CAPITAL EXPENDITURES - REGULATED HYDROELECTRIC

1.0 PURPOSE

This evidence provides an overview of the capital expenditures for OPG's regulated hydroelectric facilities for the historical years, bridge year, and the test period, with the exception of the Niagara Tunnel Project, which is addressed in Ex. D1-2-1. This exhibit also provides period-over-period explanations, and an overview of the hydroelectric project management process. Details for regulated hydroelectric capital projects are provided in Ex. D1-1-2.

2.0 OVERVIEW

Over the test period, OPG hydroelectric capital expenditures will primarily focus on sustaining assets in order to ensure the ongoing availability and reliability of OPG's hydroelectric portfolio.

Capital expenditures can vary significantly from year to year based on the number and size of projects being executed. Excluding the Niagara Tunnel project, capital expenditures for the Niagara Plant Group and R.H. Saunders GS over the 2010 to 2015 period remain stable between $30M to $40M per year. For the newly regulated hydroelectric facilities, capital expenditures are consistent over the 2010 – 2013 period and remain in the $60M to $80M per year range, with an increase in 2014 due the start of construction of the Ranney Falls GS Expansion Project.

OPG's capital expenditures for the Niagara Plant Group and R.H. Saunders GS are $34.5M and $38.2M in 2014 and 2015, respectively. The majority of OPG's planned capital expenditures for the test period are for the Sir Adam Beck 1 GS G10 Upgrade; the DeCew Falls I GS Station Upgrade; and the R.H. Saunders Powerhouse Crane Replacement projects. These three projects account for $42.5M of the total test period capital expenditures of $72.8M.

OPG's capital expenditures for the newly regulated hydro facilities are $91.0M and $100.0M in 2014 and 2015, respectively. The largest projects for the newly regulated hydroelectric

facilities in the test period include: the Ranney Falls GS Expansion, Lower Notch GS G1 and G2 Generator Rewinds, Nipissing GS Penstock Replacement, the Ottawa St. Lawrence Plant Group New Headquarters Building, and the Chenaux GS Protections Upgrade projects. These projects account for $93.8M of the total test period capital of $190.9M for the newly regulated hydroelectric facilities.

A summary of the regulated hydroelectric capital expenditures for 2010 - 2015 is provided in Ex. D1-1-1 Table 1.

The remainder of the schedule is structured as follows:
Section 3 – Regulated Hydroelectric Capital Budget
Section 4 – Period-over-period Changes – Test Years
Section 5 – Period-over-period Changes – Bridge Year
Section 6 – Period-over-period Changes – Historical Years
Section 7 – Project Management

3.0 REGULATED HYDROELECTRIC CAPITAL BUDGET

As described in Ex. F1-1-1, Appendix A, the Hydro-Thermal Operations Business Unit (HTO) uses a structured portfolio approach to identify and prioritize projects. Projects are administered using the project management process as described in section 7.0 below. The hydroelectric project portfolio is approved through OPG's business planning process. Most hydroelectric capital projects involve the replacement of end of life equipment or the refurbishment of existing structures. OPG's capitalization policy, at Ex. D4-1-1, is used to determine which projects are capital projects and which projects fall within project OM&A. Project OM&A is discussed in Ex. F1-3-3. Prior to beginning work on a project, funds are released in accordance with OPG's Organizational Authority Register following the approval of a project business case.

Through the 2013-2015 business planning process, excluding the Niagara Tunnel project, OPG's Board has approved $263.7M of capital project expenditures for the 2014 - 2015 test period to sustain or improve the Niagara Plant Group, R.H. Saunders GS, and the newly

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) during the test period. Exhibit D1-1-2 presents in-service additions for the bridge year and test period, and explains changes from OPG's EB-2010-0008 application.

Capital projects unrelated to the Niagara Tunnel project are summarized in Ex. D1-1-1 Table 1.

The following summarizes the capital budgets for the Niagara Plant Group and R.H. Saunders GS, and newly regulated station segments. Descriptions and listings of the regulated hydroelectric capital projects are provided in Ex. D1-1-2.

3.1 Niagara Plant Group and R.H. Saunders GS Capital Budget

For the Niagara Plant Group, non-tunnel expenditures are dominated by the Sir Adam Beck I GS G10 Upgrade and DeCew Falls I GS Station Upgrade projects which account for $35.1M of the $59.1M in the test period capital expenditures. The Sir Adam Beck GS 1 G10 Upgrade project is in definition phase and the current preliminary cost estimate is $25.6M with an in-service date in 2015. The DeCew Falls 1 GS Station Upgrade project is also in the definition phase and the current preliminary cost estimate is $12.0M with an in service date in 2015. The remainder of the Niagara Plant Group capital expenditures are smaller capital projects.

