

1 **SUPPORTING EVIDENCE FOR ENTRIES INTO**
2 **NUCLEAR ACCOUNTS**

3
4 **1.0 PURPOSE**

5 This evidence describes actual (2011) and projected (2012) expenditures used for the
6 calculation of entries into the Nuclear Development Variance Account, the portion of the
7 Capacity Refurbishment Variance Account related to nuclear facilities and the Nuclear Fuel
8 Cost Variance Account.

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10 **2.0 NUCLEAR DEVELOPMENT VARIANCE ACCOUNT**

11 The Nuclear Development Variance Account (“NDVA”) was established in accordance with
12 section 5.4 (1) of O. Reg. 53/05. The purpose of this account is to ensure that OPG recovers
13 the difference between actual non-capital costs incurred (including firm financial
14 commitments made) for planning and preparation for the development of proposed new
15 nuclear generation facilities and the amounts included in payment amounts for these
16 activities. The projected 2012 year-end balance in the NDVA is \$37.2M as shown in Ex. H1-
17 1-1, Table 1.

18
19 OPG did not include a forecast of non-capital costs or firm financial commitments for New
20 Nuclear at Darlington (“NND”) in its EB-2010-0008 test period revenue requirement. OPG’s
21 EB-2010-0008 evidence stated that if costs for planning and preparation for new nuclear
22 arose and no new cost recovery mechanism was developed by the Province, then OPG
23 intended to recover these costs through the NDVA (EB-2010-0008, Ex. D2-2-1, page 16).

24
25 OPG incurred non-capital costs in 2011 and 2012 related to planning and preparation
26 activities for the development of the proposed new nuclear facility. Actual 2011 expenditures
27 of \$17.3M and projected 2012 expenditures of \$32.1M total \$49.4M. These activities are part
28 of continuing initiatives to ensure readiness to construct new units following selection of a
29 preferred vendor consistent with the Minister’s Letter to OPG dated March 8, 2011
30 (Attachment 1). The Province’s intention to construct about 2,000 MW of new nuclear power
31 at the Darlington site is contained in the Long-Term Energy Plan released by the Province in
32 November 2010 and reaffirmed in the Minister’s letter.

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The projected year-end 2012 balance in the NDVA is \$37.2M. The difference between this amount and the actual /projected expenditures of \$49.4M reflects OPG’s recovery of \$10.7M of costs for new nuclear in payment amounts during the January-February 2011 “stub” period and an interest credit of \$1.5M (related to approved December 31, 2010 credit balances) as shown in Chart 1 below and in Ex. H1-1-1, Table 10.¹

CHART 1
Nuclear Development Variance Account

	Recovered in EB-2007-0905; EB-2010-0008 Payment Amounts			2011 Actual & 2012 Projected Expenditures			Variance for recovery in NDVA	Forecast expenditures in EB-2010-0008	Variance: 2011 Actual & 2012 Projected versus EB-2010-0008
	Jan - Feb 2011	Mar 2011 - Dec 2012	Total	Jan-Feb 2011	Mar 2011- Dec 2012	Total	Dec 31 2012	Total	Dec 31 2012
	(a)	(b)	(c)	(d)	(e)	(f)	(c) - (f)	(g)	(f) - (g)
Nuclear Development Variance Account	10.7	0.0	10.7	2.8	46.6	49.4	38.7	0.0	49.4
Interest							(1.5)		
Total							37.2		

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Key elements of the actual 2011 and projected 2012 planning and preparation work for NND include:

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- Preparation for and participation in a three-week Joint Review Panel public hearing in March 2011 regarding the NND Environmental Assessment (“EA”) and application for “Licence to Prepare Site”. The Panel’s report released on August 25, 2011 concluded the project will not result in any significant adverse environmental effects, provided the mitigation measures proposed and commitments made by OPG during the review and the Panel’s recommendations are implemented. In May 2012 the Federal Government responded to the recommendations of the Joint Review Panel and approved the EA.
- Ongoing work to address compliance and monitoring of the EA commitments made by OPG and the License to Prepare the Site recommendations as set out in the Joint

¹ The OEB-approved payment amounts in EB-2010-0008 became effective on March 1, 2011. The entries made to the NDVA for January and February of 2011 have been calculated with reference to the payment amounts approved in EB-2007-0905, which included forecast expenditures for new nuclear, in accordance with methodologies approved in EB-2009-0174.

1 Review Panel's report. In particular, the Joint Review Panel recommended that OPG
2 undertake a formal quantitative cost-benefit analysis for condenser cooling water
3 options, applying the principle of Best Available Technology Economically Achievable
4 ("BATEA"). OPG has retained an external engineering company to perform the BATEA
5 evaluation.

