BASE OM&A - REGULATED HYDROELECTRIC

1.0 PURPOSE
This evidence presents the regulated hydroelectric base OM&A costs for the historical years, bridge year and test period.

2.0 OVERVIEW
This evidence supports the approval sought for the proposed regulated hydroelectric base OM&A for the test period. The regulated hydroelectric base OM&A expenses for 2007 - 2012 are provided in Ex. F1-T2-S1 Table 1. The test period base OM&A expenses are $68.7M and $62.2M in 2011 and 2012, respectively.

Base OM&A costs represent the resources required to fund routine, day-to-day operations and maintenance-related activities in support of the production of electricity from OPG’s regulated hydroelectric generating units, along with associated administration and Hydroelectric Central Support Group costs.

3.0 REGULATED HYDROELECTRIC BASE OM&A
The regulated hydroelectric OM&A budget is established through the annual business planning process (see Ex. A2-T2-S1 and Ex. F1-T1-S1). Base OM&A expenditures for OPG’s regulated hydroelectric facilities are attributed on a work program basis, consistent with how costs are incurred. Base OM&A budgets are attributed to each of the plant groups based on the following work programs: operations, maintenance, and administration support.

Operations costs include all direct costs to operate the generating facilities for the purpose of generating electricity or producing other related products (e.g., ancillary services required by the electricity system). These costs include costs for control room operators, water management activities including dam operations, dam safety surveillance inspections, waterway patrol, water flow monitoring/snow surveys, ice breaking, and log operations. These costs also include OPG’s portion of all joint works
operations costs, shared with the New York Power Authority ("NYPA") pursuant to Joint Works Agreements.

Maintenance includes all costs associated with the direct maintenance of the facilities to ensure their normal, safe, and environmentally sound operation. Base maintenance activities are programmed by the type of work: preventive (to reduce the need for corrective maintenance), corrective (to address breakdowns), and emergent (condition based maintenance, resulting from inspections). Work is also categorized by the following objectives: regulatory (e.g., health and safety, dam safety, and environment) and contractual obligations (e.g., joint works), and maintain condition/sustaining.

Maintenance plans are established in a maintenance management system. The plans are used to prioritize work execution and used to support budget requirements. As indicated in Ex. F1-T1-S1, investment in hydroelectric facilities (including base OM&A funding) is determined using a structured portfolio approach, and streamlined reliability centred maintenance principles. The maintenance work program also includes OPG’s portion of the maintenance costs for joint works, which are shared with NYPA.

Administration costs within the plant groups include all common support costs incurred for the production facilities that are not directly related to the production of electricity. This includes: Asset Management and Technical Support Services, Project Management, Human Resources and other Support Services, Finance, and the Plant Manager’s Office. A program to divest certain Niagara Plant Group bridges is also included with the Niagara Plant Group’s administrative costs from 2009 - 2011.

OPG owns several bridges in the Niagara Region. OPG has ongoing maintenance responsibilities for these roadway bridges and has legal obligations to maintain them during their service life and replace them at end of life. A strategy has been put in place to divest the bridges to the local municipalities or regions on mutually agreed terms and conditions, thereby reducing the future costs, liabilities, and risks to OPG.
The year-over-year variances in base OM&A expenditures for the historical, bridge and
test years are discussed in Ex. F1-T2-S1. Exhibit F1-T2-S1 Table 1 provides a summary
of base OM&A over the 2007 - 2012 period.

Detailed descriptions of the OM&A costs for the Niagara Plant Group and R.H. Saunders
are provided below in sections 3.1, 3.2, and 3.3. Section 3.3 also describes the Ottawa -
St. Lawrence Plant Group common support costs and the methodology for allocating
these to R.H. Saunders. This level of allocation exists only for R.H. Saunders as a result
of it being the only regulated facility within the Ottawa - St. Lawrence Plant Group. Since
the Niagara Plant Group is comprised entirely of regulated facilities, no such allocation is
necessary.

