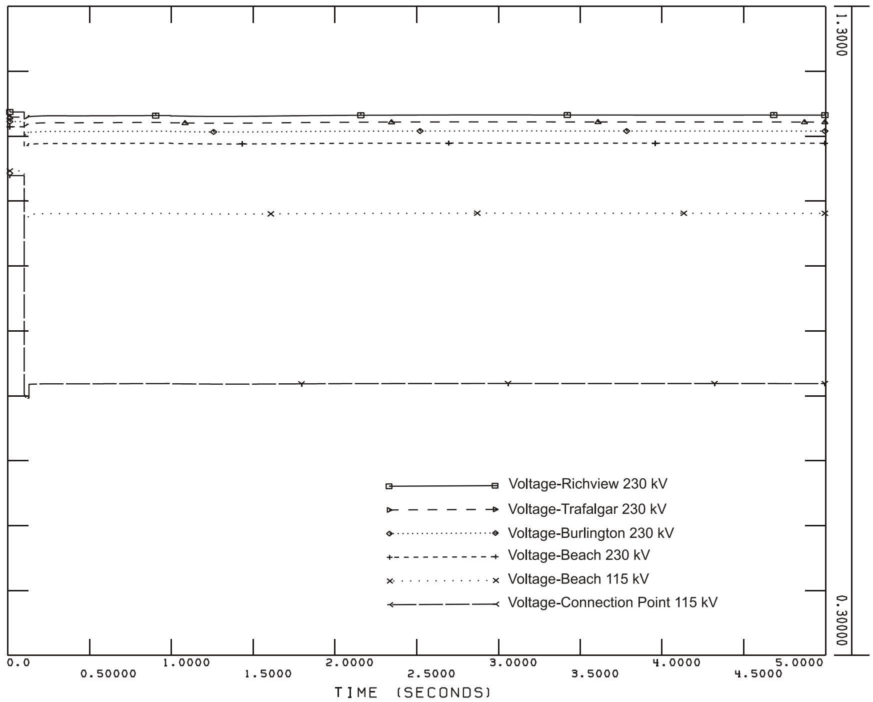

Figure 13: Major voltage responses following an un-cleared 3-phase fault on the collector bus of North Substation of the project

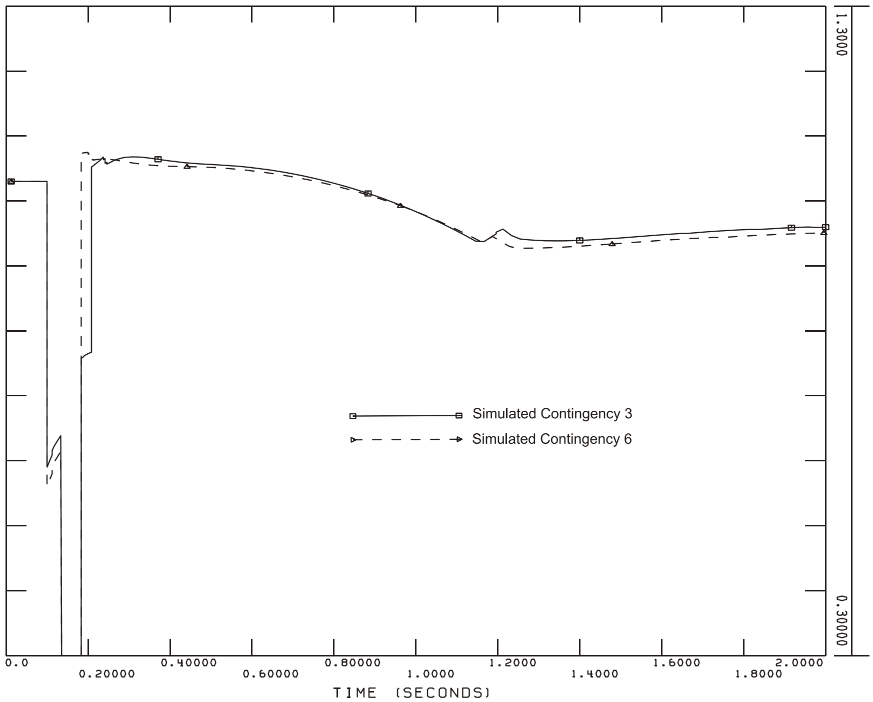

Figure 14: Terminal voltages of WTGs on collector C1 (South Substation) under simulated contingencies

