BUSINESS PLANNING AND BENCHMARKING – NUCLEAR

1.0 PURPOSE

This evidence presents the Nuclear business plan and benchmarking results and provides a summary of nuclear operating costs in support of the application.

2.0 OVERVIEW

OPG's 2013 - 2015 Nuclear Business Plan achieves a more sustainable cost structure through the implementation of Business Transformation and through other initiatives focused on improving performance while driving cost efficiencies.

Highlights of the Nuclear Business Plan include:

- A three-year staffing plan that incorporates a 298.3 FTE reduction in regular staff during 2014 and 2015[1], primarily achieved through attrition and enabled by streamlining and integrating processes across OPG. The 2014 - 2015 regular staff reductions are in addition to the 434.1 FTE reductions (excluding nuclear staff transfers to corporate under Business Transformation) between 2010-2013 (Ex. F2-1-1 Table 3).
- Preparations for the Darlington Vacuum Building Outage (VBO) in 2015 and for the start of Darlington Refurbishment in October 2016.
- Execution of the Pickering Continued Operations initiative on schedule and on budget. OPG has achieved high confidence on extending the operating life of the Pickering units to 247,000 Effective Full Power Hours, as discussed at Ex. F2-2-3.
- Implementation of plans to improve plant reliability to reduce the number of forced outages at D**a**rlington and Pickering. In 2011, Darlington achieved top quartile WANO NPI rating, a measure of safety and reliability, something that it has achieved in four of the last six years. Darlington has also received excellent safety and performance evaluation from the World Association of Nuclear Operators (WANO) and Institute of Nuclear Power Operations (INPO). Pickering continues to focus on

[1] The referenced staff reduction targets exclude the Darlington Refurbishment and Darlington New Build projects.

its Equipment Reliability program, particularly on Units 1 and 4 to improve the reliability of critical equipment at Pickering. Making Pickering more reliable by 2016, when Darlington begins its refurbishment, is one of OPG's goals**.** In mid 2013, Pickering achieved its best safety and performance evaluation from WANO.

- Targeted improvements in value for money metrics (Total Generating Cost per MWh or TGC/MWh) at Pickering by 2015 reflecting a combination of cost reductions and increased generation due to improved reliability. By comparison, the industry benchmark TGC/MWh is expected to continue trending up by inflation. Darlington's TGC/MWh metric is expected to remain at first quartile until 2015, when it is impacted by reduced generation due to a 4 unit VBO.

A summary of planned operating costs in the nuclear revenue requirement is presented in Ex. F2-1-1 Table 1.

OPG's 2012 Benchmark Report assesses OPG's 2011 performance against twenty benchmark metrics (Attachment 1). OPG nuclear maintains strong safety performance at both stations. Darlington compares very favourably against top performing plants. Pickering has improved its performance from 2010 in areas such as Collective Radiation, Fuel Reliability and Value for Money.

At the direction of the OEB, OPG Nuclear undertook nuclear staffing studies that included assessing CANDU technology differences. Initial results in 2011 indicated that OPG Nuclear was 17 per cent above its industry peers (normalized for CANDU technology differences). An update to the initial study in 2013 shows that staff reductions to-date have narrowed the gap to 8 per cent (see Section 3.3.2 below). The gap is expected to be further narrowed by 2015 relative to the 2012 benchmark with the full implementation of Business Transformation and other Nuclear initiatives.

The business plan also includes projects to support the Province's Long Term Energy Plan, specifically, Darlington Refurbishment and the Darlington New Nuclear Project. Darlington Refurbishment has moved from preliminary planning to detailed planning in 2013 - 2015 as

discussed at Ex. D2-2-1. The Darlington New Nuclear Project will continue in the planning and preparation phase as discussed at Ex. F2-8-1.

OPG Nuclear's 2013 - 2015 Business Plan is provided in Attachment 2.

3.0 NUCLEAR BUSINESS PLANNING AND BENCHMARKING

3.1 Gap-Based Business Planning Process

OPG Nuclear's business planning is undertaken annually as part of and consistent with the overall OPG business planning process (Ex. A2-2-1). The business planning process is focused on establishing strategic and performance targets for nuclear, in alignment with OPG's objectives, and identifying the initiatives and resources required to achieve these targets.

