

BASE OM&A – NUCLEAR OPERATIONS

1.0 PURPOSE

This evidence presents nuclear base OM&A expense for the historical period, bridge year, and test period (excludes OM&A expense for Darlington Refurbishment and New Build at Darlington).

2.0 OVERVIEW

The nuclear base OM&A expense for 2010 - 2015 is provided in Ex. F2-2-1 Table 1. OPG is requesting approval of base OM&A expense of \$1,151.1M in 2014 and \$1,154.0M in 2015.

Highlights of the Nuclear base OM&A program are as follows:

- For the test period, Nuclear base OM&A costs are forecast to increase year over year by one per cent in 2014 and 0.2 per cent in 2015, reflecting a continued focus on reducing staff levels, cost control and work prioritization.
- Nuclear regular staff FTEs (excluding Darlington Refurbishment and New Build) are decreasing year over year by 175.2 FTEs in 2014 and 123.1 FTEs in 2015 (Ex. F2-1-1 Table 3), capturing the benefit of staff attrition.
- Nuclear is developing and implementing initiatives that reduce costs as part of its focus on continuous improvement. These efforts are helping OPG manage base OM&A cost escalation pressures, including pension and OPEB cost increases.
- As part of Business Transformation, certain functions and resources were transferred from Nuclear to centre-led corporate business functions in May 2012. Business Transformation has also resulted in a consolidation and restructuring of functions within Nuclear.
- Nuclear base OM&A programs continue to support safe operations of the plants as well as generation reliability improvement initiatives.

These results and the supporting initiatives are discussed in more detail below.

3.0 BASE OM&A BACKGROUND

Base OM&A provides the main source of funding for operating and maintaining the nuclear stations in support of:

- the ongoing production of electricity from the nuclear operating units;
- ensuring the safe operation of the plants;
- improving the reliability of the nuclear assets;
- ensuring compliance with applicable legislation and nuclear regulatory requirements; and,
- Pickering Continued Operations, which is funded, in part, by base OM&A.

3.1 Business Transformation

There has been significant change to the Nuclear organization and to the functions and resources supported by base OM&A as a result of the Business Transformation Initiative (Ex. A4-1-1). These changes are summarized below.

a) External Transfers:

As part of Business Transformation, various Nuclear operating groups were consolidated into centre-led functions at the corporate level in 2012. For example, effective May 2012, nuclear staff providing financial and business support services to the stations were transferred out of nuclear into a centre-led corporate finance division. Other major shifts included the transfer of Nuclear Supply Chain into a new centre-led corporate supply chain and the transfer of nuclear training from Nuclear Programs and Training into a new centre-led training group within People and Culture. The rationale for and the benefits of this external reorganization are discussed in Ex. A4-1-1.

In total, \$196.4M of the 2012 base OMA was transferred to various corporate functions, representing 1064.7 FTES (an additional \$1.6M of outage OM&A was also transferred to the Corporate Supply Chain). Attachment 2 Table 1 provides details of these transfers of nuclear station and support functions including a restatement of the 2012 base OMA Budget.

1 The transferred resources continue to provide functional support to Nuclear notwithstanding
2 a change in reporting to the corporate centres (see Ex. A4-1-1). The allocation of corporate
3 costs for services provided by the corporate functions to nuclear, including those impacted by
4 Business Transformation are discussed at Ex. F3-1-1.

5
6 **b) Internal Reorganization**

7 OPG Nuclear also undertook an internal restructuring in 2012 and 2013 as part of Business
8 Transformation. As part of this restructuring, engineering staff previously reporting directly to
9 Pickering and Darlington stations now report directly to a centre-led Nuclear Engineering
10 division. Attachment 2 Table 1 provides details of the restructuring of the nuclear station and
11 support functions in 2012 including restating the 2012 base OMA Budget to illustrate the
12 internal Nuclear reorganization. Attachment 2 Table 2 provides details of the restructuring of
13 the nuclear station and support functions in 2013 including restating the 2013 base OM&A
14 Budget with and without the internal Nuclear reorganization.

15
16 **3.2 Base OM&A Description by Function and Resource Type**

17 Base OM&A cost information is presented by station and support function in Ex. F2-2-1
18 Table 1. The station and support functions are described in Attachment 1.

