NUCLEAR OUTAGE AND PICKERING CYCLICAL MAINTENANCE OM&A COSTS

1.0 PURPOSE

This evidence presents OPG nuclear facilities outage OM&A costs, Pickering Cyclical Maintenance OM&A costs, and Darlington New Nuclear Program ("DNNP") facilities outage OM&A costs for the period 2020-2031.

2.0 OVERVIEW

OPG Nuclear Facilities Outage OM&A

The IR term OPG nuclear facilities outage OM&A expenses are $223.7M in 2027, $112.7M in 2028, $219.1M in 2029, $121.6M in 2030, and $142.2M in 2031, and form part of the OM&A expenses in the nuclear revenue requirement. OPG nuclear facilities outage OM&A costs will vary year-over-year depending on the number and scope of outages and therefore cannot be trended over time. These costs are shown at Ex. F2-4-1, Table 1, line 11.

OPG nuclear facilities outage OM&A costs over the period 2025-2031 primarily reflect the following:

- Expenditures for routine inspection and maintenance activities undertaken during Darlington unit planned outages, consistent with Darlington's 36-month planned outage schedule. This includes non-refurbishment outage costs for the units laid up during refurbishment. Non-refurbishment outage costs are costs for various inspection and maintenance activities associated with a planned outage in accordance with OPG's aging and life cycle management programs that are in addition to and separate from the refurbishment of the units ("Cyclical Outages"). For example, the non-refurbishment outage work for Unit 4 during its refurbishment outage (2023-2026) effectively replaces a Unit 4 scheduled planned outage in 2024 which would otherwise have been undertaken absent Unit 4 refurbishment.
- Expenditures for routine inspection and maintenance activities undertaken during Pickering unit planned outages in 2025 and 2026, prior to the refurbishment, consistent with

Pickering's 30-month planned outage schedule including additional scope to extend Pickering's planned pre-refurbishment operation to September 2026.

- Outage OM&A cost for a scheduled Vacuum Building Outage ("VBO") at Darlington in 2027, along with preparatory costs in 2025 and 2026.
- OPG has scheduled two post refurbishment planned outages at Darlington (in 2025 and 2026) and one post-refurbishment outage at Pickering (in 2031) to address any issues that could arise after the major refurbishment of a unit is complete and the unit has resumed operations. The nuclear facilities outage OM&A forecast includes costs for work that may be undertaken during these "mini" planned outages.

OPG continues to pursue initiatives (Ex. F2-1-1, Section 3.4) to improve operational performance and cost effectiveness. This includes a continued focus on increasing the efficiency of planned outage work as part of a program to achieve the production and value for money targets in the business plan. OPG continuously seeks improvement in outage planning and execution to ensure that the required outage work is conducted at the lowest achievable cost.

DNNP Facilities Outage OM&A

The IR term DNNP facilities outage expenses are $0.1M in 2030 and $48.6M in 2031, and form part of the OM&A expense in the nuclear revenue requirement. DNNP facilities outage OM&A costs will vary year over year with the outage schedule. These costs are shown at Ex. F2-4-1, Table 1, line 17.

DNNP facilities outage OM&A costs over the IR term primarily reflect the following:

- Expenditures for refueling, inspection and maintenance activities undertaken during DNNP facilities planned outages, based on DNNP facilities planned outage schedule. Refueling outages will initially be performed on a 12-month cycle followed by 24-month cycles.

Pickering Cyclical Maintenance OM&A

The IR term Pickering Cyclical Maintenance OM&A expenses are $168.4M in 2027, $160.9M in 2028, $168.9M in 2029, $169.9M in 2030, and $106.6M in 2031, and form part of the OM&A

expenses in the nuclear revenue requirement. These costs are shown at Ex. F2-4-1, Table 1, line 14.

OPG's site licence granted by the Canadian Nuclear Safety Commission ("CNSC") is based on a comprehensive review of station operations. It mandates compliance with regulatory standards and requirements, such as protecting the health and safety of the public and the environment, maintaining national security and adhering to international obligations. OPG's site licence conditions continue to apply to Pickering throughout the entire refurbishment outage.

As discussed in Ex. F2-2-1, Section 3.3, separate from the requirements for the Pickering Refurbishment Program ("PRP"), including the work conducted under the PRP Operations & Maintenance work bundle, there is ongoing work necessary to maintain Pickering Units 5-8 and the associated infrastructure during the four-unit refurbishment outage to ensure compliance with regulatory licence requirements and readiness to return the unit to service.

The Pickering Cyclical Maintenance program includes activities typically associated with a major planned outage or online work during normal operations.[1] As required by OPG's Nuclear Management System, including activities affecting the safe operation of nuclear facilities to satisfy applicable requirements of the CSA N286-12 Management System Requirements for Nuclear Facilities, maintenance programs are structured to ensure nuclear facilities are kept within parameters established in the design basis, and equipment malfunctions or deficiencies are corrected in a timely manner and rarely recur. OPG's Pickering Cyclical Maintenance program is also aligned to OPG's aging and life cycle management programs, which ensures compliance with regulatory requirements (e.g., mandatory inspections due during the refurbishment period), preserve optimal operability, and ensure availability of plant equipment for safe and reliable operation through effective implementation and control of maintenance activities and readiness to return the unit to service. This includes managing the requirements

[1] Due to the unique station condition that is a multi-year four-unit outage, the scope of this work is broader than Darlington Cyclical Outages, which were focused on activities typically associated with a major planned outage and not regular online maintenance work. Regular online maintenance continued to be executed and funded by Base OM&A resources associated with Darlington's operating units.

for identification and execution of preventive maintenance and repetitive task work activities using the predefined process in support of operations, maintenance, and testing of nuclear generating station equipment and facilities. This program also maintains system instrumentation in a condition that can operate within specified limits, and measuring and testing equipment to ensure it remains within proper range, type, condition, and accuracy by adjustment, maintenance, and calibration of equipment.

Pickering Cyclical Maintenance program scopes were defined through a cross functional (Engineering, Operations, Reactor Safety and Maintenance) scope selection process. The program will primarily be executed by existing OPG operational staff. Pickering Cyclical Maintenance costs over the IR term primarily reflect the following:

- Non-refurbishment costs for cyclical inspection and maintenance activities at the Pickering station during the planned refurbishment window. The activities performed under cyclical maintenance include preventative and corrective maintenance work on station systems that will remain in service throughout the refurbishment period. For example, the American Society of Mechanical Engineers Pressure Boundary Code requires that safety relief valves for systems and components installed to prevent over pressure events continue to be replaced and tested on a routine basis to ensure high quality protection, which is executed by OPG's Maintenance staff.
- Planning and execution of preventative maintenance work along with performing component repairs to ensure systems and components that are not within the refurbishment scope are maintained to ensure reliability in advance of a unit's return to service. This work will help to reduce the future forced loss rate risks and maintenance backlogs.

As discussed in Ex. F2-1-1, both Base OM&A and Pickering Cyclical Maintenance OM&A resources are required to carry out the ongoing inspection, maintenance and regulatory compliance activities at Pickering during the four-unit refurbishment outage. Over the IR term, Base OM&A resources primarily fund such Operations & Project Support work programs (Ex.

F2-2-1, Section 3.3), whereas Pickering Cyclical Maintenance OM&A primarily fund the station level resources.[2]

The planned costs are relatively stable over the 2027-2030 period, averaging approximately $167.0M annually, before declining to $106.6M in 2031 as Unit 5 returns to service and the scope is transitioned, in large part, to Base OM&A resources associated with operating Unit 5. The relatively levelized nature of costs during IR term reflects the fact that work can be undertaken more flexibly during the four-unit refurbishment window as opposed to being restricted by what can be done as online maintenance work during normal operations or otherwise timed with unit outages.