For R.H. Saunders Generating Station, the planned expenditures are dominated by projects for the replacement of the powerhouse crane and the station service equipment. Together, these two projects account for $11.4M of the $13.6M in test period capital expenditures for this station. The remainder consists of expenditures on a number of smaller capital projects at the station.

3.2 Newly Regulated Facilities Capital Budget

For the Ottawa-St.Lawrence Plant Group, a large portion of the planned expenditures are projects for the Chenaux GS Protections Upgrade, New Plant Group Headquarters Building and Otto Holden GS Sluicegates and Headgates Replacements. Together, these four

projects account for $33.0M of the $71.2M in the test period capital expenditures for the Plant Group. The remainder consists of expenditures on a number of small projects and completion of a few larger projects at Des Joachims GS in 2014.

For the Central Hydro Plant Group, a significant portion of the planned expenditures are projects for the Ranney Falls GS Expansion, South Falls GS G2 Unit Turbine and Generator Replacement, and Nipissing GS Penstock Replacement and Spillway projects. Together, these four projects account for $53.2M of the $59.3M in the test period capital expenditures for the Plant Group. The remainder consists of expenditures on a number of smaller capital projects for the Plant Group.

For the Northeast Plant Group, the planned expenditures are dominated by projects for the Lower Notch GS G1 and G2 Capital Upgrades, and G1 and G2 Headgate Upgrades. Together, these four projects account for $31.5M of the $39.9M in the test period capital expenditures for the Plant Group. The remainder consists of expenditures on a number of smaller capital projects for the Plant Group.

For the Northwest Plant Group, a large portion of the planned expenditures are projects for the Cameron Falls and Pine Portage GS Transformer Replacements, Whitedog Falls GS G1 and G3 Generator Rewinds, Kakabeka Falls GS Shebandowan Dam Replacement and the Cameron Falls and Pine Portage GS Unit Breakers Replacements. Together, these projects account for $14.9M of the $20.5M in the test period capital expenditures for the Plant Group. The remainder consists of expenditures on a number of smaller capital projects for the Plant Group.

4.0 PERIOD-OVER-PERIOD CHANGES – TEST PERIOD

2015 Plan vs. 2014 Plan

Niagara Plant Group

In 2015, Niagara Plant Group capital spending is expected to increase by $9.5M to $34.3M due to the start of the DeCew Falls I Trashrack Replacement and Sir Adam Beck I G5 Major

Overhaul & Upgrade projects. In addition, planned expenditures increase for the Sir Adam Beck I G10 Upgrade and Sir Adam Beck Pump Generating Station Protection and Controls Upgrade projects in 2015.

R.H. Saunders Generating Station

In 2015, R.H. Saunders capital spending is expected to decrease by $5.8M to $3.9M due to planned completion of the construction phase of the Powerhouse Crane Replacement in 2014.

Ottawa-St.Lawrence Plant Group

In 2015, Ottawa St. Lawrence Plant Group capital spending is expected to increase by $6.8M to $39.0M due to planned expenditures on the Chenaux GS Protections Upgrade (site installation scheduled for 2015), and timing associated with the execution of approximately 40 other small capital projects.

Central Hydro Plant Group

In 2015, Central Hydro Plant Group capital spending is expected to increase by $7.1M to $33.2M due to the planned expenditures on projects at Nipissing GS for Penstock Replacement and a Spillway Capacity Increase required to meet dam safety requirements.

Northeast Plant Group

In 2015, Northeast Plant Group capital spending is expected to slightly decrease by $0.9M to $19.5M. A significant portion of the planned expenditures in 2015 includes the continuation of the Lower Notch GS Capital Upgrade projects that include generator rewinds and other associated upgrades including headgate and exciter replacements.

Northwest Plant Group

In 2015, Northwest Plant Group capital spending is expected to decrease by $4.0M to $8.3 due to planned completion of the Cameron Falls GS and Pine Portage GS Unit Breakers Replacement projects in 2014.