Since 2009, OPG nuclear has used a gap-based business planning process which consists of the following steps:

- **Benchmarking:** Using selected industry performance metrics, establish the current status of OPG nuclear relative to its peers.
- **Target Setting:** Implementing a "top-down" approach to set operational, financial and generation performance targets that will move OPG nuclear closer to top quartile industry performance over the business planning period.
- **Closing the Gap:** By reference to OPG Nuclear's four cornerstone values of Safety, Reliability, Human Performance and Value for Money, developing various initiatives to close the performance gaps between current and targeted results.
- **Resource Planning:** Preparing an OPG Nuclear business plan (i.e., the development of cost, staff and investment plans) that is based on the "top-down" targets and incorporates initiatives necessary to achieve targeted results.

3.2 Gap-Based Business Planning – Benchmarking

The 2012 Nuclear Benchmark Report benchmarks OPG's performance against industry peers based on 2011 data and uses 20 indicators aligned with the cornerstone values of Safety, Reliability, and Value for Money and Human Performance (see Attachment 1). The

2012 Nuclear Benchmark Report uses the same methodology and format as the report filed in EB-2010-0008, with five exceptions:

- An additional metric, "Human Performance Error Rate," was identified and added to the list of benchmark performance indicators.
- Five Nuclear Performance Index ("NPI")[2] sub-indicators at Darlington (industrial safety accident rate, collective radiation exposure, forced loss rate, unit capability factor and chemistry performance indicator) are now being calculated on a 3 year (rather than 2 year) average rolling basis to align with Darlington's 3-year outage cycle, consistent with reporting to the World Association of Nuclear Operators ("WANO").
- On-line deficient and on-line corrective maintenance backlogs indicators reflect new nuclear industry definitions and calculation methodologies.
- The number of participants in the operator level summary analysis for NPI and Unit Capability Factor ("UCF") (Section 6 of Attachment 1) was adjusted to remove groupings of individually-owned nuclear plants (the "Star Alliance" and the "US Alliance").
- Pickering results are shown as one station, to reflect the amalgamation of the station in 2011.

Chart 1, is a reproduction of Attachment 2 from OPG's 2012 Benchmarking Report, and provides a summary of OPG's 2011 plant-level performance for each of the 20 key performance metrics benchmarked.

[2]Nuclear Performance Index ("NPI"): NPI is a weighted average of several WANO indicators and is viewed within the nuclear industry as a primary operational performance indicator. It provides an overall measure of plant safety and reliability performance (70/30, safety/reliability split) based on a number of reliability and safety measures As a member of WANO, OPG is required to submit NPI performance measures to WANO.

Comparison of 2011 OPG Nuclear Performance to Industry Benchmarks

Metric	NPI Max	2011 Actuals			
		Best Quartile	Median	Pickering	Darlington
Safety					
All Injury Rate (#/200k hours worked)				0.31	0.18
Rolling Average Industrial Safety Accident Rate (#/200k hours worked)	0.20	0.00	0.06	0.04	0.09
Rolling Average Collective Radiation Exposure (Person-rem per unit)	80.00	59.90	110.07	110.07 ⇧	71.12
Airborne Tritium Emissions (Curies) per Unit[1]		969	3,366	2,565	969
Fuel Reliability Index (microcuries per gram)	0.000500	0.000015	0.000154	0.000175 ⇧	0.001133 ⇩
2-Year Reactor Trip Rate (# per 7,000 hours)	0.50	0.00	0.10	0.60 ⇩	0.21
3-Year Auxiliary Feedwater System Unavailability (#)	0.0200	0.0000	0.0026	0.0044	0.0000
3-Year Emergency AC Power Unavailability (#)	0.0250	0.0005	0.0067	0.0107	0.0067
3-Year High Pressure Safety Injection Unavailability (#)	0.0200	0.0000	0.0001	0.0001	0.0000
Reliability					
WANO NPI (Index)		91.4	84.6	66.1	92.8
Rolling Average Forced Loss Rate (%)	1.00	1.14	1.90	10.34	1.80
Rolling Average Unit Capability Factor (%)	92.0	90.5	85.6	72.5	89.6
Rolling Average Chemistry Performance Indicator (Index)	1.01	1.00	1.01	1.10	1.03
1-Year On-line Deficient Maintenance Backlog (work orders per unit)[2]		260	378	301	266
1-Year On-line Corrective Maintenance Backlog (work orders per unit)[2]		33	52	160	121
Value for Money					
3-Year Total Generating Cost per MWh ($ per Net MWh)		34.21	41.28	65.86	33.05 ⇧
3-Year Non-Fuel Operating Cost per MWh ($ per Net MWh)		20.78	24.40	56.54	26.42
3-Year Fuel Cost per MWh ($ per Net MWh)		6.50	7.20	4.27	4.24
3-Year Capital Cost per MW DER (k$ per MW)		48.39	72.19	32.54	18.54
Human Performance					
18-Month Human Performance Error Rate (# per 10k ISAR hours)		0.00500	0.00700	0.00669 ⇧	0.00567 ⇩

