COMPARISON OF PROJECT OM&A – NUCLEAR

1.0 PURPOSE

This evidence presents period-over-period comparisons of Nuclear project OM&A expenditures for 2016-2021. Period-over-period variances are shown in Ex. F2-3-2, Tables 1a and 1b and are explained below.

2.0 OVERVIEW

As defined in Ex. F2-3-1, Nuclear Project OM&A is made up of the following:

i) Project OM&A (Portfolio):

- Nuclear "Portfolio Projects (Allocated)", are OM&A expenditures for projects that have a Project Management Oversight Committee ("PMOC") approved budget and approved Business Case Summary ("BCS"). The approved BCS for these identified projects can vary from a very preliminary development BCS (e.g., Class 5 estimate) to an Execution BCS (e.g., Class 3 or better estimate).
- "Portfolio Projects (Unallocated)", which is the remaining budget available to cover the cost of projects that are progressing through the review and approval process but do not have a PMOC-approved budget or an approved BCS. In effect, it represents the amount of PMOC approved project OM&A funding that remains available to undertake projects, once those projects move forward with a PMOC approved budget and an approved BCS. These are projects that are currently in the project identification or project initiation phases. As projects progress beyond the project identification and initiation phases, the annual unallocated amount will decline, typically to zero, as OPG's project OM&A expenditures are allocated to projects with approved budgets. A list of the project OM&A projects being considered for funding through the project portfolio is provided in Ex. F2-3-3, Table 4.
- "Infrastructure", which includes five elements:
    - Funding for staff that do not support specific projects but provide management oversight and direction, administration and coordination of project portfolio activities, and ensure compliance with OPG governance and standards.

- An amount for minor modifications at each of the two nuclear sites. Minor modifications are lower cost modifications (generally less than $200k per generating unit) for which the full project management process is unwarranted. For administrative efficiency, these modifications are funded via a drawdown of the minor modifications budget allocated to each station and central facilities.
- An amount for project conceptual funding at the Project Initiation phase, as discussed in Ex. D2-1-1, Attachment 1.
- An amount for capital project removal costs, which are expensed to Project OM&A in accorandce with OPG's capitalization policy (Ex. D4-1-1).
- An amount for capital projects that have been cancelled and written-off. As the write-off occurs in the year of the cancellation decision and cannot be predicted, there is no budget allocated for these items.

ii) Project OM&A (Non-portfolio), which are projects listed separately from the Project OM&A (Portfolio) due to their extraordinary nature.

A description of the initiation, review and approval process for the nuclear project portfolio (Project OM&A and Capital) is provided in Ex. D2-1-1, Section 3.0. As discussed in that exhibit, the PMOC will manage funding to attempt to stay within the overall project portfolio annual budget. For example, a request for additional funding could be accommodated by re-allocating funding from other projects that are completed under budget or by delaying or deferring other projects.

More detailed project information is contained in Ex. F2-3-3.

3.0 PERIOD-OVER-PERIOD CHANGES – IR TERM

<u>2022 Plan versus 2021 Budget</u>

The decrease in planned spending from 2021 to 2022 (-$33.3M) is due to reduced spending in Project OM&A (Portfolio) (-$12.0M) and Project OM&A (Non-Portfolio) (-$21.3M).

The decrease in Project OM&A (Portfolio) is due to reduced spending in Portfolio Projects (Allocated) at Darlington (-$13.0M), Infrastructure (-$2.5M), Operations and Project Support (-$2.2M) and Pickering (-$1.5M) offset by an increase in Portfolio Projects (Unallocated) (+$7.2M).

The decrease in planned spending at Darlington is primarily due to reduced spending in Projects #84484 Darlington Unit 0 Switchgear Refurbishment (-$3.2M), #84766 Darlington Primary Heat Transport Pump Motor R01 Refurbishment (-$3.2M), Project #80067 Darlington Irradiated Fuel Bay Stacking Frame Replacement (Long Bundle) (-$3.1M) and #80110 Darlington Aging Management Scope Defining Inspections (-$2.1M).

The decrease in planned spending at Pickering is primarily due to the completion of Project #80135 Pickering 58 Digital Control Computer Hardware Modernization (OM&A) (-$1.4M).

Operations and Project Support planned spending decreased mainly due to completion of Project #84999 X-Lab Wireless Sensor Portfolio (-$1.4M).

Planned spending on Infrastructure decreased primarily due to reductions in #38349 Darlington Minor Modification Projects (-$1.0M), #46500 Pickering Minor Modification Projects (-$1.0M), and #66508 Inspection and Reactor Innovation ("IRI") Minor Modification Projects (-$0.5M). The increase in Portfolio Projects (Unallocated) is to provide funding for the projects listed in Ex. F2-3-3, Table 4, that are expected to start in 2021 and 2022.

