

## Board Staff Interrogatory #002

**Ref:** Ex. B1-T1-S1

**Issue Number:** 2.1

**Issue:** What is the appropriate amount for rate base?

### Interrogatory

Please complete the table below.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	2007 Actual	2008 Board- approved	2008 Actual	2008 variance ( c-b)	2008 Board- approved	2009 Actual	2009 variance (f-e)	2010 Budget	2011 Test Year	2012 Test Year
<b>HydroElectric</b>										
Gross plant at cost										
Accumulated depreciation										
<b>Net Plant</b>										
<b>Cash Working Capital</b>										
<b>Materials &amp; Supplies</b>										
<b>Hydroelectric Rate Base</b>										
<b>Nuclear</b>										
Gross plant at cost										
Accumulated depreciation										
Darlington Refurbishment (CWIP)										
<b>Net Plant</b>										
Cash Working Capital										
Fuel Inventory										
Materials & Supplies										
<b>Total Working Capital</b>										
<b>Nuclear Rate Base</b>										
<b>Nuclear Rate Base without "Unamortized ARC"</b>										

- a) If the Hydroelectric 2008 Rate Base variance (col. 4) is in excess of 1% please calculate the over (under) earnings that results.
- b) If the Hydroelectric 2009 Rate Base variance is (col. 7) in excess of 1%, please calculate the over (under) earnings that results.
- c) If the Nuclear 2008 Rate Base variance (col. 4) is in excess of 1%, please calculate the over (under) earnings that results.
- d) If the Nuclear 2009 Rate Base variance (col. 7) is in excess of 1%, please calculate the over (under) earnings that results.
- e) If the Nuclear without Unamortized ARC 2008 Rate Base variance (col. 4) is in excess of 1%, please calculate the over (under) earnings that results.

Witness Panel: Finance & Business Processes

- f) If the Nuclear without Unamortized ARC 2009 Rate Base variance (col. 7) is in excess of 1%, please calculate the over (under) earnings that results.

**Response**

The requested table is completed below. "Board Approved" values have been taken from the EB-2007-0905 Rate Order with supplemental rate base information from page 133 of the OEB's "Decision with Reasons".

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	2007 Actual	2008 Board- approved	2008 Actual	2008 variance (c-b)	2009 Board- approved	2009 Actual	2009 variance (f-e)	2010 Budget	2011 Test Year	2012 Test Year
<b>HydroElectric</b>										
Gross plant at cost	4,396.5	4,433.2	4,416.8	(16.4)	4,480.6	4,438.6	(42.1)	4,485.0	4,538.0	4,585.5
Accumulated depreciation	507.8	570.2	569.5	(0.7)	633.1	631.2	(1.9)	693.6	756.7	820.2
<b>Net Plant</b>	<b>3,888.7</b>	<b>3,857.8</b>	<b>3,847.3</b>	<b>(10.5)</b>	<b>3,847.5</b>	<b>3,807.4</b>	<b>(40.2)</b>	<b>3,791.4</b>	<b>3,781.3</b>	<b>3,765.3</b>
<b>Cash Working Capital</b>	21.8	21.8	23.6	1.8	21.8	26.0	4.2	23.7	21.5	21.5
<b>Materials &amp; Supplies</b>	0.6	0.6	0.6	0.0	0.6	0.7	0.0	0.7	0.6	0.6
<b>Hydroelectric Rate Base</b>	<b>3,911.1</b>	<b>3,880.2</b>	<b>3,871.5</b>	<b>(8.7)</b>	<b>3,869.9</b>	<b>3,834.0</b>	<b>(35.9)</b>	<b>3,815.7</b>	<b>3,803.4</b>	<b>3,787.4</b>
Variance - %				-0.2%			-0.9%			
<b>Nuclear</b>										
Gross plant at cost	4,321.1	4,525.5	4,498.9	(26.6)	4,733.2	4,679.5	(53.7)	5,355.3	5,547.1	5,741.7
Accumulated depreciation	1,446.1	1,737.8	1,733.0	(4.8)	2,037.1	2,023.7	(13.5)	2,278.8	2,500.3	2,745.4
Darlington Refurbishment (CWIP)									125.5	306.0
<b>Net Plant</b>	<b>2,875.0</b>	<b>2,787.7</b>	<b>2,765.9</b>	<b>(21.8)</b>	<b>2,696.0</b>	<b>2,655.8</b>	<b>(40.2)</b>	<b>3,076.5</b>	<b>3,172.2</b>	<b>3,302.3</b>
<b>Cash Working Capital</b>	16.0	16.0	15.9	(0.1)	16.0	14.3	(1.7)	9.2	4.0	4.0
<b>Fuel Inventory</b>	208.7	281.1	266.9	(14.3)	330.1	316.9	(13.3)	357.3	379.8	360.9
<b>Materials &amp; Supplies</b>	400.4	424.4	415.6	(8.8)	441.7	434.4	(7.3)	468.9	485.3	483.7
<b>Total Working Capital</b>	<b>625.1</b>	<b>721.5</b>	<b>698.4</b>	<b>(23.1)</b>	<b>787.8</b>	<b>765.6</b>	<b>(22.3)</b>	<b>835.5</b>	<b>869.1</b>	<b>848.5</b>
<b>Nuclear Rate Base</b>	<b>3,500.1</b>	<b>3,509.1</b>	<b>3,464.2</b>	<b>(44.9)</b>	<b>3,483.8</b>	<b>3,421.4</b>	<b>(62.4)</b>	<b>3,912.0</b>	<b>4,041.3</b>	<b>4,150.8</b>
				-1.3%			-1.8%			
<b>Nuclear Rate Base without "Unamortized ARC"</b>	<b>2,084.7</b>	<b>2,282.1</b>	<b>2,180.5</b>	<b>(101.6)</b>	<b>2,362.8</b>	<b>2,261.6</b>	<b>(101.2)</b>	<b>2,355.4</b>	<b>2,518.0</b>	<b>2,660.7</b>
Variance - %				-4.5%			-4.3%			

- a) and b)

The variances in the regulated hydroelectric rate base are less than 1 per cent.

- c) The 2008 actual nuclear rate base was 1.3 per cent lower than approved by the OEB. If this lower base for 2008 had been incorporated into the calculation of payment amounts in EB-2007-0905, it would have reduced OPG's revenue requirement by approximately \$3M over the 21-month test period.