3.0 OUTAGE OM&A PLANNING AND RESOURCING

Planned outages are necessary to execute inspection and maintenance work related to asset management and regulatory requirements, or project work, on systems and equipment where access is not possible under normal operating conditions. For the DNNP facilities, planned outages are also necessary to conduct refueling activities.

Planned outages also give OPG an opportunity to perform systems and equipment upgrades, configuration changes, and other improvements and modifications, as applicable.

3.1 Outage Scope and Duration Planning

The outage OM&A budget is derived in conjunction with the development of the approved generation plan and outage schedule for each station, which is discussed in Ex. E2-1-1. The generation plan, by reference to the station's life cycle management plan for OPG's nuclear facilities, establishes the number, frequency and duration of the outages for each year that are required to ensure the continued safe, reliable, long-term operation of the plant and that, for both OPG's nuclear facilities and DNNP facilities, it is in compliance with CNSC requirements.

[2] As a result, there are comparatively modest Pickering station level Base OM&A costs planned over the 2027-2030 averaging $17.6M per year (Ex. F2-2-1, Table 1a, line 2).

3.2 Outage Resource Planning for OPG's Nuclear Facilities

The outage resource plan is established and costed based on the work activities required to execute each regular planned outage scheduled under the generation plan.

Work activities are planned at a detailed level, and resource requirements are identified using material requirements and resource productivity information from recently completed outages. These resource costs are aggregated to determine total outage OM&A requirements. However, even with planning using best practices, unforeseen equipment conditions discovered during outages may result in additional outage scope and cost.

The completion of specific outages requires both base resources and incremental resources. OM&A base resources (i.e., Regular, Term and Extended Temporary Employee staff labour) in the stations or in Operations and Project Support that work on outages are captured in base OM&A. The cost of incremental resources in support of outage execution, and the cost of Advanced Inspection and Maintenance ("AIM," formerly "IRI") Regular, Term and Extended Temporary Employee staff labour, is captured in outage OM&A. This is because the primary function of AIM is to support outage execution.

The costs associated with the completion of projects undertaken during an outage are captured in either project OM&A or project capital, as applicable to the specific project.

The incremental resource types associated with resources utilized during outages are as follows:

- Non-Regular Labour: additional non-regular staff directly supervised by OPG staff (typically trade workers such as electricians).
- Overtime: regular and non-regular staff working on overtime in support of outage execution.
- Augmented Staff: contractors directly supervised by OPG staff (typically engineers and assessors).
- Materials: the materials and supplies installed or consumed in outage execution.
- Other Purchased Services: contractors performing specialized inspection and maintenance work or conducting major component refurbishments.

Incremental labour is a major component in outage OM&A costs. The key consideration in assessing the need for these resources during an outage is the ability to optimize all available base work resources and skills. Planning and executing outages are an exercise in balancing regular, temporary and contractor resources. Regular staff are utilized to the greatest extent possible to execute complex work assignments while maintaining the outage schedule. However, the availability of regular maintenance staff for outage work needs to be assessed relative to the following:

- the demand for regular maintenance staff to meet the ongoing maintenance requirements of the operating units; and
- the demand and available skill set for peak staff resources to complete the outage scope within the outage schedule and budget.

OPG uses staffing resources such as overtime or other purchased services (e.g., contractors), where appropriate, during outages. Due to the peaking nature of outage work, it is more cost effective to use incremental staffing than to maintain permanent outage staff in the base organization. Overtime is particularly useful during planned outages when base resources are insufficient to meet all the scheduled work. The selection of which labour resource option to employ is an ongoing resource optimization and balancing process of available fleet resources and depends on the specific circumstances driving the need for labour resources. Use of contractors or other temporary staff instead of overtime during an outage can be constrained by collective agreements. However, the nature of the activity may mandate the use of external, highly specialized contractors or original equipment manufacturer expertise. OPG's use of staffing resources to complete outage work activities provides important resource flexibility.

3.3 Outage Cost Estimation for DNNP Facilities

As discussed in Ex. E2-1-1, nuclear production planning and forecast methodology broadly applies in the same manner for OPG's nuclear facilities and the DNNP facilities.

As the DNNP facilities outages are in relation to a new technology for OPG and a first-of-a-kind reactor design, the DNNP facilities' outage cost forecast has been developed using distinct methodologies based on a combination of 12 and 24-month outage cycles:

- A benchmark comparison with Tennessee Valley Authority and Boiling Water Reactor Owner's Group data, scaled down to account for the outage duration and design complexity.
- An estimate from General Electric Hitachi focused specifically on refueling operations.

All methods yielded consistent estimates for the refueling and inspection portion of the costs.

4.0 OUTAGE OM&A COST DRIVERS

4.1 Factors Driving OPG's Nuclear Facilities Outage Costs

Outage OM&A is directly impacted by outage scope and the number of outages and related outage days.

The scope of outage work varies from year-to-year, reflecting station-specific inspection and maintenance activities as well as unit-specific requirements reflecting the operating life history or specific issues for a particular unit. The nuclear cost forecast and schedule are based on actual experience from previous outages and incorporation of improvements in execution efficiency where possible. Similar outage activities (e.g., unit shut down and start up windows) are considered, with process improvements incorporated into the schedule.

Since units do not necessarily age in a uniform way or at a uniform rate, it is highly unlikely that the outage scope for a particular unit in a certain year of operation will precisely match the outage scope for a different unit in the same year of its operation. While there are many standard elements included in the outage scope, there can also be unique activities, programs, or major equipment campaigns that are unit specific.

Other factors that drive outage scope include:

- Results from ongoing outage inspection and maintenance work, which could influence the scope of work planned for future outages, even if the future outages are at a different unit or station.
- New or evolving CNSC regulatory requirements which may influence outage scope and cost.

- Operational information shared within the nuclear industry provides OPG with information about potential emerging issues, which may require additional inspections in future outages to assess the impact of the emergent issue on OPG's nuclear units.

In addition to outage scope, outage OM&A cost is impacted by the number of units in outage. The following provides further background on the nature and timing of these outages.

Darlington units are on a 36-month outage cycle, currently impacted by the refurbishment schedule. As a result, outage OM&A expenditures reflect two regular planned outages in 2029, one regular planned outage in each of 2026, 2027, 2028, 2030 and 2031, no regular planned outages in 2025, and a VBO scheduled in 2027. In addition, as noted, the unit laid up during refurbishment (e.g., Unit 4 during 2023-2026) is subject to a Cyclical Outage. The work activities and associated outage OM&A expenditures for Cyclical Outages are in addition to and separate from the refurbishment of the units.

Darlington's Units 1 and 4 are scheduled for a combined two post refurbishment planned outages in 2025 and 2026 following return to service. These post-refurbishment outages will address equipment issues that are expected to arise after the refurbishment is complete and the unit has resumed operations.

Pickering units are on a 30-month planned outage cycle, such that there can be either two or three units in outage each year. Outage OM&A expenditures reflect one planned outage in each of 2025 and 2026, which support the planned extension of pre-refurbishment operations until September 2026.

Pickering Unit 5 is scheduled for a post refurbishment planned outage in 2031 following return to service. This post-refurbishment outage will address equipment issues that are expected to arise after the refurbishment is complete and the unit has resumed operations (Ex. E2-1-1, Section 3.1).

