PENSION AND OTHER POST EMPLOYMENT BENEFIT COSTS

1.0 PURPOSE

The purpose of this exhibit is to:

- Detail the forecast IR term pension and other post-employment benefit ("OPEB") costs for the nuclear facilities determined in accordance with US GAAP ("accrual costs") included in the proposed nuclear revenue requirements and set out supporting evidence for these amounts; and,
- Present the forecast IR term pension contributions and OPEB benefit payments ("cash amounts") as well as the differential between the accrual costs and cash amounts. These amounts are provided for reference and continuity with past proceedings.

2.0 OVERVIEW

OPG's pension and OPEB programs applicable to the prescribed facilities consist of a registered pension plan ("RPP"), a supplementary pension plan, other post-retirement benefits such as group life insurance and health and dental care for pensioners and their dependants, as well as long-term disability ("LTD") benefits for current employees.[1]

Consistent with the OEB's policy on pension and OPEB cost recovery set out in the OEB's Report: *Regulatory Treatment of Pension and Other Post-employment Benefits (OPEBs) Costs* (the "Report"),[2] the pension and OPEB costs in OPG's proposed nuclear revenue requirements have been calculated on an accrual basis. As the OEB stated in EB-2018-0243:

> In accepting the settlement proposal, the OEB notes the following:
>
> • The parties agreed the accrual method is the appropriate regulatory accounting and recovery basis for pensions and other post-employment benefits for OPG consistent with the *Report of the Ontario Energy Board: Regulatory Treatment of Pension and Other Post-Employment Benefits (OPEBs) Costs* (Report), issued in EB-2015-0040.[3]

[1] The term "other post-retirement benefits" is used to refer to post employment benefit plans other than the RPP and LTD benefits. Unless otherwise noted, OPEB is used to refer to all post-employment benefits other than the RPP benefits.
[2] The Report was issued in the OEB's generic consultation on the issue (EB-2015-0040).
[3] EB-2018-0243, Decision and Payments Amounts Order, February 21, 2019, p. 4.

Additionally, OPG proposes:

1) to apply the Pension and OPEB Forecast Accrual versus Actual Cash Differential Variance Account established in the Report ("Differential Account") by recording interest, at the OEB's prescribed Construction Work In Progress (CWIP) rate, on the difference between accrual costs and actual cash amounts for the nuclear facilities in the Carrying Charges Sub-Account, asymmetrically in favour of ratepayers; and,
2) to continue the existing operation of the Pension & OPEB Cash Versus Accrual Differential Deferral Account until such time as new hydroelectric payment amounts are set reflecting pension and OPEB accrual costs in a future proceeding.

Forecast pension and OPEB accrual cost amounts attributed to the nuclear facilities for the IR term are $311.7M in 2022, $294.1M in 2023, $272.8M in 2024, $228.2M in 2025, and $183.5M in 2026 (see Chart 1). The total difference between pension and OPEB accrual costs and cash amounts is forecast to decrease over the period, from $65.2M in 2022 to ($43.7M) by 2026 (see Chart 3), for an overall net difference of $52.9M across the five years. In the IR term, pension cash amounts are forecast to exceed accrual costs starting in 2023, and the aggregate of pension and OPEB cash amounts is forecast to exceed accrual costs beginning in 2025.[4] Total forecast pension cash amounts for the nuclear facilities are higher than accrual amounts by $218.8M over the IR term, while total forecast OPEB cash amounts are $271.7M lower than the accrual costs over the IR term.

The nature of accrual costs and cash amounts presented and the methodologies used to derive them are unchanged from those reflected in EB-2016-0152.[5]

Section 3 summarizes OPG's proposed IR term treatment of pension and OPEB costs for the nuclear facilities. Given the varied approaches to the recovery of OPG's pension and OPEB costs since the OEB's Decision with Reasons in EB-2013-0321, for continuity, this evidence shows both the accrual costs and cash amounts for these costs. For the historical and bridge

[4] Pension cash amounts are also projected to exceed accrual costs in 2020.

[5] Subject to the adoption of the Full Yield Curve Approach to determining current service and interest cost components beginning in 2017, as discussed in EB-2016-0152 Ex. N1-1-1, section 3.1.2.1, the methodologies are also the same as in EB-2013-0321 and prior proceedings.

years and the IR term, Charts 1, 2 and 3 show the accrual costs, cash amounts and the difference between the two, respectively. Sections 4 and 5, respectively, set out how the accrual costs and cash amounts presented in Section 3 were developed and discuss related trends and variances.

3.0 PROPOSED IR TERM TREATMENT OF PENSION AND OPEB COSTS

Chart 1 sets out pension and OPEB accrual costs attributed to the nuclear facilities in the historical and bridge year, and IR term. OPG's total accrual costs for these periods were determined by Aon, an independent actuary, in accordance with US GAAP, as set out in Attachment 1 for the 2020-2026 forecast and Attachment 2 for the 2018 and 2019 actual amounts.[6] Pension accrual costs are projected to decrease over the IR term reflecting earnings on the pension asset, at the expected rate of return, that are increasing faster than the interest cost on the benefit obligation, at the current discount rate, and lower amortizations of net actuarial losses under the corridor approach. Both pension and OPEB accrual costs also decline toward the end of the IR term due to the planned Pickering shutdown and associated reduction in the workforce.