- 1 d) The 2009 actual nuclear rate base was 1.8 per cent lower than that approved by the  
2 OEB. If this lower base for 2009 had been incorporated into the calculation of payment  
3 amounts in EB-2007-0905 it would have reduced OPG's revenue requirement by  
4 approximately \$5M over the 21-month test period.  
5
- 6 e) The 2008 actual nuclear rate base excluding the unamortized asset retirement cost  
7 ("ARC") was 4.5 per cent lower than approved by the OEB. If this lower base excluding  
8 unamortized ARC for 2009 had been incorporated into the calculation of payment  
9 amounts in EB-2007-0905 it would have reduced OPG's revenue requirement by  
10 approximately \$5M over the 21-month test period.  
11
- 12 f) The 2009 actual nuclear rate base excluding the unamortized ARC was 4.3 per cent  
13 lower than that approved by the OEB. If this lower base excluding unamortized ARC for  
14 2009 had been incorporated into the calculation of payment amounts in EB-2007-0905 it  
15 would have reduced OPG's revenue requirement by \$8M over the 21-month test period.  
16
- 17 OPG notes that the amounts in parts c) / d) and e) / f) above are not additive, but rather the  
18 impacts shown in c) / d) are largely included in the impacts shown for e) / f).

**Board Staff Interrogatory #003**

**Ref:** Ex. B1-T1-S2, pages 5-8

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

OPG states that it has calculated cash working capital by applying the net lag days resulting from the EB-2007-0905 lead/lag study.

There appear to be differences, between the charts filed in this proceeding (Charts 3 and 4) and the comparable charts filed in EB-2007-0905, in the lead lag days for some of the expense categories.

Please explain the reason for the differences.

**Response**

The lead/lag days for expenses filed in Ex. B4-T1-S1 in EB-2007-0905 were used when calculating the 2009 cash working capital in Charts 3 and 4 in Ex. B1-T1-S2 filed in this proceeding. The differences between the two sets of information are due to two factors:

- Due to editing errors when importing the table into the pre-filed evidence, some of the entries in columns (c) and (d) in Chart 3 are incorrect. As well, some of the categories were incorrectly labelled. An updated Chart 3 is attached (with changes blacklined on lines 6, 7, 11, 12, 13 and 14).
- There are some differences, between the two filings, in the categories presented. In the 2006 Lead/Lag study expense lead days were determined for each type of expense, but Charts 9 and 10 in Ex. B4-T1-S1 in EB-2007-0905 only showed results for the components that exceeded the \$2M minimum threshold in 2007. As there were changes with respect to which components meet this threshold, Charts 3 and 4 in this Application show certain items that meet the threshold for 2009 but which did not meet the threshold in 2009 and hence were not reported in EB-2007-0905. This affected lines 8, 9, 10, 12, 13, 14 and 15 on Chart 3 and line 7 on Chart 4.

In all respects, column (e) information in Charts 3 and 4 as originally filed is correct and reflects the application of the same leads/lags as in EB-2007-0905 to actual 2009 expenses.

Chart 3						
Cash Working Capital - Generation Nuclear						
2009						
		Expense				
Line		Amount	Revenue	Expense	Net Lead/Lag	CWC
No.	Expense Category	(\$M)	Lag Days	Lead Days	Days	(\$M)
		(a)	(b)	(c)	(d) = (b) - (c)	(e) = (a)*(d)/365
	OM&A - direct					
1	Labour	1,226.4	35.7	20.9	14.8	49.4
2	EPSCA Labour	9.3	35.7	12.0	23.7	0.6
3	Consultants - Nuclear	330.2	35.7	71.3	(35.6)	(32.2)
4	Consultants - Corporate	26.3	35.7	40.4	(4.7)	(0.3)
5	Augmented Staff - Nuclear	59.4	35.7	44.4	(8.7)	(1.4)
6	Augmented Staff - Corporate	2.0	35.7	61.4	(25.7)	(0.1)
7	Outsourced Services - Corporate	84.0	35.7	6.2	29.5	6.6
8	Telecommunications	2.8	35.7	54.5	(18.8)	(0.1)
9	Utilities	2.8	35.7	84.4	(48.7)	(0.4)
10	Facilities	3.8	35.7	0.0	35.7	0.4
11	Operating Licences	22.1	35.7	2.8	32.9	2.0
12	Membership Fees	2.5	35.7	(77.9)	113.6	0.8
13	Transport Work Equipment	5.0	35.7	56.0	(20.3)	(0.3)
14	Donations	2.6	35.7	0.0	35.7	0.3
15	All other cash expenses	47.9	35.7	28.7	7.0	0.9
	OM&A Centrally held Costs					
16	OPEB/Pensions	(20.6)	35.7	17.1	18.6	(1.0)
17	Incentives	29.1	35.7	240.0	(204.3)	(16.3)
18	PWU-EHT	3.5	35.7	240.0	(204.3)	(1.9)
19	ONFA fee	3.9	35.7	(151.5)	187.2	2.0
20	Gregorian Adjustment	3.8	35.7	20.9	14.8	0.2
21	Insurance	14.1	35.7	(103.7)	139.4	5.4
22	Total OM&A					14.6
	Other Costs:					
23	property taxes	16.9	35.7	1.9	33.8	1.6
24	capital taxes	7.2	35.7	15.1	20.6	0.4
25	income tax	27.6	35.7	15.1	20.6	1.6
26	Total Other Costs					3.6
27	Total for Nuclear					18.2

**Board Staff Interrogatory #004**

**Ref:** Ex. A1-T6-S1  
Ex. B1-T1-S1, page 4  
Ex. D1-T1-S2

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

It is understood that O. Reg. 53/05, amongst other things, sets rules pertaining to the recovery of capital costs incurred or financial commitments made by OPG associated with the adding to and/or the refurbishment of generating capacity that are to apply in the setting of just and reasonable rates under section 78.1 of the *Ontario Energy Board Act*.

Please prepare a table that lists those capital projects that are closing to rate base during 2009, 2010, 2011 and 2012 on the basis of sections 5 and 6 of O. Reg. 53/05. For each project please indicate the section/subsection of the regulation that applies.

**Response**

There is only one capital project for the regulated Hydroelectric business unit closing to rate base during the 2009 – 2012 period on the basis of sections 5 and 6 of O. Reg. 53/05. This project is the Sir Adam Beck I Generating Station Unit G7 Frequency Conversion project, for which \$27.5M closed to rate base in 2009.

For clarity, the Niagara Tunnel project, which is forecast to enter rate base in 2013 is also subject to section 6(2)4 of O. Reg. 53/05.