Notes

1. 2010 data is used because 2011 results were unavailable at the time of benchmarking.
2. INPO set a new standard for classifying work order backlogs with the issuance of AP-928 Work Management Process Description, revision 3, in June 2010.

New metrics have been implemented industry-wide to ensure more effective and accurate comparisons between utilities. Data collected is as of September 2011.

Green = maximum NPI points achieved or best quartile performance

White = 2nd quartile performance

Yellow = 3rd quartile performance

Red = worst quartile performance

⇩ Declining Benchmark Quartile Performance vs. 2010

⇧ Improving Benchmark Quartile Performance vs. 2010

OPG Nuclear's performance by cornerstone is described below:

- **Safety**

  Overall, OPG's nuclear generating stations continue to demonstrate strong safety performance. Darlington achieved maximum NPI points, or best quartile performance, for all but the Fuel Reliability Index, which showed a decline to 4th quartile performance. Pickering was able to achieve notable year-over-year improvements in its benchmark quartile ranking relative to 2010 for the Collective Radiation Exposure, and Fuel Reliability Index However, the Pickering station experienced a decline to 4th quartile in Reactor Trip Rate.

- **Reliability**

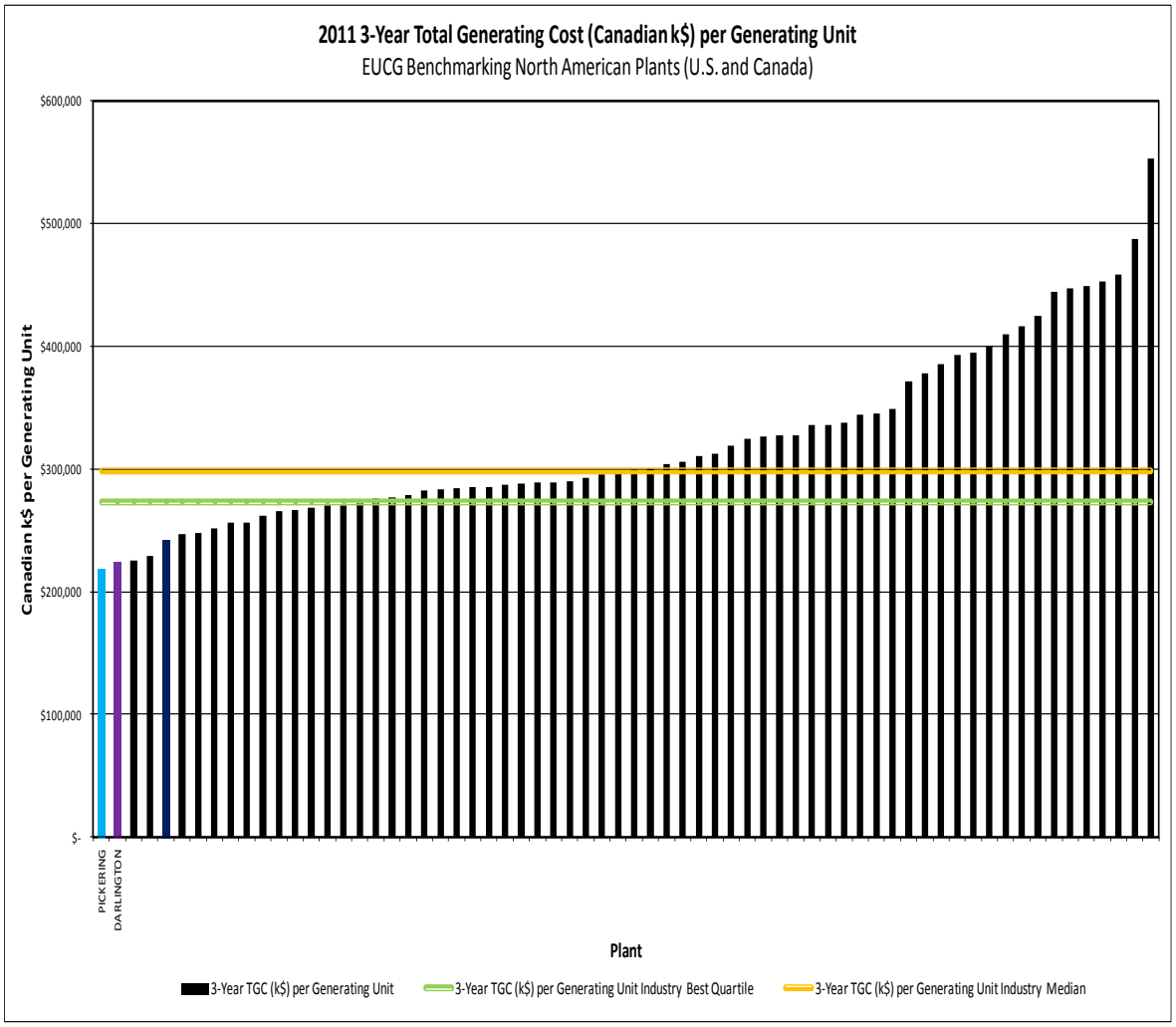
  In 2011, Darlington achieved top quartile NPI rating, something that it has achieved in four of the last six years. Darlington maintained its median quartile ranking for UCF and Forced Loss Rate. Though Pickering's 2 year rolling FLR has improved from 10.88 per cent in 2010 to 10.34 per cent in 2011, Pickering's performance continues to rank in 4th quartile for NPI and 3rd quartile for UCF. Both indicators are impacted by the ongoing challenges related to forced outages and longer planned outages at Pickering due to the Continued Operations initiative