- 6 • Site readiness activities to ensure the NND initiative is well positioned to support site
7 turnover to the vendor. OPG's objective is to avoid delay by having the project site ready
8 to turn over to a vendor in 2013, should the procurement process be completed. The site
9 readiness activities include archeological investigations that were included in the
10 commitments made by OPG as part of the application for the Licence to Prepare the Site
11 and the termination of services (e.g., water, power) plus relocation of certain Darlington
12 facilities from the proposed site to minimize the future impact on the ongoing operations
13 at the existing Darlington station as well as the need for future OPG access into the
14 vendor-controlled site.
- 15 • Providing support as required for the Province's vendor procurement process. In June
16 2012, OPG signed Services Agreements with each of Westinghouse and SNC
17 Lavalin/Candu Energy Inc. to prepare detailed construction plans schedules and cost
18 estimates for two potential nuclear reactors at Darlington.
- 19 • Maintaining community and stakeholder involvement, which includes the stakeholder
20 consultation program required as part of the BATEA evaluation.

22 **3.0 CAPACITY REFURBISHMENT VARIANCE ACCOUNT**

23 The Capacity Refurbishment Variance Account ("CRVA") was established pursuant to O.
24 Reg.53/05, section 6(2)4 to record variances between the actual capital and non-capital
25 costs, and firm financial commitments incurred to increase the output of, refurbish or add
26 operating capacity to a prescribed generation facility and the amounts for these purposes
27 included in the approved payment amounts. The projected year-end 2012 balance for
28 recovery in this account related to the nuclear facilities is \$13.1M as shown in Ex. H1-2-1,
29 Table 2. Entries in this account for recovery include:

- 30 • Expenditures for Pickering B Refurbishment undertaken pursuant to a directive that OPG
31 received from the Province on June 16, 2006.

- 1 • Expenditures for the Pickering Continued Operations program, which increase the output
- 2 of the station.
- 3 • Expenditures for Darlington Refurbishment Project, which was undertaken pursuant to a
- 4 directive that OPG received from the Province on June 16, 2006.
- 5 • Expenditures for the Fuel Channel Life Cycle Management Project in support of Pickering
- 6 Continued Operations and the Darlington Refurbishment Project.

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 8 Chart 2 below compares actual 2011 and projected 2012 expenditures against EB-2010-
 9 0008 forecast expenditures for all four subcategories and reconciles against the amounts
 10 proposed to be recovered in the CRVA, as derived in Ex. H1-1-1, Table 12.
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CHART 2
Capacity Refurbishment Variance Account

	Recovered in EB-2007-0905; EB-2010-0008 Payment Amounts			2011 Actual & 2012 Projected Expenditures			Variance for recovery in CRVA	Forecast expenditures in EB-2010- 0008	Variance: 2011 Actual & 2012 Projected versus EB-2010-0008 Forecast
	Jan - Feb 2011	Mar 2011 - Dec 2012	Total	Jan-Feb 2011	Mar 2011- Dec 2012	Total	Dec 31 2012	Total	Dec 31 2012
	(a)	(b)	(c)	(d)	(e)	(f)	(c) - (f)	(g)	(f) - (g)
Capacity Refurbishment Variance Account									
Pickering B Refurbishment	0.9	0.0	0.9	0.0	0.0	0.0	(0.9)	0.0	0.0
Pickering Continued Operations	0.0	77.0	77.0	3.7	80.0	83.7	6.7	84.0	(0.3)
Darlington Refurbishment - Non Capital	3.6	9.5	13.1	0.7	7.3	8.0	(5.1)	10.4	(2.4)
Fuel Channel Life Management	0.0	10.8	10.8	0.6	22.5	23.1	12.3	11.7	11.4
Subtotal	4.5	97.3	101.8	5.0	109.8	114.8	13.0	106.1	8.7
Interest							0.1		
Total							13.1		

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 14 **3.1 Pickering B Refurbishment**

15 Pickering B Refurbishment represents a credit to ratepayers of \$0.9M in the CRVA account.
 16 There are no expenditures on Pickering B refurbishment during the 2011-2012 period as
 17 OPG is not pursuing this option. The (\$0.9M) credit is for the period up to February 28, 2011
 18 and represents the amount OPG received for Pickering B refurbishment through the EB-
 19 2007-0905 payment amounts. The entries have been calculated with reference to these
 20 payment amounts in accordance with methodologies approved in EB-2009-0174.