The Darlington Refurbishment project is a project under section 6(2)4 of O. Reg. 53/05. OPG is proposing that Construction Work in Progress ("CWIP") for this project be included in rate base beginning in 2011. OPG has also capitalized certain leasehold improvements to office space in 2009. These improvements are valued at approximately \$1M. This space will house Darlington Refurbishment staff and so is part of the Darlington Refurbishment costs.

There are no other nuclear projects closing to rate base in 2009, 2010, 2011 or 2012 that are covered by sections 5 and 6 of O. Reg. 53/05.

**Board Staff Interrogatory #005**

**Ref:** Ex. A2-T2-S1, page 10, lines 28-31

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

Please indicate whether there have been instances in the preparation of the 2010, 2011 and 2012 capital budgets where corporate prioritization of specific projects was undertaken because of (i) corporate constraints with respect to spending or borrowing, or (ii) if the funding guidelines were exceeded in the business unit plan submissions. If there have been instances, please elaborate on what happened to the top 3 projects (in dollars) that were subject to the corporate prioritization process.

**Response**

OPG's capital planning process addresses sustaining capital expenditures (i.e., those expenditures required to maintain existing production facilities) separately from those related to major generation development or re-development projects.

The prioritization of sustaining capital projects takes place at the business unit level. Both nuclear and regulated hydroelectric capital planning processes employ a portfolio approach, which is described in Ex. D1-T1-S1 and Ex. D2-T1-S1. Utilization of these approaches has enabled OPG to stabilize its total sustaining capital expenditures – which have been in a range between \$300M and \$400M annually since 2005. The relative stability of these requirements, and the fact that OPG is able to finance its sustaining capital expenditures from operating cash flow, means that OPG has not been required to reprioritize its planned projects at the corporate level in response to funding shortages in the time period identified.

OPG's major generation development projects are planned separately with pre-arranged dedicated financing at the time of approval. In a situation where there is a significant change in expected project costs, the ability to continue financing the project is a key consideration that is addressed prior to any such changes being accepted.

**Board Staff Interrogatory #006**

**Ref:** Ex. A2-T2-S1, page 13

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**


Please provide a copy of the three most recently completed Post Implementation Review Process project appraisals.

**Response**

The three most recent Post Implementation Review appraisals are attached as follows:

- Attachment 1: Feeder Stress Analysis
- Attachment 2: Low Level Storage Building #11.
- Attachment 3: Additional Feeder Cut and Weld Tooling 10-62567.



	Document Number: FIN-TMP-PA-002*	Revision: R02	Page: 1 of 3	L-01-006 Attachment 1
	<b>POST IMPLEMENTATION REVIEW TEMPLATE</b> (For Simplified PIRs only)			

Station: DNCS, PNGS "A" and PNGS "B"	Project Name: Feeder Stress Analysis	Project No.: 10-62555	Units: all	Controlled Doc No.: N-PIR-33160-10001
--	---	--------------------------	---------------	--

Approval	Cost	Date
Original Approval Estimate	\$3,700K	29-NOV-06
Approval Revision Estimate	\$3,700K	26-NOV-08
Final Approval Estimate	\$3,700K*	26-NOV-08
	*See note at bottom	
Final Actual Project Cost	\$2,232K	24-JUN-09

Timing	
Target Date	20-MAY-09
Latest Approved i/s Date	N/A
In Service Date	24-JUN-09
Period used to calculate Performance result	JAN '07 to JUN '09

DELIVERABLES	
Target	Achievement
<p>Two measurable targets were set for this project in the BCS (Page 9 of 15 of Feeder Stress Analysis Project 10-62555 Full Release Business Case Summary N-BCS-33160-10001 R00)</p> <p>1) All analyzed lead feeders were life-extended a minimum of two outage cycles.</p>	<p><u>Pickering A:</u> Advanced feeder stress analysis (FSA) was performed on 156 lead feeders at Pickering A. In total, 152 of the 156 analyzed feeders have been life extended to or beyond two full outage cycles (P1411 for Unit 1 and P1341 for Unit 4). Seventy two (72) of these Pickering A lead feeders have been life-extended to beyond station End of Life (EOL).</p> <p>On Unit 1, 67 of the 78 analyzed lead feeders have had their required thicknesses lowered using uniform thickness profiles. An additional 7 feeders were successfully analyzed with non-uniform thickness requirements. Based on the Pickering A Feeder Replacement Schedule NA44-CALC-33126-00010 R04, three of the 4 feeders that were not successfully analyzed have had their scheduled replacement dates pushed back to beyond P1411 as a result of a decrease in the measured thinning rates. Similarly on Unit 4, 67 of the 78 analyzed lead feeders have had their required thicknesses lowered using uniform thickness profiles and an additional 6 feeders were successfully analyzed with non-uniform thickness requirements. In addition, two of the 5 remaining feeders have had their replacement dates pushed back to beyond the P1341 outage as a result of decreased feeder thinning rates. Detailed results of this analysis are documented in NA44-REP-33126-00025 R0.</p> <p><u>Pickering B:</u> A total of nine feeders were analyzed at Pickering B on Units 5 through 8. One feeder, N21W on unit 8, has had it's service life extended to 2012, meeting the requirement of 2 full outage cycles from the time analysis was completed. Four other feeders were successfully analyzed and life-extended to beyond pressure tube EOL. Results of this analysis are documented in NK30-CALC-33126-00045 R0. The five remaining feeders would require additional non-linear analysis to reduce thickness requirements. This scope has been transferred to the Localized Feeder Stress Analysis (LFSA) project # 62441 and the results will be documented in the LFSA PIR.</p>

<p><b>TITLE</b> Post Implementation Review Procedure</p>	<p><b>Document Type:</b> Procedure</p>	<p><b>Page:</b> L-01-006 2 of 3</p>	<p>Attachment 1</p>
--	--	---	---------------------

Darlington:

Stress analysis to account for localized thinning near the Grayloc connection was performed on all 67 Type B feeders on each of the 4 Darlington units. According to the most recent revision of the Darlington Feeder Replacement Schedule NK38-CALC-33160-10044 R07, only 6 of the analyzed feeders are identified for replacement before the completion of two full outage cycles. Of the 268 analyzed feeders, 166 have been life-extended to beyond pressure tube EOL.

Project Costs Achievement:

The FSA project was completed on time and \$33K under the final approved budget of \$2,265K. A total of 355 feeders were analyzed as part of this project. This represents a FSA average cost per feeder of \$6.3K.

