

UNDERTAKING J21.1

Undertaking

To update Table 1 from J14.1 to the forecast OPG requests the OEB to rely on in setting rates and the associated rate base continuities.

Response

OPG does not propose to update its capital in-service forecast for the IR Term from the pre-filed evidence to reflect the impact of actual 2016 capital in-service amounts. Rather, OPG is requesting that the OEB approve nuclear rate base values for 2017-2021 as set out in Ex. A1-2-2, p. 1 (updated on March 8, 2017) and Ex. N2-1-1, p. 5 and detailed at Ex. N2-1-1, Table 1, line 4. These values represent OPG's forecasts in the pre-filed evidence based on OPG's 2016-2018 Business Plan, as updated for two material changes: 1) the removal of the 2017-2021 forecast Heavy Water Storage and Drum Handling Facility ("D2O Project") in service additions (Ex. N2-1-1); and (2) the inclusion of the projected year-end 2016 asset retirement cost adjustment arising from the 2017 ONFA Reference Plan update (Ex N1-1-1). Attachment 1 provides a set of supporting tables, including gross plant and accumulated depreciation and amortization expense continuities, for the proposed net plant rate base inclusive of the above updates. These tables correspond to pre-filed Ex. B3-1-1 Table 1, Ex. B3-3-1 Tables 1 and 2, and Ex. B3-4-1 Tables 1 and 2. No update is required to the pre-filed Nuclear Operations capital in-service table (Ex. D2-1-3 Table 4).

This undertaking follows an exchange with the OPG witnesses at Tr. Vol. 21, p. 3, line 14 to p. 8, line 5 regarding the impact of the actual 2016 capital in-service amount on the proposed nuclear rate base for the IR Term. As discussed during that exchange and further in Ex. J20.11, potential updating for actual 2016 in-service amounts would also require consideration of changes in the forecast in-service amounts over the full six-year period (2016-2021), including those due to project in-service dates moving across years.

To confirm the reasonableness of maintaining the proposed rate base values without an update in light of the 2016 actual in-service additions, in Attachment 2, OPG provides a current best-efforts view of 2017-2021 Nuclear Operations and Support Services capital in-service amounts (Att. 2, Tables 1 and 2) and corresponding net plant rate base values (Att. 2, Table 3), including the effect of 2016 actuals.^{1,2} Attachment 2, Table 2

¹ As ratepayers are held whole with respect to variances in in-service timing and amount for the Darlington Refurbishment Program ("DRP") through the Capacity Refurbishment Variance Account, Attachment 2 continues to reflect DRP in-service amounts per the pre-filed evidence, adjusted for the removal of the 2017-2021 forecast in-service additions for the D2O Project.

1 corresponds to Ex. J14.1, Table 1. This view is based on the 2017-2019 Business Plan,
2 adjusted to account for 2016 actuals and subsequent changes in timing of in-service
3 amounts over the 2016-2021 period. The total Nuclear Operations and Support
4 Services in-service amounts in this view are \$2,009M over the 2016-2021 period (Att. 2,
5 Table 1), substantially unchanged from the total of \$2,008M reflected in the requested
6 rate base (Ex. B1-1-1, Chart 1). On average, the resulting rate base values over the IR
7 Term would be approximately \$30M lower than requested, reflecting shifts in in-service
8 timing. On the other hand, annual depreciation expense (excluding asset retirement
9 costs) would be approximately \$8M higher than requested, on average, reflecting
10 changes in the anticipated project mix across the nuclear facilities. Attachment 2,
11 Tables 4-7 provide supporting gross plant and accumulated depreciation and
12 amortization continuities for this view.

13
14 In OPG's opinion, the current view of capital in-service amounts demonstrates that the
15 requested nuclear rate base remains reasonable.

² This view also reflects the actual year-end 2016 asset retirement cost adjustment resulting from the 2017 ONFA Reference Plan update, and associated 2017-2021 annual depreciation expense impacts. The revenue requirement impacts of this adjustment are captured in Ex. J21.2.

Numbers may not add due to rounding.

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Attachment 1

Table 1

Table 1
(Ex. B3-1-1 Table 1 Updated for Ex. N1-1-1 and Ex. N2-1-1)
Prescribed Facility Rate Base - Nuclear (\$M)
Years Ending December 31, 2013 to 2021

Line No.	Prescribed Facility	2013 Actual			2014 Actual			2015 Actual		
		Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1	Darlington NGS	801.9	294.8	507.1	870.5	326.9	543.6	939.1	359.6	579.5
2	Darlington Refurbishment Program	61.3	1.1	60.2	125.9	4.7	121.2	203.1	10.5	192.6
3	Pickering NGS	2,008.1	1,145.8	862.3	2,094.3	1,279.0	815.3	2,170.9	1,422.5	748.4
4	Nuclear Support Divisions ¹	332.1	228.1	104.1	354.2	255.6	98.5	369.3	282.6	86.8
5	Nuclear - Excluding Asset Retirement Costs	3,203.5	1,669.9	1,533.6	3,444.8	1,866.2	1,578.7	3,682.5	2,075.1	1,607.4
6	Asset Retirement Costs	2,839.2	1,369.0	1,470.2	2,839.2	1,449.7	1,389.4	2,839.2	1,530.5	1,308.7
7	Total	6,042.7	3,038.9	3,003.8	6,284.0	3,315.9	2,968.1	6,521.7	3,605.6	2,916.1

Line No.	Prescribed Facility	2016 Budget			2017 Plan			2018 Plan		
		Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
8	Darlington NGS	1,190.5	393.7	796.7	1,461.3	434.2	1,027.1	1,724.6	482.0	1,242.6
9	Darlington Refurbishment Program ²	440.1	21.0	419.1	649.4	37.6	611.9	658.1	56.6	601.5
10	Pickering NGS	2,299.1	1,578.6	720.5	2,439.5	1,761.4	678.1	2,525.6	1,972.9	552.7
11	Nuclear Support Divisions ¹	389.8	309.2	80.6	411.3	336.0	75.3	427.0	361.3	65.7
12	Nuclear - Excluding Asset Retirement Costs	4,319.5	2,302.6	2,016.9	4,961.5	2,569.1	2,392.4	5,335.3	2,872.9	2,462.4
13	Asset Retirement Costs ³	2,421.7	1,596.0	825.7	2,183.7	1,659.8	524.0	2,183.7	1,737.0	446.7
14	Total ⁴	6,741.2	3,898.5	2,842.6	7,145.2	4,228.9	2,916.4	7,519.1	4,609.9	2,909.2

Line No.	Prescribed Facility	2019 Plan			2020 Plan			2021 Plan		
		Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
15	Darlington NGS	1,964.6	536.1	1,428.5	2,220.3	595.9	1,624.3	2,438.8	661.8	1,777.0
16	Darlington Refurbishment Program ²	662.5	75.9	586.7	4,858.8	159.8	4,699.1	5,472.0	317.5	5,154.5
17	Pickering NGS	2,562.3	2,197.8	364.4	2,569.8	2,427.8	142.0	2,602.3	2,571.0	31.4
18	Nuclear Support Divisions ¹	439.1	383.4	55.7	450.8	403.2	47.6	462.7	422.8	40.0
19	Nuclear - Excluding Asset Retirement Costs	5,628.5	3,193.3	2,435.3	10,099.7	3,586.7	6,513.0	10,975.9	3,973.1	7,002.9
20	Asset Retirement Costs ³	2,183.7	1,814.3	369.5	2,183.7	1,891.6	292.2	2,183.7	1,934.2	249.6
21	Total ⁴	7,812.3	5,007.6	2,804.8	12,283.4	5,478.3	6,805.2	13,159.7	5,907.2	7,252.5

Notes:

- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- Net plant values for Darlington Refurbishment Program for 2017-2021 are per Ex. N2-1-1, Chart 3.
- Net plant values for asset retirement costs for 2017-2021 are per Ex. N1-1-1, Attachment 1, Table 3, line 26.
- Total net plant values for 2017-2021 are per Ex. N2-1-1, Attachment 1, Table 1, line 1.

