EB-2013-0047

ONTARIO ENERGY BOARD

IN THE MATTER OF the *Ontario Energy Board Act, 1998,* S.O. 1998, c.15, Schedule B;

AND IN THE MATTER OF an application by Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P., Northland Power Solar Abitibi L.P., and Northland Power Solar Long Lake L.P. (the "Applicants"), to the Ontario Energy Board (the "Board") dated February 12th, 2013 under section 92 of the Act for an order of the Board granting leave to construct transmission facilities (the "Application") to connect four groundmount solar generation projects to the Ontario transmission system (the "Project").

APPLICANTS' REPLY SUBMISSION

Delivered June 14, 2013

INTRODUCTION

The Application

1. The Applicants are in the business of developing, constructing, owning and operating renewable generation projects and related facilities. Each of the four Applicants is constructing one 10 MW ground mount solar electricity generation facility in the vicinity of the Town of Cochrane, and each of the four generation facilities is subject to an Ontario Power Authority ("OPA") Feed-in Tariff ("FIT") contract (the four generation projects are collectively referred to as the "Generation Projects").

2. Each of the Applicants is a limited partnership constituted under the laws of the Province of Ontario. The Applicants' general partners are Northland Power Solar Empire GP Inc., Northland Power Solar Martin's Meadows GP Inc., Northland Power Solar Abitibi GP Inc., and Northland Power Solar Long Lake GP Inc., and each general partner is a wholly owned subsidiary of Northland Power Inc. ("NPI"). NPI and Northland Power Limited Partner Holdings Inc. are the limited partners, holding 99.9% and 0.1% limited partner interest, respectively, in each of the Applicants.

3. On February 12, 2013, the Applicants filed the current Application with the Board under sections 92, 96(2), and 97 of the *Ontario Energy Board Act, 1998*, S.O. 1998, c.15, Schedule B (the "OEB Act"). The Applicants have applied for an order of the Board granting leave to construct an electricity transmission line and related facilities which will connect the four Generating Projects to the provincial transmission system. The Applicants are also seeking Board approval of the form of easement agreements that have been or will be offered to affected landowners.

4. As Board Staff note at page 1 of their May 31, 2013 submission in this proceeding, the Applicants have a co-ownership agreement in place for the transmission line and associated transmission facilities that are the subject of this Application (referred to as the "Transmission Facilities"). The Transmission Facilities are as follows:

    - The Main Transformer Substation;
    - The Calder Transformer Substation;

- Approximately 22 kilometres of 115 kilovolt ("kV") above-ground Transmission Line, and 500 metres of underground transmission cable (Segment A and Segment B);
- A Transition Station;
- The Calder Switching Station ("Calder SS"); and
- An Interconnection Point to 115 kV circuit C2H owned by Hydro One Networks Inc. ("Hydro One")

5. At Exhibit B, Tab 1, Schedule 1, page 6, the Applicants describe the ownership structure for the Transmission Facilities as follows:

(a) Northland Power Solar Empire L.P., Northland Power Solar Martin's Meadows L.P., and Northland Power Solar Abitibi L.P., will each own:

(i) one-third of (a) the Main TS, and (b) the twenty one (21) kilometers of aboveground transmission line;

(ii) one-third of Segment A consisting of approximately 350 metres of underground transmission line connecting the Main TS to the Calder SS; and

(iii) a 25% interest in the Calder SS.

(b) Northland Power Solar Long Lake L.P. will own:

(i) 100% of the Calder TS;

(ii) 100% of Segment B consisting of the aboveground transmission line connecting the Calder TS to the Calder SS; and

(iii) a 25% interest in the Calder SS.

6. NPI shall be responsible for the operation and maintenance of the Transmission Facilities pursuant to the terms of an Operations and Maintenance Agreement with the Applicants.

7. The Applicants will own and pay for all aspects of the Transmission Facilities. These elements are discussed in greater detail in Exhibit D, Tab 1, Schedule 1 of the Application "Project Details", and at Exhibit B, Tab 1, Schedule 1, pages 3-6, paragraphs 8-18 of the Application ("Description and Location of Transmission Facilities"). As discussed at Exhibit F, Tab 1, Schedule 1 of the Application ("Land Matters"), "The Applicants elected to route the Transmission Line, wherever possible, on the municipal road allowances to minimize interference with private land in the area. Along the southern shore of Lower Deception Lake the Applicants entered into an option to purchase the property, in order to move the line into an easement on private property,

and well away from the shore and road, in order to mitigate visual concerns raised by some of the nearby residents."

Overview of the Proceeding

8. As noted above, the Applicants filed the Application on February 12, 2013. The Board issued a Notice of Application and Written Hearing on March 7, 2013. On April 8, 2013, the Board issued Procedural Order No. 1, outlining the scope of the Board's jurisdiction, granting the Applicants' request to afford certain information confidential status, and setting out a schedule for a round of interrogatories. The Board also granted an intervention request from the Independent Electricity System Operator (the "IESO"). The Applicants responded to the interrogatories as directed in Procedural Order No. 1.