Summary of Economic Benefits:

Based on assumptions in the BCS, the financial savings resulting from successful stress analysis is estimated at \$0.8M per feeder extended to station or pressure tube EOL. The estimated cost savings at each station based on BCS assumptions are as follows:

- 1) Pickering A: 72 lead feeders extended to EOL represents a cost savings of \$57.6M
- 2) Pickering B: 4 lead feeders extended to EOL represents as cost savings of \$3.2M
- 3) Darlington: 166 feeders extended to EOL represents a cost savings of 132.8M

The total estimated savings is \$193.6M for all 242 feeders extended to EOL. These savings are conservative as there are additional critical outage path savings for feeder work no longer required.

Actual Feeder Replacement Costs:

The actual feeder replacement costs depend on several factors including: the total number of feeders planned for replacement during each outage and situational issues that arise during replacements such as high dose rates or tooling delays. Based on the existing contract for feeder replacements, actual costs range from \$2.2M to replace only 1 feeder per outage to \$0.8M when replacing 4 or more feeders per outage (costs are in 2010\$).

The following are actual feeder replacement contract costs data recorded in 2009 (Reference: Nuclear Supply Chain e-mail from M. Backx to T. Cartier dated 18-May-10):

Darlington - Three feeders were replaced during the D931 outage. The total cost for the work completed was \$2.3M. This represents a replacement cost savings of \$0.76M per feeder extended to EOL. This cost savings per feeder is slightly lower than the BCS assumption.

Pickering - During the P941 outage 4 feeder replacements were scheduled, however only 3 were actually replaced. The total cost for the work completed was \$3.66M. This represents a replacement cost savings of \$1.22M per feeder extended to EOL. This cost savings is slightly higher than the BCS assumption. (i.e. OPG could potentially save more than the estimated \$193.6M)

<b>TITLE</b> <b>Post Implementation Review Procedure</b>	<b>Document Type: Procedure</b>	<b>Page:</b> <b>3 of 3</b>
---	---------------------------------	-------------------------------

<p>2) CNSC was satisfied with submissions (dealing with justification and disposition of feeder stress analysis related issues).</p>	<p>The CNSC was satisfied with all submissions related to the FSA project. The list of submissions can be found in COG-JP-3184-V33 R01, Appendix A, B and C.</p> <p>The documented feeder component dispositions were:</p> <ol style="list-style-type: none"> <li>1) 156 Pickering A lead feeders, NA44-EVAL-33126-00001 R02 and NA44-EVAL-33126-00002 R01, (accepted by the CNSC on 26-OCT-09).</li> <li>2) 5 Pickering B lead feeders, NK30-EVAL-33126-00006 R01 and NK30-EVAL-33126-00006 R02, (accepted by CNSC on 17-JUL-07 and 01-SEP-09 respectively).</li> <li>3) 67 Type B Darlington feeders, NK38-EVAL-33160-10009 R01, (accepted by CNSC on 21-SEP-07).</li> </ol>
--	--

<b>QUALITATIVE RESULTS</b>	
<p>OPG analytical expertise and intellectual assets/properties</p>	<p>OPG has gained considerable expertise in advanced feeder stress analysis for nuclear generating stations. Along with the development of this expertise, OPG has also gained intellectual assets through feeder model development, software validation, a feeder failure assessment, an update to the feeder pipe design specification and methodology for localized feeder thinning below pressure based requirements.</p>

<b>KEY LESSONS</b>	
	<p>To review lessons learned from the project refer to The Feeder Stress Analysis Lessons Learned Report: N-LLD-33160-10003 R00.</p>

\* Note: Three Project Change Request Authorization Forms (PCRAF) were approved to reduce the release amount of \$3700K to \$2265K (FSA-1 on 17-AUG-07, FSA-2 on 13-DEC-07, and CRA-62555-003 on 26-NOV-08)

Prepared by: Tyler Cartier Date: June 2/2010  
 Author

Reviewed by: Elton Tong Date: June 2/2010  
 Assignment Coach

Verified by: Ming Li Date: June 2/2010  
 Senior Engineer

Approved by: John McIntee Date: 6/24/10  
 Project Approval Authority Finance


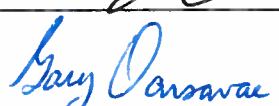

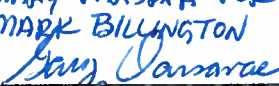








Approved by: Paul Spekkens Date: July 7, 2010  
 Project Approval Authority

**\*\*ATTACH BCS**



## POST IMPLEMENTATION REVIEW TEMPLATE (For Simplified PIRs only)

Station: WWMF	Project Name: Low Level Storage Building #11	Project No.: 10-60128	Units: L&ILW Site	Controlled Doc No.: 01098-PIR-79135-00003
------------------	---	--------------------------	----------------------	--

Routing	Location	Action	Signature	Date
G. Fritz Project Officer Design Projects	B21	Prepare		March 15, 2010
G. Varsava Section Manager Design Projects	B21	Review		17 MARCH 2010
D. Petteplace Manager Programming	B21	Review		10.03.17
M. Billington Manager Facility Projects	B21	Review	GARY VARSAVA FOR MARK BILLINGTON 	17 MARCH 2010
D. Jones Director L&ILW Operations	B21	Review	 DON JONES	MARCH 18, 2010
M. Arnone Director Projects and Modifications	P72	Review		18 March 2010
B. Tezazu Senior Advisor Investment Processes	TCH07B02	Review		26 March 2010
J. Hudson VP Nuclear Waste Management	B21	Review		06 Apr 2010
D. Power VP Corporate Investment Planning	TCH07G05	Review		April 9/10
W. Robbins Chief Nuclear Officer	P82P826A	Review		2010-04-14
D. Hanbidge SVP & Chief Financial Officer	TCH19F27	Approve		2010-04-26
T. Mitchell President & CEO	TCH19A24	Approve		2010-4-29

Approval	Cost	Date
Original Approval Estimate	\$8,378,000	June 2008
Approval Revision Estimate	N/A	N/A
Final Approval Estimate	\$8,378,000	June 2008
Final Actual Project Cost	\$7,936,570	November 2009

Timing	
Target Date	May 2009
Latest Approved i/s Date	May 2009
In Service Date	May 28, 2009
Period used to calculate Performance result	June 2009 to December 2009

