NON-ENERGY REVENUES

NUCLEAR

1.0 PURPOSE

This evidence describes OPG’s non-energy revenue derived from its nuclear operations; the regulatory treatment of these revenues; and the forecast of the nuclear non-energy revenues for the test period.

2.0 OVERVIEW

Actual and planned nuclear non-energy revenues (net of related costs) for the period 2013–2021 are presented in Ex. G2-1-1 Table 1. The forecast of nuclear non-energy revenues for the test period is included as an offset in the calculation of OPG’s revenue requirement. No change is proposed in the regulatory treatment for nuclear non-energy revenues.

As more fully described in section 3.1.1, OPG is considering a proposed new initiative to produce Cobalt-60 at Darlington. The initiative presents operational and financial risks to OPG and if it proceeds, OPG will seek revenue sharing for Cobalt 60 revenues in a future application.

Bridge and test years’ nuclear non-energy revenues trend lower than historical periods though a modest increase in demand for heavy water is reflected in higher forecasted heavy water sales revenues for 2016 and 2017. After 2017, OPG’s inventory of heavy water will be exhausted and OPG forecasts no revenues from heavy water sales for 2018 to 2021 (See Ex. G2-1-1 Table 1).

Differences between forecast and actual revenues associated with ancillary services are recorded in the Ancillary Services Net Revenue Variance Account – Nuclear Sub Account. (See Ex. H1-1-1).
3.0 NUCLEAR NON-ENERGY REVENUE SOURCES

3.1 Isotope Sales

3.1.1 Cobalt-60

Cobalt-60 is a critically important medical isotope used for radiation therapy; sterilization of medical equipment; food irradiation and specialized industrial uses. OPG currently produces Cobalt-60 at Pickering B (Units 6, 7 and 8) for use in the sterilization of surgical and medical supplies. OPG sells Cobalt-60 to Nordion (Canada) Inc. (“Nordion”) under a long term agreement.

OPG is not proposing any change to the treatment of revenues from Cobalt-60 production at Pickering. Total revenues from Cobalt-60 sales over the period 2016-2021 are shown in Ex. G2-1-1 Table 1. Electricity generating activities take precedence over Cobalt-60 processing. Cobalt-60 harvesting is tied to the outage schedule of the Pickering units. This results in fluctuating annual revenues and variances between actual and planned revenues.

Sales volumes are constrained by OPG’s ability to produce Cobalt-60. The direct costs and other support costs for this activity are discussed in section 4 below. Cobalt-60 production and its associated revenues would cease with the closure of Pickering planned for 2024.

3.1.1.1 Cobalt-60 Production at Darlington

OPG and Nordion are examining a new opportunity to develop the capability to produce Cobalt-60 at Darlington after Pickering ceases operation. The conversion of the Darlington units to enable production of Cobalt-60 will be most cost effective over the full Darlington refurbishment period.

The conversion will impose additional operational and financial risks to OPG and will require Nordion to make a significant investment by installing equipment to produce Cobalt-60. These additional risks include ensuring ongoing worker safety; maintaining production and outage schedules; regulatory compliance; and revenue variances due to a potential for outage extensions to enable harvesting Cobalt-60.
If OPG and Nordion proceed with this opportunity, production of Cobalt-60 at Darlington would not begin until after the current test period. As a result of the incremental risks OPG faces in introducing Cobalt 60 production at Darlington, OPG will, at its next payment amounts application, propose a revenue sharing of the net revenues it earns from any Cobalt-60 produced at Darlington.

3.1.2 Tritium Sales
Tritium is a by-product of electricity generation using CANDU (Canadian Deuterium Uranium) technology. It is produced by the irradiation of heavy water. In order to stay within the specified limits, and to lower radiation exposure to workers and the environment, tritium is removed from the heavy water via the Darlington Tritium Removal Facility (“TRF”).

OPG has entered into short-term contracts to sell the tritium to government-approved and licensed organizations. Commercial use of tritium includes safety and security products like land-mine markers and emergency exit signs, tritium labeled chemicals for medical research and research into future power sources.

Tritium sales have been relatively stable over time, with some variation due to competition, fluctuating demand and variations in the value of the Canadian dollar. Planned total revenues from isotope sales over the test period are shown in Ex. G2-1-1 Table 1. The direct costs and other support costs are described in Section 4 below.

3.2. Heavy Water Sales and Processing
Heavy water is a manufactured product required for CANDU reactor operations. Heavy water is required as a moderator for sustaining a nuclear reaction and as a heat transport medium in a CANDU nuclear reactor.