Decreased spending in Project OM&A (Non-Portfolio) is due to the winding down of activities on Pickering Extended Operations (-$17.6M) and Fuel Channel Life Extension Project (-$4.0M), as well as completion of Darlington Spacer Life Management (-$3.1M) and Darlington Unit 3 Fuel Channel Component Retrieval (-$2.5M) in 2021. These decreases are partially offset by an increase in Pickering Optimized Shutdown (+$5.8M), all of which are subject to the Capacity Refurbishment Variance Account.

2023 Plan versus 2022 Plan

The decrease in planned spending from 2022 to 2023 (-$4.1M) is due to decreased spending in Project OM&A (Non-Portfolio) (-$8.2M) which is partially offset by increased spending in Project OM&A (Portfolio) (+$4.2M).

The increase in Project OM&A (Portfolio) is primarily due to planned increases in spending on Infrastructure (+$7.5M) and Portfolio Projects (Unallocated) (+$3.8M) offset by reductions in planned spending in allocated projects at Darlington (-$4.8M), the Operations and Project Support (-$1.8M) and Pickering (-$0.6M).

The decrease in planned spending at Darlington is primarily due to the winding down of Project #83479 Darlington Civil Building Structure Repairs (-$3.3M) and planned completion of Project #84872 Darlington PRECISE-D (Pressure Tube Circumferential Sampling Equipment - Dry) Scrape Tooling (-$1.0M) in 2022. The decrease in planned spending at Pickering is due to planned completion in 2022 of Project #80135 Pickering 58 Digital Control Computer Hardware Modernization (OM&A) (-$0.6M).

Planned spending on Infrastructure increased due to increases in the budget for asset removal costs for Project #83914 Darlington Project Removal Costs (+$4.0M) as well as increases in #38349 Darlington Minor Modification Projects (+$3.0M), #46500 Pickering Minor Modification Projects (+$1.0M), offset by a reduction in #66508 IRI Minor Modification Projects (-$0.5M).

The increase in Portfolio Projects (Unallocated) (+$3.8M) is to provide funding for projects including those potential projects listed in Ex. F2-3-3, Table 4 that are expected to start in 2022 and 2023.

Decreased spending in Project OM&A (Non-Portfolio) is due to completion of Pickering Optimized Shutdown (-$7.8M).

2024 Plan versus 2023 Plan

The decrease in planned spending in 2024 compared to 2023 (-$4.4M) is due to a reduction

in Portfolio Projects (Allocated) at Darlington (-$7.1M) offset by an increase in Portfolio Projects (Unallocated) (+$2.7M).

The planned decrease in Portfolio Projects (Allocated) at Darlington (-$7.1M) is primarily due to the winding down of activities in #84589 Darlington Periodic Safety Review (-$3.8M), and #82826 Darlington Fuel Handling Computer Software Release (-$1.3M), which are expected to be completed in 2024 as well as reduced spending on #84415 Darlington Primary Heat Transport Pump Motor Oil Leak Vendor Support (-$2.5M).

The increase in Portfolio Projects (Unallocated) (+$2.7M) will be to provide funding for projects including those potential projects listed in Ex. F2-3-3, Table 4 that are expected to start in 2023 and 2024.

<u>2025 Plan versus 2024 Plan</u>

The decrease in planned spending in 2025 compared to 2024 (-$3.9M) is due to planned decreases in Infrastructure (-$2.5M) and Portfolio Projects (Allocated) at Darlington (-$2.5M) offset by an increase in Portfolio Projects (Unallocated) (+$1.1M).

The reduction in Infrastructure spending is due to the reduction in #46500 Pickering A Minor Modification Projects (-$4.0M) following planned shutdown of Units 1 and 4, as well as reduction in #66508 IRI Minor Modification Projects (-$0.5M) offset by #38349 Darlington Minor Modification Projects (+$2.0M).

The reduction at Darlington is primarily due to the completion of #84589 Darlington Periodic Safety Review Project (-$1.2M) as well as reduced activity on #84415 Darlington Primary Heat Transport (PHT) Pump Motor Oil Leak Vendor Support (-$1.1M) and #82825 Darlington DCC/CP/SEM Computers Software Shipments (-$0.5M).

The increase in Portfolio Projects (Unallocated) is to provide funding for projects including those potential projects listed in Ex. F2-3-3, Table 4 that are expected to start in 2023 and 2024.

2026 Plan versus 2025 Plan

The decrease in planned spending in 2026 compared to 2025 (-$14.7M) is due to planned decreases in Portfolio Projects (Unallocated) (-$6.9M), Infrastructure (-$4.0M),) and Portfolio Projects (Allocated) at Darlington (-$3.8M).

The reduction in Portfolio Projects (Unallocated) reflects an overall reduction in the OM&A Project Portfolio envelope of potential projects as work program demands decline due to Pickering reaching its planned shutdown.