DELIVERABLES	
Target	Achievement
LLSB#11 and CO <sub>2</sub> fire suppression system meet performance criteria as demonstrated by the accepted commissioning reports.	Performance criteria from Design Requirements, 01098-DR-79135-00005-R000, for the LLSB#11 building and 01098-71480-0002-R000, for the LLSB#11 CO <sub>2</sub> fire suppression system were successfully demonstrated through completion of the approved commissioning plan and supporting commissioning procedures. The commissioning report was accepted by the CNSC who granted approval to operate LLSB#11 on May 21, 2009.
Ensure stakeholder acceptance of LLSB#11 and CO <sub>2</sub> fire suppression system by the approval of the Available for Construction (AFC) package.	Stakeholder acceptance of LLSB#11 and CO <sub>2</sub> fire suppression system was achieved with the approval of the LLSB#11 building AFC package on July 29, 2008 and the CO <sub>2</sub> fire suppression system AFC package on October 16, 2008.
Meet required storage capacity needs by achieving the Approved to Operate date of May 2009.	Low Level Waste storage capacity at the WWMF L&ILW site was increased by 7000 m <sup>3</sup> and a new CO <sub>2</sub> fire suppression system in service to support LLSB#11 and up to 5 future storage buildings with an approved to operate date of May, 28 2009 (includes CNSC approval to operate and Engineering Change Control (ECC) Authorization to Operate (ATO)).

QUALITATIVE RESULTS	
System Status	LLSB#11 is currently in use and performing as designed and constructed to safely store low level waste at the WWMF L&ILW site.
Schedule/Finance	LLSB # 11 was available for in service on time and \$441,430 under final fund release.
Health and Safety	There were no lost time safety incidents.

KEY LESSONS	
Lessons Learned Report (01098-LLD-79135-00003)	Lessons learned from this project are documented in the lessons learned report that was prepared with input from A/E, OPG and Construction Contractor.

FOLLOW-UP ACTIONS	
NONE	

<b>TITLE</b> <b>Post Implementation Review Procedure</b>	<b>Document Type: Procedure</b>	<b>Page:</b> <b>3 of 3</b>
---	---------------------------------	-------------------------------


 Prepared by: G. Fritz  
 Author

*March 15, 2010*

Date:

  
 Reviewed by: D. Jones  
 Project Sponsor

*march 18, 2010*

Date:

  
 Approved by: D. Hanbidge  
 Project Approval Authority Finance

Date:

  
 Approved by: T. Mitchell  
 Project Approval Authority

*2010-4-29*

Date:

**\*\*ATTACH BCS**  
**(See attached 01098-BCS-79135-00003)**



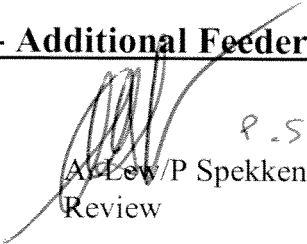
**Project Implementation Review**
**Project: Additional Feeder Cut and Weld Tooling 10-62567**


<u>Routing</u>	<u>Location</u>	<u>Action</u>	<u>Signature</u>	<u>Date</u>
J. Xiao Section Manager Feeder Cut & Weld Tooling Project	P82-6	prepare	See attached	
P. Spekkens Vice President Science & Technology	P82-6	submit	See attached	
R.C. Morrison VP Nuclear Engineering	P82-5	review	<i>R.C. Morrison</i>	24 Mar '10
John McIntee Controller, Engineering & Modifications	P82-3	review	<i>[Signature]</i>	MAR 12/10
Jamie Lawrie, Director Nuclear Investment	P82-3	review	<i>[Signature]</i>	Mar 19/10
Randy Leavitt VP Nuclear Finance	P82-3	review	<i>[Signature]</i>	Mar 25, 2010
Wayne Robbins CNO	P82-6	review	<i>[Signature]</i>	2010-03-29
D. Power VP Corporate Investment Planning	TCH07G05	review	<i>[Signature]</i>	April 13/10
Donn Hanbidge SVP & Chief Financial Officer	TCH19F27	approve	<i>[Signature]</i>	April 23/10
Tom Mitchell President & CEO	TCH19A24	approve	<i>[Signature]</i>	28 Apr 10
M. Chin Financial Analyst	P82-3	Return for distribution		



**Routing**

**PIR - Additional Feeder Cut & Weld Tooling**

1.  P.S.  
A. Lew/P Spekkens Feb 9, 2010  
Review
2. J. McIntee - P82-3F6 \_\_\_\_\_  
Approval (M. Chin)
3. T. Mitchell - TCH19A24 \_\_\_\_\_  
Approval
4. J. Xiao - P82-6B1

	Document Number: FIN-TMP-PA-002*	Revision: R02	Page: Attachment 3 1 of 2
	<b>POST IMPLEMENTATION REVIEW TEMPLATE</b> (For Simplified PIRs only)		

Station: DNGS, PNGS "A" and PNGS "B"	Project Name: Additional Feeder Cut & Weld Tooling	Project No.: 10-62567	Units: all	Controlled Doc No.: N-PIR-00120-10005-R000
--	--	--------------------------	---------------	---

Approval	Cost	Date
Original Approval Estimate	\$14,403K	13-JUL-07
Approval Revision Estimate	\$11,150K	8-NOV-07
*Final Approval Estimate	\$11,150K	8-NOV-07
Final Actual Project Cost	\$10,729K	25-NOV-09

Timing	
Target Date	15-JUN-09
Latest Approved i/s Date	15-SEP-09
In Service Date	31-MAY-09
Period used to calculate Performance result	JUL'07 to SEP'09

DELIVERABLES	
Target	Achievement
Perform feeder replacements on two reactor faces in parallel, with no project execution delays due to tooling shortage.	The first set of additional Build-To-Print tooling was placed in service on March 8, 2008, followed by the remaining two sets on December 31, 2008. Combined with the tooling existing before this project, altogether five sets of production tools and one set of training tools are now available between OPG and Bruce Power. Only one outage, P941, has occurred since all sets of tools were available for use. During this outage, three feeders were replaced, two on the east reactor face and one on the west. No work was conducted on both faces in parallel, but no project execution delays occurred as a result of tooling unavailability.
Have additional feeder cut weld tooling available for training or execution at two stations when outages for feeder replacements overlap (No delays in training or feeder replacements due to tooling at another station).	One set of training tools is now available, while five sets of production tools are available for field execution. There were no delays due to tooling unavailability during P941 Outage.

