CAPITAL BUDGET - REGULATED HYDROELECTRIC

1.0 PURPOSE

This evidence provides an overview of the capital budget for OPG's regulated hydroelectric facilities for the historical years, bridge year, and the test period. It also provides period-over-period explanations and an overview of the hydroelectric project management processes.

2.0 REGULATED HYDROELECTRIC CAPITAL BUDGET

OPG's capital expenditures for the regulated hydroelectric facilities are $328.0M and $235.8M in 2011 and 2012, respectively. A summary of the regulated hydroelectric capital expenditures for 2007 - 2012 is provided in Ex. D1-T1-S1 Table 1.

OPG's investments in the regulated hydroelectric facilities reflect OPG's mandate, as set out in the Memorandum of Agreement between OPG and its shareholder, which provides as follows:

> With respect to investment in new generation capacity, OPG's priority will be hydro-electric generation capacity. OPG will seek to expand, develop and/or improve its hydro-electric generation capacity. This will include expansion and redevelopment on its existing sites as well as the pursuit of new projects where feasible.

OPG's capitalization policy, which is provided at Ex. A2-T2-S1, is used to determine which regulated hydroelectric projects are capital projects and which projects fall within project OM&A, which is discussed in Ex. F1-T3-S3. The regulated hydroelectric capital projects discussed in this schedule, therefore, are projects that satisfy the criteria set out in the capitalization policy, namely that such projects: (a) provide future benefits beyond one year, (b) involve the purchase of a new asset or the increase in the life or output of an existing asset, and (c) meet or exceed the materiality threshold (e.g., $200k per generating unit).

OPG establishes annual budgets for the capital projects undertaken at the regulated hydroelectric facilities. As described in Ex. F1-T1-S1, section 2, the Hydroelectric Business Unit uses a structured portfolio approach to identify and prioritize projects. Projects are then

administered using the project management process that is described in section 7.0 below. The hydroelectric project portfolio is approved through OPG's business planning process, which includes approval of the capital project budget (as well as the project OM&A budget) by OPG's Board of Directors ("the OPG Board"). Prior to beginning work on a project, funds are released in accordance with OPG's Organizational Authority Register through the approval of a business case summary.

Through this business planning process, the OPG Board has approved a total of $563.8M of capital project expenditures for the 2011 - 2012 test period to sustain or improve the regulated hydroelectric generating stations. Due to the multi-year nature of many of the capital projects, not all of the capital expenditures planned for the test period will necessarily come into service (and therefore into rate base) in the test period. Capital in-service additions are discussed in Ex. D1-T1-S2, section 4.

3.0 CAPITAL BUDGET SUMMARY

OPG's planned capital expenditures for the regulated hydroelectric facilities during the test period are dominated by the Niagara Tunnel project. Of the total planned capital expenditures of $563.8M in the test period, $487.0M is for the Niagara Tunnel project, with the balance of $76.7M for other capital projects at the Niagara Plant Group or the R.H. Saunders Generating Station.

The Niagara Tunnel project was originally approved by the OPG Board on July 28, 2005, with an expected in-service date of 2010. In May 2009, the OPG Board approved a revised cost estimate of $1,600M and a revised in-service date of December 2013. OPG's planned capital expenditures for the Niagara Tunnel project are $288M in 2011 and $199M in 2012. As this project will not come into service during the test period, none of its capital expenditures will be added to rate base during the test period.

With respect to the $76.7M portion of the regulated hydroelectric capital budget for the test period that is unrelated to the Niagara Tunnel project, as shown in Ex. D1-T1-S1 Table 1, approximately $61.6M ($30.7M in 2011 and $30.9M in 2012) is associated with facilities that

are part of the Niagara Plant Group and $15.2M ($9.2M in 2011 and $5.9M in 2012) is associated with R.H. Saunders Generating Station.

For the Niagara Plant Group, the non-tunnel expenditures are primarily for the rehabilitation projects on units G3 and G10 at the Sir Adam Beck I Generating Station and the penstock replacement project at DeCew Falls I. Together, these four projects account for $30.9M of the $61.6M in capital expenditures planned during the test period for Niagara Plant Group facilities. The remainder consists of expenditures associated with smaller capital projects within this plant group.

For R.H. Saunders Generating Station, a significant portion of the planned expenditures are for the replacement of generator protections and control upgrades and the station service replacement project. Together, these two projects account for $9.6M of the $15.2M in test period capital expenditures for this station. The remainder consists of expenditures on a number of smaller capital projects at the station.

