

**GEC, Pembina, OSEA #1**

**Ref:** Ex. E1-T1-S1

**Issue Number: 4.1**

**Issue:** Is the methodology used by OPG to generate the proposed hydroelectric and nuclear business production forecasts appropriate?

**Interrogatory**

For each nuclear *unit* owned by OPG and for each year of expected unit operation, please provide the Company's projections of:

- a) Rated capacity,
- b) Nuclear fuel costs,
- c) Non-fuel OM&A costs,
- d) Gross capital additions,
- e) Net generation exclusive of plant use,
- f) Unit capability factor,
- g) Forced outage hours,
- h) Maintenance outage hours,
- i) Equivalent availability factor (EAF), and
- j) Any other projected performance factors.

**Response**

Data for nuclear units at OPG's prescribed facilities is provided below. Data for the Bruce Power nuclear units is not provided as it is not relevant to determination of the payments amounts for the prescribed facilities.

OPG is not familiar with the term "Equivalent Availability Factor (EAF)." It is not a standard nuclear industry definition. OPG has provided unit capability factor which is the industry standard unit of measure for capability comparisons across the industry.

For the information presented below:

- Forced outage data includes forced derates and extensions to planned outages.
- Planned outage hours is the term used by OPG to reflect scheduled outage maintenance activities; OPG does not measure maintenance outage hours.
- Fuel costs include uranium, CTU fuel oil, used fuel disposal and used fuel storage variable costs. Station fuel costs have been proportionally allocated to units based on respective unit generation each year.
- OM&A costs include base, outage and project OM&A.
  - Base OM&A costs are station direct costs divided by the number of operating units. They do not include allocated nuclear or corporate support costs.

- Station outage OM&A costs are generally allocated by specific unit outage. Outage OM&A does not include allocated nuclear or corporate support costs.
- OM&A project costs include all OM&A projects designated for the station, with station totals allocated equally to each of the units.
- Capital expenditures include all projects designated for the station, with station totals allocated equally to each of the units.
- Costs exclude P2/P3 safe storage expenditures.

| Year 2008                       | Darlington |       |       |       | Pickering |        |       |       |        |        |
|---------------------------------|------------|-------|-------|-------|-----------|--------|-------|-------|--------|--------|
| Measure                         | D1         | D2    | D3    | D4    | P1        | P4     | P5    | P6    | P7     | P8     |
| Rated Capacity MW's (MCR - NET) | 878        | 878   | 878   | 878   | 515       | 515    | 516   | 516   | 516    | 516    |
| Net Generation (TWh)            | 6.0        | 7.5   | 7.5   | 7.5   | 3.9       | 3.2    | 4.3   | 4.3   | 3.6    | 3.5    |
| Unit Capability Factor %        | 77.7       | 97.8  | 97.8  | 97.8  | 87.0      | 71.1   | 93.8  | 93.8  | 80.5   | 78.4   |
| Forced Outage Hrs **            | 156.4      | 196.8 | 196.8 | 196.8 | 1142.0    | 933.0  | 545.0 | 545.0 | 467.0  | 455.0  |
| Planned Outage Hrs              | 1802.0     | 0.0   | 0.0   | 0.0   | 0.0       | 1608.0 | 0.0   | 0.0   | 1248.0 | 1440.0 |
| Nuclear Fuel Costs (\$M) *      | 19.0       | 24.0  | 24.0  | 24.0  | 12.3      | 10.0   | 13.3  | 13.3  | 11.4   | 11.1   |
| Nuclear OM&A Costs (\$M)        | 151.2      | 84.2  | 85.5  | 84.2  | 103.8     | 151.1  | 77.9  | 76.2  | 105.1  | 108.9  |
| Capital Expenditures (\$M       | 15.9       | 15.9  | 15.9  | 15.9  | 12.7      | 12.7   | 3.9   | 3.9   | 3.9    | 3.9    |