Outage OM&A costs are significantly impacted by scheduled outages to inspect the station negative pressure containment systems or VBO. For Darlington, a station-wide four-unit VBO and Station Containment Outage ("SCO") is required every 12 years. The next VBO/SCO is scheduled in 2027. Darlington's outage OM&A expenditures in 2025 and 2026 include preliminary costs for preparatory work for the 2027 VBO/SCO.

4.2 Factors Driving DNNP Facilities Outage Costs

DNNP facilities outages have a planned refueling outage initially performed on a 12-month cycle, followed by 24-month refueling cycles. The initial 12-month cycle allows for first-of-a-kind verification of core and fuel performance. Units are then planned to transition to 24-month cycles allowing for increased time during refueling outages to perform required in vessel inspections and maintenance activities. Periodically, longer outages will be required for maintenance and major refueling. As a result, outage OM&A expenditures during the IR term reflect one refueling outage in 2031.[3] In addition to refueling activities, this outage includes prescribed inspection and maintenance, as well as potential additional regulatory inspections over first of a kind operations and first time start-up related activities.

Contracting services will be used for the maintenance scope in the initial refueling outage occurring in 2031, consistent with the labour agreement negotiated with the PWU. See Ex. F4-3-1 for further information.

4.3 Outage Efficiency Improvements for OPG's Nuclear Facilities

OPG seeks to continuously improve planned outages on refurbished units by optimizing and reducing scope, streamlining workflows and processes, and leveraging innovation, technology, industry experience and resource strategies with a view to optimize outage schedules. Key areas targeted for continuous improvement are outage preparedness through improved planning and execution of work, including improved outage scheduling, operations performance and resource planning.

[3] There are no planned OM&A costs included in the Application associated with a 15-day outage in 2031 to address equipment issues that are expected to emerge within the first six months of operation.

5.0 MANAGEMENT OF OUTAGE COSTS

Treatment of outage costs varies with the nature of the costs and whether they are actual or forecast costs, as described below.

5.1 Forecast Outage OM&A (Bridge Years, IR Term)

The outage OM&A forecast does not include a budget for forced outages, planned derates or forced derates. OPG typically does not use incremental non-regular labour or augmented staff for these events at its nuclear facilities. When such situations arise, base work resources are re-prioritized to focus existing regular staff on returning the unit to full-power operation as quickly as possible.

5.2 Actual Outage OM&A for OPG's Nuclear Facilities (Historical Period)

Actual outage OM&A costs include the incremental costs of the planned outages and the cost of AIM staff. Actual outage OM&A costs also include costs due to forced extensions of planned outages, planned outage extensions, or unbudgeted planned outages. Actual outage OM&A costs do not include costs incurred due to forced outages, planned derates or forced derates. These costs are recorded in nuclear facilities Base OM&A costs.

A summary of the treatment of actual and forecast outage costs is provided in Chart 1 below.

Chart 1 - Treatment of Outage Forecasts and Actual Costs

	Forecast Cost	Actual Cost*
Planned Outages	Outage OM&A	Outage OM&A
Unplanned Outage Costs		
Forced Extensions to Planned Outages	Not in Forecast	Outage OM&A
Planned Outage Extensions	Not in Forecast	Outage OM&A
Unbudgeted Planned Outages	Not in Forecast	Outage OM&A
Forced Outages	Not in Forecast	Base OM&A
Forced Derates	Not in Forecast	Base OM&A
Planned Derates	Not in Forecast	Base OM&A

*For OPG's nuclear facilities only

Numbers may not add due to rounding.

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Exhibit F2
Tab 4
Schedule 1
Table 1

Table 1

Outage OM&A and Pickering Cyclical Maintenance OM&A - Combined Nuclear ($M)[1]

Line No.	Division	2020 Actual	2021 Actual	2022 Actual	2023 Actual	2024 Actual	2025 Budget	2026 Plan	2027 Plan	2028 Plan	2029 Plan	2030 Plan	2031 Plan
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
	Darlington Outages												
1	Darlington NGS	41.8	159.0	75.6	92.0	159.3	54.6	123.7	186.4	81.8	168.5	90.4	86.9
2	Operations and Project Support	8.1	32.3	14.0	13.8	45.4	10.7	32.3	37.4	30.9	50.6	31.2	28.8
3	**Total Darlington Outages**	49.9	191.3	89.6	105.8	204.6	65.4	155.9	223.7	112.7	219.1	121.6	115.8
	Pickering Outages												
4	Pickering NGS	146.4	108.7	110.5	121.7	91.6	41.4	39.9	0.0	0.0	0.0	0.0	26.5
5	Operations and Project Support	29.9	29.3	37.8	62.9	48.7	20.2	13.5	0.0	0.0	0.0	0.0	0.0
6	**Total Pickering Outages**	176.4	138.0	148.3	184.5	140.4	61.6	53.5	0.0	0.0	0.0	0.0	26.5
	CRVA Eligible Costs												
7	FCLE Related Ongoing Costs	20.3	25.5	25.3	20.6	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Pickering Extended Operations	47.3	26.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Optimization of Pickering Shutdown	0.1	1.9	1.8	7.2	11.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	**Total CRVA Eligible Costs**	67.6	53.5	27.0	27.8	13.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	**Total OPG Nuclear Facilities Outage OM&A**	293.9	382.8	265.0	318.1	358.1	127.0	209.4	223.7	112.7	219.1	121.6	142.2
	Pickering Cyclical Maintenance												
12	Pickering NGS	0.0	0.0	0.0	0.0	0.0	0.0	25.0	158.3	150.6	158.0	158.9	100.4
13	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	10.0	10.4	10.9	11.1	6.3
14	**Total Pickering Cyclical Maintenance OM&A**	0.0	0.0	0.0	0.0	0.0	0.0	25.0	168.4	160.9	168.9	169.9	106.6
	DNNP Facilities Outages												
15	Darlington SMR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	48.6
16	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
17	**Total DNNP Facilities Outage OM&A**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	48.6

Notes:

1 2020-2026 values have been restated for Nuclear organizational changes and transfers from Corporate Support (See Ex. A1-4-1, Att.2 and Ex. F2-2-1, Att.1).

Numbers may not add due to rounding.

Table 2

Outage OM&A - OPG Nuclear Facilities ($M)[1]

Line No.	Resource Type	2020 Actual	2021 Actual	2022 Actual	2023 Actual	2024 Actual	2025 Budget	2026 Budget	2027 Plan	2028 Plan	2029 Plan	2030 Plan	2031 Plan	IR Term Percentage[2]
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)
1	**Labour**	17.9	19.8	16.2	21.5	26.2	12.0	14.2	11.8	10.8	14.0	12.0	11.3	7.3%
2	**Non-Regular Labour[3]**	40.1	53.2	32.6	35.1	35.9	11.2	20.7	9.7	7.9	16.5	8.3	8.5	6.2%
3	**Overtime**	38.7	57.2	35.4	40.9	52.6	16.3	25.0	29.6	15.4	28.6	17.9	17.0	13.2%
4	**Augmented Staff**	1.9	2.0	1.6	2.2	5.1	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
5	**Materials**	57.4	59.2	49.0	58.7	65.7	22.6	33.2	41.5	21.2	38.4	19.4	26.1	17.9%
6	**Other Purchased Services**	135.2	188.1	128.0	157.3	169.6	61.8	113.7	128.6	56.6	119.8	63.1	77.4	54.4%
7	**Other**	2.6	3.3	2.1	2.4	3.0	0.7	2.6	2.6	0.9	1.8	0.9	1.9	1.0%
8	**Total OPG Nuclear Facilities Outage OM&A**	293.9	382.8	265.0	318.1	358.1	127.0	209.4	223.7	112.7	219.1	121.6	142.2	100.0%

Notes:

1 2020-2026 values have been restated for Nuclear organizational changes and transfers from Corporate Support (See Ex. A1-4-1, Att.2 and Ex. F2-2-1, Att.1).