In addition to the costs incurred within the plant groups, certain other costs incurred to
support the regulated hydroelectric facilities are provided on a centralized basis. The
Hydroelectric Central Support Groups’ costs include functions and activities not provided
within the plant groups such as specialized Engineering, Business Support and
Regulatory Affairs, Water Resources and Aboriginal Affairs, Dam Safety and Emergency
Preparedness, Environment, Hydroelectric Development, and Supply Chain. Section 3.4
includes a description of these Hydroelectric Central Support Groups, and section 3.5
describes the methodology for allocating their costs to the Niagara Plant Group and R.H.
Saunders.
3.1 Niagara Plant Group Costs

The following Niagara Plant Group departments operate under the Niagara Plant Group Manager:

- Human Resources Department
- Business Support Department
- Production Department
- Asset Management and Technical Support Services Department
- Project Management Department
- Services Department

3.1.1 Human Resources Department

The Human Resources Department provides plant group support in the areas of employee services, labour relations, vacancy management, health and safety, disability management, compensation, and pay services. The staff associated with these functions form part of OPG’s Corporate Human Resources Department and the costs associated with supporting the Niagara Plant Group are allocated through the cost allocation process described in Ex. F4-T4-S1. Also reporting to the Manager of the Human
Resources Department are eight full time staff directly funded by the Niagara Plant Group providing support for public affairs, stakeholder relations, community relations services, environmental services and local training program co-ordination functions within the Niagara Plant Group. Their costs are budgeted, collected, and reported in the Niagara Plant Group under the appropriate program rather than allocated through the cost allocation process described in Ex. F4-T4-S1.

Starting in 2010, all trainees have been assigned to a training organization for administrative, control and tracking purposes. This organization is overseen by a training co-ordinator who manages the training program and all associated costs. However, direct day-to-day supervision for trainees is provided by their respective Plant Group departments. In 2011, there are expected to be 20 trainees in this group by year end. These trainees are part of the Niagara Plant Group’s staff compliment and their costs are included in the base OM&A budget.

3.1.2 Business Support Department

The Business Support Department, which is managed by the Site Controller, provides financial management and materials management support to the Niagara Plant Group. This department is responsible for coordinating the budgeting process, performing financial assessments on all business cases related to the Niagara Plant Group and its facilities, and monitoring adherence to corporate policies with respect to business expenses, procurement, and internal control. The staff associated with these functions are part of OPG’s Finance Group and the costs of supporting the Niagara Plant Group are allocated through the corporate cost allocation process described in Ex. F3-T1-S1. In addition, also reporting to the Site Controller are four full time staff directly funded by the Niagara Plant Group providing support for material management by operating the plant group’s stores function, including purchasing material performing all shipping and receiving functions, and inventory and warehousing controls. Their costs are part of the plant groups staff complement, and, as such, are included as part of the plant group direct costs.
3.1.3 Production Department

The Production Department’s function is to operate and maintain the regulated generation assets to produce electrical capacity and energy and energy-related products and services at targeted performance levels. The scope of required work includes: operation and maintenance of the Sir Adam Beck I, Sir Adam Beck II, and Sir Adam Beck Pump Generating Station (“PGS”), and DeCew Falls I, Decew Falls II and all associated water conveyance structures in accordance with approved plans and applicable policies, contracts, and legal requirements. The department is managed by a Production Manager. All costs associated with the Production Department are budgeted, collected and reported in the Niagara Plant Group OM&A budget. In 2011, there are expected to be 96 staff (year-end headcount) supporting the requirements of the Production Department.

3.1.4 Asset Management and Technical Support Services Department

The Asset Management and Technical Support Services Department provides specialist expertise in the area of business strategy, planning, programming, asset portfolio management, decision support, business effectiveness, due diligence, and engineering governance. The department also assists in ensuring the Niagara Plant Group meets its targets for capacity and energy, including energy-related products and services, as well as providing staff specialist expertise in the area of generation asset management consistent with Hydroelectric strategies, policies and programs.