19
20 Details of base OM&A costs by function are provided in Ex. F2-2-1 Tables 3 to 11.
21 Ex. F2-2-1 Tables 3 and 4 show that the majority of test period station base OM&A costs are
22 in the Operations and Maintenance functions, reflecting the significance of these core
23 activities to ongoing station performance. Within the Nuclear support divisions, the largest
24 cost is in Nuclear Engineering, reflecting the transfer of all Nuclear Engineering services due
25 to Business Transformation.

26
27 In addition to the operational functions described in Attachment 1, Nuclear base OM&A also
28 funds:

- 29 • The cost of regular staff supporting the execution of planned outages with the
30 exception of Inspection & Maintenance Services ("IMS"). The cost of IMS regular
31 staff involved in the execution of planned outages is charged to outage OM&A.

- All costs for forced outages, planned derates and forced derates. Forced outages, in particular, can require significant effort and materials to address the cause of the outage and return a unit to operation. As these are unplanned events for which no budget is provided, other base OM&A work must be deferred to accommodate this effort (See Ex. F2-4-1 further details of outage costing).

- an Inventory obsolescence provision.

Cost information is presented by standard OPG resource types in Ex. F2-2-1 Table 2, indicating that OPG staff labour is the most significant contributor to base OM&A costs at approximately 73 per cent. The resource types are described as follows:

1. **Labour:** The salary and benefit cost of OPG full-time regular staff, non-regular staff and part-time staff.
2. **Overtime:** The incremental pay for work outside of core hours; for example; during forced outages or urgent repairs.
3. **Augmented Staff:** External personnel providing specialized expertise (e.g. engineering) to supplement internal capability and/or to fill temporary vacancies.
4. **Other Purchased Services:** The costs of specialized external services, including construction and maintenance services, personal protective equipment laundry services, and specialized technical services (e.g., nuclear safety analysis, research and development, and specialized testing services.)
5. **Materials:** The costs of all consumables, replacement parts, and associated transportation service costs supporting station operations (e.g. ongoing maintenance and repair work).
6. **License Fees:** The costs of licensing-related fees paid to the Canadian Nuclear Safety Commission ("CNSC").
7. **Other Costs:** Costs of miscellaneous items such as, utility expenses (water, sewage, and electricity for administration buildings), and inventory adjustments as mentioned above.

Incremental short-term labour resources available for operating and maintaining the nuclear stations include overtime, as well as temporary staff (e.g. non-regular staff) and external contractors. There are three primary factors that result in the use of incremental short-term

labour resources in Nuclear: to meet peak work requirements, to maintain coverage for key staff positions in accordance with licensing requirements; and to complete priority work impacted by short term or unexpected staff shortages due to temporary vacancies, maternity leaves or vacations. For example, OPG uses base OM&A overtime to maintain coverage of key (e.g. authorized nuclear operator) positions and provide backup for absent staff so as to maintain minimum staff complement on shifts. The selection of which incremental labour resource option to employ is an ongoing resource optimization and balancing process and depends on the specific circumstances at the time.

The Goodnight Nuclear Staffing Study (Ex. F2-1-1) found that OPG's use of overtime for base operations was comparable to the U.S. PWR comparator group. Average overtime use in Nuclear was seven per cent in 2010 and six per cent in 2011, which compared favourably with U.S plants, which were at five per cent - six per cent (Ex. F5-1-1 page 20).

3.3 Major Objectives and Focus Areas

The 2013 - 2015 Nuclear Business Plan identifies specific objectives and focus areas that will impact base OM&A costs, including:

- Continuation of improvement initiatives to achieve the nuclear performance targets set in the business plan. These initiatives, which are focused on achieving safety, reliability, value for money and human performance targets, are largely executed by base OM&A resources.
- Implementation of new initiatives as part of Business Transformation to gain efficiencies, eliminate duplication of effort, and standardize processes thereby enabling OPG to pursue staff reductions.
- Continuation of the Pickering Continued Operations initiative

A list and description of the initiatives can be found at Ex. F2-1-1 Appendix A.

3.4 Base OM&A Trends

Base OM&A will increase year over year by 1 per cent in 2014 and remain flat in 2015.