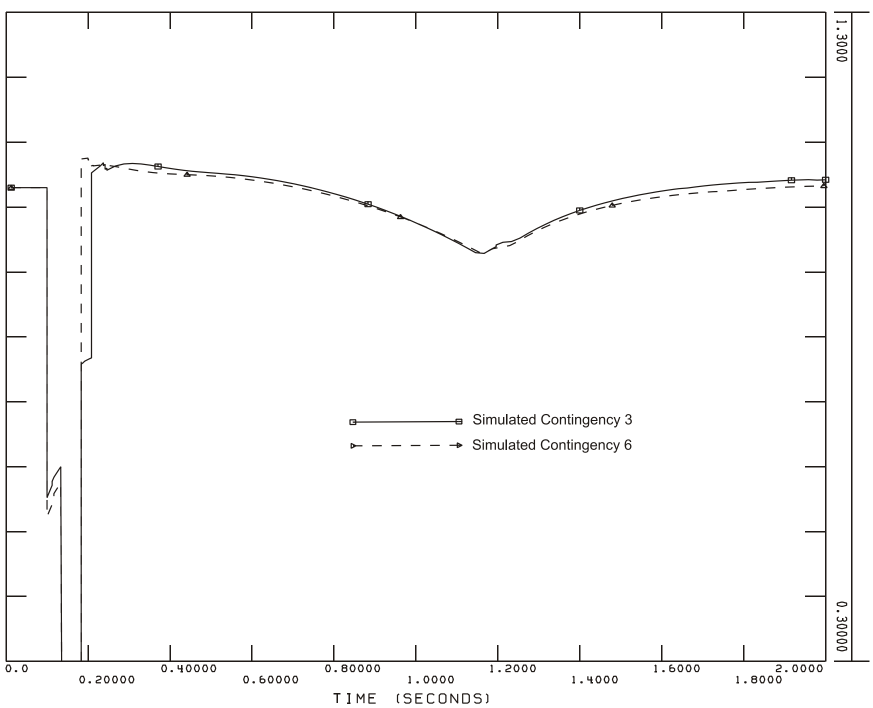

Figure 15: Terminal voltages of WTGs on collector C4 (North Substation) under simulated contingencies

-End of Document-

hydro one

Hydro One Networks Inc.
483 Bay Street
Toronto, Ontario
M5G 2P5

CUSTOMER IMPACT ASSESSMENT

Proposed 230 MW Niagara Region Wind Farm

Addendum

FIT-FLKZ509

Revision: **Final**

Date: **August 15th 2013**

Issued by: **Transmission System Department**
Transmission Projects Division
Hydro One Networks Inc.

Prepared by:

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Customer Impact Assessment – Niagara Region Wind Farm (FIT-FLKZ509) Addendum

Background

This document is an addendum to the Customer Impact Assessment titled "CIA - *Proposed 230 MW Niagara Region Wind Farm FIT-FLKZ509 – FINAL*" dated August 3rd 2012.

The proponent has confirmed on April 24th 2013 that:

- the collector system will be changed from a 44kV to 34.5kV collector system
- there are now two transformer substations with each having a 34.5kV to 115kV step up transformer with ULTC
- the transmission circuit to connect their substation to Hydro One's transmission system is longer in length with several underground 115kV sections.

The total number of wind turbines remains the same to maintain the original 230MW contractual output.

Studies were performed to assess the impact of the proposed changes on the Hydro One connected customer busses.

Short Circuit Impact

The Hydro One connected customer short circuit values are within the capability of the existing Hydro One facilities. The proposed changes have no material change from the previous arrangement.

Voltage Variations

The proposed changes have no material change from the previous arrangement.

Conclusion

The proposed connection of Niagara Region Wind Farm generating facility can be incorporated into the 115kV Q5G transmission line. Hydro One customers connected to this line will not be negatively impacted by this proposed connection. Short circuit levels and voltage variations as a result of switching the wind farm in and out of service are within acceptable limits.

