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File 92805

VIA RESS FILING and COURIER

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

Dear Ms. Walli:

Re: OPG EB-2016-0152 re Payment Amounts
Submissions of the Power Workers' Union

Attached please find the Power Workers' Union's Submissions in connection with the above-noted proceedings. An electronic copy has been filed through the Board's RESS filing system, and two paper copies will follow by courier delivery.

Yours very truly,
PALIARE ROLAND ROSENBERG ROTHSTEIN LPP

Richard P. Stephenson

Attach.

c: Applicant (via email)
Intervenors (via email)

Doc 2173697 v1

EB-2016-0152

IN THE MATTER OF the Ontario Energy Board Act, 1998;

AND IN THE MATTER OF an Application by Ontario Power Generation Inc. for an order or orders approving payment amounts for prescribed generating facilities commencing January 1, 2017.

Submissions of the Power Workers' Union

1. The following are the Power Workers' Union's ("PWU") submissions on the issues reviewed in the matter of Ontario Power Generation Inc.'s ("OPG") 2017-2021 payment amounts for its prescribed assets.

2. These submissions do not specifically address all issues on the issues list. Where an issue has not specifically been addressed, the PWU supports the application as filed, and supports and adopts the submissions of OPG in support of the application.

A. CAPITAL PROJECTS

Issue 4.3: Are the proposed nuclear capital expenditures and/or financial commitments for the Darlington Refurbishment Program reasonable?

Issue 4.5: Are the proposed test period in-service additions for the Darlington Refurbishment Program appropriate?

3. In this application, OPG seeks approval of the following in-service additions to rate base over the 2016-2021 period for the Darlington Refurbishment Project ("DRP"):[1]

	2016	2017	2018	2019	2020	2021	Total
In-Service Additions	$350.4M	$8.5M	$8.9M	$0.0M	$4,809.2M	$0.4M	**$5.177B**

[1] Exhibit N2-1-1, Table 3

4. As can be seen, forecast in-service additions related to the return to service of Unit 2 in 2020 ($4.8M), which include capital costs incurred in the Definition Phase, account for the lion's share followed by the $377.2M related to Unit Refurbishment Early In-Service Projects, Safety Improvement Opportunities ("SIO"), and Facilities and Infrastructure Projects ("F&IP").

a) Unit 2 In-Service Addition

5. OPG has presented extensive evidence and participants have had ample opportunities to inquire and assess cost and schedule estimates underlying the proposed forecast in-service addition for Unit 2.

6. It is apparent that the significant issue that arose in this proceeding with respect to the proposed in-service amounts for Unit 2 relates to the contingency cost component, and by extension, the reasonableness of the P90 confidence level chosen by OPG, which is the basis for the level of contingency included in this application for the DRP.[2]

7. The record reveals that the $12.8 billion forecast for the refurbishment of all four Darlington units includes $1.7 billion for contingency. Of this total $1.7 billion in DRP contingency, $677.5M[3] is attributed to the refurbishment of Unit 2 and forms part of the $4.8 billion forecast cost for Unit 2. The evidence also shows that OPG arrived at the $1.7 billion contingency included in the Release Quality Estimate ("RQE") for the four-unit program because that is the amount determined to be required to achieve 90 percent confidence level, or P90, based on a detailed evaluation of cost and schedule uncertainties and discrete risks associated with a megaproject such as the DRP. A 90 percent confidence level means that the entire program will, in all likelihood, come in at or under the $12.8 billion budget.

8. Over the course of the proceeding, questions were raised as to the appropriateness of the choice of a P90 confidence level, rather than a lesser confidence

[2] Notably, it was not apparent during the hearing that any party was seriously challenging the reasonableness of any of the cost estimates of the DRP projects (excluding contingency).
[3] Exhibit L-4.3-1 Staff-055, Attachment 1, p. 13 of 17

level such as P50, and hence the appropriateness of the forecast contingency amount attributable to Unit 2. This was discussed in the following exchange:

> **MR. RICHLER: What if the OEB, in this case, approves something less than the full P90 contingency amount for unit 2? Say, instead of the nearly $700 million built into your application, the OEB approved only the contingency associated with a lower confidence level, say P50. You would still be allowed to track any extending above the P50 budget in the capacity refurbishment variance account, and you would get back any amounts that were found to be prudent in a future OEB proceeding. I know that's not what you've proposed in your application, but what do you think about that idea?**
>
> **MR. LYASH: Let me say that the converse is also true, just to be clear, that if, because of our actions or good fortune, the contingency is not spent as allocated to unit 2, that also would go to the CVRA and be returned to the customers. My thought on your question, though, basically is what would be the basis for that. Our view is that the risk assessment we've done is rather robust in our consideration of the nature of this project, its complexity, and duration, and the challenges involved warrant selection of P90 as the reasonable and prudent approach to managing the project. So the OEB could certainly find that something less is appropriate, but our basis and judgment is what leads us to P90 as the choice as they are.**[4]

9. The PWU submits that the Board should accept the P90 level contingency amount for Unit 2 for the following reasons.

10. First, as OPG submits, the contingency amount is a cost component developed as part of the overall development of the project estimate for the DRP. It is not an afterthought where a P90 level amount is randomly selected and added to the total cost of the project. In this regard, while it is mathematically possible to apportion the contingency cost attributable to Unit 2 for the purpose of determining in-service amounts during the IR period, the Unit 2 contingency amount should not be considered in isolation of the $1.7 billion contingency amount estimated for the refurbishment of all four Darlington units. This is because there are always risks and uncertainties that can arise at any point of a project no matter how highly detailed the plan is. OPG should be afforded the flexibility to use the $1.7 billion contingency amount to complete the refurbishment of all four units while tracking the draw-downs from contingency or replenishment of contingencies to specific projects. It would not be appropriate to assume the contingency amount allocated to Unit 2 can be lowered without affecting the

[4] Tr. Vol. 1, pp 34-35

integrity of the total project cost estimate. This was a point Dr. Galloway stressed during the hearing when asked about the application of P90 and allocation of costs to Unit 2:[5]

> **DR. GALLOWAY: Well, the P90 confidence modelling was done on four units, not on just one unit. And so all of the units, of course, with how they are interconnected and the risks are all modelled on a four-unit basis. And so it would be difficult for me to opine specifically on, quote, how those risks may be separated out, because I don't think you can easily separate out the models since it was on four units.**

11. Second, no party has presented evidence before the Board that shows the P90 contingency for Unit 2 is inappropriate. In contrast, OPG has presented evidence that shows the risk management and contingency development process used by OPG to develop the RQE is appropriate, robust and meets best industry standard. The PWU draws the Board's attention to OPG's Argument-in-Chief which summarizes evidence from Pegasus-Global, Schiff Hardin, BMcD/Modus, KPMG, CALM Management Consulting Inc., Palisade Corporation, Concentric, etc. who have provided either written opinions or oral testimony that affirm the reasonableness and appropriateness of the process OPG followed in developing the RQE. Dr. Galloway described the methodology employed by OPG to develop the RQE estimate as 'world-class':

> **Q. Did you reach any overall opinions concerning the RQE $12.8B estimate for the DRP?**
>
> **A. Yes. From my review and evaluation of the contemporaneous documentation and the interviews of OPG management, at the time the RQE cost estimate was completed, OPG had ample reason to feel confident in the accuracy of RQE estimate. I found the methodologies employed by OPG to develop the RQE estimate to be world-class. A review of all the relevant documentation and interviews with OPG project personnel confirmed the fact that the methodologies employed met all accepted industry standards and guidelines as promulgated by AACE. As I discussed earlier in my testimony, the use of a P90 confidence level, along with the detailed estimate development process, provides OPG with appropriate assurances that the DRP can be completed within the $12.8B estimate.**[6]

12. Third, the Board has heard testimony of experts that OPG's selection of a P90 confidence level is reasonable and in accordance with the robust risk analyses that were performed. OPG is not the first company to apply a P90 confidence level for a complex megaproject like the DRP. Dr. Galloway provided two real life examples:

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[5] Tr. Vol. 6, pp. 48-49
[6] Exhibit D2-2-11 Attachment 3, p. 56

London's Crossrail project and Bellafonte. Of particular interest is Dr. Galloway's description of the complex nature of the Crossrail project and why a P90, in fact a P95, confidence level is applied:

> **MR. KEIZER: Dr. Galloway, are you familiar with any other megaprograms in which you've been involved with that also had a P90 confidence level?**
>
> **DR. GALLOWAY: Yes...there are two projects that I, though, do distinctly remember a P90 confidence level being used, which, one of them is a project that is currently still underway. It is the Crossrail project in London. It is approximately 80 percent complete. It's approximately an 18 billion dollar megaprogram....It was actually done at a P95 level, not a P90. The reason for the P90 to begin with was due to the extreme complexities of the project, but an additional P95 versus 90 was used because, as I'm sure everyone can appreciate, London Underground, full of completely unknowns of hundreds and hundreds of years. And because of the extreme unknowns in the geo-technical area of the underground tunnels that would need to be done, there was a decision to increase that to a P95.**[7]

13. Dr. Galloway also testified that the Crossrail project is currently under budget and under schedule:[8]

> **DR. GALLOWAY: .... Parliament gave the approval for that project. It is funded by the government, and it is currently under budget and ahead of schedule [Emphasis added].**
>
> **MR. MONDROW: Under budget on a P90 basis, and ahead of schedule on a P90 basis?**
>
> **DR. GALLOWAY: Yes.**

14. There is a reason why all the experts in this proceeding found the process OPG followed to develop the RQE, the contingency amounts and OPG's choice of the P90 confidence level appropriate. OPG has spent substantial time and resources to design the DRP based on extensive feasibility study, planning, risk analysis, engineering, mock-up, detailed contracting strategies, and lessons learned from past experience, with the aim to mitigate or entirely avoid schedule delays and cost overruns that have defined most if not all megaprojects. The PWU asked Schiff Hardin, the Board's expert witness, on OPG's effort in this respect:[9]

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[7] Tr. Vol. 5, p. 145
[8] Tr. Vol. 6, p. 148
[9] Exhibit M1-4.3-PWU-002

Question

Throughout the Schiff's Report, the OEB puts 13 questions on whether OPG has met industry standards with respect to the different aspects of the DRP, including preparation of a risk register, risk mitigation, project control systems, development of the RQE estimate, schedule development, project management staffing plans, audit and oversight, contracting strategy, contract terms, strategy for dispute resolution, etc. Schiff responds to all questions by saying that OPG has met industry standards.

a) To Schiff's knowledge and within the scope of Schiff's review, are there any aspects of the DRP where OPG does not meet industry standards?

Answer

a) Based on the material Schiff has reviewed and Schiff's knowledge, there are not any aspects of the DRP that does not meet industry standards.

15. OPG should be commended for preparing a DRP plan that meets industry best practices, is described as 'world class', and includes the use of an integrated Monte Carlo simulation of the DRP's cost and schedule. The Monte Carlo simulation is a very helpful risk modelling tool in identifying potential risks and uncertainties that are the basis for determination of the confidence level associated with project cost estimates, including contingency. Were OPG's plan deficient, the completion of DRP at/under budget/schedule would be threatened. It is therefore wrong to suggest a lower confidence level such as P50, while at the same time accepting the process OPG used to develop the P90 RQE and contingency as best practice. As Pegasus Global put it:

> **Using a lower confidence level, such as a P50 confidence level, may not adequately address the complexities and risks inherent with the execution of a megaprogram (particularly the extended duration of execution as compared to a typical project), thus increasing the risk of a cost overrun.**[10]

16. OPG was asked in interrogatories and during the hearing to provide an estimate of the contingency amount for the entire DRP and specifically for Unit 2 if the confidence level was lowered from P90 to P50, which OPG provided as $1.4 billion (in 2015 dollars, excluding interest and escalation) and $578 million, respectively.[11] In other words, the contingency cost for Unit 2 would be lower by about $116 million. In the PWU's view the assumption behind such inquiries by some parties is that a P90 confidence level would

[10] Exhibit D2-2-11, Attachment 3, p. 56
[11] CCC IR 118 and Tr. Vol. 5, pp. 17-18

be excessive. Such a view would be inconsistent with the foregoing evidence and, as the Board's own expert witness put it, there is no basis for it:

> **MR. ROBERTS: I don't -- I can't answer that, because that question presupposes that the P90 contingency is excessive, and I don't have any basis at this stage to make that statement. In fact, I mean, I think that on the process and procedure part of it, using a P90 in and of itself is a prudent, you know, decision.**[12]

17. This was further noted by Mr. Coyne, the expert witness from Concentric, during the hearing when he said OPG's choice of P90 is prudent, adding that the risks are substantial even at P90 confidence level:

> **MR. YAUCH: So it seems OPG is taking less risk on the project under a P90 model than, say, a P50. And the Board has suggested that if OPG does that in the future, then it might reconsider the capital structure. So I'm wondering about your opinion on that interpretation of it.**
>
> **MR. COYNE: I think it's prudent, from a company standpoint, to tighten that band as much as possible. It will have to show amounts above that estimate as being prudent before it would be able to file for inclusion in rates in the future...And as we know, and I think the record is established in this proceeding, there are a lot of ways that costs can vary from estimates even for the best planned projects of this type. So I don't find it unusual that the company would be looking for that type of a band in that regard, because even with that band, I think the risks are still substantial.**[13]

18. The fact of the matter is that the contingency amount for Unit 2 may or may not be sufficient regardless of the detailed plan OPG has presented. The contingency amount can substantially increase or decrease as estimates of some projects get refined. For example, this came up at the hearing:

> **MR. RUBENSTEIN: -- a small increase, a 1 percent increase in your expectation within the unit 2 cost; correct?**
>
> **MR. REINER: Yes.**
>
> **MR. RUBENSTEIN: But you're not seeking to change to the in-service additions for unit 2.**
>
> **MR. REINER: That's correct. And just maybe to characterize the variance which you highlighted as an increase in cost, what you'd expect to see as further work is done in defining precise scope and associated cost estimates, and at the time that the release quality estimate was established, there were some projects that were not yet at the class of estimate that allowed for a precise cost estimate to be put against it, so those dollars were carried in contingency. And as the estimate precision gets refined, the contingency draws are utilized to put into**

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[12] Tr. Vol. 7, pp. 51
[13] Tr. Vol. 19, p. 11

the estimate for that project, so you see that kind of movement here.

19. Fourth, the Board should accept OPG's submission that it has the incentive and the confidence to complete the DRP at or under budget and that it would return to ratepayers contingency that is not used up. In his testimony, OPG's President and CEO, Jeff Lyash, provided a long list of incentives driving OPG's determination to complete the DRP at or under budget/schedule.[14] Mr. Lyash also confirmed that if the contingency is not spent as forecast, the difference will go to the Capacity Refurbishment Variance Account ("CRVA") and will be returned to ratepayers.[15] Contingency being cost, it should be treated in the same way other forecast in-service additions are treated through a variance account.