Exhibit F2-2-1 Table 1 further demonstrates that cost containment is relatively consistent

- 1 across the stations and support functions, with all functions exhibiting flat costs or only
- 2 modest increases in the test period. An explanation of year-over-year variances in base
- 3 OM&A is provided in Ex. F2-2-2.

ATTACHMENTS

1

2

3 Attachment 1: Nuclear Operations Functional Descriptions

4

5 Attachment 2: Nuclear OM&A by Function with BT Adjustments

6

ATTACHMENT 1:

NUCLEAR OPERATIONS FUNCTION DESCRIPTIONS

The functional descriptions provided below are reflective of Nuclear Operations post 2012 implementation of Business Transformation.

1.0 OPERATIONAL FUNCTIONS WITHIN THE GENERATING STATIONS

At each of the generating stations, operational functions are broken down into four main components: Operations and Maintenance, Work Management, and Site and Support Services as described below. In addition, for Darlington there is the Tritium Removal Facility.

- Operations and Maintenance includes:

- Operations, which operates the plant on a 24-hour basis. The CNSC approves the operations organization structure, including mandating minimum shift complement to address foreseeable emergency response requirements.
- Maintenance, which performs all activities directly related to the preventive, elective, and corrective maintenance of structures, systems, or components to address material condition issues, maintain equipment reliability, and optimize equipment life.
- Fuel Handling, which includes all activities in support of refuelling the reactor during unit operation; maintenance of the fuelling machines and related systems; support of outage activities requiring fuelling machine or related systems; and, management of new fuel storage.

- Work Management includes:

- Work Control, which ensures corrective, elective, and preventive maintenance is planned effectively and efficiently.
- Outage Planning, which develops specific milestones for scope definition, long lead materials, schedule development, and pre-requisite work.

- Site Services includes:

- Site Vice President's office

- 1 ○ Strategic Planning at Pickering for end of life planning and at Darlington for
- 2 integration between operations and refurbishment,
- 3 ○ Chemistry and Environment including the operation of the chemistry lab;
- 4 environmental compliance and monitoring; and, assistance in managing plant
- 5 chemistry.
- 6 ○ Common Services (Pickering), which operates and maintains station and site support
- 7 systems for the Pickering station specifically, management of heavy water and
- 8 operation of facilities such as heavy water upgraders, station containment systems
- 9 and radioactive waste management.
- 10
- 11 • Tritium Removal Facility ("TRF"), located at Darlington, provides tritium removal services
- 12 to all OPG nuclear stations and third party customers (as discussed in Ex. G2-1-1).
- 13

14 **2.0 OPERATIONAL FUNCTIONS WITHIN THE SUPPORT DIVISIONS**

15 Support divisions are accountable for providing specialized services to the stations, as well
16 as the common procedural framework within which the stations operate. Key functions of the
17 support divisions are outlined here.

18

19 Engineering is accountable for:

- 20 ○ Engineering Services, including non-station specific engineering support, project
- 21 design support, nuclear safety analysis, and life cycle plans for steam generators and
- 22 fuel channels.
- 23 ○ Science and Technology Development, which provides administration of the nuclear
- 24 research and development program, as well as specialized technical support for key
- 25 nuclear plant systems and equipment.
- 26 ○ Engineering Codes, Standards and Quality Programs, which provides expert-level
- 27 support on nuclear industry codes and standards; interfaces with technical standard
- 28 organizations (the CNSC, as well as Technical Standards and Safety Association,
- 29 and Canadian Standards Association); and, manages governance for programs such
- 30 as the engineering change control program.

- Station Engineering which provides engineering oversight, analysis, and support for Work Management, as well as Operations and Maintenance at the stations in the areas of components and equipment, performance engineering, plant design and reactor safety.

Projects and Modifications is accountable for executing or managing the execution of the majority of project work carried out at the generating stations and associated sites. Project work (in contrast to base OM&A work) is defined at Ex. D2-1-1. While the Projects and Modifications function is primarily funded by project OM&A and capital (Ex. F2-3-1 and Ex. D2-1-1), Projects and Modifications also provides a limited amount of operational support to the stations which is funded by base OM&A.

