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BY COURIER

March 25, 2008

Ms. Kirsten Walli
Secretary
Ontario Energy Board
Suite 2700, 2300 Yonge Street
P.O. Box 2319
Toronto, ON M4P 1E4

Dear Ms. Walli:

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

I am attaching a paper copy of the responses to the interrogatory questions from Ontario Energy Board List 2.

Electronic versions will be sent to Intervenors (and to the OEB) with text searchable Acrobat files of the following Interrogatory Responses:

OEB Staff List 2
Updated response to OEB Staff Interrogatory C-1-2.6
Pollution Probe List 4 and List 5
Energy Probe List 2, 3 and List 4
Ross Interrogatories to Hydro One List 1
Ross Interrogatories to the Ontario Power Authority List 1
Ross Interrogatories to the Independent Electricity System Operator List 1
Powerline Connection List 1

A complete paper copy of all the EB-2007-0050 Interrogatory Responses organized in binder sets will be sent shortly. Electronic text-searchable copy of interrogatory responses will also continue to be available for download from the Hydro One Networks regulatory website.

Sincerely,

Oded Hubert

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

Ontario Energy Board (Board Staff) INTERROGATORY #2.1.1 List 2

Interrogatory

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

Ref.(a) Exh. B/T 1/S 3/p. 2 and 3
Ref.(b) Exh. B/T 6/S 5/Appendix 1/Section 2.2/p. 4/lines 14-17
Ref.(c) Exh. B/T 6/S 5/Appendix 5/Discussion Paper 5(Nov 13, 2006) (IPSP)/page 60-61

Preamble:

(i) In Ref.(a) and Ref.(b), the Applicant states that the project is needed in order to accommodate additional Bruce area generation and to satisfy IESO reliability requirements and indicate that beyond year 2013 there is additional 1, 000 MW identified by OPA in the area.

(ii) In Ref.(c), page 60 shows two maps (Figure 240 for East Lake Huron and Figure 241 for Bruce Peninsula), and page 61 it states that there are 400 MW potential wind for Bruce Peninsula, and 600 MW located north and south of Goderich.

Questions:

1) Please confirm that the 1,000 MW of additional potential wind resources identified in in Ref. (a) and Ref.(b) comprise the projects identified in Ref.(c) which indicate that there are 400 MW potential wind for Bruce Peninsula, and 600 MW located north and south of Goderich.
2) If the response to 1) above is negative, please list the locations and for each such location the potential amount of MW of wind power
3) Please provide supporting evidence to show the portion of the power output in MW from all these wind resources (total potential installed capacity of 1000 MW) during system peak time, which will end up flowing
east on the existing and proposed 500 kV circuits. This can be simplified by choosing a typical day in winter and summer seasons

Response

1. No, the 1,000 MW consists of more than just the two sites identified in Ref.(c). The 1,000 MW consists of approximately 300 MW of Standard Offer Program (SOP) wind generation and approximately 700 MW of potential large wind generation (see: Day 1 Technical Conference Presentation Exhibit KT.1 slide 16, and transcript pages 16 and 17). At the time of the original application, there was a total of 726 MW of SOP in the Hydro One connection queue for the Bruce Area. Due to distribution system limitations, only 300 MW of this can be connected to the system. Because of the large interest beyond this level, the 300 MW is considered as sufficiently firm. There is also approximately 1,400 MW of potential large wind generation identified in the Bruce Area. However, for planning purposes, only half of this potential is assumed in the Bruce to

Milton forecast to come in-service due to development uncertainties. This is a conservative assumption, as there is the potential for further development beyond the level of 1,000 MW.

2. The two tables shown below provide details of both the SOP and Potential Large Wind generation.

Station	Total SOP Potential in Queue (MW)	SOP Potential Adjusted due to Distribution Limitations (MW)
Centralia TS	10	10
Constance DS	50	11
Douglas Point TS	147	48
Goderich TS	60	0
Grand Bend East DS	56	15
Hanover TS	63	63
Meaford TS	30	30
Owen Sound TS	23	23
Palmerston TS	29	29
Seaforth TS	68	28
Wingham TS	190	56
Total	**726**	**313**

Wind Farm	Potential (MW)
Bruce (S36)	177
Bruce Peninsula (S46)	192
Bruce Peninsula (S5)	188
Elmira-Palmerston (D24)	200
Goderich (D32)	200
Goderich (D37)	75
Goderich (D38)	75
Goderich (S58)	79
Stratford (S59)	60
Stratford (S60)	123
Wingham (D22)	36
Total	**1405**
Adjusted Capacity at 50%	**702.5**

3. The numbers found in the Table below reflect a summer peak case. For a winter peak case with the same amount of generation and a peak load that is not significantly different for that area, the proportion of the wind production transmitted on the 500 kV system will be approximately the same.