1 **3.2 Pickering Continued Operations**

2 Pickering Continued Operations represents \$6.7M to be recovered in the CRVA account. As
3 described in evidence in EB-2010-0008, the objective of Pickering Continued Operations is
4 to achieve a short-term extension to the operating life of Pickering Units 5-8 for a further four
5 calendar years beyond their originally-assumed end of life. In its decision in EB-2010-0008,
6 the OEB approved \$84.1M in costs during the 2011/2012 test period and determined that
7 variances between budgeted and actual expenditures should be tracked through the
8 Capacity Refurbishment Variance Account.

9

10 Actual Pickering Continued Operations expenditures (exclusive of amounts allocated from
11 the Fuel Channel Lifecycle Management Project described below) in 2011 amounted to
12 \$40.9M, compared with the OEB-approved amount of \$45.7M. For 2012, actual/projected
13 expenditures are \$42.8M compared to the OEB-approved amount of \$38.3M. The combined
14 variance is a credit of \$0.3M.

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16 The lower actual 2011 expenditures compared to OEB-approved expenditures reflects cost
17 savings mainly associated with fuel channel inspections, deferral of some work, for example,
18 Unit 8 stator clean, and a reduction in scope of certain programs, for example Unit 6
19 enhanced water lancing.

20

21 For 2012, the increase of \$4.5M in projected expenditures compared to OEB-approved
22 amount is attributable to increased base and outage work for Pickering Continued
23 Operations including some deferred work from 2011.

24

25 As shown in Chart 2 above, OPG is seeking to recover \$6.7M from ratepayers in the CRVA
26 for Pickering Continued Operations, while having experienced only a slight credit variance of
27 (\$0.3M) between actual/projected 2011-2012 Pickering Continued Operations expenditures
28 and the forecast in EB-2010-0008. The reason that the amount sought for recovery is greater
29 than the variance in expenditures is that expenditures for Pickering Continued Operations
30 were forecast in EB-2010-0008 over a 24-month period, but the approved payment amounts

1 became effective on March 1, 2011 and thus only reflect expenditures for 22 of those 24
2 months.

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4 The entries made to the CRVA for January and February of 2011 have been calculated with
5 reference to the payment amounts approved in EB-2007-0905 in accordance with
6 methodologies approved in EB-2009-0174. These payment amounts did not include any
7 expenditures for Continued Operations, which had not yet been identified as the go-forward
8 option in EB-2007-0905. Consequently, OPG is receiving \$77.0M (\$84.0M x 22/24) through
9 the EB-2010-0008 payment amounts, rather than the full \$84.0M budgeted in EB-2010-0008.
10 This \$7.0 M shortfall, as reduced by the (\$0.3M) variance, is the \$6.7M entry in the CRVA for
11 2011/2012.

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13 **3.3 Darlington Refurbishment Project**

14 The entries for the Darlington Refurbishment Project (“DRP”) - Non Capital represents a
15 credit to ratepayers of \$5.1M in the CRVA account. The project is primarily capitalized but
16 there are some OM&A expenditures equalling \$8.0M (\$2.6M actual in 2011 and \$5.4M
17 projected in 2012) related to provision of training as well as some OM&A costs related to
18 various facilities and infrastructure projects.

19

20 The variance between actual/projected 2011-2012 DRP – Non Capital expenditures and the
21 amounts forecast in EB-2010-0008 is (\$2.4M) as shown in Chart 2 above. The reasons for
22 this variance in 2011 and 2012 are provided in the paragraphs that follow.

23

24 The variance for 2011 is \$3.3M below the approved OEB amount of \$5.9M. This is primarily
25 due to the graduate engineer-in-training program ending earlier than expected as trainees
26 moved into regular full-time engineering positions, as well as lower demolition and removal
27 costs incurred during the year related to facility improvements required for Darlington
28 Refurbishment. As trainees move into their regular full-time engineering positions, their costs
29 are attributable to the work that they are performing; i.e., capitalized work for Darlington
30 Refurbishment planning.

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1 The projected variance for 2012 is \$0.9M above the approved OEB amount of \$4.5M. This is
2 primarily due to higher training costs than budgeted for additional nuclear operators (e.g.,
3 authorized nuclear officers-in-training) required to support Darlington Refurbishment because
4 during the execution phase, there will be a need for additional nuclear operators beyond
5 normal station requirements.