2014 Plan vs. 2013 Budget

Niagara Plant Group

Niagara Plant Group capital spending is expected to decrease by $3.9M to $24.8M due to the completion of on the DeCew Falls II GS Powerhouse Crane Rehabilitation and Governor Sump & Pump Replacement projects, as well as the Sir Adam Beck I G3 Upgrade and Public Health and Safety Fencing Improvements projects. These decreases will be offset by Sir Adam Beck I G10 Upgrade and DeCew Falls I Station Upgrade which are both starting execution in late 2013.

R.H. Saunders Generating Station

R.H. Saunders GS 2014 capital spending is expected to increase to $9.7M from the 2013 plan of $5.0M. This is a result of several projects ramping up in 2014 including Station Service Replacement, Fire Water System Replacement, and the Powerhouse Crane Replacement.

Ottawa-St.Lawrence Plant Group

In 2014, Ottawa St. Lawrence Plant Group capital spending is expected to slightly increase by $0.4M to $32.2. The Des Joachims Turbine Runner Replacement and the Otto Holden Headgate Replacement are continuing in 2014 with expenditures of $2.4M and $2.5M respectively. The balance of the planned spending in 2014 is associated with the approximately 40 other small capital projects.

Central Hydro Plant Group

In 2014, Central Hydro Plant Group capital spending is expected to increase by $17.1M to $26.1M due to the start of construction on the Ranney Falls GS Expansion project, and expenditures on the South Falls GS Unit G2 Turbine and Generator Replacement.

Northeast Plant Group

In 2014, Northeast Plant Group capital spending is expected to increase by $4.8M to $20.4 due to planned expenditures on the Lower Notch GS G1 Capital Upgrade that includes a generator rewind and other associated upgrades including headgate and exciter replacements.

Northwest Plant Group

In 2014, Northwest Plant Group capital spending is expected to decrease by $3.3M to $12.2 due to decreased expenditures on the Aguasabon GS 13.8 kV Switchgear Replacement and planned completion of the Alexander GS G1 Headgate Replacement in 2013.

5.0 PERIOD-OVER-PERIOD CHANGES – BRIDGE YEAR

2013 Budget vs. 2012 Actual

Niagara Plant Group

In 2013, Niagara Plant Group capital spending is expected to increase by $1.7M to $28.8M mainly due to spending related to the PGS Reservoir Refurbishment project and the start of DeCew Falls II Powerhouse Crane Rehabilitation and Governor Sump & Pump Replacement projects, which are partially offset by reduced spending on the Sir Adam Beck I Unit G3 rehabilitation.

R.H. Saunders Generating Station

R.H. Saunders GS 2013 capital spending is expected to increase to $5.0M from the 2012 plan of $2.7M. The increase is due the ramping up of work for the Powerhouse Crane Replacement project, and the start of work to replace the dewatering system in 2013.

Ottawa-St.Lawrence Plant Group

In 2013, Ottawa St. Lawrence Plant Group capital spending is expected to decrease by $9.2M to $31.7M due to completion of the Mountain Chute GS G1 and G2 Generator Rewinds, Arnprior GS Headgate Replacements, Barrett Chute GS Transformer Replacements and Chenaux GS Headgate Replacements in 2012.

Central Hydro Plant Group

In 2013, Central Hydro Plant Group capital spending is expected to decrease by $0.3M to $8.5M due to substantial completion of the Crystal Falls GS 44 kV Conversion project and deferral of Nipissing GS Turbine and Generator Replacement project in 2012. The project was deferred in 2012 to allow for further investigation into the project scope and cost. The decreases are offset by planned expenditures on the Ranney Falls GS Expansion project.

Northeast Plant Group

In 2013, Northeast Plant Group capital spending is expected to decrease by $6.0M to $15.6 mainly due to the completion of the Matabichuan GS Penstock and Saddle Replacement project in 2012.

Northwest Plant Group

In 2013, Northwest Plant Group capital spending is expected to increase by $6.8M to $15.6 due to commencement of the Pine Portage GS Transformer Replacement and G3 Generator Rewind projects.

6.0 PERIOD-OVER-PERIOD CHANGES – HISTORICAL PERIOD

2012 Actual vs. 2012 Budget

Niagara Plant Group

Capital spending for the Niagara Plant Group in 2012 was $27.1M, or $3.8M below the OEB approved plan of $30.9M. The variance in expenditures primarily due to the deferral of three projects: the DeCew Falls I GS Electrical and Mechanical Station Upgrade, Sir Adam Beck Pump Generating Station Breaker Replacements, and the Sir Adam Beck I G10 Upgrade. DeCew Falls GS I Electrical and Mechanical Station Upgrade and Sir Adam Beck GS I G10 Upgrade were deferred to allow more planning time to confirm project scope, while the Sir Adam Beck Pump Generating Station Breaker Replacements was deferred due to favorable breaker condition. These reductions are partly offset by higher than planned spending on Sir Adam Beck I G3 Upgrade. The timing for G3 rehabilitation work was delayed to allow for the completion of warranty work on Unit G7 at Sir Adam Beck I GS.