9. On May 23, 2013, the Board issued Procedural Order No. 2, in which it ordered that the IESO and Board staff were to file final submissions with the Board and deliver them to the Applicant and all other parties on or before Friday, May 31, 2013, and that the Applicants, with input from HONI as necessary, were to file with the Board and deliver to the IESO their Reply Submission, on or before Monday, June 10, 2013.

10. On May 31, 2013, the Applicants received the submission of Board Staff. The IESO did not file a submission. On June 10, 2013, the Applicants wrote to the Board to advise that in the Board staff submission, Board staff had identified two matters in respect of which Hydro One input is required. The Applicants advised that they had been in contact with HONI about these matters, but it appeared that it would take some additional time to complete the discussions with Hydro One and address the matters identified by Board staff in the Applicants' Reply. The Applicants requested that the Board extend the deadline for the filing of the Reply, and advised that they anticipated being in a position to deliver the Reply by the week of June 17, 2013. By letter dated June 12, 2013, the Board extended the Applicants' filing deadline to June 19, 2013.

11. The Applicants' reply to the Board Staff submission is set out below. As noted in the conclusion, below, the Applicants respectfully request that the Board grant the relief requested in the Application, including granting leave to construct the Transmission Facilities and the approval of the forms of land-related agreements provided in the Application.

SUBMISSIONS OF THE APPLICANTS

(a) General

12. At pages 2-3 of the Board Staff submission, Board Staff discuss the scope of the Board's consideration of the public interest in electricity leave to construct applications, as defined by Section 96(2) of the OEB Act. Board Staff conclude that "the Applicants' pre-filed evidence and the answers received to all the interrogatories, except for a response to one interrogatory as discussed below, clarifying key aspects of the Application, have shown that the construction of the transmission line is in the public interest."

13. At page 9 of the Board Staff submission, Board Staff also confirm that they are "satisfied that all needed land rights and related agreements have been concluded with landowners".

14. At page 10 of their submission, Board Staff concluded that:

> "Notwithstanding the concerns on whether all of the Transmission Facilities are covered by the connection agreement with Hydro as outlined earlier, it is Board staff's submission that the Applicants have shown that the transmission lines and related facilities meet the test articulated in section 96(2) of the Act. In particular that the construction of the transmission lines and related facilities are in the interests of consumers with respect to prices and the reliability and quality of electricity service, and is consistent with the promotion of the use of renewable energy sources in a manner consistent with the policies of the Government of Ontario."

15. The Applicants agree with the Board Staff conclusions. Accordingly, there are only two matters identified by Board Staff that the Applicants must address in this reply – these matters are discussed at sections B.1 and B.3 of the Board Staff submission.

(b) Section B.1 of the Board Staff Submission

16. In Section B.1, Board Staff note that in an interrogatory response (to Staff Interrogatory #2, the response to which was prepared in consultation with Hydro One), the Applicants indicated that a single Connection Agreement will be concluded between the Applicants and Hydro One. Board Staff are concerned because (in their view) "it is not clear that the proposed Connection Agreement will cover all of the Transmission Facilities that comprise the project." Again in the view of Board Staff,

"If the Connection Agreement only encompasses the Calder Switching Station, then Board staff is concerned that there is a "gap", and that the remainder of the Transmission Facilities will not be covered by either the Connection Agreement or, by reference, by the TSC. In the short term this would likely not be a great concern – the CIA and SIA for the project (discussed in further detail below) do not reveal any problems with the current configurations. In the future, however, it is possible that TSC standards may change. In such a scenario, it is not clear that the transmitter (Hydro One) would have the power to require upgrades to any Transmission Facilities that are not subject to the Connection Agreement.

A potential solution to this issue would be to specify in the Connection Agreement which Transmission Facilities are covered. Alternately, separate Connection Agreements could be entered into with the individual Applicants for the individual elements of the Transmission Facilities.

Board staff requests that the Applicants, in consultation with Hydro One as necessary, describe their understanding of which Transmission Facilities will be captured by the Connection Agreement in their reply argument. To the extent that not all of the Transmission Facilities are covered, Board staff asks that the Applicants discuss their views relating to staff's concerns about the noted "gap". Board staff recognizes that this issue is not unique to the current application, however, Board staff is of the view that the Board should address this matter in its decision for this application to ensure there is no confusion going forward."

17. The Applicants have discussed this matter with Hydro One. Hydro One provided the following response by email:

"Hydro One's Comments on Board Staff Submission (B.1)

In accordance with section 4.1.1 of the Transmission System Code (TSC), when a transmitter connects a customer's facilities to the transmitter's transmission system, a Transmission Connection Agreement (TCA) is executed between the transmitter and the directly connected customer.

However, strictly speaking, the TCA applies only to those facilities that are owned by the directly connected customer. As such, the transmitter rightly has no contractual relationship with any embedded customers, i.e. third parties that may in turn be connected (directly or indirectly) to the facilities of the directly connected customer. The facilities owned by these embedded customers are therefore arguably not covered by the TCA.

In Northland Power's case then, only those facilities jointly owned by all of the four parties signing the TCA would be covered by the TCA. Specifically, this means that only Calder SS and the segment of transmission line that connects Calder SS to Hydro One's transmission system would be captured by the TCA.