Nuclear Services is accountable for developing/maintaining the regulatory programs for nuclear divisions, including licencing and environmental assessments, radiation protection programming and services including assistance with radiation protection during plant operation and maintenance activities, and administration of the program for keeping radiation As Low As Reasonably Achievable ("ALARA"). It is also responsible for nuclear fleet wide strategic, business and generation planning.

Fleet Operations and Maintenance drives improvement across the Nuclear fleet by developing, implementing and monitoring nuclear-wide programs and procedures for the nuclear stations in the areas of Operations, Maintenance, Outage and Work Management. In addition, this group maintains the governing document framework for all nuclear divisions.

Security and Emergency Preparedness provides security services for nuclear sites and facilities, and ensures compliance with all CNSC security requirements, as well as other OPG sites. In addition, as part of Business Transformation, Emergency Preparedness and Fire Protection services are now included within this support division.

Inspections and Maintenance Services ("IMS") is accountable for providing inspection and maintenance services to supplement those carried out by station staff, where the nature of

1 the skills or equipment required makes the work more effectively managed as a centralized
2 function. The direct costs associated with the provision of inspection and maintenance
3 services during outages are included in outage OM&A costs (Ex. F2-4-1). IMS indirect costs
4 such as administration are included in base OM&A as are the provision of inspection and
5 maintenance services during normal (i.e., non-outage) operation.

6
7 Other Support is an aggregate of a number of smaller functions. Specifically:

- 8
- 9 • Nuclear Level Common includes centralized or fleet-wide costs required to manage the
10 Nuclear business that are not directly attributable to any one plant or support
11 organization. Typical costs include nuclear consulting contracts, inventory adjustments
12 and Low and Intermediate Level Waste variable expenses.
 - 13 • Waste and Transportation Services is accountable for radioactive waste and used fuel
14 management at the stations, as well as conventional waste and transportation service
15 support to the stations. Base OM&A includes the costs associated with managing
16 recycled conventional wastes; and providing conventional waste transportation services
17 for all stations. Expenditures to manage radioactive waste and used fuel management
18 operations are funded by Nuclear Liabilities (see Ex. C2-1-1).
- 19

ATTACHMENT 2

Table 1 below restates the 2012 Nuclear base OM&A Budget to account for the:

(i) transfer of Nuclear functions to centre-led corporate functions as part of Business Transformation, highlighted in column b of Table 1.

(ii) internal reorganization within Nuclear during 2012 as part of Business Transformation, highlighted in column (c) of Table 1.

(iii) revisions to the presentation of nuclear station and site support base OM&A costs from that provided in EB-2010-000, primarily due to the Pickering site amalgamation, highlighted in column (e) of Table 1.

1

Table 1

Nuclear Base OM&A by Function (\$M)
Restated Board Approved - Calendar Year Ending December 31, 2012¹

Line No.	Function	Total 2012 OEB Board Approved	Business Transformation Transfers Out of Nuclear	Business Transformation Transfers Within Nuclear Phase 1	Sub Total	Presentation Reforming	2012 Board Restated Total
		(a)	(b)	(c)	(d)	(e)	(f)
	Stations						
1	Operations & Maintenance						
2	- Operations	191.4			191.4	0.0	191.4
3	- Maintenance	289.5			289.5	66.8	356.3
4	- Fuel Handling	70.3			70.3	(66.8)	3.5
5	- Rad Protection, Chemistry & Envmt	39.2		(15.3)	23.9	(23.9)	0.0
6	- Pickering Common Services	24.9			24.9	(24.9)	0.0
7	Station Engineering	78.2		(78.2)	0.0	0.0	0.0
8	Work Management	33.8			33.8	0.0	33.8
9	Support Services/Site & Support Services	31.1	(5.2)	(0.9)	25.0	48.9	73.9
10	Tritium Removal Facility	18.3			18.3	0.0	18.3
11	Pickering Continued Operations	14.7			14.7	0.0	14.7
13	Total Stations	791.5	(5.2)	(94.4)	691.9	0.0	691.9
	Support						
14	Engineering	56.5		89.3	145.8	0.0	145.8
15	Projects & Modifications	5.1			5.1	0.0	5.1
16	Facilities Management	43.4	(43.4)		(0.0)	0.0	(0.0)
17	Records and Admin	25.4	(25.4)		0.0	0.0	0.0
18	Nuclear Programs & Training	116.6	(61.8)	(54.8)	(0.0)	0.0	(0.0)
new	Nuclear Services	0.0		57.4	57.4	0.0	57.4
new	Fleet Operations & Maintenance	0.0		4.5	4.5	0.0	4.5
19	Security/Security & Emergency Services	59.5		9.0	68.6	0.0	68.6
20	Supply Chain	67.7	(46.8)	(20.9)	(0.0)	0.0	(0.0)
21	Inspection & Maintenance Services	31.4	(2.4)		29.0	0.0	29.0
22	Nuclear Oversight	9.4	(9.4)		0.0	0.0	0.0
23	Commercial Services	1.8	(1.8)		0.0	0.0	0.0
24	NWMD	5.1		(0.5)	4.7	(4.7)	(0.0)
25	Nuclear Level Common/Other Support	13.1		10.3	23.4	4.7	28.1
26	Total Support	435.2	(191.2)	94.4	338.3	0.0	338.3
27	Total Base OM&A	1,226.7	(196.4)	(0.0)	1,030.2	0.0	1,030.2