3.2.1 Heavy Water Sales
OPG seeks opportunities to sell surplus quantities of heavy water from its heavy water inventory. Surplus quantities are defined as those quantities of heavy water not required to meet OPG’s current and future needs. OPG expects to have surplus heavy water available
for sale up to 2017 when OPG’s inventory will be depleted. As determined by the OEB in EB-2010-0008, revenues (less costs) from heavy water sales are to be shared on a 50-50 basis between OPG and ratepayers. OPG proposes that this treatment continue unchanged during the test period.

3.2.2 Heavy Water Processing

Heavy water processing is primarily comprised of tritium removal (detritiation) at the TRF. The bulk of the heavy water processing revenue is earned from the provision of detritiation services to Bruce Power. Opportunities for providing detritiation services to others are limited because of storage and capacity restrictions at the TRF.

Provision of detritiation services is affected by a station’s ability to ship water to the TRF and the availability of the TRF, which fluctuates according to its maintenance cycle. TRF outages follow a three year cycle, with the first year requiring a long outage (six months), the second year requiring a shorter one (three months) and the third year requiring no outage at all. As a result, revenues fluctuate from year to year.

On occasion, OPG is able to lease/loan small quantities of heavy water to third parties; revenues from these transactions are also recorded under “heavy water services”. Planned total revenues for heavy water sales and processing over the test period are summarized in Ex. G2-1-1 Table 1. Cost of goods sold and other support costs are described in section 4 below.

3.3 Helium-3

In EB-2013-0321, OPG included a forecast for $4M of revenue in 2015 from the sale of Helium-3. A change in customer requirements resulted in no sales of Helium-3. OPG’s test period forecast does not include revenue for sales of Helium-3.

3.4 Ancillary Services

OPG’s nuclear assets are able to supply the IESO with reactive support and voltage control. Reactive support service allows the IESO to maintain the reactive power levels required by
the IESO-controlled grid. Voltage control service allows the IESO to maintain voltage levels required by the IESO-controlled grid.

OPG and the IESO negotiated an extension to the existing Reactive Support and Voltage Control Service Agreement effective January 1, 2013 to May 31, 2016. OPG’s expectation for the plan period is that a new contract will be negotiated with terms and conditions similar to those in the existing contract; hence the forecast is based on 2015 values with an allowance for inflation.

4.0 OPERATING COSTS OF NUCLEAR NON-ENERGY BUSINESSES

The operating costs of the nuclear non-energy business are made up of direct costs (costs directly associated with producing or generating the product or service) and other support costs (costs associated with sales, administration and other overheads). The direct costs of the nuclear non-energy business are shown in Ex. G2-1-1 Table 1 on an aggregated basis. Other support costs are included in Base OM&A (Ex. F2-2-1 Table 1 Nuclear Support Divisions either under Inspection and Maintenance Services or under Commercial Services).

4.1 Cobalt-60

The direct costs for Cobalt-60 production include installation, removal, processing, storage, and packaging of Cobalt-60. Under the Amended and Restated Used Fuel Waste and Cobalt-60 Agreement between Bruce Power and OPG, Bruce Power makes payments to OPG to assume liability for the interim storage and future disposal of Bruce Power’s spent Cobalt-60. The revenues associated with Cobalt-60 are included in Isotope Sales and are set out in Ex. G2-1-1 Table 1.

Other support costs for Cobalt-60 are included in OPG OM&A and represent an allocation of the Isotopes Sales Group support costs including a portion of labour costs related to sales and administration.
### 4.2 Tritium Sales

The direct costs for the tritium sales program are primarily Canadian Nuclear Laboratories dispensing fees, packaging, and shipping costs. The product itself is a pure by-product of the detritiation process and no production cost is attached to what is sold.

Other support costs for the tritium sales program are included as OM&A and represent an allocation of the Isotopes Sales Group support costs including a portion of labour costs related to sales and administration.

### 4.3 Heavy Water Sales

The direct costs for heavy water sales include labour for handling, testing, loading, unloading, and packaging; the cost of containers, and transportation costs. OPG proposes that 50 per cent of the related costs from the sale of surplus heavy water continue to be included in the determination of the revenue requirement in accordance with the OEB’s decision in EB-2010-0008.

### 4.4 Heavy Water Processing

Direct costs for heavy water processing services are for estimated incremental direct labour costs attached to processing heavy water for Bruce Power at the TRF and direct labour (e.g., handling, testing, packaging) and other costs (e.g., shipping) attached to the provision of other services (e.g., loans, swaps, upgrading) to third parties.

“Other support costs” for heavy water detritiation processing services relate to sales and support staff dedicated to serving this market, all of which is included in OPG OM&A (i.e., Commercial Services see Ex. F2-2-1 Table 1).
Table 1
Other Revenues - Nuclear ($M)

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