Chart 1

Total Pension and OPEB Accrual Costs – Nuclear[7] ($M)											
	2016 Actual	**2017 Actual**	**2018 Actual**	**2019 Actual**	**2020 Budget**	**2021 Budget**	**2022 Plan**	**2023 Plan**	**2024 Plan**	**2025 Plan**	**2026 Plan**
Pension	293.3	192.5	218.3	199.0	124.4	171.1	154.0	134.2	111.7	71.3	36.7
OPEB	150.7	167.2	172.1	164.2	170.5	154.8	157.7	159.9	161.1	156.9	146.8
Total	**444.0**	**359.7**	**390.4**	**363.2**	**294.9**	**325.9**	**311.7**	**294.1**	**272.8**	**228.2**	**183.5**

Chart 2 below sets out pension and OPEB cash amounts attributed to the nuclear facilities in the historical and bridge years, and the IR term. The cash amounts consist of contributions to

[6] Aon's reports in support of the 2016 and 2017 actual amounts were provided in EB-2018-0243, Ex. H1-1-1 Attachment 3.

[7] Nuclear pension and OPEB amounts presented in this exhibit exclude amounts related to the Nuclear Waste Management Organization ("NWMO"), which is consolidated into OPG's financial statements.

the RPP and benefit payments to retirees and dependents under the OPEB plans. OPG's total forecast cash amounts for pension and OPEB for 2020-2026 were calculated by Aon, as shown in Attachment 1. Pension contributions, which are set by actuarial valuations filed at least once every three years, are projected to decrease after each such assumed valuation during the IR term, effective January 1, 2023 and January 1, 2026, as discussed in Section 5.2. The decrease in forecast pension contributions in 2026 reflects the planned Pickering shutdown. Forecast amounts for pension contributions represent estimated minimum required company contributions for current service cost (also known as normal cost), attributed to the nuclear facilities.[8] Increasing OPEB benefit payments over the period reflect the growing retiree population and expected increases in per capita medical and other costs.

Chart 2

Pension and OPEB Cash Amounts – Nuclear[9] ($M)											
	2016 Actual	**2017 Actual**	**2018 Actual**	**2019 Actual**	**2020 Budget**	**2021 Budget**	**2022 Plan**	**2023 Plan**	**2024 Plan**	**2025 Plan**	**2026 Plan**
Pension	201.5	170.4	155.3	141.2	148.2	147.6	148.5	151.5	152.1	151.7	123.0
OPEB	85.2	87.1	88.5	90.4	84.9[10]	95.4	98.0	101.4	103.2	103.8	104.2
Total	**286.7**	**257.5**	**243.8**	**231.6**	**233.1**	**243.0**	**246.5**	**252.9**	**255.3**	**255.5**	**227.2**

Chart 3 below sets out the difference between pension and OPEB accrual costs and cash amounts attributed to the nuclear facilities for the historical and bridge years, and IR term (i.e., the difference between the amounts in Chart 1 and the amounts in Chart 2). The difference is expected to decline by the end of the IR term such that cash amounts are, in aggregate, expected to exceed accrual costs starting in 2025. For pension costs, cash amounts exceed

[8] No going concern or solvency special payments are projected for 2022-2026. Going concern special payments only were made in 2017.
[9] Nuclear pension and OPEB amounts presented in this exhibit exclude amounts related to the Nuclear Waste Management Organization ("NWMO"), which is consolidated into OPG's financial statements.
[10] Cash amounts for OPEB are projected to be temporarily lower in 2020 due to the impact of the COVID-19 pandemic.

accrual costs starting in 2023. The OPEB cash-to-accrual difference is projected to decline gradually over the IR term.

Chart 3

Pension and OPEB Accrual-Cash Differential Amounts – Nuclear[11] ($M)											
	2016 Actual	2017 Actual	2018 Actual	2019 Actual	2020 Budget	2021 Budget	2022 Plan	2023 Plan	2024 Plan	2025 Plan	2026 Plan
Pension	91.8	22.1	63.0	57.7	(23.7)	23.5	5.5	(17.2)	(40.4)	(80.4)	(86.3)
OPEB	65.5	80.1	83.7	73.8	85.7	59.4	59.7	58.5	57.8	53.1	42.6
Total	**157.3**	**102.2**	**146.7**	**131.5**	**62.0**	**83.0**	**65.2**	**41.3**	**17.4**	**(27.3)**	**(43.7)**

4.0 ACCRUAL COSTS FOR PENSION AND OPEB

As in prior applications, OPG's accrual costs for pension and OPEB continue to be determined in accordance with US GAAP and include several components. These components are: current service cost (net of required employee contributions for funded plans), interest cost on the benefit obligations at the appropriate discount rate, the expected return on RPP fund assets using an assumed long-term rate of return, amounts for past service costs arising from plan amendments, and amounts for actuarial gains or losses. Actuarial gains or losses consist of experience gains or losses, which arise because actual experience differs from that assumed (e.g., investment returns higher than assumed), and adjustments for changes in assumptions (e.g., discount rates).

In accordance with US GAAP, OPG's pension and other post-retirement benefit accrual costs for a given year are based on the measurement of benefit obligations and RPP fund assets at the end of the previous year. As discussed below, the full impact of certain events arising during a year is not charged to pension and OPEB costs for that year; rather, certain amounts are accumulated and amortized over future periods. OPG's LTD costs for the current year are based on the measurement of the benefit obligation at the end of both the current and the

[11] Positive amounts represent excess of accrual costs over cash amounts.

previous year, in accordance with US GAAP. The full impact of events arising during a year related to LTD benefits is charged to OPEB costs for that year.