2 IR Term Percentage = Sum of IR Term Resource Costs divided by Sum of IR Term Outage OM&A.

3 Non-Regular labour includes costs for term and temporary staff.

Numbers may not add due to rounding.

Table 3
Pickering Cyclical Maintenance OM&A ($M)

Line No.	Resource Type	2026 Budget	2027 Plan	2028 Plan	2029 Plan	2030 Plan	2031 Plan	IR Term Percentage[1]
		(a)	(b)	(c)	(d)	(e)	(f)	(g)
1	**Labour**	16.9	95.9	97.0	102.4	104.1	65.9	60.1%
2	**Non-Regular Labour[2]**	0.3	1.4	1.5	1.6	1.3	1.2	0.9%
3	**Overtime**	0.2	13.9	13.9	14.6	14.7	8.4	8.5%
4	**Augmented Staff**	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
5	**Materials**	7.5	28.4	13.9	14.6	14.7	12.0	10.8%
6	**Other Purchased Services**	0.0	28.8	34.7	35.7	35.1	19.1	19.8%
7	**Other**	0.0	0.0	0.0	0.0	0.0	0.0	0.0%
8	**Pickering Cyclical Maintenance OM&A**	25.0	168.4	160.9	168.9	169.9	106.6	100.0%

Notes:

1 IR Term Percentage = Sum of IR Term Resource

2 Non-Regular labour includes costs for term and temporary staff.

COMPARISON OF NUCLEAR OUTAGE AND PICKERING CYCLICAL MAINTENANCE OM&A COSTS

1.0 PURPOSE

This evidence presents period-over-period comparisons of OPG's nuclear facilities outage OM&A costs by station, Pickering Cyclical Maintenance OM&A costs and Darlington New Nuclear Program ("DNNP") facilities outage OM&A for 2020-2031, in support of the approval of these forecast costs for the IR term.

Nuclear facilities outage OM&A costs and DNNP facilities outage OM&A costs are impacted by the frequency, duration and scope of planned outages ("PO"), as well as specific outage initiatives requiring support work.

Period-over-period variances are presented in Ex. F2-4-2, Table 1a and 1b and are explained below, along with the extent to which the above factors influence outage OM&A costs in the 2027-2031 IR term. Net reportable variances and period-over-period changes (10% or greater, subject to a minimum materiality limit of $1.0M), are discussed below.

All comparisons to OEB-approved amounts are before any settlement or OEB adjustments.

2.0 PERIOD-OVER-PERIOD CHANGES – IR TERM, OPG NUCLEAR FACILITIES

2027 Plan versus 2026 Budget

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2027 is $223.7M, which is $14.4M or 6.9% higher than the 2026 Budget of $209.4M. The variance is attributable to Darlington outages ($67.8M or 43.5% increase), partially offset by Pickering outages ($53.5M or 100.0% decrease).

The reportable variances are as follows:

- Darlington PO costs are higher due to an extended outage which includes capital funded projects such as the Darlington Steam Generator Primary Moisture Separators ("PMS")

Replacement projects to replace the primary moisture separators on all four steam generators in Unit 2 (compared to primary moisture separators replacement on two steam generators in Unit 3 in 2026) and the Unit 2 Turbine Control and Auxiliary Systems Upgrade project, in addition to the Darlington Vacuum Building Outage ("VBO"), as compared to one regular PO, Unit 4 refurbishment cyclical outage work and one post-refurbishment outage in 2026, (Darlington station $62.7M or 50.7% increase and related Operations and Project Support $5.1M or 15.8% increase).

- Pickering PO costs are lower due to the completion of PO scope on one unit in 2026 and Pickering Units 5-8 entering into refurbishment in 2027 (Pickering station $39.9M or 100.0% decrease and related Operations and Project Support $13.5M or 100.0% decrease).

Pickering Cyclical Maintenance OM&A

Planned Cyclical Maintenance OM&A in 2027 is $168.4M, which is $143.4M or 573.4% higher than the 2026 Budget of $25.0M. The variance is attributable to Pickering station ($133.3M or 533.4% increase) and related Operations and Project Support ($10.0M or 100.0% increase).

The reportable variance is attributable to Pickering Units 5-8 being in the refurbishment outage for the full year in 2027 compared to the last three months in 2026. The increase in Pickering Cyclical Maintenance OM&A is offset by the year-over-year reduction in station level Base OM&A costs (Ex. F2-2-1, Table 1a, line 2).

2028 Plan versus 2027 Plan

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2028 is $112.7M, which is $111.0M or 49.6% lower than the 2027 planned amount of $223.7M. The variance is attributable to Darlington outages ($111.0M or 49.6% decrease).

The reportable variances are as follows:

- Darlington PO costs are lower due to one regular PO in 2028 as compared to an extended outage and the Darlington VBO in 2027 (Darlington station $104.6M or 56.1% decrease and related Operations and Project Support $6.4M or 17.2% decrease).

Pickering Cyclical Maintenance OM&A

Planned Cyclical Maintenance OM&A in 2028 is $160.9M, which is $7.4M or 4.4% lower than the 2027 planned amount of $168.4M. The variance is attributable to Pickering station ($7.8M or 4.9% decrease), partially offset by related Operations and Project Support ($0.3M or 3.5% increase).

There are no reportable variances during this timeframe.

2029 Plan versus 2028 Plan

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2029 is $219.1M, which is $106.4M or 94.3% higher than the 2028 planned amount of $112.7M. The variance is attributable to Darlington outages ($106.4M or 94.3% increase).

The reportable variances are as follows:

- Darlington PO costs are higher in 2029 due to two POs in 2029 as compared to one regular PO in 2028 (Darlington station $86.6M or 105.9% increase and related Operations and Project Support $19.7M or 63.7% increase).

Pickering Cyclical Maintenance OM&A

Planned Cyclical Maintenance OM&A in 2029 is $168.9M, which is $8.0M or 5.0% higher than the 2028 planned amount of $160.9M. The variance is attributable to Pickering station ($7.4M or 4.9% increase) and related Operations and Project Support ($0.6M or 5.4% increase).

There are no reportable variances during this timeframe.

2030 Plan versus 2029 Plan

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2030 is $121.6M, which is $97.5M or 44.5% lower than the 2029 planned amount of $219.1M. The variance is attributable to Darlington outages ($97.5M or 44.5% decrease).

The reportable variances are as follows:

- Darlington PO costs are lower due to one regular PO in 2030 as compared to two POs in 2029 (Darlington station $78.0M or 46.3% decrease and related Operations and Project Support $19.4M or 38.4% decrease).

OPG Pickering Cyclical Maintenance OM&A

Planned Cyclical Maintenance OM&A in 2030 is $169.9M, which is $1.0M or 0.6% higher than the 2029 planned amount of $168.9M. The variance is attributable to Pickering station ($0.9M or 0.6% increase) and related Operations and Project Support ($0.2M or 1.5% increase).

There are no reportable variances during this timeframe.

2031 Plan versus 2030 Plan

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2031 is $142.2M, which is $20.6M or 16.9% higher than the 2030 planned amount of $121.6M. The variance is attributable to Pickering outages ($26.5M or 100.0% increase), partially offset by Darlington outages ($5.9M or 4.8% decrease).