Hydro One agrees with Board Staff that this represents a gap in the standard form of the TCA in terms of the obligations to the transmitter of directly connected customers in respect of embedded customers and their facilities. However, it is not clear to Hydro One that either specifying "all" transmission facilities in the TCA or executing a separate TCA

with each of the four individual Applicants would be sufficient or appropriate to fully address all of the issues.

Furthermore, Hydro One believes that other gaps may also exist in the TSC and the TCA with respect to embedded and other customers beyond the specific issues raised with this particular connection in this proceeding, and that there may be benefit in a separate examination of the TSC and the TCA outside of this proceeding (to avoid delaying Northland Power's Section 92 application to deal with these broader issues). Hydro One would be prepared to work with the Board, Board Staff and stakeholders to address these generic issues that impact on both existing and future TCAs."

18. The Applicants have considered the Hydro One comments. The Applicants agree that they will be transmission customers of Hydro One by virtue of the connection of their assets to the Hydro One transmission system. They also understand Hydro One's comment that if a third party were to connect to their system, the third party would be considered embedded in relation to Hydro One, and would not be considered a Hydro One transmission customer.

19. However, no third party connections to the Applicants' transmission facilities are planned. The Applicants will be Hydro One transmission customers and will be subject to the requirements of the Transmission Connection Agreement, and these requirements include those set out in Section 24 (Facility Standards), which provides, in part:

"24.1 …The Customer shall ensure that its facilities:

(a) meet all applicable requirements of the Ontario Electrical Safety Authority, subject to any exemption that may have been granted to or that may apply to the Customer;

(b) conform to all applicable industry standards, including those of the Canadian Standards Association, the Institute of Electrical and Electronic Engineers, the American National Standards Institute, and the International Electrotechnical Commission (IEC);

(c) are constructed, operated and maintained in accordance with this Agreement, the Customer's licence, the Market Rules, all applicable reliability standards and good utility practice;

(d) where they are connection facilities, are made by it with due regard for the safety of the Customer's employees and the public;

(e) where they are connection facilities, are made by it on a timely basis and are designed and constructed by it in accordance with the applicable provisions of the Transmitter's Board-approved connection procedures or, in the absence of such Board-approved connection procedures, in accordance with section 6.1.8 of the Code; and

(f) where they are connection facilities, do not materially reduce the reliability or performance of the Transmitter's transmission system and are constructed with such mitigation measures as may be required so that no new available fault

> current level exceeds the maximum allowable fault levels set out in Appendix 2 of the Code if this would have an adverse effect on the Transmitter. Where the new available fault current level would exceed the maximum allowable fault level set out in Appendix 2 of the Code and would have an adverse effect on the Transmitter the Customer may, as an alternative, make suitable arrangements with the Transmitter to mitigate the economic or financial impact of allowing the new available fault current level to exceed the maximum allowable fault level set out in Appendix 2 of the Code. Such arrangements shall be consistent with the cost responsibility principles set out in the Code.
>
> 24.2. The Customer shall ensure that those of its facilities that are connected to the Transmitter's transmission system, other than the facilities identified in section H.1 of Schedule H, comply with the basic general performance standards and technical requirements set out in the Code, including in Appendix 2."

20. The Applicants submit that even if a third party were to connect to their transmission system, the Applicants would be required to maintain their own system in such a manner as to avoid material reductions in the reliability or performance of the Hydro One system. While the Applicants can understand a concern about a potential third party connection, the Applicants submit that the Transmission Facilities that are the subject of this Application do not create a risk to the Hydro One system. This is supported by the findings of the SIA and the CIA, and their respective addenda.

21. The Applicants agree with Hydro One's comment that it is not clear that either specifying all of the Transmission Facilities or executing a separate TCA with each of the four individual Applicants would be sufficient or appropriate to fully address all of the issues. In either case, there exists the possibility of a third party connection to a single Applicant's system or the jointly owned system (although the Applicants again note that no third party connections are planned). To the extent that this may be considered a concern, the concern exists whether there is one agreement or four. However, the Applicants submit that with the ownership structure set out in the Application, it is more reasonable and appropriate to have a single TCA to which all of the Applicants are parties.

22. Finally, while the Applicants are not in a position to comment on whether "other gaps may also exist in the TSC and the TCA with respect to embedded and other customers beyond the specific issues raised with this particular connection in this proceeding" as suggested by Hydro One, the Applicants do suggest (consistent with Hydro One's comments) that it would be more appropriate to consider any such matters "in a separate examination of the TSC and the TCA outside of this proceeding (to avoid

delaying Northland Power's Section 92 application to deal with these broader issues)". As Hydro One notes, these are generic issues that impact on both existing and future TCAs (presumably the possibility of third parties becoming embedded in relation to unlicensed transmitters exists in many cases), and they should not be considered an impediment to the Board's approval of this Application.

