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Susan Frank
Vice President and Chief Regulatory Officer
Regulatory Affairs

BY COURIER

March 11, 2008

Mr. Alex Monem
Barrister and Solicitor
Harbord House
546 Euclid Avenue
Toronto ON M6G 2T2

Dear Mr. Monem:

EB-2007-0050 – Hydro One Networks' Section 92 Bruce - Milton Transmission Reinforcement Application – Hydro One Networks' Response to Interrogatory Questions from Saugeen Ojibway First Nations

I am attaching an electronic copy and a paper copy of the responses to the interrogatory questions of Saugeen Ojibway First Nations.

Intervenors and the OEB are being provided electronic copies. CDs are available on request

Sincerely,

ORIGINAL SIGNED BY ANDREW PORAY FOR SUSAN FRANK

Susan Frank

c. Kirsten Walli, Ontario Energy Board
EB-2007-0050 Intervenors (by email)
M. Heinz, Ontario Power Authority (by email)

Saugeen Ojibway First Nations INTERROGATORY #1 List 1

Interrogatory

Ref. Exh. *B/T' 6/S* 6/Appendices 1,2,5 [and *10/15/07* Tech. Conference at 22:4 - 24:2]
Issne Nnmber: 1.1

1.1 Issue: Has the need for the proposed project been established?

In 1985, the Hydro One transmission system was designed to be adequate for eight units at Bruce for the condition of the study at that time. Please state why today's transmission system is only adequate to deliver the output of six Bruce units.

Response

The major causes of the capability difference between today's system and the system in 1985 is described in the response to Board Staff Interrogatory 1.3

Saugeen Ojibway First Nations INTERROGATORY #2 List 1

Interrogatory

Ref. Exh. *B/T 6/S 6/*Appendices 1, 2, 5 [and *10/15/07* Tech. Conference at 22:4 - 24:2]
Issue Number: 1.1

1.1 Issue: Has the need for the proposed project been established?

Reguest

Please state the transfer capability away from the Bruce Complex by use of both (i) NPCC Operating Procedures (loss of one circuit on a double circuit tower) and (ii) planning criteria (loss of both circuits on a double circuit tower) for each of the following conditions:

a. The existing transmission system.
b. The existing transmission system with near-term upgrades.
c. The existing transmission system with interim term upgrades.
d. The existing transmission system with the existing generation rejection scheme, near-term upgrades and series capacitors.
e. The existing transmission system with an ENHANCED generation rejection scheme (of up to two Bruce Units), near-term upgrades and series capacitors.

Response

The NPCC Operating Criteria and the planning criteria include the same contingencies. Therefore, IESO has responded to this Interrogatory by considering the most limiting contingency, namely the loss of two circuits on a double circuit tower.

The *Transmission Design Criteria* defined in Section 5 of *NPCC Document A2: Basic Criteria for Design and Operation of Interconnected Power Systems*, require that both stability and acceptable voltages be maintained during and following the most severe of the contingencies listed below:

(a) A permanent three-phase fault on any generator, transmission circuit, transformer or bus section with **normal fault clearing**.

(b) Simultaneous permanent phase-to-ground faults on different phases of each of two adjacent transmission circuits on a multiple circuit tower, with **normal fault clearing**.

(c) A permanent phase-to-ground fault on any transmission circuit, transformer, or bus section with **delayed fault clearing**.

(d) Loss of any **element** without a fault.

(e) A permanent phase-to-ground fault on a circuit breaker with **normal fault clearing**.

(f) Simultaneous permanent loss of both poles of a direct current bipolar facility without an ac fault

(g) Failure of a circuit breaker to operate when initiated by an SPS following: loss of any **element** without a fault; or a permanent phase-to-ground fault, with **normal fault clearing**, on any transmission circuit, transformer or bus section.

The transfer capability from the Bruce area that is quoted for each of the scenarios listed therefore corresponds to the double-circuit contingency condition involving circuits B560V & B561M.

(a) The existing transmission system.

- *Transfer capability*: Approximately 5000MW

(b) The existing transmission system with near-term upgrades.

- *Transfer capability*: Approximately 5400MW

The increase in the transfer capability resulting from the ongoing uprating of circuits B4V & B5V between Hanover TS and Orangeville TS will allow the wind-turbine projects connected to these circuits to be incorporated.

(c) The existing transmission system with interim upgrades.

- *Transfer capability*: Approximately 6325MW

Once the interim measures have been completed and assuming that post-contingency generation rejection is initiated to reject one unit at the Bruce Complex together with the 400MW of wind-turbine capacity associated with circuits B4V & B5V, then the output from a total of seven Bruce units together with the 675MW (excluding the 25MW incorporated into the distribution system in the Bruce area) of committed wind-turbine capacity could be accommodated.

Please refer to the response to Saugeen Interrogatory No. 9 which explains why generation rejection at the Bruce Complex would be restricted to only a single unit.

(d) The existing transmission system with the existing generation rejection scheme, near-term upgrades and series capacitors.

- *Transfer capability*: Approximately 6325MW - with no G/R initiated.

- *Transfer capability*: Approximately 7075MW - with the rejection of one Bruce unit initiated post-contingency

Without generation rejection, the installation of series capacitors would allow the output from seven units at the Bruce Complex together with that from the 675MW of committed wind-turbine projects to be accommodated**.**

With a single unit at the Bruce complex rejected post-contingency, the series capacitors would allow the combined output from all eight units at the Bruce Complex together with the committed wind-turbine projects to be accommodated.

(e) The existing transmission system with an ENHANCED generation rejection scheme (of up to two Bruce Units), near-term upgrades and series capacitors.

- *Transfer capability*: Approximately 6325MW - with no G/R initiated.

- *Transfer capability*: Approximately 7075MW - with the rejection of one Bruce unit initiated post-contingency

The enhancements to the generation rejection scheme are intended to expand the number of contingency conditions to which the scheme can respond as well as increasing the range of actions that can be initiated in response to these contingencies.

It will not permit any increase in the number of units at the Bruce Complex that could be rejected for the most severe double-circuit contingency condition involving the Bruce-to-Milton line while all transmission elements in-service.

The transfer capability therefore remains the same as that quoted for condition e.

Please see the response to Board Staff Interrogatories 3.2 and 3.4 for further information regarding the use of series capacitors and generation rejection as stop-gap measures to meet the need while the long-term solution is under development.

Saugeen Ojibway First Nations INTERROGATORY #3 List 1

Interrogatory

Ref. Exh. *B/T 6/S 6/*Appendices 1, 2, 5 [and *10/15/07* Tech. Conference at 22:4 - 24:2]
Issue Number: 1.1
1.11ssue: Has the need for the proposed project been established?

Request

When the two Bruce units were shut down, were any provisions made to maintain the right to recall the transmission capacity in the event the Bruce units were reactivated? If so, please provide all documents related to, arising from or used in connection with making such provisions.

Response

The IESO is not aware of any provisions made to maintain the right to recall the transmission capacity in the event the two Bruce units were subsequently reactivated.

Although the enabling legislation, regulations and current Market Rules provisions governing open access to the IESO-controlled grid were only put into effect upon Market opening in 2002, the general principles of transmission access are similar to those in place before that time. Transmission access in Ontario for a proposed new or modified connection to the transmission system is provided only upon the successful completion of a connection assessment and its approval by the IESO. That is, there are no provisions to reserve physical rights to transmission capacity, nor is a physical right required to participate in the IESO-administered market.

Saugeen Ojibway First Nations INTERROGATORY #4 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 6/Appendices 1,2, 5 [and *10/15/07* Tech. Conference at 22:4 - 24:2]
Issue Nnmber: 1.1

1.1 Issue: Has the need for the proposed project been established?

Request

Please state whether, when interconnection studies were performed for new generation planned to enter service after the Bruce units were shut down, interconnection and/or related transmission service were provided conditionally such that transfer capacity could be recalled in order to provide for delivering the output of the Bruce units if, as and when those units were brought back into service. If not, please state why not.

Response

Please refer to response to Saugeen Interrogatory No.3.

Interconnection studies for new generation planned after the Bruce units were shut down did not contain a provision for conditional transmission service that could be re-called if the Bruce units were brought back into service.

Saugeen Ojibway First Nations INTERROGATORY #5 List 1

Interrogatory

Ref. Exh. *B/T 1/*S 1 and Exh. *B/T 6/S 4/S 5/*Appendices 1, 2, 5
Issue Number: 1.1
1.1 Issue: Has the need for the proposed project been established?

Request

Please provide the winter and summer continuous rated capacity of existing generation in the Bruce area, listing each facility and its individual capacities. Please include the identification of each existing generator, the rated capacity used in each relevant period, and the basis for the ratings employed.

Response

The IESO has advised Hydro One that it does not collect generation production data based on a differentiation between winter and summer continuous capacity of the Bruce nuclear generation stations. As a matter of practice, the continuous capacities of the Bruce generation stations are rated with respect to their Maximum Continuous Rating (MCR). The MCR is defined as the maximum output (MW) that the generating station is capable of producing continuously under normal conditions over a year. However, under ideal conditions, the actual output could be higher than the MCR. Please refer to Hydro One's response to Pollution Probe interrogatory No. 1 for the MCR of the Bruce A and Bruce B generation stations from market opening until the present.

Given that the wind generators in the Bruce Area have not been in continuous operation for a long time, representative winter and summer MRC values for each wind farm are provided below.