Numbers may not add due to rounding.

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Attachment 1

Table 2

Table 2
(Ex. B3-3-1 Table 1 Updated for Ex. N1-1-1 and N2-1-1)
Continuity of Gross Property, Plant and Equipment - Nuclear (\$M)
Years Ending December 31, 2013 to 2016

Line No.	Prescribed Facility	Opening Balance	In-Service Additions	Retirements, Transfers & Adjustments	(b)+(c) Net Change	(a)+(d) Closing Balance	(a+e)/2 Gross Plant Rate Base Amount
		(a)	(b)	(c)	(d)	(e)	(f)
	2013 Actual ¹ :						
1	Darlington NGS	759.6	83.4	1.2	84.6	844.2	801.9
2	Darlington Refurbishment Program ²	5.0	99.2	0.0	99.2	104.2	61.3
3	Pickering NGS	1,959.6	99.7	(2.6)	97.1	2,056.7	2,008.1
4	Nuclear Support Divisions ⁴	316.8	33.9	(3.2)	30.7	347.5	332.1
5	Nuclear - Excluding Asset Retirement Costs	3,041.0	316.1	(4.6)	311.5	3,352.5	3,203.5
6	Asset Retirement Costs	2,839.2	0.0	0.0	0.0	2,839.2	2,839.2
7	Total	5,880.2	316.1	(4.6)	311.5	6,191.7	6,042.7
	2014 Actual:						
8	Darlington NGS	844.2	52.6	(0.0)	52.5	896.7	870.5
9	Darlington Refurbishment Program ³	104.2	43.5	0.0	43.5	147.6	125.9
10	Pickering NGS	2,056.7	75.7	(0.5)	75.2	2,131.9	2,094.3
11	Nuclear Support Divisions ⁴	347.5	13.4	(0.0)	13.3	360.8	354.2
12	Nuclear - Excluding Asset Retirement Costs	3,352.5	185.1	(0.6)	184.6	3,537.1	3,444.8
13	Asset Retirement Costs	2,839.2	0.0	0.0	0.0	2,839.2	2,839.2
14	Total	6,191.7	185.1	(0.6)	184.6	6,376.3	6,284.0
	2015 Actual:						
15	Darlington NGS ⁵	896.7	117.4	4.1	121.5	1,018.3	939.1
16	Darlington Refurbishment Program ⁶	147.6	147.1	0.0	147.1	294.8	203.1
17	Pickering NGS	2,131.9	79.6	(1.6)	78.0	2,209.9	2,170.9
18	Nuclear Support Divisions ⁴	360.8	17.1	(0.1)	17.0	377.9	369.3
19	Nuclear - Excluding Asset Retirement Costs	3,537.1	361.2	2.5	363.7	3,900.8	3,682.5
20	Asset Retirement Costs ⁷	2,839.2	(417.5)	0.0	(417.5)	2,421.7	2,839.2
21	Total	6,376.3	(56.3)	2.5	(53.8)	6,322.4	6,521.7
	2016 Budget:						
22	Darlington NGS ⁸	1,018.3	305.1	0.0	305.1	1,323.4	1,190.5
23	Darlington Refurbishment Program ⁹	294.8	350.4	0.0	350.4	645.2	440.1
24	Pickering NGS	2,209.9	178.4	0.0	178.4	2,388.3	2,299.1
25	Nuclear Support Divisions ⁴	377.9	24.0	0.0	24.0	401.8	389.8
26	Nuclear - Excluding Asset Retirement Costs	3,900.8	857.9	0.0	857.9	4,758.7	4,319.5
27	Asset Retirement Costs ¹⁰	2,421.7	0.0	(237.9)	(237.9)	2,183.7	2,421.7
28	Total	6,322.4	857.9	(237.9)	620.0	6,942.4	6,741.2

Notes:

- 2013 Actual from EB-2013-0321 Ex. L-1.0-1, Staff-002, Att. 1, Table 2 for the corresponding rows and columns.
- As shown in EB-2013-0321 Ex. L-9.1-17, SEC-132, Att. 1, Table 12a, Table to Note 1, line 4a.
- As shown in EB-2014-0370 Ex. H-1-1-2, Table 12a, Table to Note 6, line 1b.
- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- Reflects in-service addition of \$55.1M for the Operations Support Building Refurbishment at the end of October 2015. This amount is assigned a two-month weighting in calculating the 2015 Gross Plant Rate Base amount.
- Reflects in-service addition of \$86.6M for the Darlington Refurbishment Program Office in mid September 2015. This amount is assigned a three and a half-month weighting in calculating the 2015 Gross Plant Rate Base amount.
- The change in asset retirement costs was recorded on December 31, 2015 (from Ex. C2-1-1 Table 2, line 24, col. (c)), therefore the Gross Plant Rate Base amount excludes the impact of this change.
- Reflects forecast in-service addition of \$94.2M for the Auxiliary Heating System in mid April 2016. (Ex. D2-1-3 Table 1, line 11, col. (k)). This amount is assigned an eight and a half-month weighting in calculating the 2016 Gross Plant Rate Base amount.
- Reflects forecast in-service additions of \$87.0M for the R&FR - Tooling for Removal Activities in mid May 2016, \$80.1M for the Containment Filtered Venting System in mid August 2016, and \$105.3M for the Third Emergency Power Generator in mid October 2016, as shown in Ex. D2-2-10 Table 2, col. (k) at line 2, line 10, and line 9, respectively. These amounts are assigned a seven and a half-month, a four and half-month and a two and a half-month weighting, respectively, in calculating the 2016 Gross Plant Rate Base amount.
- Reflects the projected decrease in asset retirement costs of \$(237.3M) recorded on December 31, 2016 as a result of the 2017 ONFA Reference Plan update (Ex. N1-1-1 Table 3, line 22). The 2016 Gross Plant Rate Base Amount excludes the impact of this change.

Numbers may not add due to rounding.

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Attachment 1

Table 3

Table 3
(Ex. B3-3-1 Table 2 Updated for Ex. N1-1-1 and Ex. N2-1-1)
Continuity of Property, Plant and Equipment - Nuclear (\$M)
Years Ending December 31, 2017 to 2021