   The IESO simulated 1000 MW of wind generation being received at the Bruce transmission switching station. The 500 kV and 230 kV systems are interconnected at this location. As mentioned in the SIA Report, incorporating significant amounts of additional generating capacity into the existing 230 kV system would be expected to cause overloading of these circuits. Given this, the simulation took into account that all of the generation would be incorporated into the 500 kV as opposed to the 230 kV system. However, due to the interconnectedness of the lines, some of the resulting flows end up on the 230 kV system.

   The respective flows on the 500 kV (including the applied-for line) and the existing 230 kV circuits for the conditions with eight Bruce units in-service, and with eight Bruce units plus an additional 1000 MW of new generation capacity in-service have been summarised in the following Table:

1

Flow Distributions with the new Bruce to Milton 500kV double-circuit line in-service									
Condition:	*8 Bruce units + 675MW of committed wind-turbine capacity*			*8 Bruce units + 675MW of committed wind-turbine capacity & 1000MW of additional wind capacity at the Bruce SS*			*Increase in the Flows*		
Circuit	*MW*	*MVAr*	*Amps*	*MW*	*MVAr*	*Amps*	*MW*		
500kV									
B560V	1182.0MW	49.7MVAr	1252A	1384.9MW	114.5MVAr	1470A	202.9MW		
B561M	1223.4MW	81.9MVAr	1294A	1413.5MW	145.3MVAr	1499A	190.1MW		
B566M	1201.7MW	64.0MVAr	1273A	1389.8MW	125.0MVAr	1476A	188.1MW		
B567M	1220.4MW	78.2MVAr	1291A	1410.2MW	140.9MVAr	1495A	189.8MW	*Σ 912.4MW*	
B562L	155.0MW	-133.2MVAr	216A	225.0MW	-129.4MVAr	273A	70.0MW		
B563L	258.8MW	-162.3MVAr	322A	330.3MW	-157.3MVAr	382A	71.5MW		
230kV									*Σ 1000.0MW*
B4V	200.3MW	31.6MVAr	470A	225.7MW	29.2MVAr	508A	25.4MW		
B5V	201.3MW	32.7MVAr	472A	226.6MW	30.2MVAr	511A	25.3MW		
B22D	225.9MW	48.8MVAr	535A	239.1MW	47.6MVAr	529A	13.2MW		
B23D	225.7MW	49.9MVAr	535A	238.9MW	48.7MVAr	529A	13.2MW	*Σ 87.6MW*	
B27S	142.9MW	-15.8MVAr	333A	152.1MW	-13.5MVAr	353A	9.2MW		
B28S	65.2MW	-6.2MVAr	152A	66.5MW	-5.5MVAr	155A	1.3MW		

2

Ontario Energy Board (Board Staff) INTERROGATORY #2.1.2 List 2

Interrogatory

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

Ref.(a) Exh. B/T 1/S 3/p. 2 and 3
Ref.(b) Exh. B/T 6/S 5/Appendix 1/Section 2.2/p. 4/lines 14-17
Ref.(c) Exh. B/T 6/S 5/Appendix 5/Discussion Paper 5(Nov 13, 2006) (IPSP)/page 60-61
Ref.(d) Integrated Power System Plan (IPSP) Review
Exh. D/Tab 5/S 1/p. 21/ Table 10

Preamble:

(i) In Ref.(a) and Ref.(b), the Applicant states that the project is needed in order to accommodate additional Bruce area generation and to satisfy IESO reliability requirements and indicate that beyond year 2013 there is additional 1, 000 MW identified by OPA in the area.