(a) Winter MCR (January 2008 representative production data)

Wind Project	**MCR (MW)**
Amaranth	68
Kingsbridge	40
Port Burwell	99
Ripley South	76
Total Wind	283

(b) Forecasted Summer MCR (June 2008 representative production data)

Wind Project	**MCR (MW)**
Amaranth	68
Kingsbridge	40
Port Burwell	99
Ripley South	76
Total Wind	283

Saugeen Ojibway First Nations INTERROGATORY #6 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issne Number: 1.1
1.1 Issue: Has the need for the proposed project been established?

Reguest

Please state whether the studies that allegedly demonstrate the need for additional transmission for the reactivated Bruce units, upgrades of Bruce units and committed and planned wind generation include the effect of planned new transmission facilities in the New York ISO, Mid West ISO and expanded PJM region in a West to East direction.

a. If so, please state how Hydro One ensures that its studies reflect all committed andlor potential transmission system upgrades in the United States.
b. Please list those major planned transmission facility upgrades and state the MW impact of those planned upgrades on circulating loop flow through the Bruce 500 kV and 230 kV facilities.
c. Please state whether the base case load flows used in studying the proposed Bruce-Milton double circuit 500 kV line reflect all planned upgrades in the United States.
d. If any such planned, committed andlor potential upgrades were not modeled in Hydro One's studies, please indicate the reasons for the exclusion of each planned upgrade.

Response

(a) Active participation by the IESO and other organizations from Ontario in inter-area, intra-regional and inter-regional working groups ensures models used in assessments include the effect of planned new transmission facilities in the New York ISO, Mid-West IS0 and expanded PJM region.

(b) The only planned facility upgrade that the IESO is expecting to have a material effect on circulating flows are the Michigan-Ontario phase shifters. The Michigan-Ontario phase-shifters have been represented in the model used to study transmission requirements for the reactivation of the Bruce units. These phase shifters are expected to have the capability to block about 600 MW of circulating power flow and thereby shield Ontario from effects of transmission changes in the United States.

(c) The representation of the United States transmission system used for studying the proposed Bruce-Milton double circuit 500 kV line was developed by staff from New York ISO, Mid West IS0 and expanded PJM region. Plans are continually evolving in the United States so this case may not reflect all planned upgrades in the United States.

(d) As indicated in parts (a) – (c), to the extent possible the modeling includes all planned, committed or anticipated transmission system upgrades. Any other upgrades outside of Ontario that may not have been reflected in the above are not expected to materially affect study results or conclusions.

Saugeen Ojibway First Nations INTERROGATORY #7 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issue Number: 1.1

1.1 Issue: Has the need for the proposed project been established?

Reguest

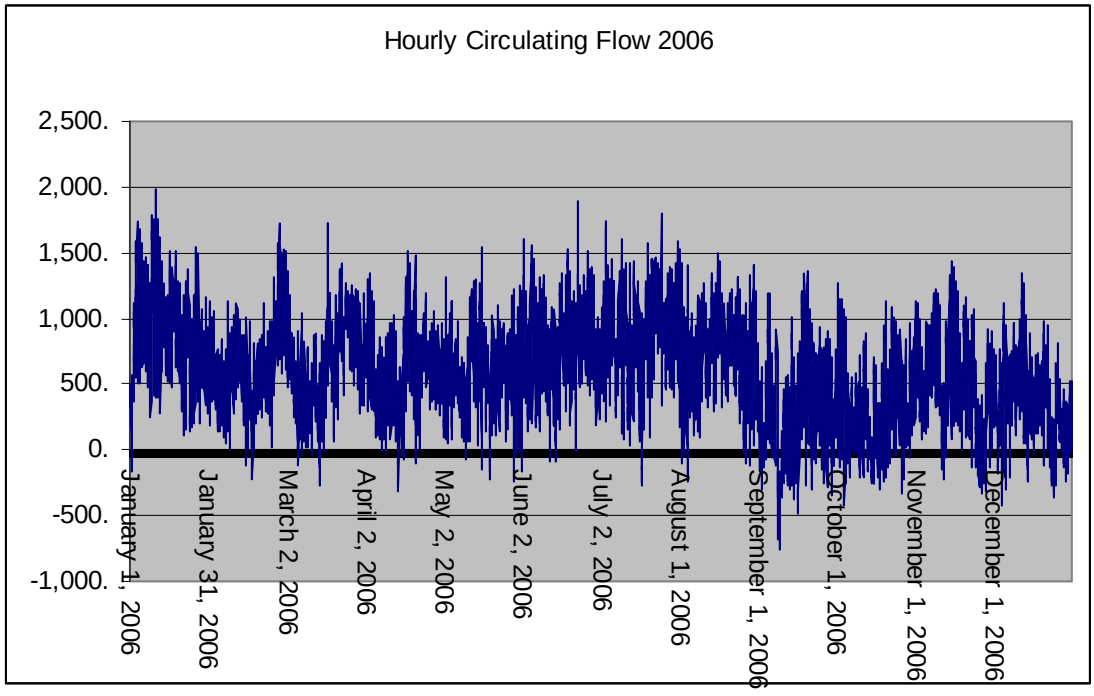
Please state the forecast amount and direction of circulating loop flow on the 500 kV and 230 kV lines emanating from the Bruce Complex during peak summer conditions for (i) each hour of the historical period since January 1,2006 and (ii) peak summer conditions projected for the years 2008 through 20 I4.

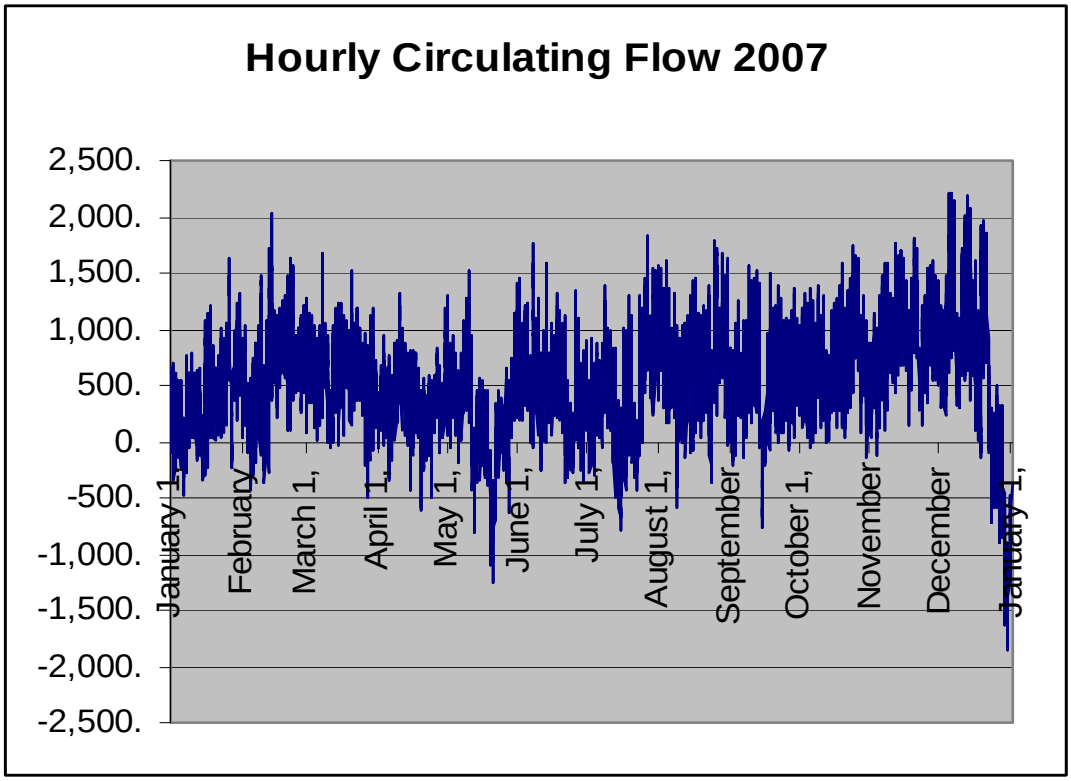
a. Please include loop flow data for each other condition to the extent that such circulating loop flow has been, or is expected to be, limiting.

b. Please indicate the amount and duration of generation backdowns at the Bruce Complex attributable to circulating loop flows for the historical period since. Please indicate the extent to which such backdowns were attributable to forced or scheduled outages of transmission system equipment.

Response

For the purpose of responding to this Interrogatory, circulating loop flow has been defined as the difference between Michigan measured flow and Michigan scheduled flow. The hourly circulating flow for 2006 and 2007 are illustrated below:





Positive numbers represent counter-clockwise flow (i.e. from Ontario to Michigan south of Lake Erie and then back into Ontario through Niagara). Negative numbers represent clockwise flow (i.e. from Michigan to Ontario north of Lake Erie and then back into New York/Michigan through Niagara). As noted in the response to Interrogatory Saugeen No. 6(b), installation of new phase shifters is expected to have the capability to block about 600 MW of circulating power flow. This is expected to cause a downward shift of 600 MW in the above charts.

Information presented in the charts above relate to the Michigan-Ontario interconnection. The circulating loop flow on the 500 kV and 230 kV lines emanating from the Bruce Complex and included in the Michigan-Ontario interconnection data can be estimated using the following distribution factors. A positive sign indicates positive circulating flow increases flow away from the Bruce complex.

500kV lines emanating from Bruce area				**230kV lines emanating from Bruce area**					
B56OV	**B561M**	**B562L**	**B563L**	**B4V**	**B5V**	**B22D**	**B23D**	**B27S**	**B28S**
-13%	-14%	+15%	+15%	-1%	-1%	-<1%	-<1%	-<1%	-<1%

(a) The net effect on flow away from the Bruce Complex for circulating flow is zero. As seen from the plots, circulation can be both positive and negative often within the same day. On average, circulating flows help increase transfers from the Bruce Complex. During times when loop flow is negative, the adverse effect on Bruce voltage and stability limits is about 20% of the loop flow. A little less than 10% of pre-contingency flow from Circuits B560V and B561M is transferred to Circuits B4V and B5V for the most limiting thermal contingency. Since B560V and B561M get about 15% of the circulating flow, then the effect on thermal limits is only about 1.5% of the circulating flow.