2 Notes:

3

4 Explanation of transfer of Nuclear functions to corporate functions (column b):

- 5 • Support Services/Site & Support Services (\$5.2M): The finance function within the
- 6 stations (i.e. business support accountable for the station-specific
- 7 accounting/controllership function, cost reporting and analysis, and station business
- 8 plan coordination) transferred to Finance.

¹ As Board Approved adjustments were made at the aggregated Nuclear OM&A level, the figures presented here are the 2012 Budget rather than 2012 Board Approved.

- 1 • Facilities Management (\$43.4M): The Nuclear facilities management function
2 (accountable for managing all nuclear facilities outside of the protected areas of the
3 generation stations, but within the station boundaries) was transferred to Business
4 and Administration.
- 5 • Records and Administration (\$25.4M): The Nuclear records and administration
6 function within Nuclear Programs and Training (accountable for centralized business
7 services such as clerical/administration/records and maintaining the governing
8 document framework for all nuclear divisions) transferred to a centre-led records and
9 administration function in Business and Administration.
- 10 • Nuclear Programs and Training: (\$54.8M): Nuclear training (\$58.8M) which is
11 accountable for designing and delivering training across the Nuclear organization on
12 conventional safety, general orientation, licensed and non-licensed operator training,
13 skilled trades, engineering and leadership training was transferred to Peoples and
14 Culture; Nuclear environmental (\$3.0M) which is accountable for development,
15 implementation and oversight of the Nuclear Environment Program was transferred to
16 Commercial Operations and Environment.
- 17 • Supply Chain (\$40.1M): All of nuclear supply chain with the exception of engineering
18 procurements and inventory obsolescence provision was transferred to Business &
19 Administration;
- 20 • Inspections and Maintenance Services (\$2.4M): The supply chain function within IMS
21 was transferred to centre-led supply chain function in Business & Administration.
- 22 • Nuclear Oversight (\$9.4M): Nuclear Oversight (accountable for providing audit
23 function for station operations) was transferred to Finance.
- 24 • Commercial Services (\$1.8M): Commercial services (accountable for the sale of
25 isotope products and services to third parties (see Ex. G2-1-1), and managing the
26 Bruce Lease (see Ex. G2-2-1) was transferred to Commercial Operations and
27 Environment.

1 Explanation of internal transfer to Nuclear functions (column d):

- 2 • Nuclear Engineering (\$89.3M): Station Engineering (\$78.2M), Nuclear Waste
3 Management Division Engineering (\$0.5M) and Nuclear Supply Chain engineering
4 procurement (\$10.6M) was transferred to Nuclear Engineering (\$89.3M).
- 5 • Nuclear Services (\$57.4M): Station Radiation Protection (\$15.3M) and Darlington
6 Strategic Planning (\$ 0.9M) and all remaining functions of Nuclear Programs and
7 Training (\$41.2M) including Stakeholder Relations, Health Physics and Nuclear
8 Regulatory were transferred to newly created Nuclear Services support group
9 (\$57.4M);
- 10 • Fleet Operations and Maintenance (\$4.5M): Programs and procedures function for
11 operations and maintenance support in Nuclear Programs and Training (\$4.5M) were
12 transferred into newly created Fleet Operations and Maintenance support group.
- 13 • Nuclear Security and Emergency Preparedness (\$9.0M): The nuclear-wide programs
14 and procedures function for Emergency Preparedness and Fire Protection function
15 within Nuclear Programs and Training (\$9.0M) was transferred to Nuclear Security
16 and Emergency Preparedness.
- 17 • Nuclear Other Support (\$10.3M): The nuclear inventory obsolescence provision
18 (\$10.3M) within Nuclear Supply chain was transferred to Nuclear Other Support.