20. It is submitted that, at its core, the debate about P90 versus P50[16] is a false one. Fundamentally, the position of those that oppose the inclusion in rates of the P90 contingency amount is that OPG will use the Board's approval of that amount to improperly recover costs which are not prudently incurred by it. As the PWU understands it, the argument runs as follows:

a. If the Board approves the P90 contingency amount in this hearing, OPG will not require any further approval from the Board to recover all of those costs so long as the costs do not exceed the approved amount;

b. Because this is a forward test year application, and the costs in question are forecast costs, no one knows at the present time exactly what the actual costs will be;

c. There are two different ways that the actual costs might be incurred (within the P90 envelope):

    i. The first way is if OPG undertakes all of the work on a prudent basis, and some or all of the contingent events that are implicit in the P90 estimate actually materialize, and they are also managed in a prudent way. In this scenario, OPG would be fully justified in receiving all of the approved amounts;

[14] Tr. Vol. 1, pp. 37-40
[15] Tr. Vol. 1, pp. 34-35
[16] Or for that matter, the P37 contingency amount as Board Staff now proposes in its written submissions.

ii. The second way is if some or all of the contingent events that are implicit in the P90 estimate do not materialize, but the project is managed by OPG in an imprudent manner, such that the total cost is inflated to an amount not exceeding the total forecast cost, inclusive of the P90 contingency amount. In this scenario, OPG is recovering imprudently incurred costs; and

d. As a consequence, the Board should only approve a contingency amount based upon a lower probability factor (e.g. P50), in order to reduce the amount that OPG can recover without the need for an after the fact review and approval process through the CVRA clearing mechanism.

21. The PWU submits that this argument should be rejected. It is not actually an argument about the merits of a "P90" versus "P50" contingency at all. It is really just an argument about whether the Board should approve test period in-service additions on a forecast basis. Whenever the Board approves an in-service amount on a forecast basis, it never has certainty as to how the funds comprising the approved in-service amount will actually be spent. It is always theoretically possible that the applicant's forecast of what the cost of the project should be if the project is completed prudently will be too high.[17] There is always a possibility that the actual cost of some aspect of the project will exceed the prudent costs for that work, and so long as the total project cost does not exceed the approved in-service amount, the Board will never know exactly how or why the total actual cost wound up being what it was.

22. Notwithstanding this theoretical problem, the Board has routinely approved forecast test period in-service additions, without the need for any "after-the-fact" justification or reconciliation.[18] Unless the Board proposes to undertake a radical re-

[17] By "too high" we are not suggesting any kind of deliberate overestimate. Rather, because forecasts are uncertain, there is always potential for good faith forecasts which prove, after the fact, to be underestimates, or overestimates.

[18] Indeed, the issue is not restricted to forecast in-service capital additions. Because forecasts of future events are inherently uncertain, there is always a possibility that the prudent amount of costs (whether capital or operating) might wind up being less than the approved amount. The Board can never be certain that the actual spending, up to the approved amount, does not contain some aspect of spending which, viewed in isolation (after the fact), might be determined to be imprudent. The only way to eliminate this possibility is to conduct an after the fact review of all costs to ensure that none of the amounts actually spent was spent imprudently. Not only would this be a radical re-thinking of the Board's

evaluation of the manner in which it grants approval of in-service amounts, there is simply no basis to approve a contingency amount at a figure lower than the P90 amount.

23. The PWU's submission that contingency cost is intrinsic to the total DRP/Unit 2 project cost and that OPG should be afforded the flexibility to apply the total contingency amount as needed is even more appropriate in view of Board Staff's submission on the treatment of DRP related costs in the CRVA.[19] OEB staff is proposing that whether the overall variance in the CRVA is positive or negative, the OEB is required to ensure that all incremental spending[20] on each component of the DRP (and hence of Unit 2) is prudent. In other words, even if the entire Unit 2 project comes in under the Board approved in-service amount (which can only occur if some components of Unit 2 come under budget), the Board should still review any overspending on other components of Unit 2. To this effect, Board Staff is proposing that OPG be required to provide a sufficiently detailed list of all of the components of the Unit 2 refurbishment and a list of all campus plan projects (> $5 million), disaggregated by the 'applied for' and the 'approved in-service amount' with the related applied for and approved contingency amounts shown separately. By way of reference, Board Staff recommends a list of close to 20 sub-components each for Unit 2 and F&I and SIO Capital Costs.

24. It is appropriate for the Board to put overspending to a prudence test. However, the issue is under what circumstances will it be considered that an "overspend" has occurred. Board staff's proposal for a granular cost review of all aspects of the DRP in the CRVA disaggregated as 'with' and 'without' contingency is problematic for two reasons.

25. First, the envelope contingency of $1.7 billion at P90 is developed for the entire DRP project, of which $694 million is allocated to Unit 2. By suggesting that Unit 2's contingency be further broken down to numerous "components" for prudence test,

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approach to rate setting, it would also effectively make the rates established by the Board in a rate hearing to be "interim" rates, until the after the fact reconciliation had been completed.

[19] Board Staff submission, pp. 55-63

[20] That is, spending in excess of the approved forecast cost (including allocated contingency) of that component.

presumably based on a convenient cost apportioning, Board Staff is assuming that OPG would be able to fairly and accurately disaggregate risks and uncertainties pertaining to the inter-related components of Unit 2. The PWU's understanding is that OPG established the contingency for the DRP as a whole on a probabilistic basis. There is no evidence that the aggregate contingency can be fairly or appropriately allocated to the component level (which would be required in order for the Board Staff approach to be implemented). Nor is there any evidence of what the total amount of the contingency would have been if the contingency had been developed in this manner (assuming such an allocation were possible at all).

26. Secondly, the Board Staff approach is inconsistent with OPG's legitimate need to be able to manage the DRP as an overall, integrated project. OPG must be given the management flexibility to actually manage the project. This includes the possibility of devoting more money and resources to one aspect of the project where that will yield net benefits to the project as a whole. OPG must be permitted to do this, without the spectre that, having achieved a successful outcome, it will have triggered the need for an after the fact justification.

27. The PWU submits that as long as the actual contingency cost comes at or under the Board-approved contingency cost in the current proceeding, OPG should be justified to cross-subsidize contingency resources among project components regardless of original plans and OPG's prudence should be measured in terms of its coming at or under the approved total contingency for Unit 2.

b) Early In-Service, F&IP and SIO Projects

28. These are DRP-related projects expected to enter into service prior to the completion of the refurbishment of Unit 2. OPG's evidence shows that these projects become used and useful as soon as they are completed. While some projects are useful to two or more units of the Darlington station, OPG's proposal is to add such projects to rate base when OPG returns Unit 2 to service.

29. The PWU submits that the Board should approve the requested in-service additions relating to the early in-service, F&I and SIO projects because OPG's request is consistent with the Board's 'used and useful' regulatory principle.

30. In summary, the evidence presented before the Board shows that the in-service addition amounts proposed for the 2016-2021 period are a result of extensive, high quality planning and preparation. The PWU submits that the Board should approve the forecast DRP in-service amounts.

B. OPERATING COSTS

I. NUCLEAR

Issue 6.1: Oral Hearing: Is the test period Operations, Maintenance and Administration budget for the nuclear facilities (excluding that for the Darlington Refurbishment Program) appropriate?

31. OPG's efforts to control operating costs are evident in the relatively flat level of OM&A through the test period. A significant contributor to the cost control is the low base wage growth realized in the 2015 collective bargaining agreements. The evidence shows that OPG is managing the resources required to maintain reliability and safety performance efficiently with minimal impact on rates. The following table is a summary of nuclear OM&A through the test period.[21]

Test Period Nuclear OM&A ($M)

	2016 Actual	2017 Plan	2018 Plan	2019 Plan	2020 Plan	2021 Plan
Base OM&A	1,182.4	1,210.6	1,226.0	1,248.4	1,264.7	1,276.3
Project OM&A	89.3	113.7	109.1	100.1	100.2	86.8
Outage OM&A	306.7	394.6	393.8	415.3	394.4	308.5
Total	**1,578.3**	**1,718.9**	**1,728.9**	**1,763.8**	**1,759.4**	**1,671.6**

32. Total nuclear OM&A declines by 2.8% from the beginning of the test period to the end. The decline is primarily due to declines in project OM&A and outage OM&A in the later years of the test period. Base OM&A increases by 5.4% from 2017 to 2021, an

[21] OPG Argument-in-Chief, p. 73, Chart 7.1

annual average increase of 1.3% per year. Base OM&A by resource type is detailed in the following PWU table:

Test Period Base OM&A								
($ Million)	2017	2018	2019	2020	2021	Test Period %*	Total Change	Annual Average Change
Labour	859.0	846.9	874.3	885.0	887.9	69.92%	3.4%	0.83%
Overtime	46.1	46.5	46.1	47.4	47.8	3.76%	3.7%	0.91%
Augmented Staff	4.5	3.5	3.0	2.6	1.6	0.24%	-64.4%	-22.78%
Compensation Subtotal	**909.6**	**896.9**	**923.4**	**935.0**	**937.3**	**73.92%**	**3.0%**	**0.75%**
Materials	68.4	68.2	68.5	71.1	70.8	5.57%	3.5%	0.87%
License	37.2	38.7	39.6	40.2	40.6	3.15%	9.1%	2.21%
Other Purchased Services	161.1	185.1	180.8	178.3	187.3	14.34%	16.3%	3.84%
Other	34.2	37.0	36.2	40.2	40.3	3.02%	17.8%	4.19%
Non-Compensation Subtotal	**300.9**	**329.0**	**325.1**	**329.8**	**339.0**	**26.08%**	**12.7%**	**3.03%**
Total Base OM&A	**1,210.6**	**1,226.0**	**1,248.4**	**1,264.7**	**1,276.3**	**100.00%**	**5.4%**	**1.33%**

Based on data from Exhibit F2, Tab 2, Schedule 1, Table 2

*Test Period % = Sum of Test Period Resource Costs Divided by Test Period Base OM&A

33. The majority of base OM&A is in labour, which comprises nearly 70% of total base OM&A through the test period. The PWU notes that labour's share of total base OM&A declines through the period as labour costs increase by 0.83% per year through the test period - lower than the 1.33% rate of total base OM&A growth, and a fraction of the growth of non-labour base OM&A. The low level of growth in labour costs is consistent with the low level of wage growth discussed later in this submission.[22] Additionally, a similar table filed in OPG's last rate application indicates labour was forecast to be 72.6% of base OM&A for that rate period.[23]

34. Overtime costs increase slightly over the test period which is offset by declining augmented staff costs, further contributing to overall compensation cost control. Compensation costs, comprising of labour, overtime, and augmented staff, increase by 0.8% per year while non-compensation costs increase by 3% per year. Though non-compensation costs make up just 26% of base OM&A, those costs are responsible for

[22] Issue 6.6 - Compensation
[23] EB-2013-0321, Exhibit F2-2-1, Table 2

the majority of cost increases in the test period. Compensation costs are not the primary driver of increases to base OM&A.

35. In their submission, Board Staff propose an annual $40 million disallowance of base OM&A comprising of $15 million of labour and overtime costs and $25 million of purchased services. The reduction of $15 million to labour and overtime is half of the increase in those costs from 2016 actual amounts to 2017 planned. Board Staff's rationale for the proposed disallowance includes that cost should be lower when Darlington units are being refurbished, that some work is discretionary,[24] and that OPG should not require more FTEs than it had in 2016.[25]

36. Base OM&A at Darlington does not decline when units are being refurbished because base OM&A work is done for the station as a whole and not by individual unit. This was discussed in Board Staff's cross-examination of the nuclear operations panel:[26]

> **MS. CARMICHAEL: But in general terms, most of our costs are fixed. And it is particularly due to the fact that our operations and maintenance cover sort of these common systems across the four unit fleet, and even though you might have one in refurbishment, you still have the same number of people supporting all these common systems.**
>
> **As an example, tritium removal has to remain. We do work not just for Darlington, but we do tritium removal for Pickering, we do tritium removal for Bruce, so those costs remain the same. That's just one example.**
>
> **But in general, costs would be fixed and we've accounted for that in our application.**

37. As discussed later in this submission, OPG was under-complement in 2016. Board Staff note that OPG may utilize "swing staff" to move staff between nuclear operations and the DRP groups.[27] OPG moved FTEs to the DRP as it has faced challenges in recruiting employees for that program. In doing so, there was a shortfall in 2016 FTEs and OPG had to use more than planned overtime in response to the limited labour resources. Additionally, the nuclear operations panel explained in the oral

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[24] OEB Staff Submission, pp. 76-77
[25] OEB Staff Submission, pp. 90-91
[26] Tr. Vol. 13, pp. 77-78
[27] OEB Staff Submission, p. 77

hearing that some work was not done in recent years due to a hiring lag caused by higher than expected attrition:[28]

> **MR. MILLAR: Did the budgets from 2014 to 2015 -- there was an under-spend in those years. Did that work get shifted to 2016-2017, or was it work that didn't end up materializing?**
>
> **MS. CARMICHAEL: I can't specifically [say] what got done and didn't get done. I believe there was some work not done. As we know, our attrition was high. We were losing people quickly at a higher pace than we expected. We had hiring lags and in terms of also trying to get -- fill those temporarily with temporary positions or people.**
>
> **So we did see a lag. I can't tell you exactly how much work did get done or didn't get done. We know the high priority work and the work we had to get done got done. But it's always a balancing act when you're in a situation like that.**

38. This does not indicate, as Board Staff suggest, that some base OM&A work is discretionary but rather that OPG did not have adequate resources in 2016, and that there was some element of flexibility with respect to timing of the execution of some work (not that there was any discretion as to whether the work was done at all). Board Staff's submission suggests that OPG's test year labour costs should align with the 2016 costs though it is evident that the 2016 actual base OM&A is an anomaly. In fact, labour in 2016 was at its lowest level from 2013 through the test period. Meanwhile, overtime spending in 2016 was higher than any other year over the same period. The proposed disallowance of labour and overtime costs does not adequately consider the need for additional FTEs in the test period.

39. OPG has faced challenges in obtaining the proper labour resources it needs to complete its work programs. In the oral hearing, the nuclear panel explained why the use of resources may differ from the plan:[29]

> **MS. CARMICHAEL: ...I would like to state that overall, if you do look at our base OM&A picture, we plan in various categories, but they don't always happen in each of the categories, so labour, overtime, aug staff, purchased service, there's a mix. So sometimes the actuals don't always agree with the way it was planned. But from an overall perspective, we have a steady state base OM&A budget. It escalates at 1.24 percent and we're also proposing a stretch factor of .3 on top of that. So we think this is a reasonable projection of cost structure for the base OM&A nuclear group.**

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[28] Tr. Vol. 13, p. 92
[29] Tr. Vol. 14, pp. 8-9

40. Evaluation of the most cost-effective labour resource plan may differ from the original plan and OPG rightfully considers this before executing planned work and may adjust the resource mix. Discrepancies between planned and actual work may also reflect a lack of resources, as described in cross-examination with SEC regarding purchased services:[30]

> **MS. CARMICHAEL: I believe I said -- I don't know if I said more robust attrition, but I did say that part of this cost would be associated with backfilling for attrition with purchased services on a temporary basis, until we could actually hire full-time people for the full-time roles. We know that if we hire contractors to do work, they're a little bit higher in cost than regular labour costs.**
>
> **I did take a look at this line particularly, and I would like to clarify that in 2016 -- excuse me, in the 2015 budget. So if you look at that row, our actual budget for that year was 146 million and we actually spent only 108. If you went to F2, tab 2, schedule 1, table 2 in EB- 2013, that will show you our actual budget was 146 and our actuals were 108.**
>
> **Some of that reduction was due to us over spending and overtime, because our budget for overtime was lower But the other element was that even though we planned to do extra purchased service work, which included things like hiring an engineering company to reduce our engineering holds and do sort of other peak work or non-steady state work. We actually didn't spend that budget because we had to look at ways to reprioritize our spending, due to our disallowance that we received for that year, which was about $85 million for the nuclear group.**
>
> **So in fact, we had planned to spend more and so there was -- it does look like there was a reduction, but in fact it was because we had to reprioritize our work and push it out.**

41. Disallowances in the previous rate period caused a situation in which work had to be reprioritized. The nuclear operations panel also explained that OPG was unable to get the resources it needed on a timely basis to hire some planned purchased services.[31] The shortage of labour resources at OPG is evident in its underspending in both labour and purchased services in 2016 that ultimately forced some work to be deferred. The PWU submits that a disallowance of labour, overtime, and purchased services within base OM&A would not be appropriate as it would further restrict OPG's resources and hinder its ability to safely and efficiently execute necessary work.