(b) The IESO records do not attribute generation backdowns at the Bruce complex to circulating loop flows. The IESO records also do not attribute generation backdowns at the Bruce complex to forced or scheduled outages of transmission system equipment.

Saugeen Ojibway First Nations INTERROGATORY #8 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issue Number: 1.1
1.1 Issue: Has the need for the proposed project been established?

Request

Please state whether studies have been conducted of the feasibility of limiting circulating loop flow over the transmission facilities out of the Bruce generation area so as to free up transmission capacity for use by the Bruce units and the committed and potential wind generation in the vicinity of the Bruce Complex. Please provide a copy of all documents related to, arising from or used in connection with such studies.

Response

The phase-shifters planned for the Michigan-Ontario interconnection lines are expected to significantly control circulating flows through the Hydro One system, and are expected to be in service before the 7th Bruce unit is placed in service. Therefore, specific studies have not been conducted of the feasibility of further limiting circulating loop flow over the transmission facilities out of the Bruce generation area.

Saugeen Ojibway First Nations INTERROGATORY #9 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2, Exh. *BIT 6/S* 5/Appendix 5, other studies performed by the IESO
Issue Number: 3.3

3.3 Issue: If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

Request

Please provide all studies (by the IESO or others) that support the claim that generation rejection ("OR") of up to two Bruce units will increase the effective transfer capability out of Bruce to about 6,700 MW, as stated in Exhibit B, Tab 6, Schedule 5, Appendix 5 at page 51 (Ontario IPSP, Discussion Paper 5: Transmission).

Response

When the IPSP Discussion Paper was being prepared, a transfer capability from the Bruce Area of 6700MW was initially considered achievable. This was based on rejecting or being able to reject up to two units at the Bruce Complex while respecting an NPCC-IESO generation deficiency limit of 1500MW, following a contingency, for the subsequent transfers into Ontario from neighbouring jurisdictions to compensate for the resulting resource deficiency.

Subsequent analysis has shown that, following the loss of the 500kV double-circuit line between the Bruce Complex & Milton TS, the transmission losses on the system would increase by between 300MW & 400MW. In addition, in order to respect the thermal ratings of circuits B4V & B5V, between the Bruce Complex & Orangeville TS, the 400MW of wind-turbine projects that are connected to circuits B4V & B5V, would have to be rejected.

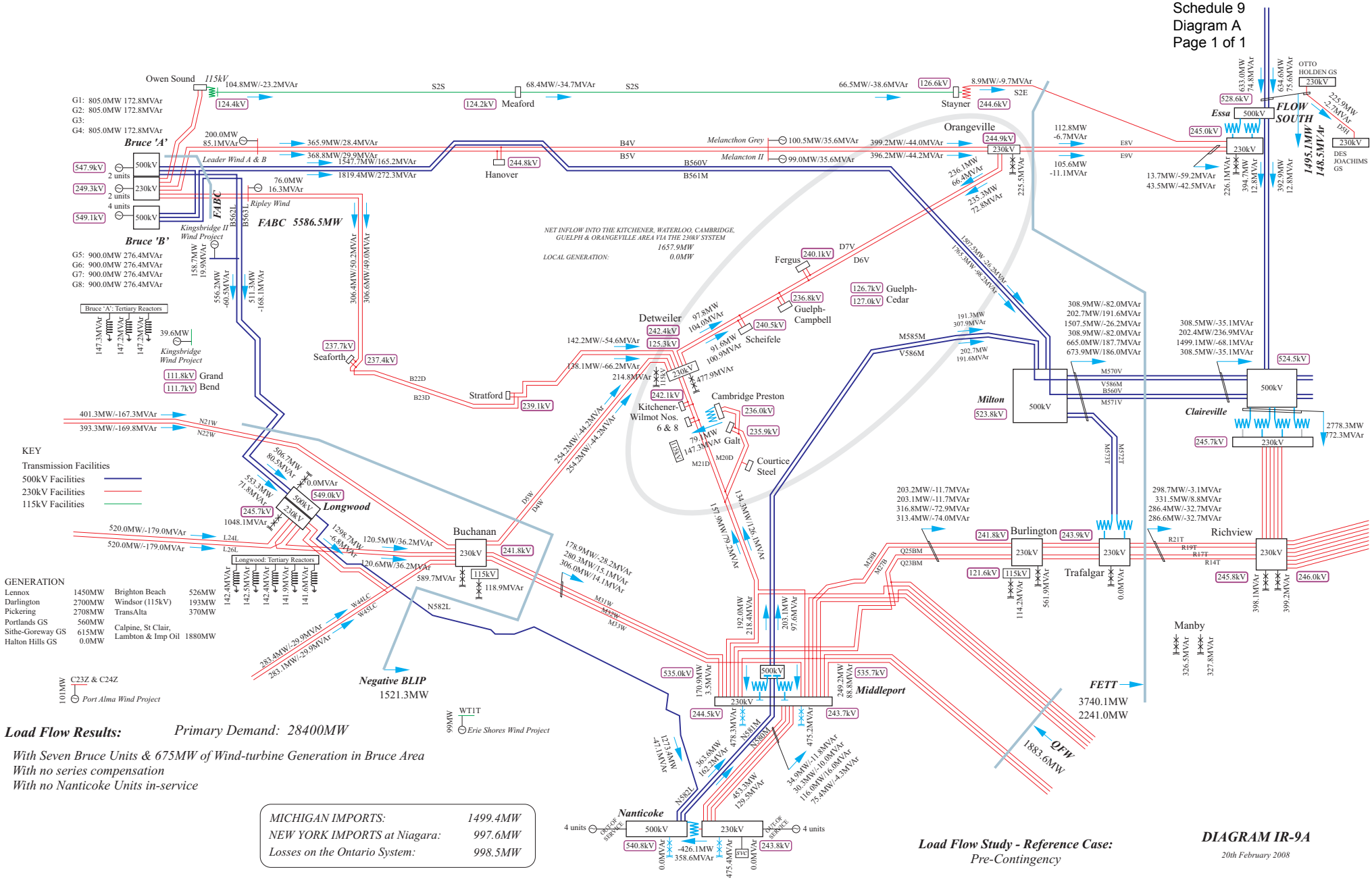
After taking account of the increased losses and the rejected wind-turbine generation, the maximum amount of generation that could be rejected at the Bruce Complex would therefore need to be restricted to a single unit.

Following the completion of the interim measures, the maximum amount of generation capacity that could therefore be accommodated within the Bruce area if post-contingency generation rejection of one Bruce unit and the 400MW of wind-turbine capacity were to be used, would total 6325MW, consisting of:

Seven units at the Bruce Complex:	Combined Capacity	5650MW (net)
Committed wind-turbine projects in the Bruce area:	Combined capacity	675MW

The results from the analysis supporting this transfer capability have been summarised in the attached Diagrams A & B for the pre- and post-contingency conditions, respectively.

Filed: March 11, 2008
EB-2007-0050
Exhibit C
Tab 5
Schedule 9
Diagram A
Page 1 of 1



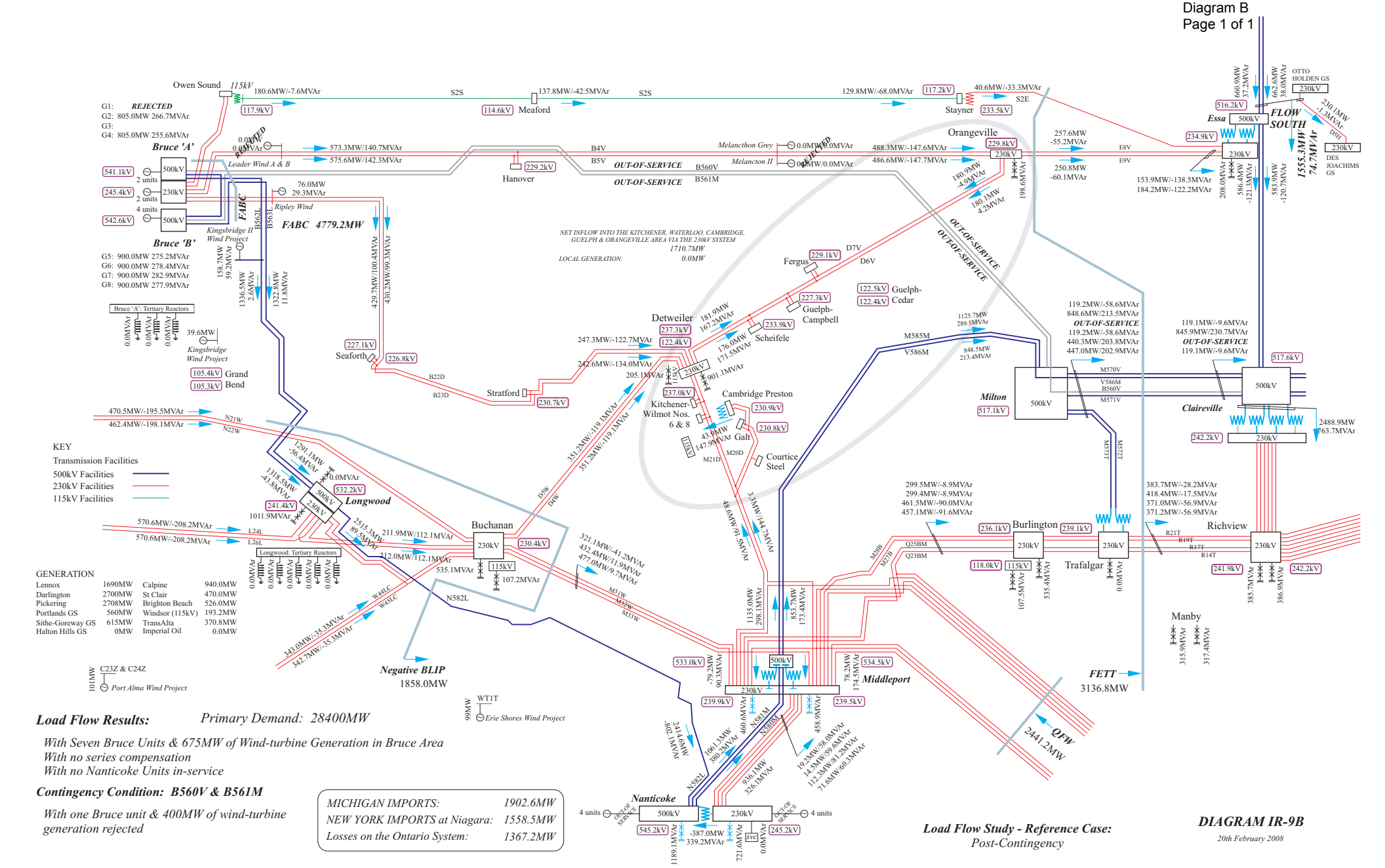
Load Flow Results: *Primary Demand: 28400MW*