Similarly, the reduction in Infrastructure spending is due to the reduction in #46500 Pickering A Minor Modification Projects (-$4.0M) following planned Pickering shutdown.

The reduction at Darlington is primarily due to the winding down of activities in Project #84484 Darlington Unit 0 Switchgear Refurbishment (-$1.8M) and Project #82825 Darlington DCC/CP/SEM Computers Software Shipments (-$0.4M) toward their planned completion in 2026.

4.0 PERIOD-OVER-PERIOD CHANGES – BRIDGE YEARS

2021 Budget versus 2021 OEB Approved

The increase in 2021 Budget versus 2021 OEB approved (+$35.4M) is due to planned increases in spending on Project OM&A (Non-Portfolio) (+$29.5M) and Project OM&A (Portfolio) (+$5.9M).

The increase in Project OM&A (Non-Portfolio) is due to increased spending on the following, all of which are subject to the Capacity Refurbishment Variance Account:

- Pickering Extended Operations (+$17.6M) which was extended to 2021 from 2020 primarily to complete additional scope added to the Pickering Extended Operations project for # 84506 Feeder Replacements (+$11.1M). Pickering Extended Operations actual and

budgeted OM&A/capital expenditures over the period 2016-2021 are forecast to total $307M, which aligns with the 2016-2020 forecast provided in EB-2016-0152.

- Fuel Channel Life Extension (+$4.4M) which was extended till 2022 to perform additional testing;
- Darlington Annulus Spacer Life Management (+$3.1M);
- Darlington Unit 3 Fuel Channel Component Retrieval (+$2.5M); and
- Pickering Optimized Shutdown (+$2.0M).

The planned increase in Project OM&A (Portfolio) is due to increases in Project Portfolio (Allocated) spending at Darlington (+$32.0M), Operations and Project Support (+$4.0M), and Pickering (+$2.0M), as well as increased Infrastructure spending (+$15.1M), offset by reduced Project Portfolio (Unallocated) (-$47.1M).

The decrease in Project Portfolio (Unallocated) reflects the increased definition of the Project OM&A Portfolio as compared to the EB-2016-0152 submission and decrease in the overall envelope to offset spending on non-portfolio projects. The remaining budget is expected to be allocated for new projects, once approved, including those potential projects listed in Ex. F2-3-3, Table 4.

Projects not included in EB-2016-0152 account for +$23.0M of the increase in Project Portfolio (Allocated) spending at Darlington, notably the following:

- #84589 Darlington Periodic Safety Review (+$5.6M)
- #84484 Darlington Unit 0 Switchgear Refurbishment (+$5.3M)
- #84766 Darlington Primary Heat Transport Pump Motor R01 Refurbishment (+$3.6M)
- #83479 Darlington Civil Building Structure Repairs (+$3.0M)
- #84415 Darlington Primary Heat Transport Pump Motor Oil Leak Vendor Support (+$2.3M)
- #82825 Darlington DCC/CP/SEM Computers Software Shipments (+$1.1M)

Ongoing projects from EB-2016-0152 account for +$9.0M of the increase in Project Portfolio (Allocated) spending at Darlington, notably the following:

- #80067 Darlington Irradiated Fuel Bay Stacking Frame Replacement (Long Bundle) (+$3.1M)
- #82826 Darlington Fuel Handling Computer Software Release (+$2.9M)
- #80110 Darlington Aging Management Scope Defining Inspections (+$2.4M)

The increase in spending at Pickering is due to Project #80135 Pickering 58 Digital Control Computer Hardware Modernization (OM&A) (+$2.0M).

Operations and Project Support spending increased primarily due to Projects #83824 Asset Management Implementation (+$2.0M) and #84999 X-Lab Wireless Sensor Portfolio (+$1.4M).

Infrastructure spending increased due to planned increases in minor modification spending at Pickering and IRI (+$8.0M and +$1.5M respectively), increases in project support and initiation costs (+$6.6M), as well as establishment of budgets for capital project removal costs at Darlington (+$4.0M). These increases were offset by a reduction in minor modifications at Darlington (-$5.0M).

<u>2021 Budget versus 2020 Budget</u>

The increase in 2021 Budget versus 2020 Budget (+$14.4M) is due to planned increased spending in Project OM&A (Portfolio) (+$28.2M) offset by decreases in spending on Project OM&A (Non-Portfolio) (-$13.8M).

The planned increase in Project OM&A (Portfolio) (+$28.2M) is due to increased Project Portfolio (Allocated) spending in Darlington (+$13.9M), Project Portfolio (Unallocated) (+$9.5M) and Infrastructure spending (+$9.2M), offset by decreases in Project Portfolio (Allocated) spending at Operations and Project Support (-$3.7M) and Pickering (-$0.7M).

