

**Pollution Probe INTERROGATORY #42 List 4**

**Interrogatory**

**Ref.** Exh. B/T 1/S 1. On page 2, Table 1 lists generation resources, loads, and interconnection capacities in SW Ontario.

**Issue Number 1.0**

**1.0 Issue:** Project Need and Justification

**Request**

- a) For each of the generation resources listed, please provide:
  - i the name of each generating unit that is included in each generation resource listed;
  - ii each generating unit's in-service date;
  - iii each generating unit's projected shut-down date (if any);
  - iv each generating unit's summer peak generating capacity;
  - v each generating unit's winter peak generating capacity;
  - vi each generating unit's minimum generating level
  - vii each generating unit's primary fuel;
  - viii each generating unit's net generation in each of the last three years; and
  - ix each generating unit's per-MWH fuel and variable operating cost in each of the last three years.
- b) For each of the loads listed, please provide the summer peak load and the winter peak load in each of the past three years, and please also provide the annual energy consumed by each of the loads in each of the past three years.
- c) For each of the interconnections listed:
  - i please provide net summer MW and MWH supplied over the interconnection and the direction of the net supply;
  - ii please provide net winter MW and MWH supplied over the interconnection and the direction of the net supply; and
  - iii please explain how winter and summer are defined.
- d) What level of generation reserve margin is considered adequate to provide reliable supply in the Province?
- e) Please provide a copy of any planning criteria used in the Province to plan for reliable electric generation supply.

**Response**

- a) Please see the supplementary response provided as Attachment A. This response is filed in respect of the Board's Apr. 7, 2008 Order concerning Generation Forecast Information.
- b) The winter and summer peak loads for the areas requested are shown in the table below. The loads in referenced table (Exhibit B Tab 1 Schedule 1 page 2 Table 1) are rounded, whereas the loads in the table below are more precise.

| Loads (MW)          | 2005        |             | 2006        |             | 2007        |             |
|---------------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                     | Winter      | Summer      | Winter      | Summer      | Winter      | Summer      |
| Windsor             | 800         | 1075        | 727         | 1044        | 770         | 893         |
| Sarnia              | 731         | 823         | 723         | 785         | 724         | 754         |
| London              | 573         | 749         | 607         | 756         | 595         | 651         |
| KWCG                | 1229        | 1392        | 1182        | 1383        | 1226        | 1301        |
| Hamilton            | 1090        | 1229        | 1032        | 1291        | 1087        | 1184        |
| Woodstock/Ingersoll | 155         | 170         | 163         | 180         | 165         | 170         |
| Brantford/Brant     | 221         | 261         | 181         | 213         | 181         | 202         |
| Niagara             | 846         | 1042        | 915         | 1087        | 863         | 1058        |
| Other               | 2085        | 2052        | 1765        | 2229        | 2148        | 2183        |
| <b>Total</b>        | <b>7729</b> | <b>8794</b> | <b>7295</b> | <b>8969</b> | <b>7760</b> | <b>8396</b> |

The annual energy consumed by each of the loads in each of the past three years are as follows:

| Load                | Annual Energy Consumption (MWh) |                 |                 |
|---------------------|---------------------------------|-----------------|-----------------|
|                     | 2005                            | 2006            | 2007            |
| Windsor             | 5038584                         | 5028525         | 5020465         |
| Sarnia              | 5134394                         | 5124143         | 5115931         |
| London              | 3762345                         | 3754834         | 3748816         |
| KWCG                | 7428122                         | 7413293         | 7401411         |
| Hamilton            | 7430382                         | 7415548         | 7403662         |
| Woodstock/Ingersoll | 1057867                         | 1055755         | 1054063         |
| Brandford/Brant     | 1124308                         | 1122064         | 1120265         |
| Niagara             | 5752611                         | 5741126         | 5731924         |
| Other               | 15516186                        | 15485208        | 15460389        |
| <b>Total</b>        | <b>52244800</b>                 | <b>52140495</b> | <b>52056926</b> |

c)