With Seven Bruce Units & 675MW of Wind-turbine Generation in Bruce Area
With no series compensation
With no Nanticoke Units in-service

MICHIGAN IMPORTS:	*1499.4MW*
NEW YORK IMPORTS at Niagara:	*997.6MW*
Losses on the Ontario System:	*998.5MW*

Load Flow Study - Reference Case:
Pre-Contingency

DIAGRAM IR-9A
20th February 2008



Load Flow Results: *Primary Demand: 28400MW*

With Seven Bruce Units & 675MW of Wind-turbine Generation in Bruce Area
With no series compensation
With no Nanticoke Units in-service

Contingency Condition: B560V & B561M

With one Bruce unit & 400MW of wind-turbine generation rejected

MICHIGAN IMPORTS:	*1902.6MW*
NEW YORK IMPORTS at Niagara:	*1558.5MW*
Losses on the Ontario System:	*1367.2MW*

Load Flow Study - Reference Case:
Post-Contingency

DIAGRAM IR-9B
20th February 2008

Saugeen Ojibway First Nations INTERROGATORY #10 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2, Exh. *BIT 6/S* 5/Appendix 5, other studies performed by the IESO
Issue Number: 3.3

3.3 Issue: If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

Request

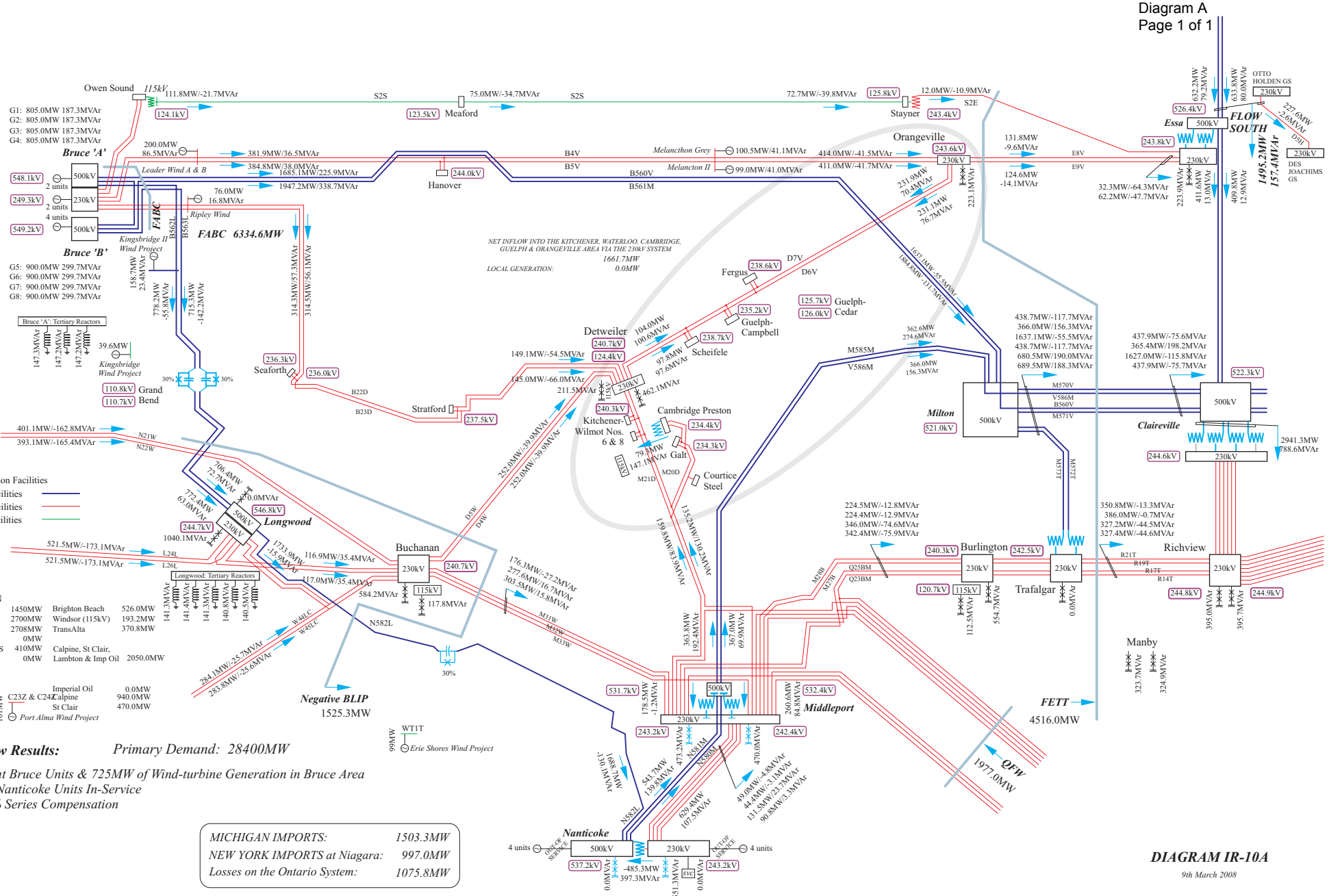
Please indicate whether IESO (or any other party) has modeled the impact upon the effective transfer capability out of Bruce using a OR of up to two Bruce Units in addition to series compensation. If such studies have been conducted, please provide the results of such studies and the load flow input data in computer readable form. If no such studies were conducted, please indicate the reason for not conducting such studies.

