NUCLEAR WASTE MANAGEMENT AND DECOMMISSIONING –
REVENUE REQUIREMENT TREATMENT OF NUCLEAR LIABILITIES

1.0 PURPOSE
The purpose of this evidence is to explain how nuclear liabilities are treated in determining OPG’s revenue requirement and present the forecast amounts for nuclear liabilities included in the revenue requirement.

2.0 OVERVIEW
A summary of the revenue requirement impact of the nuclear liabilities for the prescribed nuclear facilities and the Bruce facilities is provided in Ex. C2-T1-S2 Table 5. The test period revenue requirement impact is $291.3M for the prescribed facilities and $110.3M for the Bruce facilities.

For the 2011 - 2012 test years, OPG proposes to maintain the revenue requirement treatment for nuclear liabilities approved by the OEB in EB-2007-0905 for Pickering, Darlington and the Bruce facilities.¹ OPG is continuing to investigate the impacts of the OEB approved revenue requirement treatment on its ability to fully recover its nuclear liabilities. Based on the results of this investigation, OPG may propose modifications to the existing treatment or an alternative treatment in a future application.

Section 3.0 sets out the approved methodology and how it applies to the revenue requirement respecting the nuclear liabilities. Section 4.0 addresses the changes in the asset retirement obligation, the unamortized asset retirement costs and the segregated fund balances for the period 2008 to 2012.

¹ As explained fully in EX. C1-T1-S1, OPG as the owner of the Bruce facilities is responsible for the management of all levels of nuclear waste generated at the Bruce facilities and for decommissioning. However, because the revenue requirement treatment approved for the Bruce facilities in EB-2007-0905 differs from that approved for Pickering and Darlington, it is discussed in a separate section.
The revenue requirement impact of the nuclear liabilities decreases significantly in the 2010-2012 period compared to the historical years as a result of the changes in the asset retirement obligation (“ARO”) and depreciation expense associated with the decision to move to the definition phase of the Darlington Refurbishment project. A presentation of the impact of the Darlington Refurbishment project on the nuclear liabilities is provided in Ex. C2-T1-S2 Table 4 and discussed in section 4.1 below.

3.0 APPLICATION OF THE METHODOLOGY FOR RECOVERY NUCLEAR LIABILITIES APPROVED IN EB-2007-0905

3.1 Background

OPG’s nuclear liabilities represent the present value of the lifecycle cost of decommissioning and nuclear waste management programs. These lifecycle costs include the fixed cost components of each program as well as the lifetime variable costs for waste already generated. The present value of the committed costs is recorded as an ARO on the balance sheet of OPG.

To the extent that the ARO increases or decreases from changes such as an approved Ontario Nuclear Fund Agreement (“ONFA”) Reference Plan or a change in the accounting estimate, an equal amount must be recorded as an increase or decrease in the net book value of the assets to which the retirement obligation relates. This addition to net book value is known as an asset retirement cost (“ARC”). The only exception to this is related to the annual incremental waste to be generated which increases the ARO but is expensed directly in the year and does not impact the ARC.

Asset retirement costs represent a substantial portion of the net book value of the Pickering, Darlington and Bruce nuclear facilities. The ARC is amortized over the useful life of these assets like any other capital cost. This amortization gives rise to depreciation expense.

The ARO is allocated to the station level based on each of the five programs involved in retiring nuclear stations and managing nuclear waste. These five programs are:
decommissioning; used fuel storage; used fuel disposal; low and intermediate level waste
(“L&ILW”) storage and L&ILW disposal. The methodology for allocating these five programs
to the station level’s ARO is:

• Decommissioning and Used Fuel Storage programs: The cost estimates for these two
  programs are prepared at the station level with individual estimates prepared for each
  station; therefore no allocation is required.

• Used Fuel disposal, L&ILW storage and L&ILW disposal programs: As these three
  programs involve central facilities, the cost estimates are prepared at the program level.
  The costs are allocated to stations based on the most up-to-date lifecycle waste volume
  estimate.

The ARC is recorded to the station level using the same methodologies described above.
The allocation of the ARO and ARC as it impacts the prescribed facilities and Bruce facilities
is reflected in Ex C2-T1-S2 Table 1 and Table 2.