(ii) In Ref.(c), page 60 shows two maps (Figure 240 for East Lake Huron and Figure 241 for Bruce Peninsula), and page 61 it states that there are 400 MW potential wind for Bruce Peninsula, and 600 MW located north and south of Goderich.

(iii) In Ref. (d), ten "Large Sites" for potential wind resources in the "Region" of Bruce are listed as follows:

S 36	Bruce	177	
S 5	Bruce Peninsula	188	
S 46	Bruce Peninsula	192	(total Bruce Penin.=380 MW)
D 37	Goderich	75	
D 38	Goderich	75	
S 58	Goderich	79	
D 32	Goderich	200	(total Goderich=429 MW)
S 59	Stratford	60	
S 60	Stratford	123	(total Stratford=183 MW)
D 22	Wingham	36	

Questions:

Comparing the amounts reported on the potential wind resources in Ref.(c) and Ref.(d) please:

1) Using the table in Ref. (d) please indicate the sites and corresponding MW that add up to approximately 1000 MW which is the amount referred to in Ref.(a) as the

potential wind farm resource capacity that increases the generation capacity in the Bruce area which in turn need transmission capability to accommodate the increasing power flow east from the Bruce area toward the GTA.

2) indicate whether the 400 MW of potential in the Bruce Peninsula in Ref. (c) is an approximation to the more detailed potential in Ref.(d) of 380 MW;

3) please explain the 600 MW of potential in the Goderich area in Ref. (c) with the amounts shown in the Table of Ref.(d) where the total MW for Goderich is only 429 MW.

4) In Ref.(d), is the amounts shown for Stratford of 183 MW is then added to the Goderich total of 429 MW to a total of 612 MW, which would be comparable to the 600 MW of Ref.(c)?

5) If the answer to Question (c) above is affirmative, please provide supporting evidence to show the portion of the power output in MW from all the wind resources from the 183 MW located in the Stratford area during system peak time, which will end up flowing east on the existing and proposed 500 kV circuits. This can be simplified by choosing a typical day in winter and summer seasons.

6) Using the table in Ref. (d) please indicate the sites and corresponding MW that add up to approximately 1000 MW shown in Ref.(a).

Response

1. The 1,000 MW is composed of 700 MW of large wind farms and 300 MW of Standard Offer Program wind generation (see Hydro One's response to OEB Staff Interrogatory 2.1.1). The 700 MW is half of the 1,400 MW of large wind farm potential in the Bruce Area. This is composed of the potentials in Table 10 of Ref(d) as well as the Elmira-Palmerston (D24) site which is, from a transmission perspective, within the Bruce Area.

2. The 400 MW in Ref.(c) was an approximation of the potential and was included in more detail in Ref.(d).

3. The wind resources in Ref.(c), referred to in part (ii) of the Preamble to this Interrogatory as "north and south of Goderich", include the four sites in Ref.(d). These are the "Goderich" (D37, D38, S58, D32), in addition to the Wingham (D22) and Bruce (S36) sites. It should be noted that the values in Ref.(c) were rounded, whereas those in Ref.(d) were not.

4. The 183 MW of wind in the vicinity of Stratford is not part of the approximately 600 MW of potential north and south of Goderich identified in Ref.(c). Please refer to the response to part 3 of this Interrogatory for an explanation of the sites that compose the approximately 600 MW identified in Ref.(c).

5. Not applicable. See part 4.

6. The sites corresponding to the 1,000 MW of future wind potential are discussed in the response to Board Staff Interrogatory 2.1.1.

Ontario Energy Board (Board Staff) INTERROGATORY #2.1.3 List 2

Interrogatory

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

Ref.(a) Technical Conference (Oct. 15, 2007)
Panel 1 Presentation
Covering Existing Facilities & Grid Operations, Need, Alternatives & Evaluation and Near-term & Interim Terms
Ref.(b) Integrated Power System Plan (IPSP) Review
Exh. D/Tab 5/S 1/p. 22/ Table 11: Wind Resource Potential – Small Sites (Installed MW)

Preamble:

(i) In Ref. (a), a graph titled "Near-term and Interim Measure Improvements" show four profiles of generation from 2007 to 2014:

- Bruce Generation (blue);
- Committed Wind Generation (pink);
- Future Wind Generation (green);
- Stranded SOP (Standard Offer Program) Wind Potential ("Orange Zone")

The amount of generation in that Orange Zone appears to be approximately 300 MW;

(ii) In Ref.(b),Table 11 indicate that there are potential of 753 MW of Small Sites for Wind generation in the Bruce area.

