OTHER REVENUES – REGULATED HYDROELECTRIC

1.0 PURPOSE

The purpose of this evidence is to present the forecast of revenues from sources other than energy production ("Other Revenues") from OPG’s regulated hydroelectric generating facilities and to explain the proposed treatment of these revenues.

The values for Segregated Mode of Operation ("SMO") and Water Transactions ("WT") are based on the OEB methodology of averaging the three prior years established in EB-2007-0905 and reaffirmed in EB-2010-0008, except where otherwise noted.

The forecast of Other Revenues for the test period is included as an offset in the calculation of OPG’s revenue requirement for the regulated and newly regulated hydroelectric facilities.

2.0 OVERVIEW

Other Revenues earned by OPG’s regulated and newly regulated hydroelectric facilities are revenues associated with ancillary services\(^1\), segregated mode of operation ("SMO"), and water transactions ("WT"). Other revenues also include the Hydroelectric Incentive Mechanism ("HIM") Revenue Requirement Adjustment.

Differences between forecast and actual revenues associated with ancillary services are recorded in the Ancillary Service Net Revenue Variance Account - Hydroelectric and Nuclear Sub Accounts (Ex. H1-1-1).

For SMO, the Board concluded (OEB’s Decision with Reasons in EB-2010-0008) that a change in the revenue offset mechanism was required for 2011-2012, as a result of the impacts of the Quebec DC intertie that came into service in 2009. In this application, OPG proposes to return to the original revenue offset mechanism established by the Board in EB-2007-0905 and will use the average net revenues over the last three years (2010, 2011 and

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\(^1\) Ancillary Services include black start capability, operating reserve ["OR"], reactive support/voltage control, and regulation service (formerly referred to as automatic generation control ["AGC"]).
2012) for the 2014 and 2015 rate period.

Water transactions revenues in the test period are forecast to decrease by approximately 65 per cent from previous years. The decrease is due to the Niagara Tunnel Project, which went into service on March 9, 2013. In much the same way as the DC intertie was a “game-changer” for SMO, the tunnel is a structural change to WT revenues. In response to this change, OPG proposes to reduce the average revenue forecast by 65 per cent for 2014 and 2015.

The HIM Revenue Requirement Adjustment is included pursuant to EB-2010-0008 which incorporates HIM revenues into the revenue requirement as a revenue offset. As this is a revenue offset, it is included in Ex. G1-1-1 for consistency. See Ex. E1-2-1 Section 4.0 for more information on this account.

Exhibit G1-1-1 Table 1 presents the Other Revenues associated with the regulated hydroelectric assets for the period 2010 - 2015.

### 3.0 ANCILLARY SERVICES

The evidence in this section is substantially unchanged from that filed in EB-2010-0008 Ex. G1-1-1. The data reflects updated information on expected ancillary service requirements in the test period.

Under the market rules, ancillary service suppliers receive compensation for costs associated with supplying ancillary services. These include out-of-pocket costs; opportunity costs when providing the service; and any other compensation deemed by the IESO to be fair and reasonable. The cost of supplying these services is passed on to consumers by the IESO through monthly uplift charges.

### 3.1 Black Start Capability

Black start capability, as defined in the Market Rules, refers to the capability of a generation facility to start without an outside electrical supply so as to be used to energize a defined
portion of the IESO-controlled grid. Sir Adam Beck II and R.H. Saunders have this ability and are currently under contract with the IESO to supply black start.

OPG forecasts revenues for black start capability for 2014 and 2015 as per the terms of the negotiated Procurement of Certified Black Start Facilities Agreement effective May 1, 2013 to April 30, 2016.

3.2 Reactive Support/Voltage Control Service

Under the Market Rules, reactive support service refers to a service provided by a market participant to allow the IESO to maintain the reactive power levels required by the IESO-controlled grid. Similarly, voltage control service is a service provided by a market participant to allow the IESO to maintain voltage levels required by the IESO-controlled grid. Collectively, these are referred to in this Application as reactive support/voltage control service.

OPG and the IESO negotiated a Reactive Support/Voltage Control Service Agreement effective January 1, 2013 to December 31, 2015. The revenues for this service will increase with the addition of newly regulated hydro.

OPG’s nuclear assets also provide reactive support/voltage control service and receive revenues from this activity. These revenues are presented in Ex. G2-1-1 Table 1.

3.3 Regulation Service (formerly referred to as Automatic Generation Control)

As defined in the Market Rules, regulation service refers to the process that automatically adjusts the output from a generation facility based on automated, electronic signals in order to provide frequency control and to maintain the balance between the demand from load and the supply from generation facilities.