Line No.	Prescribed Facility	Gross Plant Opening Balance	In-Service Additions	Retirements, Transfers & Adjustments	(b)+(c) Net Change	(a)+(d) Closing Balance	(a+e)/2 Gross Plant Rate Base Amount
		(a)	(b)	(c)	(d)	(e)	(f)
	2017 Plan:						
1	Darlington NGS	1,323.4	275.8	0.0	275.8	1,599.2	1,461.3
2	Darlington Refurbishment Program	645.2	8.5	0.0	8.5	653.7	649.4
3	Pickering NGS	2,388.3	102.4	0.0	102.4	2,490.7	2,439.5
4	Nuclear Support Divisions ²	401.8	18.8	0.0	18.8	420.7	411.3
5	Nuclear - Excluding Asset Retirement Costs	4,758.7	405.6	0.0	405.6	5,164.3	4,961.5
6	Asset Retirement Costs	2,183.7	0.0	0.0	0.0	2,183.7	2,183.7
7	Total	6,942.4	405.6	0.0	405.6	7,348.0	7,145.2
	2018 Plan:						
8	Darlington NGS	1,599.2	250.8	0.0	250.8	1,850.0	1,724.6
9	Darlington Refurbishment Program	653.7	8.9	0.0	8.9	662.5	658.1
10	Pickering NGS	2,490.7	69.7	0.0	69.7	2,560.5	2,525.6
11	Nuclear Support Divisions ²	420.7	12.6	0.0	12.6	433.3	427.0
12	Nuclear - Excluding Asset Retirement Costs	5,164.3	342.1	0.0	342.1	5,506.4	5,335.3
13	Asset Retirement Costs	2,183.7	0.0	0.0	0.0	2,183.7	2,183.7
14	Total	7,348.0	342.1	0.0	342.1	7,690.1	7,519.1
	2019 Plan:						
15	Darlington NGS	1,850.0	229.2	0.0	229.2	2,079.2	1,964.6
16	Darlington Refurbishment Program	662.5	0.0	0.0	0.0	662.5	662.5
17	Pickering NGS	2,560.5	3.6	0.0	3.6	2,564.0	2,562.3
18	Nuclear Support Divisions ²	433.3	11.6	0.0	11.6	444.9	439.1
19	Nuclear - Excluding Asset Retirement Costs	5,506.4	244.3	0.0	244.3	5,750.7	5,628.5
20	Asset Retirement Costs	2,183.7	0.0	0.0	0.0	2,183.7	2,183.7
21	Total	7,690.1	244.3	0.0	244.3	7,934.5	7,812.3
	2020 Plan:						
22	Darlington NGS	2,079.2	282.0	0.0	282.0	2,361.3	2,220.3
23	Darlington Refurbishment Program ³	662.5	4,809.2	0.0	4,809.2	5,471.8	4,858.8
24	Pickering NGS ³	2,564.0	11.6	0.0	11.6	2,575.6	2,569.8
25	Nuclear Support Divisions ²	444.9	11.8	0.0	11.8	456.7	450.8
26	Nuclear - Excluding Asset Retirement Costs	5,750.7	5,114.7	0.0	5,114.7	10,865.4	10,099.7
27	Asset Retirement Costs	2,183.7	0.0	0.0	0.0	2,183.7	2,183.7
28	Total	7,934.5	5,114.7	0.0	5,114.7	13,049.1	12,283.4
	2021 Plan:						
29	Darlington NGS	2,361.3	155.1	0.0	155.1	2,516.4	2,438.8
30	Darlington Refurbishment Program	5,471.8	0.4	0.0	0.4	5,472.2	5,472.0
31	Pickering NGS ³	2,575.6	53.5	0.0	53.5	2,629.1	2,602.3
32	Nuclear Support Divisions ²	456.7	12.0	0.0	12.0	468.7	462.7
33	Nuclear - Excluding Asset Retirement Costs	10,865.4	221.1	0.0	221.1	11,086.4	10,975.9
34	Asset Retirement Costs	2,183.7	0.0	0.0	0.0	2,183.7	2,183.7
35	Total	13,049.1	221.1	0.0	221.1	13,270.2	13,159.7

Notes:

- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- Reflects forecast in-service addition of \$4,777.7M for the return to service of the refurbished Darlington Unit 2 in mid February 2020 (included in amount at Ex. D2-2-10 Table 2, line 1, col. (o)). This amount is assigned a ten and a half-month weighting in calculating the 2020 Gross Plant Rate Base amount.
- The closing net plant balance for Pickering NGS in 2020 and 2021 reflects minor fixed assets (e.g., portable equipment) assumed to be transferrable to support other parts of OPG's regulated operations.

Numbers may not add due to rounding.

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Attachment 1
Table 4

Table 4
(Ex. B3-4-1 Table 1)
Continuity of Accumulated Depreciation and Amortization - Nuclear (\$M)
Years Ending December 31, 2013 to 2016

Line No.	Prescribed Facility	Opening Balance	Depreciation and Amortization	Retirements, Transfers & Adjustments	(a)+(b)+(c) Closing Balance	(a+d)/2 Accumulated Depreciation and Amortization Rate Base Amount
		(a)	(b)	(c)	(d)	(e)
	2013 Actual¹:					
1	Darlington NGS	279.8	32.3	(2.2)	309.9	294.8
2	Darlington Refurbishment Program ²	0.0	2.3	0.0	2.3	1.1
3	Pickering NGS	1,082.9	127.5	(1.7)	1,208.7	1,145.8
4	Nuclear Support Divisions ³	214.2	27.3	0.4	241.9	228.1
5	Nuclear - Excluding Asset Retirement Costs	1,576.9	189.4	(3.5)	1,762.8	1,669.9
6	Asset Retirement Costs	1,328.6	80.7	0.0	1,409.4	1,369.0
7	Total	2,905.6	270.1	(3.5)	3,172.2	3,038.9
	2014 Actual:					
8	Darlington NGS	309.9	34.0	(0.0)	343.8	326.9
9	Darlington Refurbishment Program ⁴	2.3	4.7	0.0	7.0	4.7
10	Pickering NGS	1,208.7	140.9	(0.5)	1,349.2	1,279.0
11	Nuclear Support Divisions ³	241.9	27.4	(0.0)	269.3	255.6
12	Nuclear - Excluding Asset Retirement Costs	1,762.8	207.0	(0.5)	1,969.3	1,866.2
13	Asset Retirement Costs	1,409.4	80.7	0.0	1,490.1	1,449.7
14	Total	3,172.2	287.8	(0.5)	3,459.4	3,315.9
	2015 Actual:					
15	Darlington NGS	343.8	31.5	(0.0)	375.4	359.6
16	Darlington Refurbishment Program	7.0	7.0	0.0	14.0	10.5
17	Pickering NGS	1,349.2	147.3	(0.8)	1,495.8	1,422.5
18	Nuclear Support Divisions ³	269.3	26.6	(0.1)	295.8	282.6
19	Nuclear - Excluding Asset Retirement Costs	1,969.3	212.4	(0.9)	2,180.9	2,075.1
20	Asset Retirement Costs	1,490.1	80.7	0.0	1,570.8	1,530.5
21	Total	3,459.4	293.2	(0.9)	3,751.7	3,605.6

Notes:

- 2013 Actual from EB-2013-0321 Ex. L-1.0-1, Staff-002, Att. 1, Table 3.
- As shown in EB-2013-0321 Ex. L-9.1-17, SEC-132, Att. 1, Table 12a, Table to Note 1, line 5a.
- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- As shown in EB-2014-0370 Ex. H1-1-2, Table 12a, Table to Note 6, line 2b.

Numbers may not add due to rounding.

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Attachment 1
Table 5

Table 5
(Ex. B3-4-1 Table 2 Updated for Ex. N1-1-1 and Ex. N2-1-1)
Continuity of Accumulated Depreciation and Amortization - Nuclear (\$M)
Years Ending December 31, 2017 to 2021

