DESIGN OF THE NUCLEAR PAYMENT AMOUNTS

1.0 PURPOSE

The purpose of this evidence is to describe the proposed design of the nuclear payment amounts and to explain why it is the best approach for maximizing efficient use of the nuclear facilities.

2.0 PROPOSED DESIGN OF NUCLEAR PAYMENT AMOUNTS

The OEB Methodology Report solicits input on the question of maximizing the efficient use of the nuclear assets. Given the importance of the nuclear facilities in meeting Ontario's electricity needs, it is important that the regulatory regime governing these facilities support their economically efficient operation.

OPG proposes a payment design that includes both a fixed monthly payment of $58.2M/month and a variable payment of $41.5/MWh. The fixed payment would allow for recovery of 25 percent of the revenue requirement for the nuclear facilities and the variable payment would allow for recovery of the remaining 75 percent of the revenue requirement. The significant variable component of the proposed payment amount design provides a strong incentive for OPG to maximize its nuclear unit availability, while the smaller fixed component, which would be independent of the level of energy production in that month, allows for partial recovery of the fixed costs. The details of the calculation for the payment amounts are provided in Ex. K1-T3-S1. The rationale for including a fixed component of 25 percent in the payment amount design is provided in Section 3 of this evidence.

3.0 FIXED COMPONENT OF NUCLEAR PAYMENT AMOUNT

The costs of OPG's nuclear facilities are over 90 percent fixed. Accordingly, OPG is seeking recovery of some of its fixed costs through a partially fixed payment structure. Because costs are fixed to such a high degree, OPG bears a significant amount of risk when the entire revenue requirement is recovered through a variable, energy-based payment. For example, during an unforeseen nuclear unit outage, costs continue to accumulate (and, in fact, may do so at an accelerated rate due to additional, unforeseen costs associated with the forced

outage itself) but revenues for the unit drop to zero. OPG's current interim payment amount design is 100 percent variable and paid on a per MWh basis.

The rationale for including a fixed component in the design of the payment amounts is based on the following three considerations:

- Over 90 percent of the costs associated with OPG's nuclear facilities are fixed and the design of the payment amounts should reflect, at least to some extent, the underlying cost structure.
- Generators in Ontario and other jurisdictions recover fixed costs.
- Rate structures approved by the OEB for other regulated entities typically include both a fixed and variable component and the percentage of the revenue requirement recovered through the fixed component is often greater than the 25 percent proposed for the nuclear payment amount.

Taking the above into consideration, 25 percent is seen as an appropriate percentage for the fixed component of the nuclear payment. Each of these considerations is addressed below in sections 3.1 - 3.3.

3.1 OPG's Nuclear Cost Structure

OPG's nuclear facilities are characterized by relatively high fixed costs and low variable costs. OPG's analysis considered the variability of costs and revenues with production assuming continued availability of the facilities. Fixed costs are defined as those that do not fluctuate as long as the facilities are available to produce electricity within their historical average range of output. Variable costs are those that fluctuate with the level of electricity output.

<u>Variable Costs</u>

The only costs that vary with production are:

- Nuclear Fuel (including the variable portion of used fuel disposal costs)
    - Nuclear fuel and the corresponding variable portion of used fuel management/disposal costs are directly related to station production levels.

- However, the portion of nuclear fuel costs held as inventory carrying costs are fixed.

Fixed Costs

The following costs are fixed:

- Depreciation
  - Depreciation is a cost primarily associated with the fixed asset value of OPG's regulated facilities and as such it does not vary with production but is primarily affected by the additions to and retirements of assets in service.

- Interest
  - Interest is a cost associated predominantly with the financing of OPG's capital investment in its regulated facilities (interest costs are presented in Ex. C1-T1-S1). As such, the cost does not vary with production.

- Property Tax
  - OPG is responsible for both the payment of municipal property taxes and a payment in lieu of property tax to the Province of Ontario. These payments are directly associated with OPG's property and the generation assets (property taxes are presented in Ex. F3-T2-S1). As such, these costs do not vary with production.

- Capital Taxes
  - By definition, capital tax varies with the level of OPG's capital only (capital taxes are presented in Ex. F3-T2-S1). Therefore, capital tax expense is fixed and does not vary with the level of production.

- Asset Service Fee
  - The asset service fee represents charges to the nuclear facilities for the use of certain assets held centrally, such as OPG head office at 700 University Avenue and OPG-wide IT assets (the asset service fee is described in detail at Ex. F3-T3-S1). Because the use of these assets by the generation segments does not vary

- materially with production, these costs are fixed.

The following cost is predominantly fixed:

- Operations, Maintenance and Administration (OM&A)
  - OM&A costs are largely fixed for OPG's nuclear facilities over the planning period. These costs consist primarily of maintenance costs, project costs, costs of operating staff, business level and corporate level overhead costs, including allocations of corporate function costs and centrally-held costs. The vast majority of these costs do not vary with production, although certain costs which are incremental to the ongoing OM&A costs such as outage costs may vary depending on the outage requirements and schedules for the various plants/units. Also, OM&A project costs will vary depending on the specific projects or tasks that are included in the project.

  - Maintenance needs to be performed in order to ensure that the units are available to generate safely when required. Most maintenance programs are not driven by the level of production (because, other than planned outages for maintenance, nuclear units are assumed to run all the time), but rather by the passage of time and regulatory requirements to perform regular maintenance. The key drivers of Nuclear base OM&A costs are presented in Ex. F2-T2-S1.

Other Costs

The following costs are neither fixed nor variable and are therefore not included in the analysis presented:

- Income Taxes
  - To the extent the nuclear payment is fixed then income taxes are largely fixed; to the extent the nuclear payment is variable then the income taxes would be largely variable. Accordingly, because the characterization of these costs is determined by the structure of the payment, this expense has not been used in the cost analysis.