Ontario Energy Board (Board Staff) INTERROGATORY #2 List 1

Interrogatory

Ref: Exhibit A/ Tab 2/Schedule 1

At the above reference, Hydro One states that it intends to apply for approval under the Class Environmental Assessment for Minor Transmission Facilities ("Class EA"). Has Hydro One applied for and received approval for the proposed facilities in accordance with the Class EA. When is the decision on the Class EA expected?

Response

Hydro One sent out notification letters to all parties potentially affected by the project, including affected First Nations and Métis Communities, stakeholders, elected officials, and relevant government ministries and agencies, informing them that the Class EA process was initiated. A copy of this letter has been included as Attachment 1 for ease of reference. At this time, Hydro One awaits any comments or concerns from the 30 day comment period. Once NRWC receives their Renewable Energy Approval, a screen-out report will be filed with the Ministry of the Environment. As long as the project is prepared in accordance to the approved Class EA process, the process is deemed complete and a decision is not required nor expected.

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Toronto, ON M5G 2P5

Tel: 1-877-345-6799

www.HydroOne.com

February 12, 2014

RE: Upgrade of existing idle 115 kV Transmission Line (Circuit Q5G) in Towns of Lincoln and Grimsby, and City of Hamilton to connect Niagara Region Wind Corporation project

Dear «First_Name»:

Hydro One Networks Inc. (Hydro One) has initiated a Class Environmental Assessment screening process to connect the Niagara Region Wind Corporation's (NRWC) project to Ontario's transmission system. This letter is to inform you that Hydro One's work is contingent on NRWC obtaining all the necessary approvals to build its wind farm. The project will involve upgrading approximately 25 kilometres of an existing 115 kV transmission line, which extends from Hydro One's Beach Transformer Station (TS) in the City of Hamilton, to Beamsville TS in the Town of Lincoln. The line is labeled Q5G on the attached map.

To reenergize the idle transmission line, Hydro One must refurbish some of the existing towers to accommodate for the higher capacity. The upgrades will involve increasing the height of some towers, upgrades to tower cross-arms and foundations plus replacing the existing conductor (wire) with a higher capacity conductor. Details of this work will be determined closer to the start of construction, and we will provide you with an update prior to the start of construction. The project also involves the construction of four new steel lattice structures to connect NRWC to the system. The connection point is represented as a triangle on the attached map.