19
20 Explanation of changes to the presentation of base OM&A functions (column e):

- 21 • Nuclear Fuel Handling (\$66.8M): Nuclear fuel handling (\$66.8M) is now captured
22 within each station's Maintenance function.
- 23 • Site Support Services (\$48.8M): Chemistry and Environment (\$23.9M) and Pickering
24 Common Services (\$24.9M) are now captured within Site Support Services function.
- 25 • Nuclear Waste Management Division ("NWMD") (\$4.7M): NWMD (\$4.7M) is now
26 captured within Nuclear Other Support.

27

Table 2 below restates the 2013 nuclear base OM&A budget prior to changes (highlighted in column (b) of Table 2) within the Nuclear organization which occurred January 1, 2013 as part of Business Transformation.

Table 2
 Nuclear Base OM&A by Function (\$M)
 2013 Budget Pre and Post Business Transformation

Line No.	Function	2013 Budget Pre Jan 1, 2013 Business Transf	Business Transformation Transfers Within Nuclear As Of Jan 1, 2013	2013 Budget
		(a)	(b)	(c)
	Stations			
1	Operations & Maintenance			
2	- Operations	191.0	(11.5)	179.5
3	- Maintenance	405.0	(10.4)	394.6
4	- Fuel Handling	3.5	(3.5)	0.0
5	- Rad Protection, Chemistry & Envnt	0.0	0.0	0.0
6	- Pickering Common Services	0.0	0.0	0.0
7	Station Engineering	0.0	0.0	0.0
8	Work Management	36.0	0.0	36.0
9	Site & Support Services	81.5	(11.1)	70.4
10	Tritium Removal Facility	18.3	0.0	18.3
11	Pickering Continued Operations	12.6	0.0	12.6
13	Total Stations	747.9	(36.5)	711.4
	Support			
14	Engineering	149.9	3.5	153.4
15	Projects & Modifications	6.6	0.0	6.6
16	Facilities Management	0.0	0.0	0.0
17	Records and Admin	0.0	0.0	0.0
18	Nuclear Programs & Training	0.0	0.0	0.0
new	Nuclear Services	71.5	3.6	75.1
new	Fleet Operations & Maintenance	16.0	14.2	30.2
19	Security & Emergency Services	69.1	15.1	84.2
20	Supply Chain	0.0	0.0	0.0
21	Inspection & Maintenance Services	36.5	0.0	36.5
22	Nuclear Oversight	0.0	0.0	0.0
23	Commercial Services	0.0	0.0	0.0
24	NWMD	0.0	0.0	0.0
25	Nuclear Level Common/Other Support	42.3	0.0	42.3
26	Total Support	391.9	36.5	428.3
27	Total Base OM&A	1,139.8	(0.0)	1,139.7

Notes:

Explanation of internal transfer to Nuclear functions (column b):

- 1 • Nuclear Engineering (\$3.5M): Fuel Handling Engineering (\$3.5M) to Nuclear
2 Engineering.
- 3 • Fleet Operations and Maintenance (\$14.2M): Station operations support function
4 (\$11.5M) and station maintenance support function (\$2.8M) were transferred into
5 Fleet Operations and Maintenance support group (\$14.2M).
- 6 • Security and Emergency Preparedness (\$15.1M): Fire protection function within the
7 stations (Pickering \$7.6M; Darlington \$7.5M) was transferred to Security and
8 Emergency Preparedness (\$15.1M).
- 9 • Nuclear Services (\$3.6M): The corrective action program functions within Site &
10 Support Services (\$3.6M) were transferred to the Nuclear Services support group
11 (\$3.5M).