- Return on Equity
  - The return on equity is also directly dependent on the payment design and therefore the return on equity cost has not been included in this analysis.

  - The percentages of fixed and variable costs for the nuclear revenue requirement forecast for the years 2008 and 2009 are presented in Chart 1 below. The very high percentage of fixed costs supports the need for a design of the nuclear payment amount that provides some assurance of fixed cost recovery. To the extent the payment amounts do not directly reflect the nature of the nuclear facility costs, OPG's earnings are subject to greater variability and therefore risk. Both the Market Surveillance Panel and the IESO have recognized that Ontario market prices are often insufficient to allow generators to earn sufficient revenues[1, 2], resulting in marginal generators not covering all costs and discouraging additional investment, thereby necessitating other means of ensuring long-term adequacy, such as contracting.

[1] MSP Report dated December 13, 2006 (page vii).

[2] IESO CBA on Operating Reserve states "The OPA as central planner is charged with identifying future investment needs in the province and contracting for this investment. In general, they are tasked with providing the incentives (through contract) to invest when the market itself does not provide these incentives." page 13.

Chart 1

Fixed / Variable Components of Nuclear Costs ($M)

	2008 Plan	2009 Plan
Variable Components		
Nuclear Fuel	162	204
Total Variable	**162**	**204**
Fixed Components		
OM&A	2185	2169
Depreciation & Amortization	350	389
Deemed Interest[1]	86	88
Property Tax	14	14
Capital Tax	8	8
Total Fixed	**2643**	**2668**
Total Variable and Fixed	2805	2872
% Variable	***6%***	***7%***
% Fixed	***94%***	***93%***

[1]Based on a deemed capital structure of 57.5 percent equity and 42.5 percent debt, an ROE rate of 10.5 percent and a deemed interest rate of 5.76 percent for 2008, and 5.92 percent for 2009.

3.2 Generator Cost Recovery

Many North American electricity generators receive fixed payments, in some form, to assure recovery of fixed costs. The traditional regulatory approach applied to cost allocation and rate design for electric utilities includes a capacity charge for generation function costs.

Traditionally, a utility first functionalizes its costs as generation, transmission, distribution or administrative, and general costs. Generation function costs are typically classified as capacity- or energy-related costs to reflect cost causation.

Capacity-related costs are largely fixed, are incurred to meet peak demand, and are related to the size of the plant. They typically do not vary with production volumes and include fixed costs such as depreciation, return and related taxes, and fixed operations and maintenance expenses. Energy-related costs are incurred to produce energy and typically vary with production volumes. They include fuel and variable operations and maintenance expenses.

The recovery of fixed costs through an energy-based charge as reflected in OPG's current payment design structure raises the following concerns:

- The design of the payment amounts does not reflect cost causation.
- It creates increased volatility in the utility's revenue and income, and causes mismatches between the utility's costs and revenue, because costs that are fixed are recovered based on energy usage that is variable. Increased volatility in revenue and income can give rise to increased financing costs for OPG.

OPG's nuclear facilities provide both capacity and energy to the IESO grid and therefore a payment amount design that includes a fixed component to recognize the provision of capacity and a variable component to recognize the provision of energy is appropriate. Competitive electric markets neighbouring Ontario, specifically, New York, PJM, and New England, have recognized the need to provide for fixed cost recovery for electricity generators and have established capacity markets.

Although Ontario's IESO market has not established a capacity market, the hybrid market structure in Ontario provides contracting mechanisms to provide fixed cost recovery for generation. Contracted generation in Ontario has a high degree of assurance of recovery of fixed costs through the structure of OPA contracts. For example, the contract structure for Ontario's clean energy supply contracts includes a monthly contingent support payment which is the monthly net revenue requirement less the imputed net revenue, where the

imputed net revenue represents the expected net revenue from energy sales given the characteristics of the facility.

It is appropriate for the design of the nuclear payment amounts to reflect the common approach of allowing for recovery of at least a portion of fixed generation costs through a payment that is not based on energy production.

3.3 Approved Rate Structures for Other Regulated Utilities

OPG analyzed the rate structure of both Union Gas and Enbridge Gas, as these two large utilities have a long history of rate regulation by the OEB and their costs have been subject to very detailed cost allocation reviews. The analysis of the rates/charges recently approved for Union Gas, as reflected in schedules 6 and 20 of its EB-2005-0520 Working Paper, indicate that Union Gas recovers approximately 50 percent of its approved non-commodity revenue requirement through charges that do not vary with throughput. In the case of Enbridge, their evidence currently before the OEB indicates that approximately 20 percent of its non-commodity revenue requirement is recovered through charges that do not vary with throughput.

Hydro One collects about 50 percent of its revenues from distribution customers through fixed charges.

While Union and Enbridge are integrated utilities and do not demonstrate the unique characteristics of OPG's prescribed facilities, OPG used the above rate structures to establish a reasonable level for the fixed component of the payment design for the nuclear facilities.

3.4 Conclusion

OPG recognized that the level of its fixed costs, greater than 90 percent of total revenue requirement, was too high for recovery through a fixed charge because a significant variable component of the payment amount incents OPG to maximize production from the nuclear facilities.

OPG's proposed payment design that includes a fixed monthly payment, allowing for partial recovery of fixed costs along with a variable payment that acts as a strong incentive to maximize unit availability, is considered by OPG to be the best approach for maximizing efficient use of the nuclear facilities.

OPG suggests that the proposed recovery of 25 percent of the revenue requirement for the nuclear facilities through the fixed monthly payment can be adjusted in the future based on an assessment of both its effectiveness in maximizing efficient use of the nuclear facilities and actual fixed costs incurred for the nuclear facilities.