QUALITATIVE RESULTS	
External Technical Partnership	OPG has provided an excellent opportunity for external vendors to further develop technical knowledge in feeder tooling development. OPG now has two capable vendors, B&W and AECL, to support future tooling development needs.

\* SEE ATTACHED FOR EXPLANATIONS

<b>TITLE</b> Post Implementation Review Procedure	<b>Document</b> Procedure	<b>Page</b> Attachment 3 2 of 2
--	---------------------------	------------------------------------

KEY LESSONS	
<b>Areas for Improvement:</b> <i>Tooling</i>	<p>Issues with the original welders' fibre optic vision system were identified as part of a feeder replacement lessons learned review following the D611 outage. As a result, an improved CCD vision system was included with the new AROW welding tools; however it was not included in the project scope to upgrade the vision system of the existing tools. It is recommended that all original welding tools be upgraded to include the CCD vision system.</p> <p>During the P941 outage, the most recently approved version of the water handling tool could not be used in its appropriate configuration because the attached camera jammed inside the conduit tube. A previous configuration of the tool was ultimately used to complete the work. Performance of the tool should be monitored in future outages to determine what tooling configurations will be most effective for future feeder replacement work.</p>
<b>Economic Value:</b>	<p>As stated in the BCS, procurement of the three additional sets of Cut &amp; Weld tooling is expected to increase revenue over the next ten years by reducing outage duration. However, since approval of the BCS in 2007, OPG has significantly reduced the number of feeders to be replaced each year, thereby reducing the overall potential for revenue. In addition, new tooling related issues emerge at each outage making it difficult to directly compare outage duration. At this time it is difficult to confirm the validity of the economic calculations presented by the BCS. However, OPG now has the capability to plan for and execute parallel feeder replacements during future outages, which is expected to significantly reduce future outage times.</p>

Prepared by: John Xiao Date: Feb. 8, 2010  
 Author

Reviewed by: A. Lew/P. Spekkens Date: Feb 9, 2010  
 Project Sponsor

Approved by: Donn Hanbidge Date: \_\_\_\_\_  
 Project Approval Authority Finance

Approved by: Tom Mitchell Date: 28 Apr 2010  
 Project Approval Authority

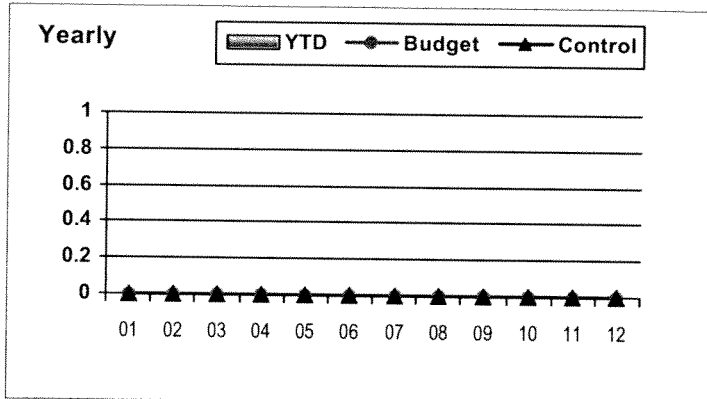
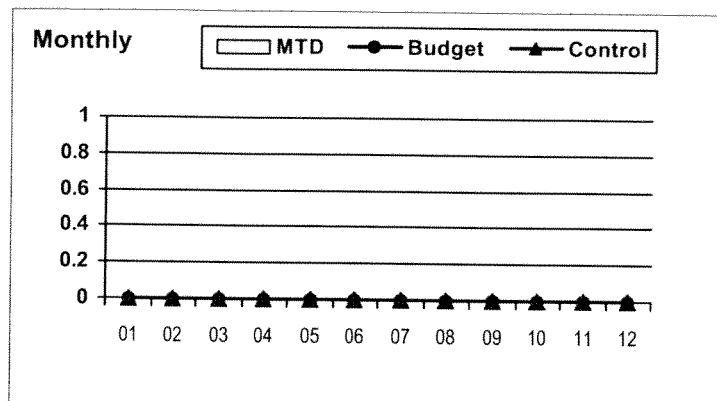
**\*\*ATTACH BCS**

## 62567: Additional Feeder Cut & Weld Tools

### Project Summary - Control Budget (K\$)

Week ending: Wednesday, Mar 3, 2010 (March 2010, week 1 of 5)

**ONTARIOPOWER**  
GENERATION



Week	MTD			YTD			Annual Budget		LTD	Release	%
Actual	Actual	C	Bdgt	Actual	C	Bdgt	Original	Control	Actual	Amt	spent

#### Costs by Resource Group

Labour	0	0	0	0	0	0	0	0	506		
Materials	0	0	0	0	0	0	0	0	2		
Purchased Services	0	0	0	0	0	0	0	0	9,913		
Travel	0	0	0	0	0	0	0	0	23		
Interest and Overhead	0	0	0	0	0	0	0	0	252		
Other	0	0	0	0	0	0	0	0	33		
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,729</b>	<b>15,763</b>	<b>68</b>

#### Costs by Organization

Engineering & Mods	0	0	0	0	0	0	0	0	10,589		
Nucl Programs & Training	0	0	0	0	0	0	0	0	57		
Projects & Modifications	0	0	0	0	0	0	0	0	83		
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>10,729</b>	<b>15,763 (1)</b>	<b>68</b>

Owning Organization= 1806: Feeder Integrity Project

Cost Category= Capital: Projects

Labour includes Regular, EPSCA, and overtime

Note: This report only includes the charges that have the appropriate Project # and associated Cost Category for this project. Charges that bear the correct project number but an incorrect Cost Category are excluded. Please refer to the exception reports to see if there are such charges and undertake corrections as necessary.

(1)

Without Contingency = 14,403

PCRAF = 3,253

\$11,150k

**Board Staff Interrogatory #007**

**Ref:** Ex.B1-T1-S1, Table 2

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

Please add two rows at the bottom of the table to show the amount of "Asset Retirement Costs/Nuclear Liabilities" that is included in line 1(Gross Plant at cost) and in line 2 (Accumulated Depreciation and amortization) amounts. Also show what was included for 2008 Board-approved and 2009 Board-approved.

**Response**

The attached Table 1 provides the requested rows for the average gross asset retirement costs and average accumulated depreciation related to gross asset retirement costs ("ARC") that are included in lines 1 and 2 of Ex. B1-T1-S1, Table 2 on an annual basis. These annual amounts are presented on an average basis (i.e., opening + closing balances for each year / 2) consistent with the approach to determining total rate base.