Questions:

1) Please indicate whether or not the 300 MW in the Orange Zone in Ref.(a) is the portion of the potential 753 MW shown in Ref.(b) that would be the "Stranded SOP"? if not please provide the amount in MW of potential small wind resources in the Bruce area.
2) Please identify the transformer station names and the 115 kV or 230 kV transmission lines connecting these stations to the power system. The assumption is that these transformer stations would be interfacing with the distribution systems through which the power flow would occur from the small wind generation sites and would contribute to that Orange Zone.
3) Please provide explanation as to the expected power flow from each of the identified transformer stations (from the response to Question 2) above) during a typical system peak day in the winter and during a typical system peak day in the summer. In providing the explanation in this question, please also list assumptions in regard to:
   a) The total installed capacity of the wind generation sites connected via the distribution system to each of the identified transformer stations;

b) The capacity factors (two numbers are expected - one applicable for typical system peak day in the Summer and a second for typical system peak day in the Winter) to be applied to the amount provided in responding to a) above, which essentially contribute to the Orange Zone.

Response

1. Yes, the 300 MW in the Orange Zone in Ref (b) is the estimate of the amount of stranded Standard Offer Program (SOP) potential. The 726 MW (see the response to Board Staff Interrogatory 2.1.1) is the amount of SOP potential in the Hydro One connection queue (see response to Board Staff Interrogatory 2.1.1). The 300 MW is the amount expected after the consideration of distribution system limitations. Only the 300 MW is considered stranded by the lack of transmission capability in the Bruce Area because the other approximately 400 MW is restricted by the distribution system instead of the transmission system in the Bruce Area.

2. The SOP potential will be connected to the transformer stations listed in Table 1 below. The transformer stations are connected to the grid by the circuits shown in Table 1 below.

Table 1

Transformer Station	Connection Circuits
Centralia TS	115 kV circuit L7S
Constance DS	115 kV circuit M18
Douglas Point TS	230 kV circuits B20P, B24P
Goderich TS	115 kV circuit M18
Grand Bend East HVDS	115 kV circuit L7S
Hanover TS	230 kV circuits B4V, B5V
Owen Sound TS	230 kV circuits B27S, B28S
Seaforth TS	230 kV circuits B22D, B23D
Wingham TS	230 kV circuits B22D, B23D

3. a) The total installed capacity of the SOP potential respecting distribution system limits is shown in Table 2 below.

b) An average seasonal energy generation of approximately 20% of installed capacity during the summer peak and 34% of installed capacity during the winter peak was calculated for the Bruce Area based on the AWS Truewind Report. The installed capacities in the response to Board Staff Interrogatory 2.1.1 part 2 have been multiplied by these percentages in Table 2 below. Note that wind generation is variable and its output will vary between zero and its installed capacity.

Transmission capability planning for a region composed of wind and nuclear generation is discussed in the response to Board Staff Interrogatory 1.6 part (iv).

The 2007 loads coincident with system summer and winter peaks are listed for each transformer station in Table 3 below. The power flow for each transformer station is calculated for both the installed capacity and average generation of the SOP wind potential at the system coincident winter and summer peak loads in Table 4 below.

Table 2

Station	SOP Potential Respecting Distribution System Limitations (MW)	Average Summer Peak Generation of SOP Sites in Bruce Area (MW)	Average Winter Peak Generation of SOP Sites in Bruce Area (MW)
Centralia TS	10	2	3
Constance DS	11	2	4
Douglas Point TS	48	10	16
Goderich TS	0	0	0
Grand Bend East DS	15	3	5
Hanover TS	63	13	21
Meaford TS	30	6	10
Owen Sound TS	23	5	8
Palmerston TS	29	6	10
Seaforth TS	28	6	10
Wingham TS	56	11	19

Table 3

2007 Loads (MW)	Winter System Peak	Summer System Peak
Centralia TS	34	33
Constance DS	19	17
Douglas Point TS	67	42
Goderich TS	38	36
Grand Bend East DS	16	17
Hanover TS	99	70
Meaford TS	51	43
Owen Sound TS	125	98
Palmerston TS	58	45
Seaforth TS	35	31
Wingham TS	70	61