Line No.	Prescribed Facility	Opening Balance	Depreciation and Amortization on Opening Balance	Depreciation and Amortization on In-Service Additions	Retirements, Transfers & Adjustments	(a)+(b)+(c)+(d) Closing Balance	(a+e)/2 Accumulated Depreciation and Amortization Rate Base Amount
		(a)	(b)	(c)	(d)	(e)	(f)
	2016 Budget:						
1	Darlington NGS	375.4	31.8	4.9	0.0	412.1	393.7
2	Darlington Refurbishment Program	14.0	9.6	4.5	0.0	28.1	21.0
3	Pickering NGS	1,495.8	146.4	19.3	0.0	1,661.4	1,578.6
4	Nuclear Support Divisions ¹	295.8	23.8	3.0	0.0	322.6	309.2
5	Nuclear - Excluding Asset Retirement Costs	2,180.9	211.7	31.7	0.0	2,424.2	2,302.6
6	Asset Retirement Costs	1,570.8	50.3	0.0	0.0	1,621.1	1,596.0
7	Total	3,751.7	261.9	31.7	0.0	4,045.4	3,898.5
	2017 Plan:						
8	Darlington NGS	412.1	39.9	4.3	0.0	456.4	434.2
9	Darlington Refurbishment Program	28.1	12.4	6.5	0.0	47.0	37.6
10	Pickering NGS	1,661.4	185.3	14.6	0.0	1,861.3	1,761.4
11	Nuclear Support Divisions ¹	322.6	24.3	2.4	0.0	349.3	336.0
12	Nuclear - Excluding Asset Retirement Costs	2,424.2	262.0	27.8	0.0	2,714.0	2,569.1
13	Asset Retirement Costs	1,621.1	77.3	0.0	0.0	1,698.4	1,659.8
14	Total	4,045.4	339.2	27.8	0.0	4,412.4	4,228.9
	2018 Plan:						
15	Darlington NGS	456.4	47.3	4.1	0.0	507.7	482.0
16	Darlington Refurbishment Program	47.0	19.1	0.1	0.0	66.2	56.6
17	Pickering NGS	1,861.3	209.5	13.7	0.0	2,084.5	1,972.9
18	Nuclear Support Divisions ¹	349.3	22.5	1.6	0.0	373.4	361.3
19	Nuclear - Excluding Asset Retirement Costs	2,714.0	298.3	19.5	0.0	3,031.8	2,872.9
20	Asset Retirement Costs	1,698.4	77.3	0.0	0.0	1,775.7	1,737.0
21	Total	4,412.4	375.6	19.5	0.0	4,807.4	4,609.9
	2019 Plan:						
22	Darlington NGS	507.7	53.0	3.9	0.0	564.6	536.1
23	Darlington Refurbishment Program	66.2	19.3	0.0	0.0	85.6	75.9
24	Pickering NGS	2,084.5	226.2	0.4	0.0	2,311.2	2,197.8
25	Nuclear Support Divisions ¹	373.4	18.7	1.4	0.0	393.5	383.4
26	Nuclear - Excluding Asset Retirement Costs	3,031.8	317.3	5.7	0.0	3,354.8	3,193.3
27	Asset Retirement Costs	1,775.7	77.3	0.0	0.0	1,852.9	1,814.3
28	Total	4,807.4	394.5	5.7	0.0	5,207.7	5,007.6
	2020 Plan:						
29	Darlington NGS	564.6	58.6	4.1	0.0	627.3	595.9
30	Darlington Refurbishment Program	85.6	19.3	129.1	0.0	234.0	159.8
31	Pickering NGS	2,311.2	224.8	8.5	0.0	2,544.4	2,427.8
32	Nuclear Support Divisions ¹	393.5	17.3	2.2	0.0	413.0	403.2
33	Nuclear - Excluding Asset Retirement Costs	3,354.8	320.0	143.9	0.0	3,818.7	3,586.7
34	Asset Retirement Costs	1,852.9	77.3	0.0	0.0	1,930.2	1,891.6
35	Total	5,207.7	397.3	143.9	0.0	5,748.9	5,478.3
	2021 Plan:						
36	Darlington NGS	627.3	66.2	2.9	0.0	696.4	661.8
37	Darlington Refurbishment Program	234.0	166.9	0.0	0.0	400.9	317.5
38	Pickering NGS ²	2,544.4	2.3	50.8	0.0	2,597.5	2,571.0
39	Nuclear Support Divisions ¹	413.0	18.1	1.5	0.0	432.5	422.8
40	Nuclear - Excluding Asset Retirement Costs	3,818.7	253.5	55.3	0.0	4,127.4	3,973.1
41	Asset Retirement Costs	1,930.2	7.9	0.0	0.0	1,938.1	1,934.2
42	Total	5,748.9	261.4	55.3	0.0	6,065.6	5,907.2

Notes:

1 Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).

2 Pickering in-service additions (other than for minor fixed assets assumed to be transferrable to other parts of OPG's regulated operations) in 2021 are shown as fully depreciated in 2021, in line with the current December 31, 2020 end-of-life date for the stations, as discussed in Ex. F4-1-1 section 3.2.

Table 1
Forecast Nuclear In-Service Capital Additions
(Current View of Ex. B1-1-1 Chart 1)

	Actual 2016	2017	2018	2019	2020	2021
Nuclear Operations capital projects ¹	292.0	479.0	354.7	385.4	244.7	181.6
Darlington Refurbishment Program ²	350.4	8.5	8.9	0.0	4,809.2	0.4
Support Services capital projects entering rate base	8.9	29.8	17.4	7.7	4.7	3.2
Total nuclear in-service additions, excluding ARC	651.3	517.3	381.0	393.0	5,058.6	185.2

¹ Actual 2016 as shown in Ex. J14.1, Att. 1, Table 1, col. (e), line 17.

² As discussed in Ex. J21.1, footnote 1, for DRP, pre-filed in-service amounts are reflected for all years, excluding the D2O Project.

Numbers may not add due to rounding.

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Table 2

Table 2
(Current View of Ex. J14.1, Table 1)
Comparison of In-Service Capital Additions - Nuclear Operations (\$M)

Line No.	Business Unit	2013 Budget	(c)-(a) Change	2013 Actual	(g)-(c) Change	2014 OEB Approved	(g)-(e) Change	2014 Actual	(k)-(g) Change	2015 OEB Approved	(k)-(i) Change	2015 Actual
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
1	Darlington NGS	89.9	(10.0)	79.9	(48.8)	43.8	(12.8)	31.1	75.9	7.7	99.3	107.0
2	Pickering NGS	53.6	41.3	94.9	(26.2)	48.8	19.9	68.7	3.0	12.5	59.1	71.7
3	Nuclear Support Divisions ¹	17.4	10.2	27.6	(1.6)	6.4	19.6	26.0	(22.9)	0.7	2.4	3.1
4	Subtotal	160.8	41.6	202.4	(76.7)	99.1	26.7	125.7	56.0	20.9	160.9	181.8
5	Supplemental In-Service Forecast ²	0.0	0.0	0.0	0.0	37.9	(37.9)	0.0	0.0	99.1	(99.1)	0.0
6	Total Portfolio In-Service Forecast	160.8	41.6	202.4	(76.7)	137.0	(11.3)	125.7	56.0	120.0	61.7	181.8
7	Minor Fixed Assets	19.9	(9.7)	10.2	12.6	21.3	1.6	22.9	(0.5)	21.7	0.6	22.3
8	Total In-Service Capital Additions	180.7	31.9	212.6	(64.0)	158.3	(9.7)	148.6	55.5	141.7	62.4	204.1

Line No.	Business Unit	2015 Actual	(e)-(a) Change	2016 Budget	(e)-(c) Change	2016 Actual	(g)-(e) Change	2017 Plan	(i)-(g) Change	2018 Plan	(k)-(i) Change	2019 Plan
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
9	Darlington NGS	107.0	112.8	331.4	(111.6)	219.8	13.8	233.6	(15.2)	218.4	121.6	340.0
10	Pickering NGS	71.7	(23.8)	164.9	(117.0)	47.9	149.8	197.7	(147.2)	50.5	(40.8)	9.7
11	Nuclear Support Divisions ¹	3.1	(1.3)	17.1	(15.3)	1.8	19.8	21.6	19.3	40.9	(40.9)	0.0
12	Subtotal	181.8	87.7	513.4	(243.9)	269.5	183.5	453.0	(143.2)	309.8	40.0	349.8
13	Supplemental In-Service Forecast ²	0.0	0.0	(47.4)	47.4	0.0	0.0	0.0	0.0	24.9	0.0	16.6
14	Total Portfolio In-Service Forecast	181.8	87.7	466.0	(196.5)	269.5	183.5	453.0	(143.2)	334.7	40.0	366.3
15	Darlington New Fuel	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Minor Fixed Assets	22.3	0.2	31.0	(8.5)	22.5	3.5	26.0	(6.0)	20.0	(0.9)	19.1
17	Total In-Service Capital Additions	204.1	87.9	497.0	(205.0)	292.0	187.0	479.0	(149.2)	354.7	39.1	385.4