A contract for Regulation Service was executed with the IESO effective May 1, 2013 to April 30, 2014. Pricing terms associated with providing regulation service at Sir Adam Beck GS were revised to reflect the expected operations with the in-service operation of the Niagara Tunnel Project. OPG expects to enter into a new Regulation Service contract with the IESO.
for the remainder of the test period. The revenues from this service will increase with the addition of newly regulated hydro.

3.4 Operating Reserve

Operating Reserve ("OR") refers to the capacity that can be called upon on short notice by the IESO to replace scheduled energy supply that is unavailable as a result of an unexpected outage or to augment scheduled energy as a result of unexpected demand or other contingencies. Operating reserve is not contracted, rather it is market based, as the IESO establishes separate prices for the energy market and the OR markets.

For the test period, OPG forecasts similar market conditions to 2012, hence the forecast for the test period is based on 2012 Actual with an allowance for inflation per OPG’s Business Plan. There is an increase in the number of hydroelectric facilities which provide this service with the addition of newly regulated hydro facilities along with an increase in OR revenues.

OPG’s nuclear facilities do not provide OR.

4.0 WATER TRANSACTIONS

As more fully described below, OPG proposes to change how it calculates the revenue offset mechanism approved by the OEB in EB-2010-0008 to reflect the significant decrease in the amount of water transactions resulting from the Niagara Tunnel coming into service.

The New York Power Authority ("NYP A") and OPG are responsible for developing and operating the hydroelectric facilities on the Niagara and St. Lawrence Rivers. Pursuant to an agreement between the parties, NYP A and OPG coordinate certain operations to maximize energy production from the total volume of water available for generation under the relevant international treaties. The majority of WT are conducted at Sir Adam Beck as conditions generally do not provide this opportunity at R.H. Saunders GS.

WT allow either OPG or NYP A to use a portion of the other’s share of available water. The transferred water is then available for power generation and sale into either the Ontario
market (by OPG) or New York Market (by NYPA). In return, the entity that used the water makes a financial payment to the other party equal to the value of the WT, minus an accommodation charge. The value of the WT is the realized amount based on the market price where the energy is generated and sold and the volume of water transferred.

The OEB’s Decision with Reasons from EB-2007-0905 and EB-2010-0008 specified that the average of the previous three historical years of actual net WT revenues be applied as an offset against OPG’s revenue requirement for the test period. To calculate Net WT revenues, accommodation charges and gross revenue charges (“GRC”) attributable to these transactions are removed from the gross WT revenues.

With the Niagara Tunnel Project in-service, OPG is able to use more of its Niagara River water entitlement. Prior to the Niagara Tunnel in-service OPG’s Sir Adam Beck GS had a water diversion capability of approximately 1,800 m³/s. With the addition of the Niagara Tunnel, OPG’s diversion capability increased to approximately 2,400 m³/s. The increase in water utilization will result in significantly decreased WT volumes.

To develop its forecast of WT volumes for the test period, OPG conducted an analysis using actual WT data for the January 2009 to December 2011 period and assuming that the diversion capability of the new Niagara tunnel had been available. This analysis shows that if the diversion capability at Sir Adam Beck had been 2,400 m³/s during this period, WT volumes would have decreased by approximately 65 per cent. The analysis is provided below.

Chart 1 summarizes actual WT data (from OPG to NYPA only) between January 1, 2009 and December 31, 2011 categorized for three separate flow conditions:

1. Low flow: WT that occurred when the water flow available for diversion was less than 1,800 m³/s (this represents the diversion capability before the new Niagara Tunnel is in-service).
2. High flow: WT that occurred when the water flow available for diversion was greater than 2,400 m³/s (this represents the diversion capability after the new Niagara Tunnel is in-service.)

3. Mid flow: WT that occurred when the water flow available for diversion was greater than 1,800 m³/s but less than 2,400 m³/s.

As shown in Chart 1, 92 per cent of the WT volume occurred when the water flow available for diversion to Sir Adam Beck GS was greater than the diversion capability of 1,800 m³/s, with the majority of transactions occurring during ‘Mid flow’ conditions (83 per cent).