R.H. Saunders Generating Station

In 2012, R.H. Saunders capital spending was $3.2M less than the OEB approved plan of $5.9M. This is a result of several projects being reprogrammed including the reclassification of the Service Water System project as an OM&A project, deferral of the Excitation System replacement following a technical assessment, and deferral of the Fire Water System to determine full scope. These decreases were partially offset by the Powerhouse Crane Replacement project starting in 2012.

Ottawa-St.Lawrence Plant Group

Capital spending for the Ottawa St. Lawrence Plant Group in 2012 was $41.0M, or $0.7M below the approved budget of $41.7M. Work in 2012 included ongoing work for the Des Joachims Main Output Transformer Replacements ($4.6M in 2012), and the remaining balance of 2012 spending was associated with the approximately 40 other capital projects in execution.

Central Hydro Plant Group

Capital spending for the Central Hydro Plant Group in 2012 was $8.8M, or $6.0M under budget. The variance is mainly due to the deferral of the Ranney Falls Expansion project due to delays in obtaining project approvals, in addition to less than planned spending on the Central Hydro Plant Group SCADA Upgrade project, and the deferral of the Nipissing GS Turbine and Generator Replacement.

Northeast Plant Group

Capital spending for the Northeast Plant Group in 2012 was $21.6M, or $4.5M under budget. This under variance was primarily attributed to the deferral of the Otter Rapids GS Runner Upgrade Purchase and Abitibi Canyon GS Station Service Replacement projects due to availability of staff resources that were required on other major projects.

Northwest Plant Group

Capital spending in the Northwest Plant Group in 2012 was $8.7M, or $0.1M under Plan. Several larger projects, such as the Whitedog Falls GS Transformer Replacement, the

Alexander GS Headgate Replacement, and the Caribou Falls GS Sluicegate Replacements and the Pine Portage GS Runner Upgrades, were on budget.

2012 Actual vs. 2011 Actual

Niagara Plant Group

In 2012, Niagara Plant Group capital spending decreased by $0.1M. This is due to the completion of DeCew Falls I GS Penstock Replacement project and reduced spending on Sir Adam Beck I GS G7 Frequency Conversion project.

R.H. Saunders Generating Station

R.H. Saunders GS 2012 capital spending decreased by $5.4M from the 2011 Actual. This was due to the completion of the Protections and Controls project in 2011, partially offset by the timing of the Powerhouse Crane Replacement.

Ottawa-St.Lawrence Plant Group

Ottawa St. Lawrence Plant Group 2012 capital spending of $41.0M was $13.9M more than 2011 spending primarily due to increased project spending on the Des Joachims GS DC Station Service Switchgear, Breakers Replacement, and G1, G3, G5 Generator Rewind projects, and the Mountain Chute GS Generator Rewind, Stewartville GS Protections and Controls and Otto Holden GS Station Service Upgrade projects.

Central Hydro Plant Group

Central Hydro Plant Group 2012 capital spending of $8.8M was $1.3M less than 2011 spending due deferrals of Nipissing GS Turbine and Generator Replacement, Bingham Chute GS Log Lifter, and McVittie GS Sluicegate Repair/Replacement projects, and cancellation of Big Eddy GS Installation of Log Handling Equipment at the Spillway Dam in 2012. This was offset by higher than planned spending on the Ragged Rapids GS and Ranney Falls GS Headgate Replacements, and Gravenhurst Public Safety Upgrades in 2011.

Northeast Plant Group

Northeast Plant Group 2012 capital spending of $21.6M was $11.5M more than 2011 mainly due to the construction phase for Matabichuan GS Penstock and Saddle Replacement project in 2012.

Northwest Plant Group

Northeast Plant Group 2012 capital spending of $8.7M was $5.3M less than 2011 spending due to the completion of the Cameron Falls GS and Whitedog Falls GS Headgate Replacements, and Kakabeka Falls GS G4 Turbine Inlet Valve Replacement projects in 2011.