| <b>Michigan Interface</b> |                                  |             |
|---------------------------|----------------------------------|-------------|
| <b>Period</b>             | <b>Net Scheduled Interchange</b> |             |
|                           | <b>(MWh)</b>                     | <b>(MW)</b> |
| Winter (2004–2005)        | -1,748,818                       | -1,980      |
| Summer (2005)             | -1,478,459                       | -1,646      |
| Winter (2005-2006)        | -1,273,495                       | -1,658      |
| Summer (2006)             | -444,272                         | -1,880      |
| Winter (2006-2007)        | -456,736                         | -1,674      |
| Summer (2000)             | -433,618                         | -1,562      |
| <b>New York Interface</b> |                                  |             |
| <b>Period</b>             | <b>Net Scheduled Interchange</b> |             |
|                           | <b>(MWh)</b>                     | <b>(MW)</b> |
| Winter (2004–2005)        | +2,384,210                       | +2,264      |
| Summer (2005)             | +1,383,733                       | +2,194      |
| Winter (2005-2006)        | +2,853,268                       | +2,246      |
| Summer (2006)             | +2,342,801                       | +2,006      |
| Winter (2006-2007)        | +1,921,563                       | +1,994      |
| Summer (2000)             | +2,164,005                       | +1,900      |

The winter and summer periods are based on the calendar definition of winter and summer.

Note: - (negative) values represents net imports and + (positive) values represents net exports.

d) Generation reserve margins which meet or exceed the NPCC resource adequacy criteria are considered adequate to provide reliable supply in Ontario in the operating timeframe. The applicable criterion is found in NPCC Document A-02 “Basic Criteria for Design and Operation of Interconnected Power Systems”. The relevant portion of this document is:

### **“3.0 Resource Adequacy - Design Criteria**

Each Area’s probability (or risk) of disconnecting any **firm load** due to resource deficiencies shall be, on average, not more than once in ten years. Compliance with this criteria shall be evaluated probabilistically, such that the **loss of load expectation [LOLE]** of disconnecting **firm load** due to resource deficiencies shall be, on average, no more than 0.1 day per year. This evaluation shall make due allowance for demand uncertainty, scheduled outages and de-ratings, forced

1 outages and de-ratings, assistance over interconnections with neighbouring **Areas**  
2 and **Regions**, transmission transfer capabilities, and capacity and/or load relief  
3 from available operating procedures.”  
4

5 The manner in which the IESO applies this criterion is described in document  
6 IMO\_REQ\_0041, “Ontario Resource and Transmission Assessment Criteria”,  
7 Section 8, Resource Adequacy Assessment Criterion. For capacity planning  
8 purposes, where longer term decisions must be made, additional reserves to cover  
9 residual uncertainties and project delays may be appropriate. Also, the IESO does  
10 not consider emergency operating procedures for longer term capacity planning to  
11 be appropriate because the relief provided by these measures is intended to deal  
12 with emergencies rather than as a surrogate resource. Regular triggering of  
13 emergency operating procedures rather than developing appropriate resources  
14 could lead to the erosion of these emergency operating procedures through  
15 overuse. The extent to which all uncertainty is covered becomes an economic  
16 decision which should be guided by the NPCC criterion.  
17

18 e) Applicable planning criteria and relevant links to such documents are discussed in  
19 the response to Board Staff Interrogatory 3.2.  
20  
21  
22

**Attachment A**  
**Supplementary Response to Pollution Probe Interrogatory 42(a)**

Pollution Probe Interrogatory 42(a) references a table found in Hydro One's pre-filed application (Exhibit B, Tab 1, Schedule 1, Page 2, Table 1). This Table describes generation resources, loads, and interconnection capacities in all of Southwestern Ontario. Table 1 is an OPA work product and was originally included in its IPSP Discussion Paper #5.

The purpose of Table 1 was to provide a list of existing (i.e., 2005) generating plants in southwestern Ontario as part of an overview of the existing demand/supply situation as existed at the time of preparing the IPSP Discussion Paper #5. Table 1 is not a forecast of generation in southwestern Ontario. The source data used by the OPA in preparing Table 1 comprised only the individual generating plants in each of the listed regions and their nominal generation capacities. The attached Table A provides a more detailed breakdown, by units, of the generating plants identified in the referenced table in Discussion Paper #5. None of the other information requested in the subparts to Interrogatory 42(a) were in the possession of the OPA and thus used for preparing the Table.

Based on the April 7 Decision, Hydro One and the OPA understand that the Board's findings are intended to have further information provided that concerns the source data used by the OPA in preparing its Bruce Area generation forecast (Exhibit B, Tab 1, Schedule 1, Figure 1, Page 4) as revised. In particular what, if any of the information requested in Pollution Probe Interrogatory 42(a) was used by the OPA in preparing its Bruce Area generation forecast.