| Year 2009                       | Darlington |       |        |       | Pickering |       |        |        |       |       |
|---------------------------------|------------|-------|--------|-------|-----------|-------|--------|--------|-------|-------|
| Measure                         | D1         | D2    | D3     | D4    | P1        | P4    | P5     | P6     | P7    | P8    |
| Rated Capacity MW's (MCR - NET) | 878        | 878   | 878    | 878   | 515       | 515   | 516    | 516    | 516   | 516   |
| Net Generation (TWh)            | 6.9        | 6.9   | 5.9    | 6.9   | 3.3       | 4.0   | 3.8    | 3.7    | 4.3   | 4.3   |
| Unit Capability Factor %        | 90.0       | 89.4  | 75.9   | 89.7  | 72.7      | 90.0  | 95.0   | 81.5   | 95.0  | 95.0  |
| Forced Outage Hrs **            | 160.8      | 159.8 | 135.6  | 160.3 | 708.0     | 876.0 | 383.0  | 376.0  | 438.0 | 438.0 |
| Planned Outage Hrs              | 720.0      | 768.0 | 1977.6 | 744.0 | 1680.0    | 0.0   | 1104.0 | 1248.0 | 0.0   | 0.0   |
| Nuclear Fuel Costs (\$M) *      | 28.5       | 28.5  | 24.3   | 28.5  | 13.3      | 16.1  | 15.3   | 15.0   | 17.4  | 17.4  |
| Nuclear OM&A Costs (\$M)        | 86.4       | 86.4  | 141.5  | 86.4  | 158.9     | 104.2 | 103.0  | 109.0  | 73.0  | 73.3  |
| Capital Expenditures (\$M       | 5.1        | 5.1   | 5.1    | 5.1   | 2.6       | 2.6   | 1.5    | 1.5    | 1.5   | 1.5   |

\* Fuel Costs includes Uranium/CTU/Disposal/Storage

\*\* Includes forced derates and forced extensions to planned outages

**GEC, Pembina, OSEA #2**

**Ref:** Ex. E1-T1-S1

**Issue Number: 4.1**

**Issue:** Is the methodology used by OPG to generate the proposed hydroelectric and nuclear business production forecasts appropriate?

**Interrogatory**

Please provide the unit in-service date of each nuclear unit owned by OPG.

**Response**

Unit in-service dates are provided below for the nuclear units at OPG's prescribed facilities and the Bruce Power nuclear units.

1

| <u>UNIT</u>                        | <u>IN-SERVICE DATE</u>      |
|------------------------------------|-----------------------------|
| Pickering A Unit 1                 | July 29, 1971               |
| Pickering A Unit 1 following Layup | November 10, 2005           |
| Pickering A Unit 2                 | December 30, 1971           |
| Pickering A Unit 3                 | June 1, 1972                |
| Pickering A Unit 4                 | June 17, 1973               |
| Pickering A Unit 4 following Layup | September 25, 2003          |
| Pickering B Unit 5                 | May 10, 1983                |
| Pickering B Unit 6                 | February 1, 1984            |
| Pickering B Unit 7                 | January 1, 1985             |
| Pickering B Unit 8                 | February 28, 1986           |
| Darlington Unit 1                  | November 14, 1992           |
| Darlington Unit 2                  | October 9, 1990             |
| Darlington Unit 3                  | February 14, 1993           |
| Darlington Unit 4                  | June 14, 1993               |
| Bruce Unit 1                       | September 1, 1977           |
|                                    | Laid up on October 16, 1997 |
| Bruce Unit 2                       | September 1, 1977           |
|                                    | Laid up on October 08, 1995 |
| Bruce Unit 3                       | February 1, 1978            |
|                                    | Laid up on April 09, 1998   |
| Bruce Unit 3 following Layup       | March 28, 2004              |
| Bruce Unit 4                       | January 18, 1979            |
|                                    | Laid up on March 16, 1998   |
| Bruce Unit 4 following Layup       | November 28, 2003           |
| Bruce Unit 5                       | March 1, 1985               |
| Bruce Unit 6                       | September 14, 1984          |
| Bruce Unit 7                       | April 10, 1986              |
| Bruce Unit 8                       | May 22, 1987                |

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**GEC, Pembina, OSEA #3**

**Ref:** Ex. E1-T1-S1

**Issue Number: 4.1**

**Issue:** Is the methodology used by OPG to generate the proposed hydroelectric and nuclear business production forecasts appropriate?

**Interrogatory**

Please provide the projected retirement date of each nuclear unit owned by OPG with and without refurbishment.

**Response**

Current projected retirement dates of each nuclear unit owned and operated by OPG, developed on the basis of technical reviews and assuming no refurbishment, are as follows:

| Nuclear Station | Unit   | Projected Retirement Date |
|-----------------|--------|---------------------------|
| Darlington      | Unit 1 | March 2019                |
| Darlington      | Unit 2 | March 2019                |
| Darlington      | Unit 3 | December 2019             |
| Darlington      | Unit 4 | March 2020                |
| Pickering A     | Unit 1 | February 2022             |
| Pickering A     | Unit 2 | Unit is in safe storage   |
| Pickering A     | Unit 3 | Unit is in safe storage   |
| Pickering A     | Unit 4 | April 2028                |
| Pickering B     | Unit 5 | Q1 2014                   |
| Pickering B     | Unit 6 | Q1 2014                   |
| Pickering B     | Unit 7 | Q1 2014                   |
| Pickering B     | Unit 8 | Q1 2016                   |