6
7 As shown in Chart 2 above, OPG is proposing to credit ratepayers \$5.1M in the CRVA for the
8 Darlington Refurbishment Project - Non Capital, while having experienced only a credit
9 variance of \$2.4M between actual/projected 2011-2012 Darlington Refurbishment Project -
10 Non Capital expenditures and the forecast in EB-2010-008. The reason that the amount
11 sought to be credited is greater than the credit variance in expenditures is that expenditures
12 were forecast in EB-2010-0008 over a 24-month period, but the approved payment amounts
13 became effective on March 1, 2011 and thus only reflect expenditures for 22 of those 24
14 months.

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16 The entries made to the CRVA for January and February of 2011 have been calculated with
17 reference to the amounts underpinning the payment amounts received by OPG approved in
18 EB-2007-0905 in accordance with methodologies approved in EB-2009-0174. These
19 payment amounts included expenditures for Darlington Refurbishment Project - Non Capital
20 that were higher than those included in the approved EB-2010-0008 forecast amounts.
21 Consequently, over the full 24 month period of 2011-2012 OPG received \$13.1M in payment
22 amounts, rather than the \$10.4M budgeted in EB-2010-0008. This (\$2.7 M) credit plus the
23 (\$2.4M) credit variance explained above, is the (\$5.1M) credit entry in the CRVA shown in
24 Chart 2 above.

25 26 **3.4 Fuel Channel Life Cycle Management Project**

27 The Fuel Channel Life Cycle Management ("FCLM") project represents \$12.3M be recovered
28 in the CRVA account. The FCLM project supports both the Pickering Continued Operations
29 and Darlington Refurbishment initiatives. This OPG-initiated industry effort is being
30 coordinated through the CANDU Owners Group, and is aimed at gaining greater certainty
31 around the remaining service lives of all CANDU units in Ontario. For Darlington, the work

1 will confirm that the refurbishment of Darlington can begin in 2016 and will not need to be
2 advanced. The work also supports the determination of high confidence that Pickering can
3 maintain fitness for service to 2020 end-of life. In December 2012, a high confidence
4 statement regarding the service lives of pressure tubes based on available research and
5 development (“R&D”) results Pickering and Darlington will be presented to the OPG Board of
6 Directors in order to make business decisions on the continued operations of Pickering and
7 the refurbishment of Darlington.

8
9 The 2011 variance is \$2.4M (actual 2011 FCLM expenditures were \$10.1M, compared with a
10 Board-approved amount of \$7.7M). The projected 2012 variance is \$9.0M (projected
11 expenditures are \$13.0M compared to a Board-approved amount of \$4.0M). The combined
12 2011/2012 variance is \$11.4M as shown in Chart 2 above.

13
14 The primary activities that account for the increased 2011 and 2012 expenditures are as
15 follows:

- 16 • R&D Integration: Following an internal review of the FCLM project in 2011, additional
17 costs were added to the FCLM project to increase oversight of the project to ensure its
18 success, and therefore the success of Pickering Continued Operations and Darlington
19 Refurbishment. Additional staff were deployed to develop and execute management
20 strategies, enhance the risk management process and facilitate improved integration and
21 alignment of the project within OPG and with the CNSC.
- 22 • Expanded R&D scope: In 2011 OPG and Bruce Power consulted with the CNSC to
23 qualify techniques for demonstrating the fitness-for-service of the pressure tubes related
24 to OPG’s initiatives to operate Pickering to 2020 and Darlington refurbishment. A protocol
25 agreement was formally documented and signed by the CNSC, Bruce Power and OPG.
26 The protocol agreement and subsequent CNSC documentation established the technical
27 deliverables required for submission to CNSC to establish pressure tube component
28 fitness-for-service for regulatory compliance. As a result, OPG incurred increased costs
29 in 2011 and 2012 directly related to work activities that reflected the expanded R&D
30 scope and well as obtaining third party review of technical submissions to the CNSC.

1 Additional work was also undertaken in 2012 in the areas of pressure tube fracture
2 toughness and annulus spacer material properties to validate assumptions and service
3 life projections.

4
5 The difference between the expenditure variance of \$11.4M and the amount to be recovered
6 in the CRVA of \$12.3M exists for the same reasons explained above in Section 3.1 and
7 Section 3.2 with respect to Pickering Continued Operations and Darlington Refurbishment.

8
9 **4.0 NUCLEAR FUEL COST VARIANCE ACCOUNT**

10 The projected 2012 year-end balance in the Nuclear Fuel Cost Variance Account is \$0.0M
11 (Ex. H1-1-1, Table 1). While there were transaction entries of \$5.8M to the account in
12 January and February 2011 and \$0.2M of interest, the zero balance reflects the fact that the
13 account is being terminated on December 31, 2012. The remaining balance of \$6.0M is
14 being transferred to the Nuclear Deferral and Variance Over/Under Recovery Variance
15 Account as shown at Ex. H1-1-1, Table 1c, line 19.