Line No.	Business Unit	2019 Plan	(c)-(a) Change	2020 Plan	(e)-(c) Change	2021 Plan
		(a)	(b)	(c)	(d)	(e)
18	Darlington NGS	340.0	(209.0)	131.0	(68.9)	62.1
19	Pickering NGS	9.7	(9.7)	0.0	0.0	0.0
20	Nuclear Support Divisions ¹	0.0	0.0	0.0	0.0	0.0
21	Subtotal	349.8	(218.8)	131.0	(68.9)	62.1
22	Supplemental In-Service Forecast ²	16.6	62.3	78.8	21.4	100.2
23	Total Portfolio In-Service Forecast	366.3	(156.5)	209.8	(47.5)	162.3
24	Darlington New Fuel	0.0	15.3	15.3	(15.3)	0.0
25	Minor Fixed Assets	19.1	0.4	19.5	(0.1)	19.3
26	Total In-Service Capital Additions	385.4	(140.7)	244.7	(63.0)	181.6

Notes:

1 Includes Engineering, Inspection and Maintenance Services, and Security & Emergency Services.

2 Supplemental forecast to reconcile BCS in-service estimates to final business plan (see Ex. D2-1-3, Section 4.0).

Numbers may not add due to rounding.

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Table 3

Table 3
(Current View of Ex. B3-1-1 Table 1)
Prescribed Facility Rate Base - Nuclear (\$M)
Years Ending December 31, 2013 to 2021

Line No.	Prescribed Facility	2013 Actual			2014 Actual			2015 Actual		
		Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1	Darlington NGS	801.9	294.8	507.1	870.5	326.9	543.6	939.1	359.6	579.5
2	Darlington Refurbishment Program	61.3	1.1	60.2	125.9	4.7	121.2	203.1	10.5	192.6
3	Pickering NGS	2,008.1	1,145.8	862.3	2,094.3	1,279.0	815.3	2,170.9	1,422.5	748.4
4	Nuclear Support Divisions ¹	332.1	228.1	104.1	354.2	255.6	98.5	369.3	282.6	86.8
5	Nuclear - Excluding Asset Retirement Costs	3,203.5	1,669.9	1,533.6	3,444.8	1,866.2	1,578.7	3,682.5	2,075.1	1,607.4
6	Asset Retirement Costs ²	2,839.2	1,369.0	1,470.2	2,839.2	1,449.7	1,389.4	2,839.2	1,530.5	1,308.7
7	Total	6,042.7	3,038.9	3,003.8	6,284.0	3,315.9	2,968.1	6,521.7	3,605.6	2,916.1

Line No.	Prescribed Facility	2016 Actual			2017 Plan			2018 Plan		
		Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
8	Darlington NGS	1,152.4	394.9	757.5	1,385.3	436.6	948.7	1,656.5	484.7	1,171.9
9	Darlington Refurbishment Program ³	440.1	21.0	419.1	649.4	37.6	611.9	658.1	56.6	601.5
10	Pickering NGS	2,235.2	1,570.7	664.5	2,367.0	1,736.7	630.3	2,522.5	1,941.6	581.0
11	Nuclear Support Divisions ¹	384.0	307.2	76.7	398.5	331.4	67.1	412.2	355.5	56.7
12	Nuclear - Excluding Asset Retirement Costs	4,211.7	2,293.9	1,917.9	4,800.2	2,542.3	2,258.0	5,249.4	2,838.3	2,411.1
13	Asset Retirement Costs ²	2,421.7	1,596.0	825.7	2,163.3	1,658.2	505.1	2,163.3	1,732.3	431.0
14	Total	6,633.4	3,889.8	2,743.5	6,963.5	4,200.4	2,763.1	7,412.7	4,570.6	2,842.1

Line No.	Prescribed Facility	2019 Plan			2020 Plan			2021 Plan		
		Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant	Gross Plant at Cost	Less: Accumulated Depreciation and Amortization	Net Plant
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
15	Darlington NGS	1,964.0	540.2	1,423.8	2,240.7	603.2	1,637.5	2,413.2	672.2	1,741.1
16	Darlington Refurbishment Program ³	662.5	75.9	586.7	4,858.8	159.8	4,699.1	5,472.0	317.5	5,154.5
17	Pickering NGS	2,587.6	2,178.5	409.1	2,622.7	2,445.5	177.2	2,657.5	2,605.1	52.5
18	Nuclear Support Divisions ¹	422.2	376.3	45.9	431.7	395.2	36.5	441.4	412.9	28.5
19	Nuclear - Excluding Asset Retirement Costs	5,636.4	3,171.0	2,465.5	10,153.9	3,603.7	6,550.2	10,984.2	4,007.6	6,976.6
20	Asset Retirement Costs ²	2,163.3	1,806.5	356.8	2,163.3	1,880.6	282.7	2,163.3	1,921.5	241.8
21	Total	7,799.7	4,977.4	2,822.3	12,317.2	5,484.3	6,832.9	13,147.5	5,929.1	7,218.4

Notes:

- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- Starting in 2017, updated to reflect the decrease in asset retirement costs of \$(258.3M) recorded on December 31, 2016 as a result of the 2017 ONFA Reference Plan update, and associated annual depreciation expense impacts.
- As discussed in Ex. J21.1, footnote 1, for DRP, pre-filed in-service amounts are reflected for all years, excluding D2O Project.

Numbers may not add due to rounding.

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Attachment 2

Table 4

Table 4
(Current View of Ex. B3-3-1 Table 1)
Continuity of Gross Property, Plant and Equipment - Nuclear (\$M)
Years Ending December 31, 2013 to 2016

Line No.	Prescribed Facility	Opening Balance	In-Service Additions	Retirements, Transfers & Adjustments	(b)+(c) Net Change	(a)+(d) Closing Balance	(a+e)/2 Gross Plant Rate Base Amount
		(a)	(b)	(c)	(d)	(e)	(f)
	2013 Actual¹:						
1	Darlington NGS	759.6	83.4	1.2	84.6	844.2	801.9
2	Darlington Refurbishment Program²	5.0	99.2	0.0	99.2	104.2	61.3
3	Pickering NGS	1,959.6	99.7	(2.6)	97.1	2,056.7	2,008.1
4	Nuclear Support Divisions⁴	316.8	33.9	(3.2)	30.7	347.5	332.1
5	Nuclear - Excluding Asset Retirement Costs	3,041.0	316.1	(4.6)	311.5	3,352.5	3,203.5
6	Asset Retirement Costs	2,839.2	0.0	0.0	0.0	2,839.2	2,839.2
7	Total	5,880.2	316.1	(4.6)	311.5	6,191.7	6,042.7
	2014 Actual:						
8	Darlington NGS	844.2	52.6	(0.0)	52.5	896.7	870.5
9	Darlington Refurbishment Program³	104.2	43.5	0.0	43.5	147.6	125.9
10	Pickering NGS	2,056.7	75.7	(0.5)	75.2	2,131.9	2,094.3
11	Nuclear Support Divisions⁴	347.5	13.4	(0.0)	13.3	360.8	354.2
12	Nuclear - Excluding Asset Retirement Costs	3,352.5	185.1	(0.6)	184.6	3,537.1	3,444.8
13	Asset Retirement Costs	2,839.2	0.0	0.0	0.0	2,839.2	2,839.2
14	Total	6,191.7	185.1	(0.6)	184.6	6,376.3	6,284.0
	2015 Actual:						
15	Darlington NGS⁵	896.7	117.4	4.1	121.5	1,018.3	939.1
16	Darlington Refurbishment Program⁶	147.6	147.1	0.0	147.1	294.8	203.1
17	Pickering NGS	2,131.9	79.6	(1.6)	78.0	2,209.9	2,170.9
18	Nuclear Support Divisions⁴	360.8	17.1	(0.1)	17.0	377.9	369.3
19	Nuclear - Excluding Asset Retirement Costs	3,537.1	361.2	2.5	363.7	3,900.8	3,682.5
20	Asset Retirement Costs⁷	2,839.2	(417.5)	0.0	(417.5)	2,421.7	2,839.2
21	Total	6,376.3	(56.3)	2.5	(53.8)	6,322.4	6,521.7
	2016 Actual:¹¹						
22	Darlington NGS⁸	1,018.3	228.1	(0.7)	227.5	1,245.8	1,152.4
23	Darlington Refurbishment Program^{9,10}	294.8	350.4	0.0	350.4	645.2	440.1
24	Pickering NGS	2,209.9	51.3	(0.6)	50.7	2,260.6	2,235.2
25	Nuclear Support Divisions⁴	377.9	15.8	(3.6)	12.2	390.1	384.0
26	Nuclear - Excluding Asset Retirement Costs	3,900.8	645.7	(4.9)	640.8	4,541.6	4,148.6
27	Asset Retirement Costs¹²	2,421.7	(258.3)	0.0	(258.3)	2,163.3	2,421.7
28	Total	6,322.4	387.3	(4.9)	382.4	6,704.9	6,570.2