The department is managed by the Asset Management and Technical Services Manager (“Asset Manager”) and has two sub-departments, the Technical Services Department and the System Support Department. The Technical Services Department provides electrical, mechanical and civil engineering services, as well as technical services (separate and distinct from the services provided by the central Engineering group that will be discussed below in section 3.4.1), dam safety management, management systems coordination (including registration for the International Organization for Standardization), compliance with Market Rules, as well as providing liaison services between the plant group and central Hydro Engineering. The System Support
Department provides drafting, clerical, administrative, records management, and information technology processes and services to the plant group. All costs associated with the department are budgeted, collected and reported in the Niagara Plant Group OM&A and capital budgets. In 2011, there are expected to be 36 staff (year-end headcount) supporting the functions of the Asset Management and Technical Support Services Department.

3.1.5 Project Management Department
The Project Management Department is responsible for delivering projects at targeted levels of performance and results. The scope of the assigned work includes the management and execution of projects in support of the Asset Manager. The department is responsible for the execution of all Niagara Plant Group controlled capital and non-standard projects and includes a Site Project Group, Engineering Management Group, and a rehabilitation crew. In 2011, there are expected to be 28 staff (year-end headcount) executing the responsibilities of the Project Management Department and the costs associated with their services are budgeted, collected, and reported against the Niagara Plant Group capital and OM&A budgets. In the event there is less project work than budgeted, labour costs not associated with project work are recorded as base OM&A.

3.1.6 Services Department
The Services Department is responsible for an annual work program which supports the needs of the Niagara Plant Group that are not part of operations and maintenance activities directly associated with production equipment. The department is managed by the Services Manager and has three sections: River Control Operations, Field Services, and Shop Services. River Control Operations provides 24 hour staffing of the Niagara International Control Works in order to manage the Niagara River water flows in accordance with the International Boundary Waters Treaty. Other activities include: outside maintenance, snow removal, ice breaker operations, maintenance of transport and work equipment, and property maintenance related to generating facilities. The department is also responsible for the joint works program as agreed with New York
Power Authority (“NYPA”) under the Joint Works Agreement. The Shop Services section provides specialized machine shop services and welding shop services to the Niagara Plant Group. In 2011, there are expected to be 57 staff (year-end headcount) in this department.

All costs associated with the joint works program are budgeted, collected, and reported in accordance with the Joint Works Agreements. All costs associated with the Niagara Plant Group regulated facilities and structures are budgeted, collected and reported in the Niagara Plant Group OM&A budget.

3.2 R.H. Saunders Generating Station Costs

The R.H. Saunders Production/Project Department manages the station to produce electrical capacity and energy and energy-related products and services at targeted performance levels. The scope of required work includes: operation and maintenance of the station in accordance with approved plans and applicable policies, contracts, and legal requirements. Almost all of the OM&A budget for R.H. Saunders is comprised of maintenance and operations expenses. Starting in 2008, the Production/Project Department assumed responsibility for the management of all capital and OM&A projects at the station. All other services are provided to R.H. Saunders from either the Ottawa - St. Lawrence Plant Group or by Hydroelectric Central Support Groups, both of which are discussed in subsequent sections of this exhibit. The R.H. Saunders Production/Project Department staff complement has remained relatively stable around the planned number of 68 staff. Similarly, excluding extraordinary items, the OM&A budget has also remained relatively stable.

Operations expenses include control room operations, which will have a total staff of 15 (year-end headcount) in 2011, responsible for various water management activities such as: dam operations, waterway patrol, water flow monitoring, and ice management, and all joint works operations expenses shared with NYPA.
Maintenance plans have been developed for R.H. Saunders based on streamlined reliability centred maintenance practices (Ex. A1-T4-S2). Base maintenance activities are categorized by these objectives: regulatory, maintain condition, contractual (i.e., NYPA joint works), dam safety, environmental, policy, and health and safety. There are expected to be 53 staff (year-end headcount) supporting the maintenance programs and project execution in 2011, including the production/project manager and two first line managers for the electrical and mechanical trades, who also manage engineering support, clerical, and supply chain activities.

3.3 Ottawa - St. Lawrence Plant Group Common Costs

This section describes the Ottawa - St. Lawrence Plant Group central departments and explains the methodology for allocating a portion of their costs to R.H. Saunders.