OPA confirms that the only information requested in Pollution Probe 42(a)(i) through (ix) that has been used for purposes of preparing the Bruce Area generation forecast was the names of the individual generating units in the Bruce the area and their primary fuel (i.e., wind or nuclear). OPA did not, for example, take into account the per-MWH fuel and variable operating costs of the individual generating units in operation in south-western Ontario (or for that matter units specific to the Bruce area) in the past three years for its generation forecast.

The source information OPA has used to prepare its forecast is described in Exhibit B, Tab 6, Schedule 5, Appendix 1 of the Application, and the responses to Board Staff Interrogatory 1.1, and Energy Probe Interrogatories 6 and 21. This source data was also discussed at the Day 1 Technical Conference Presentation (Exhibit KT.1).

In those Responses, OPA has noted that specific and up-to-date capacity and in-service information was used for generators in the Bruce area only.

1 The in-service dates of other units outside of the Bruce area and their nominal capacities  
2 were considered to assist the OPA in the determination of the base case conditions in  
3 order to develop study base cases used by the IESO and the OPA. These are shown in  
4 Table B.

5  
6 Specific shutdown dates for the Nanticoke and Lambton coal-fired generation stations  
7 were not used for the purposes of developing study base cases. Instead the assumption  
8 made was that shut-down would occur by the end of 2014. No minimum generation  
9 levels were assumed for Bruce area generation. This is because the Bruce area  
10 generation forecast has been predicated upon existing and planned nameplate capacity  
11 generation levels. OPA did consider primary fuel sources of Bruce generation and this  
12 expressly shown in the generation forecast (i.e. wind and nuclear).

13  
14 With respect to forecast system generation costs, OPA's generation forecast has used the  
15 avoided energy costs in Table 11 of the "Avoided Cost Analysis for the Evaluation of  
16 CDM Measures" report by Navigant as indicated in the response to Pollution Probe  
17 Interrogatory 49. OPA did not, for example, use marginal unit cost in calculating locked-  
18 in energy in this application. Instead, nuclear and wind generation in the Bruce Area was  
19 assumed to be dispatched in all cases given well recognized understandings that nuclear  
20 and wind generation have, relative to other generation types, low operating costs.

21  
22 To be helpful, Hydro One, with the assistance of OPA, IESO and OPG, has attempted to  
23 address subparts to Interrogatory 42(a). Where available, the most recent information  
24 using 2007 data has been provided with respect to (i) – (viii). OPA wishes to be clear,  
25 however, that this information was not used by the OPA in preparing Table 1 or in the  
26 preparation of its Bruce Area generation forecast. This additional information is attached  
27 as Table B.

1 Table A – OPA’s Breakdown of Table

| <b>Generation Unit</b>  | <b>Capacity (MW)</b> |
|-------------------------|----------------------|
| <b>BRUCE</b>            |                      |
| Bruce Unit 3            | 750                  |
| Bruce Unit 4            | 750                  |
| Bruce Unit 5            | 890                  |
| Bruce Unit 6            | 890                  |
| Bruce Unit 7            | 890                  |
| Bruce Unit 8            | 890                  |
|                         |                      |
| <b>NANTICOKE</b>        |                      |
| Nanticoke Unit 1        | 490                  |
| Nanticoke Unit 2        | 490                  |
| Nanticoke Unit 3        | 490                  |
| Nanticoke Unit 4        | 490                  |
| Nanticoke Unit 5        | 490                  |
| Nanticoke Unit 6        | 490                  |
| Nanticoke Unit 7        | 508                  |
| Nanticoke Unit 8        | 497                  |
|                         |                      |
| <b>LAMBTON</b>          |                      |
| Lambton Unit 1          | 485                  |
| Lambton Unit 2          | 485                  |
| Lambton Unit 3          | 501                  |
| Lambton Unit 4          | 501                  |
|                         |                      |
| <b>BECK</b>             |                      |
| Beck 1 - EBUS           | 350                  |
| Beck 1 – FC             | 50                   |
| Beck 2 - G 11,12        | 193                  |
| Beck 2 - G 13,14        | 174                  |
| Beck 2 - G 15,16        | 175                  |
| Beck 2 - G 17,18        | 193                  |
| Beck 2 - G 19,20        | 193                  |
| Beck 2 - G 21,22        | 181                  |
| Beck 2 - G 23,24        | 181                  |
| Beck 2 - G 25,26        | 193                  |
| Beck 2 - PGS G 1,2,3    | 60                   |
| Beck 2 - PGS G 4,5,6    | 63                   |
|                         |                      |
| <b>SARNIA</b>           |                      |
| TransAlta Sarnia G861   | 120                  |
| TransAlta Sarnia G871   | 130                  |
| TransAlta Sarnia G881   | 130                  |
| TransAlta Sarnia G891   | 130                  |
|                         |                      |
| <b>WINDSOR AREA GAS</b> |                      |
| Brighton Beach          | 580                  |
| TransAlta Windsor G 1,2 | 62                   |
| West Windsor G 1,2      | 97                   |