(c) Section B.3 of the Board Staff Submission

23. As discussed in Section B.3 of the Board Staff submission, the IESO issued a draft 2nd Addendum to its System Impact Assessment (the "SIA") on May 20, 2013 in response to the Applicants' decision to combine the energy generated by the four Generation Facilities at the 27.6 kV bus of the Main TS, and to reduce the required step-up transformers from three to one. This was contemplated in the pre-filed evidence.[1] Board Staff summarize the findings of the 2nd Addendum at page 7 of their submission as follows:

> "At page 1 of the (2nd Addendum) SIA report, it is indicated that the IESO and Hydro One have examined the proposed change and concluded that it is not materially different from the first Addendum's application data, as the equivalent impedance of the new transformer is similar to that of the three single transformers previously assessed. That 2nd Addendum SIA Report also indicated that the IESO recommends that a Notification of Conditional Approval for Connection be issued for the proposed connection of Northland Power Solar Long Lake, Abitibi, Martin's Meadows and Empire, operating up to 40MW, subject to implementation of the requirements outlined in the previous SIA reports."

24. At page 7 of the Board Staff submission, Board Staff express their satisfaction "with the 2nd Addendum SIA Report's conclusion that the project will have no material adverse impact on the reliability of the integrated power system", but go on to express their expectation "that Hydro One will confirm by filing a letter with the Board that the noted proposed changes contemplated in the pre-filed evidence, will have no negative impact on its transmission system or any customers connected in the vicinity of the proposed Calder SS."

25. The Applicants have discussed this matter with Hydro One, and have received a letter dated June 10, 2013 from Hydro One which confirms the following:

[1] Ex.B/Tab 1/Sched. 1/pp. 3-4/paras. 12-13

- In accordance with Customer Impact Assessment ("CIA") Addendum #2 for Martin's Meadows, Abitibi and Empire, and with CIA Addendum #2 for Long Lake, "there will be no impact on Hydro One's transmission system or on customers connected to neighbouring circuits as a result of the proposed connection"; and

- That "Hydro One's preliminary assessment indicates that no negative impact is expected on Hydro One's transmission system or on any customers connected to the 115 kV C2H transmission line as a result of the proposed transformer change from three units to one unit within the Northland Power facility."

26. A copy of the Hydro One letter, which in turn includes copies of CIA Addendum #2 for Martin's Meadows, Abitibi and Empire; Addendum #2 for Long Lake; and Draft CIA Addendum #3 related to the proposed change from three transformer units to one transformer unit, accompanies this submission as Attachment 1. The Applicants note that Hydro One indicates in that letter that customer comments on the Draft Addendum #3 are due by June 14, 2013, and that Hydro One anticipates that Hydro One expects to complete its assessment by the end of this month. The Applicants will deliver a copy of the final version of CIA Addendum #3 when it is received from Hydro One.

27. As is clear from the Hydro One letter, there are no negative impacts on Hydro One's transmission system or on customers connected to the Hydro One C2H circuit as a result of the connection of the facilities that are the subject of this Application.

(d) Conditions

28. The Applicants would anticipate that the Board would append a list of Conditions of Approval to its Decision approving the Application. For the Board's reference, the Applicant notes that in response to Board Staff Interrogatory No. 3, the Applicant provided information on the status of required permits and approvals for completion of the Transmission Facilities.

CONCLUSION

29. As stated by the Board in Procedural Order No.1, applicable legislation and Board practice, the scope of the Board's mandate in a leave to construct proceeding is narrow.

The Applicants have demonstrated the need for the Transmission Facilities, which need is consistent with the promotion of the use of renewable energy sources. The Applicant has also demonstrated that because the costs related to the construction and operation of the Transmission Facilities will be the responsibility of the Applicant, rate payers will not be adversely affected. The IESO and Hydro One, through the SIA and CIA including addenda thereto and Hydro One's correspondence appended to this submission, have demonstrated that the construction and operation of the Transmission Facilities is not anticipated to have an adverse impact on reliability or the quality of electricity service.

30. The Applicant therefore requests that the Board grant the relief requested in the Application, including granting leave to construct the Transmission Facilities and the approval of the forms of land-related agreements provided in the Application.

ALL OF WHICH IS RESPECTFULLY SUBMITTED THIS 14TH DAY OF JUNE, 2013

Northland Power Solar Empire L.P.
Northland Power Solar Martin's Meadows L.P.
Northland Power Solar Abitibi L.P.
Northland Power Solar Long Lake L.P.
By their Counsel
Borden Ladner Gervais LLP
Per:

Original Signed by James C. Sidlofsky

James C. Sidlofsky

TOR01: 5206598: v4

ATTACHMENT 1 TO APPLICANTS' REPLY SUBMISSION:

COPY OF HYDRO ONE LETTER DATED JUNE 10, 2013

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

June 10, 2013

Re: Application for Leave to Construct Transmission Facilities by:

- **Northland Power Solar Empire L.P.;**
- **Northland Power Solar Martin's Meadows L.P.;**
- **Northland Power Solar Abitibi L.P.; and**
- **Northland Power Solar Long Lake L.P.**

(collectively "Northland Power")

Application Board File Number EB-2013-0047

Attached are a copy of Customer Impact Assessment Addendum #2 for Martins Meadows #FQJ0FUC, Abitibi #FAQLBA0, Empire #FM5F42U and Customer Impact Assessment Addendum #2 for Long Lake #FE8GSGA, both dated May 16, 2013, and issued to Northland Power by the IESO on May 28, 2013. Hydro One Networks Inc. ("Hydro One") confirms that in accordance with the said two attachments, there will be no impact on Hydro One's transmission system or on any customers connected to neighbouring circuits as a result of the proposed connection.