There are four departments in the Ottawa - St. Lawrence Plant Group providing support services to R.H. Saunders. Effective 2008 the Project Management Department was amalgamated with the Production Departments in the Plant Group. This has resulted in the project management resources becoming a direct base OM&A expense, replacing the allocation of these costs that existed previously.

The Plant Group Management Department leads, manages, and supports the provision of common services. The Human Resource and Support Services Department provides a range of common services and expertise, and supplies public affairs, stakeholder relations, and community relations services. Effective 2010 the environmental section that was part of the Human Resource and Support Services Department was reorganized into the Asset Management and Technical Services Department to better align accountabilities and resources. The Business Support Department provides general administrative support, fleet management administration, accounts receivables and payables, procurement support for project execution, and the administration of project management enterprise systems. The total cost of these three groups is allocated to R.H. Saunders based on its proportion of the total budgeted base OM&A within the Ottawa - St. Lawrence Plant Group. Base OM&A is generally linked to the size
of the station and its generation and therefore provides a reasonable basis for allocating common services costs as discussed below.

The Asset Management and Technical Support Services Department provides specialist expertise in the area of business strategy, planning, programming, asset portfolio management, decision support, business effectiveness, due diligence, and engineering governance. The department also provides electrical, mechanical, and civil engineering services (separate and distinct from the more specialized services provided by the central Engineering Group discussed below), information and records management services, and is responsible for business programming and performance reporting functions.

R.H. Saunders is already resourced to provide the vast majority of asset management and engineering support so the level of support provided from Asset Management and Technical Support Services Department is fairly modest. In addition, R.H. Saunders is resourced to provide all of its own information and records management functions. As such, based on management’s estimates, 15 per cent of the asset management and engineering services costs and none of the information and records management function costs from this department are allocated to R.H. Saunders.

Effective 2010 the Environmental Section, comprising four staff, was reorganized into the Asset Management Department. This reorganization does not impact the level of services provided by the Environmental Section to R. H. Saunders, and, therefore, environmental support costs will continue to be allocated to Saunders based on its proportion of the total budgeted base production OM&A within the Ottawa/St.Lawrence Plant Group.

Overall, approximately 20 per cent of the costs associated with the four common support service departments are allocated to R.H. Saunders. The allocations were made in accordance with the methodology recommended by R.J. Rudden Associates and Black & Veatch Corporation as described below in section 3.5.
3.4 Hydroelectric Central Support Groups Descriptions

The following Hydroelectric Central Support Groups’ costs are allocated in part to the regulated facilities:

- Engineering
- Dam Safety and Emergency Preparedness
- Water Resources and Aboriginal Affairs
- Business Support and Regulatory Affairs
- Environment
- Hydroelectric Development
- Supply Chain
- Executive Vice President’s Office

The Hydroelectric Central Support Groups provide common or specialized services to all of OPG’s hydroelectric plant groups, both regulated and non-regulated. This section provides a brief description of the functions and key activities of each central support group. Section 3.5 describes the methodology used to allocate costs to the regulated and non-regulated facilities.

3.4.1 Engineering

The Engineering Division provides specialized civil, mechanical, and electrical engineering support to all the hydroelectric plant groups. It includes three main departments - Civil, Mechanical, and Electrical Engineering.

The Civil Engineering Department provides expertise in the following areas:

- Structural
- Geotechnical
- Instrumentation
- Hydrotechnical (hydraulics and hydrology)
- Specialized inspection and maintenance support
- Owner’s engineer and advice for projects
- Dam safety engineering
• Dam performance monitoring, instrumentation, assessment, data management, and reporting
• Dam safety emergency response support
• Geographic Information System
• Drafting Governance

The Mechanical Engineering Department provides expertise in the following areas:
• Hydraulic turbines
• Sluice and head gates
• Cranes
• Piping
• Non-destructive examinations

The Electrical Engineering department provides expertise in the following areas:
• Hydro generators
• Power transformers
• Breakers
• Rotating exciters
• Grounding
• Protections
• Static exciters / voltage regulators
• Metering
• Governor controls
• Market compliance
• NERC Cybersecurity