Notes:

- 1 2013 Actual from EB-2013-0321 Ex. L-1.0-1, Staff-002, Att. 1, Table 2 for the corresponding rows and columns.
- 2 As shown in EB-2013-0321 Ex. L-9.1-17, SEC-132, Att. 1, Table 12a, Table to Note 1, line 4a.
- 3 As shown in EB-2014-0370 Ex. H-1-1-2, Table 12a, Table to Note 6, line 1b.
- 4 Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- 5 Reflects in-service addition of \$55.1M for the Operations Support Building Refurbishment at the end of October 2015. This amount is assigned a two-month weighting in calculating the 2015 Gross Plant Rate Base amount.
- 6 Reflects in-service addition of \$86.6M for the Darlington Refurbishment Program Office in mid September 2015. This amount is assigned a three and a half-month weighting in calculating the 2015 Gross Plant Rate Base amount.
- 7 The change in asset retirement costs was recorded on December 31, 2015 (from Ex. C2-1-1 Table 2, line 24, col. (c)), therefore the Gross Plant Rate Base amount excludes the impact of this change.
- 8 Reflects an in-service addition of \$68.8M for the Auxiliary Heating System in mid March 2016. This amount is assigned an nine and a half-month weighting in calculating the 2016 Gross Plant Rate Base amount.
- 9 As discussed in Ex. J21.1, footnote 1, for DRP, pre-filed in-service amounts are reflected for 2016 onwards, excluding D2O Project.
- 10 Reflects forecast in-service additions of \$87.0M for the R&FR - Tooling for Removal Activities in mid May 2016, \$80.1M for the Containment Filtered Venting System in mid August 2016, and \$105.3M for the Third Emergency Power Generator in mid October 2016, as shown in Ex. D2-2-10 Table 2, col. (k) at line 2, line 10, and line 9, respectively. These amounts are assigned a seven and a half-month, a four and half-month and a two and a half-month weighting, respectively, in calculating the 2016 Gross Plant Rate Base amount.
- 11 The difference between the sum of 2016 in-service additions in col. (b), lines 22, 24 and 25 and the sum of 2016 Nuclear Operations and Support Services in-service additions at Ex. J20.10, Attachment 1, Table 1 relates to self-correcting inter-period timing differences of the type described in Ex. L-2.1-1 Staff-007.
- 12 Reflects the decrease in asset retirement costs of \$(258.3M) recorded on December 31, 2016 as a result of the 2017 ONFA Reference Plan update.

Numbers may not add due to rounding.

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Attachment 2

Table 5

Table 5
(Current View of Ex. B3-3-1 Table 2)
Continuity of Property, Plant and Equipment - Nuclear (\$M)
Years Ending December 31, 2017 to 2021

Line No.	Prescribed Facility	Gross Plant Opening Balance	In-Service Additions	Retirements, Transfers & Adjustments	(b)+(c) Net Change	(a)+(d) Closing Balance	(a+e)/2 Gross Plant Rate Base Amount
		(a)	(b)	(c)	(d)	(e)	(f)
	2017 Plan:						
1	Darlington NGS	1,245.8	279.2	0.0	279.2	1,524.9	1,385.3
2	Darlington Refurbishment Program ¹	645.2	8.5	0.0	8.5	653.7	649.4
3	Pickering NGS	2,260.6	212.8	0.0	212.8	2,473.4	2,367.0
4	Nuclear Support Divisions ²	390.1	16.8	0.0	16.8	406.9	398.5
5	Nuclear - Excluding Asset Retirement Costs	4,541.6	517.3	0.0	517.3	5,058.9	4,800.2
6	Asset Retirement Costs ⁵	2,163.3	0.0	0.0	0.0	2,163.3	2,163.3
7	Total	6,704.9	517.3	0.0	517.3	7,222.2	6,963.5
	2018 Plan:						
8	Darlington NGS	1,524.9	263.2	0.0	263.2	1,788.2	1,656.5
9	Darlington Refurbishment Program ¹	653.7	8.9	0.0	8.9	662.5	658.1
10	Pickering NGS	2,473.4	98.4	0.0	98.4	2,571.7	2,522.5
11	Nuclear Support Divisions ²	406.9	10.5	0.0	10.5	417.5	412.2
12	Nuclear - Excluding Asset Retirement Costs	5,058.9	381.0	0.0	381.0	5,439.9	5,249.4
13	Asset Retirement Costs ⁵	2,163.3	0.0	0.0	0.0	2,163.3	2,163.3
14	Total	7,222.2	381.0	0.0	381.0	7,603.2	7,412.7
	2019 Plan:						
15	Darlington NGS	1,788.2	351.8	0.0	351.8	2,139.9	1,964.0
16	Darlington Refurbishment Program ¹	662.5	0.0	0.0	0.0	662.5	662.5
17	Pickering NGS	2,571.7	31.8	0.0	31.8	2,603.5	2,587.6
18	Nuclear Support Divisions ²	417.5	9.5	0.0	9.5	426.9	422.2
19	Nuclear - Excluding Asset Retirement Costs	5,439.9	393.0	0.0	393.0	5,832.9	5,636.4
20	Asset Retirement Costs ⁵	2,163.3	0.0	0.0	0.0	2,163.3	2,163.3
21	Total	7,603.2	393.0	0.0	393.0	7,996.3	7,799.7
	2020 Plan:						
22	Darlington NGS	2,139.9	201.5	0.0	201.5	2,341.4	2,240.7
23	Darlington Refurbishment Program ^{1,3}	662.5	4,809.2	0.0	4,809.2	5,471.8	4,858.8
24	Pickering NGS ⁴	2,603.5	38.3	0.0	38.3	2,641.8	2,622.7
25	Nuclear Support Divisions ²	426.9	9.6	0.0	9.6	436.5	431.7
26	Nuclear - Excluding Asset Retirement Costs	5,832.9	5,058.6	0.0	5,058.6	10,891.6	10,153.9
27	Asset Retirement Costs ⁵	2,163.3	0.0	0.0	0.0	2,163.3	2,163.3
28	Total	7,996.3	5,058.6	0.0	5,058.6	13,054.9	12,317.2
	2021 Plan:						
29	Darlington NGS	2,341.4	143.7	0.0	143.7	2,485.1	2,413.2
30	Darlington Refurbishment Program ¹	5,471.8	0.4	0.0	0.4	5,472.2	5,472.0
31	Pickering NGS ⁴	2,641.8	31.4	0.0	31.4	2,673.2	2,657.5
32	Nuclear Support Divisions ²	436.5	9.7	0.0	9.7	446.3	441.4
33	Nuclear - Excluding Asset Retirement Costs	10,891.6	185.2	0.0	185.2	11,076.8	10,984.2
34	Asset Retirement Costs ⁵	2,163.3	0.0	0.0	0.0	2,163.3	2,163.3
35	Total	13,054.9	185.2	0.0	185.2	13,240.1	13,147.5

Notes:

- As discussed in Ex. J21.1, footnote 1, for DRP, pre-filed in-service amounts are reflected for 2016 onwards, excluding D2O Project.
- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- Reflects forecast in-service addition of \$4,777.7M for the return to service of the refurbished Darlington Unit 2 in mid February 2020 (included in amount at Ex. D2-2-10 Table 2, line 1, col. (o)). This amount is assigned a ten and a half-month weighting in calculating the 2020 Gross Plant Rate Base amount.
- The closing net plant balance for Pickering NGS in 2020 and 2021 reflects minor fixed assets (e.g., portable equipment) assumed to be transferrable to support other parts of OPG's regulated operations.

