

Board Staff Interrogatory #72

Issue Number: 4.3

Issue: Are the proposed nuclear capital expenditures and/or financial commitments for the Darlington Refurbishment Program reasonable?

Interrogatory

Reference:

Ref: Exhs D2-2-7, D2-2-8 and D2-2-10

OPG has provided copies of third party reports in the above referenced exhibits.

- a) Please provide a copy of any other third party reports regarding the DRP prepared during the planning phase that have not already been filed by OPG in EB-2016- 0152.
- b) Please provide a copy of all audit reports regarding the DRP.
- c) Will OPG receive reports from any other third party independent oversight groups involved in the DRP during the execution phase? What is the frequency? Will they generate written reports? Who will receive the reports?
- d) What is OPG's Audit program during the execution phase of the DRP? What areas will be audited? What is the schedule for the audits during the execution phase of the DRP? Who will receive the reports?

Response

a) There are an extensive amount of third party reports regarding the Darlington Refurbishment Program (DRP) that cover technical details on a variety of topics. The following is a list of third party oversight reports regarding the DRP:

1) Modus/Burns & McDonnell – Definition Phase

Reports are provided as Attachments as listed:

- 1. Initial Project Assessment – Darlington Nuclear Refurbishment Project (August 13, 2013)
- 2. Report to Nuclear Oversight Committee – 4th Quarter 2013
- 3. Report to Nuclear Oversight Committee – 1st Quarter 2014
- 4. Report to Nuclear Oversight Committee – 2nd Quarter 2014
- 5. Report to Nuclear Oversight Committee – 3rd Quarter 2014
- 6. Report to Nuclear Oversight Committee – 4th Quarter 2014

- 1 7. Supplemental Report to Nuclear Oversight Committee Observations Regarding
- 2 4d Cost Estimate - 4th Quarter 2014
- 3 8. Report to Nuclear Oversight Committee – 1st Quarter 2015
- 4 9. Report to Nuclear Oversight Committee – 2nd Quarter 2015
- 5 10. Report to Darlington Nuclear Refurbishment Project – 3Q 2015
- 6 11. Report to Darlington Review Committee of OPG Board of Directors
- 7 12. Nuclear External Oversight Assessment Report Cost Management & Earned
- 8 Value
- 9 13. Nuclear External Oversight Assessment Report Assessment of 4c Estimate and
- 10 Cost Management
- 11 14. Nuclear External Oversight Review of OPG Risk Management Practices and
- 12 Procedures – February 2015
- 13 15. Report to Board of Directors Board Retreat October 1-2, 2015
- 14 16. BMcD/Modus Recommendations 2Q 2015 Report to NOC
- 15 17. Nuclear External Oversight Assessment of OPG Operating Experience &
- 16 Lessons Learned Practices and Procedures
- 17 18. Nuclear External Oversight Review of Darlington Refurbishment Schedule
- 18 Management Practices and Procedures
- 19 19. Attachment B – Update of BMcD/Modus Recommendations from Initial Project
- 20 Assessment of August 2013
- 21 20. Nuclear External Oversight Assessment Report of DR Team's Process for
- 22 Developing the RQE Estimate (already filed at Ex. D2-2-8, Attachment 2)
- 23 21. Independent Oversight Team – Assessment of OPG Scope Definition and
- 24 Management Process

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26 2) Previous Ontario Minister of Energy - Independent Advisor

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28 Reports are provided as Attachments as listed:

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- 30 22. Report to the Minister of Energy on the Oversight of the Darlington
- 31 Refurbishment Program - Q3 2014
- 32 23. Report to the Minister of Energy on the Oversight of the Darlington
- 33 Refurbishment Program - Q4 2014
- 34 24. Report to the Minister of Energy on the Oversight of the Darlington
- 35 Refurbishment Program - Q1 2015
- 36 25. Report to the Minister of Energy on the Oversight of the Darlington
- 37 Refurbishment Program - Q2 2015
- 38 26. Report to the Minister of Energy on the Oversight of the Darlington
- 39 Refurbishment Program - Q3 2015
- 40 27. Report to the Minister of Energy on the Oversight of the Darlington
- 41 Refurbishment Program – Q4 2015
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- 44 **b)** OPG produces two types of audit reports that are applicable to the DRP: (1) Nuclear
- 45 Oversight reports, and, (2) Internal Audit reports:
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1) Nuclear Oversight

During the period of January 1, 2014 to September 30, 2016, Nuclear Oversight performed 45 Audits and Assessments (34 Audits, 11 Assessments) that included Darlington Nuclear Refurbishment in scope. Of those, 13 identified issues requiring corrective action within Refurbishment.

Nuclear Oversight works closely with the Line organizations being evaluated, including implementing processes that provide acknowledgement of the issues identified and achieving agreement and ownership of corrective actions.

The issues identified during this period consisted of deficiencies/gaps from a fleet or station perspective as well as specific to the refurbishment project. The areas requiring further corrective action included assessment of planning and design activities, conduct and implementation of plant activities, as well as assessment of programmatic effectiveness.