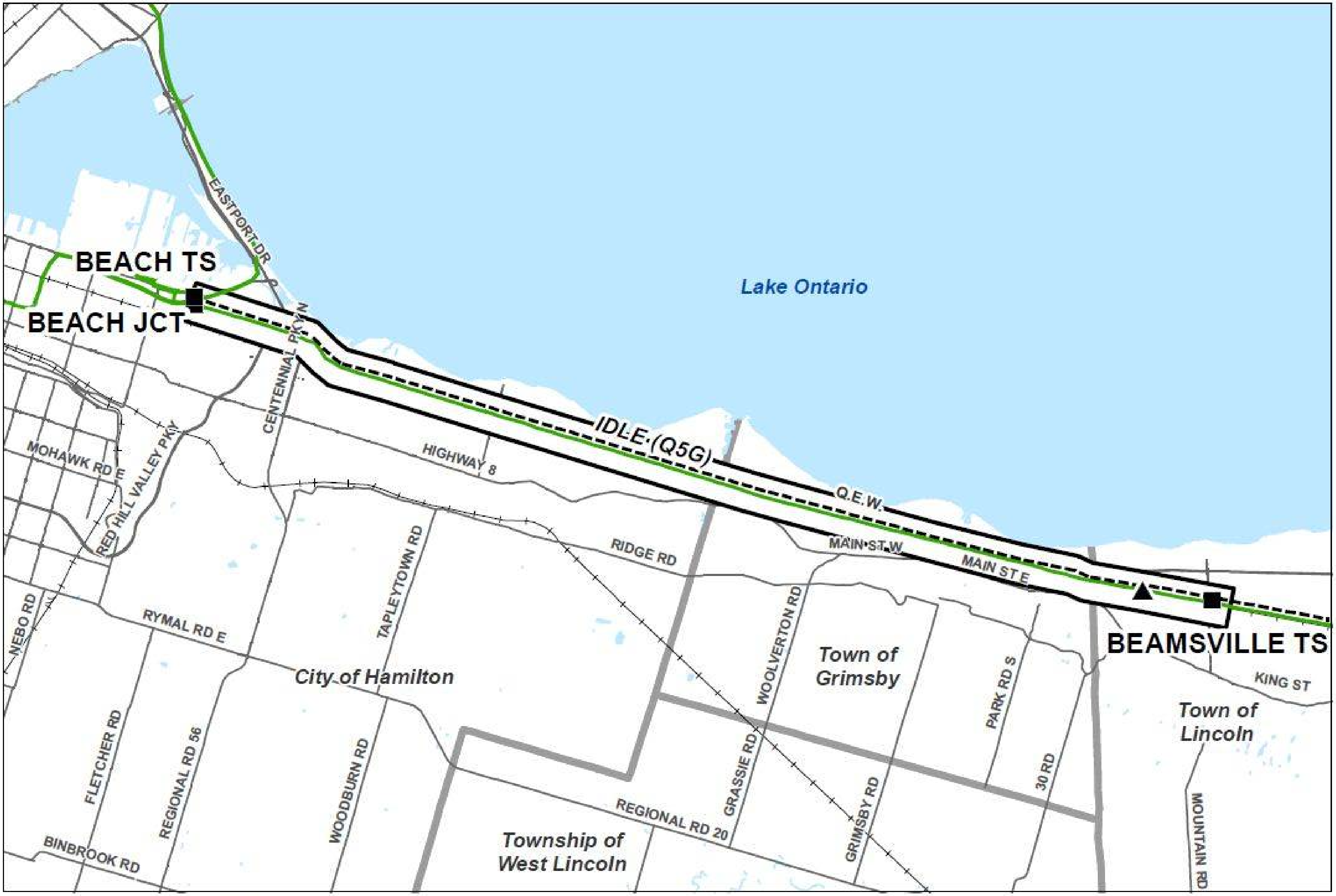
All work will be carried out by Hydro One crews within the existing corridor, and planned access will be accomplished using existing roads/trails. The appearance of the transmission line will not change significantly after the project is completed.

This project is carried out under the *Class Environmental Assessment (EA) for Minor Transmission Facilities,* approved under the provincial Ontario *Environmental Assessment Act*. This project is also subject to approval in accordance with Section 92 (Leave to Construct) of the *Ontario Energy Board Act*. Contingent on the outcome of the Class EA screening process, Section 92 process, and NRWC's required approvals, construction may begin in spring 2014 and be completed by summer 2015.

If you have any questions or concerns, I can be contacted at 1-877-345-6597 or by email at Communtiy.Relations@HydroOne.Com

Thank you,

Marylena Stea
Public Affairs
Hydro One Networks Inc



hydro one — inergi

Produce by: GIS Services, Inergi LP
Date: June 2013 / Revised: Jan 2014
Map12463_IDLE(Q5G)_ProjectArea_V2

▲ NRWC Connection Point
- - - IDLE (Q5G) - Transmission Line
— 115 kV Transmission Lines
■ Transformer Station
▭ Project Area
Water
Municipal Boundaries

Niagara Region Wind Corp.
PROJECT AREA

1:125,000 — 0 — 2.5 — 5 km

Ontario Energy Board (Board Staff) INTERROGATORY #3 List 1

Interrogatory

Ref: Exhibit B/Tab 5/Schedule 2

Please update the Line Construction and In-service Schedule at the above reference.

Response

On March 7, 2014, Hydro One was informed by NRWC that NRWC would not be willing to execute an agreement to reimburse Hydro One for required expenditures to advance and complete work such as detailed engineering activities ahead of an REA Approval for NRWC's project. As such, no update to the Line Construction and In-service Schedule can be provided at this time. Once an agreement between Hydro One and NRWC is reached, Hydro One will provide an updated schedule to the Board.