- **Value for Money**

  Darlington improved its Total Generating Cost/MWh (TGC/MWh) ranking from 2nd quartile in 2010 to top quartile in 2011. This was achieved by improved performance in Fuel Cost/MWh and Capital Cost/MWh DER and an increase in generation. Although industry costs are escalating as demonstrated by the increase in the top quartile and median TGC/MWH values, Pickering has been able to maintain a stable TGC/MWh, thereby improving its relative performance against benchmark. Nevertheless, Pickering's lower capability factors, due to forced outages and longer planned outages, and its smaller unit sizes will continue to have an unfavourable impact on Pickering's TGC/MWh metric which remains in the 4th Quartile.

Goodnight's Nuclear Staffing Studies (Section 3.3 below) show that technology, design and regulatory differences exist between CANDU and PWR units and that these factors result in higher staffing levels for CANDU plants. The following Chart 2 shows that though CANDU plants have the lowest per unit costs in the industry, reduced production (due in part by Pickering's small unit sizes) plays a significant role in Pickering's TCG/MWh results.

Chart 2



- **Human Performance Error Rate**

  OPG Nuclear's human performance strategy focuses on and reinforces the right behaviors during all phases of station operations and maintenance. Pickering's Human Performance Error Rate (HPER) improved from third quartile in 2010 to second quartile in 2011. However, Darlington experienced mixed performance in 2011, moving from best quartile to second quartile.