The following chart contains the list of the Nuclear Oversight Audits and Assessments that included Darlington Nuclear Refurbishment in Scope. All findings and associated management actions relevant to the DRP are provided in Attachment 28.

Chart 1 – Nuclear Oversight Audits

Audit #	Audit Title
2014-005	Work Protection
2014-006	Pressure Boundary Section 18
2014-008	PB Program Review (incl. CAP review surveillance)
2014-011	Procurement Engineering
2014-012	Human Performance
2014-017	Fire Protection Program
2014-018	Environment Programs
2014-020	PB Design Control (including PB Procurement Engineering)
2014-021	PB Control of Processes & Test Control and Material Management
2015-013	Software Program – Real Time Process Computing
2015-014	Environmental Management
2015-016	Fire Protection
2015-018	PB Design Control (incl: PB Procurement Eng. Aspects)
2015-020	Pressure Boundary Audit - Section 18
2015-021	Reactor Safety Program
2015-022	Project Management
2015-024	Items & Services Management, including Pressure Boundary
2015-029	Heavy Water Management

Audit #	Audit Title
2015-033	Configuration Management
2016-001	Health & Safety Management System Program
2016-002	Corrective Action Program
2016-004	Equipment Reliability
2016-005	Major Components
2016-008	Welding
2016-013	Risk and Reliability
2016-014	Environmental Management
2016-015	Conduct of Maintenance
2016-016	Records and Documentation
2016-020	Work Management
2016-021	Work Protection
2016-027	Integrated Aging Management
2016-028	DNR Project Management
2016-029	DNR Conduct of Engineering
2016-031	DNR Emergency Preparedness

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Chart 2 – Nuclear Oversight Assessments

Assessment #	Assessment Title
2014-200	Darlington Nuclear Refurbishment (DNR) Engineering Activities
2014-204	Darlington Performance Assessing - Operations & Maintenance Readiness for DNR
2014-310	Contract Administration Assessment
2014-319	Fleet Performance Assessing - CMO 180 Day Follow
2015-202	Darlington Nuclear Refurbishment Chemistry
2015-205	DNR - Engineering
2015-206	DNR Contractor Safety Plan
2015-208	Darlington NLO Initial Training
2015-321	Follow-up to Human Performance Audit NO-2014-012
2016-208	Pressure Boundary Darlington Refurbishment
2016-209	SATM & Housekeeping Darlington Nuclear Generating Station ("DNCS")

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2) Internal Audit

During the period of January 1, 2014 to September 30, 2016, Internal Audit performed 17 audits that included DRP in scope.

The issues identified during this period include (but are not limited to) deficiencies with documentation, unclear organizational accountabilities, contractor non-compliances, planning and scheduling issues, and financial controls.

The following table contains the list of the Internal Audit reports relating to DRP. All findings and associated management action plans relevant to the DRP are provided in Attachment 29 (confidential).

Chart 3 – Internal Audit Reports

Audit #	Audit Title
14-15	Administration of Contractual Documentation - Refurbishment
14-17	Finance's Control Over Darlington Refurbishment
14-18	Turbine Generator (TG) Critical Parts Procurement – Darlington Refurbishment Project
14-26	Darlington Station Readiness for Refurbishment
15-17	EPC Contractor Procurement Review – Darlington Nuclear Refurbishment Project
15-24	Invoice Review & Approval Process – DRP Projects
15-47	ES MSA Recovery negotiations Audit - Follow-up on 2013 Auditor General Findings
16-07	Darlington Nuclear Refurbishment Project Management Audit
16-08	Darlington Nuclear Refurbishment – Contractor Invoicing Audit
16-09	Darlington Nuclear Refurbishment On boarding
16-13	Darlington Nuclear Refurbishment Contractor and Subcontractor Management Audit
16-23	Darlington Nuclear Refurbishment– Retube & Feeder Replacement Construction and Tooling Audit
16-24	Darlington Nuclear Refurbishment Turbine Generator Engineering Audit
16-25	Darlington Nuclear Refurbishment Integrated Database for Project Reporting Audit
16-39	DNR Contractor Procurement – R&FR Project Audit

c) External oversight of the DRP is being conducted on behalf of the Board of Directors, the Ontario Minister of Energy, and OPG's President and CEO. This will continue throughout the Execution Phase:

- 1) Darlington Refurbishment Committee of the OPG Board of Directors- Burns and McDonnell