2011 Actual vs. 2011 Budget

Niagara Plant Group

Capital spending for the Niagara Plant Group in 2011 was $27.2M, or $3.5M below the OEB approved plan of $30.7M. The decrease in expenditures is primarily related to changes in the scope of the Sir Adam Beck I Unit G3 rehabilitation. The original scope was revised as a result of a detailed engineering assessment conducted on the unit which indicated that the major generator components were suitable for an additional 20 to 30 years of service with the planned rehabilitation work. The previous estimate for the Unit G3 project was based on a generator replacement. Overall project savings of $7M will be realized through this scope change. The timing for G3 rehabilitation work was delayed to allow for the completion of warranty work and the installation of the Johnson valve sleeve on Unit G7 at Sir Adam Beck I GS. Overall spending in 2011 on Unit G3 was $10.8M below forecast.

The reduced spending on Sir Adam Beck I Unit G3 was offset by increased spending on the DeCew Falls I GS Penstock Replacement ($1.7M), Sir Adam Beck I Unit G7 warranty work ($3.7M), Sir Adam Beck Pump Generating Station Reservoir Refurbishment definition phase work ($2.2M) and a number of smaller projects.

R.H. Saunders Generating Station

Capital spending at R.H. Saunders in 2011 was $8.1M which was $1.1M less than the 2011 OEB approved plan. This difference was due to several small schedule changes to a number of projects including the Protection and Controls Upgrade project.

Ottawa-St.Lawrence Plant Group

Capital spending for the Ottawa St. Lawrence Plant Group in 2011 was $27.1M, or $9.9M under budget due to less than planned spending on the Mountain Chute GS Generator Rewinds, deferral of the New Plant Group Headquarters Building and small schedule and cash flow changes on a significant number of other projects. The Mountain Chute GS Generator Rewinds outage schedule was updated after the budget was finalized resulting in less than planned spending. The New Plant Group Headquarters Building project was initiated to address the extensive deterioration of the existing building (approx. 45 years old). This project was deferred to allow for a more thorough assessment of options for an headquarters building.

Central Hydro Plant Group

Capital spending for the Central Hydro Plant Group in 2011 was $10.1M, or $0.4M under budget due to less than planned spending on Crystal Falls GS Conversion to 44 kV operations, and the deferral of North Bay Headquarters Renovations. The North Bay Headquarters Renovations ($1.8M budget) was deferred to 2012 to allow for further study of office space requirements and cost effective building construction options. This was offset higher than planned spending on the Ragged Rapids GS and Ranney Falls GS Headgate Replacements.

Northeast Plant Group

Capital spending for the Northeast Plant Group in 2011 was $10.1M, or $4.9M under budget due to less than planned spending for the Matabichuan GS Penstock and Saddles Replacement project due to delays to obtain required permitting and to perform detailed exploratory work, and less than planned spending for the Otter Rapids GS Sluice Hoist Installation and Runner Purchase projects due to issues identified with manufacturer's design.

Northwest Plant Group

Capital spending for the Northwest Plan Group in 2011 was $14.1M, or $0.1M under budget. The largest projects, Alexander GS and Whitedog Falls GS Headgate Replacements and the Caribou Falls GS Sluicegate Replacements were all on budget.

2011 Actual vs. 2010 Actual

Niagara Plant Group

In 2011, Niagara Plant Group capital spending decreased by $1.3M mainly due a reduction in spending on the unit rehabilitation program at Sir Adam Beck I.

R.H. Saunders Generating Station

R.H. Saunders' 2011 capital spending was $3.7M lower than 2010 mainly due to the completion of the St. Lawrence Power Development Visitor Centre project in 2010.

Ottawa-St.Lawrence Plant Group

Ottawa St. Lawrence Plant Group 2011 capital spending of $27.1M was $21.3M less than 2010 due to the completion of the Otto Holden GS Transformers Replacements, the Chenaux GS Limerick Island Dam Sluicegate Rehabilitation, and Chats Falls GS T20 Transformers Replacement projects in 2010.

Central Hydro Plant Group

Central Hydro Plant Group 2011 capital spending of $10.1M was $5.3M more than 2010 spending due to the start of the Ragged Rapids GS and Ranney Falls GS Headgates Replacement projects, as well as, higher than planned spending for the Northbury and Gravenhurst Public Safety Upgrades, the Central Hydro SCADA upgrades, and the Wanapitei Stop Log Replacement projects in 2011. The public safety upgrades consisted of the installation of additional fencing, barriers, safety booms, gates, and signage for generating stations and control structures maintained by the Northbury and Gravenhurst Service Centres. The Wanapitei Control Structure provides water management for the Stinson, Coniston, and McVittie Generating Stations.