The accounting obligations for pension and other post-retirement benefits continue to be determined using the projected benefit method pro-rated on service. Under this method, an equal portion of the total estimated benefit liability is attributed to each year of service until the date the plan participant would be entitled to the full benefit. The obligation at a particular date is the actuarial present value of the benefits attributed to the service rendered up to that date. The LTD obligation continues to be determined using the projected benefit method on a terminal basis. Under this method, the total estimated future benefit is attributed to the year of service in which a disability occurs.

OPG's pension and OPEB costs and obligations continue to be determined annually by an independent actuary using management's best estimate assumptions, both economic (e.g., inflation, salary escalation and health care cost trends) and demographic (e.g., mortality rates and improvement scale, termination rates and retirement rates). The long-term inflation assumption is based on a long-term outlook view of the consumer price index, informed by economic forecasts and the Bank of Canada's target range of inflation. It also takes into consideration the spreads between nominal and real interest rates. The salary escalation rate builds on the long-term inflation assumption, subject to adjustments in the near term for known short-term salary expectations based on collective agreement provisions and other expectations of salary growth. As in EB-2013-0321 and subsequent applications, the longer term salary escalation rate continues to be equal to the long-term inflation rate plus 0.5%. Many of the pension assumptions used for accounting purposes are the same as those used in the actuarial valuations for funding purposes discussed in Section 5.0.

As discussed in detail in EB-2016-0152 Ex. N1-1-1, Section 3.1.2, beginning in 2017, OPG started using the Full Yield Curve Approach to determine the current service and interest cost components of pension and OPEB costs. This approach involves calculating the current service cost by applying individual spot interest rates based on a representative AA corporate bond yield curve to discount each future year's underlying projected benefit payments, and

interest cost by multiplying individual spot rates from the yield curve by each year's present values of future projected benefit payments.[12,13]

For purposes of determining pension costs, RPP fund assets continue to be valued using a market-related value of assets. The market-related value used in determining OPG's pension costs recognizes gains and losses on equity assets relative to a six percent assumed real return over a five-year period. This contributes to the smoothing of impacts from equity market volatility over time. Gains and losses on other than equity assets continue to be recognized in the market-related value of assets immediately.

The expected long-term rate of return on the RPP fund assets continues to be calculated by Aon based on the pension fund asset mix and capital market expectations of future risk and return for each asset class within the fund portfolio.

Actuarial gains and losses for pension and other post-retirement benefits are generally amortized over future periods. In accordance with US GAAP, OPG amortizes the net cumulative unamortized gain or loss for each of these plans in excess of 10% of the greater of the benefit obligation and the market-related value of the plan assets over the expected average remaining service life of the employees (i.e., the "corridor approach."). Past service costs or credits for pension and other post-retirement benefits continue to be amortized over

[12] Prior to 2017, OPG had been determining the current service and interest cost components of pension and OPEB costs using the weighted-average discount rate reflected in the calculation of the plan benefit obligations, based on a representative AA corporate bond yield curve (the "Traditional Approach"). The Traditional Approach included calculating the current service cost by discounting the underlying future cash flows at the weighted-average interest rate implicit in the entire benefit obligation, and the interest cost by multiplying the benefit obligation by that same rate. This was the generally accepted approach to determining pension and OPEB costs in accordance with US GAAP.
In 2017, the Full Yield Curve Approach had emerged as an acceptable alternative to the Traditional Approach under US GAAP, with a view to more precisely measuring the current service and interest cost components. OPG determined that the Full Yield Curve Approach would result in a more precise measurement of its pension and OPEB costs and adopted it, prospectively, starting with the 2017 fiscal year costs. The same yield curve is used under both the Traditional Approach and the Full Yield Curve Approach.

[13] Tied to financial market conditions, discount rates are often a main driver of variability in accrual costs. Changes in discount rates affect accrual costs in several different ways: 1) they directly decrease or increase current service cost component, which is determined on a present value basis; 2) they decrease or increase the benefit obligation, which is determined on a present value basis, giving rise to an actuarial gain or loss that, in turn, is subject to amortization under the corridor approach (other than for LTD); and 3) they change the interest rates applied to the benefit obligation cash flows to determine the interest cost component.

the expected average remaining service period to full eligibility of the affected employee groups. All actuarial gains and losses and past service costs related to LTD benefits continue to be recognized in the year they arise, in accordance with US GAAP.

4.1 Forecasting Pension and OPEB Accrual Costs

Forecasting pension and OPEB accrual costs requires estimating the values of the benefit obligations and pension fund asset value at the end of the year preceding the forecast year. Developing these estimates requires projections of the actual pension fund performance as well as projections of assumptions that will be used to determine the actual obligations. Forecasting LTD costs also requires estimating the value of the benefit obligation at the end of the last year in the forecast period.

OPG's total projected pension and OPEB accrual costs for 2022-2026 underpinning this application were determined by Aon. The forecast 2020 costs were determined using actual December 31, 2019 values of the benefit obligations and pension fund assets, and the final assumptions as at December 31, 2019.[14] The forecast 2021-2026 costs reflect projections of benefit obligations and pension fund assets at the end of each year in the 2020-2025 period using the assumptions determined as of the end of June 2020, per the 2020-2026 Business Plan.[15]

Chart 4 below presents the assumptions used to determine OPG's 2016-2019 actual and 2020-2026 projected pension and OPEB accrual costs in accordance with US GAAP.