16
17 There is a minimal variance (less than \$300K) between actual nuclear fuel costs and EB-
18 2010-0008 forecast nuclear fuel costs for the period January-February 2011. However, as
19 EB-2010-0008 payment amounts did not become effective until March 2011, the \$5.8M
20 transaction entry in the account for the period January-February 2011 reflects the calculation
21 of a fuel cost rate variance as per EB-2009-0174 based on forecasts from EB-2007-0905
22 (see Ex. H1-1-1, Table 13).

LIST OF ATTACHMENTS

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Attachment 1: Minister's Letter from Brad Duguid, Minister of Energy to Honourable Jake Epp, OPG dated March 8, 2011 Re: Long Term Energy Plan as it relates to OPG.

Ministry of Energy

Office of the Minister

4th Floor, Hearst Block
900 Bay Street
Toronto ON M7A 2E1
Tel.: 416-327-6758
Fax: 416-327-6754

Ministère de l'Énergie

Bureau du ministre

4^e étage, édifice Hearst
900, rue Bay
Toronto ON M7A 2E1
Tél. : 416 327-6758
Télééc. : 416 327-6754



MAR 08 2011

MC-2010-5008

The Honourable Jake Epp
Chair
Ontario Power Generation
1900–700 University Avenue
Toronto ON M5G 1X6

Dear Mr. Epp

I am writing in regards to the government's recently released Long-Term Energy Plan (LTEP) as it relates to Ontario Power Generation.

Atikokan Generating Station Biomass Conversion

On August 26th, 2010, I directed the Ontario Power Authority to negotiate an "Atikokan Biomass Energy Supply Agreement" (ABESA) with OPG for the output from the Atikokan Generating Station once it has been converted from coal to biomass. I stated that the conclusion of the ABESA was contingent on a direction to OPG overriding paragraph A5 of the Memorandum of Agreement between the Crown and OPG dated August 17, 2005. This paragraph precludes OPG from pursuing any non-hydroelectric renewable generation projects.

The LTEP restated the government's desire to have the Atikokan Generating Station operating on biomass by the end of 2013. I would like this letter to serve as sufficient direction to OPG to enter into the agreements necessary to achieve this goal.

Thunder Bay Generating Station Natural Gas Conversion

As stated in the LTEP, the government would like both units at the Thunder Bay Generating Station converted from coal to natural gas by the end of 2014. Due to the lead times involved in natural gas conversion, I would request that OPG continue with definition phase work on the construction of the required natural gas infrastructure in advance of any directive on a revenue agreement for the output from the plant. This would include proceeding with the public environmental assessment on the pipeline.

I expect that OPG will work with the IESO to manage outages at the northwest thermal stations to ensure that system reliability is maintained while adhering to the schedules specified in this letter.

.../cont'd

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Nanticoke Generating Station Unit Closure

The LTEP also stated that Ontario will shut down two additional units at Nanticoke Generating Station before the end of 2011 as part of the government's continuing coal phase out strategy. I would like OPG to develop and implement a plan to place these units on stand-by in fall 2011 and have them shut down entirely by the end of 2011. Again, I expect that OPG will work closely with the IESO to manage the timing of these closures.

Nanticoke and Lambton Natural Gas Pipelines

Although the government has not yet made any decisions on the future of either the Lambton or Nanticoke Generating Stations after coal phase out, I would like OPG to continue with planning work on natural gas conversion in the event that converted station(s) are required for system reliability. This will include public consultations regarding pipeline routing and environmental reviews.

Refurbishment at the Darlington Nuclear Generating Station

The government is committed to continuing to use nuclear power to supply about 50 per cent of Ontario's energy supply. Achieving this goal will require the refurbishment of all existing units at OPG's Darlington Nuclear Generating Station. This refurbishment is key to the government's plan for modernizing the existing nuclear fleet. To this end, I encourage OPG to efficiently manage the refurbishment process in a transparent and cost-effective manner.

New Nuclear Construction

The LTEP restated the government's intention to construct about 2,000 MW of new nuclear power at the Darlington site. Due to the lead times involved in nuclear procurement and construction it is essential for OPG to continue with the environmental assessment and site licensing process currently underway to ensure that we are ready to construct the new units following selection of a preferred vendor.

I look forward to working closely with OPG as we phase out coal generation in Ontario, re-power some existing generating assets with clean fuels, and expand our supply of safe and reliable nuclear power. Thank you for your attention to these matters.

Sincerely,

Original signed by:

Brad Duguid
Minister