42. An update to OPG's application included a new base OM&A expense, $41.1 million in the test period, to comply with the CNSC's expected Fitness for Duty

[30] Tr. Vol. 14, pp. 7-8
[31] Tr. Vol. 13, p. 91

regulatory requirement.[32] The proposed Fitness for Duty regulations are related to employee drug, alcohol, psychological, and physical testing. When the N1 update was filed in December 2016, the regulatory document was expected to be released March 2017. The CNSC subsequently informed OPG that release of the Fitness for Duty regulatory document has been postponed and there is no set timeframe for its release or implementation.[33] Nor is there any indication that the regulatory document, when and if it is finally introduced, will be the same, or even similar to the draft document.

43. The PWU therefore submits that any amount related to Fitness for Duty should be removed from the revenue requirement and subject to a deferral account. OPG's obligation to spend this amount is subject to the determination of an external entity (the CNSC). It is not apparent when, if ever, the obligation will be imposed. Without the final document it is also not apparent what OPG's obligations will be and the resulting costs, assuming the regulation is actually imposed.

44. Should the obligations be imposed, OPG understands that there is a very serious question whether random drug testing can be lawfully imposed. OPG also understands that it is highly probable that the legality of those obligations will be challenged by the PWU and others. It is highly uncertain whether all, or any, of the funds in question will actually be spent. Given that OPG does not know whether the costs will be incurred and, if they are incurred, the amount of those costs or when they will be incurred, the PWU believes that it would be more appropriate to subject Fitness for Duty costs to a variance account than include it in the revenue requirement.

45. Project OM&A includes costs for work that is considered unique and temporary. Costs can vary from year to year according to forecast work programs, though project OM&A is consistently close to $100M per year. OPG notes that the majority of project OM&A is related to sustaining projects that are required to operate safely and maintain unit reliability.[34]

46. Similarly, outage OM&A varies from year to year depending on the scope of work required during each planned outage according to the Nuclear Generation and Outage

[32] Exhibit N1 - Impact Statement, p. 20-21
[33] Undertaking J13.5
[34] Exhibit F2-3-1, p. 4

Plan.[35] Outage OM&A is higher in the first few years of the test period with outage work on Unit 2 spread over 2017 to 2019 and additional outages required for Pickering Extended Operations ("Extended Operations" or "PEO"). Outage OM&A consists of routine and non-routine activities performed during planned outages, such as maintenance, inspection, and replacements.[36]

47. The majority of outage OM&A costs are in labour resources: regular labour, non-regular labour, overtime, augmented staff, and other purchased services.[37] A major accommodation from the PWU in the 2015 collective agreement was providing OPG with more flexibility to increase the use of purchased services. OPG can use purchased services for irregular work if it is the most economically feasible option. Following the new collective agreement, OPG is expanding the use of purchased services and reducing the amount of overtime paid to its employees. As noted in the oral hearing, overtime is still used when it is the most cost effective option.[38] As discussed further in this submission,[39] OPG's success in recent collective agreement negotiations contributes greatly to its ability to control costs.

48. In their submission, Board Staff propose a 5% disallowance to outage OM&A based on a historical overspend and Board Staff's claim that forecast Unit 2 outage spending is too high. OPG's evidence indicates that a number of initiatives have been undertaken to reduce outage OM&A costs. The initiatives are aimed at improving outage planning and execution to minimize the schedule and costs needed to undertake the required work, which was discussed by the nuclear operations panel in the oral hearing:[40]

> **MS. CARMICHAEL: I would say that for outage OM&A what we've done is we've incorporated duration and times associated with improving outage performance, so if it takes a shorter amount of time to do a window or a certain job within that outage, we've incorporated a shorter duration, and we've also included a shorter requirement for labour, which could be a balance between purchased services and some overtime. So we've already incorporated those in the calculation of outage OM&A.**

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[35] Exhibit F2-4-1, p. 3
[36] Exhibit E2-1-1, pp. 6-7
[37] Exhibit F2-4-1, Tables 2 & 3
[38] Tr. Vol. 6, p. 113 & Tr. Vol. 13, p. 106
[39] Issue 6.6 - Compensation
[40] Tr. Vol. 14, p. 16

49. One example of improving outage performance provided by OPG is a reduction in the number of days required for a PHT pump replacement from 28 days to 20 days.[41] The lower costs realized from efficiencies like the reduced PHT pump replacement schedule are already reflected in the application.

50. Had there been no refurbishment, Unit 2 would have required two outages, one in 2016 and another in 2019. Those two outages are replaced with outage work performed from 2017 to 2019 as Unit 2 is laid up during refurbishment. Outage OM&A for each Darlington unit is summarized in the following table: [42]

Line No.	Nuclear Stations	2013 Actual (a)	2014 Actual (b)	2015 Actual (c)	2016 Budget (d)	2017 Plan (e)	2018 Plan (f)	2019 Plan (g)	2020 Plan (h)	2021 Plan (i)
1	Darlington NGS									
2	Unit 1	2.2	70.1	1.7	8.3	122.6	1.1	6.4	128.2	6.1
3	Unit 2	83.9	0.5	0.1	16.0	53.7	38.7	31.7	14.8	13.6
4	Unit 3	0.0	3.9	91.4	0.0	3.9	110.3	0.0	43.9	44.6
5	Unit 4	60.5	0.7	1.7	99.5	0.3	4.3	110.1	0.0	0.0
6	Common[1]	0.5	5.7	63.5	1.3	0.0	0.0	0.0	0.0	0.0
7	Total Darlington NGS	147.2	80.9	158.4	125.2	180.6	154.3	148.1	187.0	64.3

51. The total cost of outage work on Unit 2 in those three years (2017-2019) is $124.1 million. Board Staff contend that this budget is greater than the cost of a typical outage of $80 million to $100 million.[43] The PWU disagrees with this and notes that the cost of each Darlington unit outage in the test period is between $110 million to $130 million. The total $124.1 million for Unit 2 outages over the first three years of the test period is comparable to each Unit 1 outage. Board Staff note the scope of outage work can be different for a unit that is not in-service. Activities related to start up and shut down and work on components that are part of the DRP can be avoided. However, on the other hand, some work that is beyond the scope of regular outage work can only be done during an extended outage. The PWU submits that the outage budget for Unit 2 is reasonable given that the cost is comparable to the other unit outages in the test period.

52. OPG is undertaking a number of initiatives aimed at controlling OM&A costs. Some of these initiatives include: the Human Performance Initiative to reduce human

[41] Tr. Vol. 14, p. 18
[42] Exhibit L-6.1-20 VECC-020, Chart 1
[43] OEB Staff Submission, p. 80

error, the Equipment Reliability Initiative to reduce the forced loss rate, the Outage Performance Initiative to minimize outage OM&A, the Parts Improvement Initiative to increase part availability, the Inventory Reduction Initiative to minimize the cost and obsolescence of spare parts, and the Workforce Planning and Resource Initiative to better manage human resources.[44]

53. Some of these initiatives directly reduce OM&A and many reduce costs indirectly by reducing lost generation and maximizing resource efficiency. The PWU notes that some OM&A functions contribute to reducing capital costs and so increases to spending in those areas may be a result of a prudent decision to minimize rate impacts.

54. The benefits of the initiatives listed above are already built into OPG's application. On top of these cost control measures, OPG is proposing a 0.3% stretch factor that will require the organization to find further cost-saving measures. Practically, the application of the stretch factor will reduce annual base OM&A growth from 1.3% to 1%. The PWU submits that this level of low OM&A growth is reasonable given the level of cost control efforts exhibited by OPG in the face of upward cost pressures.

Issue 6.5: Are the test period expenditures related to extended operations for Pickering appropriate?

55. The PEO initiative will extend the operating life of all six units at Pickering beyond 2020 until 2022, at which point two units would be shut down and the four remaining units would operate until 2024. Extended Operations includes incremental activities such as the Periodic Safety Review, the Fuel Channel Life Assurance project, incremental outage inspection and maintenance programs, component condition assessments, and potential modifications required to demonstrate fitness-for-service beyond 2020 and maintain safe, reliable operations.[45]

56. The incremental cost of the PEO, above normal operating costs, is forecast to be $307M over 2016-2020 period.[46]

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[44] Exhibit F2-1-1, pp. 19-21
[45] Exhibit F2-2-3, p. 6 of 9
[46] Exhibit F2-2-3, p. 3 of 9

57. OPG has filed the IESO's independent assessment of Extended Operations dated March 2015 as well as an updated assessment dated October 2015. The updated assessment shows a net present value benefit ranging from $300M to $500M ($2015). This corresponds with OPG's own internal assessment, which shows benefits ranging from $500M to $600M. The difference arises primarily because the IESO uses a lower real discount rate (4 per cent versus approximately 5 per cent used by OPG) and different system assumptions for items such as load growth and the price of gas-fired generation.[47]

58. The incremental investment is expected to allow OPG to generate approximately 62 additional TWh over the remaining life of the plant, which equates to a levelized unit energy cost of about 6.5 cents/KWh for the additional production.[48]

59. OPG submits that for the Ontario electricity system, the PEO will mitigate capacity uncertainties during the refurbishments of the Darlington and Bruce stations. The overall system net economic value is positive because maintaining Pickering's capacity reduces the need to operate more expensive gas-fired capacity and the need for imports. Additionally, CO_2 emissions are reduced by approximately 17 million tonnes over the 2021 to 2024 period.[49]

60. With respect to electricity customers, OPG submits that the primary benefit is to moderate the rate impacts that would otherwise occur during the Darlington refurbishment following the shutdown of the Pickering units. This is made possible by increased nuclear generation after 2020, which results in a larger OPG generation base to spread the impacts of the Darlington Refurbishment costs being placed into the rate base.[50]

61. Following the eventual shutdown of Pickering, OPG expects to incur severance and related costs. Extended Operations will defer the costs associated with closure of the station by up to four years. OPG estimated the incremental savings in severance

[47] Exhibit F2-2-3, p. 7 of 9
[48] Exhibit F2-2-3, p. 2 of 9
[49] Exhibit F2-2-3, p. 2 of 9
[50] Exhibit F2-2-3, p. 7 of 9

and related costs to be $247M ($2015).[51] Additional deferral benefits are expected to come from delaying the costs to place the Pickering Units in a safe-stored state and eventually dismantling the units. Extending the time before these costs are incurred also permits additional growth in decommissioning funds.[52]

62. According to OPG, the nuclear revenue requirement has been developed on a nuclear-wide basis and cannot be readily attributed to a particular initiative or facility due to various common costs shared between facilities. OPG has presented evidence that shows the impact of the PEO enabling costs on the nuclear revenue requirement is negligible as can be seen from the chart below:[53]

Chart 1

Line No.	Description	Reference	2017	2018	2019	2020	2021
		(a)	(b)	(c)	(d)	(e)	(f)
1	Pickering Extended Operations Enabling Costs ($M)	Ex. F2-2-3, p. 6, Chart 2, line 7	25.6	55.3	107.1	104.3	0.0
2	Nuclear Revenue Requirement ($M)	Ex. I1-1-1, Table 1, line 26	3,189.9	3,250.0	3,285.0	3,774.8	3,489.4
3	PEO Enabling Costs as a % of Nuclear Revenue Requirement (%)	n/a	0.8%	1.7%	3.3%	2.8%	0.0%

63. Similarly, OPG's evidence shows that any variance between forecast and actual Extended Operations spending, including amounts spent in 2016 where no forecast was incorporated in the 2014-15 approved payment amounts, will be included in the CRVA for disposition in a future proceeding.

64. The PWU has observed, as has the Board, that most of the issues raised by some parties with respect to the PEO would involve an examination of updated or alternative system planning scenarios. The Board has explicitly ruled that its assessment of the reasonableness of the forecast PEO costs will not be based on

[51] Undertaking J13.6
[52] Exhibit F2-2-3, p. 8 of 9
[53] Exhibit L-6.5-1 Staff-133

system planning considerations or criteria. The Board made its view clear on many occasions in this proceeding including in its Decision on Motions filed by Environmental Defence:[54]

> **updated analysis would be of limited value in assessing whether the expenditures are reasonable, given the fact that the economic rationale is not the only relevant factor" and any examination of system planning would be inconsistent with the scope of Issue 6.5.**
>
> ...
>
> **The OEB also rejects the argument that the determination of the Pickering operating costs should be based on a comparison with the least supply alternative. The OEB is open to considering arguments on appropriate cost containment measures to ensure efficient operation of Pickering, but does not consider that the market price argument is the appropriate way to achieve that outcome.**

65. Notwithstanding the Board's express decision to exclude examination of system planning and "least cost supply alternatives" from the scope of the issue, it is apparent that some parties seek to reintroduce this analysis as a basis to support an argument in favour of disallowances.

66. The PWU submits that in assessing the prudence of OPG's expenditures to-date and those proposed in the test years for the PEO, the Board should consider the following.

a. The Relevance of IESO's Economic Analyses

67. In March 2015, upon the request of the Ministry of Energy ("Ministry"), the IESO provided an independent assessment of the integrated power system impacts of various Pickering life extension scenarios between 2018 and 2024.[55]

68. The IESO's March 2015 assessment concluded that:[56]

> **while not without its potential pitfalls, extended Pickering operation holds potential benefit and merits further exploration. In particular, the scenario of Pickering operation to 2022/2024 appeared most promising among the extension options assessed.**

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[54] Ontario Energy Board Decision and Order on Motion Filed by Environmental Defence, February 16, 2017

[55] Exhibit F2-2-3, Attachment 1, p. 2 of 116

[56] Exhibit F2-2-3, Attachment 1, p. 2 of 116

69. The Government convened a working group in April 2015 consisting of the Ministry of Energy, OPG, and IESO to develop a work plan, identifying activities to increase the economic, technical, and regulatory confidence with respect to Pickering life extension.[57]

70. Consequently, the IESO updated its evaluation of the merits of Extended Operations in October 2015, focusing on the extension to 2022/2024 option in light of updated technical and economic information from OPG and changes to the electricity planning context since the March study.[58]

71. The IESO's updated assessment indicated,[59] on balance, Pickering extension to 2022/2024 was an option worth continuing to explore due to the fact that it:

- **Defers the need of supply/transmission investments that would otherwise be required earlier**
- **Defers procurement decisions with respect to new resources, providing more time in exercising options while reducing the risk of over investment during a period of supply/demand uncertainty**
- **Provides insurance supply in some years in case of nuclear refurbishment delays**
- **Defers Pickering decommissioning and severance costs**
- **Offsets production from natural gas-fired resources**
- **Increases export revenues and reduces carbon emissions**

72. The objective of the two reports by the IESO was to assess the impact of different PEO scenarios on the integrated power system and as such the reports are inputs prepared to inform system planning. The reports analyze and compare the economic benefits of the PEO against those of an alternative energy supply option – gas-fired generation. The IESO explained its choice of a gas-fired generation for comparison by saying that gas fired generation is a fairly mature and standardized technology that is readily available in Ontario.[60] The IESO considered other alternative supply resources in its analyses including imports, demand response, renewal of NUG contracts, etc. - but only in the event that the PEO does not proceed.

