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February 24, 2017

**VIA RESS AND COURIER**

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
P.O. Box 2319  
2300 Yonge Street, 27th Floor  
Toronto, ON M4P 1E4

Dear Ms. Walli:

**Re: EB-2016-0152 – Amended JT2.5**

Enclosed is an amended response to undertaking JT2.5 pursuant to the OEB's February 16, 2017 Decision and Order on Motion Filed by Environmental Defense. OPG has submitted this document through the Regulatory Electronic Submissions System and is providing fourteen (14) paper copies. This material will also be available on OPG's website at [www.opg.com](http://www.opg.com).

Yours truly,

*[Original signed by]*

Barbara Reuber

cc: John Beauchamp (OPG) via e-mail  
Charles Keizer (Torys) via e-mail  
Crawford Smith (Torys) via e-mail

## UNDERTAKING JT2.5

### Undertaking

OF THE COSTS INCLUDED IN ED 18, BOARD STAFF 116, AND GEC 38, TO ADVISE WHICH WERE INCLUDED OR EXCLUDED FROM THE ECONOMIC ASSESSMENT OF PICKERING, INCLUDING THE CALCULATION OF THE 6.5 CENTS PER KILOWATT-HOUR

### Response

OPG notes that levelized unit energy cost (LUEC) is an economic measure and as such is based on incremental costs and generation. The approach used to calculate LUEC differs from a rate calculation. For example, LUEC calculations exclude “non-cash” items such as depreciation and amortization expense, and instead include the incremental capital expenditures in the year incurred. As well, LUEC calculations exclude non-incremental costs that are considered to be independent of the decision being made. Please see also OPG’s response to Ex. L-04.3-6 EP-014. OPG’s response to JT 1.17E Attachment 1 provides an explanation of the LUEC methodology.

The LUEC calculation referenced in the Pickering Extended Operations Economic Assessment (Ex. F2-2-3 Attachment 2) includes the following cost categories:

1. Base OM&A (Station and Nuclear Support)
2. Outage OM&A (Station Direct and Nuclear Support)
3. Project OM&A
4. Capital
5. Corporate Support
6. Fuel Costs

As directed by the OEB’s February 16, 2017 Decision and Order on Motion Filed by Environmental Defence, Chart 1 below shows the reconciliation between total operating costs (reflected in OPG’s 2016-2018 Business Plan, including total fuel costs, shown at Chart 1 line 19) and the incremental operating costs included in the Pickering Extended Operations Economic Assessment (including incremental fuel costs, shown at Chart 1 line 3) for 2016-2021.

Chart 1: Reconciliation Between Total Operating Costs and Incremental Operating Costs

Line No.	Constant 2015 M\$	2016	2017	2018	2019	2020	2021	Source
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	
<b>Incremental Costs for Economic Assessment</b>								
1	Incremental Operating Costs	7	35	79	145	218	987	Ex. L-6.5-1 Staff-126 Chart 2, Ex. L-6.5-7 ED-28 (i)
2	Incremental Fuel Costs (BCS Option 2 - 62 TWh)	0	-5	-6	-8	-19	101	Ex. L-6.5-1 Staff-126 Chart 2
3	Incremental Operating Costs and Incremental Fuel Costs	7	30	73	137	199	1,088	line 1 + line 2
<b>Changes in Forecast Between Economic Assessment and 2016-2018 Business Plan</b>								
4	Incremental Operating Costs	8	5	3	6	9	-8	
5	Incremental Fuel Costs	0	0	0	0	0	4	
6	Changes in Incremental Costs Between Economic Assessment and 2016-2018 BP	8	5	3	5	10	-4	line 4 + line 5
<b>Incremental Costs per 2016-2018 Business Plan</b>								
7	Incremental Operating Costs	15	39	82	151	228	979	line 1 + line 4
8	Incremental Fuel Costs	0	-5	-6	-8	-19	105	line 2 + line 5
9	Incremental Operating Costs and Incremental Fuel Costs	15	34	76	142	208	1,084	line 3 + line 6
<b>Escalated M\$</b>								
<b>Incremental Costs per 2016-2018 Business Plan</b>								
10	Incremental Operating Costs	15	41	87	163	251	1,103	line 7 converted from constant to escalated dollars Ex. L-6.5-1 Staff-118 Table 1 line 12 (to 2020)
11	Incremental Fuel Costs	0	-5	-7	-9	-21	118	line 8 converted from constant to escalated dollars Ex. L-6.5-1 Staff-118 Table 2 line 1 (to 2020)
12	Incremental Operating Costs and Incremental Fuel Costs	15	36	81	154	230	1,221	
<b>Add: Excluded Non-Incremental Operating Costs</b>								
13	Normal Operating Costs (Non-Incremental Station Direct)	781	739	674	641	508	0	
14	Normal Operating Costs (Non-Incremental Support)	568	572	590	587	579	292	
15	Non-Incremental Fuel Costs	120	119	122	126	142	0	
16	Total Operating and Fuel Costs	1,484	1,466	1,467	1,508	1,458	1,513	line 12 + line 13 + line 14 + line 15
<b>Total Operating Costs per 2016-2018 Business Plan</b>								
17	Total Operating Costs	1,364	1,351	1,351	1,392	1,338	1,395	line 10 + line 13 + line 14 Ex. L-6.5-7 ED-18 Chart 1, Ex. L-6.5-8 GEC-38 Chart 1, Ex. L-6.5-1 Staff-116
18	Total Fuel Costs	120	114	116	117	120	118	line 11 + line 15 Ex. L-6.5-7 ED-18 Chart 1, Ex. L-6.5-8 GEC-38 Chart 1
19	Total Operating and Fuel Costs	1,484	1,466	1,467	1,508	1,458	1,513	line 17 + line 18
Numbers may not sum due to rounding								