|   |     |
|---|-----|
| <b>OTHER</b>                                  |     |
| Bruce A Oil G1                                | 12  |
| Bruce B Oil G1                                | 12  |
| Countryside London Cogeneration Facility      | 12  |
| Decew Falls G1                                | 72  |
| Decew Falls G2                                | 72  |
| Decew Falls G5-8                              | 23  |
| Dow Chemical Cogen                            | 100 |
| East Windsor                                  | 84  |
| Eastview Landfill Gas Energy Plant            | 3   |
| Erie Shores Wind Farm                         | 99  |
| Great Northern Tri-Gen Facility               | 12  |
| Hamilton (Digester Gas) Cogeneration Facility | 2   |
| Imperial Oil Cogen                            | 98  |
| Kingsbridge I Wind Farm                       | 40  |
| Kingsville B-Bus Oil Gen                      | 3   |
| Kingsville Y-Bus Oil Gen                      | 7   |
| Lambton Oil G1                                | 7   |
| Lambton Oil G2                                | 7   |
| Melancthon I Wind Farm                        | 68  |



1 Table B – Information Provided by OPA, IESO and OPG

2

| Station      | In-Service Date  | Shutdown Date | 2007 Peak Capacity (MW) |        | 2007 Minimum Generation Level (MW) | Net Generation (MW) |      |      | Primary Fuel Type |
|--------------|--|---------------|-------------------------|--------|------------------------------------|---------------------|------|------|-------------------|
|              |  |               | Winter                  | Summer |                                    | 2005                | 2006 | 2007 |                   |
| Bruce A      |  |               |                         |        |                                    |                     |      |      |                   |
| Unit 1       | Sept 1, 1977   | Oct 16, 1997  | -                       | -      | -                                  | -                   | -    | -    | Uranium           |
| Unit 2       | Sept 1, 1977   | Oct 8, 1995   | -                       | -      | -                                  | -                   | -    | -    | Uranium           |
| Unit 3       | Feb 1, 1978  | N/A           | 750                     | 805    | 0                                  | 772                 | 779  | 805  | Uranium           |
| Unit 4       | Jan 18, 1979   | N/A           | 789                     | 750    | 0                                  | 810                 | 805  | 789  | Uranium           |
| Bruce B      |  |               |                         |        |                                    |                     |      |      |                   |
| Unit 5       | Mar 1, 1985  | N/A           | 847                     | 808    | 290                                | 796                 | 833  | 847  | Uranium           |
| Unit 6       | Sept 14, 1984  | N/A           | 827                     | 874    | 0                                  | 881                 | 833  | 874  | Uranium           |
| Unit 7       | Apr 19, 1986   | N/A           | 875                     | 828    | 0                                  | 800                 | 828  | 875  | Uranium           |
| Unit 8       | May 22, 1987   | N/A           | 836                     | 827    | 0                                  | 843                 | 857  | 836  | Uranium           |
|              |  |               |                         |        |                                    |                     |      |      |                   |
| Lambton      |  |               |                         |        |                                    |                     |      |      |                   |
| Unit 1       | May 14, 1970   | N/A           | 509                     | 483    | 0                                  | 481                 | 481  | 509  | Coal              |
| Unit 2       | Dec. 31, 1969  | N/A           | 487                     | 484    | 0                                  | 491                 | 484  | 487  | Coal              |
| Unit 3       | Nov. 6, 1970   | N/A           | 500                     | 504    | 0                                  | 508                 | 503  | 504  | Coal              |
| Unit 4       | Dec. 14, 1970  | N/A           | 501                     | 488    | 0                                  | 502                 | 499  | 501  | Coal              |
|              |  |               |                         |        |                                    |                     |      |      |                   |
| Nanticoke    |  |               |                         |        |                                    |                     |      |      |                   |
| Unit 1       | July 5, 1973   | N/A           | 424                     | 457    | 0                                  | 465                 | 476  | 457  | Coal              |
| Unit 2       | March 8, 1973  | N/A           | 478                     | 445    | 0                                  | 474                 | 454  | 478  | Coal              |
| Unit 3       | Nov. 29, 1973  | N/A           | 483                     | 466    | 0                                  | 476                 | 482  | 483  | Coal              |
| Unit 4       | May 9, 1974  | N/A           | 456                     | 457    | 0                                  | 479                 | 483  | 457  | Coal              |
| Unit 5       | July 31, 1975  | N/A           | 496                     | 475    | 0                                  | 455                 | 429  | 496  | Coal              |
| Unit 6       | Jan. 27, 1977  | N/A           | 455                     | 439    | 0                                  | 481                 | 448  | 455  | Coal              |
| Unit 7       | Dec. 21, 1978  | N/A           | 499                     | 500    | 0                                  | 501                 | 506  | 500  | Coal              |
| Unit 8       | Sept. 21, 1978   | N/A           | 499                     | 494    | 0                                  | 499                 | 495  | 499  | Coal              |
|              |  |               |                         |        |                                    |                     |      |      |                   |
| Beck         |  |               |                         |        |                                    |                     |      |      |                   |
| Beck 1       | Unit 1,2, & 4-1922<br>Unit 5- 1923<br>Unit 3, 6, & 7-1924<br>Unit 8 & 9 - 1925<br>Unit 10 – 1930 | N/A           | 360                     | 338    | 1                                  | 451                 | 388  | 360  | Hydro             |
| Beck 2       | Unit 11-17 – 1954,<br>Unit 18-22 – 1955,<br>Unit 23-24 – 1957,<br>Unit 25-26 – 1958              | N/A           | 1433                    | 1421   | 377                                | 1442                | 1437 | 1433 | Hydro             |
| Beck 2 PGS   | 1957   | N/A           | 102                     | 107    | 0                                  | 108                 | 107  | 107  | Hydro             |
| Windsor Area |  |               |                         |        |                                    |                     |      |      |                   |
| TransAlta    | 1996   | N/A           | 66                      | 67     | 0                                  | 68                  | 68   | 67   | Gas               |