OPG is currently in the initial phase of assessing the refurbishment of Pickering B, with a recommendation with respect to Pickering B refurbishment options to be provided to OPG's Board of Directors no later than early 2009 (Ex. D2-T1-S3, Section 2.1.1, page 4). Darlington refurbishment assessment work is starting in 2008 (Ex. D2-T1-S3, Section 2.1.2, page 6). OPG has not undertaken any assessment of the refurbishment of Pickering A. Because the refurbishment review process is in its initial stages for Pickering B and Darlington and is non-existent for Pickering A, OPG is unable to provide projected retirement dates that assume refurbishment.

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Exhibit L

Tab 7

Schedule 3

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- 1 OPG does not operate Bruce Power units and therefore cannot provide projected
- 2 retirements dates (with or without refurbishment) which are based on technical review.
- 3 Current end-of-life dates for the Bruce stations used only for depreciation purposes are
- 4 provided in the response to interrogatory L-1-44.

**GEC, Pembina, OSEA #4**

**Ref:** Ex. E1-T1-S1

**Issue Number: 4.1**

**Issue:** Is the methodology used by OPG to generate the proposed hydroelectric and nuclear business production forecasts appropriate?

**Interrogatory**

For each nuclear unit owned by OPG, please provide the following data for the period 1990 through 2004:

- a) Rated capacity,
- b) Net generation exclusive of plant use,
- c) Unit capability factor,
- d) Forced outage hours,
- e) Maintenance outage hours,
- f) Equivalent availability factor (EAF),
- g) Nuclear fuel costs,
- h) Non-fuel OM&A costs,
- i) Gross capital additions, and
- j) Any other available performance data.

**Response**

OPG declines to provide historical information for 1990 through 2004 for the reasons given in L-12-6.

**GEC, Pembina, OSEA #5**

**Ref:** Ex. E1-T1-S1

**Issue Number: 4.1**

**Issue:** Is the methodology used by OPG to generate the proposed hydroelectric and nuclear business production forecasts appropriate?

**Interrogatory**

For each option considered in Phase 1 of the Pickering B and Darlington refurbishment projects, please provide the following information:

- a) the projected effect of the additional capital investment on unit output, availability factor, capability factor, and OM&A.
- b) all feasibility and economic analyses of the option and without limiting the generality of this request, any analysis that includes the base assumptions for unit performance (i.e. if no refurbishment occurs).

**Response**

Analysis relating to Darlington refurbishment is starting in 2008 (Ex. D2-T1-S3, Section 2.1.2, page 6). Because the work on this analysis is in its initial stages, there is no information related to the projected effects on the factors listed in a) above and no feasibility and economic analyses are available as requested in b) above.

With respect to Phase 1 of Pickering B refurbishment, OPG's analyses are preliminary and are not provided. While a number of the elements of the analysis have been considered in detail, a number of uncertainties remain. Only when these uncertainties are resolved will OPG be able to conclude its analysis.

Further, the information requested is not relevant to the issues the OEB must determine in this proceeding. The Pickering B refurbishment project is covered by section 6(2)4 of O. Reg. 53/05. The issues list includes four issues relating to section 6(2)4:

3.1 Are the costs and financial commitments OPG is seeking to recover under section 6(2)4 incurred to increase the output of, refurbish or add operating capacity to a prescribed facility?

3.2 If so, are the costs and financial commitments within project budgets approved for that purpose by the board of directors of OPG?

3.3 If the costs and financial commitments are not within project budgets approved by the board of directors of OPG, are the costs and financial commitments prudent?



1  
2 3.4 In section 6(2)4, what is a “firm financial commitment” and a “pre-  
3 engineering commitment  
4  
5 OPG is not seeking approval of any costs in respect of these refurbishments that are  
6 outside the approved project budgets. The project is clearly to refurbish a prescribed  
7 facility. Therefore, the information requested by the interrogatory is not relevant to the  
8 issues on the issues list.

9 Further, the appropriate time to consider the information requested by this interrogatory  
10 is in the context of OPG’s next application for payment amounts. At that time, a  
11 recommendation will have been made with respect to the Pickering B refurbishment  
12 option (Ex. D2-T1-S3, page 4, lines 21 - 22) based on a detailed assessment of the  
13 business case. The cost consequences of any decision to proceed with refurbishment  
14 will only have an impact on subsequent test periods after the capital costs have entered  
15 rate base.