1.0 PURPOSE
This evidence describes OPG’s nuclear operations that generate non-energy revenue, the regulatory treatment of those revenues and the forecast of non-energy revenues for the test period.

2.0 OVERVIEW
The forecast of nuclear non-energy revenues (net of related costs) for the test period is $31.2M and $28.5M in 2014 and 2015, respectively. Nuclear non-energy revenues (net of related costs) for the period 2010 - 2015 are presented in Ex. G2-1-1 Table 1.

No change is proposed in the regulatory treatment for non-nuclear revenues. As a result, OPG offsets 50 per cent of its forecasted revenues (net of related costs) from the sale of surplus heavy water in its determination of the revenue requirement, consistent with the Board’s decision in EB-2010-0008. This amount has been accounted for in OPG’s forecast of the above noted nuclear non-energy revenues. (See Ex. G2-1-2 Note 1a).

The 2013 - 2015 projections are consistent with OPG’s 2010 performance and are consistent with the trend (after adjustment is made for the IMS revenues) existing in prior years. The results for 2011 and 2012 reflect unusual demand conditions, deviating from the general trend.

3.0 NUCLEAR NON-ENERGY REVENUE SOURCES
3.1 Heavy Water
Heavy water is a manufactured product required for CANDU (Canadian Deuterium Uranium) 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.
3.1.2 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. As determined by the Board in EB-2010-0008, revenues (less costs) from this source are to be shared on a 50-50 basis between OPG and ratepayers. OPG proposes that this treatment continue unchanged during the test period.

3.1.3 Heavy Water Services
The heavy water service business consists of the provision of tritium removal (detritiation) services by processing heavy water through the Darlington Tritium Removal Facility (“TRF”). The bulk of the heavy water service revenue is 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 processing facility.

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. Outages follow a three year cycle, with the first year requiring a long outage (6 months), the second year requiring a shorter one (3 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”.

Total revenues for heavy water services over the period 2010 – 2015 are summarized in Ex. G2-1-1, Table 1. Cost of goods sold and other support costs are described in Section 4 below. Revenues in the years 2011 and 2012 were high relative to results in the years preceding and following. This is the result of two extraordinary events - the preparation and return to service of 2 Bruce A Units (B1 & B2) and work associated with the Pointe Lepreau station. These events drove a large increase in the demand for heavy water and for detritiation services, resulting in a significant and unforeseen increase in revenues for OPG.
Additionally, customer purchases of non-tritiated heavy water increased in 2012 in anticipation of OPG exiting the market when its surplus inventory is depleted.

### 3.2 Isotope Sales

#### 3.2.1 Cobalt-60

Cobalt-60 produced by OPG is used primarily in the health industry to sterilize surgical and medical supplies. Cobalt-60 is produced at Pickering (Units 6, 7, and 8). OPG sells cobalt-60 under an exclusive long-term agreement to a third party.

In Canada, the Canadian Nuclear Safety Commission (“CNSC”) has the responsibility for setting and enforcing the regulations and standards for all activities involving the use of radioactive materials. In producing and handling cobalt, OPG works diligently to ensure compliance with such requirements.

Total revenues from cobalt-60 sales over the period 2010 - 2015 are shown in Ex. G2-1-1 Table 1. Yearly revenue variations are driven by the timing of the cobalt harvest (tied to outage schedule of the Pickering units). The potential for revenue growth is limited, as sale volumes are constrained by the ability to produce cobalt-60. The direct costs and other support costs for this activity are discussed in Section 4 below.

#### 3.2.2 Tritium Sales

Tritium is a by-product of electricity generation using CANDU 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 TRF (see Ex. F2-2-1).

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 fluctuations due to competition (mostly from Russia) and variations in the value of the Canadian dollar. The slight decline in 2012 is primarily due to the temporary reduction of operations by one of OPG customers.

Total revenue from Isotope Sales (which includes tritium and cobalt) over the period 2010 - 2015 is shown in Ex. G2-1-1 Table 1. The direct costs and other support costs are described in Section 4 below.

3.3 Inspection and Maintenance Services

OPG’s inspection and maintenance services Division (“IMS”) supports OPG’s internal work program needs for fuel channel, steam generator, and balance of plant inspections and specialized maintenance at Pickering and Darlington. If resources are available, IMS may provide limited inspection services for other OPG divisions and Nuclear Waste Management. Costs associated with the provision of IMS work activities for all OPG facilities are discussed under Base OM&A (Ex. F2-2-1) and Outage OM&A (Ex. F2-4-1).

Inspection and maintenance services also provided inspection, maintenance and technical services to Bruce Power. However, in June 2011, OPG’s service agreement with Bruce Power was terminated. At present, IMS is focusing on internal work programs.

Total revenues from IMS third party sales for the period 2010 - 2011 are shown in Ex. G2-1-1 Table 1. The direct costs and other support costs are discussed in Section 4 below.

3.4 Helium-3

OPG’s 2013 - 2015 Business Plan includes $4M of anticipated revenue relating to the sale of Helium-3.

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 Heavy Water Sales

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

4.2 Heavy Water Services

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

“Other support costs” for heavy water detritiation 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).

4.3 Cobalt-60

The direct costs for this product include installation, removal, processing, storage, and packaging of the cobalt. Under the 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.

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.
4.4 Tritium Sales

The direct costs for the tritium sales program are primarily Atomic Energy of Canada Limited laboratory and 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.

4.5 Inspection and Maintenance Services

Inspection and Maintenance Services has ceased commercial operations and no revenues are forecasted for the test period. IMS costs for the test period are solely for the provision of services for OPG internal work programs and are budgeted within Nuclear Base OM&A or Outage OM&A.