Also attached is a copy of the draft Customer Impact Assessment Addendum #3 for Martins Meadows #FQJ0FUC, Abitibi #FAQLBA0, Empire #FM5F42U and Long Lake #FE8GSGA dated March 11, 2013, which was circulated for customer comment on May 15, 2013. Hydro One's preliminary assessment indicates that no negative impact is expected on Hydro One's transmission system or on any customers connected to the 115 kV C2H transmission line as a result of the proposed transformer change from three units to one unit within the Northland Power facility. Customer comments on the draft CIA Addendum #3 are due on June 14, 2013, and Hydro One expects to complete its assessment by the end of June.

Yours truly,

John Sabiston
Manager, Transmission Planning

encls

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

May 16, 2012

Addendum #2

Customer Impact Assessment - Northland Power

(Martins Meadows #FQJ0FUC, Abitibi #FAQLBA0, Empire #FM5F42U)

Background

This document is an addendum to the Customer Impact Assessment titled *CIA-Northland Power (Martins Meadows-Abitibi-Empire (#FQJ0FUC,FAQLBA0,FM5F42U)-FINAL* dated January 5, 2011.
This document replaces the previous addendum dated June 27, 2011

Reason for Addendum

Northland Power will not proceed with the connection of the 30MW solar generating facility (Abitibi / Martins Meadows / Empire) to the Hydro One A5H circuit. This generating project will be connected to the Hydro One C2H circuit. Study results for this connection can be found in *CIA - Addendum #2 – Long Lake #FE8GSGA*

Conclusion

The Northland Power solar generating facility (Long Lake, Martins Meadows, Abitibi, and Empire solar farms) can be incorporated into the 115kV C2H transmission line.

Hydro One customers connected to neighboring circuits will not be impacted by this proposed connection. Short circuit levels and voltage variations are within acceptable limits.

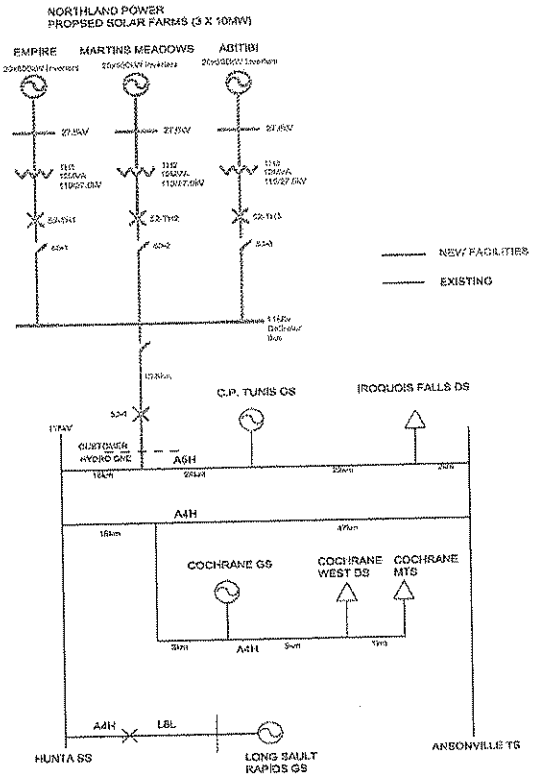

Figure 1- Original Proposal for 30MW Northland Power Solar Farm Connection to Hydro One A5H circuit

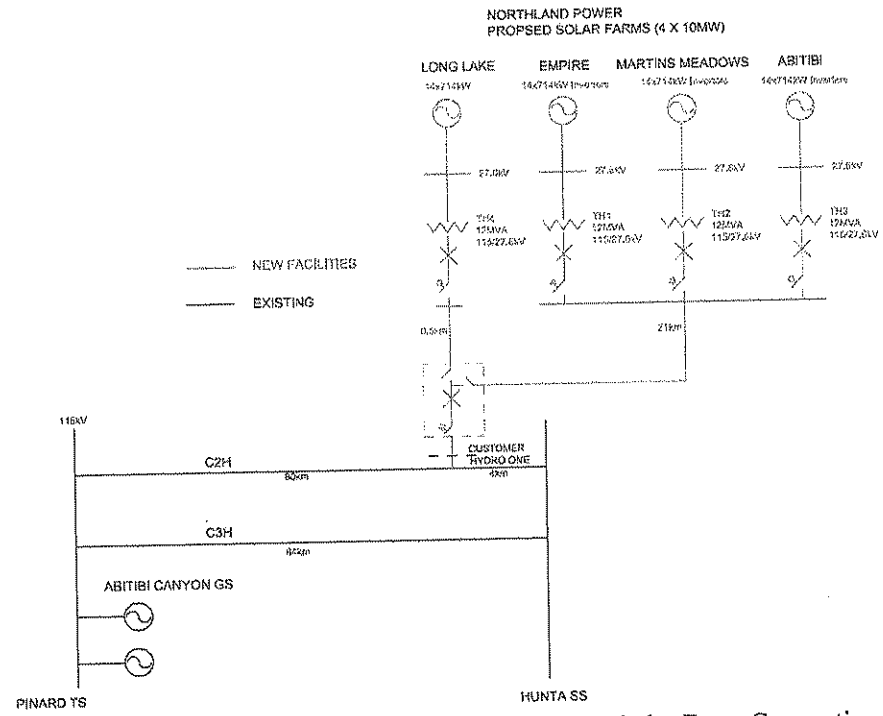

Figure 1 – Proposed Application for Northland Power Solar Farm Connection to Hydro One C2H circuit. (40MW Total)