Descriptions and listings of the regulated hydroelectric capital projects are provided in Ex. D1-T1-S2. This exhibit also presents in-service additions for the bridge year and test period, and explains changes from OPG's EB-2007-0905 application. The remainder of this schedule provides period-over-period explanations of the capital budget, followed by a description of the project management process that OPG uses to identify, approve and oversee regulated hydroelectric projects.

4.0 PERIOD-OVER-PERIOD CHANGES – TEST PERIOD

2012 Plan versus 2011 Plan

Capital expenditures associated with the regulated hydroelectric facilities are expected to decrease from $328.0M in 2011 to $235.8M in 2012, mostly due to a reduction in the work associated with the Niagara Tunnel project. The tunnelling operation using the tunnel boring machine ("TBM") is expected to end in 2011 with an associated reduction in costs. In 2012, work is expected to continue on the installation of the tunnel lining and begin on the construction of the outlet structure.

In 2012, Niagara Plant Group capital spending (excluding the Tunnel project) is expected to increase by only $0.2M as work will be continuing on the rehabilitation of generator G3 at Sir Adam Beck I and the rehabilitation of generator G10 at Sir Adam Beck I will begin.

R.H. Saunders' 2012 capital spending is expected to decrease to $3.3M from the 2011 plan. This is a direct result of the Protections and Controls project winding down in early 2012, partially offset by: the execution phase of the excitation system replacement, the beginning of station service replacement, and the replacement of the fire water system.

2011 Plan versus 2010 Budget

Capital expenditures associated with the regulated hydroelectric facilities are expected to increase to $328.0M in 2011 from the $295.3M in 2010 mostly due to incremental work associated with the Niagara Tunnel project. While the tunnelling with the TBM continues, work will accelerate on the installation of the tunnel lining.

In 2011, Niagara Plant Group capital spending is expected to decrease by $5.5M mainly due to the completion of the DeCew Falls I penstock replacement in 2010, while the completion of the unit rehabilitation of generator G9 at Sir Adam Beck I will be offset by the beginning of rehabilitation work for generator G3 at Sir Adam Beck I.

R.H. Saunders' 2011 capital spending is expected to be $8.1M less than the 2010 budget as two large projects, the St. Lawrence Power Development Visitor Centre and the Powerhouse Crane Rehabilitation projects are completed in 2010.

5.0 PERIOD-OVER-PERIOD CHANGES – BRIDGE YEAR

2010 Budget versus 2009 Actual

Regulated hydroelectric capital expenditures are expected to increase to $295.3M in 2010 from $251.0M in 2009. The main reason for the higher expenditures in 2010 is work on the Niagara Tunnel project as the rate of progress of the TBM is expected to increase, along with the ramp up of tunnel lining activities.

Capital expenditures at the Niagara Plant Group are expected to increase from $25.6M in 2009 to $36.2M in 2010. Increases are a result of planned expenditures for installation of penstocks at DeCew Falls I, station service replacement at Sir Adam Beck II and transformer replacements at the Sir Adam Beck Pump Generating Station. In addition, planned expenditures on Sir Adam Beck I G9 unit rehabilitation are higher in 2010 than in 2009 and the rehabilitation of Sir Adam Beck I G3 is expected to begin.

Capital expenditures at R.H. Saunders will be $5.4M higher in the 2010 budget than the 2009 actual costs mainly due to two projects: the Powerhouse Crane Rehabilitation, and the Generator Protections and Controls.

6.0 PERIOD-OVER-PERIOD CHANGES – HISTORICAL PERIOD

2009 Actual versus 2009 Budget

The 2009 actual capital expenditure was $251.0M versus a 2009 budget of $395.6M, mostly due to changes associated with the Niagara Tunnel project.

Capital spending on the Niagara Tunnel project was $133.3M lower than plan in 2009 due to the contractor's slower than planned progress of the TBM, lower interest costs, and unspent contingency. The progress was slower than expected under the original contractor schedule primarily due to excess overbreak in the tunnel crown. In June 2009, following the recommendations of the Dispute Review Board ("DRB"), OPG and the contractor signed an amended design-build contract with a revised target cost and schedule. The target cost and schedule took into account the difficult rock conditions encountered, restoration of the circular cross section in areas of rock overbreak, and the concurrent tunnel excavation and liner installation work required to expedite completion of the tunnel. OPG's Board of Directors approved a revised project cost estimate of $1.6B and a revised scheduled completion date of December 2013. The advancement of the TBM was temporarily interrupted from September 11, 2009 to December 8, 2009 to repair a short section of the temporary tunnel liner that failed about 1,800 metres behind the TBM location, and to complete a planned overhaul of the TBM cutterhead, conveyor systems and other tunnel construction equipment. Installation of the lower one-third of the permanent tunnel concrete lining was ahead of

schedule. Restoration of the circular cross-section of the tunnel before installation of the upper two-thirds of the concrete lining began in September 2009.