<table>
<thead>
<tr>
<th>Water Flow Available for Diversion</th>
<th>Average</th>
<th>Transaction</th>
<th>Total # of Hours</th>
<th>OPG to NYP</th>
<th>Volm (m³/s-hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low ≤ 1,800 m³/s</td>
<td>149</td>
<td>143,860</td>
<td>8,431</td>
<td>964</td>
<td>8%</td>
</tr>
<tr>
<td>High &gt; 2,400 m³/s</td>
<td>200</td>
<td>152,030</td>
<td>3,145</td>
<td>761</td>
<td>9%</td>
</tr>
<tr>
<td>Mid &gt; 1,800 m³/s and ≤ 2,400 m³/s</td>
<td>200</td>
<td>1,467,018</td>
<td>14,704</td>
<td>7,334</td>
<td>83%</td>
</tr>
</tbody>
</table>

Using this data and the assumptions noted below, OPG then estimated the WT volume if the additional diversion capability due to the new Niagara Tunnel had been available during the 2009 - 2011 period.

1. In the analysis, it was assumed the WT volumes associated with the Low flow (≤1,800 m³/s) and High flow (>2,400 m³/s) conditions would remain unchanged. (i.e., the increased diversion capability would not have impacted WT under these conditions.)

2. During Mid flow conditions (>1,800 m³/s and ≤2,400 m³/s), WT were assumed to occur at the same frequency as those during the Low flow conditions. (Circumstances other than diversion capability limitations were assumed to be the cause for the transactions during the Low flow conditions.) Applying the lower transaction frequency, from the Low flow
condition, to the average transaction flow for the Mid flow condition is a reasonable assumption given that the new Niagara Tunnel removes the diversion limitation. The results are considerably lower WT volumes, as is evident in Chart 2.

### Chart 2

<table>
<thead>
<tr>
<th>Available Diversion Flow</th>
<th>OPG to NYPA Transactions</th>
<th>Average Transaction Flow</th>
<th>Transaction Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of Hours</td>
<td>(m³/s)</td>
<td>(m³/s-hr)</td>
</tr>
<tr>
<td>Low ≤ 1,800 m³/s</td>
<td>964</td>
<td>149</td>
<td>143,860</td>
</tr>
<tr>
<td>High &gt; 2,400 m³/s</td>
<td>761</td>
<td>200</td>
<td>152,030</td>
</tr>
<tr>
<td>Mid &gt; 1,800 m³/s and ≤ 2,400 m³/s</td>
<td>1,681</td>
<td>200</td>
<td>336,250</td>
</tr>
</tbody>
</table>

A WT volume of 632,140 m³/s-hr for the 2009 to 2011 period represents a decrease in WT volume of 1,130,768, or a reduction of almost 65 per cent.

The Niagara Tunnel Project is a structural change to the WT market similar to how the DC intertie affected SMO sales market (see Section 5.0). Accordingly, WT volumes and net revenues will experience a permanent and significant decrease.

As the use of the three year historical average would overstate the value of WT revenues anticipated in the test period, OPG proposes that the revenue offset forecast for 2014 and 2015 be reduced by 65 per cent of the three year rolling average from 2010 – 2012. The revenue offset forecast for 2014 and 2015 is $1.7M per year.

### 5.0 SEGREGATED MODE OF OPERATION

OPG is proposing to continue with the same revenue offset mechanism approved by the OEB in EB-2010-0008; using a three-year rolling average (i.e. 2010, 2011 and 2012) to calculate the test period forecast. Among the previously regulated hydro facilities, only R.H. Saunders GS is able to enter into SMO. Chats Falls, a newly regulated station, also has the capability to enter into SMO. The test period forecast reflects the three-year rolling average.
specific to each facility.

Segregated mode of operation ("SMO") is defined in the Market Rules as an electrical configuration where a portion of the IESO controlled grid is used to connect one or more registered generating facilities to a neighboring control area using a radial intertie for the purposes of delivering electricity.

Segregated mode of operation is conducted by OPG when it identifies economic opportunities in neighboring markets. These transactions are arranged in advance with counterparties and are typically conducted in off-peak periods. The economic drivers used in deciding whether or not to engage in an SMO transaction are the forecast market prices in Ontario and surrounding markets.

Segregated mode of operation net revenues are calculated by subtracting the incremental costs associated with these transactions from the SMO revenues received. These incremental costs incurred in transacting SMO consist of export fees, transmission charges in other control areas, costs associated with the non-regulated Trading business, transmission losses between generator source and point of delivery and production losses during the switching process between control areas.

6.0 HIM REVENUE REQUIREMENT ADJUSTMENT

EB-2010-008 directed that 50 per cent of the HIM annual threshold values be included as a revenue offset to OPG’s 2011 and 2012 revenue requirement. In 2011 and 2012, these amounts were $5M and $7M, respectively.

For the test period, OPG is proposing an alternate treatment for HIM revenues (See Ex. E1-2-1), hence Not Applicable (N/A) has been recorded for the test period in G1-1-1, Table 1.