OPG’s contributions to the used fuel fund and the decommissioning fund are determined
based on the current ONFA reference plan. The allocation of ONFA liabilities to the station
level are based on lifecycle waste volumes for the three programs that involve central
facilities discussed above. For the decommissioning and used fuel storage programs,
estimates are prepared at the station level. ONFA contribution requirements are calculated at
the station levels based on the difference between the station level liabilities and fund
balances. Fund balances at the station level represent the cumulative balance of the
segmented funds since the inception of ONFA. Cumulative station level fund balances are
adjusted for contributions, disbursements and fund returns. The difference between OPG’s
ARO and segregated fund balances is the unfunded nuclear liability (“UNL”).

Continuity schedules showing the opening, closing and average\(^2\) balances for ARO,
segmented funds, UNL and ARC are provided in Ex C2-T1-S2 Table 1 (for the prescribed

\(^2\) Averages are only provided for the prescribed facilities as they are required to determine rate base values used
in the approved methodology for the prescribed assets only.
facilities) and Table 2 (for the Bruce facilities\(^3\)). Annual changes in these balances are discussed in section 4.0 below.

For the 2011 - 2012 test years, OPG proposes to maintain the revenue requirement treatment for nuclear liabilities approved by the OEB in EB-2007-0905 for Pickering, Darlington and the Bruce facilities. The determination of the revenue requirement arising from the nuclear liabilities for the prescribed facilities and the Bruce facilities is discussed sections 3.2 and 3.3 below. The treatment determined by the OEB in EB-2007-0905 for nuclear liabilities is significantly different from that proposed by OPG in its application. OPG does not present information for 2007, the year prior to OEB regulation, in the Ex. C2-T2-S1 tables as the revenue requirement impact under the methodology in place at that time is not comparable to that in the 2008 to 2012 period.

3.2 Application of the Approved Methodology to the Prescribed Facilities

Under the approved methodology, depreciation expense, variable incremental used fuel costs and variable incremental L&ILW costs related to the revenue requirement impact of OPG’s nuclear liabilities are determined in accordance with GAAP.

The approved regulatory approach discussed in section 3.2.4 requires that the return on a portion of the rate base be limited to the average accretion rate on OPG nuclear liabilities.

Each of these components is discussed separately below.

3.2.1 Depreciation Expense

Depreciation on the unamortized ARC is treated in the same manner as the depreciation associated with other capital assets.

\(^3\) Under the approved methodology UNL is used to determine return on rate base. The approved methodology for the Bruce facilities does not include a return on rate base; therefore UNL is not in the continuity schedule for the Bruce facilities.
Nuclear depreciation expense is presented in Ex. F4-T1-S2. A portion of this depreciation expense is attributable to unamortized ARC for each year. For the 2008 to 2012 period, these amounts are shown in Ex C2-T1-S2 Table 1, line 26. The amounts of depreciation expense attributable to unamortized ARC for each year for the 2008 to 2012 period are shown in Ex C2-T1-S2 Table 5, line 1.

3.2.2 Variable Incremental Used Fuel Costs

Nuclear fuel expense is presented in Ex. F2-T5-S1 Table 1. A portion of the nuclear fuel expense is attributable to the present value of the variable costs related to incremental quantities of used fuel generated in each period. The difference between the lifecycle estimate and the amount of committed costs relating to used fuel included in the nuclear liabilities balance represents the variable costs of future fuel waste. Using a present value basis, these variable costs are divided by the forecast number of future fuel bundles to calculate the $/bundle rate. Used fuel expenses are then calculated by applying the $/bundle rate to forecast used fuel generated. Each bundle is charged an equal amount in present value terms. The amount of this expense for each year for the 2008 to 2012 period are shown in Ex C2-T1-S2 Table 5, line 2.

3.2.3 Variable Incremental Low and Intermediate Level Waste Expense

Low and intermediate level waste is a separate component of the depreciation expense presented in Ex. F4-T1-S2. A portion of this depreciation expense is attributable to the present value of the variable costs related to incremental volumes of L&ILW produced in each period. The difference between the lifecycle estimate and the amount of committed costs included in the nuclear liabilities balance represents the variable costs of future waste. Using a present value basis, these variable costs are divided by the L&ILW volume estimates to calculate the $/m³ rate. Low and intermediate level waste expenses are then calculated by applying the $/m³ rate to the forecast waste volumes generated. The amount of this expense for the 2008 to 2012 period are shown in Ex C2-T1-S2 Table 5, line 3.
3.2.4 Return on Rate Base