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[57] OPG Argument-in-Chief, May 3, 2017
[58] Exhibit F2-2-3, Attachment 1, p. 2 of 116
[59] Assessment of Pickering Life Extension Options October 2015 Update. Prepared for discussion with Ministry of Energy. October 30, 2015
[60] Tr. Vol. 8, pp. 115-116

73. It is apparent that the IESO did not find it necessary to undertake exhaustive and comprehensive analyses of each and every alternative generation resource for two reasons:

a. First, the decision to shut down Pickering has already been made and the scope of the work the IESO has been assigned to undertake is to analyze the benefits of extending Pickering operation by a few years. It would not have been practical or cost-effective to engage in more comprehensive and all-inclusive analyses, especially given that most of the so-called alternatives are known to be impractical, unrealistic, and costly;

b. Secondly, for the purpose of analyzing the economic benefits of extending Pickering by 4 to 5 years, it makes sense to use gas-fired generation as comparator for its obvious simplicity, understandability, availability of data, and viability as an alternative resource within the time frame for which the PEO is considered.

74. Some parties have challenged the findings of the IESO reports on the ground that they do not fully analyze all the 'available' alternatives. The PWU submits that this is inconsistent with the scope of the issue and irrelevant to a rates proceeding. The Board concluded as much in its rulings on the Environmental Defence motion. Even if one were to agree with the view that the analyses are deficient (which is not acknowledged) because they do not fully analyze all available resources, they would only be deficient from a system planning perspective. However, that would only be a matter of consideration for the system planner – the government - who is mandated to make a decision as part of the Long Term Energy Plan ("LTEP") that is currently under review. It should also be recognized that IESO includes/excludes a variety of considerations from its analyses including societal costs and benefits that are not directly transferable or relevant to rate proceedings but very important from a system planning and public policy perspective.

75. Parties have also challenged the IESO analyses on the ground that some of the assumptions may not be current. It is not clear to the PWU how this line of argument is anything other than a system planning exercise.

76. It was acknowledged in the oral hearing that the IESO analyses provide a snapshot in time and that while some of the variables in the assumptions such as gas price have changed, they are generally consistent with the 2015 assumptions in the reports.[61] Moreover, as the IESO witness pointed out during the hearing, though variables may have changed, it is difficult to tell where the variables such as gas/carbon prices will be some years from now: [62]

> **MR. PIETREWICZ: --- yes. That is what the result yields. The uncertainty, though, is what will the gas prices be, number one –**
>
> **....and number two, what will those carbon costs be. I understand that only a couple of days ago Ontario had its first carbon auction. I don't have the results of that, and we'll see where that goes. What we project in the OPO, which is the series of carbon assumptions that you have, is what they call a floor price. Our understanding is that in the carbon auctions of the future there will be a level below which carbon prices will not be allowed to go. They can certainly go higher than that, but they will not be allowed to go lower. As a conservative measure we chose that floor price.**

b. The Scope of the issue and OEB's Jurisdiction

77. The PWU anticipates that some parties will make an argument that the Board's rate-setting jurisdiction extends to assessing whether the PEO is needed or not. As the PWU understands it, the suggestion is that the OEB has the authority to determine that the pursuit of the PEO would not result in rates which are "just and reasonable", and therefore should disallow some or all of its proposed costs. The PWU disagrees with any such suggestion and submits that if advanced, it should be dismissed.

78. It is implicit, if not explicit, in the Board's February 16, 2017 Decision and Order on the Environmental Defence Motion that the Board does not view itself as having the statutory authority to, in effect, decide whether the PEO proceeds or does not proceed, by allowing its costs to be recovered through rates. As the Board acknowledged, these decisions are made on the basis of system planning considerations, and are not governed exclusively by economic rationale.[63]

79. In any event, it is submitted that the provisions of s. 78.1 of the *Ontario Energy Board Act,* 1998 make the limits of the Board's authority clear. Section 78.1(1) entitles

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[61] Tr. Vol. 12, pp. 111-112
[62] Tr. Vol. 12, p. 77
[63] Exhibit L-6.5-1 Staff-133

OPG to receive payments from the IESO "with respect to the output that is generated by a unit at a generation facility prescribed by the regulations."[64] Further, s. 78.1(2) prescribes that the amount of the payment that OPG is to receive pursuant to s. 78.1(1) is the amount to be determined by order of the Board (essentially the amount determined by the Board to be "just and reasonable").[65]

80. The purpose and effect of s. 78.1 could not be clearer. So long as a generation unit remains "prescribed" (a determination made by the Lieutenant Governor-in-Council), and so long as it continues to generate "output", OPG is entitled to be paid for that output. The sole role of the Board is to determine the "amount" of that payment. The statutory scheme pre-supposes that the unit is generating output (since, in the absence of any output, there is no "amount" to be determined by the Board). It would be entirely inconsistent with the statutory scheme for the OEB to retain some residual authority to determine that, notwithstanding the fact the unit was generating output, the price of that output should be zero, or some other amount less than the actual costs OPG prudently incurs to operate that unit.[66]

81. Moreover, the PWU submits that the Board's ratemaking authority, as broad as it is, cannot extend to the circumstances here. To do so, would necessitate the Board undertaking a system planning exercise, in circumstances where it has recognized it has no such authority. Essentially, the submission is made that, while the Board does not have approval authority over the PEO, it does have authority to limit OPG's recovery in rates only to a just and reasonable amount, which in such circumstances is the "least cost" provider of the capacity and energy in the market. Presumably this would be achieved by disallowing all costs claimed by OPG in relation to PEO which exceed the least cost alternative.

82. Of course, this exercise presupposes that the optimal system planning outcome is the "least cost alternative" (a proposition which the Board has already rejected), and that the Board is actually in a position to determine what the cost (over the test period)

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[64] *OEB Act, 1998,* s. 78.1(1). NB pursuant to O. Reg. 53/05 Pickering NGS remains a "prescribed asset".
[65] *OEB Act, 1998,* s. 78.1(2)
[66] A price less than OPG's actual prudently incurred costs would be inconsistent with the Board's statutorily imposed objects of maintaining the financial viability of utilities.

of the "least cost alternative" actually is. The Board has neither the statutory mandate,[67] nor institutional competence to make such a determination, and in any event, has no evidence on this record to do so.

c. Pickering Benchmarking Performance

83. It would appear that the only potential basis to disallow any part of the PEO costs claimed by OPG is Pickering's relative cost performance as presented in the benchmarking study. In many instances the Board has considered performance benchmarking as one source of information to help it determine the reasonableness of proposed costs. The PWU has reservations as to the utility of benchmarking as a reliable tool for rate-setting purposes. However, the PWU also believes that it can be used as an additional tool to assess how utilities compare directionally and historically with other utilities in order to encourage them to improve efficiency.

84. The reality of the Pickering situation is clear. Pickering is an aging station close to retirement. Due to its older technology and outage rates, costs cannot be reasonably compared. The issue should be whether OPG has done what it can and what is within its control to improve Pickering's performance. The PWU submits OPG has. Improvements have been achieved at Pickering. OPG discussed measures it is taking to control Pickering costs in cross-examination with Board Staff:[68]

> **MS. CARMICHAEL: I would again reflect on Darlington and Pickering separately. So Pickering, if you see how Pickering metrics are tracking, they have on an absolute matter improved. So we've gone from 2008 to -- where we were at 60.9 for NPI up to 68.5. UCF, we've gone from 67 percent to 77 percent. I know the quartiles are red, but the absolute number is a pretty significant improvement.**
>
> **And the TGC, as I explained earlier, has been contained; the cost elements have been contained.**
>
> **So we do know that's the Pickering situation. We believe that this shows improvement, and in addition, from 2008 earlier numbers, we've also included higher outage days for Pickering continued ops, which we have completed, and we've also included more dollars to accommodate the Pickering continued operation. So all those extra costs are included there, including the extended outages. That's the Pickering story.**
>
> **And in terms of Pickering again, I would like to talk about the FLR performance on Pickering. I know I mentioned this on Friday.**

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[67] Pursuant to Bill 135, the Minister of Energy is the system planner.
[68] Tr. Vol. 13, pp. 23-24

MR. MILLAR: Yes.

MS. CARMICHAEL: If you go back to the SEC 63, issue 6.2, and I believe it's page 49, again UCF is a factor of keeping your unit online. But if you have large extended outages to accommodate Pickering continued ops or even in the future extended operations, you would have to have these bigger outages. So the one area we can control is FLR.

So we have had concerted effort controlling FLR, improving FLR, and I would say a substantial improvement as you can see from this chart going from 2008, when the rolling Pickering FLR was 25 percent. And we have gotten that down to -- on this chart, I think it's 8.5 rolling, and we know our actuals have been now in the last two years just below 5 percent.

So that's another factor of we have been improving in Pickering.

MR. MILLAR: Pickering has been improving; that's fair. If you look at TGC, you're more or less frozen from 2008. There's been no increase.

85. If there had been evidence which compared the performance of Pickering against nuclear stations of a similar unit size, vintage, and proximity to retirement, such evidence might have some probative value in assessing the performance of the Pickering station. However, no such evidence is available.

86. In summary, it is evident that there is going to be significant change in Ontario's electricity system in the next 10-15 years. OPG has presented evidence demonstrating the role that PEO would play in this significant change. Aside from the economic benefits, PEO will provide a much needed insurance against many of the moving parts in the electricity system, including nuclear refurbishments, expiring contracts, and aging infrastructure. The Board's role in assessing the reasonableness of PEO's incremental costs are undisputed, however, the basis of such assessment should not be the costs of alternative energy supply or a consideration of whether there is a need for the PEO.

87. The Government has clearly demonstrated its support for the plan for PEO. The Province approved PEO in OPG's business plan and has publically indicated its intention to continue operating Pickering on a number of occasions, including within the 2017 LTEP discussion guide. The Board now has the critical task of determining the reasonableness of PEO's incremental costs.

88. In their submission, Board Staff propose to disallow all restoration costs in the test period and enabling costs in 2019 and 2020.[69] Restoration costs would instead be subject to a deferral account and enabling costs in 2019/2020 would be tracked in the CRVA upon approval of PEO. The pending approval of PEO by the CNSC is Board Staff's basis for the proposed disallowance and deferral/variance account treatment.

89. Board Staff suggest that OPG should "consider commencing the Restoration work after it has received approval from the CNSC."[70] While it is fair to put forward a suggestion for OPG to consider this, it would be unreasonable to expect that OPG can modify its PEO work schedule without consequences to project costs or resource availability. The impact of restricting OPG's labour resources has been noted in this submission[71] – deferring PEO restoration work would exacerbate this issue. PEO incremental cost estimates are based on OPG's work plan that appropriately considers many factors including resource availability and co-ordination with Pickering's regular operations. Disallowing costs or modifying the work program can lead to an increase in these incremental costs and reduce the net benefit of PEO to the detriment of ratepayers.

90. The PWU submits that all PEO enabling and restoration costs in the test period should be approved and not subjected to deferral/variance accounts. Should the Board disagree with this submission, the PWU suggests that the Board set clear conditions for when OPG can track these costs in the appropriate deferral/variance accounts. The PWU submits that this should occur upon approval of PEO by the CNSC.

91. To conclude, there has been no evidence adduced to demonstrate that OPG has not been prudently managing, and will not continue to prudently manage the costs associated with the PEO. As a result, the PWU submits that the Board should approve the costs associated with PEO.

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[69] Board Staff submission, p. 98-99
[70] Board Staff submission, p. 98
[71] Issue 6.1 and Issue 6.6

II. CORPORATE COSTS

Issue 6.6: Are the test period human resource related costs for the nuclear facilities (including wages, salaries, payments under contractual work arrangements, benefits, incentive payments, overtime, FTEs and pension costs, etc.) appropriate?

92. For ratemaking purposes, the OEB is interested in OPG's compensation costs because they constitute a material component of its overall revenue requirement. Like most of OPG's cost components, its total compensation costs are an aggregate of a number of different elements, which OPG must manage to produce an optimal result. Some of these factors include:

a. having the correct mix of skills and experience in sufficient numbers to undertake the work that must be done through the test period;

b. having the correct mix of labour and capital to efficiently and effectively undertake required work;

c. compliance with all applicable legal requirements including those for health and safety, environmental matters, nuclear safety, employment and labour relations standards; and

d. having the optimal mix of regular staff; non-regular staff and contractors to manage work flows.

93. While OPG's management of the component elements that comprise its total compensation cost may be of interest, the Board must be mindful of the fact that its ultimate concern is with the total of these costs. Moreover, it must be mindful of the fact that it is an intrinsic aspect of the management of the business to make trade-offs between and amongst these various cost elements in order to seek to achieve an optimal outcome. The Board must resist the temptation to unduly disaggregate these cost components and to "cherry-pick" amongst them for items which may, in isolation, appear "high". Such an exercise unfairly intrudes into the proper domain of management and ignores the inevitable trade-offs that management must make.

94. This "cherry-picking" issue arises in relation to a number of aspects of OPG compensation costs, and will be dealt with below as those issues arise. However, one example illustrates the issue.

95. It is apparent that OPG faces significant limitations on its ability to achieve substantial absolute reductions in per employee wage reductions for its unionized staff.[72] Confronted with this reality, it is apparent that OPG has used different strategies to reduce its overall compensation envelope. The most apparent is the significant reduction of the size of its regular staff. Through this mechanism, OPG's total compensation costs at the end of the test period will be lower than at the beginning. From the OEB's perspective, it is this outcome, rather than OPG's performance measured on a compensation per employee basis, which is the critical one.

96. The bottom line is that OPG has made significant strides in controlling compensation since their previous rate application. Efforts to reduce complement combined with low negotiated base wage growth rates allow for a 1.5% reduction in total compensation costs for OPG by the end of the rate period.[73] Though offset by lump sum payments and the share performance plan during the IR period, changes to the pension program will greatly benefit ratepayers beyond the test period.

97. OPG underwent a Business Transformation from 2011 to 2015 to reduce regular headcount by 2,700. OPG changed its structure to a centre-led matrix organization that requires fewer FTEs to operate on an ongoing basis.[74] The Business Transformation has allowed OPG to reduce overall compensation costs and puts OPG in a position to maintain those cost savings through the IR period.