The reportable variance is as follows:

- Pickering PO costs are higher due to one post-refurbishment outage in 2031, as compared to no regular PO in 2030 (Pickering station $26.5M or 100.0% increase).

Pickering Cyclical Maintenance OM&A

Planned Cyclical Maintenance OM&A in 2031 is $106.6M, which is $63.3M or 37.3% lower than the 2030 planned amount of $169.9M. The variance is attributable to Pickering station

($58.5M or 36.8% decrease) and related Operations and Project Support ($4.8M or 43.6% decrease).

The reportable variance is attributable to the Unit 5 return to service planned in May 2031, with the ongoing scope of preventative maintenance and other ongoing activities transitioning in large part back to Base OM&A funding for operating units.

4.0 PERIOD-OVER-PERIOD CHANGES – BRIDGE YEARS, OPG NUCLEAR FACILITIES

2026 Budget versus 2026 OEB-Approved

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2026 is $209.4M, which is $148.1M or 241.4% higher than the 2026 OEB-approved budget of $61.3M. The variance is attributable to Darlington outages ($94.6M or 154.2% increase) and Pickering outages ($53.5M or 100.0% increase).

The reportable variances are as follows:

- Darlington PO costs are higher due to moving the Unit 3 regular PO from 2027 to 2026, partially offset by reduced Cyclical outage costs for Unit 4 due to the earlier than planned return to service from refurbishment (Darlington station $65.9M or 114.0% increase and related Operations and Project Support $28.7M or 810.4% increase).
- Pickering PO costs are higher due to the addition of a Unit 6 PO, related to the extension of Units 5-8 operations into 2026 relative to the assumed shutdown of the station in EB-2020-0290 (Pickering station $39.9M or 100.0% increase and related Operations and Project Support $13.5M or 100.0% increase).

Pickering Cyclical Maintenance OM&A

Planned Cyclical Maintenance OM&A in 2026 is $25.0M, which is $25.0M or 100.0% higher than the 2026 OEB-approved budget of $0.0M. The variance is attributable to Pickering station ($25.0M or 100.0% increase).

The reportable variance is attributable to the refurbishment of Pickering Units 5-8 not being assumed in EB-2020-0290 as the Pickering station was then planned to shut down in 2025.

2026 Budget versus 2025 Budget

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2026 is $209.4M, which is $82.4M or 64.9% higher than the 2025 budget amount of $127.0M. The variance is attributable to Darlington outages ($90.6M or 138.5% increase), partially offset by Pickering outages ($8.2M or 13.3% decrease).

The reportable variances are as follows:

- Darlington PO costs are higher due to one regular PO in 2026 as compared to no regular POs in 2025, partially offset by lower Cyclical outage costs for Unit 4 due to the earlier return to service date (Darlington station $69.0M or 126.3% increase and related Operations and Project Support $21.5M or 200.7% increase).
- Pickering PO related Operations and Project Support costs are $6.7M or 33.1% lower due to less inspection and maintenance support required for the Unit 6 PO.

Pickering Cyclical Maintenance OM&A

Planned Cyclical Maintenance OM&A in 2026 is $25.0M, which is $25.0M or 100.0% higher than the 2025 planned amount of $0.0M. The variance is attributable to Pickering station ($25.0M or 100.0% increase).

The reportable variance is attributable to the fact that Pickering Units 5-8 are planned to enter the refurbishment outage in September 2026.

2025 Budget versus 2025 OEB-Approved

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2025 is $127.0M, which is $65.6M or 34.0% lower than the 2025 OEB-approved budget of $192.6M. The variance is attributable to Darlington outages ($127.2M or 66.1% decrease), partially offset by Pickering Outages ($61.6M or 100.0% increase).

The reportable variances are as follows:

- Darlington PO costs are lower primarily due to shifting the Darlington Unit 2 Turbine Control and Auxiliary Systems Upgrade project from 2025 to 2027 to support grid reliability and manage resource constraints during concurrent nuclear outages, and also not requiring one of the planned post-refurbishment outages, partially offset by increased routine station inspection and maintenance work for Unit 4 during the refurbishment cyclical outage (Darlington station $102.3M or 65.2% decrease and related Operations and Project Support $24.9M or 69.9% decrease).
- Pickering PO costs are higher due to the added Unit 5 PO to enable the extension of Unit 5 operations into 2026 relative to the assumed shutdown of the station in EB-2020-0290. (Pickering station $41.4M or 100.0% increase and related Operations and Project Support $20.2M or 100.0% increase).

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2025 Budget versus 2024 Actual

OPG Nuclear Facilities Outage OM&A

Planned outage OM&A in 2025 is $127.0M, which was $231.1M or 64.5% lower than the 2024 actual amount of $358.1M. The variance is mainly attributable to Darlington outages ($139.3M or 68.1% decrease) and Pickering outages ($78.7M or 56.1% decrease) and CRVA eligible costs ($13.1M or 100.0% decrease).

The reportable variances are as follows:

- Darlington PO costs are lower due to no regular POs in 2025, as compared to one PO in 2024 (Darlington station $104.7M or 65.7% decrease and related Operations and Project Support $34.6M or 76.3% decrease).
- Pickering PO costs are lower due to one regular PO in 2025, as compared to two regular POs in 2024 (Pickering station $50.2M or 54.8% decrease and related Operations and Project Support $28.5M or 58.5% decrease).

- Fuel Channel Life Extension ("FCLE") Related Ongoing Costs are $1.3M or 100.0% lower due to completion of the outage OM&A expenditures for this program in 2024.
- Optimization of Pickering Shutdown outage costs are $11.8M or 100.0% lower due to completion of the outage OM&A expenditures for this program in 2024.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

5.0 PERIOD-OVER-PERIOD CHANGES – HISTORICAL YEARS, OPG NUCLEAR FACILITIES

2024 Actual versus 2024 OEB-Approved

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2024 was $358.1M, which was $145.7M or 68.6% higher than the 2024 OEB-approved budget of $212.4M. The variance is attributable to Darlington outages ($110.0M or 116.2% increase), Pickering outages ($36.4M or 35.0% increase), partially offset by CRVA Eligible Costs ($0.6M or 4.7% decrease).

The reportable variances are as follows:

- Darlington PO costs are higher due to shifting the Unit 2 PO from 2023 to 2024 and an increase in routine inspection and maintenance work for Unit 4 during the refurbishment cyclical outage (Darlington station $77.3M or 94.4% increase and related Operations and Project Support $32.6M or 256.8% increase).
- Pickering PO costs are higher primarily due to increased scope added to the POs to support the extension of operations of Units 5-8 to September 2026 relative to the assumed shutdown of the station in EB-2020-0290 (Pickering station $14.6M or 19.0% increase and related Operations and Project Support $21.8M or 80.7% increase).
- FCLE Related Ongoing Costs are $1.0M or 403.3% higher primarily attributable to the manual tube plugging & locking tab scope for Pickering Unit 7.
- Pickering Optimized Shutdown PO costs are $1.7M or 12.5% lower attributable to the Unit 5 and Unit 7 inspection scope.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2024 Actual versus 2023 Actual

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2024 was $358.1M, which was $40.0M or 12.6% higher than the 2023 Actual amount of $318.1M. The variance is attributable to Darlington outages ($98.9M or 93.5% increase), partially offset by Pickering outages ($44.2M or 23.9% decrease) and CRVA eligible costs ($14.7M or 52.7% decrease).