[14] As the final December 31, 2019 assumptions were used in the projection, the 2020 pension and OPEB costs are expected to be close to the actual costs for the year with the exception of LTD costs. The 2020 LTD cost projections are less definitive because the actual costs will be calculated using information as of year-end 2020.

[15] For the purpose of projecting pension and OPEB costs, OPG may adjust discount rate assumptions from those provided by its independent actuary by a maximum of 25 basis points. This type of adjustment can occur when bond yields are not considered to be indicative of historical trends or are volatile. OPG made no adjustment to the end of June 2020 discount rates provided by an independent actuary in projecting 2021-2026 costs. OPG does not adjust discount rates in determining actual costs.

1

Chart 4

	2016 Actual[16]	2017 Actual[16]	2018 Actual[17]	2019 Actual	2020 Budget[18]	2021-2026 Plan[18]
Discount rate for pension[19,20]	4.10%	Current service cost – 4.15% Interest cost – 3.37%	Current service cost – 3.69% Interest cost – 3.25%	Current service cost - 3.93% Interest cost – 3.56%	Current service cost – 3.19% Interest cost – 2.91%	Current service cost – 3.02% Interest cost – 2.37%
Discount rate for other post-retirement benefits[19,20]	4.20%	Current service cost – 4.21% Interest cost – 3.58%	Current service cost - 3.73% Interest cost – 3.38%	Current service cost – 3.96% Interest cost – 3.64%	Current service cost - 3.21% Interest cost – 3.00%	Current service cost - 3.08% Interest cost – 2.56%
Discount rate for long-term disability[19,20,21]	3.10%	Current service cost – 3.10% Interest cost – 2.46%	Current service cost – 3.09% Interest cost – 2.70%	Current service cost - 3.43% Interest cost – 3.11%	Current service cost – 2.83% Interest cost – 2.55%	Current service cost – 2.21% Interest cost – 1.67%
Expected long-term rate of return on pension fund assets	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Inflation rate	2.0%	2.0%	2.0%	2.0%	1.75%	1.75%
Weighted average salary schedule escalation rate[22]	1.6% from Jan 1, 2016 to Dec 31, 2021 and 2.5% thereafter	1.8% from Jan 1, 2017 to Dec 31, 2021 and 2.5% thereafter	1.9% from Jan 1, 2018 to Dec 31, 2021 and 2.5% thereafter	2.0% from Jan 1, 2019 to Dec 31, 2024 and 2.5% thereafter	1.7% from Jan 1, 2020 to Dec 31 2026; 2.25% thereafter	1.7% from Jan 1, 2020 to Dec 31 2026; 2.25% thereafter
Rate of return used to project year-end pension fund asset values[23]	N/A	N/A	N/A	N/A	N/A	6.0% in 2020 to 2025

2

[16] These are the same assumptions used to develop the final 2016 and 2017 pension and OPEB costs presented in EB-2018-0243 (see EB-2018-0243, Ex. F1-1-1, Chart 1, p.16).

[17] Except for the LTD discount rate determined at year-end, these are the same assumptions used to develop the final 2018 pension and OPEB cost projections presented in EB-2018-0243 (see EB-2018-0243, Ex. JT1.1, Attachment 1, pp. 6-7).

[18] The assumptions for 2020-2026 can also be found at pp. 6-8 of Aon's report in Attachment 1.

[19] The rate for current service cost shown represents the single equivalent discount rate implicit in the current service cost calculations under the Full Yield Curve Approach.

[20] The rates for interest cost shown apply to the projected benefit obligations at the beginning of the year under the Full Yield Curve Approach adopted in 2017. Under this approach, a separate rate is used to calculate the interest cost on the current service cost recognized during the year. For 2017, this rate is 3.95% for pension costs, 4.13% for other post-retirement benefit costs and 2.70% for LTD cost. For 2018 and 2019, this rate can be found at pp. 6-7 of Attachment 2. For 2020-2026, this rate can be found at pp. 6-7 of Attachment 1.

[21] As the LTD costs for the year are based on the re-measurement of the benefit obligation at the end of the year in accordance with US GAAP, the total LTD costs inclusive of any actuarial gains or losses due to the re-measurement continue to reflect the discount rate used to determine the year-end benefit obligations, notwithstanding the adoption of the Full Yield Curve Approach. This discount rate was 3.09% for December 31, 2017, 3.43% for December 31, 2018, 2.83% for December 31, 2019, and 2.21% for projected December 31, 2020.

The actual returns on pension fund assets were 0.13% for 2018 and 11.66% in 2019.

4.2 Pension and OPEB Accrual Cost Distribution

A portion of OPG's total pension and OPEB accrual costs continues to be charged to OPG businesses and functions as part of standard labour rates, based on an estimate of the accrual current service cost for pension and OPEB. The remainder of the accrual costs, which include interest costs on the obligations, the expected return on pension plan assets, amounts for past service costs and actuarial gains and losses, and any current service cost variance from the estimate reflected in standard labour rates, continues to be recorded as a centrally-held cost (line 1 of Ex. F4-4-1 Table 1 and Table 3).