| Station                 | In-Service Date | Shutdown Date | 2007 Peak Capacity (MW) |        | 2007 Minimum Generation Level (MW) | Net Generation (MW) |      |      | Primary Fuel Type |
|-------------------------|-----------------|---------------|-------------------------|--------|------------------------------------|---------------------|------|------|-------------------|
|                         |                 |               | Winter                  | Summer |                                    | 2005                | 2006 | 2007 |                   |
| West Windsor            | May 31, 1996    | N/A           | 129                     | 116    | 0                                  | 128                 | 126  | 129  | Gas               |
| Brighton Beach          | Jul 20, 2004    | N/A           | 599                     | 545    | 0                                  | 573                 | 583  | 599  | Gas               |
|                         |                 |               |                         |        |                                    |                     |      |      |                   |
| <b>TransAlta Sarnia</b> | Mar 27, 2003    | N/A           | 443                     | 405    | 105                                | 441                 | 408  | 443  | Gas               |
|                         |                 |               |                         |        |                                    |                     |      |      |                   |
| <b>Other</b>            |                 |               |                         |        |                                    |                     |      |      |                   |
| Decew Falls             | Aug, 1898       | N/A           | 73                      | 146    | 0                                  | 145                 | 146  | 146  | Hydro             |
| Decew ND1               | Oct, 1943       | N/A           | 21                      | 22     | 0                                  | 22                  | 22   | 22   | Hydro             |
| Erie Shores             | Mar 17, 2006    | N/A           | 98                      | 89     | 0                                  |                     | 98   | 98   | Wind              |
| Amaranth I              | Feb 16, 2006    | N/A           | 66                      | 65     | 0                                  |                     | 65   | 66   | Wind              |
| Kingsbridge             | May 31, 2006    | N/A           | 38                      | 37     | 0                                  |                     |      | 38   | Wind              |
| Misc.                   | Various         | N/A           |                         |        | 0                                  |                     |      |      | Various           |