Capital spending for the Niagara Plant Group in 2009 was $25.6M, or $16.6M below the budget of $42.2M. The significant decrease in expenditures is primarily related to changes in the Sir Adam Beck I unit rehabilitation schedule. The original schedule, which formed the basis for the last rate application, was revised because the time required to complete the necessary work exceeded the estimated outage duration. The first Frequency Conversion/Unit Rehabilitation (Unit G7) was completed on schedule and officially placed in service three months later in order to implement design changes to correct vibration problems discovered during unit commissioning. Lessons learned from the first unit rehabilitation have been applied in the planning for the subsequent rehabilitation projects. The resulting schedule changes increased 2009 expenditures for Unit G7 ($2.7M) and decreased expenditures for G9 ($9.2M), G3 ($0.5M) and G10 ($6.0M).

In addition, the G8 unit overhaul at DeCew Falls I ($0.5M) was deferred along with the Sir Adam Beck I canal lining repairs ($0.5M) and #1 elevator repairs ($5.0M). These decreases were offset by projects that were added to the capital expenditures after the last rate application. The additional capital projects include the DeCew Falls I Penstock Replacement ($3.0M), Service Center Facility ($1.5M), and the rehabilitation of the Sir Adam Beck Pump Generating Station Powerhouse Crane ($0.6M).

Capital spending at R.H. Saunders in 2009 was $11.9M which was $5.3M higher than planned. This difference was due to a variety of schedule and cash flow changes for a number of projects as follows:

- $7.2M was spent on the St. Lawrence Power Development Visitor Centre. OPG initiated community consultations in 2008 and did not include this project in its plans until the final scope had been determined and agreed to by both OPG and external stakeholders.
- $2.2M more was spent on the Protections and Controls project as the bids received were much higher than estimated.

- $4.5M less was spent because the Power House Crane project was deferred a year so a more detailed investigation and scoping could be conducted in order to develop a higher quality estimate.

2009 Actual versus 2008 Actual

The 2009 actual capital expenditure was $251.0M versus the 2008 actual expenditure of $160.1M.

The Niagara Tunnel project spending in 2009 was $82.1M more than 2008 ($213.5M versus $131.3M). This increase was mainly due to the progress of the TBM in 2009, and start of the tunnel invert lining operation.

Capital spending within the Niagara Plant Group was $25.6M in 2009 versus $24.8 in 2008. The increase in capital expenditures was due to the deferral of work on the Unit G7 frequency conversion/unit rehabilitation and Unit G9 Rehabilitation projects at Sir Adam Beck I into 2009.

Capital spending at R.H. Saunders was $11.9M in 2009 versus $4.0M in 2008 due to an expanded capital program and higher costs as discussed above in the 2009 actual versus 2009 budget discussion.

2008 Actual versus 2008 Budget

The 2008 actual capital expenditure was $160.1M versus the 2008 budget of $208.8M. The components of the variance are discussed below.

Capital spending on the Niagara Tunnel project was $39.3M lower than plan in 2008 ($131.3M versus $170.6M). The progress of the TBM was slower than what was expected under the original contractor schedule, primarily due to excess overbreak of the Queenston shale in the tunnel crown.

The Niagara Plant Group's capital spending in 2008 was $8.8M under plan. The capital variance was mainly due to the deferral of projects at the Sir Adam Beck I, including: the G7 Frequency Conversion/Unit Rehabilitation project ($5.6M), the G9 Unit Rehabilitation project ($5.1M), and the deferral of the #1 Elevator Shaft repair ($1.1M). These decreases were partially offset by the acquisition of the 2600 Stanley Avenue property, which is being developed as the new Niagara Service Centre facility that will allow the current service centre at the 25 Hz Niagara Transformer Station to be closed and decommissioned.

R.H. Saunders' capital spending in 2008 was $600k under plan ($4.0M versus a plan of $4.6M). The reduced spending was due to a deferral of the start of the Powerhouse Crane project, the deferral of the Station Service Ground Switches project, and less contingency required on the Compressed Air System Replacement project.