The OEB did not approve an average ARC amount for the full year 2008. Instead, the OEB approved the average ARC amount of \$1,227M for the period April 1, 2008 to December 31, 2008 (Payment Amounts Order, EB-2007-0905, Appendix A, Table 4b, note 6). For 2009, the OEB approved the average ARC amount of \$1,121M (Payment Amounts Order, EB-2007-0905, Appendix A, Table 5b, note 5). For the 2008 annual amount, OPG presented an average ARC balance of \$1,241.7M in Ex. L-2-55 in EB-2007-0905.

OPG notes that, per the methodology established by EB-2007-0905 for the recovery of the nuclear liabilities for prescribed facilities and as outlined in Ex. C2-T1-S2, the relevant amount in calculating the portion of nuclear facility rate base that attracts the weighted average accretion rate is determined as the lesser of the average net ARC and the average unfunded nuclear liability ("UNL"). The calculation of the lesser of ARC and UNL for each of the years 2008 - 2012 is presented, on an annual basis, in Ex. C2-T1-S2, Table 1, with the final result of the calculation shown in line 29 of that table.

Numbers may not add due to rounding.

Filed: 2010-08-12  
EB-2010-0008  
L-01-007  
Attachment 1

Table 1  
Prescribed Facility Rate Base - Nuclear, with Average Asset Retirement Costs Separated (\$M)

Line No.	Rate Base Item	Note	2007 Actual	2008 Actual	2009 Actual	2010 Budget	2011 Plan	2012 Plan
			(a)	(b)	(c)	(d)	(e)	(f)
1	<b>Gross Plant at Cost</b>		4,321.1	4,498.9	4,679.5	5,355.3	5,672.5	6,047.7
2	<b>Accumulated Depreciation and Amortization</b>		1,446.1	1,733.0	2,023.7	2,278.8	2,500.3	2,745.4
3	<b>Net Plant</b>		2,875.0	2,765.9	2,655.8	3,076.5	3,172.2	3,302.3
4	<b>Cash Working Capital</b>		16.0	15.9	14.3	9.2	4.0	4.0
5	<b>Fuel Inventory</b>		208.7	266.9	316.9	357.3	379.8	360.9
6	<b>Materials &amp; Supplies</b>		400.4	415.6	434.4	468.9	485.3	483.7
7	<b>Total</b>		3,500.1	3,464.2	3,421.4	3,912.0	4,041.3	4,150.8

Included in Lines 1, 2 & 3 above, respectively:

8	<b>Asset Retirement Costs</b>	1	2,327.0	2,327.0	2,327.0	2,802.1	2,802.1	2,802.1
9	<b>Accumulated Depreciation and Amortization</b>	1	911.6	1,043.3	1,167.2	1,245.6	1,278.8	1,312.0
10	<b>Net Asset Retirement Costs</b>	1	1,415.4	1,283.7	1,159.8	1,556.5	1,523.3	1,490.1

Notes:

- 1 The reclassification adjustment from non-ARC PPE to ARC noted in Ex. C2-T1-S2, Table 1, Note 7 impacted both 2007 opening and closing balances of ARC. As such, the actual average net ARC balance for 2007 presented above differs slightly from that presented by OPG in EB-2007-0905.

**Board Staff Interrogatory #008**

**Ref:** Ex. A2-T2-S1, Attachment 1, page 6

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

The 2010 – 2014 Business Plan (dated June 3, 2009) indicates that work is proceeding on the feasibility study to refurbish the Pickering B nuclear generating station. The evidence (Exh F2/Tab2/Sch3 p.3 ln 29) also states that further work was put on hold in 2009 pending the decision on whether or not to proceed with the refurbishment project, with the end result being OPG's decision to discontinue the project.

Please confirm the date on which OPG decided not to proceed with the refurbishment project. Why wasn't this consideration mentioned in the 2010 – 2014 Business Plan?

**Response**

The OPG Board of Directors decided not to refurbish Pickering B Generating Station on November 19, 2009; a decision which received the concurrence of the Minister of Energy on February 4, 2010 (ref: Ex. D2-T2-S1, Attachment 3).

The reference in the question is to the June 3, 2009 Corporate Business Planning Instructions. These instructions put on hold all work other than the Integrated Safety Review, pending the refurbishment decision which was expected later in the year.

**Board Staff Interrogatory #009**

**Ref:** Ex. B1-T1-S1, page 6

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

Please describe any initiatives OPG has undertaken since 2008 to improve (i.e. reduce) its working capital requirements. If such initiatives have been undertaken, please elaborate.

**Response**

As the nuclear working capital represents 98 per cent of the total working capital associated with the prescribed assets, the response focuses on initiatives related to nuclear fuel, and nuclear materials and supplies ("M&S"). OPG's strategies underlying its nuclear fuel supply program are discussed in detail in Ex. F2-T5-S1, and OPG does not repeat that information here.

With respect to M&S inventories, OPG's Nuclear Supply Chain implemented an Inventory Optimization Strategy in 2008. To date, Nuclear Supply Chain has advanced the implementation of a collaborative demand planning process, decreased stock-out rates, and improved inventory accuracy.

The Inventory Optimization Strategy is currently focused on five sub-initiatives:

- Continuous improvement in the collaborative demand planning process that better utilizes tools such as Passport to link all supply chain activities and processes.
- Implementing a program to define, identify and reduce excess/surplus inventory.
- Continue/accelerate the program to identify and write-off obsolete inventory.
- Implementing a "risk-informed" approach to establishing inventory service levels.
- Implementing a parts standardization program to reduce the number of catalogue IDs and eliminate/reduce the number of redundant items.

In addition, OPG Nuclear established an Inventory Review Board, which reports to OPG's Chief Nuclear Officer. This Board has representatives from Finance, Nuclear Supply Chain and the Site Business Support Directors. Monthly meetings are held to address emerging issues related to inventory and to address the root causes of these issues.



**Board Staff Interrogatory #010**

**Ref:** Ex. B1-T1-S1

**Issue Number:** 2.1

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

OPG as a publicly accountable enterprise for financial accounting reporting purposes will be required to adopt IFRS starting in 2011.