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

May 16, 2012

Addendum #2

Customer Impact Assessment - Northland Power
(Long Lake #FE8GSGA)

Background

This document is an addendum to the Customer Impact Assessment titled *CIA-Northland Power (Long Lake (#FE8GSGA)-FINAL* dated January 5, 2011.
This document complements the previous addendum dated June 27, 2011

Reason for Addendum

Northland Power confirmed on November 21, 2011 that in addition to the existing 10MW *Long Lake LP Solar Farm* application, 3x10MW solar farms will also be constructed, increasing the total generating capacity of the Northland Power facility from 10MW to 40MW.

As seen in figure 1, the Long Lake Solar farm will connect to the Hydro One system through a customer owned switching station. Three other solar farms (Abitibi, Martins Meadows, Empire) will also connect to the switching station via a 21km transmission line. The customer switching station will consist of a motorized disconnect switch and a circuit breaker which will be used to isolate the entire Northland Power facility during faults or maintenance activities.

Hydro One is presently working to re-terminate the 115kV C2H / C3H circuits from Abitibi Canyon SS to Pinard TS. This reconfiguration is expected to be completed prior to Northland Power energizing their 40MW generating facility, thus, all studies below have taken this reconfiguration into consideration.

Short Circuit Impact

1) Short circuit values shown are shown in the table below.

Fault Level Locations	Bus Voltage (kV)	Existing				With Northland Power Facility I/S on C2H (40MW)			
		3-Phase		Line-Ground		3-Phase		Line-Ground	
		Fault Current (kA)	Asym Current (kA)	Fault Current (kA)	Asym Current (kA)	Fault Current (kA)	Asym Current (kA)	Fault Current (kA)	Asym Current (kA)
Pinard TS	115	5.64	6.60	5.55	6.49	5.79	6.76	5.65	6.57
Hunta SS	115	9.32	9.32	5.88	5.91	10.0	10.0	6.04	6.10
C2H Tap	115	7.88	7.88	4.93	4.93	8.54	8.54	5.10	5.10
Abitibi Canyon GS	115	5.59	6.67	5.77	7.04	5.74	6.82	5.87	7.15

*Existing scenario assumes all other FIT projects In-Service
*Study assumes C2H will be terminated at 115kV Pinard SS. Original CIA assumed C2H termination at Abitibi Canyon GS.

Result
Customer Busses are not significantly impacted by the incorporation of the 40MW Northland Power Solar Generating facility on the C2H Hydro One circuit.

2) Short Circuit at Previously Identified Stations

Station	Voltage (kV)	3P Fault (kA Symm)			SLG Fault (kA Symm)		
		Without NP Facility	With NP Facility	Difference	Without NP Facility	With NP Facility	Difference
Martindale Z Bus	44	15.13	15.13	0	20.03	20.03	0
Windsor Walker TS#1	27.6	17.57	17.57	0	3.50	3.500	0
Kingsville TS	27.6	16.91	16.91	0	11.92	11.92	0
Caledonia TS	27.6	16.53	15.53	0	9.91	9.91	0

* All FIT projects with a queue position that precedes NP, is assumed I/S
* NP – Northland Power Facility (Long Lake, Abitibi, Martins Meadows, Empire)

Result
Short Circuit values at the above busses are not impacted by the incorporation of Northland Power facility on the C2H circuit.

Voltage Variations

115kV Bus	NP O/S (kV)	NP I/S (kV)	ΔV post ULTC (%)	Loss of NP Facility pre-ULTC (kV)	ΔV pre ULTC (%)
	All Elements I/S				
Canyon GS	129.24	130.17	0.72	129.28	-0.68
Hunta SS	127.67	128.91	0.97	127.71	-0.93
Pinard TS	125.95	126.91	0.76	125.98	-0.73
C2H Tap	127.67	128.99	1.03	127.71	-0.99
	L21S O/S				
Canyon GS	130.14	130.99	0.65	130.11	-0.67
Hunta SS	128.86	130.00	0.88	128.84	-0.89
Pinard TS	126.87	127.74	0.69	126.84	-0.70
C2H Tap	128.88	130.01	0.88	128.84	-0.90
	A4H O/S				
Canyon GS	128.35	129.94	1.24	128.74	-0.92
Hunta SS	126.54	128.59	1.62	127.00	-1.24
Pinard TS	125.05	126.66	1.29	125.44	-0.96
C2H Tap	126.55	128.61	1.63	127.01	-1.24

Table 3 – Voltage Variations on Customer Busses

*NP (Northland Power Generating Facility – 40MW – Long Lake, Abitibi, Martins Meadows, Empire)
*Base case study voltage 118.05kV on the Hydro One 115kV system
*Study assumes C2H will be terminated at 115kV Pinard SS
*Inverters capable of operating 0.9 lag – 0.95 lead pf. (above table assumed 0.9 lag)

Result

Voltage variations at customer busses are within acceptable limits with the incorporation of the 40MW Northland Power solar generating facility on the 115kV C2H circuit. Voltage results for original application can be found in Customer Impact Assessment dated January 5, 2011 page 7.