2008 Actual versus 2007 Actual

Capital expenditures associated with the regulated hydroelectric facilities increased to $160.1M in 2008 from the $84.3M actual expenditure in 2007 due to the planned increase in the rate of excavation by the TBM (Niagara Tunnel project), and continuing work on the frequency conversion/unit rehabilitation of Unit G7 at Sir Adam Beck I. Some of the increase is offset by the reduction in capital requirements for the Heating, Ventilation and Air Conditioning ("HVAC") Replacement project at R.H. Saunders.

2007 Actual versus 2007 Budget

The 2007 actual capital expenditure was $84.3M versus the 2007 budget of $229.4M.

The Niagara Tunnel project was $144.6M under budget in 2007 due to slower than expected progress of the TBM. The progress of the TBM was slower than what was expected under the original contractor schedule, primarily due to excess overbreak of the Queenston shale in the tunnel crown.

Capital spending at Niagara Plant Group was $0.2M below plan resulting from the deferral or cancellation of a number of smaller projects, offset by the advancement of spending of approximately $0.9M on the Unit G7 Frequency Conversion/Unit Rehabilitation project.

R.H. Saunders' capital spending in 2007 was approximately $0.2M under plan ($10.5M versus $10.8M). The majority of the variance is attributed to:

- The HVAC Replacement project spending was $1.1M below plan primarily as a result of very little discovery work requiring less of the contingency funds, and the late delivery of the heat exchangers which pushed some of the expenditures into 2008.
- The Domestic Water System Replacement project was reclassified to capital from OM&A after the final assessment concluded that it was more cost effective to replace the system than to upgrade or refurbish it. This resulted in $0.7M of unplanned capital spending in 2007.

7.0 PROJECT MANAGEMENT

As noted, capital expenditures for the regulated hydroelectric facilities are planned through the use of a structured portfolio approach, whereby OPG identifies and prioritizes projects. Projects are then administered using a comprehensive hydroelectric project management process. This hydroelectric project management process has been developed by the Hydroelectric Business Unit within the framework of, and consistent with, OPG's corporate level investment management processes, which are outlined in Ex. A2-T2-S1.

At any point in time, the portfolio of hydroelectric projects potentially includes projects at all stages of the project life cycle, from newly identified opportunities to projects that are in execution or close-out phases and for which funds have been fully released. The five phases within the project life cycle, each of which is discussed below, are as follows:

- Identification
- Initiation
- Definition
- Execution
- Final closing

The progression of a project from one phase to the next is governed by a management process, which ensures that periodic and systematic reviews are conducted, and that approvals are obtained before OPG proceeds with further investments. Between each phase, a distinct "decision gate" is reached, where a decision is taken on whether the project should proceed to the next phase, revert back to a previous phase, or cease entirely. Each step in the project life cycle may require a significant amount of time and resources (as in the case of a major rehabilitation or new station construction), or represent steps that are passed through relatively quickly (as in the case of the replacement of a minor plant component due to breakdown).

Project Identification

In general, problems or opportunities are identified by plant group or station staff as part of annual engineering reviews, periodic plant condition assessments, or ongoing maintenance activities (e.g., recurring equipment failures, technological obsolescence, or health and safety or environmental issues). If the identified problem or opportunity is likely to lead to the need for a project, then the project is proposed as part of the business plan with a budget estimate and planned duration.

Project Initiation

If funding for an identified project is approved through the business planning process, then the project enters the initiation phase. During this phase a project charter is normally created. The project charter sets out the project objectives, defines the responsibilities of the project team, identifies stakeholders, and specifies the initial project scope and schedule. Project charters are normally prepared by a plant group's Asset Management Department.

Project Definition

Where a definition phase is deemed necessary, the asset manager is accountable for carrying out the definition work according to the approved scope, cost, and schedule. This activity may be supported by the project manager. Definition work consists mostly of investigation required to determine project scope, verify site conditions, perform preliminary engineering, and produce a release quality estimate and a detailed schedule. Where the

definition work required is significant, the authorization to proceed is obtained through the approval of a developmental business case summary ("BCS"). Since the initial project scope and schedule was determined in the initiation phase, the capitalization of project costs begins with the definition phase, often with the approval of the developmental BCS.

Once the project has been evaluated and a decision has been made to seek approval for the execution phase of the project, a business case summary must be prepared. Business case summary preparation and approval is normally coordinated by the Asset Management Department.