Discussion of each of the performance indicators, trends and drivers can be found in the 2012 Benchmarking Report (Attachment 1).

3.3 Gap-Based Business Planning – Nuclear Staffing Study

In its Decision with Reasons in EB-2010-0008, the OEB directed OPG to conduct an examination of staffing levels as part of its benchmarking studies for the next proceeding. Also, the Board noted that "OPG may wish to consider whether a study of the major cost differences between CANDU and PWR/BWR would facilitate the review of its application on the issue of cost differences between the various technologies." (Board Decision page 45]

The initial Nuclear Staffing Study was conducted in July 2011 by Goodnight Consulting Inc. ("Goodnight"), an external consultant with extensive experience in nuclear industry staff benchmarking. Goodnight was selected using a competitive request for proposal process. A copy of the Nuclear Staffing Study is provided at Ex. F5-1-1

In the Nuclear Staffing Study's terms of reference, Goodnight was asked to:

- Benchmark OPG nuclear staffing levels against other North American nuclear operators;
- Identify the source of any significant differences in staffing levels including consideration of technology differences between CANDU and PWR/BWR;
- Analyze the nature of the differences; and,
- By reference to OPG Nuclear's 2012 Business Plan, compare planned 2014 staffing levels with benchmarks.

3.3.1 Nuclear Staffing Study Methodology

Goodnight's staff benchmarking process consisted of three steps:

- Quantify the number of OPG nuclear staff by functional grouping in order to identify applicable OPG personnel (including base-line contractors) for benchmarking;
- Develop industry benchmark staffing levels by functional grouping by identifying applicable U.S. nuclear plants/nuclear organizations as the benchmarking source; and,
- Compare OPG Nuclear with industry benchmark staffing levels and identify gaps, adjusted for technology, labour hours and work program differences.

Goodnight made adjustments or exclusions to both the OPG and industry benchmark staff levels in order to ensure OPG staffing information was on an equivalent basis with the industry benchmark data. Excluded from the OPG functional staff counts are those employees engaged in specific activities unique to the CANDU design for which there are no comparators in U.S. PWR plants. This included staff necessary for heavy water management, the tritium removal facility, fuel handling and feeder/fuel channel engineering/inspection/maintenance support.

Goodnight's benchmarking methodology is also limited to on-power, steady state operations and therefore Goodnight excluded outage execution staff from both OPG and the PWR industry comparators (but included outage preparation work activities). Staffing for major projects or one time initiatives (e.g. Darlington Refurbishment) are also excluded from the analysis. Finally, the study excluded certain functions undertaken at both OPG and PWR facilities where the processes are uniquely different and benchmarking was not recommended (e.g. Low and Intermediate Level Radioactive Waste Management) or where staffing information was confidential (e.g. security personnel).

3.3.2 Nuclear Staffing Study Results

Goodnight identified, after adjustments, a total OPG staff count for benchmarking of 5,956 FTEs, comprising:

- 5,386 FTEs of OPG Nuclear staff;

- 188 FTEs of OPG corporate staff that provide direct corporate support to OPG Nuclear (such as Finance and Human Resources); and,
- 382 FTEs of baseline contractors (i.e., contractors engaged in power, steady state activities including work activities related to the execution of the project portfolio).

Goodnight established an industry staffing benchmark of 5,090 FTEs. The comparator group was 16 large (greater than 800 MW) 2-unit PWRs stations operating in the United States. Goodnight selected PWRs over BWRs because in its opinion, CANDU plants are more similar to PWRs in that there are steam generators with similar primary and secondary loops. Goodnight chose larger capacity PWR stations because these later model designs are more complex than earlier versions, and therefore in Goodnight's opinion, would make for a more appropriate comparator with CANDU stations. However, in deriving the 5,090 industry staff benchmark, Goodnight made adjustments for CANDU versus PWR technology/design/regulatory differences as well as differences in work week hours (35 versus 40 hours).