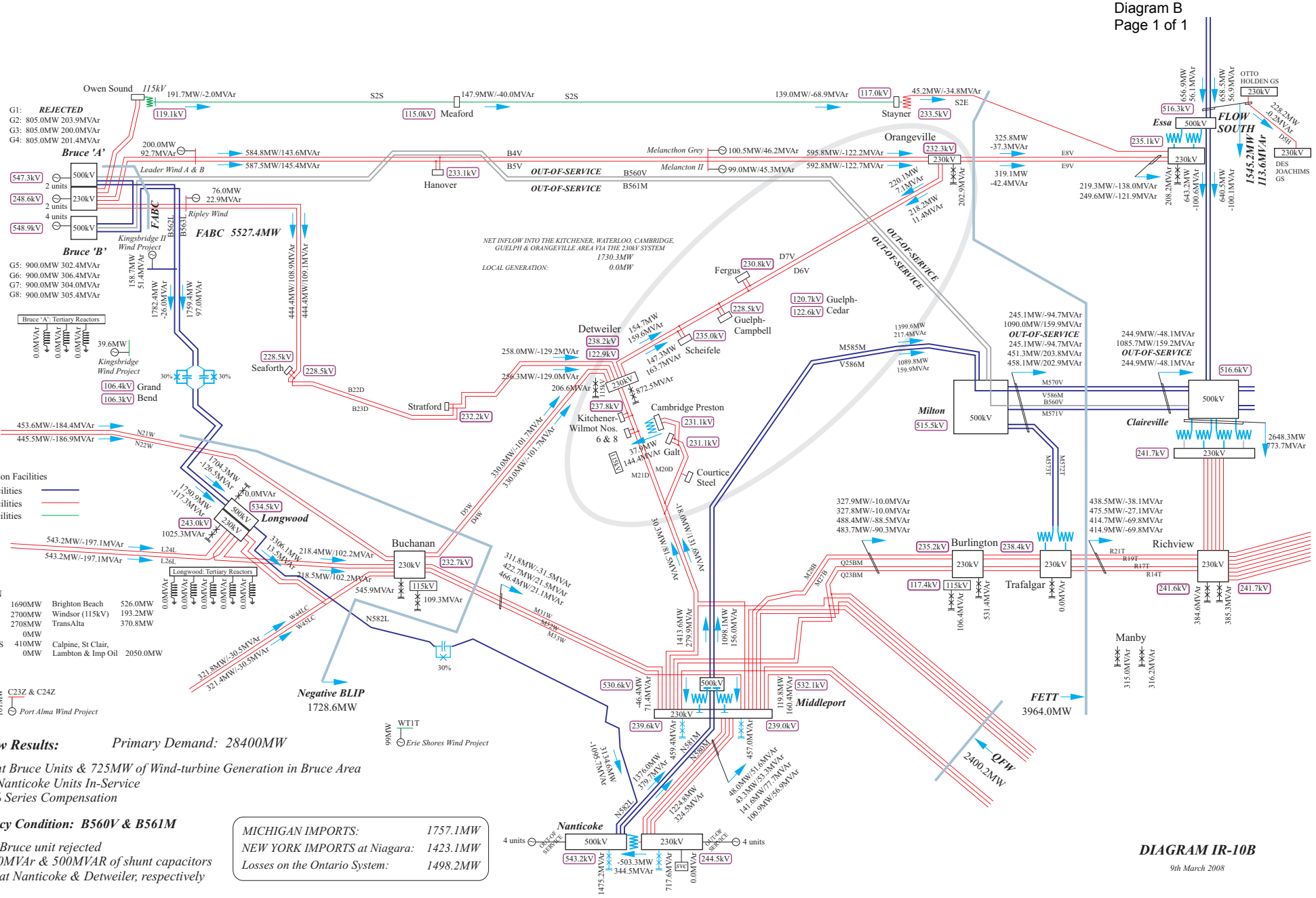
Response

In the IESO's SIA Report Entitled "Proposed Installation of Series Capacitors in 500 kV Circuits Between the Bruce Complex and Nanticoke GS" dated April 11 2006 (Ref: IESO_REP_0299 and filed in this proceeding as part of the response to Pappas Interrogatory No. 2 demonstrated that the existing system would be capable of accommodating seven units at the Bruce Complex together with the 675MW of committed wind-turbine projects in the Bruce area without deploying generation rejection if series capacitors, together with the interim measures were implemented.

The IESO has also determined that maximum amount of generation rejection that is permissible when post contingency increase in losses are taken into account is 1 Bruce unit and up to 400 MW of wind generation. With this restriction there would be no capacity to accommodate any incremental generation beyond an eighth Bruce unit.

The results of the load flow study for the pre- & post-contingency conditions with series capacitors installed and with a single unit at the Bruce Complex rejected are shown in the attached Diagrams A & B, respectively.


Owen Sound
115kV
111.8MW/-21.7MVAr
124.1kV
S2S
75.0MW/-34.7MVAr
123.5kV
Meaford
72.7MW/-39.8MVAr
125.8kV
12.0MW/-10.9MVAr
Stayner
243.4kV
G1: 805.0MW 187.3MVAr
G2: 805.0MW 187.3MVAr
G3: 805.0MW 187.3MVAr
G4: 805.0MW 187.3MVAr
Bruce 'A'
200.0MW
86.5MVAr
381.9MW/36.5MVAr
384.8MW/38.0MVAr
Leader Wind A & B
1685.1MW/225.9MVAr
1947.2MW/338.7MVAr
548.1kV
500kV
2 units
249.3kV
230kV
2 units
4 units
549.2kV
500kV
Bruce 'B'
G5: 900.0MW 299.7MVAr
G6: 900.0MW 299.7MVAr
G7: 900.0MW 299.7MVAr
G8: 900.0MW 299.7MVAr
FABC
B562L
B563L
Ripley Wind
76.0MW
16.8MVAr
FABC 6334.6MW
Kingsbridge II
Wind Project
158.7MW
23.4MVAr
778.2MW
-55.8MVAr
715.3MW
-142.2MVAr
314.3MW/57.3MVAr
314.5MW/56.1MVAr
Hanover
244.0kV
B4V
B5V
B560V
B561M
Melancthon Grey
100.5MW/41.1MVAr
Melancton II
99.0MW/41.0MVAr
414.0MW/-41.5MVAr
411.0MW/-41.7MVAr
Orangeville
243.6kV
230kV
223.1MVAr
231.9MW
70.4MVAr
231.1MW
76.7MVAr
131.8MW
-9.6MVAr
124.6MW
-14.1MVAr
E8V
E9V
NET INFLOW INTO THE KITCHENER, WATERLOO, CAMBRIDGE, GUELPH & ORANGEVILLE AREA VIA THE 230kV SYSTEM
1661.7MW
LOCAL GENERATION:
0.0MW
Fergus
238.6kV
D7V
D6V
1637.1MW/-55.5MVAr
1664.4MW/-137.7MVAr
Guelph-Cedar
125.7kV
126.0kV
Guelph-Campbell
235.2kV
238.7kV
Scheifele
Detweiler
240.7kV
124.4kV
104.0MW
100.6MVAr
97.8MW
97.6MVAr
149.1MW/-54.5MVAr
145.0MW/-66.0MVAr
211.5MVAr
115kV
230kV
462.1MVAr
Bruce 'A': Tertiary Reactors
147.3MVAr
147.2MVAr
147.2MVAr
147.2MVAr
39.6MW
Kingsbridge Wind Project
30%
30%
110.8kV
Grand Bend
110.7kV
236.3kV
Seaforth
236.0kV
B22D
B23D
Stratford
237.5kV
240.3kV
Kitchener-Wilmot Nos. 6 & 8
Cambridge Preston
234.4kV
234.3kV
Galt
79.5MW
147.1MVAr
L13K
M20D
M21D
Courtice Steel
252.0MW/-39.9MVAr
252.0MW/-39.9MVAr
D7W
D4W
159.8MW/83.9MVAr
135.2MW/130.2MVAr
M20B
M23B
Milton
521.0kV
500kV
362.6MW
274.6MVAr
366.0MW
156.3MVAr
M585M
V586M
438.7MW/-117.7MVAr
366.0MW/156.3MVAr
1637.1MW/-55.5MVAr
438.7MW/-117.7MVAr
680.5MW/190.0MVAr
689.5MW/188.3MVAr
M570V
V586M
B560V
M571V
M572T
M573T
437.9MW/-75.6MVAr
365.4MW/198.2MVAr
1627.0MW/-115.8MVAr
437.9MW/-75.7MVAr
Claireville
522.3kV
500kV
244.6kV
230kV
2941.3MW
788.6MVAr
401.1MW/-162.8MVAr
393.1MW/-165.4MVAr
N21W
N22W
706.4MW
72.7MVAr
772.4MW
63.0MVAr
0.0MVAr
546.8kV
500kV
230kV
Longwood
244.7kV
1040.1MVAr
521.5MW/-173.1MVAr
521.5MW/-173.1MVAr
L24L
L26L
1733.9MW
-15.9MVAr
116.9MW/35.4MVAr
117.0MW/35.4MVAr
Longwood: Tertiary Reactors
141.3MVAr
141.4MVAr
141.3MVAr
140.8MVAr
140.5MVAr
Buchanan
230kV
240.7kV
584.2MVAr
115kV
117.8MVAr
176.3MW/-27.2MVAr
277.6MW/16.7MVAr
303.5MW/15.8MVAr
M31W
M32W
M33W
N582L
30%
284.1MW/-25.7MVAr
283.8MW/-25.6MVAr
W41LC
W45LC
Negative BLIP
1525.3MW
101MW
C23Z & C24Z
Imperial Oil
0.0MW
Calpine
940.0MW
St Clair
470.0MW
Port Alma Wind Project
99MW
WT1T
Erie Shores Wind Project
224.5MW/-12.8MVAr
224.4MW/-12.9MVAr
346.0MW/-74.6MVAr
342.4MW/-75.9MVAr
240.3kV
Burlington
242.5kV
230kV
120.7kV
115kV
112.5MVAr
554.7MVAr
Trafalgar
0.0MVAr
Q25BM
Q23BM
350.8MW/-13.3MVAr
386.0MW/-0.7MVAr
327.2MW/-44.5MVAr
327.4MW/-44.6MVAr
Richview
R21T
R19T
R17T
R14T
230kV
244.8kV
244.9kV
395.0MVAr
395.7MVAr
Manby
323.7MVAr
324.9MVAr
531.7kV
178.5MW
-1.2MVAr
500kV
230kV
532.4kV
260.6MW
84.8MVAr
Middleport
243.2kV
242.4kV
543.7MW
139.8MVAr
473.2MVAr
470.0MVAr
N582L
N586M
N560M
49.0MW/-4.8MVAr
44.4MW/-3.1MVAr
131.5MW/23.7MVAr
90.8MW/3.3MVAr
629.4MW
107.5MVAr
1688.7MW
-130.1MVAr
FETT
4516.0MW
QFW
1977.0MW
Nanticoke
4 units
ON LINE SERVICE
500kV
230kV
4 units
ON LINE SERVICE
537.2kV
0.0MVAr
-485.3MW
397.3MVAr
243.2kV
0.0MVAr
551.3MVAr
SVC
OTTO HOLDEN GS
230kV
632.2MW
79.2MVAr
633.8MW
80.0MVAr
526.4kV
Essa
500kV
243.8kV
230kV
FLOW SOUTH
1495.2MW
157.4MVAr
32.3MW/-64.3MVAr
62.2MW/-47.7MVAr
223.9MVAr
411.6MW
15.0MVAr
409.8MW
12.9MVAr
227.6MW
-22.6MVAr
D9H
DES JOACHIMS GS
230kV
2941.3MW
788.6MVAr
KEY
Transmission Facilities
500kV Facilities
230kV Facilities
115kV Facilities
GENERATION
Lennox 1450MW
Darlington 2700MW
Pickering 2708MW
Portlands GS 0MW
Sithe-Goreway GS 410MW
Halton Hills GS 0MW
Brighton Beach 526.0MW
Windsor (115kV) 193.2MW
TransAlta 370.8MW
Calpine, St Clair, Lambton & Imp Oil 2050.0MW
Load Flow Results:
Primary Demand: 28400MW
With Eight Bruce Units & 725MW of Wind-turbine Generation in Bruce Area
With No Nanticoke Units In-Service
With 30% Series Compensation
MICHIGAN IMPORTS: 1503.3MW
NEW YORK IMPORTS at Niagara: 997.0MW
Losses on the Ontario System: 1075.8MW
DIAGRAM IR-10A
9th March 2008