Approval of Project Releases

The budget plan for projects (both capital and OM&A) is approved by the OPG Board as part of the business plan approval process. While this process ensures that overall budget envelopes are approved, OPG governance additionally requires approval of project specific releases through the approval of BCS.

Project BCSs are reviewed and approved in accordance with OPG's Organizational Authority Register ("OAR"), which sets out the approval authority for different levels of OPG management (see Ex. A2-T2-S1, section 6.0). Hydroelectric projects with an approved budget of up to $4M can be approved by a plant group manager; projects up to $10M can be approved by the Executive VP – Hydroelectric; projects up to $25M can be approved by the President and CEO; and projects above $25M require the approval of the OPG Board.

Further corporate oversight is provided by the OAR requirement that BCSs also be reviewed and approved by OPG's corporate finance function, which reports to the Chief Financial Officer. Project BCSs up to $4M require finance approval from the Plant Group Controller; projects up to $10M require approval of the Director of Finance – Hydroelectric; and projects over $10M require approval of the Vice President, Corporate Investment Planning.

For the release of funds for project development work, project approval is based on the dollar value of the developmental release work as a stand-alone project. The developmental

release is limited to 10 per cent of the estimated total project cost and, as outlined above, the product of this stage is an updated estimate of total project cost and a full release BCS to request approval to continue to the project execution phase.

If an investment of greater than 10 per cent of the total project estimate had been required at this stage, or if project staff recommend conducting some execution activities in advance of a full release, then a partial release BCS will be prepared and approved, per the OAR, on the basis of estimated total project cost. This approach ensures effective management involvement and oversight in these instances and minimizes OPG's financial commitment while providing management with adequate additional information to decide whether to proceed with a full release.

With reference to a partial BCS, this approach may be used to allow execution of the first unit of a multi-unit project or the first stage of a large, multi-stage project. A phased approach is used to allow confirmation of costs and benefits from the first unit installation, prior to committing to proceeding with the project execution phase for the balance of units with a full release BCS.

Project Execution

After approval has been obtained, the plant group Project Management Department normally carries out the execution phase of a project. In addition to the actual construction and physical execution of the project, activities associated with the execution phase typically include:

- Managing the people and resources, or outside contractors required to complete the project deliverables.
- Managing the scope, quality, cost, and schedule.
- Managing project risks, health and safety, quality, and environmental requirements.
- Monitoring progress and forecasting time, effort, and cost to complete.
- Analyzing variances from the plan and re-planning the project as required.
- Managing project changes.
- Identifying and recording lessons learned as they occur.

- Commissioning, startup, and performance testing (in coordination with operations and maintenance staff).

For capital projects only, when equipment is placed into service, key accounting information is provided so the asset can be properly recorded on OPG's balance sheet.

Project Oversight

During the execution phase of a hydroelectric project, ongoing management oversight continues at various levels of the OPG organization commensurate with the total cost, scope, project risks, and/or the strategic importance of the project. For smaller projects, oversight is provided by the plant group's Asset Management, Project, and Finance Departments through monthly cost review meetings. For larger projects, typically over $1M in total costs, specific project milestones are identified and included in the performance targets of each Plant Group Manager's Annual Incentive Plan (see Ex. F4-T3-S1). These specific projects receive further oversight from the Executive VP - Hydroelectric and the central support groups through monthly reporting and quarterly review meetings with plant group management. The highest level of management oversight is reserved for projects that are uniquely large, carry significant risks and are of particular strategic importance (e.g., the Niagara Tunnel project). For these projects, frequent progress reports would be reviewed by OPG's Executive Management Team and may be sent to the Major Projects Committee of the OPG Board for periodic review.

If, during the execution of a project, the cost projection at completion is forecast to exceed the approved project budget, a superseding BCS is prepared to document the status of the project, the causes of the forecast overexpenditure, the management actions taken to-date to control costs, and all viable cost control or scope adjustment options for management consideration. The additional project specific budget request as identified in the superseding BCS is routed for approval per the OAR. Approval is required before exceeding the previously approved full release amount.

Project Close-Out and Post-Implementation Review

On completion of the execution phase, a project closure report describing the final project costs is prepared within six months of the project's in-service date. In addition, if required, a post-implementation review is prepared for the project. Post implementation reviews are required for all OM&A or capital projects over $200k in value. The purpose of the post-implementation review is to confirm whether the benefits and/or business objectives stated in the business case summary have been achieved, and to communicate any lessons learned back to management to aid in future decisions. The post-implementation review will normally be completed within one year of the in-service date or as specified in the business case summary.