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 2 OPG's Board of Directors recently re-engaged Burns and McDonnell with Modus as
 3 subcontractors to provide independent oversight services during the Execution Phase.
 4 The Burns and McDonnell reports are submitted to the Darlington Refurbishment
 5 Committee of the OPG Board of Directors at their quarterly meetings.
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7 2) Ontario Minister of Energy - Independent Advisor
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9 Please see Ex. L-4.3-1 Staff-222 for description of the Ontario Minister of Energy's
 10 oversight during Execution Phase.
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12 3) OPG President and CEO-Refurbishment Construction Review Board (RCRB)
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14 Please see Ex. L-4.3-1 Staff-222 for a description of the RCRB. Reports are provided to
 15 OPG's President and CEO.
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 18 d) OPG's Audit program during the Execution Phase of the DRP is as follows:
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20 1) Nuclear Oversight
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22 Nuclear Oversight Rolling Audit Schedule Q3 2016 - Q3 2017 (Attachment 30)
 23 represents the current Nuclear Oversight Audit plan for the next five quarters. The DRP
 24 (see: Darlington Nuclear Refurbishment (DNR) column on the attached) is in scope for
 25 the majority of the planned audits. The Nuclear Oversight 2017-2019 Audit Plan is
 26 below:
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28 **Chart 4 – Nuclear Oversight 2017-2019 Audit Plan**

AUDITS	2017	2018	2019
Pressure Boundary	X	X	X
Pressure Relief Valves			X
Conduct of Engineering – Design Authority	X		
Conduct of Engineering - Research and Technology	X		
Conduct of Inspection & Maintenance Services	X		X
Component & Equipment Surveillance			X
Software		X	
Items & Services Management		X	
Risk & Reliability			X
Equipment Reliability			X
Reactor Safety		X	
Project Management	X		
Major Components			X

Engineering Change Control	X		
Environmental Qualification	X		
Chemistry		X	
Welding			
Integrated Aging Management			
Decommissioning		X	
Nuclear Waste Management Program		X	
Nuclear Operations	X	X	X
Heavy Water Management			
Nuclear Operations (Fuel Handling)			X
Conduct of Maintenance	X	X	X
Work Protection		X	
Production Work Management		X	
Fire Protection		X	X
Training	X		X
Human Performance		X	
Corrective Action			X
Radiation Protection		X	
Health & Safety Management System Program			X
Environmental Management	X	X	
Nuclear Pandemic Planning	X		
Design Management			X
Nuclear Security (with Nuclear Safeguards)	X		
Radioactive Material Transportation		X	
Consolidated Nuclear Emergency Plan		X	X
Business Planning	X		
Records and Document Control			
Nuclear Safeguards (with Nuclear Security)	X		
Fuel			X
Managed Systems		X	
Conduct of Regulatory Affairs	X		
Independent Assessment (NIEP)			X
Component Equipment Surveillance (DNR only)		X	
Safety System Functional Audit (DNR only)			X

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Nuclear Oversight audit reports are distributed to the senior management team within Nuclear (SVPs, VPs, Directors) and to line management who have been involved with audit.

2) Internal Audit

For 2016, Internal Audit will perform the audits set out in Chart 5 relating to the DRP. The 2017 to 2019 Audit Plan relating to DRP is provided in Chart 6.

Chart 5 – 2016 Internal Audit Plan

No.	Engagement Name	Status
1	DNR Onboarding	Complete
2	DNR Project Management	Complete
3	DNR Contractor Invoicing	Complete
4	DNR Contractor and Subcontractor Management	Complete
5	DNR Construction & Tooling - R&FR Project	Complete
6	DNR Engineering - Turbine Generator Project	Complete
7	DNR Integrated Database for Project Reporting	Complete
8	DNR Contractor Timekeeping	In Progress
9	DNR EPC Procurement	In Progress
10	DNR Project Revisions & Rework	In Progress
11	DNR Contractor Procurement - R&FR Project	Complete
12	DNR Project Cost Management System	In Progress
13	DNR Finance Controls	In Progress

Chart 6 – 2017 – 2019 Internal Audit Plan

Darlington Nuclear Refurbishment			
Year	2017	2018	2019
Program Management	Program Oversight & Reporting	Program Oversight & Reporting	Program Oversight & Reporting
	Vendor Productivity	Quality Management Program	-
Core Project Execution – Project Management	Retube & Feeder Replacement (“R&FR”) – Project Execution	Steam Generator – Project Execution	R&FR – Project Execution
	Fuel Handling – Project Execution	Turbine Generator – Project Execution	Turbine Generator – Project Execution
	Balance of Plant – Project Execution	-	Balance of Plant – Project Execution

The distribution for Internal Audit reports is as follows:

Reports are directed to:

- 1 • SVP, Nuclear Projects
- 2 • Other Executive Leadership Team Members (as applicable if their organization
- 3 has ownership for actions)
- 4 • Process Owner for the Audit

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6 Other stakeholders included on the distribution (copied) are:

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- 8 • President & Chief Executive Officer
- 9 • SVP Finance, Strategy, and Chief Financial Officer
- 10 • Nuclear President & Chief Nuclear Officer
- 11 • SVP Nuclear Refurbishment
- 12 • VP Nuclear Finance
- 13 • Director Refurbishment Systems Oversight
- 14 • Director Nuclear Oversight
- 15 • Other impacted stakeholders (as applicable)