Conclusion

The Northland Power solar generating facility (Long Lake, Martins Meadows, Abitibi, and Empire solar farms) can be incorporated into the 115kV C2H transmission line.

Hydro One customers connected to this line will not be impacted by this proposed connection. Short circuit levels and voltage variations are within acceptable limits.

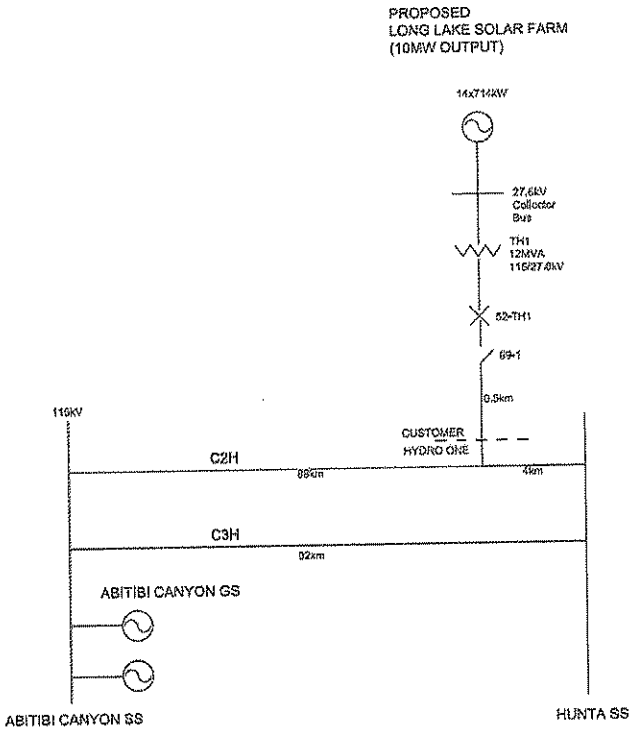

Figure 1 – Original Application for 10MW Northland Power Solar Farm Connection to Hydro One C2H circuit

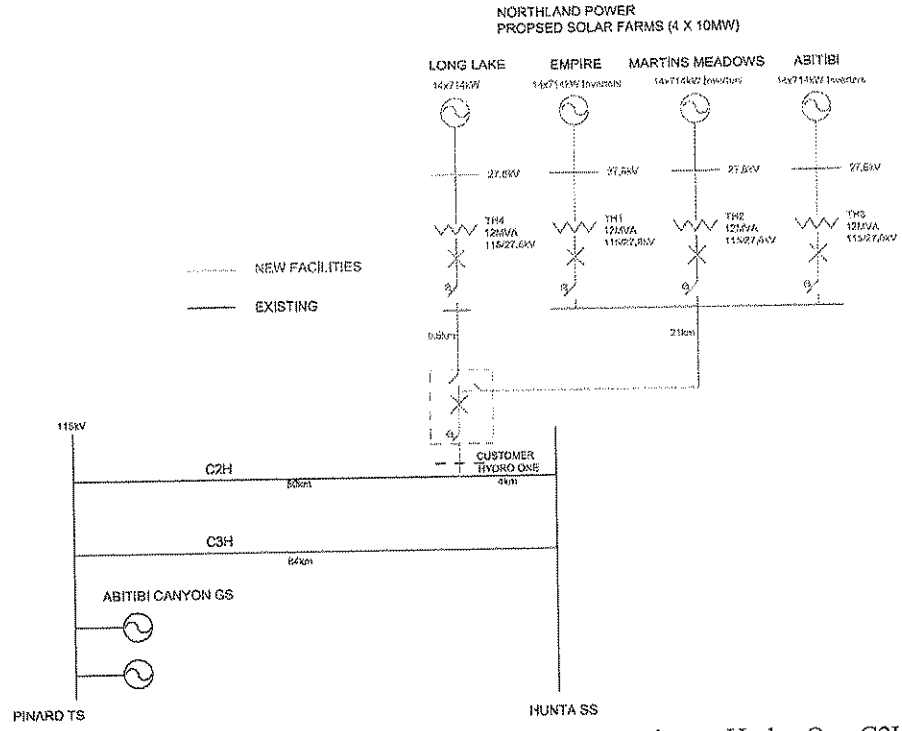

Figure 2- Proposed Northland Power Solar Farm Connection to Hydro One C2H circuit (40MW Total)

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

March 11, 2013

Addendum #3

Customer Impact Assessment - Northland Power
(Long Lake, Martins Meadows, Abitibi, Empire – FE8GSGA / FQJ0FUC / FAQLBA0 / FM5F42U)

Background

This document is an addendum to the Customer Impact Assessment titled *CIA - Northland Power (Long Lake LP #FE8GSGA)- FINAL* dated January 5, 2011.