Load Flow Results: *Primary Demand: 28400MW*

With Eight Bruce Units & 725MW of Wind-turbine Generation in Bruce Area
With No Nanticoke Units In-Service
With 30% Series Compensation

Contingency Condition: B560V & B561M

With one Bruce unit rejected
With 1250MVAr & 500MVAR of shunt capacitors switched at Nanticoke & Detweiler, respectively

MICHIGAN IMPORTS:	*1757.1MW*
NEW YORK IMPORTS at Niagara:	*1423.1MW*
Losses on the Ontario System:	*1498.2MW*

DIAGRAM IR-10B

9th March 2008

Saugeen Ojibway First Nations INTERROGATORY #11 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2, Exh. *B/T 6/S 5*/Appendix 5, other studies performed by the IESO
Issue Number: 3.3

3.3 Issue: If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

Request

Please provide detailed descriptions and studies of the existing GR scheme that exists at the Bruce substation and all enhancements of the existing GR scheme that have been considered by IESO, Hydro One or OPA. Please provide a copy of all documents related to, arising from or used in connection with implementing the existing GR scheme and all enhancements to that GR scheme that have been considered, including, but not limited to, all communications with the Northeast Power Coordinating Council ("NPCC") with respect to the GR Schemes compliance with NPCC's SPS procedures and requirements.

Response

Please refer to response to Board Staff Interrogatory 1.4(v) for information regarding the Bruce GR scheme.

The original Bruce Special Protection System ("SPS") was classified by the NPCC over twenty years ago and records relating to those matters are not available. The existing Bruce SPS is classified by NPCC as a type I SPS. In the most recent comprehensive transmission review (which took place in 2007 and was undertaken to demonstrate compliance with NPCC criteria) the IESO reported to NPCC that the SPS is expected to continue to require a type I classification. The report compiled in respect of this review is a non-public confidential document as it relates to the ongoing protection and security of the Ontario transmission grid.

The Bruce SPS addresses specific post-contingency connectivities (i.e., configurations) of the transmission system, and initiates appropriate operational responses, including the rejection of generating units at the Bruce Complex.

A revised functional specification for the Bruce SPS is currently being prepared by the IESO in collaboration with Hydro One. This will increase the scope of the Bruce SPS beyond that which was detailed in Section 14 of the IESOs SIA Report (Ref: IESO_REP_0299, dated 11th April 2006).

The preliminary list of the contingencies that are to be covered by the enhanced Bruce SPS is as follows:

500kV Circuits

1. B569B
2. B560V
3. B561M
4. B560V & B561M
5. B x M new circuit 1
6. B x M new circuit 2
7. B x M new circuit 1 & B x M new circuit 2
8. B562L
9. B563L
10. B562L & B563L
11. B561M & B562L
12. B560V & B563L
13. M585L
14. V586M
15. M585L & V586M

500kV Circuits (Continued)

16. M570V
17. M571V
18. M570V & M571V
19. B560V & M571V
20. N582L
21. N580M
22. N581M
23. Loss of Bruce x Milton 500kV ROW

230kV Circuits

1. B22D
2. B23D
3. B22D & B23D
4. B4V
5. B5V
6. B4V & B5V

And the range of responses that is required are as follows:

Responses

1. Trip Bruce 'A' Unit G1
2. Trip Bruce 'A' Unit G2
3. Trip Bruce 'A' Unit G3
4. Trip Bruce 'A' Unit G4
5. Trip Bruce 'B' Unit G5
6. Trip Bruce 'B' Unit G6
7. Trip Bruce 'B' Unit G7
8. Trip Bruce 'B' Unit G8
9. Trip Reactor R25 at Bruce 'A'
10. Trip Reactor R27 at Bruce 'A'
11. Trip Reactor R28 at Bruce 'A'
12. Trip Reactor R3 at Longwood TS
13. Trip Reactor R4 at Longwood TS
14. Trip Reactor R5 at Longwood TS
15. Trip Reactor R6 at Longwood TS
16. Trip Reactor R7 at Longwood TS

Responses (Continued)

16. Cross-trip 115kV circuit S2S
17. Trip Leader Wind Project
18. Trip Melancthon Wind Project
19. Trip Ripley Wind Project
20. Trip Kingbridge II Wind Project
21. Trip Lake Erie Wind Project
22. Trip All Wind Project
23. Switch Capacitor 1 at Nanticoke
24. Switch Capacitor 2 at Nanticoke
25. Switch Capacitor 3 at Nanticoke
26. Switch Capacitor 4 at Nanticoke
26. Switch Capacitor 5 at Nanticoke
27. Switch Capacitor 1 at Detweiler
28. Switch Capacitor 2 at Detweiler

NPCC registration and approval will be sought for the deployment of the enhanced Bruce SPS scheme upon completion of the design and IESO system impact analysis.

Saugeen Ojibway First Nations INTERROGATORY #12 List 1

Interrogatory

Ref. Exh. *B/T 6/S 5/*Appendix 5, Exh. *B/T 6/S* 2, other studies performed by the IESO
Issue Number: 3.3

3.3 Issue: If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

Request

Please provide all studies (by the IESO or others) that support the claim that series compensation is effective in increasing the Bruce transfer capability to about 6,300 MW without the need for GR, as stated in Exhibit B, Tab 6, Schedule 5, Appendix 5 at page 51 (Ontario IPSP, Discussion Paper 5: Transmission).

Response

In the IESO's SIA Report (Ref: IESO_REP_0299, dated 11th April 2006 and filed as part of Hydro One's response to Pappas Interrogatory No. 1) for the Installation of series capacitors in the 500kV circuits between the Bruce Complex & Nanticoke GS, it was shown that with the addition of these series capacitors, together with the interim measures, the existing system would be capable of accommodating seven units at the Bruce Complex together with the 675MW of committed wind-turbine projects in the Bruce area without deploying generation rejection. Please refer to Diagrams 15 and 16 in the referenced SIA Report.

This would therefore represent a transfer capability from the Bruce area with no post-contingency generation rejection initiated of 6325MW, consisting of:

Seven units at the Bruce Complex	Combined Capacity 5650MW (net)
Committed wind-turbine projects in the Bruce area	Combined capacity 675MW

Saugeen Ojibway First Nations INTERROGATORY #13 List 1

Interrogatory

Ref. Exh. *B/T 6/S 51*Appendix 5
Issue Number: 3.3

3.3 Issue: If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

Request

Please explain whether the need for new transmission *and/or* generation capacity in West GTA is one of the main reasons for choosing the Bruce-Milton 500 kV line. See Exhibit B, Tab 6, Schedule 5, Appendix 5 at pp. 101-104 (Ontario IPSP, Discussion Paper 5: Transmission).

Response

The need for new transmission capability and/or generation capacity in West GTA was not a reason for selecting the proposed project. The local area supply need for West of GTA is addressed separately. Transmission system upgrades are required for the delivery of all generation planned in the Bruce area to the grid in southern Ontario. System studies have demonstrated that transmission lines connecting Bruce to Milton would provide the needed improvements. In consideration of using the existing transmission corridor, the second Bruce x Milton line was determined to be the best and only option than meets the need.

Saugeen Ojibway First Nations INTERROGATORY #14 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issue Number: **1.1**

1.1 Issue: Has the need for the proposed project been established?

Request

It appears that the interconnection studies for wind power consider the fact that when wind power is most likely to occur (i.e., under wind velocities beyond specified levels) that level of wind velocity will also allow higher thermal ratings of the transmission lines within a specified radius of the wind generation.

a. Please state whether the studies for determining needed transmission upgrades for the repowering of the Bruce units also consider such increased thermal ratings?

b. Has Hydro One conducted any studies of the correlation of wind velocities in the vicinity of committed and potential wind generation near the Bruce Complex with wind velocities along the Bruce-Milton corridor and the Bruce-Longwood-Nanticoke corridor? If so, please provide all documents related to, arising from or used in connection with such studies.

c. Please state whether Hydro One, IESO or OPA has considered use of dynamic ratings on the transmission facilities emanating from the Bruce Complex (ratings that vary with the ambient temperature, radiant energy *and/or* wind velocity along the transmission lines). If so, please provide all documents related to, arising from or used in connection with such consideration.

Response

(a) On Page 6 of the IESOs SIA Report (Ref: IESO_REP_0299, dated 11th April 2006 and filed as part of Hydro One's response to Pappas Interrogatory No. 1) for the Installation of series capacitors in the 500kV circuits between the Bruce Complex & Nanticoke GS, specific reference was made to the use of higher thermal ratings, corresponding to a wind speed of 15km/hr, for that section of circuits B4V & B5V within 50km of the Amaranth wind-turbine project.

Use of this higher rating corresponds to the IESOs Transmission Assessment Criterion which states:

Clause 6.2 Wind Power

For *connection assessments*, transmission line ratings will be calculated using 15km/hr winds, instead of the typical 4km/hr, within the vicinity of the wind farm and, with the approval of the transmission asset owner, out to a 50km radius.

In this SIA Report it was therefore shown that, after allowing for the higher rating corresponding to a 15km/hr wind speed on that section of circuits B4V & B5V between the connection of the Amaranth wind-turbine project and Orangeville TS, the circuits would be able to accommodate the projected transfers and rejection of these wind generators would not be necessary.