The main conclusions of the initial Goodnight Nuclear Staffing Study were:

- As of July 2011, OPG Nuclear is above the comparable benchmark by 866 employees or approximately 17 per cent;
- Goodnight observed that OPG's use of overtime was not unusual relative to the U.S. PWR comparator group. Average base overtime use at OPG was 7 per cent in 2010 and 6 per cent in 2011, which compared favourably with U.S plants at 5 per cent-6 per cent (Ex. F5-1-1 page 20).
- OPG's 2012 - 2014 Nuclear Business Plan is directionally correct, reducing staff to within 343 FTEs of the benchmark, or 6.7 per cent, by 2014;
- OPG should target nuclear staff reductions in appropriate functions, as the Goodnight benchmark analysis indicates plant staffing is already below benchmark for certain functions (e.g. plant and technical engineering).

3.3.3 Update to Goodnight Nuclear Staffing Study

In early 2013, OPG asked Goodnight to revisit the Nuclear Staffing Study to update the industry comparator staffing benchmark (i.e., 5090 FTES) and compare it to the current OPG Nuclear staff count as of February 2013. A copy of the Updated Nuclear Staffing Study is provided at Ex. F5-1-2. Goodnight's update confirmed that OPG's staffing benchmark gap had narrowed by 9 per cent in less than 2 years. This significant improvement (17 per cent to 8 per cent) reflects OPG's staff reduction initiative through controlled hiring and the implementation of Business Transformation, as well as a small increase in industry comparator staffing levels for the reasons set out in Ex. F5-1-2 pages 13-20.

3.3.4 OPG's Response to the Goodnight Nuclear Staffing Studies

OPG accepts the methodology and observations of the Goodnight's studies as reasonable for the purpose of benchmarking staff levels (in total and by function) between OPG CANDU units and U.S. PWR units. Specifically:

a) OPG accepts the conclusions from the application of the Goodnight's methodology that technology/design/regulatory differences exist between CANDU and PWR units and that such factors drive staffing differences. Goodnight identified that OPG's CANDU requires an additional 82 FTEs for every 2-units in operation (i.e. approximately 400 FTEs for OPG's 10-unit operations) relative to the same functional areas in a PWR across a number of functions (e.g. training, scheduling, and radiation protection) (Ex. F5-1-1, page 4). Goodnight also identified 1,031 FTEs at OPG that are engaged in activities that have no equivalent in a PWR reactor (e.g. heavy water management, fuel handling, and tritium removal (Ex. F5-1-1, pages 14-15). Goodnight eliminated these FTEs from its benchmark comparison in order to normalize for these technology/design/regulatory differences between CANDU and PWR units

b) OPG agrees with Goodnight that benchmarking can be useful for highlighting gaps and acknowledges that OPG benchmarked staff levels as of July 2011 exceeded the PWR comparator in total (F5-1-1, page 7). OPG notes that Goodnight's

methodology establishes that OPG's focus on improving the material condition of the Pickering station (particularly Units 1 and 4) and the Continued Operations initiative contributes to the staff benchmark gap, since these programs require additional staff resources. OPG also is currently subject to longer and more extensive planned outages than many of the comparators in the Goodnight study. This is a significant contributor to higher OPG staff levels in such functions as outage planning and scheduling. Many of the comparators in the Goodnight study have already completed plant material condition improvement initiatives similar to the ones that OPG currently has underway.

Goodnight's July 2011 study concluded that planned staff reductions in OPG's 2012-2014 Nuclear Business Plan means that OPG is generally headed in the right direction, reflecting OPG's commitment to staff reductions. The 2011 study also noted that by the end of 2014, OPG should expect to be above the staffing benchmark by 343 FTEs, or 6.7 per cent, rather than the original 17 per cent at July 2011 (Ex F5-1-1 Part a, page 52). OPG's progress in that regard was reaffirmed by Goodnight's February 2013 update that found that within less than 2 years OPG had improved significantly and was above the updated staff benchmark by 8 per cent (vs. 17 per cent) (Ex F5-1-1 Part b, page 4).

In response to the Goodnight study findings, the 2013-2015 Nuclear business planning guidelines were updated to include staff adjustments where possible. For example, additional resources were budgeted for plant and technical engineering which were significantly below benchmark, while the resource budgets were reduced by similar amounts for areas such as Operations and Maintenance Support groups which were over benchmark.