The Engineering Division has 61 staff (2011 year-end headcount), consisting of engineers, technicians, and clerks.
3.4.2 Dam Safety and Emergency Preparedness

The Dam Safety and Emergency Preparedness Group, which has five staff (2011 year-end headcount), provides oversight and guidance on dam safety and emergency preparedness at all of OPG’s dams. Key elements of their program include oversight of dam-related comprehensive inspections, assessments, design reviews, monitoring, safety upgrades, and personnel training as follows:

- Develop and maintain a managed system for dam safety, waterways public safety and emergency preparedness programs, including establishing program objectives, scope, accountabilities, assessment and reporting.
- Develop and maintain the hydroelectric standards for emergency preparedness, provide oversight on tests, drills and exercises, and coordinate participation with corporate emergency preparedness as required.
- Develop and maintain dam safety governance documents and technical standards that are aligned with regulations, corporate policy and industry best practices.
- Assess compliance with regulations, corporate dam safety policy and programs for waterways public safety and emergency preparedness, provide advice to meet/maintain compliance.
- Report annually to the OPG Board of Directors on the results of the dam and waterways public safety program and regular updates on emerging dam and public safety issues.

3.4.3 Water Resources and Aboriginal Affairs

The Water Resources and Aboriginal Affairs Group, which has 14 staff (2011 year-end headcount), provides business level expertise and services for the management of water resources and Aboriginal relations including:

- Water management policy and planning (negotiating, establishing, and maintaining relationships with regulatory agencies and boards)
- Energy forecasting
- Administration of agreements (e.g., water power leases, licenses of occupation, crown leases, Parks Canada, Quebec, and water conveyance)
- Day-ahead coordination of hydroelectric resources
• Integration of capacity and energy forecasts submitted by plant groups
• Aboriginal relations
• Leading past grievance negotiations with First Nations and administering payments associated with settled past grievances

3.4.4 Business Support and Regulatory Affairs
The Business Support and Regulatory Affairs Division, which has 14 staff (2011 year-end headcount), provides business-related oversight/support for the EVP - Hydroelectric and support to all of the plant groups in the following areas:
• Business planning and budgeting (five year time horizon)
• Strategic Planning
• Performance reporting
• Production support and integration (e.g., Maintenance Module for Streamlined Reliability Centred Maintenance)
• Benchmarking
• Market operations support
• Asset management oversight in areas such as project prioritization and life cycle planning
• Annual incentive plan development and monitoring for Hydroelectric Management
• Interface with corporate support groups as required
• Regulatory support for OPG’s rate filing
• Centralized document management support for the hydroelectric business

3.4.5 Environment
The Environment Division, which has seven staff (2011 year-end headcount), provides environmental oversight for the EVP-Hydroelectric. In addition, this division supports the business by providing expertise and services in a wide range of environmental areas including:
• ISO 14001 Environmental Management Systems
• Legislative monitoring and compliance
Aquatic and terrestrial biology
Environmental assessments
Environmental approvals
Land, water, and waste management
Environmental risk management

3.4.6 Hydroelectric Development
Hydroelectric Development’s role is to expand and re-develop OPG’s existing sites as well as to develop new locations where feasible. This group identifies, studies, plans, and oversees the conceptual work, design and execution of hydroelectric re-development and new development projects (e.g., Niagara Tunnel project). The group includes the Vice President of Hydroelectric Development, project managers, project engineers, and project specialists. In 2011, there are expected to be 41 staff (year-end headcount) in this group. The work program is primarily capital in nature. However, before a project is approved and released, costs incurred for conceptual and preliminary engineering studies are classified as OM&A expenses. There are also general OM&A expenses incurred by this group that must be allocated to the Plant Groups. These include costs to maintain a hydroelectric developments database, develop and provide information to the Ontario Power Authority (e.g., Integrated Power System Plan process), and interface with the various government ministries (Ministry of Natural Resources, Ministry of the Environment, and Ministry of Finance) with respect to hydroelectric developments.