Numbers may not add due to rounding.

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J21.1
Attachment 2
Table 6

Table 6
(Ex. B3-4-1 Table 1)
Continuity of Accumulated Depreciation and Amortization - Nuclear (\$M)
Years Ending December 31, 2013 to 2016

Line No.	Prescribed Facility	Opening Balance	Depreciation and Amortization	Retirements, Transfers & Adjustments	(a)+(b)+(c) Closing Balance	(a+d)/2 Accumulated Depreciation and Amortization Rate Base Amount
		(a)	(b)	(c)	(d)	(e)
	2013 Actual¹:					
1	Darlington NGS	279.8	32.3	(2.2)	309.9	294.8
2	Darlington Refurbishment Program ²	0.0	2.3	0.0	2.3	1.1
3	Pickering NGS	1,082.9	127.5	(1.7)	1,208.7	1,145.8
4	Nuclear Support Divisions ³	214.2	27.3	0.4	241.9	228.1
5	Nuclear - Excluding Asset Retirement Costs	1,576.9	189.4	(3.5)	1,762.8	1,669.9
6	Asset Retirement Costs	1,328.6	80.7	0.0	1,409.4	1,369.0
7	Total	2,905.6	270.1	(3.5)	3,172.2	3,038.9
	2014 Actual:					
8	Darlington NGS	309.9	34.0	(0.0)	343.8	326.9
9	Darlington Refurbishment Program ⁴	2.3	4.7	0.0	7.0	4.7
10	Pickering NGS	1,208.7	140.9	(0.5)	1,349.2	1,279.0
11	Nuclear Support Divisions ³	241.9	27.4	(0.0)	269.3	255.6
12	Nuclear - Excluding Asset Retirement Costs	1,762.8	207.0	(0.5)	1,969.3	1,866.2
13	Asset Retirement Costs	1,409.4	80.7	0.0	1,490.1	1,449.7
14	Total	3,172.2	287.8	(0.5)	3,459.4	3,315.9
	2015 Actual:					
15	Darlington NGS	343.8	31.5	(0.0)	375.4	359.6
16	Darlington Refurbishment Program	7.0	7.0	0.0	14.0	10.5
17	Pickering NGS	1,349.2	147.3	(0.8)	1,495.8	1,422.5
18	Nuclear Support Divisions ³	269.3	26.6	(0.1)	295.8	282.6
19	Nuclear - Excluding Asset Retirement Costs	1,969.3	212.4	(0.9)	2,180.9	2,075.1
20	Asset Retirement Costs	1,490.1	80.7	0.0	1,570.8	1,530.5
21	Total	3,459.4	293.2	(0.9)	3,751.7	3,605.6

Notes:

- 2013 Actual from EB-2013-0321 Ex. L-1.0-1, Staff-002, Att. 1, Table 3.
- As shown in EB-2013-0321 Ex. L-9.1-17, SEC-132, Att. 1, Table 12a, Table to Note 1, line 5a.
- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- As shown in EB-2014-0370 Ex. H1-1-2, Table 12a, Table to Note 6, line 2b.

Numbers may not add due to rounding.

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J21.1
Attachment 2
Table 7

Table 7
(Current View of Ex. B3-4-1 Table 2)
Continuity of Accumulated Depreciation and Amortization - Nuclear (\$M)
Years Ending December 31, 2017 to 2021

Line No.	Prescribed Facility	Opening Balance	Depreciation and Amortization ⁴	Retirements, Transfers & Adjustments	(a)+(b)+(c) Closing Balance	(a+d)/2 Accumulated Depreciation and Amortization Rate Base Amount
		(a)	(b)	(c)	(d)	(e)
	2016 Actual:					
1	Darlington NGS	375.4	39.3	(0.2)	414.5	394.9
2	Darlington Refurbishment Program ³	14.0	14.1	0.0	28.1	21.0
3	Pickering NGS	1,495.8	150.4	(0.5)	1,645.6	1,570.7
4	Nuclear Support Divisions ¹	295.8	24.6	(1.8)	318.6	307.2
5	Nuclear - Excluding Asset Retirement Costs	2,180.9	228.4	(2.5)	2,406.8	2,293.9
6	Asset Retirement Costs	1,570.8	50.3	0.0	1,621.1	1,596.0
7	Total	3,751.7	278.7	(2.5)	4,028.0	3,889.8
	2017 Plan:					
8	Darlington NGS	414.5	44.2	0.0	458.7	436.6
9	Darlington Refurbishment Program ³	28.1	18.9	0.0	47.0	37.6
10	Pickering NGS	1,645.6	182.0	0.0	1,827.7	1,736.7
11	Nuclear Support Divisions ¹	318.6	25.6	0.0	344.2	331.4
12	Nuclear - Excluding Asset Retirement Costs	2,406.8	270.8	0.0	2,677.7	2,542.3
13	Asset Retirement Costs ⁵	1,621.1	74.1	0.0	1,695.3	1,658.2
14	Total	4,028.0	345.0	0.0	4,372.9	4,200.4
	2018 Plan:					
15	Darlington NGS	458.7	51.9	0.0	510.6	484.7
16	Darlington Refurbishment Program ³	47.0	19.2	0.0	66.2	56.6
17	Pickering NGS	1,827.7	227.7	0.0	2,055.4	1,941.6
18	Nuclear Support Divisions ¹	344.2	22.5	0.0	366.7	355.5
19	Nuclear - Excluding Asset Retirement Costs	2,677.7	321.3	0.0	2,998.9	2,838.3
20	Asset Retirement Costs ⁵	1,695.3	74.1	0.0	1,769.4	1,732.3
21	Total	4,372.9	395.4	0.0	4,768.3	4,570.6
	2019 Plan:					
22	Darlington NGS	510.6	59.3	0.0	569.9	540.2
23	Darlington Refurbishment Program ³	66.2	19.3	0.0	85.6	75.9
24	Pickering NGS	2,055.4	246.2	0.0	2,301.6	2,178.5
25	Nuclear Support Divisions ¹	366.7	19.3	0.0	385.9	376.3
26	Nuclear - Excluding Asset Retirement Costs	2,998.9	344.0	0.0	3,343.0	3,171.0
27	Asset Retirement Costs ⁵	1,769.4	74.1	0.0	1,843.5	1,806.5
28	Total	4,768.3	418.2	0.0	5,186.5	4,977.4
	2020 Plan:					
29	Darlington NGS	569.9	66.7	0.0	636.6	603.2
30	Darlington Refurbishment Program ³	85.6	148.4	0.0	234.0	159.8
31	Pickering NGS	2,301.6	287.7	0.0	2,589.3	2,445.5
32	Nuclear Support Divisions ¹	385.9	18.5	0.0	404.5	395.2
33	Nuclear - Excluding Asset Retirement Costs	3,343.0	521.3	0.0	3,864.3	3,603.7
34	Asset Retirement Costs ⁵	1,843.5	74.1	0.0	1,917.7	1,880.6
35	Total	5,186.5	595.5	0.0	5,782.0	5,484.3
	2021 Plan:					
36	Darlington NGS	636.6	71.3	0.0	707.8	672.2
37	Darlington Refurbishment Program ³	234.0	166.9	0.0	400.9	317.5
38	Pickering NGS ²	2,589.3	31.5	0.0	2,620.8	2,605.1
39	Nuclear Support Divisions ¹	404.5	16.8	0.0	421.3	412.9
40	Nuclear - Excluding Asset Retirement Costs	3,864.4	286.5	0.0	4,150.9	4,007.6
41	Asset Retirement Costs ⁵	1,917.7	7.7	0.0	1,925.4	1,921.5
42	Total	5,782.0	294.2	0.0	6,076.2	5,929.1