In the SIA Report for the new 500kV Bruce-to-Milton line, it was never necessary to assume a higher rating corresponding to a 15km/hr wind speed because, with the new 500kV line in-service, the projected flows on these circuits always remained within the ratings corresponding to the normal 4km/hr wind speed rating.

(b) Hydro One has not conducted any studies of the correlation between the wind velocities in the vicinity of committed and potential wind in the Bruce Area with the wind velocities along any transmission corridor.

(c) For the actual day-to-day operation of the transmission system, the IESO receives "dynamic" ratings from Hydro One at 5 minute intervals that recognize both the local ambient temperatures and the prevailing wind speeds, while also allowing for the solar conditions and the actual pre-contingency loadings on the circuits. With this latest information, the IESO is then able to maximize the use of the available transfer capability.

Saugeen Ojibway First Nations INTERROGATORY #15 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issue Number: 2.2

2.2 Issue: Has an appropriate evaluation methodology been applied to all the alternatives considered?

Request

Please state all the reasons underlying Hydro One's determination that it must develop 230 kV and 500 kV upgrades that will enable Hydro One to deliver the output of existing and planned wind generation in the vicinity of the Bruce Complex on a firm basis (i.e., so that deliveries of full rated wind capacity can continue after the outage of a double circuit 500 kV line).

a. Please provide all documents related to, arising from or used in connection with that determination, including, but not limited to, documents analyzing the cost/benefit ratio of upgrades necessary to provide firm transmission service to wind generators.

b. Please state the incremental cost of providing firm transmission service by means of 500 kV transmission upgrades (per kW and per kWh) for each planned block of wind generation.

Response

(a) & (b) Wind generation in the Bruce area is being provided as a result of government directives (please see Exhibit B, Tab 6, Schedule 5, Appendices 7 – 12). As a result, Hydro One, the OPA and the IESO have not analyzed the cost/benefit ratio of upgrades necessary to provide firm transmission service to wind generators nor determined the incremental cost of providing firm transmission service for each planned block of wind generation.

This application is not concerned with the need for the committed and planned generation resources forecast for the Bruce area, but rather whether the plan for the transmission facilities necessary to deliver all the committed and planned generation resources in the Bruce area is needed and is the best of the alternatives considered. In this case, there is only one alternative, the Bruce to Milton 500 kV line, that meets the need. Cost comparisons have been provided for the series compensation option (please refer to the responses to Pollution Probe Interrogatory 11 and to OEB Interrogatory 3.4). While the series compensation option does not meet the long-term capability need and has technical and operational disadvantages as compared to the Bruce to

Milton line, the cost comparison was done to establish that the proposed Bruce to Milton line is economically preferred even under such a comparison.

All generation in Ontario, including wind, is offered the same level of transmission service. To provide a less firm transmission service to wind generation in the Bruce would mean either their curtailment when the system is constrained or rejection of wind generators following critical contingencies. The former would result in congestion cost to the system similar to the cost of undelivered energy calculated in the response to Pollution Probe Interrogatory 9 and included in the economic assessment. The latter would be employing generation rejection for normal operation, which is not consistent with the applicable planning standards (please see the response to OEB Interrogatory 3.2).

Saugeen Ojibway First Nations INTERROGATORY #16 List 1

Interrogatory

Ref. Exh. *B/T 6/S 5/*Appendix 5, Exh. *B/T 6/S* 2, other studies performed by the IESO
Issue Number: 3.3

3.3 Issue: If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

Request

Please state what amount of kW and kWh of committed 700 MW of wind generation and 1,000 MW of potential wind generation planned for the vicinity of the Bruce Complex that Hydro One projects could not be delivered if Hydro One did not build the planned Bruce-Milton 500 kV line but instead installed series capacitors and increased the amount of Bruce and wind generation that could be rejected upon the loss of critical transmission facilities.

Response

Without the proposed line, the capability of the Bruce transmission system with 30% series compensation (and no reliance of generation rejection (GR) under normal condition) is estimated to be 6,326 MW which would provide the capability to deliver power from 7 Bruce units and 700 MW of existing and committed wind generation in the Bruce area. This transmission system option would not be able to deliver the 8th Bruce unit and the 1,000 MW [about 2.5 TWHr] of planned wind. The use of GR under normal conditions is not consistent with the applicable planning standard (please see the response to Board Staff Interrogatory 3.2). However, should it be used, the transmission with 30% series compensation would be able to deliver the 8th Bruce unit (or the equivalent of 850 MW of wind if the 8th Bruce unit is not added).

It should also be noted that, until transmission is reinforced in the Bruce area, no power purchase contracts are being granted by the OPA under the renewable energy standard offer program (the restricted Bruce area is also known as the Orange Zone under this consideration). Based on information from Hydro One's project queue, the OPA is aware of significant interest from developers to develop wind generation under this program in the Bruce area. This constitutes a portion of the 1,000 MW planned wind generation potential forecast for the area.

Saugeen Ojibway First Nations INTERROGATORY #17 List 1

Interrogatory

Ref. Exh. *B/T 6/S 5/*Appendix 5, Exh. *B/T 6/S* 2, other studies performed by the IESO
Issue Number: 3.3

3.3 Issue: If these proposed near term and interim measures could be utilized for a longer period than proposed, could they (or some combination of similar measures) be considered an alternative to the double circuit 500 kV transmission line for which Hydro One has applied?

Request

Please state what diversity assumptions underlie the asserted need for transmission additions (e.g., the fact that wind power has limited capacity value due to both its intermittent nature and the fact that peak output is likely to occur during off-peak periods).

Response

Please refer to the responses to Board Staff Interrogatory 1.6 and Pollution Probe No. 7.

Saugeen Ojibway First Nations INTERROGATORY #18 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issue Number: 1.1
1.1 Issue: Has the need for the proposed project been established?

Request

Please state what amount of the committed and potential installed wind generation planned for the vicinity of the Bruce Complex would be deemed firm (or dependable) generation for purposes of meeting Ontario's peak demand requirements assuming that the Bruce Milton 500 kV line were added.

Response

OPA has assumed that 20% of the installed capacity of any wind generation in Ontario will be available for meeting Ontario's peak demand. This would be 140 MW of the 700 MW of existing and committed wind generation in the Bruce Area and 200 MW of the 1,000 MW of planned future wind generation in the Bruce Area.

Please refer to response Board Staff Interrogatory 1.6 for a discussion of the appropriate planning of the transmission system to accommodate the wind generation in the Bruce.

Saugeen Ojibway First Nations INTERROGATORY #19 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issue Number: 1.1
1.1 Issue: Has the need for the proposed project been established?

Request

Please state whether cost-benefit studies have been conducted to show the ability to back down the Bruce units to allow additional wind power to be transmitted when available without the need to build additional transmission facilities. If so, please provide all documents related to, arising from or used in connection with such studies.

Response

The requested studies have not been conducted. Furthermore, the current Ontario Market design and rules do not permit the curtailment of a particular type of generation resource in favor of another. Non-intermittent resources are dispatched based on acceptance of their generation offers in the market. Intermittent resources such as wind are permitted to run and inject their output into the IESO-controlled grid whenever these resources are available, unless otherwise curtailed for reliability reasons.

Saugeen Ojibway First Nations INTERROGATORY #20 List 1

Interrogatory

Ref. Exh. *B/T 6/S* 2 and other studies performed by the IESO
Issue Number: 1.1
1.1 Issue: Has the need for the proposed project been established?

Request

Please state the extent to which the reactive power needs of committed and potential wind generation under steady state and dynamic conditions affect the transfer capability away from the Bruce Complex. Please provide all documents related to, arising from or used in connection Hydro One's consideration of the reactive power needs of that committed and potential wind generation.

a. Please state the extent to which committed and potential wind generators will utilize existing transfer capability and the extent to which they or Hydro One will be required to create new transfer capability (or some combination) to ship their power to market.
b. Please state the extent to which any such additional transfer capability is expected to be limited by (i) stability, (ii) voltage/reactive, and/or (iii) thermal limits.
c. To the extent such additional transfer capability is expected to be limited by voltage/reactive considerations, please state whether the committed and potential wind generation is expected to rely on existing available voltage/reactive capability.
d. If not, please state whether the committed and potential wind generation will be required to contribute new voltage/reactive support in order to cover their own needs for transfer capability to and away from Bruce.
e. Please state whether the committed and potential wind generation will be expected and/or required to provide new voltage/reactive support needs going beyond that required to increase transfer capability beyond their own needs.

Response

For information concerning applicable Market Rules, please refer to response to Saugeen Interrogatory 21.

(a) None. As indicated in the application at Exhibit B, Tab 1, Schedule 1, page 5, existing transfer capability out of Bruce is only sufficient to meet existing generation (i.e., approximately 5,000 MW). As a result, committed and planned wind generation resources in the Bruce Area will exceed the existing transfer capability. Any additional or potential wind or nuclear generation over and above the current forecast identified in this application will require incremental transmission capability beyond that provided by the proposed project.

(b) The applied-for Bruce to Milton facilities are expected to have an initial voltage stability limit of approximately 8100 MW, which is expected to accommodate eight Bruce units and the committed and planned wind generation. Please refer to the IESO SIA Report (Exhibit B Tab 6 Schedule 2).

(c) Committed and potential wind generation will provide proportional voltage/reactive capability and is not expected to rely on existing available voltage/reactive capability.

(d) Please see part (c) above. Each committed and potential wind generation unit is required to have the capability to supply reactive power at its terminals and within the range specified by the Market Rules.

(e) No, committed and potential wind generators are not required to supply reactive power support beyond the amount specified by the Market Rules in order to satisfy their own needs.