3.4.7 Hydroelectric Supply Chain
The Supply Chain Division, which has 13 staff (2011 year-end headcount), provides procurement support activities and materials management activities for all the hydroelectric plant groups and Hydroelectric Development.

3.4.8 Executive Vice President’s Office
The costs budgeted in this category include various expenses incurred by the EVP - Hydroelectric, including travel, administrative support and membership costs in various
hydroelectric associations, such as the International Hydropower Association and Canadian Hydropower Association. In 2011 there are expected to be two staff (year-end headcount) in this category.

3.5 Allocation Methodology for Hydroelectric Central Support Cost

The method for allocating Hydroelectric Central Support Group Costs was reviewed by R.J. Rudden Associates in 2006 and Black & Veatch Corporation in 2009, as part of an OPG-wide review (Ex. F3-T1-S1). R.J. Rudden Associates recommended that as a general principle, direct assignment (i.e., time estimates or management estimates of full time equivalents dedicated to a particular group) should be used where practical and efficient, and base OM&A costs should be used to allocate all other central support group costs that cannot be directly assigned. The recommendations were implemented by OPG starting in 2006. R.J. Rudden also reviewed the allocation of Ottawa - St. Lawrence common costs to R.H. Saunders and its recommendations were adopted (see allocation methodology in section 3.3 above).

With respect to Hydroelectric central support costs, R.J. Rudden Associates and Black & Veatch recommended the use of plant group base OM&A costs to allocate central costs that cannot be directly assigned or where it is inefficient to perform direct assignment. This includes costs for the office of the EVP - Hydroelectric, Business Support and Regulatory Affairs, Water Resources and Aboriginal Affairs, Dam Safety and Emergency Preparedness and Environment. OPG accepted this recommendation and uses the base OM&A approach to allocate planned and actual costs for each of these central support groups.

As described below, a direct assignment approach was generally used for Engineering, Supply Chain and Hydroelectric Development (except the Hydroelectric Development VP Office and Project Management Office costs).
3.5.1 Allocation of Engineering

The costs for Engineering services are allocated as follows:

- Estimates of engineering cost allocations for each year in the planning cycle are developed during the business planning/budgeting process. Each department in the Engineering Division develops time estimates for each of the plant groups (or plants in the case of R.H. Saunders) based on a high level review of each plant group’s future work plans/projects and anticipated support requirements, as well as a review of previous year’s historical engineering support costs for each plant group.

- Total engineering hours are then allocated to each plant group based on these reviews.

- The total engineering budget for the year is allocated using the ratio of estimated hours for each plant group divided by the total engineering hours. The 2011 and 2012 planned engineering allocations to each plant group are calculated by applying the 2010 ratios (i.e., the ratios developed as part of the 2010 - 2014 business planning process) to the forecast costs in 2011 and 2012, respectively.

3.5.2 Hydroelectric Development

Hydroelectric Development OM&A costs are either directly attributed to the regulated stations where applicable, or allocated based on the total cost estimates for development projects. If a project is in the pre-concept or concept phase, and is related to a regulated facility or site, then its costs are directly attributed to that site (e.g., the PGS Expansion Study). The costs associated with the office of the Vice President - Hydroelectric Development and the general OM&A expenses referred to above in section 3.4.6 are allocated based on estimated project expenditures. General OM&A costs are allocated based on the total estimates of capital and OM&A projects. Since the project portfolio varies year by year, the portion of general OM&A costs allocated to the regulated plants varies between 7 per cent and 17 per cent of the total hydroelectric development base OM&A costs over the period from 2007 - 2012.
3.5.3 Supply Chain

The allocation of Supply Chain costs is based on management’s time estimates. Approximately three staff are dedicated to procurement and material management activities related to the regulated operations. Therefore, less than 30 per cent of the 11 person Supply Chain group’s costs are allocated to the regulated operations. Allocation between the Niagara Plant Group and R.H. Saunders is based on further time estimates by management of the responsibilities assigned to staff. Two of the staff are assigned to the Niagara Plant Group and are physically located in Niagara, while the remaining staff person is dedicated to R.H. Saunders.