The centrally-held portion of pension and OPEB costs continues to be directly assigned and allocated to the operating businesses, in proportion to amounts of pension and OPEB costs charged directly to each of the businesses (including amounts assigned and allocated as part of corporate Support Services costs). This methodology has been reviewed by independent experts as part of OPG's overall cost allocation methodology, and is unchanged from prior OPG applications.[24]

4.3 Comparison of Pension and OPEB Accrual Costs

Chart 5 provides a breakdown of the 2016-2026 pension and OPEB accrual costs shown in Chart 1 for the nuclear facilities between amounts charged to OPG businesses/functions and those recorded in centrally held costs. As noted above, OPG is providing in Attachment 1 and Attachment 2 independent actuarial reports in support of the total OPG forecast 2020-2026 costs and the actual 2018 and 2019 costs, respectively.

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[22] The weighted average salary schedule escalation rates reflect assumptions based on existing collective agreements and requirements of Bill 124 limiting public section compensation increases (see Ex. F4-3-1). The longer term salary schedule escalation (currently after 2024) is set at the assumed inflation rate plus 0.5%, as in EB-2016-0152 and EB-2013-0321.

[23] Projections of rates of return to determine year-end pension fund asset values are not required for the calculation of the 2016-2020 costs because the actual prior year-end asset values are known.

[24] Refer to Ex. F3-1-4, Attachment 1 for an independent expert's report on OPG's cost allocation methodology.

Chart 5

Total Pension and OPEB Accrual Costs – Nuclear[25] ($M)											
	2016 Actual	**2017 Actual**	**2018 Actual**	**2019 Actual**	**2020 Budget**	**2021 Budget**	**2022 Plan**	**2023 Plan**	**2024 Plan**	**2025 Plan**	**2026 Plan**
Pension – Business Unit Charge	222.0	221.7	207.7	210.3	246.4	243.1	243.3	243.9	245.3	217.3	193.8
Pension – Centrally Held	71.3	(29.2)	10.6	(11.3)	(122.0)	(72.0)	(89.3)	(109.7)	(133.6)	(146.0)	(157.2)
Total Pension Cost	**293.3**	**192.5**	**218.3**	**199.0**	**124.4**	**171.1**	**154.0**	**134.2**	**111.7**	**71.3**	**36.7**
OPEB – Business Unit Charge	60.3	61.8	59.8	59.0	60.3	57.8	56.5	56.1	56.5	51.1	45.9
OPEB – Centrally Held	90.4	105.4	112.3	105.2	110.2	97.0	101.2	103.8	104.6	105.8	101.0
Total OPEB Cost	**150.7**	**167.2**	**172.1**	**164.2**	**170.5**	**154.8**	**157.7**	**159.9**	**161.1**	**156.9**	**146.8**
Total Pension and OPEB Costs	**444.0**	**359.7**	**390.4**	**363.2**	**294.9**	**325.9**	**311.7**	**294.1**	**272.8**	**228.2**	**183.5**

Pension costs decreased from 2016 to 2017, primarily due to the adoption of the Full Yield Curve Approach, as well as the negative expected net growth in cost components, partially offset by the impact of lower discount rates as at December 31, 2016 used to determine the 2017 costs.[26] The decrease also reflected an increase in employee contributions under collective agreement provisions. Expected negative net growth represents earnings on the pension assets, at the expected rate of return, that are increasing faster than the interest cost on the benefit obligation, at the current discount rate, and lower amortizations of net actuarial losses under the corridor approach.

OPEB costs increased from 2016 to 2017, reflecting a reduction in 2016 costs due to the LTD actuarial gain and the effect of lower discount rates as at December 31, 2016 used to

[25] See footnote 7.

[26] As in previous proceedings, "expected net growth" (i.e., change) in cost components is used to refer to the net impact of the following: increases in current service costs due to the passage of time in the present value calculation, higher interest costs on a higher benefit obligation due to the passage of time, changes in the pension asset value due to expected earnings and expected unwinding of the market-related value, and related changes in amortization of historical actuarial gains or losses under the corridor approach.

determine the 2017 OPEB costs, partially offset by the impact of lower expected per capita health care benefit costs reflecting lower costs of prescription drugs (as part of a comprehensive accounting valuation) and the adoption of the Full Yield Curve Approach.[27]

Actual pension accrual costs increased from 2017 to 2018 primarily due to the impact of lower discount rates, as at December 31, 2017, used to determine the 2018 costs, partially offset by the impact of negative expected growth in the cost components and higher than expected year-end 2017 pension fund asset value.

Actual pension accrual costs decreased from 2018 to 2019 primarily due to the impact of higher discount rates, as at December 31, 2018, used to determine the 2019 costs and negative expected net growth in the cost components, partially offset by the impact of a lower than expected year-end 2018 pension fund asset value.

Pension accrual costs are projected to decrease from 2019 to 2020 primarily due to the impact of a reduction in the inflation rate assumption from 2.0% to 1.75%, higher than expected year-end 2019 pension fund asset value, reduction in the near-term salary escalation rate assumption to reflect Bill 124 provisions (see Ex. F4-3-1), the impact of an updated base mortality table developed by Aon based on OPG's historical plan experience (as part of a comprehensive accounting valuation), and expected net growth of cost components.[28] These factors were partially offset by the impact of lower discount rates, as at December 31, 2019, used to set the 2020 costs.