Table 4

	Power Flow at Winter System Peak (MW)		Power Flow at Summer System Peak (MW)	
Station	@ SOP Installed Capacity	@ SOP Average Generation	@ SOP Installed Capacity	@ SOP Average Generation
Centralia TS	24	31	23	31
Constance DS	8	15	6	15
Douglas Point TS	18	50	-7	32
Goderich TS	38	38	36	36
Grand Bend East DS	1	11	2	14
Hanover TS	36	77	7	57
Meaford TS	21	41	13	37
Owen Sound TS	102	117	75	94
Palmerston TS	29	48	16	39
Seaforth TS	6	25	3	26
Wingham TS	14	51	5	50

Note: Flows are from the system to the transformer station.

Ontario Energy Board (Board Staff) INTERROGATORY #2.2.1 List 2

Interrogatory

Issue Number: 1.1
Issue: Have all reasonable alternatives to the project been identified and considered?
Issue Number: 3.1
Issue: Are the proposed near term and interim measures as outlined in the application appropriate?

Ref.(a) Exh.B/T 3/S 1/pp. 1-6
Ref.(b) Technical Conference (Oct. 15, 2007)
Panel 1 Presentation
Covering Existing Facilities & Grid Operations, Need, Alternatives & Evaluation and Near-term & Interim Terms
Ref.(c) Technical Conference Transcripts(Oct. 15, 2007/pp. 197 to 201

Preamble:

(i) the updated evidence of November 30, 2007 show the same five alternatives that were presented in the original evidence of March 29, 2007;
(ii) Ref. (b) show:
- a table with 8 options including one titled "Series Capacitors on 500 kV lines" which is judged to be inadequate in regard to "Provide required capability" and is also judged inadequate in regard to having "Limited effect on other paths";
- a graph for "Near –term and Interim Measures Improvements" which excludes "Series Compensation" and show that these two measures increase the capability of the system from about 5000 MW to about 6500 MW

(iii) In Ref.(c) OPA staff stated that *"At that time, series compensation is a possibility. I am indicating here it is still a possibility, with those considerations. So it is always looked at as a back-pocket solution that we would put in if certain conditions are met."*

Questions/Requests:

1) What is the estimatded increase in the system capability in MW attributed to use of series Compensation?;
2) If Series Compensation is considered part of the interim measures, please indicate the total capability of the near term plus the interim measures comprising both generation rejection and Series Compensation.
3) If the view of the Applicant, Hydro One, is that of the OPA as expressed in Ref.(b) and Ref.(c), please provide clarification in regard to:
   a. What are the exact triggers for revisiting that option;

b. Who will make that decision;
c. More detailed criteria which would be used to justify the investment;
d. What is the process the applicant foresee to secure approval from the OEB

Response

1) The estimated increase in the system capability is 941 MW. This increase takes into account only series compensation and with generation rejection used only for outages and not with all elements in service. Please refer to responses to Pollution Probe Interrogatory 16 and Board Staff Interrogatory 3.2.

2) As described in response to Board Staff Interrogatory 3.5, the use of series capacitors is an interim measure that, along with other interim measures (such as GR) and near-term measures, are expected to increase the transfer capability of the Bruce transmission system to 7,076 MW. However, GR is only appropriate as stop-gap measure and series compensation does not provide sufficient transfer capability to meet the identified need (8,100 MW).

3a) As described in response to Board Staff Interrogatory 3.5, the use of series capacitors as an interim measure is proposed if there are significant delays in the in-service of the proposed Bruce to Milton line. The decision on series capacitors will be made in consideration of the line in-service date, the effectiveness of the near-term and interim measures being proposed, and the progress of generation additions (see: Day 1 Technical Conference Presentation Exhibit KT.1 slide 42 and transcript page 35).

b) The OPA will make a recommendation, in consultation with Hydro One and the IESO. Hydro One will seek necessary approvals to implement the project.

c) To justify the investment, the cost will be examined vis-à-vis the impact of delays which necessitate this interim measure.

d) Section 92 approval is not required**.**