The approved methodology for the prescribed assets recognized that OPG’s rate base includes an amount associated with ARC. However, the approved methodology also requires that the return on a portion of the rate base be limited to the weighted average accretion rate of 5.6 per cent (as established in EB-2007-0905). This portion is equal to the lesser of: (i) the forecast amount of the average unfunded nuclear liabilities related to the Pickering and Darlington facilities, and (ii) the average unamortized ARC included in the fixed asset balances for Pickering and Darlington. As seen in Ex C2-T1-S2 Table 5, note 3 the ARC is less than unfunded nuclear liabilities (“UNL”). The remainder of OPG’s rate base earns the weighted average cost of capital. For OPG’s prescribed assets the average UNL, average unamortized ARC and the determination of the amounts to be receive the accretion rate or the Weighted Average Cost of Capital (“WACC”) rate is provided in Ex C2-T1-S2 Table 1.

The approved methodology requires a forecast of the value of the unfunded nuclear liabilities for the test period. As discussed in Ex C2-T1-S1 the target rate of return on these funds is currently 5.15 per cent, which OPG applies in determining its forecast return on its segregated funds.

For the period April 1, 2008 to December 31, 2012 the amount of the average unamortized ARC is less than the amount of the average unfunded nuclear liability. Therefore, the unamortized ARC amount earns the weighted average accretion rate of 5.6 per cent for the period April 1, 2008 to December 31, 2009 and 5.58 per cent for the 2010 to 2012 fiscal years. The resulting amount of earnings calculated by applying the weighted average accretion rate to the average amount of unamortized ARC is shown in Ex. C2-T1-S2 Table 5.

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4 As discussed in Section 4.1 the Darlington Refurbishment Project results in an increase in the ARO of $293M at an accretion rate of 4.8 percent, reducing the accretion rate of 5.6 percent in EB-2007-0905 marginally to 5.58 percent during the 2010 to 2012 period.
3.3 Application of the Approved Methodology to the Bruce Facilities

As a result of determining that the Bruce facilities were not prescribed facilities, the OEB approved a GAAP approach to determine the net revenue impact for the nuclear liabilities associated with the Bruce facilities. In summary, the difference is that for Bruce facilities the OEB substitutes the net income determinants of accretion expense and earnings on segregated funds in lieu of a return on the unamortized ARC (rate base) used in determining the revenue requirement for prescribed facilities.

Each of the components of the net revenue impact of nuclear liabilities associated with the Bruce facilities is discussed separately below.

3.3.1 Depreciation Expense

Depreciation on the unamortized ARC is treated in the same manner (GAAP basis) as the depreciation associated with other capital assets.

Depreciation expense presented in Ex. G2-T2-S1 Table 5 is a cost component of the calculation of the Bruce Lease net revenues. A portion of this depreciation expense is attributable to the unamortized ARC for each year for the 2008 to 2012 period and is shown in Ex C2-T1-S2 Table 2, line 24. The amounts of depreciation expense attributable to unamortized ARC for each year for the 2008 to 2012 period are shown in Ex C2-T1-S2 Table 5, line 7.

3.3.2 Variable Incremental Used Fuel Costs

Nuclear fuel for Bruce facilities is determined in the same manner (GAAP basis) as described in section 3.2 to determine the nuclear fuel expense for prescribed facilities.

Nuclear fuel expense presented in Ex. G2-T2-S1 Table 5 is a cost component of the calculation of the Bruce Lease net revenues. Used fuel expenses are calculated by applying the $/bundle rate discussed above to forecast used fuel generated. Each bundle is charged
an equal amount in present value terms. The amounts of this expense for the 2008 to 2012 period are shown in Ex C2-T1-S2 Table 5, at line 8.

3.3.3 Variable Incremental Low and Intermediate Level Waste Expense

Low and intermediate level waste for Bruce facilities is determined in the same manner (GAAP basis) as described in section 3.2 to determine the L&ILW expense for prescribed facilities.

Low and intermediate level waste presented in Ex. G2-T2-S1 Table 5 is a cost component of the calculation of the Bruce Lease net revenues. The L&ILW expenses are calculated by applying the $/m³ rate discussed above to forecast L&ILW volumes generated. The amount of this expense for the 2008 to 2012 period are shown in Ex C2-T1-S2 Table 5, line 9.