The reportable variances are as follows:

- Darlington PO costs are higher in 2024 due to one regular PO, as compared to no such outage in 2023, increased Unit 1 and 4 refurbishment cyclical outage work, offset by lower Unit 3 refurbishment cyclical work (Darlington station $67.3M or 73.1% increase and related Operations and Project Support $31.6M or 229.8% increase).
- Pickering PO costs decrease due to conducting two regular POs in 2024 as compared to three such outages in 2023, partially offset by increased outage scope to support extension of Units 5-8 operations into 2026 (Pickering station $30.0M or 24.7% decrease and related Operations and Project Support $14.1M or 22.5% decrease).
- FCLE Related Ongoing Costs are $19.3M or 93.7% lower due to continued winding down of this program with Pickering Unit 6 and 8 scope completed in 2023.
- Pickering Optimized Shutdown PO costs are $4.6M or 64.2% higher attributable to the Unit 5 and Unit 7 inspection scope.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2023 Actual versus 2023 OEB-Approved

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2023 was $318.1M, which was $43.1M or 11.9% lower than the 2023 OEB-approved budget of $361.2M. The variance is attributable to Darlington outages ($81.4M

or 43.5% decrease), partially offset by Pickering outages ($27.2M or 17.3% increase) and CRVA eligible costs ($11.1M or 66.5% increase).

The reportable variances are as follows:

- Darlington PO costs are lower primarily due to shifting the Unit 2 PO from 2023 to 2024, partially offset by increased costs for Units 1, 3, and 4 refurbishment cyclical outage work (Darlington station $67.0M or 42.1% decrease and related Operations and Project Support $14.3M or 51.1% decrease).
- Pickering PO costs are higher primarily due to costs incurred for spindle refurbishment, and increased scope to support extension of Units 5-8 operations into 2026 relative to the assumed shutdown of the station in EB-2020-0290 (Pickering station $15.9M or 15.1% increase and related Operations and Project Support $11.3M or 21.8% increase).
- FCLE Related Ongoing Costs are $6.1M or 42.4% higher attributable to Pickering Unit 6 and Unit 8 inspection scope.
- Pickering Optimized Shutdown PO costs are $5.0M or 223.3% higher attributable to the Unit 6 and Unit 8 inspection scope.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2023 Actual versus 2022 Actual

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2023 was $318.1M, which was $53.1M or 20.0% higher than the 2022 Actual amount of $265.0M. The variance is attributable to Pickering outages ($36.2M or 24.4% increase), Darlington outages ($16.2M or 18.0% increase), and CRVA eligible costs ($0.7M or 2.7% increase).

The reportable variances are as follows:

- Darlington station PO costs are higher due to incurring pre-requisite costs for the 2024 Unit 2 regular PO along with increased Unit 1 and 4 refurbishment Cyclical Outage work,

partially offset by reduced Unit 3 refurbishment Cyclical Outage work (Darlington station $16.4M or 21.7% increase).

- Pickering PO costs increase due to conducting three regular PO in 2023 as compared to two such outages in 2022 plus the Pickering VBO (Pickering station $11.2M or 10.1% increase, and related Operations and Project Support $25.0M or 66.2% increase).
- Fuel Channel Life Extension Ongoing (consequential) PO costs are $4.7M or 18.6% lower primarily attributable to a Single Fuel Channel Replacement and other inspection scope in 2022 at Pickering.
- Pickering Optimized Shutdown PO costs are $5.4M or 308.1% higher attributable to the Unit 6 and Unit 8 inspection scope.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2022 Actual versus 2022 OEB-Approved

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2022 was $265.0M, which was $14.1M or 5.1% lower than the 2022 OEB-approved budget of $279.1M. The variance is attributable to Pickering outages ($9.0M or 5.7% decrease) and CRVA eligible costs ($5.3M or 16.4% decrease), partially offset by Darlington outages ($0.2M or 0.2% increase).

The reportable variances are as follows:

- Darlington PO related Operations and Project Support costs decrease $1.8M or 11.5% primarily due to no pre-requisite costs incurred for the Unit 2 outage that was moved to 2024, partially offset by increased Unit 1 and 3 refurbishment cyclical outage work.
- FCLE Related Ongoing Costs are $4.5M or 15.2% lower attributable to the Pickering Unit 5 scope which included a Single Fuel Channel Replacement and Scrape.
- Pickering Optimized Shutdown PO costs are $0.8M or 30.8% lower attributable to the Unit 5 and 6 inspection scope.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2022 Actual versus 2021 Actual

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2022 was $265.0M, which was $117.8M or 30.8% lower than the 2021 Actual amount of $382.8M. The variance is attributable to Darlington outages ($101.7M or 53.1% decrease), CRVA eligible costs ($26.5M or 49.5% decrease), partially offset by Pickering outages ($10.3M or 7.5% increase).

The reportable variances are as follows:

- Darlington PO costs are lower due to one post-refurbishment outage in 2022 as compared to two regular POs and one post-refurbishment outage in 2021, partially offset by an increase in routine station inspection and maintenance work for Unit 1 during the refurbishment cyclical outages (Darlington station $83.4M or 52.4% decrease and related Operations and Project Support $18.3M or 56.6% decrease).
- Pickering PO related Operations and Project Support costs increase $8.5M or 29.1% primarily due to the Pickering VBO scheduled in 2022, partially offset by a planned unbudgeted outage for Unit 5 in 2021.
- Pickering Extended Operations PO costs are $26.1M lower or 100% due to the completion of outage OM&A expenditures for this program in 2021.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2021 Actual versus 2021 OEB-Approved

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2021 was $382.8M, which was $74.3M or 24.1% higher than the 2021 OEB-approved amount of $308.5M. The variance is primarily attributable to Darlington outages

($127.0M or 197.3% increase), CRVA eligible costs ($52.0M increase), partially offset by Pickering outages ($104.7M or 43.1% decrease).

The reportable variances are as follows:

- Darlington PO costs are higher due to moving the Unit 1 regular PO from 2020 to 2021 and adding a Unit 4 regular PO as a result of the deferred Darlington Refurbishment Program schedule. (Darlington station $104.9M or 193.7% increase and related Operations and Project Support $22.1M or 216.5% increase).
- Pickering PO costs are lower primarily due to moving the Pickering VBO from 2021 to 2022 and reducing regular POs from three to two in line with the 30-month outage cycle (Pickering station $60.5M or 35.8% decrease and related Operations and Project Support $44.2M or 60.1% decrease).
- FCLE Related Ongoing Costs are $24.0M higher primarily attributable to the addition of Waterlancing and Scrape Sample Analysis for Darlington Unit 4 and Pickering Unit 7 and Unit 8 as well as moving the Darlington Unit 1 regular PO from 2020 to 2021.
- Pickering Extended Operations PO costs are $26.1M higher primarily due to Unit 7 and Unit 8 inspection work moved from 2020 to 2021 (there were no outage OM&A costs forecast in 2021 OEB-approved). Overall Pickering Extended Operations initiative was completed within budget.
- Pickering Optimized Shutdown PO costs are $1.9M higher primarily attributable to the introduction of this work program for Unit 7 and Unit 8 inspection work.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2021 Actual versus 2020 Actual

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2021 was $382.8M, which was $89.0M or 30.3% higher than the 2020 Actual amount of $293.9M. The variance is attributable to Darlington outages ($141.4M or 283.4% increase), partially offset by Pickering outages ($38.4M or 21.8% decrease) and CRVA eligible costs ($14.1M or 20.8% decrease).