Overall, the OPG 2013-2015 Nuclear Business Plan is targeting to further narrow the staffing benchmark gap. It includes various initiatives (including the implementation of Business Transformation across OPG), which when successfully implemented, will allow OPG to narrow the Nuclear staffing gap, as discussed in Section 3.4. Achieving the business plan targeted staff numbers requires continuous monitoring, controls and initiative development and implementation to streamline processes and find efficiencies.

The 2013 - 2015 Nuclear Business Plan reductions reflect senior management's direction to implement staff reductions by managing attrition and implementing Business Transformation initiatives to enable OPG to sustain the reductions over time. The nuclear staffing plan is a measured approach and will not compromise safety or the ongoing initiatives to improve reliability and implement industry best practices.

Safe and reliable operations remain OPG's top priority. OPG will not put at risk its efforts to improve performance reliability by moving too quickly to eliminate staff as improved plant reliability will improve OPG's TGC/MWh metric. OPG is using the Goodnight study to monitor attrition reductions to assess those functions identified as being at or below benchmark. One of the challenges of using an attrition-based model to reduce FTEs is that attrition does not always occur in areas that are over the benchmark. As such, a controlled hiring process was implemented to ensure critical functions do not fall too far below functional benchmarks so that they can continue to meet performance expectations and mitigate risks.

Exhibit F2-11 Table 3 provides the number of FTEs for Nuclear Operations, Darlington Refurbishment and New Build from 2010 to 2015. During the period 2005-2008, nuclear staff increased primarily due to work requirements related to feeder inspections, safe storage and maintenance. Nuclear staff levels began to decline in 2009 reflecting completion of safe storage, the end of the provision of inspection and maintenance services to Bruce Power, and various cost saving initiatives. Table 3 includes the 1064.7 FTE staff transfers from Nuclear to corporate functions in May 2012 as part of the Business Transformation initiative. As shown in Table 3, through various initiatives from 2010 to 2013, Nuclear regular staff levels declined by 431 FTEs, or 5.7 per cent (excluding nuclear transfers to corporate).[3] OPG's 2013 - 2015 Nuclear Business Plan set out further regular staff reductions of 298.3 FTEs or an additional 4.9 per cent reduction over the period 2013 - 2015[4]. Achieving these

[3] Staff reduction calculations exclude Darlington Refurbishment and New Build at Darlington
[4] Staff reduction calculations exclude Darlington Refurbishment and New Build at Darlington

2015 targeted staff reductions requires continuous reassessment of existing fleet and site targets and initiatives, as well as, developing new initiatives.

3.4 Gap Based Business Planning: Target Setting

Top-down targets are performance improvement targets designed to close performance gaps and significantly drive OPG nuclear operations closer to top quartile industry performance over the duration of a business plan. The CNO, in consultation with OPG's Nuclear Executive Committee ("NEC"), provided direction on top-down performance targets for each nuclear station for the planning period (i.e. 2013 - 2015). The top-down approach establishes operational, financial, generation and staff targets set by reference to historical performance, targets established in the prior years, and updated benchmarking results.

Chart 3 sets out the final OPG operational and financial targets for the 20 benchmark performance indicators for the period 2013 - 2015.

Chart 3

	Pickering Annual Targets			Darlington Annual Targets		
Benchmarking Indicators – Annual Targets	**2013**	**2014**	**2015**	**2013**	**2014**	**2015**
Safety						
All Injury Rate (#/200k hours worked)	0.89	0.89	0.89	0.89	0.89	0.89
Industrial Safety Accident Rate (#/200k hours worked)	0.15	0.15	0.15	0.15	0.15	0.15
Collective Radiation Exposure (person-rem per unit)	101.95	100.95	98.71	96.73	56.00	73.80
Airborne Tritium Emissions (Curies) per Unit	2,350	1,900	1,800	1,000	1,000	1,000
Fuel Reliability (microcuries per gram)	0.0005	0.0005	0.0005	0.0005	0.0005	0.0005
Reactor Trip Rate (# per 7,000 hours)	0.5	0.5	0.5	0.5	0.5	0.5
Auxiliary Feedwater System Unavailability (#)	0.02	0.02	0.02	0.02	0.02	0.02
Emergency AC Power Unavailability (#)	0.025	0.025	0.025	0.025	0.025	0.025