3.3.4 Accretion Expense

For the April 1, 2008 to 2012 period, accretion expense for Bruce is calculated by applying the weighted average accretion rate to the amount of nuclear liability associated with Bruce in each year as shown in Ex. C2-T1-S2 Table 2. The allocation between Bruce and the prescribed facilities is based on the amounts set out in the most recently approved ONFA Reference Plan as discussed in section 3.1 above. The accretion expense for the Bruce facilities is shown in Ex C2-T1-S2 Table 5, line 10.

3.3.5 Earnings on the Segregated Funds

For the April 1, 2008 to 2012 period, segregated funds earnings are calculated by taking the difference between the opening and closing balances less contributions plus disbursements from each fund each year as shown in Ex. C2-T1-S2 Table 2. The attribution of earnings to Bruce is based on the amounts set out in the most recently approved ONFA Reference Plan. This methodology is applied to both actual earnings and disbursements in 2008 and 2009 as well as forecast amounts for 2010 – 2012. The segregated fund earnings for the Bruce facilities are shown in Ex C2-T1-S2 Table 5, line 11.
3.3.6 Return on Rate Base

For the period January 1, 2008 to March 31, 2008, the unamortized ARC for the Bruce facilities received the same treatment and the same WACC (5.55 per cent) as the prescribed facilities as reflected in the payment amounts established by the Province. The revenue requirement impact is shown in Ex C2-T1-S2 Table 5.

4.0 CHANGES IN ARO, UNAMORTIZED ARC and SEGREGATED FUND BALANCES

The segregated fund balances, ARO and ARC for prescribed facilities and the Bruce facilities are presented in Ex. C2-T1-S2 Tables 1 and 2, respectively for the period 2008 to 2012.

The segregated fund balances in the 2008 to 2009 period reflect the turmoil in the financial markets over 2008 and 2009. Contributions do not change as a result of the Darlington Refurbishment project; rather they continue to be made in accordance with the 2006 ONFA Reference Plan per Ex C2-T1-S1, Attachment 1 until the ONFA reference plan is updated. For 2010 to 2012, OPG has used the target rate of growth of 5.15 per cent on its segregated funds as the rate of earnings the funds are forecast to achieve during that period.

The growth in the ARO over the 2008 to 2012 period is primarily the result of accretion and the impact of the decision on Darlington Refurbishment as of January 1, 2010. The impact of the Darlington Refurbishment project is considered in section 4.1 below.

Depreciation is the primary cause of the declining trend in the ARC balance from 2008 to 2012. The major exception reflects the forecast accounting impact of the Darlington Refurbishment project on January 1, 2010 as discussed in section 4.1.

4.1 Impact of the Darlington Refurbishment Project

A summary of the impacts of the Darlington Refurbishment project on revenue requirement impact of the nuclear liabilities is in Ex. C2-T1-S2 Table 4.

GAAP accounting requires OPG to change the ARO to reflect the recently announced decision to move to the definition phase of the Darlington Refurbishment project.
Refurbishment of the Darlington facility will allow for it to operate with replaced components until the year 2051. The main impacts of the refurbishment decision are: (a) a decrease in the ARO for Darlington decommissioning as the present value of the work reflects the deferral of the decommissioning work for approximately 30 years; and (b) an increase in the cost of used fuel storage and disposal activities to account for the incremental volumes of used fuel to be generated. The net impact is a $293M increase in both ARC and ARO.

An allocation of this incremental ARO/ARC has been made to the stations on the same basis as the balance of the ARO/ARC. The allocation of ARO to stations and the related allocation of ARC amounts are presented in Ex C2-T1-S2 Table 3.

The impact of the change in ARO/ARC results in a reduction in revenue requirement impacts for both the prescribed facilities and the Bruce facilities (the latter through a reduction in the net revenues used to offset the revenue requirement of the prescribed facilities) as presented in Ex C2-T1-S2 Table 4.

The average accretion rate for the ARO liability with this change is 5.58 per cent for the 2010 to 2012 period.

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5 The Darlington Refurbishment project results in an increase in the ARO of $293M at an accretion rate of 4.8 percent, reducing the accretion rate of 5.6 percent in EB-2007-0905 marginally to 5.58 percent during the 2010 to 2012 period.