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[27] Comprehensive accounting valuations are conducted periodically to incorporate current demographics of plan membership, and update applicable assumptions to represent the current best estimate based on plan experience and current expectations. Beginning in 2016, OPG has conducted a comprehensive accounting valuation at each year-end, including as forecast for year-end 2020, as triggered by the availability of more current information as a result of performing annual pension funding valuations discussed in section 5.0. Performing comprehensive accounting valuations ensures that OPG's accounting obligations continued to be fairly stated in accordance with US GAAP.

[28] As part of a comprehensive accounting valuation, Aon recommended updates to assumed base mortality rates based on its updated analysis of recent mortality experience information for OPG retirees. As discussed in EB-2013-0321, Ex. N1-1-1, pp. 6-9, Aon determined that OPG's plans are large enough to develop base mortality rates specific to OPG's employee and pensioner base population. Aon's periodic review and update of base mortality rates based on recent OPG-specific data is considered best practice, as affirmed in the Second Revision of the CIA Educational Note: Selection of Mortality Assumptions for Pension Plan Actuarial Valuations issued on December 31, 2017, and ensures OPG's benefit obligations are fairly stated.

Pension accrual costs are forecast to increase from 2020 to 2021 primarily due to lower than expected projected year-end 2020 pension fund asset value and the impact of lower discount rates, as of the end of June 2020, used to project the 2021 to 2026 costs, partially offset by the negative expected growth in the cost components. OPEB costs are forecast to decrease from 2020 to 2021 primarily due to the impact of lower discount rates as of end of June 2020 and an increase in 2020 costs due to a projected LTD actuarial loss.

Pension accrual costs are projected to decrease steadily over the 2022-2026 period reflecting negative expected net growth in cost components. Both pension and OPEB accrual costs also decline toward the end of the IR term due to the planned Pickering shutdown and associated reduction in the workforce.

Chart 6 presents the current service cost component of the pension and OPEB accrual costs shown in Chart 5. As discussed in Section 5.2, total current service cost is comprised of estimated amounts charged to the business units through standard labour rates as well as variances from these estimated amounts, which are included in centrally-held costs. The total of pension and OPEB current service cost shown in Chart 6 is presented as part of the total compensation details shown in Ex. F4-3-1, Attachment 1.

Chart 6

Pension and OPEB Accrual Current Service Cost – Nuclear[29] ($M)											
	2016 Actual	**2017 Actual**	**2018 Actual**	**2019 Actual**	**2020 Budget**	**2021 Budget**	**2022 Plan**	**2023 Plan**	**2024 Plan**	**2025 Plan**	**2026 Plan**
Pension – Direct Charge[30]	222.0	221.7	207.7	210.3	246.4	243.1	243.3	243.9	245.3	217.3	193.8
Pension – Centrally Held	(3.5)	(3.0)	52.5	34.1	17.6	30.0	35.8	27.4	29.4	28.0	18.1
Total Pension Current Service Cost	**218.5**	**218.7**	**260.2**	**244.4**	**264.0**	**273.1**	**279.1**	**271.3**	**274.7**	**245.3**	**212.0**
OPEB – Direct Charge[38]	60.3	61.8	59.8	59.0	60.3	57.8	56.5	56.1	56.5	51.1	45.9
OPEB – Centrally Held	(2.6)	(2.4)	9.1	2.6	14.6	16.6	20.2	21.3	21.2	22.4	17.3
Total OPEB Current Service Cost	**57.7**	**59.4**	**68.9**	**61.6**	**74.9**	**74.4**	**76.7**	**77.4**	**77.7**	**73.5**	**63.2**
Total Pension and OPEB Current Service Cost	**276.2**	**278.1**	**329.1**	**306.0**	**338.9**	**347.5**	**355.8**	**348.7**	**352.4**	**318.8**	**275.2**

Pension accrual current service cost increased from 2017 to 2018, and decreased from 2018 to 2019, mainly due to the impact of lower discount rates as at December 31, 2017 and higher discount rates as at December 31, 2018, respectively.

Pension accrual current service cost is projected to increase from 2019 to 2020 primarily due to lower discount rates as at December 31, 2019, partially offset by the impact of updated plan membership data as at January 1, 2020 (as part of a comprehensive accounting valuation), reduction in the inflation rate assumption from 2.0% to 1.75%, and reduction in the near-term salary escalation rate assumption to reflect Bill 124 provisions.

OPEB accrual current service cost increased from 2017 to 2018 mainly due to lower discount rates as at December 31, 2017. OPEB accrual current service cost is projected to increase from 2019 to 2020 primarily due to lower discount rates as at December 31, 2019. The

[29] See footnote 7.
[30] As shown in Chart 6.

decrease in the OPEB accrual current service cost from 2019 to 2020 also reflects changes to medical and dental provisions from the recent rounds of collective bargaining with the Power Workers' Union and the Society of United Professionals and from changes applicable to Management employees (Ex. F4-3-1).

Forecast current service costs for both pension and OPEB are largely stable between 2021 and 2024 as the impact of lower regular headcount is offset by increases in current service costs due to the passage of time in the present value calculation, and declines in 2025 and 2026 due to the planned Pickering shutdown and associated reduction in the workforce. The decrease in forecast pension current service cost in 2025 also reflects the coming into effect of pension plan reform measures negotiated in a previous round of collective agreement (i.e. earnings basis for pension and retirement eligibility for undiscounted pension (Ex. F4-3-1).