98. Goodnight prepared a Nuclear Staffing Benchmarking study which found OPG to be overstaffed by 213 FTEs over the benchmark in 2014. The nuclear and compensation panels confirmed at the oral hearing that OPG has eliminated the staffing gap.[75] The following chart from a response to an interrogatory from the Society of

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[72] The reasons for this have been canvassed in this and prior hearings and will be referenced below. Of course, OPG has obtained a number of specific accommodations for its unions which will provide it with material savings in a number of important respects.
[73] Exhibit F4-3-1, Attachment 1
[74] Exhibit F4-3-1, p. 5
[75] Tr. Vol. 15, p. 45 & Tr. Vol. 16, p. 182

Energy Professionals (the "Society" or "SEP") demonstrates the recent reduction in FTEs to below the benchmark level.[76]

Process Area	March 2014 Actual	March 2016 Actual	Change 2016 vs. 2014
	(a)	(b)	(b) - (a)
Configuration Control	345	364	19
Equipment Reliability	442	407	(35)
Loss Prevention	303	302	(1)
Materials & Services	208	169	(39)
Operate The Plant	1,072	1,059	(13)
Support Services & Training	1,149	1,073	(76)
Work Management	1,902	1,686	(216)
OPG Benchmarked FTEs	**5,421**	**5,060**	**(361)**
2014 Goodnight Benchmark	5,208	5,208	
Benchmark Gap	**213**	**(148)**	

99. In their submission, Board Staff contend that the level of actual 2016 operations FTEs should be considered the steady state and thus should be the maximum number of FTEs in which OPG should recover compensation costs. The PWU disagrees with this submission. First, OPG was below planned FTEs (and the Goodnight benchmark) in 2016 and, consequently, overtime was 22% above plan.[77] Both the nuclear operations and compensation panels attributed above-plan overtime to the insufficient level of FTEs.[78] Second, work above the steady-state level is required for enabling PEO.

100. OPG is proposing more FTEs than Board Staff's proposed "steady-state" level in only the first three years of the test period before FTEs decline in 2020 and 2021. In suggesting a "steady-state" cap on the number of FTEs in a given year, Board Staff is micromanaging OPG's labour resources. The PWU notes that the average number of operations FTEs in the test period is 6,150 – fifty FTEs fewer than the so-called steady-

[76] Exhibit L-6.2-19 SEP-003, p. 2, Chart 1
[77] Undertaking J15.12
[78] Tr. Vol. 15, pp. 100-101 & Vol. 16, pp. 1-2

state.[79] OPG must be provided the flexibility to manage its work programs in a prudent manner and should not be restrained by artificial restrictions to their resources. The PWU submits that the number of FTEs is appropriately determined by OPG based on need and should not be limited by an artificial cap.

101. In 2015 OPG negotiated new collective bargaining agreements with the PWU and the Society. As OPG's shareholder, the provincial government established a mandate for OPG to achieve a net neutral cost outcome and address long term pension sustainability.[80] The key outcomes of the negotiated agreements are:

- A 1% annual base wage increases;
- More flexibility with respect to purchased services and term employees; and
- Increased employee pension contributions and pension program restructuring in exchange for lump sum payments and share performance plan disbursements.[81]

102. The provincial government was satisfied that the collective agreements met the mandate.[82] Details of the net neutrality of the collective agreements and long-term benefits of the pension reform were provided on a confidential basis in a response to Board Staff interrogatory 147, undertaking JX17.10, and undertaking JX17.11.

103. Mr. Milton discussed the significance of the collective agreements in cross-examination with the PWU:[83]

> **MR. MILTON: It's been -- in my years of bargaining, it's been a significant improvement in our pension costs and our pension design in my years with the company. So without a doubt, it's significant there.**
>
> **With refer to the base wages, if you look at the history over the last 15, 16 years, it's been -- with the exception of a Society arbitrated settlement, the wages have been lower than what we've negotiated in the past.**
>
> **So it has been a very good deal for a collective agreement for OPG.**

104. The 1% wage growth through the duration of the collective agreements is, for the most part, lower than past negotiated wage growth rates and lower than inflation.[84]

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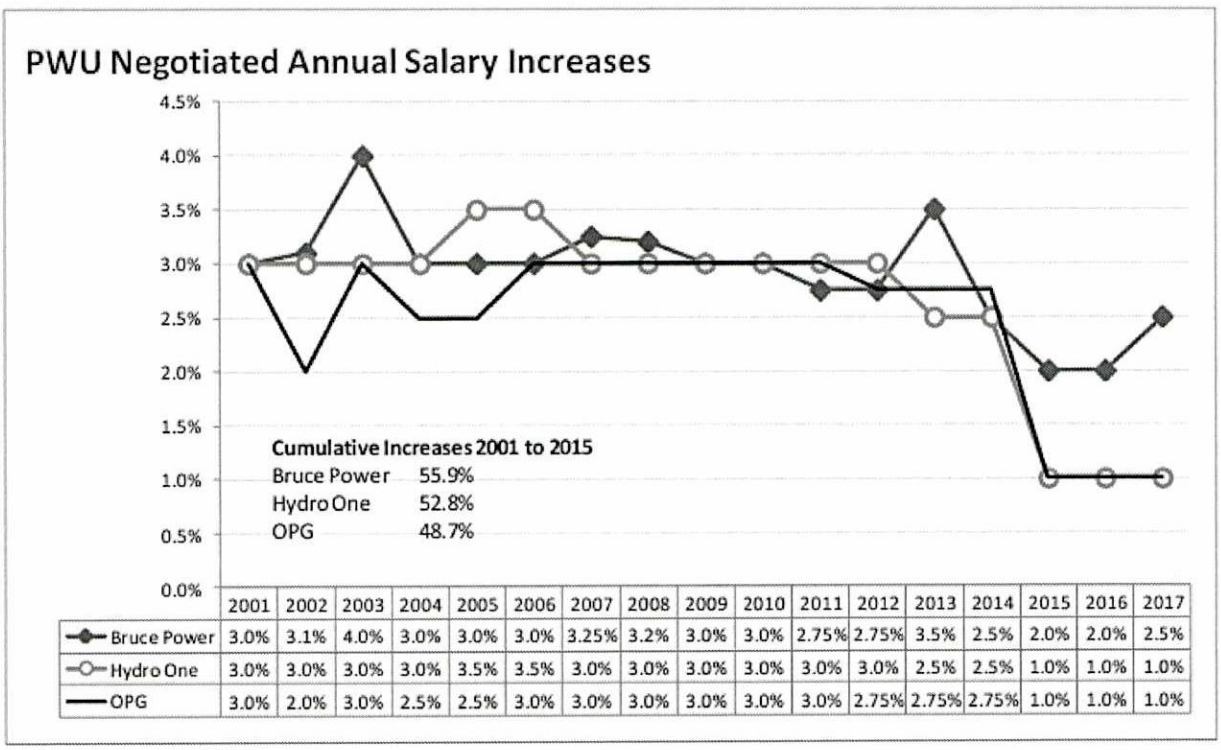
[79] OEB Staff Submission, p. 92
[80] Exhibit F4-3-1, p. 15 & Exhibit L-6.6-1 Staff-147, Attachment 1
[81] Exhibit F4-3-1, pp. 8 & 15-17
[82] Exhibit F4-3-1, p 15
[83] Tr. Vol. 16, p. 10

Overtime, benefits, and pensions are tied to base wages so modest wage increases will contribute to controlling these compensation costs.[85] The following chart compares the wage trends of OPG with its two main competitors for labour, Hydro One and Bruce Power, for PWU represented employees.[86]



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bruce Power	3.0%	3.1%	4.0%	3.0%	3.0%	3.0%	3.25%	3.2%	3.0%	3.0%	2.75%	2.75%	3.5%	2.5%	2.0%	2.0%	2.5%
Hydro One	3.0%	3.0%	3.0%	3.0%	3.5%	3.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	2.5%	2.5%	1.0%	1.0%	1.0%
OPG	3.0%	2.0%	3.0%	2.5%	2.5%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	2.75%	2.75%	2.75%	1.0%	1.0%	1.0%

105. The provincial mandate of net zero in the collective agreement was achieved by offsetting the small increases in wage costs with savings arising from increased resource flexibility.[87] These savings may not necessarily reduce compensation costs and compensation metrics directly. Increased resource flexibility provides material cost savings for OPG realized through concessions made by the PWU and Society. OPG discussed resource flexibility within the context of the difficulties of achieving compensation cost reductions in cross-examination with the PWU:[88]

> **MR. STEPHENSON: And that's why the company has focused really on using other mechanisms that allow it to save money overall, in terms of giving it flexibility, about deployment of issues, and use of purchased services, use of**

[84] Exhibit F4-3-1, p. 8
[85] Tr. Vol. 16, p. 13
[86] Exhibit F4-3-1, p. 8, Figure 5
[87] Cost savings can be found in confidential undertaking JX17.10
[88] Tr. Vol. 16, p. 19

augmented staff and so forth. You've had to look to a broader range of options that wind up saving you net dollars overall, fair? It's not just about rates?

MR. MILTON: We look at all options that could make us more effective and save costs at bargaining, and where we can negotiate those and get agreement with the PWU, we do so.

106. In determining just and reasonable rates, an overreliance on the compensation per employee metric does not appropriately consider these savings. OPG's goal going into collective bargaining negotiations is to minimize its total compensation cost for a given level of service or to maximize the level of service for a given level of total compensation cost. As stated above, this goal can be achieved through a variety of means. OPG cannot, does not, and should not, focus simply on compensation per employee.

107. Though offset by lump sum payments and the share performance plan during the test period, the pension structure reform negotiated in the collective agreements is a significant benefit to ratepayers beyond the test period. Pension cost reductions are realized through a number of changes to the pension structure.

108. The main change is a nearly 50% increase in employee contributions from 24% in 2014 to 35% in 2017.[89] The projected savings associated with the increased employee contributions is $88 million[90] in the test period.[91] The earnings basis for determining pension benefits will now include the five highest years of an employee's earnings instead of three years. This will reduce the amount paid to retirees, for both new hires and current employees, starting in 2025. Additionally, early undiscounted pension eligibility will be extended from the Rule of 82 to the Rule of 85 in 2025, effectively delaying pension eligibility for an average of one and half years.[92] As a result, employees will now be paying more, and getting less in terms of pension.

109. In exchange for these pension reforms, the PWU and the Society received two lump sum payments and shares in Hydro One from the Share Performance Plan. PWU and Society represented employees each received one per cent of their salary in lump

[89] Obviously, this rate of increase vastly exceeded inflation or the rate of compensation increases over the same time frame.
[90] Exhibit L-6.6-1 Staff-147, p. 2 (d)
[91] Projected savings beyond the test period were provided on a confidential basis in Undertaking JX17.11
[92] Exhibit F4-3-1, p. 16

sum payments in the first year of the contract and two per cent in the second year. Unlike base wages, the lump sum payments are not tied to overtime, pensions, or benefits so there is no corresponding increase to those costs.[93]

110. The Share Performance Plan grants Hydro One shares to employees based on their salary at the start of the collective agreement. Employees with less than 35 years of pensionable service are eligible to receive shares for up to 15 years. As new hires are not eligible and share disbursements cease when an employee leaves OPG, the cost of the Share Performance Plan declines as the number of eligible employees declines over time.[94]

111. The projected total test period cost for the lump sum payments and Share Performance Plan is $92 million,[95] only $4 million more than the test period savings from increased employee contributions. As the lump sum payment and Share Performance Plan costs continue to decline until they cease completely in 2032, the savings from increased employee contributions will continue. This is further explored in confidential undertaking JX 17.11. The marginal cost of pension reform in the test period can be considered as an investment in future pension cost savings. The PWU submits that it is a worthwhile investment with clear benefits to ratepayers.

112. A quantification of future savings associated with the increase to the number of years considered in determining pension earnings and the move to the Rule of 85 have not yet been provided by OPG. These changes to the pension structure, though not realized until 2025, will result in material savings for ratepayers in the future. The PWU submits that it would not be appropriate to consider OPG's costs in obtaining concessions from the PWU and the Society without fully considering the benefits of those concessions.

113. The positive outcomes of the collective agreements put OPG in a position to effectively control compensation costs going forward. This is best demonstrated by the following PWU table of OPG's total and year-over-year average compensation trends from the start of the collective agreements in 2015 through to the end of the test period.

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[93] Tr. Vol. 16, p. 13
[94] Exhibit F4-3-1, p. 17
[95] Exhibit L-6.6-1 Staff-147, p. 2 (g)

	Total Change 2015-2021			Average Annual Change 2015-2021[96]		
	FTEs	Comp / FTE	Total Compensation	FTEs	Comp / FTE	Total Compensation
PWU	**-1.76%**	**2.37%**	**0.57%**	**-0.30%**	**0.39%**	**0.09%**
Society	4.35%	5.08%	9.65%	0.71%	0.83%	1.55%
Management	3.40%	1.31%	4.76%	0.56%	0.22%	0.78%
EPSCA	115.73%	-18.55%	75.71%	13.67%	-3.36%	9.85%
OPG Overall	**2.21%**	**2.80%**	**5.07%**	**0.37%**	**0.46%**	**0.83%**

Based on Exhibit F4, Tab 3, Schedule 1, Attachment 1

114. Total compensation increases by slightly more than 5% in this 7 year period, an average annual increase of 0.83%. This rate of total compensation cost growth is markedly lower than inflation and lower than OPG's historic rate. This is particularly true for PWU represented employees in which total compensation increases by 0.09% per year.

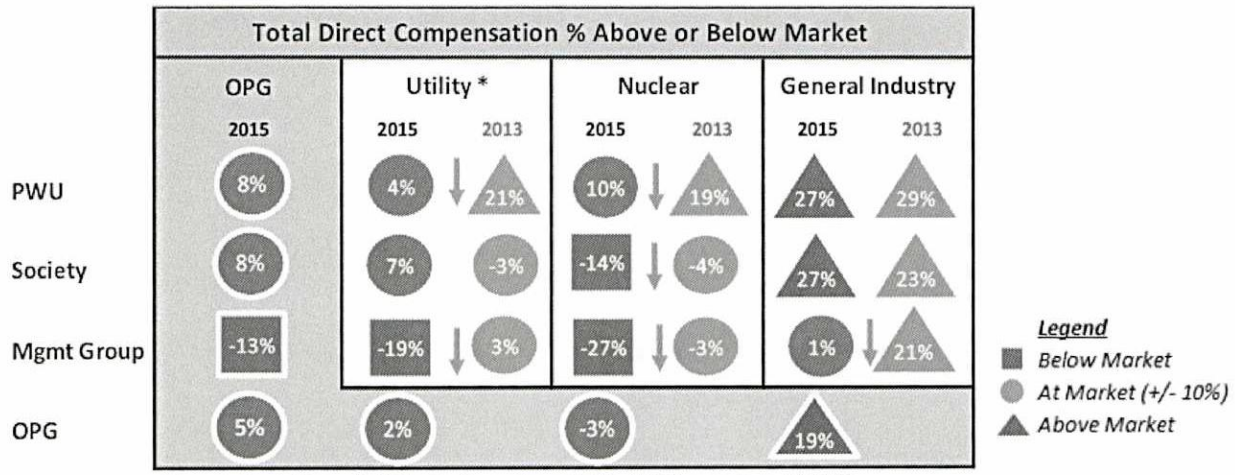
115. After an increase in FTEs required for the DRP and PEO, the number of FTEs falls as PEO work programs and outage activity declines. Additionally, further staffing reductions by 2020 are embedded in OPG's business plan and this application.[97] By the end of the test period, OPG expects to have 2.2% more FTEs in 2021 than in 2015, an average annual increase of 0.37%. Notably, the number of PWU represented FTEs declines by 0.3% per year.