High Pressure Safety Injection Unavailability (#)	0.02	0.02	0.02	0.02	0.02	0.02
Reliability						
WANO NPI (Index)	66.0	72.0	74.2	97.7	97.9	96.1
Forced Loss Rate (%)	8.09	7.76	5.5	1.50	1.25	1.00
Unit Capability Factor (%)	79.2	79.9	82.1	88.8	93.5	86.3
Chemistry Performance Indicator (Index)	1.06	1.05	1.04	1.01	1.01	1.01
On-line Deficient Critical and Non-Critical Mtce Backlog (work orders/unit).	207	197	<197	200	190	180
On-Line Corrective Critical and Non-critical Mtce Backlog (work orders/unit).	104	85	78	50	29	25
Value for Money						
Total Generating Costs per MWh ($/Net MWh) [1]	65.99	66.08	60.25	40.25	36.21	42.78
Non-Fuel Operating Costs per MWh ($/Net MWh) [1]	55.83	55.71	53.34	31.76	27.21	32.82
Fuel Costs per MWh ($/Net MWh)	6.04	6.02	5.93	5.39	5.36	5.28
Capital Costs per MW DER (k$/MW) [2]	28.05	29.98	6.98	23.76	29.48	34.82
Human Performance						
Human Performance Error Rate (# per 10k ISAR hours)	.005	.004	.004	.004	.004	.004

[1] Excludes OPEB, Pension, and Asset Service Fees
[2] Design Electrical Rating (DER)

OPG is targeting improved performance by 2015 in each of its four cornerstones. Specifically:

- OPG will continue to target first quartile performance in safety for Pickering and Darlington. OPG is targeting improvements in Fuel Reliability at Darlington and Reactor Trip Rate at Pickering.

- OPG will focus on improved reliability at both Pickering and Darlington. OPG is targeting improved FLR at Darlington but its UCF will decline in 2015 due to the VBO which will take all four units off-line for more than 1 month. For Pickering, OPG is

targeting improved reliability as shown by the improvement in Pickering's FLR and an increase in Pickering's UCF.

Improvements are also targeted at both Pickering and Darlington to reduce Online Deficient and Corrective Maintenance backlogs.

- OPG's is targeting improvement in the Value for Money metrics. The 2015 Pickering TGC/MWh target relative to 2011 reflects the impact of labour escalation costs offset by lower staff levels and improved output. Darlington's 2015 targeted TGC/MWh reflects lower staff levels as well as the impact of lower production due to the planned VBO.

3.5 Gap Based Business Planning - Gap Closure and Resource Plan

The operational and financial targets established by the target setting process are the basis for site and support group business planning. As part of that process, the site and support groups establish and pursue improvement initiatives to close performance gaps to targets over the business planning period. The initiatives are either site specific, fleet-wide or part of Business Transformation to improve efficiencies and reduce work through process streamlining (Attachment 3).

The fleet wide initiatives included in the 2013-2015 Nuclear Business Plan include new initiatives as well as the continuation of initiatives identified in EB-2010-0008 (e.g. Days Based Maintenance; Engineering Restructuring). Another initiative launched in 2010 was Pickering Amalgamation, which combined the former operations of Pickering A and B into a single operating station, which was completed in August 2011. Estimated impact on staffing is a reduction of 70 management staff achieved through attrition.

The 2013 - 2015 Nuclear Business Plan (Attachment 2) sets out the resource requirements (cost, staff and investment plans) for each Nuclear station and support group. The 2013-2015 Nuclear Business Plan achieves a more sustainable cost structure by the

implementation of Business Transformation and other initiatives focused on improving performance while driving cost efficiencies.

LIST OF ATTACHMENTS

Attachment 1:	OPG 2012 Nuclear Benchmark Report
Attachment 2:	2013 - 2015 Nuclear Business Plan
Attachment 3:	Gap Closure Initiatives