The split of each year's accrual current service cost between direct charges and centrally-held costs primarily varies with differences between actual and budgeted current service cost amounts, and differences between total estimated payroll for regular employees used to develop standard labour rates and the company's actual payroll.

5.0 CASH AMOUNTS FOR PENSION AND OPEB

OPG's pension plans are defined benefit pension plans that provide members with a pension amount based on years of service and salary at retirement. The RPP is funded by member (i.e., employee) and OPG (i.e., employer) contributions.[31] The *Pension Benefits Act* (Ontario) ("PBA") sets the minimum funding requirements for registered pension plans to ensure that plans have sufficient assets in place to meet existing and future obligations. Contributions must be made to fund the plan's current service cost (also known as normal cost), as well as deficiencies (i.e., deficits), if any, through defined special payments over a period of time.

The PBA requires actuarial valuations on both going concern and solvency bases to be performed at least once every three years to determine the funded status of a registered

[31] The supplementary pension plan is not funded but is secured by letters of credit.

pension plan (i.e., the difference between the value of pension fund assets and the actuarial present value of the accrued liability[32] as of the valuation date) and required future contributions. The going concern valuation measures the financial position of the pension plan assuming that the plan continues indefinitely into the future. The solvency valuation measures the financial position of the pension plan, as defined pursuant to the PBA, assuming that the plan is wound-up on the valuation date and all benefits are settled by either lump sum payments or annuity purchases.

Under the funding rules effective May 1, 2018, going concern special payments are made over a 10-year period. To the extent that going concern special payments will not eliminate 85% of the solvency deficit over a 5-year period beginning no later than 12 months from the date of the valuation in which the solvency deficiency is determined, additional payments towards the solvency deficit (i.e., solvency special payments) are required over the 5-year period. Valuations are prepared and certified by an independent actuary and must be filed with the Financial Services Regulatory Authority of Ontario ("FSRA")[33] and the Canada Revenue Agency.

In determining the going concern accrued liability and current service cost, an actuary attributes the present value of future expected benefits over each plan member's projected service. The obligation at a particular date is the actuarial present value of the benefits attributed to each member's service rendered up to that date. Employer's current service cost represents the actuarial present value of benefits earned in respect of each additional year of employee service, less any required employee contributions to the pension plan.

In order to establish funding requirements, economic and demographic assumptions are required to determine the plan's accrued liability as of the valuation date and to project current service cost for future years. Examples of economic assumptions include discount rates, inflation rate, and salary escalation rate. Examples of demographic assumptions include mortality rates and improvement scale, termination rates, and retirement rates. As discussed

[32] The term "accrued liability" and "benefit obligation" may be used interchangeably in this exhibit.
[33] Formerly Financial Services Commission of Ontario ("FSCO").

below, certain assumptions differ between going concern valuations and solvency valuations. Many of the assumptions used in the going concern funding valuations are also applied in accounting valuations for determining the pension obligation and accrual costs, as discussed in Section 4.0 of this exhibit.

Going concern valuation assumptions and methods are determined by the actuary preparing the valuation, in accordance with accepted actuarial practice and taking into account regulatory and legislative constraints and guidance issued by the Canadian Institute of Actuaries ("CIA"), with input from plan sponsors. As prescribed by the PBA, key assumptions used in the solvency valuation are required to be set in accordance with specific CIA standards of practice.

The going concern benefit obligation and funding requirements are determined using a discount rate based on the expected long-term rate of return on pension plan assets. This long-term rate of return is based on the pension fund asset mix and capital market expectations of future risk and return for each asset class within the fund portfolio, net of passive investment management fees.[34] Under the funding rules effective May 1, 2018, a provision for adverse deviation ("PfAD") must be included in the non-indexed going concern benefit obligation and total current service cost, which serves to increase funding requirements.[35] The PfAD replaces any margin for adverse deviation that was previously in the going concern discount rate. The PfAD is determined based on the plan's target asset allocation at the valuation date and is tested against an overall benchmark discount rate that varies with government of Canada bonds yields.[36]

For the solvency valuation, the discount rates used to determine the benefit obligation are required to be determined in accordance with specific standards of practice issued by the CIA and with reference to government of Canada bonds.[37]

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[34] The long-term expected rate of return used for US GAAP accrual accounting purposes is determined in a similar way to the going concern discount rate, with the main differences being that the accounting rate does not take into account an allowance for passive investment management fees.

[35] There is no equivalent to PfAD in the accrual accounting calculations under US GAAP.

[36] The PfAD is also determined by whether the plan is "open" or "closed" to new entrants.

[37] The solvency discount rates are typically lower than the going concern discount rates, as the solvency rates reflect current government bond yields and annuity purchase rates determined using information provided by insurance companies rather than the rate of return expected to be earned on pension fund assets.

The most recently filed actuarial valuation of OPG's RPP is as at January 1, 2020. That valuation showed that the pension fund was fully funded. Funding requirements pursuant to the valuation are therefore for the employer's portion of current service cost only, with no going concern or solvency special payments. OPG is forecasting contributions for 2020-2022 based on the minimum required contributions pursuant to the January 1, 2020 valuation. The January 1, 2020 valuation is filed in Attachment 3.