- a) Assuming all else remains the same, does OPG anticipate that reporting under IFRS will impact the recording of "actual " capital expenditures, including capitalization of overheads, and rate base as compared to the test period amounts presented in the evidence?
- b) Has OPG undertaken any reviews to estimate the impact of IFRS reporting in relation to capital assets including capitalization requirements?
- c) If yes to b) above, please provide the results of the reviews or studies and provide an estimate of the resulting differences between reporting under CGAAP and IFRS for the test period.

**Response**

a), b) and c)

OPG is not providing information regarding the impact of IFRS. OPG has filed its application on a Canadian GAAP basis, consistent with the filing guidelines. The OEB, in Procedural Order No. 3, rejected inclusion of the impacts of IFRS as an issue in the proceeding.

**AMPCO Interrogatory #002**

**Ref:** Ex. B1-T1-S1, Table 1 and Table 2

**Issue Number: 2.2**

**Issue:** Is OPG's proposal to include CWIP in rate base for the Darlington Refurbishment Project appropriate?

**Interrogatory**

With respect to projects closed to rate base in each year 2008 through 2012:

- a) Please identify those projects where the actual or forecast final cost is greater than the budget originally approved by the OPG Board of Directors.
- b) For each, please indicate OPG's view of how the provisions of O.Reg. 53/05 apply.

**Response**

- a) The OPG Board of Directors ("OPG Board") approves all projects with a total project cost greater than \$25M. There are no projects closing to rate base in 2008 through 2012 where the actual or forecast final cost is greater than the original OPG Board-approved project cost.
- b) Not applicable.

**AMPCO Interrogatory #003**

**Ref:** Ex. B3-T5-S, Table 1

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

- a) With respect to OPG's nuclear fuel inventory over the period 2007 through 2012, please indicate the average cost of uranium in each year.
- b) With respect to OPG's nuclear fuel inventory for 2008 through 2010, please indicate the amount included in rates and the amount approved by the Board.
- c) Please provide any benchmarking data OPG has with respect to the level of nuclear materials and supplies included in working capital.

**Response**

- a) Please see Table 1 below.

**Table 1**

<b>Year</b>	<b>Closing Balance – Fuel Inventory (Ex. B3-T5-S1) (\$M)</b>	<b>Average Cost of Uranium Concentrate in Closing Year Inventory (Cdn\$/lb U)</b>
2007	233.0	49.6
2008	300.7	59.4
2009	333.0	66.7
2010	381.7	76.0
2011	377.9	82.2
2012	343.8	77.4

- b) In its Decision and Payment Amounts Order in EB-2007-0905, the OEB accepted and approved OPG's proposed nuclear working capital forecast of \$705.4M for 2008 and \$771.8M for 2009, which included nuclear fuel inventory of \$281.1M and \$330.1M for 2008 and 2009, respectively. The nuclear fuel inventory amounts included in the working capital that underpin the current payment amounts are found in Table 8-1 on page 133 of the Decision. The payment amounts established in EB-2007-0905 continue into 2010.
- c) OPG has recently obtained a ScottMadden report ("2007 Utility Materials Management Benchmarks – Nuclear Generation") which indicates a median benchmark value for nuclear inventory of \$32.8k per MW.

**CCC Interrogatory #004**

**Ref:** Ex. B1-T1-S1 pages 6-7

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

The total working capital for OPG's nuclear facilities is forecast to be \$869.1 million in 2011 and \$848.5 million in 2012. What has OPG done or what is OPG currently doing to reduce nuclear working capital requirements. When, from OPG's perspective would it be appropriate to undertake a new lead-lag study?

**Response**

OPG's initiatives to reduce nuclear working capital are outlined in Ex. L-1-009.

From OPG's perspective, it would be appropriate to conduct a new lead/lag study as part of the proceeding to establish the base for incentive rates. See response in Ex. L-1-150.

**CCC Interrogatory #006**

**Ref:** Ex. D2-T2-S2

**Issue Number:** 2.2

**Issue:** Is OPG's proposal to include CWIP in rate base for the Darlington Refurbishment Project appropriate?

**Interrogatory**

- a) Please provide all materials, presentations and reports provided to OPG's Board of Directors in seeking approval to include the Darlington Refurbishment CWIP in rate base.
- b) When was the Decision made?
- c) Did OPG get specific approval to seek recovery of CWIP in rate base from its shareholder?
- d) If not why not?
- e) If so, please provide all correspondence related to that directive.

**Response**

- a) See the response to Interrogatory L-04-001 part (b) with respect to the requested provision of Board of Directors materials.
- b) The Construction Work in Progress ("CWIP") proposal is part of OPG's Application and was approved as part of the overall approval of the Application.
- c) OPG did not seek shareholder approval of its CWIP in rate base proposal.
- d) The appropriate level of approval for the CWIP in rate base proposal is the OPG Board of Directors.
- e) Not applicable.

**Energy Probe Interrogatory #005**

**Ref:** Ex. A1-T3-S1, page 5 of 9

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

The Prefiled Evidence indicates that the regulated hydro rate base decreases over the period 2007-2012 and that the rate base for nuclear facilities is expected to remain stable over the period 2010-2012.

Does OPG expect the rate bases to grow beyond 2012? If so, what is the expected growth rate?

**Response**

The specific growth rates for hydroelectric and nuclear rate base beyond 2012 will depend on events beyond the test period. The major factors currently apparent are:

- The growth rate of the regulated hydroelectric rate base will be affected by the addition of the Niagara Tunnel upon its completion and the completion of appropriate regulatory reviews and approvals.
- The growth rate of the nuclear rate base will depend on a number of factors related to planned operations and investments including:
  - The Continuing Operations initiative at Pickering B Generating Station, which will impact depreciation lives and investment levels.
  - Scope and pace of progress on Darlington Refurbishment.
  - Potential changes in nuclear asset retirement obligations.

**VECC Interrogatory #003**

**Ref:** Ex. B1-T1, page 3, Forecast Methodology

**Issue Number: 2.1**

**Issue:** What is the appropriate amount for rate base?

**Interrogatory**

For each year for which actual values are available, please provide the forecasted and actual rate bases for the regulated hydroelectric facilities and for the regulated nuclear fleet. Please provide variance explanations in all cases where there is a material difference between forecasted and actual rate base.

**Response**

Please see the response to Interrogatory L-1-002, which includes a comparison of forecasted (OEB approved) rate base to actual rate base for the years 2008 and 2009.

As indicated in that response, the variances in rate base for those years are not significant.

- The hydroelectric rate base variances are less than one per cent in each year.
- The nuclear rate base variance is in the one – two per cent range each year, and is a combination of small variances in net plant and fuel inventories.