The following discussion uses 2021 as an example to explain the operation of Chart 1 with references back to the associated interrogatory responses. The sum of the above economic assessment cost categories excluding Fuel Costs is \$1,395M, which represents total operating costs on a fully allocated basis (Chart 1 line 17, col. (f) and as provided in Ex. L-06.5-1 Staff-116 and Ex. L-06.5-1 GEC-38, and the first line of Chart 1 in Ex. L-06.5-7 ED-018). With the exception of Fuel Costs, these categories are itemized in Ex. L-06.5-1 Staff-118 (a) & (b). Total Fuel Costs are \$118M in 2021 (Chart 1 line 18, col. (f)), as provided in Ex. L-06.5-7-ED-018 and Ex. L-06.5-1 GEC-38. In 2021, the sum of total operating costs and total Fuel Costs is equal to \$1,513M (Chart 1 line 19, col. (f)). All of these values are expressed in escalated dollars.

As described in the Pickering Extended Operations Economic Assessment, the financial evaluation and the related LUEC are calculated using incremental operating costs relative to a 2020 Pickering shutdown. The incremental OM&A and Capital costs are shown in constant 2015 M\$ in Interrogatories Ex. L-6.5-7 ED-028 part (i) and Ex. L-6.5-1 Staff-126, Chart 2. For the year 2021, the non-fuel incremental Operating Costs assumed in the Pickering Extended Operations Economic Assessment are \$987M (2015\$) (Chart 1 line 1, col. (f)). The difference in 2021 operating costs between the \$987M and the \$1,395M is related to

1 escalation from constant to nominal dollars and the exclusion of non-incremental costs (i.e.,  
2 the assumed non-incremental portion of nuclear and corporate support costs), as shown in  
3 Chart 1. Escalation and non-incremental costs also explain the difference in 2021 Fuel Costs  
4 between the \$101M (Chart 1 line 2, col (f)) and the \$118M (Chart 1 line 18, col (f)).

5  
6 Cost categories shown in Ex. L-06.5-7 ED-018 that are not included in the economic  
7 assessment or LUEC calculation are provided below. Amounts provided below refer to 2021  
8 values from Chart 1 in Ex. L-06.5-7 ED-018, for reference purposes:

- 9  
10 1. Inventory Obsolescence (\$12.4M) – These costs are excluded as a non-cash item.  
11 2. Pickering Portion of Tritium Removal Facility (\$12.8M) -- These costs are considered  
12 non-incremental as they would be borne by OPG in the absence of operating  
13 Pickering units.  
14 3. OPEB and Pension excluded from Centrally Held Costs and Other Costs (\$-12.7M) –  
15 These costs primarily represent non-current service components of pension and  
16 OPEB amounts that largely would be incurred whether or not the operation of the  
17 Pickering station were extended, as well as the pension and OPEB adjustment for  
18 cash to accrual differences shown at Ex. F4-4-1 Table 3 line 2.  
19 4. IESO Non-Energy Charges (\$22.3M) – If not paid by OPG, these costs (e.g.,  
20 transmission charges or IESO administration fees) are assumed to be recovered from  
21 other transmission system customers and therefore are not incremental.  
22 5. Depreciation and Amortization Pickering (\$53.1M) – These costs are non-cash  
23 accounting transactions related to matching capital costs to the period when benefits  
24 are considered to be realized. Instead, incremental capital costs associated with the  
25 extending Pickering operations are reflected in the LUEC.  
26 6. Depreciation and Amortization Pickering Generic (\$20.4M) – These costs are non-  
27 cash accounting transactions related to matching capital costs to the period when  
28 benefits are considered to be realized.  
29 7. Income Tax Pickering (\$27.5M) – Income taxes are not directly related to costs of  
30 operating an asset; rather, they result from earning income from the asset.  
31 8. Property Tax Pickering (\$6.3M) – Property taxes for the Pickering site were assumed  
32 to be payable in the post-2020 period regardless of whether or not the operation of  
33 the station were extended, and are therefore not incremental.