116. The other key influence on total compensation trends, besides FTE growth, is compensation on a per employee basis. Compensation per employee increases by a total of 2.8% from the start of the collective agreements to the end of the test period. That is an average of less than half a percent increase per year.

117. Willis Towers Watson conducted a benchmarking study to compare OPG's compensation levels with its peers in 2015. AON Hewitt conducted a similar study in 2013 for OPG's last rate application. During the oral hearing the compensation panel stated the Towers study includes more individuals and more organizations so it is more representative of OPG's compensation than the AON Hewitt study.[98] The results of the

[96] Geometric Mean
[97] Exhibit L-6.6-1 Staff-143, p. 5, (d)
[98] Tr. Vol. 16, pp. 70-71

Willis Towers Watson and AON Hewitt studies are summarized by work segment and by representation in the following chart.[99]



** Largest portion of OPG employees are in the Utility segment (69%).*

118. The figures reported in the above chart represent the difference in magnitude of OPG's total direct compensation relative to the market. OPG's overall compensation levels are 5% above market, which is considered to be at market.[100] The results show a clear improvement in compensation relative to OPG's peers, though the differences between the studies make trend analysis unreliable. In cross-examination with Board Staff, the compensation panel contended that, in addition to methodological changes, some of the improvement in relative compensation levels is attributable to initiatives undertaken by OPG.[101]

119. The target percentile for the utility and general industry segments is the 50th percentile, or the median, and the 75th percentile is targeted for the nuclear authorized segment. The 75th percentile is used for this segment to account for the increased complexity of OPG's nuclear generation stations. The compensation panel provided more detail in cross-examination with Board Staff:[102]

> **MS. REES: It's more than just the four to the two units, or the two to the four units. One, with the number of units, you're responsible for the safe operations of more units from a single control room. You're overseeing more equipment, you're overseeing more systems. With the CANDU technology as well, there are**

[99] Exhibit F4-3-1, p. 19, Figure 11
[100] Exhibit F4-3-1, p. 18
[101] Tr. Vol. 16, p. 69
[102] Tr. Vol. 16, p. 56

more functions that is are not found in the U.S. utilities; so online fuel handling, and the heavy water handling as well are functions that are done by these licensed in the control rooms, and they will have more staff and more responsibility.

So the overall -- you might say sort of rating or level of the position has more responsibility associated with it in like with our units relative to the nine U.S. comparators.

120. Goodnight made a similar adjustment in their staffing benchmarking study to account for the increased complexity of CANDU technology, which was discussed further in cross-examination with SEC:[103]

MR. MILTON: I think what's called out here in the Goodnight study, the CANDU technology adjustment, that is a specific adjustment. It's staff numbers you require for things that are completely unique to a CANDU technology, like the heavy water processing and things like that that you don't find in U.S. reactors.

What Donna and myself have referred to is if you look at CANDU technology that is generating the electricity, not some of the ancillary things like heavy water that is in this adjustment here, it has more systems and those systems are highly integrated, and therefore it introduces more complexity whatever CANDU -- whether Pickering A, Pickering B, or Darlington, compared to a U.S. PWU. There's less systems in U.S. PWR.

So it was our determination that the 75th percentile was more representative. It was more representative of a proper benchmark for authorized staff, which is a small segment, as you know, of our population.

121. The PWU submits that the 75th percentile is the appropriate target for employees in the nuclear authorized segment.

122. The results of the Towers study show that OPG has made significant progress in controlling compensation relative to its peers. The compensation data used by Towers is as of April 1, 2015; the same day the PWU's collective agreement came in effect, and before the Society's collective agreement was in place. The beneficial outcomes of those collective agreements have been and continue to be realized by OPG but are not considered in this study.

123. In their submission, Board Staff note that the lump sum payments, the performance share plan, and overtime are not included in the study. With respect to lump sum payments and the share performance plan, Board Staff contend that it is "unlikely that OPG's comparators have similar incentives that have been excluded from

[103] Tr. Vol. 17, pp. 8-9

their total direct compensation."[104] Board Staff provide no basis to make this claim and to assume lump sum payments and share disbursements are unique to OPG. There may be other monetary and non-monetary elements provided to employees of comparators and not OPG. It is inappropriate to substitute assumptions for evidence. In the absence of adequate evidence, it was entirely appropriate for such payments to be excluded from the study. Moreover, as noted earlier in this submission, the lump sum payments and share performance plan should be considered within the context of the associated concessions and not simply as additional disbursements. Including lump sum payments would not be representative of compensation in the test period as the lump sum payments have been paid and shares are not available to each union member or to any new employees.

124. Similarly, there is no basis to contend that OPG's overtime is over benchmark. Various factors influence the use of overtime, including work programs and availability of other resources. Even if it were the case that OPG uses more overtime, that alone does not suggest that those costs were imprudently incurred. As noted in oral hearing, overtime is used when it is the most cost-efficient option.[105] Furthermore, an adjustment to the study to include overtime would overstate compensation without comparable adjustment acknowledging the additional work undertaken by OPG employees.

125. Progress in compensation cost control since the Towers study is already embedded in the application. OPG's ability to hold compensation increases per employee to 0.46% per year from 2015 to 2021 is largely due to the concessions made by the PWU and Society in their 2015 collective agreements. The Towers study reflects OPG's benchmarked compensation at a point in time, April 2015, and does not necessarily represent the organization's compensation relative to its peers in 2017 or through the test period. This was discussed in the PWU's cross-examination of the compensation panel:[106]

[104] OEB Staff Submission, p 103
[105] Tr. Vol. 16, p. 8
[106] Tr. Vol. 16, p. 21

MR. STEPHENSON: And so the results of that can change over time based upon two main factors. Number one, what your performance is, correct?

MS. REES: Correct.

MR. STEPHENSON: And number two is what the performance of everybody else is, right?

MS. REES: Correct.

MR. STEPHENSON: And those are both dynamic. They're both moving at all times, correct?

MS. REES: Correct.

MR. STEPHENSON: So what, if anything, does the Towers study tell us about where your benchmark placement will be in 2018, or 2020, or 2021?

MS. REES: It does not tell us what the forecast placement will be. It only tells us what it is as of this date.

126. The PWU anticipates that one or more parties will urge the Board to disallow some portion of OPG's forecast compensation costs for the test period on the basis that, regardless of OPG's forecast of changes to its compensation costs over the test period, OPG's per employee compensation costs are (a) already too high; and (b) any amount paid over the Towers median cost is excessive and should be disallowed. The Board should not accept these submissions.

127. First, viewed globally, the Towers survey shows that, in 2015 OPG was "at market". As noted above, the focus of the Board's concern should be with OPG's global performance, not its component parts. It is inappropriate to "cherry-pick" amongst the results and penalize OPG where the Board perceives it to have underperformed. The objective of OPG, as prudent manager, is to obtain the desired results from the sources where those results are available.

128. Secondly, the Towers survey is, at most, a snapshot of OPG's performance relative to certain peers at a point in time in 2015. Performance relative to a benchmark is a dynamic thing, and is likely to change with time. There is simply no evidence of what OPG's performance will be in the future relative to any benchmark, for any portion of the test period. It is not capable of supporting any amount of disallowance.

129. Thirdly, while the Towers survey may be a valuable management tool, it does not tell the Board anything as to what OPG will actually be able to achieve in its compensation setting, particularly with its unionized staff. Collective bargaining outcomes are not determined on the basis of benchmarking surveys. They are determined by the parties undertaking their legally imposed obligations to bargain in good faith, and the exertion of their bargaining power to achieve results in the parties' respective best interests. There is evidence that OPG obtained favourable outcomes in its most recent bargaining with the PWU and the SEP. There is no evidence whatsoever that OPG had any ability to achieve absolute rollbacks in wage rates either then, or will have such ability in future collective bargaining with its respective unions.

130. The Board does have evidence of the very modest per employee compensation increases that OPG is forecasting for the balance of the test period. The structure of the present application, whereby OPG is seeking to set rates for five years, means that OPG is under a very strong economic incentive to meet or beat those forecast outcomes when it undertakes it's bargaining. This will not be a situation where OPG can simply "pass along" the actual cost of a collective agreement to ratepayers. To the contrary, if OPG does better than it has forecast, the shareholder will be able to keep the difference. If OPG does worse than forecast, the shareholder will be forced to absorb those incremental costs.

131. Finally, as identified by OPG, insofar as the Board considers its performance relative to peers to be relevant, it has such evidence available to it. That is the evidence pertaining to Bruce Power. It is submitted that this evidence is far more probative and compelling than the Towers survey. The object of the Towers survey is to take a number of companies (each different in some way from OPG) and through their diversity, distill a composite "median" for use as a comparator. While such a process may have some value (particularly in circumstances where no direct comparator exists), its relevance is diminished in circumstances where there is a close direct comparator.

132. Bruce Power is such a close, direct comparator. In the oral hearing, Ms. Rees described Bruce Power as "the organization that is most similar to us".[107] Bruce Power

[107] Tr. Vol. 16, p. 25

is similar to OPG in that both operate in Ontario, compete within the same market for labour, negotiate with the same unions, have equivalent positions, and use similar CANDU technology.[108] Moreover, Bruce Power is an unregulated entity, so the Board need not be concerned that one regulated entity is "leveraging" off another. The evidence reveals that, in terms of per employee compensation, OPG pays materially less, and has done so consistently for a long period of time. This evidence may be inconvenient to those seeking to support a disallowance, but it is powerful, probative evidence the Board cannot ignore in exercising its responsibilities.

133. A comparison of compensation between the two nuclear generators conducted by Towers was included in OPG's evidence.[109] The following table details the salary comparisons for various PWU represented positions.[110]

			2015							
			Hourly				Yearly			
OPG Band	Job Titles	April 2015 Headcount	OPG	Bruce Power	Difference (OPG - Bruce Power)		OPG	Bruce Power	Difference (OPG - Bruce Power)	
					$ Per Hour	% Per Hour			$ Per Year	% Per Year
Authorized	Authorized Nuclear Operator (including Trainees, excluding supervisors)	227	$73.14	$71.75	$1.39	2%	$152,654	$149,752	$2,901	2%
	Certified Unit 0 Control Room Operator (including Trainees)	22	$65.61	$64.58	$1.23	2%	$137,355	$134,788	$2,567	2%
Band 3	Nuclear Operator (including Trainees)	649	$51.97	$60.96	-$8.99	-17%	$108,469	$127,232	-$18,763	-17%
	Electrical & Control Techn & Technologists / Shift Control Technician	729	$51.97	$59.87	-$7.90	-15%	$108,469	$124,957	-$16,488	-15%
	Mechanical Technician & Technologist / Mechanical Maintainer	714	$51.97	$59.70	-$7.73	-15%	$108,469	$124,602	-$16,134	-15%
	Chemical Technician / Chemical Technologist†	72	$51.97	$62.12	-$10.15	-20%	$108,469	$113,447	-$4,978	-5%
	Planning & Cost Control Technician / Cost & Scheduling Technician†	45	$51.97	$55.02	-$3.05	-6%	$108,469	$100,480	$7,989	7%
	Project Technician - E&C / Project Tech II - E&C	28	$51.97	$53.69	-$1.72	-3%	$101,690	$105,047	-$3,358	-3%
Band 2	Civil & Service Trades Maintainers / Civil Maintainer I	435	$40.42	$54.74	-$14.32	-35%	$84,362	$114,250	-$29,888	-35%
	Civil & Service Trades Maintainers / Civil Maintainer II		$40.42	$51.27	-$10.85	-27%	$84,362	$107,008	-$22,645	-27%
	Nuclear Security Officer	n/a	$40.42	$42.73	-$2.31	-6%	$84,362	$89,184	-$4,821	-6%
	Emergency Response Maintainer / Emergency Services Maintainer	84	$40.42	$49.33	-$8.91	-22%	$84,362	$102,959	-$18,596	-22%
	Office Support Representative II / Administrative Assistant - Clerk I (Admin)	194	$40.42	$48.12	-$7.70	-19%	$73,817	$87,879	-$14,062	-19%
	Finance Clerk / Payroll & Accounting Services Specialist	42	$40.42	$50.96	-$10.54	-26%	$73,817	$93,066	-$19,249	-26%
Band 1	Office Support Representative I / Clerk II	101	$33.20	$37.21	-$4.01	-12%	$60,631	$67,955	-$7,323	-12%
Totals & Weighted Average		*3,342*	*$50.32*	*$58.18*	*-$7.85*	*-17%*	*$103,967*	*$119,634*	*-$15,667*	*-16%*
% of PWU population		60%								

134. The table shows that the annual weighted average salary of PWU represented OPG employees is 16% lower than Bruce Power employees. A similar table shows that Society represented employees at OPG earn 2% less than at Bruce Power.[111] A comparison of wage growth for OPG, Hydro One, and Bruce Power is consistent with these results from the Towers study.[112]

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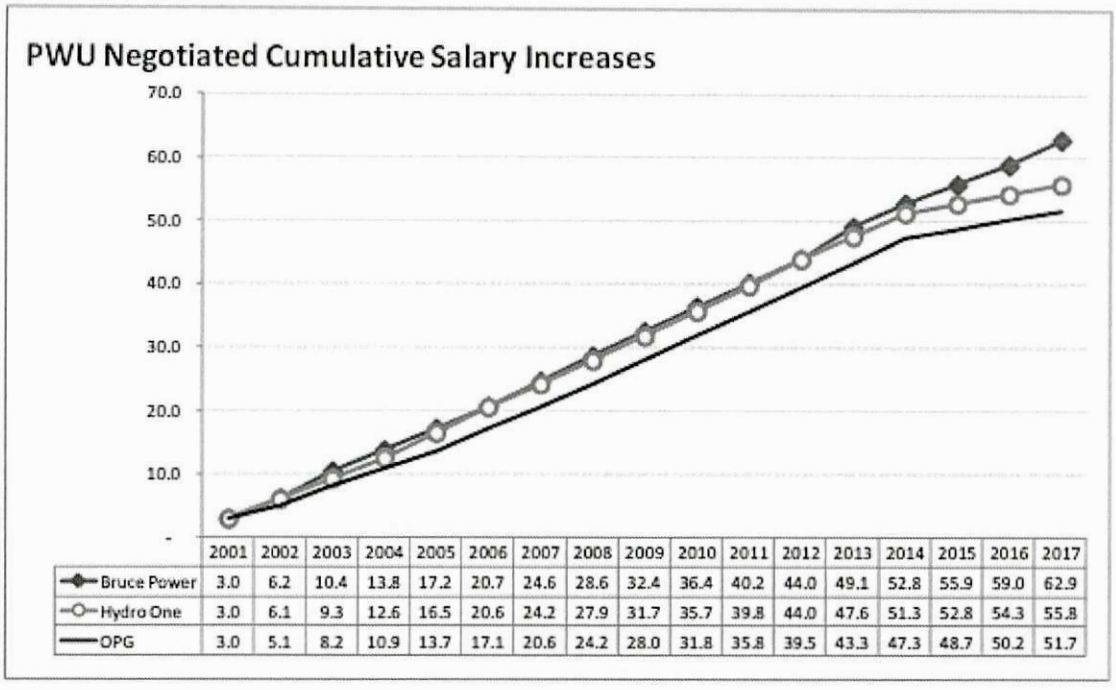
[108] OPG Argument-in-Chief, p. 112
[109] Exhibit F4-3-1, Attachment 3
[110] Exhibit F4-3-1, Attachment 3, p. 3
[111] Exhibit F4-3-1, Attachment 3, p. 2
[112] Exhibit F4-3-1, Figure 6, p. 9



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Bruce Power	3.0	6.2	10.4	13.8	17.2	20.7	24.6	28.6	32.4	36.4	40.2	44.0	49.1	52.8	55.9	59.0	62.9
Hydro One	3.0	6.1	9.3	12.6	16.5	20.6	24.2	27.9	31.7	35.7	39.8	44.0	47.6	51.3	52.8	54.3	55.8
OPG	3.0	5.1	8.2	10.9	13.7	17.1	20.6	24.2	28.0	31.8	35.8	39.5	43.3	47.3	48.7	50.2	51.7

135. This graph demonstrates OPG's past success in negotiating lower wage growth than Bruce Power. It also illustrates the significance of OPG's recent low wage growth. The kink created by the 2015 collective agreements marks an unprecedented departure from OPG's historic compensation trends. Bruce Power, OPG's closest comparator, has not realized comparable compensation control.