Saugeen Ojibway First Nations INTERROGATORY #21 List 1

Interrogatory

Ref. Exh. B/T 6/S 2 and other studies performed by the IESO
Issne Nnmber: 1.1
1.1 Issue: Has the need for the proposed project been established?

Request

Please state whether Hydro One, IESO or OPA has mandated that wind generators provide specific levels of reactive power both in terms of quantity and responsiveness (e.g., mechanically switched capacitors versus Static VAR Compensation or an equivalent dynamic source integrated into the wind machines). If so, please provide all documents related to, arising from or used in connection with such mandates and specifications.

Response

The Market Rules set out specific standards and requirements for connection of generation resources to the IESO-controlled grid. Please refer to Market Rules, Chapter 4, Grid Connection Requirements at

http://www.ieso.ca/imoweb/pubs/marketRules/mr_chapter4appx.pdf:

1. Appendix 4.2, Generator Facilities Requirements (Embedded and Non-Embedded);

2. Appendix 4.6, Generation Facilities

3. Appendix 4.15, IESO Monitoring Requirements – Generators

4. Appendix 4.19, IESO Monitoring Requirements – Generator Performance Standard

With respect to the wind farms approved for connection to date, the specified levels of reactive power, in terms of quantity and their responsiveness, are set out in the IESOs study reports which are available at the following links:

Kingsbridge

- http://www.ieso.ca/imoweb/pubs/caa/caa_PAReport-PortAlbertWindGen.pdf

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2003-106.pdf

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAReport_2004-114.pdf

Port Burwell

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2003-106.pdf

Amaranth

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2003-103.pdf
- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAAddendum_2003-103.pdf

Wolfe Island

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAFinalReport_2004_111.pdf

Prince

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2004-117.pdf

Underwood

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAAddendum_2004-121.pdf
- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAReport_2004-143.pdf

Ripley

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAReport_2004-125.pdf

Saugeen Ojibway First Nations INTERROGATORY #22 List 1

Interrogatory

Ref. Exh. *B/T* 6/S 2 and other studies performed by the IESO
Issue Number: 1.1
1.1 Issue: Has the need for the proposed project been established?

Request

Please state whether Hydro One, IESO or OPA has mandated that wind generators provide the ability to ride through faults. If so, please provide all documents related to, arising from or used in connection with such mandates and specifications.

Response

The IESO has mandated generators provide the ability to ride through faults. This requirement is documented in the materials listed below. It is not practicable to list all documents from all wind vendors demonstrating the ability to ride through faults, but an example from one particular vendor with wind turbines in Ontario has been included at the bottom of the list below to demonstrate this capability.

Kingsbridge

- http://www.ieso.ca/imoweb/pubs/caa/caa_PAReport-PortAlbertWindGen.pdf
- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2003-106.pdf
- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAReport_2004-114.pdf

Port Burwell

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2003-106.pdf

Amaranth

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2003-103.pdf
- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAAddendum_2003-103.pdf

Wolfe Island

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAFinalReport_2004_111.pdf

Prince

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIA_2004-117.pdf

Underwood

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAAddendum_2004-121.pdf

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAReport_2004-143.pdf

Ripley

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAReport_2004-125.pdf

Port Alma

- http://www.ieso.ca/imoweb/pubs/caa/caa_SIAFinalReport_2005-203.pdf

Low voltage ride through capability

- http://www.gepower.com/businesses/ge_wind_energy/en/downloads/ge_lvrt_brochure.pdf

Saugeen Ojibway First Nations INTERROGATORY #23 List 1

Interrogatory

Ref. Exh. B/T *6/S* 2 and other studies performed by the IESO
Issue Number: **1.1**
1.1 Issue: Has the need for the proposed project been established?

Request

Please state what portion of the existing and committed wind generation is expected and/or permitted to be dropped upon the occurrence of nearby single line-to-ground faults under Hydro One's policies.

Response

Appendix C of the IESOs Ontario Resource and Transmission Assessment Criteria states that when assessing the connection of a wind farm, generating units must not trip except for contingencies that remove the facility by configuration. This will require wind-turbine facilities to have adequate ride-through capability in response to both high and low system voltages.

For those wind-turbine projects in the Bruce area, the amount of generation that would be lost in response to specific contingencies would be as follows:

B4V single-circuit contingency:

- the respective halves of the Amaranth and Leader wind-turbine projects that are connected directly to this circuit. Total capacity lost of 200 MW.

B5V single-circuit contingency:

- the respective halves of the Amaranth and Leader wind-turbine projects that are connected directly to this circuit. Total capacity lost of 200 MW.

B4V & B5V double-circuit contingency:

- all of the Amaranth and Leader wind-turbine projects. Total capacity lost of 400 MW.

B22D or a B23D single-circuit contingency:

- none of the Ripley wind-turbine project since it has a common 230kV bus-bar that is connected to both 230kV circuits.

B22D & B23D double-circuit contingency:

- all of the Ripley wind-turbine project. Total capacity lost of 76 MW.

B563L contingency:

- all of the Kingsbridge II wind-turbine project since it will have only a single connection to this 500 kV circuit.

For all other contingencies in the area, none of the wind-turbine capacity is expected to be lost because every generation unit is expected to have an adequate ride-through capability that will avoid inadvertent tripping.

Saugeen Ojibway First Nations INTERROGATORY #24 List 1

Interrogatory

Ref. Exh. B/T *6/S* 2 and other studies performed by the IESO
Issue Number: 2.1

2.1 Issue: Have all reasonable alternatives to the project been identified and considered?

Request

Please state whether Hydro One, IESO or OPA has considered the use of dynamic braking resistors in connection with its plans to increase the transfer capability from Bruce to Hydro One's load centers. If so, please provide all documents related to, arising from or used in connection with such consideration. If not, please explain why no such consideration has bccn given to dynamic braking resistors.

Response

Not in any material way. The use of dynamic braking resistors is a possible consideration for transient stability limitations. The transfer capability of the Bruce transmission system is limited by thermal, voltage and transient stability constraints. An acceptable solution for the Bruce transmission system must be able to address all three constraints.

Saugeen Ojibway First Nations INTERROGATORY #25 List 1

Interrogatory

Ref. Exh. *B/T 6/S 2*
Issue Number: 2.2
2.2 Issue: Has an appropriate evaluation methodology been applied to all the alternatives considered?

Request

Please provide the most recent load flow model used by Hydro One in conducting its studies of the proposed Bruce-Milton 500 kV line in computer-readable form showing the existing system, and the system with the proposed Bruce-Milton transmission line. Please provide in PTI format.

Response

Please refer to the IESO's letter of March 4th, 2008 to the Board and parties regarding the disclosure of confidential load flow model, and the Board's subsequent direction set out in Procedural Order No. 6 dated March 7th, 2008.

Saugeen Ojibway First Nations INTERROGATORY #26 List 1

Interrogatory

Ref. Exh. B/T 6/S 2 and other studies performed by the IESO
Issue Number: **1.1**

1.1 Issue: Has the need for the proposed project been established?

Request

Please explain why the IESO performs system impact studies assuming imports from Michigan and New York in the thousands of MW range, while OPA is attempting to show that Ontario can serve its own loads with its own, internal, mostly clean generation. Has any investigation been made of the portion of Hydro One's imports that are nuclear and renewable? If so, please provide all documents related to, arising from or used in connection with such investigations.

Response

The IESO performs system impact studies to identify whether the proposed project will have a material adverse effect on the reliability of the IESO-controlled grid. Included in the assessment, is a review of the project design against IESO grid connection requirements, and a check that the proposed project does not reduce the existing transmission transfer capability.

In accordance with NPCC criteria, transmission design assessments assume power flow conditions utilizing transfers, load, and generation conditions which stress the system. Specifically, in the case of the Bruce to Milton system impact assessment, generation dispatch conditions assumed some Ontario generating unit outages, and their energy replaced by imports from Michigan and New York. In most cases, these combinations of assumptions will stress the system more than if all the Ontario energy demand is supplied from internal generation.

Although the generation plan for Ontario is to make Ontario generation “self-sufficient”, high import flows have often occurred during past peak demand periods, and are likely to occur in future extreme weather (the hottest) days, leading the IESO to conclude it is prudent to assess the system design with these combinations of flows.

Imports are not identifiable by type and generation source.

Saugeen Ojibway First Nations INTERROGATORY #27 List 1

Interrogatory

Ref. Exh. B/T 6/S 2 and other studies performed by the IESO
Issue Number: **1.1**

1.1 Issue: Has the need for the proposed project been established?

Request

What would be the impact on need for a new Bruce-Milton transmission line if all imports from the U.S. are removed?

Response

Under the assumption that all imports are removed, increased sourcing of domestic generation would be required. If existing transfer capability out of south western Ontario is assumed to be maintained, incremental generation could be sited in the Bruce area and this could result in the need for additional transfer capability out of the Bruce area.

Saugeen Ojibway First Nations INTERROGATORY #28 List 1

Interrogatory

Ref. Exh. B/T 3/S I and other studies performed by the IESO
Issue Number: 2.1
2.1 Issue: Have all reasonable alternatives to the project been identified and considered?

Request

Please state whether Hydro One, IESO or OPA has considered converting the existing Bruce-to-Milton 500 kV transmission line from AC to DC? If not, is Hydro One Networks aware that such a conversion is possible and potentially feasible?

Response

No. This was not considered to be a reasonable alternative as a new DC line would only carry between 1500 - 2000 MW of transfer capability but the removal of the existing Bruce to Milton 500 kV transmission line would exceed that range. This would not meet the need for transmission transfer capability to meet the forecast generation out of the Bruce area.