The next actuarial valuation of the OPG RPP is assumed to be completed in 2023, on a triennial cycle, using data and assumptions as of January 1, 2023, and must be filed with FSRA and CRA by September 30, 2023. A subsequent valuation is assumed to be completed as of January 1, 2026. The forecast cash amounts over the IR term reflect projected RPP contributions for the 2023-2026 period as determined by Aon. As discussed further in Section 5.1, Aon prepared this projection based on information available as of end of June 2020, extrapolating to the assumed January 1, 2023 and January 1, 2026 future valuation dates.

Cash amounts for OPEB reflect OPG's benefit payments to retirees and dependants in accordance with the provisions of the plans. Forecast OPEB payments for the 2022-2026 period represent the total estimated future cash flows used by Aon to project OPEB benefit obligations over this period, as attributed to the nuclear facilities.

5.1 Forecasting Pension and OPEB Cash Amounts

Forecasting RPP contributions requires estimating the funded status of the plan as of the date of each assumed future funding valuation. Developing these estimates requires expectations of assumptions that will be used to determine the accrued liability as of these dates, and projections of the actual pension fund performance to those dates. OPG's total projected required RPP contributions for 2023-2026 were calculated by Aon, as set out in Attachment 1, by projecting the going concern and solvency funded status of the plan as at January 1, 2023 and January 1, 2026 based on end of June 2020 information. These projections are reflected in OPG's 2020-2026 Business Plan.

In order to project the January 1, 2023 and January 1, 2026 benefit obligations, Aon applied the January 1, 2020 funding valuation assumptions, subject to certain updates as of the end June 2020.[38] For the going concern valuation, the PfAD calculation was updated to align to the benchmark discount rate as of end of June 2020. For the solvency valuation, the changes were to update the prescribed assumptions, including discount rates as of end of June 2020. The January 1, 2023 and January 1, 2026 pension asset values were projected by Aon based on the end of June 2020 actual value, at the expected long-term rate of return of 6.0% per annum.

Aon's projections of the funded status of the RPP indicate that the plan will be fully funded on both going concern and solvency bases in both the January 1, 2023 and January 1, 2026 valuations. As such, the total minimum required contributions for 2023 and 2026 based on the projected January 1, 2023 and January 1, 2026 valuations represent the employer's current service cost only. For all years of the projection, the employer's current service cost has been reduced to reflect increases in employee contribution levels, the change in pensionable earnings basis and the change in retirement eligibility for an unreduced pension discussed in Ex. F4-3-1.

Projected benefit payments for OPEB plans reflect the cash flows of the underlying accounting benefit obligations discussed in Section 4.0.

As in previous proceedings, total OPG projected RPP contributions and OPEB payments were attributed to the nuclear facilities in proportion to the respective benefit costs. The resulting cash amounts for the nuclear facilities are presented in Chart 2 above.

5.2 Comparison of Pension and OPEB Cash Amounts

RPP contributions decreased over the historical period reflecting lower minimum required contributions pursuant to the applicable actuarial valuations filed with FSRA / FSCO, including a reduction in going concern special payments from 2016 to 2017.

RPP contributions remain largely stable over the 2020-2024 period as they represent the employer's current service cost only. RPP contributions are forecast to decline toward the end

[38] Attachment 1, pp. 9.

of the IR term due to the planned Pickering shutdown and associated reduction in the workforce.

OPEB benefit payments increased gradually during the historical period and are expected to continue to increase through the bridge and IR term. This trend reflects a growing retiree population and expected increases in per capita medical and other costs. The somewhat lower benefit payments projected in 2020 reflect the impact of the COVID-19 pandemic on retiree medical and dental claims in the first half of the year.

Chart 7 below presents the EB-2016-0152 projected (2016) and OEB-approved (2017 to 2019) pension and OPEB cash amounts for the nuclear facilities.

Chart 7

EB-2016-0152 Projected Pension and OPEB Cash Amounts – Nuclear ($M)				
	2016	**2017**	**2018**	**2019**
Pension	283.3	200.0	202.9	243.5
OPEB	96.6	91.1	95.7	99.9
Total	379.9	291.1	298.6	343.4

RPP contributions attributed to the nuclear facilities for 2016 were lower than the EB 2016-0152 forecast reflecting the results of the actuarial valuation of the RPP as of January 1, 2016 filed with FSCO in September 2016. The 2016 valuation reduced the minimum required contributions relative to the previous valuation that underpinned the forecasts, due to lower going concern special payments.

RPP contributions attributed to the nuclear facilities for 2017 to 2019 were lower than the forecast in the EB-2016-0152 payment amounts, reflecting the results of subsequent actuarial valuations of the RPP as of January 1, 2017, 2018 and 2019 filed with FSCO/FSRA in September 2017, 2018 and 2019, respectively. The 2017 to 2019 valuations resulted in

reductions in minimum required contributions relative to the 2016 valuation, primarily due to lower or no going concern special payments.

OPEB payments attributed to the prescribed facilities for 2016 to 2019 were lower than the EB-2016-0152 forecast amounts, mainly due to lower health care benefit costs.

LIST OF ATTACHMENTS

Attachment 1:	Aon Report on OPG's Estimated Pension and OPEB Costs for 2020-2026
Attachment 2:	Aon Report on OPG's Pension and OPEB Costs for 2018 and 2019
Attachment 3:	Aon Report on the actuarial valuation as at January 1, 2020 for OPG's pension plan