Northeast Plant Group

Northeast Plant Group 2011 capital spending of $10.1M was $3.8M more than 2010 spending due to the start of the Matabichuan GS Penstocks and Saddle Replacement project in 2011.

Northwest Plant Group

Northwest Plant Group 2011 capital spending of $14.1M was $5.1M more than 2010 spending due to start of the Cameron Falls GS G7 Headgate Replacement and Silver Falls GS T1 Transformer Replacement projects in 2011.

2010 Actual vs. 2010 Budget

Niagara Plant Group

The Niagara Plant Group's capital spending in 2010 was $7.7M under plan. The capital variance was mainly due to reduced spending on the installation of penstocks at DeCew Falls I ($1.5M), reduced spending on generator rehabilitation work at Sir Adam Beck I for Units G3 ($1.7M) and G9 ($3.5M), and the deferral of protection and control work at Sir Adam Beck Pump Generating Station ($1.0M).

R.H. Saunders Generating Station

R.H. Saunders' capital spending in 2010 was $5.5M under plan ($11.8M versus a plan of $17.3M). This variance was due to: the deferral of the Powerhouse Crane Replacement to 2012 in order to better determine project scope, the deferral of the Projections and Control project to allow for outage scheduling, and for lower than planned contingencies on the St. Lawrence Power Development Visitor project.

Ottawa-St.Lawrence Plant Group

Capital spending for the Ottawa St. Lawrence Plant Group in 2010 was $48.4M, or $2.9M under budget primarily due to less planned spending on the Mountain Chute GS Generator Rewind project. The project scheduled for 2010 was delayed due to a forced outage of Unit 2

in 2009. In addition, there was a deferral the Arnprior GS Headgate Replacement project execution phase to 2011 to accommodate the procurement schedule.

Central Hydro Plant Group

Capital spending for the Central Hydro Plant Group in 2010 was $4.8M, or $2.7M under budget due to the deferral of the North Bay Headquarters Renovations, Nipissing GS Penstock Replacement, and Ragged Rapids GS G1 Runner Replacement and Rewind projects, as well as, less than planned spending on the Central Hydro PG SCADA Upgrades.

Northeast Plant Group

Capital spending for the Northeast Plant Group in 2010 was $6.4M, or $4.8M under budget. As described above, the Matabichuan GS Penstock and Saddles Replacement project was project was delayed in order to perform additional exploratory work and detailed design. Also, there was less than planned spending for the Indian Chute GS G1 Turbine Replacement project.

Northwest Plant Group

Capital spending for the Northwest Plant Group in 2010 was $9.0M , or $1.1M under budget due to less than planned spending on the Kakabeka Falls GS G4 Turbine Inlet Valve Replacement project. As the project progressed in definition phase, it became apparent that there were multiple logistical issues that needed to be addressed, which resulted in postponing the project.

7.0 PROJECT MANAGEMENT

OPG's project management process for regulated hydroelectric facilities is substantially unchanged from EB-2010-0008 with the exception of the addition of a centralized Project Management Office ("PMO"). 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 project management process. This project management process has been developed by the Hydro

Thermal Business Unit within the framework of, and consistent with, OPG's corporate level investment management processes, which are outlined in Ex. A2-2-1.

The PMO ensures adherence to industry best practice standards for project management. Through planning, training, project management competency, and contractor pre-qualification services, PMO ensures that contractors meet the requirements to perform work on OPG sites. On major strategic projects, a comprehensive Post Implementation Review ("PIR") is conducted by the PMO to ensure that the business and project objectives have met the intended purpose as stated in the Business Case Summary (BCS).

At any point in time, the portfolio of hydroelectric projects may include 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 are as follows:

- Identification - problems or opportunities are identified that are likely to lead to a project;
- Initiation - initial project scope, schedule, and stakeholders are identified, and the project is included in business plans;
- Definition - investigation to determine project scope, verify site conditions, perform preliminary engineering, and produce a release quality estimate and a detailed schedule;
- Execution - management of construction and physical execution of the project;
- Final closing - preparation of project closure report and Post-Implementation Review to document final costs and lessons learned.

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).

Release of funds for hydroelectric projects typically occurs at two stages: definition and execution. For the definition phase, the release of funds is based on a developmental BCS and is limited to 10 per cent of the total project estimate. A full BCS releases all of the funds for the execution phase of the project based on a release quality estimate and a detailed schedule.