136. That Bruce Power has not achieved the lower wage growth that OPG has is hardly surprising given the difficulty both organizations have in achieving direct compensation reductions in labour negotiations. The compensation panel discussed the achievability of reductions in compensation costs in cross-examination with the PWU:[113]

> **MR. STEPHENSON: ...There are going to be people in this room that say that's not reasonable. There are going to be people in this room that say your compensation levels are already too high, and anything less than an absolute rollback in compensation rates for PWU and SEP employees is unacceptable and unreasonable.**
>
> **What do you say to that, in terms of the achievability of that outcome in 2018? What is the achievability of obtaining absolute rollbacks in those compensation rates in that round of bargaining?**
>
> **MR. MILTON: I guess I can answer two ways. If you look historically the wage increases, that would be extremely challenging. But bargaining is not done based solely on past experience. It's based on the climate at the time, the**

[113] Tr. Vol. 16, pp. 18-19

political climate, the corporate issues and concerns at the time, the government shareholder issues and concerns, so you would have to make an assessment at that time of what the priorities are and what the likelihood of success of those priorities are.

But to get an absolute zero or a rollback? Very challenging.

137. Despite the challenges faced by OPG, "a very good deal for a collective agreement for OPG"[114] that is net neutral to ratepayers and marks a significant improvement in compensation trends was achieved. The Board received evidence that further cost reductions to address the gap identified in the Towers study was not possible. The PWU submits that the disallowance of costs in circumstances where the utility could not actually achieve the lower costs is confiscatory and a denial of prudently incurred costs.

138. The PWU notes that in its written submissions, Board Staff proposes a disallowance of $50 million in compensation,[115] in addition to the $40 million proposed disallowance of base OM&A, on the basis of the results of the Towers study, the confidential AON Hewitt benefit study, and their interpretation of the pension contribution ratio. The PWU disagrees with this submission.

139. The proposed $50 million per year reduction cannot be achieved in the context of the current collective agreements. This disallowance cannot be made without a finding that the OPG acted imprudently in entering into those collective agreements. There is no such evidence, in fact the evidence is entirely to the contrary. Moreover, the $50 million proposed disallowance could not be achieved in the later years of the test period without an absolute rollback in current compensation for the PWU and SEP. There is no evidence that such a rollback is achievable by OPG acting reasonably. The PWU submits that the disallowance of costs in circumstances where the utility could not actually achieve the lower costs is confiscatory and a denial of prudently incurred costs. It cannot result in a just and reasonable rate.

140. Board Staff's proposed disallowance is a large round number, but the determination of that amount is vague and not substantiated. Their submission includes

[114] Tr. Vol. 16, p. 10
[115] OEB Staff Submission, p. 113

a discussion of disallowances in previous applications. Previous disallowances are irrelevant and do not consider the improvement in compensation costs reflected in this application and the fact that the current application is based on a combination of 5-year IR and customized IR framework, which is different from the past cost of service applications covering a 2 year period.

141. The submission notes a potential range of compensation above the Towers median as between $29.6 million, provided by OPG, and $46.7 million, calculated by SEC.[116] These amounts were derived as the difference between OPG's compensation and the peer group median according to relative compensation in 2015. This completely ignores all compensation cost savings achieved by OPG since the study. As a result, the proposed disallowance is the same regardless of the outcomes of those collective agreements.

142. In response to a PWU interrogatory, OPG indicated that the revenue requirement would be $31 million higher in the first year of the test period had wage escalation been 2%, the rate of inflation.[117] If wage escalation continued at the historic rate, the revenue requirement impact would have been even greater. A disallowance of $50 million based largely on the Towers study implicitly assumes that compensation relative to the peer group will remain constant from 2015 to 2021. The PWU submits that this is an inappropriate assumption and it is demonstrably not the case.

143. Board Staff's submission regarding pensions and benefits are also underpinned with outdated reports. Conclusions from the 2014 Leech Report, 2013 Auditor General report, and a 2011 Towers Watson study were discussed, though the relevance of OPG's pension plan prior to recent pension restructuring is not supported. The pension structure has materially changed since these reports were written. This was noted by the Auditor General in their 2015 follow-up to the 2013 report.[118] The follow-up report explains that OPG has made "significant progress" regarding its recommendations on compensation and has implemented a new policy to "align the ratio for pension

[116] OEB Staff Submission, p. 104
[117] Exhibit L-6.6-13 PWU-015
[118] Follow-up to 2013 Annual Report, Ontario Power Generation Human Resources, p 628

contribution and employee relocation benefits with the Ontario Public Service."[119] The PWU submits that compensation control measures implemented since the Collective Bargaining Agreements and the results of studies prior to that period should be considered in determining the appropriateness of proposed compensation costs in the test period. The outcomes of future collective bargaining agreements can only benefit from the Board's recognition of progress made in previous negotiations.

C. METHODOLOGIES FOR SETTING PAYMENT AMOUNTS

I. HYDROELECTRIC

Issue 11.1: Is OPG's approach to incentive rate-setting for establishing the regulated hydroelectric payment amounts appropriate?

Hydroelectric Productivity Factor

144. Two hydroelectric total factor productivity ("TFP") studies were produced for this case. The London Economics Group ("LEI") prepared a study for OPG to file as part of its evidence and the Pacific Economics Group ("PEG") prepared one on behalf of Board Staff. The studies differ in methodology, peer group selection, and overall conclusions. The key differences in methodology concern the appropriate output measure, the method to measure capital quantity, the time frame, and the mathematical method used to aggregate peer trends.

145. LEI's Empirical Analysis of TFP Trends in the North American Hydroelectric Generation Industry report found a -1% TFP trend over a 13 year period from 2002 to 2014. The study used volume to measure output and a physical method to quantify capital.[120] LEI suggests a negative productivity factor can be expected from a mature hydroelectric industry as capital is generally fixed and OM&A increases over time.[121]

146. Consistent with the Board's policy for LDCs with respect to negative productivity factors, OPG has proposed a 0% TFP. This effectively increases the stretch factor by

[119] Follow-up to 2013 Annual Report, Ontario Power Generation Human Resources, p. 627
[120] Exhibit A1-3-2, Attachment 1, p. 8
[121] Exhibit A1-3-2, pp. 18-19

1%. As noted by OPG, the hydroelectric segment must now exceed LEI's TFP trend by 1% to achieve target performance.[122]

147. PEG's IRM Design for OPG report found a 0.29% TFP[123] trend from 1996 to 2014. PEG used capacity to quantify output and a monetary method to measure capital. In its argument-in-chief, OPG explained in detail why LEI's use of volume as an output measure and the physical method for capital quantification are more appropriate for the hydroelectric industry.[124]

148. In addition to those methodological differences, the longer study period used by PEG significantly impacts on the results. PEG provided results for three time periods:[125]

Time Period	TFP Trend
1975-2014	0.94%
1996-2014	0.29%
2003-2014	0.05%

149. This table shows a clear decline in the TFP trend over time. In other words, the output trend has declined relative to the input trend. A declining TFP trend is consistent with LEI's notion that output is relatively steady while OM&A increases over time in a mature hydroelectric industry. PEG's recommended 0.29% TFP is based on the 19-year period from 1996 to 2014. The shorter time frame, 2003-2014, excludes the first seven years which results in a 0.05% TFP in that 12-year period. For the 19-year period TFP trend to be substantially different from the 12-year period TFP trend, the trend in that 1996 to 2002 period alone must be significantly greater than 0.29%.

150. The shorter time frame is close to LEI's study period. In direct examination by OPG, the expert witness from LEI explained the rationale for using this time frame:[126]

> **MS. FRAYER: We went back to 2002, so we had data covering 13 years, 2002 through 2014, in our report. Dr. Lawrie, I believe, has a preference to go back to the mid-1990s do his analysis.**

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[122] Exhibit A1-3-2, p. 19
[123] PEG refers to the trend as a Multifactor Productivity ("MFP") trend because the study does not consider the productivity of all inputs. PEG remarks the term "TFP" is sometimes used for this type of study regardless. For consistency, the term "TFP" is used in place of PEG's "MFP" in this submission.
[124] Argument-in-Chief, pp 160-163
[125] Exhibit M2, p. 51
[126] Tr. Vol. 9, pp. 22-23

MR. SMITH: Why did you not do that?

MS. FRAYER: I believe that the data that precedes restructuring and market reforms, both here in Ontario and in the U.S., is not as relevant to the future business conditions that will overlay the operations of Ontario Power Generation in the next 5 years.

There was distinct patterns occurring at that time, and distinct sets of drivers to operations and maintenance costs and even capital spending in that period that I don't believe would be relevant.

151. Due to structural changes in North American electricity markets, the years prior to 2002 are not reflective of industry trends since then and, more relevant to this case, the industry trend going forward. LEI's reasoning is consistent with PEG's results by time period, as described above. The additional period included in PEG's study unduly inflates the industry's current TFP trend. The PWU submits that the time frame since the late 1990s and early 2000s market restructuring is the most relevant study period for determining the TFP trend.

152. In consideration of the relevant study period and the appropriate methodology as discussed in OPG's argument-in-chief, the PWU submits that the results of the LEI study are the most relevant to OPG in the test period.

Hydroelectric Stretch Factor

153. The stretch factors proposed for OPG's nuclear and hydroelectric facilities were determined according to the OEB's 4GIRM methodology. OPG has proposed a 0.3% stretch factor for its hydroelectric facilities, reflecting median performance. The stretch factor is based on OPG's performance in Navigant's 2015 Hydro Benchmarking Study. The study was produced as directed by the Board in its decision of OPG's last rate application (EB-2013-0321).[127]

154. Navigant's study benchmarked OPG's performance by functional area against a peer group of comparable generators.[128] Cost performance is measured by a Partial

[127] EB-2013-0321 Decision with Reasons, pp. 17-18
[128] Exhibit A1-3-2, Attachment 2, p. 3

Cost Function that excludes costs that are unique to OPG's regulated operations. The following table summarizes OPG's performance:[129]

CAD in Millions	OPG Adjusted Cost	1st Quartile Reference Cost	Median Reference Cost	3rd Quartile Reference Cost	Gap to Median Reference (3)	% of Total Gap
Operations	23	21	28	47	(5)	-3%
Plant Maintenance	56	43	62	98	(5)	-3%
Waterways & Dams	9	10	18	39	(8)	-4%
Buildings & Grounds	16	6	13	35	3	1%
Support	97	35	83	189	14	7%
Partial Function	*201*	*114*	*203*	*408*	*(2)*	*-1%*
PA&R	326	28	115	218	211	104%
Total Function	*527*	*142*	*318*	*625*	*209*	*103%*
Investment	140	64	146	444	(6)	-3%
Total Costs Benchmarked (1)	*666*	*206*	*463*	*1,069*	*203*	*100%*

Top Quartile
Second Quartile
Third Quartile
Bottom Quartile

155. OPG's partial function cost is slightly below the median, consistent with the proposed 0.3% stretch factor indicating median performance. The primary difference between the partial function cost and the total cost is the exclusion of public affairs and regulatory costs from the partial function. The other function that is excluded is investment. OPG's investment costs are also just below median so its exclusion does not impact OPG's relative performance.

156. OPG's public affairs and regulatory costs are considerably higher than the peer group median. The two largest components of this function are the Gross Revenue Charge in lieu of property tax and Gross Revenue Charge for water rental fees. Navigant notes that these costs are prescribed by regulation and are not controllable by OPG.[130]

157. The above table shows that the median total function (which includes public affairs and regulatory but excludes investment) is lower than just OPG's public affairs and regulatory costs. Including public affairs and regulatory costs in the benchmark would necessarily give OPG worse-than-median cost performance before any OM&A is factored in. A stretch factor based on this total function would not be indicative of OPG's cost performance. The PWU submits that the partial function cost is the appropriate measure to benchmark OPG's cost performance.

[129] Exhibit A1-3-2, p. 21
[130] Exhibit A1-3-2, Attachment 2, p. 6

158. PEG's IRM Design for OPG report included a discussion of the stretch factor:[131]

> **We believe that Navigant's study does not by itself provide a satisfactory basis for a stretch factor determination. However, our productivity research suggests that OPG's recent MFP growth trend has been normal even when the NTP is included. In the absence of fully satisfactory benchmarking evidence, we believe that a 0.3% stretch factor is reasonable for OPG's first generation IRM.**

159. PEG disagreed with using Navigant's study to determine the stretch factor but ultimately agreed with the proposed 0.3% stretch factor. Though PEG disagreed with the use of Navigant's study, the PWU notes that the study and its use adhere fully to the Board's direction in EB-2013-0321 as it is fully independent, comparable to OPG's nuclear benchmarking, and is used to develop OPG's incentive regulation methodology.[132]

160. The PWU submits that the proposed 0.3% stretch factor is appropriate given its performance in Navigant's Hydro Benchmarking study and the opinion described by Board Staff's witness, PEG.

II. NUCLEAR

Issue 11.3: Is OPG's approach to incentive rate-setting for establishing the nuclear payment amounts appropriate?

Nuclear Productivity Factor

161. OPG is not proposing to use a productivity factor in its proposed X-factor.[133] OPG's nuclear facilities are experiencing significant change through the test period. Past productivity trends will not be indicative of current and future productivity. The PWU submits that excluding the productivity factor is appropriate for this IR period.