This document complements the previous addendum #2 dated May 16, 2012

The proponent has confirmed on March 6, 2013 that the three transformers (10MVA Z=9% each) supplying Martins Meadows / Abitibi / Empire solar farms will be replaced with one larger unit (27MVA, Z=9%). The three individual solar farms will now be connected to a common 27.6kV collector bus as shown in figure 1.

Short Circuit Impact

1) Short Circuit - The proposed changes will not result in a change to the short circuit values on the Hydro One connected customer busses.

2) Short Circuit at previously identified stations - The proposed changes will not have a short circuit impact to the area busses.

Voltage Variations

The proposed change does not have impact on voltage variations.

Conclusion

The proposed transformer change within the Northland Power customer substation is acceptable to Hydro One. Hydro One customers connected to this line will not be impacted by this proposed change. Voltage variations as a result of switching the solar farm in and out of service are within acceptable limits.

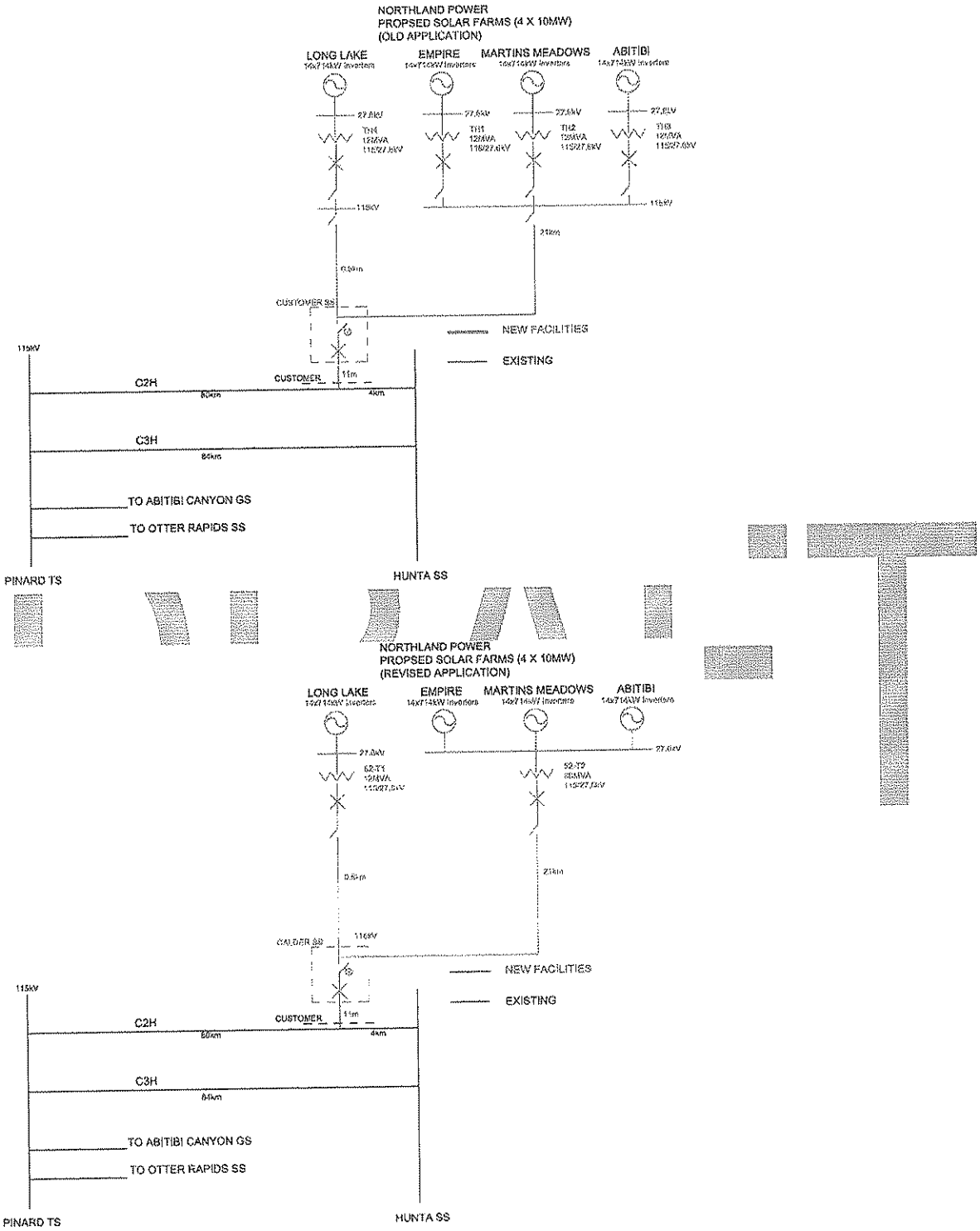

Figure 1 – Proposed changes to Northland Power Solar Farm