Notes:

- Includes support divisions within nuclear accountable for providing specialized services (e.g. Nuclear Engineering, Inspection and Maintenance Services).
- Pickering in-service additions (other than for minor fixed assets assumed to be transferrable to other parts of OPG's regulated operations) in 2021 are shown as fully depreciated in 2021, in line with the current December 31, 2020 end-of-life date for the stations, as discussed in Ex. F4-1-1 section 3.2.
- As discussed in Ex. J21.1, footnote 1, for DRP, pre-filed in-service amounts are reflected for 2016 onwards, excluding D2O Project.
- On a best efforts basis, OPG has provided the depreciation forecast for opening gross plant and in-service additions on a combined basis.
- Reflects the impact of the decrease in asset retirement costs of \$(258.3M) recorded on December 31, 2016 as a result of the 2017 ONFA Reference Plan update.

UNDERTAKING J21.3

Undertaking

To explain \$3.1B differential between the ARO liability and the ONFA segregated funds balance at the end of 2016, and if any significant amount of it is the discount rate, to provide the calculation.

Response

Chart 1 below reconciles the noted 2016 year-end \$3.1B difference between OPG's nuclear asset retirement obligation ("ARO") balance of \$19.1B determined in accordance with US GAAP and the Ontario Nuclear Funds Agreement ("ONFA") Decommissioning Segregated Fund and Used Fuel Segregated Fund (collectively "segregated funds") fully funded balance of \$16.0B, as reflected in the company's 2016 audited consolidated financial statements.

As shown below, the difference in the discount rate used to calculate the nuclear ARO and the ONFA funding requirement accounts for approximately \$2.2B of the \$3.1B differential. The other two notable differences, discussed below, are nuclear liability expenditures that are not funded under the ONFA but included in the ARO, and the inclusion of future waste costs in the ONFA funding that are not recorded in the ARO until such wastes are produced. The calculation of the discount rate difference is provided in Attachment 1.

Chart 1
Reconciliation of 2016 Year-End ARO and ONFA Segregated Funds Balances

Line	Description	Billion \$
1	2016 year-end ARO balance	19.1
2	Liability for internally funded expenditures (i.e. not ONFA eligible)	<u>(2.2)</u>
3	ONFA funded portion of ARO balance	16.9
4	Discount rate difference	(2.2)
5	ONFA funding for future wastes not yet generated, which are not included in current ARO balance in accordance with US GAAP	1.0
6	Other	<u>0.3</u>
7	2016 year-end ONFA segregated funds balance	16.0

Internally Funded Expenditures

As noted at Ex. C2-1-2, p. 9, lines 7-10 and discussed by Mr. Mauti at Tr. Vol. 21, p. 75, line 7 to p. 79, line 2, the costs for used fuel management and L&ILW storage costs incurred during the stations' operating lives are not funded under the ONFA and cannot be drawn from the segregated funds. As these costs, referred to as internally funded,

1 are part of OPG's legal obligation for nuclear waste, they are included in the ARO and
2 are funded from OPG's operating cash flow. Therefore, these costs, which account for
3 approximately \$2.2B of the \$19.1B of the 2016 year-end ARO balance, are not included
4 in the ONFA segregated funds balance.
5

6 Discount Rate

7 OPG is required to use different discount rates to determine the ARO in accordance
8 with US GAAP and the funding requirement in accordance with the ONFA. As
9 discussed below, the ONFA discount rate is currently 5.15% while the ARO weighted
10 average discount rate is approximately 4.95%.¹ Once internally funded costs are
11 excluded, the discount rate difference accounts for approximately \$2.2B of the
12 difference between the ARO balance and the ONFA segregated fund balance at the
13 end of 2016, as calculated in Attachment 1. OPG has no discretion with respect to the
14 use of these discount rates.
15

16 The initial value and each subsequent revision to the ARO are known as tranches. As
17 noted at Ex. C2-1-1, p. 4, lines 21-26 and Ex. C2-1-2, p. 7, lines 26-28, in accordance
18 with US GAAP, each tranche is calculated using a discount rate determined at the time
19 of the revision and is not revalued for subsequent changes in the discount rate. As
20 discussed in Ex. L-8.2-1 Staff-207, each upward revision in the amount of undiscounted
21 estimated cash flows underlying the ARO is required to be calculated using a credit-
22 adjusted risk-free rate determined as of the date the revision. As discussed in Ex. N1-1-
23 1, p. 16, lines 11-18, downward revisions in the amount of undiscounted estimated cash
24 flows are required to be calculated using the weighted average discount rate of the
25 existing tranches. Following the year-end 2016 adjustment, OPG's nuclear ARO
26 consists of seven tranches, each with its own discount rate, as shown in Attachment 1.
27 The estimated weighted average discount rate of the seven tranches is approximately
28 4.95%.
29

30 The discount rate used to determine the ONFA funding requirement is determined in
31 accordance with the ONFA, at the time of each approved ONFA reference plan. As
32 explained by Mr. Mauti at Tr. Vol. 21, p. 77, line 3 to p. 77, line 12 and Tr. Vol. 21, p.
33 149, line 22 to p. 150, line 1, the ONFA discount rate is calculated as 3.25% real rate of
34 return prescribed by the ONFA plus the long-term change in the Ontario consumer price
35 index. The resulting rate stands at 5.15% per the current approved ONFA reference
36 plan and establishes the long-term target rate of return on the ONFA segregated funds.
37

38 Future Waste Volume

39 The ARO balance represents the present value of the obligation for nuclear facilities
40 decommissioning and interim storage and long-term management of nuclear wastes
41 generated to date (in this case, to the end of 2016). As noted at Ex. C2-1-1, p. 4, lines

¹ The difference between the ARO discount rate and the ONFA discount rate were explored in previous OPG proceedings (for example, see EB-2012-0002 Ex. L-1-7 SEC-12).

1 6-12 and Ex. C2-1-2, p. 7, lines 8-12, these are referred to as committed costs and
2 comprise the ARO liability in accordance with US GAAP.² Committed costs exclude
3 incremental variable costs associated with future wastes not yet generated. The ONFA
4 funding requirement accounts for the same obligation as the ARO, plus the estimated
5 cost of the long-term management of future nuclear wastes forecast over the remaining
6 life of OPG-owned nuclear generating stations, in line with assumptions in the approved
7 ONFA reference plan. The inclusion of future waste volume accounts for approximately
8 \$1B of the 2016 year-end ONFA segregated fund balance.

² As discussed in Ex. C2-1-1, sections 3.2.2 and 3.2.3 and Ex. C2-1-2, p. 8, lines 3-7, additional wastes generated over time give rise to incremental committed costs, which are recorded as increases to the ARO at that time. These costs are referred to variable used fuel and low and intermediate level waste management expenses, the forecasts for which are included in the 2017-2021 proposed revenue requirement as period costs, as they were in previous OPG payment amount proceedings.

CALCULATION OF DISCOUNT RATE DIFFERENCE BETWEEN ARO LIABILITY AND ONFA SEGREGATED FUNDS

[illegible]