Nuclear Stretch Factor

162. The nuclear stretch factor proposed by OPG is a combination of Darlington and Pickering's stretch factors. It is the production-weighted average of the two nuclear generating stations' individually determined stretch factors. The appropriate stretch

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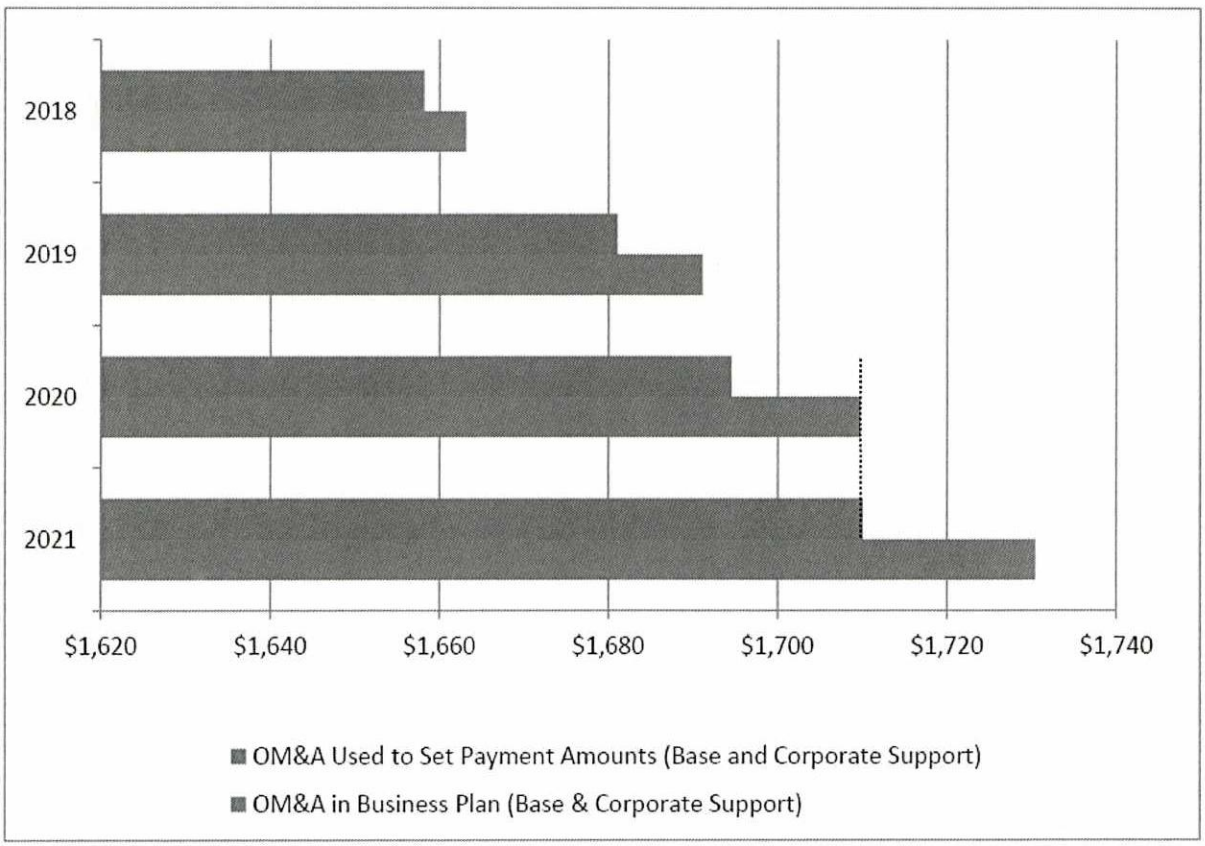
[131] Exhibit M2, p. 60
[132] EB-2013-0321 Decision with Reasons, p. 18
[133] Exhibit A1-3-2, p. 33

factors were determined based on the total generating cost per MWh as set out in the 2015 Nuclear Benchmarking Report.[134] The underlying methodology and peer group selection for the report was established by ScottMadden.[135] OPG is proposing to apply the stretch factor to the 75% of nuclear OM&A that is not related to safety and legislative requirements.[136]

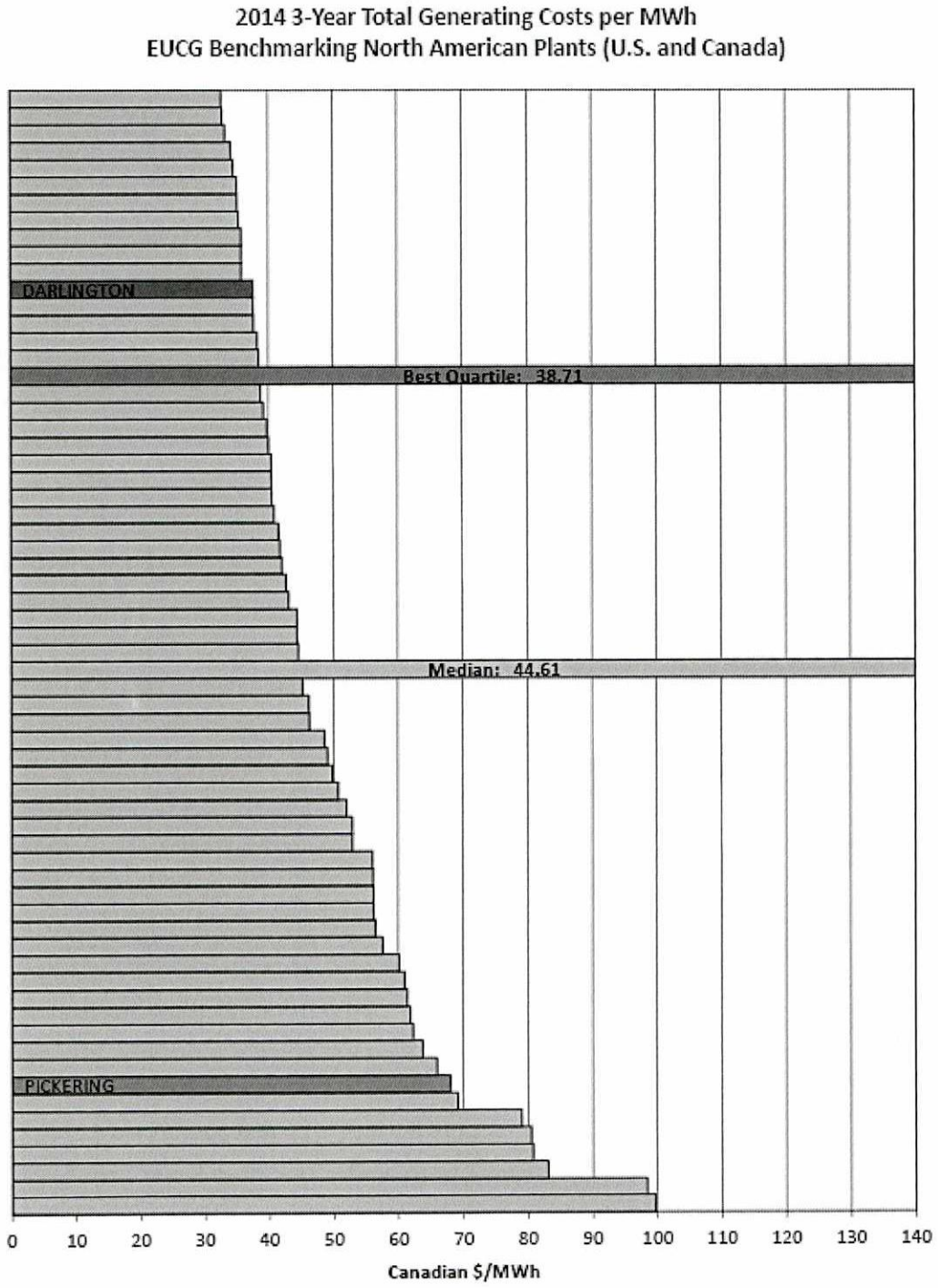
163. Stretch reductions are cumulative, effectively growing each year through the test period. By 2021 the stretch reduction from a 0.3% stretch factor will reach $20.4 million.[137] The following chart shows base and nuclear allocated corporate OM&A with and without the stretch factor.[138]



164. The difference between the red and blue bars for a given year is the stretch reduction amount. The cumulative nature of stretch factors can be seen in the increasing delta over time. The following table from the Nuclear Benchmarking Report

[134] Exhibit A1-3-2, p. 32
[135] Tr. Vol. 6, p. 125
[136] Exhibit A1-3-2, p. 30
[137] Exhibit A1-3-2, p. 29
[138] Exhibit A1-3-2, p. 30, Figure 1

outlines Darlington and Pickering's relative positions within the peer group in terms of 3-Year Total Generating Cost per MWh.[139]



[139] Exhibit F2-1-1, Attachment 1, p. 65

165. Darlington's performance is considered top quartile as its 3-Year Total Generating Cost per MWh is lower than the 75th percentile reflected in the "best quartile". The top quartile performance results in a proposed 0% stretch factor. It may be more appropriate to consider relative performance in quintiles, rather than quartiles, as there are five possible stretch factors. The PWU notes that Darlington is also within the top quintile. Pickering's proposed stretch factor is 0.6%, reflecting bottom quartile cost performance. The resulting production-weighted stretch factor is 0.3%, as indicated in the following table.[140]

Input	Value
OEB-approved 2015 Darlington production (TWh)	25.0
OEB-approved 2015 Pickering production (TWh)	21.6
Darlington stretch factor (based on benchmark performance)	0.0%
Pickering stretch factor (based on benchmark performance)	0.6%
Production-weighted average stretch factor	0.3%

166. In its submission, Board Staff suggested that a single stretch factor based on OPG's nuclear total generating cost per MWh is more appropriate. Specifically, Board Staff submits that the stretch factor should be higher than 0.3%, and could be as high as 0.6%.[141] The PWU submits a production-weighted average of the two stretch factors appropriately considers that the nuclear generation stations face different challenges and cost trends. The stations have distinctly different improvement opportunities. OPG's overall total generating cost per MWh is greater than the median because Pickering's poor performance more than offsets the good performance at Darlington.

167. Pickering uses first generation CANDU technology, uses smaller units, and is nearing its end of life. Darlington uses third generation CANDU technology and has historically achieved high levels of efficiency.[142]

[140] Exhibit A1-3-2, p. 32
[141] Board Staff submission, p. 168
[142] Exhibit L-11.4-1 Staff-256, p. 2

168. Much of Pickering's poor cost performance is due to the realities of operating an older, less technologically advanced nuclear station. Additional outages required to enable extended operations will only make cost improvement more difficult. In cross-examination with Board Staff, the nuclear operations panel explained why finding opportunities to increase efficiency at this point is not realistic:[143]

> **MS. CARMICHAEL:...And Pickering, though we do know that it compared to benchmark, maybe fourth quartile, in most of these metrics, the reason is it's just technically not possible for Pickering to have anything higher than a red in total generating costs due to the size of its units. So basically, it generates half the amount of each Darlington station unit. So it's technically not feasible for it to reduce its cost. If we wanted to move it to another quartile, we would have to reduce so many head count that we couldn't run the plant.**

169. In combining Pickering and Darlington cost performance, Darlington's stretch factor is unduly influenced by Pickering's performance. In contrast to the production-weighted average stretch factor, a single stretch factor based on overall cost and production is effectively a cost-weighted stretch factor. This puts significantly more weight on Pickering's performance than Darlington's.

170. An appropriate stretch factor should incentivize continuous improvement at both stations. If Darlington's top quartile performance isn't recognized in the determination of the stretch factor the incentive to maintain that level of performance is removed. The lower relative weight assigned to Darlington makes it much more unlikely for cost controlling initiatives at the plant to influence the stretch factor in any way. The PWU submits that the production-weighted average is more effective in providing appropriate incentives and more aligned with the principles outlined in the Renewed Regulatory Framework.

171. OPG has proposed to apply the stretch factor to nuclear base OM&A and nuclear allocated corporate OM&A, representing 75% of total OM&A. This represents the share of OM&A expenditures in which efficiency opportunities can reasonably be expected. The nuclear rate-setting panel elaborated on this in cross-examination with Board Staff:[144]

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[143] Tr. Vol. 13, p. 13
[144] Tr. Vol. 6, p. 135

MR. MILLAR: Okay. All right. And you propose to exclude all other O&M from the application of the stretch factor because in -- I'm reading from page 24 here. I don't know that you need to pull it up, but you state:

"OPG does not expect to find material efficiencies in the remaining 25 percent."

MR. FRALICK: Yes, so the projects, for example, and outages, they are discrete activities, so they're not activities that we do on a repetitive basis. Each one is a unique endeavour, and we develop a scope, and that is tailored to that specific need at that time.

So from the perspective of efficiency of getting better at doing the same thing, these cost categories do not lend themselves to that type of gains.

172. Compared to LDCs, the work undertaken by OPG's nuclear segment can fluctuate significantly from year to year. Much of OPG's work is not continuous and there is no basis for new work to be continuously improved upon.

173. OPG does not anticipate it will find efficiencies in all elements of the 75% of OM&A that is subject to the stretch factor. In response to a PWU interrogatory, OPG indicated that it will not compromise functions mandated by the CNSC and areas that impact safety and environmental risks.[145] If elements of OM&A subject to the stretch factor can't be reduced OPG will have to be more aggressive in reducing costs elsewhere to fully meet the stretch reduction. The PWU submits that it is appropriate for OPG to apply the nuclear stretch factor to 75% of OM&A.

Issue 11.5: Is OPG's Proposed Mid-Term Review Appropriate?

174. OPG seeks approval to file an application in the first half of 2019 to review and update the nuclear production forecast and corresponding fuel costs for the July 1, 2019 to December 31, 2021 period. OPG is also proposing a Mid-Term Nuclear Production Variance Account to record revenue variance arising from an updated production forecast. According to OPG, the production variance account will record the difference between: (i) the nuclear production forecast approved in this Application; and, (ii) the nuclear production forecast approved in the mid-term review application.

175. The PWU submits that OPG's proposal for a mid-term review is reasonable and beneficial to both rate payers and OPG for the following reasons:

[145] Exhibit L-6.6-13 PWU-20

a. OPG's actual nuclear production has consistently been lower than OEB approved production. For the period 2008 to 2015, for example, the average annual production shortfall was 3.2 TWh, which resulted in a negative average revenue impact of $154.0 million.[146] For 2016, OPG's actual nuclear production was lower than budget by 1.2 TWh.[147] OPG experienced these variances in payment amount applications that covered shorter test periods (2-3 years). The current application is based on a 5-year production forecast which increases the production risk associated with setting nuclear payment amounts over the five-year term of this Application;

b. In addition to the inherent technical difficulty to forecast production over a longer period, OPG is facing significant production risk in the second half of the 5-year term as a result of the DRP and the work required to enable PEO. The PWU agrees with OPG that:[148]

> **It has proven difficult to forecast nuclear production in the past where OPG's Pickering and Darlington facilities were operating in a comparatively steady state compared to the operating circumstances that will be facing these facilities during the application period.**

c. There is a general increase in risk of unplanned outages as the nuclear units begin to approach their end of life, which can significantly affect actual production; and

d. As OPG submits,[149] the Mid-term Nuclear Production Variance Account provides symmetrical protection to customers and to OPG irrespective of whether the approved mid-term review nuclear production forecast is higher or lower than the nuclear production forecast approved in this Application, i.e., customers will be refunded if production is higher than currently forecast, and OPG recovers the variance from customers if production is lower than forecast.

All of which is respectfully submitted.

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[146] Exhibit E2-1-1, p. 2
[147] EB-2016-0152 J15.11, Attachment 1
[148] Exhibit A1-3-3, pp. 10-14
[149] OPG Argument-in-Chief, p. 152