The reportable variances are as follows:

- Darlington PO costs are higher due to two regular POs and one post-refurbishment outage in 2021, as compared to no regular POs in 2020 (Darlington station $117.2M or 280.6% increase and related Operations and Project Support $24.2M or 297.6% increase).
- Pickering planned outage costs decrease $37.8M or 25.8% due to conducting two regular POs in 2021 as compared to three such outages in 2020, partially offset by Unit 8 Single Fuel Channel Replacement and an unbudgeted outage for Unit 5 in 2021.
- FCLE Related Ongoing Costs are $5.2M higher or 25.6% primarily attributable to Pickering for Unit 5 Fuel Channel Replacement pre-requisites for the 2022 outage and Unit 7 Waterlancing and Scrape Analysis.
- Pickering Extended Operations PO costs are $21.1M lower or 44.7% primarily due to conducting two regular POs in 2021 as compared to three such outages in 2020.
- Pickering Optimized Shutdown PO costs are $1.9M higher primarily attributable to the introduction of this work program in 2021 for Unit 7 and Unit 8 inspection work.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

2020 Actual versus 2020 OEB-Approved

OPG Nuclear Facilities Outage OM&A

Actual outage OM&A in 2020 was $293.9M, which was $100.6M or 25.5% lower than the 2020 OEB-approved amount of $394.4M. The variance is primarily attributable to Darlington outages ($128.7M or 72.1% decrease), CRVA eligible costs ($26.3M or 28.0% decrease), partially offset by Pickering outages ($54.4M or 44.6% increase).

The reportable variances are as follows:

- Darlington PO costs are lower primarily due to moving the Unit 1 regular PO from 2020 to 2021, as discussed above (Darlington station $108.9M or 72.3% decrease and related Operations and Project Support $19.8M or 70.9% decrease).
- Pickering PO costs are higher primarily due to increasing regular POs from two to three in line with the 30-month outage cycle and higher costs incurred for spindle refurbishment

(Pickering station $46.2M or 46.1% increase and related Operations and Project Support $8.2M or 37.8% increase).

- FCLE Related Ongoing Costs are $11.9M or 141.2% higher primarily attributable to higher Single Fuel Channel Replacement costs for Darlington Unit 3 than originally planned for Darlington Unit 1.
- Pickering Extended Operations Enabling PO costs are $38.3M or 44.7% lower primarily due to the further definition post-2016 of scope, which resulted in a decrease in Pickering Extended Operations outage OM&A partially offset by increases in Pickering Extended Operations Base OM&A and Pickering Extended Operations Capital in 2020, and timing of expenditures as Unit 7 and Unit 8 inspection work was moved from 2020 to 2021.

Pickering Cyclical Maintenance OM&A

There are no costs planned or incurred during this timeframe.

6.0 PERIOD-OVER-PERIOD CHANGES – IR TERM, DNNP FACILITIES

There are no reportable variances for DNNP Facilities Outage OM&A over the 2026-2029 period.

2030 Plan versus 2029 Plan

DNNP Facilities Outage OM&A

Planned outage OM&A in 2030 is $0.1M, which is $0.1M or 100.0% higher than the 2029 planned amount of $0.0M. The variance is attributable to the DNNP facilities outages ($0.1M or 100.0% increase).

There are no reportable variances during this timeframe.

2031 Plan versus 2030 Plan

DNNP Facilities Outage OM&A

Planned outage OM&A in 2031 is $48.6M, which is $48.6M or 100.0% higher than the 2030 planned amount of $0.1M. The variance is attributable to the DNNP facilities outages ($48.6M or 100.0% increase).

The reportable variance is as follows:

- DNNP facilities PO costs are higher due to the first refuelling outage which is planned to occur 12 months after the commercial in-service date, as compared to no regular PO in 2030 (DNNP facilities $48.6M or 100.0% increase).

Numbers may not add due to rounding.

Table 1a

Comparison of Outage OM&A and Pickering Cyclical Maintenance OM&A - Combined Nuclear ($M)[1,2]

Line No.	Business Unit	2020 OEB Approved	(c)-(a) Change	2020 Actual	(g)-(c) Change	2021 OEB Approved	(g)-(e) Change	2021 Actual	(k)-(g) Change	2022 OEB Approved	(k)-(i) Change	2022 Actual
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
	Darlington Outages											
1	Darlington NGS	150.7	***(108.9)***	41.8	***117.2***	54.1	***104.9***	159.0	***(83.4)***	73.6	2.0	75.6
2	Operations and Project Support	27.9	***(19.8)***	8.1	***24.2***	10.2	***22.1***	32.3	***(18.3)***	15.8	***(1.8)***	14.0
3	**Total Darlington Outages**	178.6	***(128.7)***	49.9	***141.4***	64.3	***127.0***	191.3	***(101.7)***	89.4	0.2	89.6
	Pickering Outages											
4	Pickering NGS	100.2	***46.2***	146.4	***(37.8)***	169.2	***(60.5)***	108.7	1.8	118.8	(8.3)	110.5
5	Operations and Project Support	21.7	***8.2***	29.9	(0.6)	73.5	***(44.2)***	29.3	***8.5***	38.5	(0.7)	37.8
6	**Total Pickering Outages**	121.9	***54.4***	176.4	***(38.4)***	242.7	***(104.7)***	138.0	10.3	157.3	(9.0)	148.3
	CRVA Eligible Costs											
7	FCLE Related Ongoing Costs	8.4	***11.9***	20.3	***5.2***	1.5	***24.0***	25.5	(0.2)	29.8	***(4.5)***	25.3
8	Pickering Extended Operations	85.5	***(38.3)***	47.3	***(21.1)***	0.0	***26.1***	26.1	***(26.1)***	(0.0)	0.0	0.0
9	Optimization of Pickering Shutdown	0.0	0.1	0.1	***1.9***	0.0	***1.9***	1.9	(0.2)	2.6	(0.8)	1.8
10	**Total CRVA Eligible Costs**	93.9	***(26.3)***	67.6	***(14.1)***	1.5	***52.0***	53.5	***(26.5)***	32.4	***(5.3)***	27.0
11	**Total OPG Nuclear Facilities Outage OM&A Before Adjustments**	394.4	***(100.6)***	293.9	***89.0***	308.5	***74.3***	382.8	***(117.8)***	279.1	(14.1)	265.0
12	**OEB/Settlement Adjustments**		0.0		0.0		0.0		0.0	(8.4)	***8.4***	
13	**Total OPG Nuclear Facilities Outage OM&A Including Adjustments**	394.4	***(100.6)***	293.9	***89.0***	308.5	***74.3***	382.8	***(117.8)***	270.7	(5.7)	265.0
	Pickering Cyclical Maintenance											
14	Pickering NGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
15	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	**Total Pickering Cyclical Maintenance OM&A**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DNNP Facilities Outages											
17	DNNP Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	**Total DNNP Facilities Outage OM&A**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Line No.	Business Unit	2022 Actual	(e)-(a) Change	2023 OEB Approved	(e)-(c) Change	2023 Actual	(i)-(e) Change	2024 OEB Approved	(i)-(g) Change	2024 Actual	(k)-(i) Change	2025 Budget
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
	Darlington Outages											
20	Darlington NGS	75.6	***16.4***	159.1	***(67.0)***	92.0	***67.3***	81.9	***77.3***	159.3	***(104.7)***	54.6
21	Operations and Project Support	14.0	(0.3)	28.1	***(14.3)***	13.8	***31.6***	12.7	***32.6***	45.4	***(34.6)***	10.7
22	**Total Darlington Outages**	89.6	***16.2***	187.2	***(81.4)***	105.8	***98.9***	94.7	***110.0***	204.6	***(139.3)***	65.4
	Pickering Outages											
23	Pickering NGS	110.5	***11.2***	105.8	***15.9***	121.7	***(30.0)***	77.0	***14.6***	91.6	***(50.2)***	41.4
24	Operations and Project Support	37.8	***25.0***	51.6	***11.3***	62.9	***(14.1)***	27.0	***21.8***	48.7	***(28.5)***	20.2
25	**Total Pickering Outages**	148.3	***36.2***	157.4	***27.2***	184.5	***(44.2)***	104.0	***36.4***	140.4	***(78.7)***	61.6
	CRVA Eligible Costs											
26	FCLE Related Ongoing Costs	25.3	***(4.7)***	14.5	***6.1***	20.6	***(19.3)***	0.3	***1.0***	1.3	***(1.3)***	0.0
27	Pickering Extended Operations	0.0	0.0	0.0	(0.0)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	Optimization of Pickering Shutdown	1.8	***5.4***	2.2	***5.0***	7.2	***4.6***	13.5	***(1.7)***	11.8	***(11.8)***	0.0
29	**Total CRVA Eligible Costs**	27.0	0.7	16.7	***11.1***	27.8	***(14.7)***	13.8	(0.6)	13.1	***(13.1)***	0.0
30	**Total OPG Nuclear Facilities Outage OM&A Before Adjustments**	265.0	***53.1***	361.2	***(43.1)***	318.1	***40.0***	212.4	***145.7***	358.1	***(231.1)***	127.0
31	**OEB/Settlement Adjustments**		0.0	(10.8)	***10.8***		0.0	(6.4)	***6.4***		0.0	
32	**Total OPG Nuclear Facilities Outage OM&A Including Adjustments**	265.0	***53.1***	350.4	(32.3)	318.1	***40.0***	206.0	***152.1***	358.1	***(231.1)***	127.0
	Pickering Cyclical Maintenance											
33	Pickering NGS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
34	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
35	**Total Pickering Cyclical Maintenance OM&A**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	DNNP Facilities Outages											
36	DNNP Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
37	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
38	**Total DNNP Facilities Outage OM&A**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Notes:

1 2020-2026 values have been restated for Nuclear organizational changes and transfers from Corporate Support (See Ex. A1-4-1 Attachment 2 and Ex. F2-2-1, Attachment 1).

2 Per EB-2020-0290 OEB Decision and Order, Schedule A, p. 25, nuclear Outage OM&A costs are reduced by 3% per year over the 2022-2026 period.

Numbers may not add due to rounding.

Table 1b

Comparison of Outage OM&A and Pickering Cyclical Maintenance OM&A - Combined Nuclear ($M)[1,2]

Line No.	Business Unit	2025 OEB Approved	(c)-(a) Change	2025 Budget	(g)-(c) Change	2026 OEB Approved	(g)-(e) Change	2026 Budget	(i)-(g) Change	2027 Plan	(k)-(i) Change	2028 Plan
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)
	Darlington Outages											
1	Darlington NGS	156.9	***(102.3)***	54.6	***69.0***	57.8	***65.9***	123.7	***62.7***	186.4	***(104.6)***	81.8
2	Operations and Project Support	35.7	***(24.9)***	10.7	***21.5***	3.5	***28.7***	32.3	***5.1***	37.4	***(6.4)***	30.9
3	**Total Darlington Outages**	192.6	***(127.2)***	65.4	***90.6***	61.3	***94.6***	155.9	***67.8***	223.7	***(111.0)***	112.7
	Pickering Outages											
4	Pickering NGS	0.0	***41.4***	41.4	(1.5)	0.0	***39.9***	39.9	***(39.9)***	0.0	0.0	0.0
5	Operations and Project Support	0.0	***20.2***	20.2	***(6.7)***	0.0	***13.5***	13.5	***(13.5)***	0.0	0.0	0.0
6	**Total Pickering Outages**	0.0	***61.6***	61.6	***(8.2)***	0.0	***53.5***	53.5	***(53.5)***	0.0	0.0	0.0
	CRVA Eligible Costs											
7	FCLE Related Ongoing Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	Pickering Extended Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	Optimization of Pickering Shutdown	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	**Total CRVA Eligible Costs**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	**Total OPG Nuclear Facilities Outage OM&A Before Adjustments**	192.6	***(65.6)***	127.0	***82.4***	61.3	***148.1***	209.4	14.4	223.7	***(111.0)***	112.7
12	**OEB/Settlement Adjustments**	(5.8)	***5.8***		0.0	(1.8)	***1.8***		0.0		0.0	
13	**Total OPG Nuclear Facilities Outage OM&A Including Adjustments**	186.8	***(59.8)***	127.0	***82.4***	59.5	***149.9***	209.4	14.4	223.7	***(111.0)***	112.7
	Pickering Cyclical Maintenance											
14	Pickering NGS	0.0	0.0	0.0	***25.0***	0.0	***25.0***	25.0	***133.3***	158.3	(7.8)	150.6
15	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	***10.0***	10.0	0.3	10.4
16	**Total Pickering Cyclical Maintenance OM&A**	0.0	0.0	0.0	***25.0***	0.0	***25.0***	25.0	***143.4***	168.4	(7.4)	160.9
	DNNP Facilities Outages											
17	DNNP Facilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
18	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
19	**Total DNNP Facilities Outage OM&A**	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Line No.	Business Unit	2028 Plan	(c)-(a) Change	2029 Plan	(e)-(c) Change	2030 Plan	(g)-(e) Change	2031 Plan
		(a)	(b)	(c)	(d)	(e)	(f)	(g)
	Darlington Outages							
20	Darlington NGS	81.8	***86.6***	168.5	***(78.0)***	90.4	(3.5)	86.9
21	Operations and Project Support	30.9	***19.7***	50.6	***(19.4)***	31.2	(2.4)	28.8
22	**Total Darlington Outages**	112.7	***106.4***	219.1	***(97.5)***	121.6	(5.9)	115.8
	Pickering Outages							
23	Pickering NGS	0.0	0.0	0.0	0.0	0.0	***26.5***	26.5
24	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
25	**Total Pickering Outages**	0.0	0.0	0.0	0.0	0.0	***26.5***	26.5
	CRVA Eligible Costs							
26	FCLE Related Ongoing Costs	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	Pickering Extended Operations	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	Optimization of Pickering Shutdown	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	**Total CRVA Eligible Costs**	0.0	0.0	0.0	0.0	0.0	0.0	0.0
30	**Total OPG Nuclear Facilities Outage OM&A**	112.7	***106.4***	219.1	***(97.5)***	121.6	***20.6***	142.2
	Pickering Cyclical Maintenance							
31	Pickering NGS	150.6	7.4	158.0	0.9	158.9	***(58.5)***	100.4
32	Operations and Project Support	10.4	0.6	10.9	0.2	11.1	***(4.8)***	6.3
33	**Total Pickering Cyclical Maintenance OM&A**	160.9	8.0	168.9	1.0	169.9	***(63.3)***	106.6
	DNNP Facilities Outages							
34	DNNP Facilities	0.0	0.0	0.0	0.1	0.1	***48.6***	48.6
35	Operations and Project Support	0.0	0.0	0.0	0.0	0.0	0.0	0.0
36	**Total DNNP Facilities Outage OM&A**	0.0	0.0	0.0	0.1	0.1	***48.6***	48.6

Notes:
1 2020-2026 values have been restated for Nuclear organizational changes and transfers from Corporate Support (See Ex. A1-4-1, Att.2 and Ex. F2-2-1, Att. 1).
2 Per EB-2020-0290 OEB Decision and Order, Schedule A, p. 25, nuclear Outage OM&A costs are reduced by 3% per year over the 2022-2026 period.