The increase in spending at Darlington is primarily due to new projects not included in EB-2016-0152, notably the following:

- #84484 Darlington Unit 0 Switchgear Refurbishment (+$5.3M)
- #84766 Darlington Primary Heat Transport Pump Motor R01 Refurbishment (+$2.6M)

- #83479 Darlington Civil Building Structure Repairs (+$2.4M)

The increase in Project Portfolio (Unallocated) reflects less definition of the Project OM&A Portfolio in 2021 compared to 2020. The variance is expected to be eliminated as new projects are approved, including those potential projects listed in Ex. F2-3-3, Table 4.

The increase in planned spending at Pickering is mainly due to Project #86059 - Pickering PCB Lighting Ballasts Replacement (OM&A) (+$1.5M), offset by Project #41024 Pickering Instrumentation and Control Obsolescence (-$0.2M).

Infrastructure spending increased primarily due to increases in project support (+$3.7M), and removals at Darlington (+$4.0M).

Operations and Project Support spending decreased due to the planned completion in 2021 of #83412 Security Project D (-$2.7M) and reduced spending in Project #83824 Asset Management Implementation (-$2.3M)

The decrease in Project OM&A (Non-Portfolio) is due to the following variances:

- Pickering Extended Operations (-$15.3M) due to planned completion of a number of sub-projects in 2021 primarily related to additional scope for Feeder Replacements ($11.1M) and Fuel Handling Reliability (+$2.2M).
- Fuel Channel Life Extension (-$0.7M);
- Darlington Annulus Spacer Life Management (+$0.4M); and
- Pickering Optimized Shutdown (+$1.8M).

<u>2020 Budget versus 2020 OEB Approved</u>

The increase in 2020 Budget versus 2020 OEB approved (+$7.7M) is due to planned increases in spending on Project OM&A (Non-Portfolio) (+$24.6M) offset by reduced spending in Project OM&A (Portfolio) (-$16.9M).

The increase in Project OM&A (Non-Portfolio) is due to increased spending on the following,:

- Pickering Extended Operations (+$14.1M) primarily due to additional scope added to Pickering Extended Operations related to #84506 Feeder Replacements, #84842 Fuel Handling Reliability and DCC Power Supply & Digital Relays Replacements
- Fuel Channel Life Extension (+$5.1M) due to a need to perform additional research activities and testing as part of Project #80014 Fuel Channel Life Extension.
- Darlington Annulus Spacer Life Management (+$2.7M).
- Darlington Unit 3 Fuel Channel Component Retrieval (+$2.5M).
- Pickering Optimized Shutdown (+$0.2M).

The planned decrease in Project OM&A (Portfolio) (-$16.9M) is due to reduced Project Portfolio (Unallocated) (-$46.5M) offset by increases in Project Portfolio (Allocated) spending at Darlington (+$17.4M), Operations and Project Support (+$7.7M), Pickering (+$2.7M) as well as increased Infrastructure spending (+$1.8M).

The reduction of the 2020 Actual Portfolio Projects (Unallocated) reflects the increased definition of the Project OM&A Portfolio as new projects have emerged as compared to the EB-2016-0152 submission.

Over half of the increase in spending at Darlington (+$17.4M) is due to new projects that were not included in EB-2016-0152, notably the following:

- #84415 Darlington Primary Heat Transport Pump Motor Oil Leak Vendor Support ($3.1M)
- #84589 Darlington Periodic Safety Review (+$3.1M)
- #84766 Darlington Primary Heat Transport Pump Motor Refurbishment (+$1.0M)

The remaining variance is due to ongoing projects from EB-2016-0152, notably including the following:

- #80067 Darlington Irradiated Fuel Bay Stacking Frame Replacement (Long Bundle) (+$2.3M)
- #83545 Darlington Annunciation Modifications and Post-Accident Monitoring Configuration Management (+$2.0M)

Operations and Project Support spending increased due to Projects #83824 Asset Management Implementation (+$4.3M) and #83412 Security Project D (+$2.8M).

The increase in spending at Pickering is due to Projects #80135 Pickering 58 Digital Control Computer Hardware Modernization (OM&A) (+$2.3M) and #41024 Pickering Instrumentation and Control Obsolescence (+$0.3M).

<u>2020 Budget versus 2019 Actual</u>

The increase in the 2020 Budget compared to the 2019 Actual spending (+$1.8M) is due to increased planned spending on Non-Portfolio Projects (+$9.2M) and Portfolio Projects (Unallocated) (+$1.3M), which are offset by reductions in spending in Infrastructure (-$5.7M) and Portfolio Projects (Allocated) (-$3.0M).

The increase in Non-Portfolio Projects is due to the following projects:

- Pickering Extended Operations (+$7.4M) primarily due to additional scope added to Pickering Extended Operations related to $84506 Feeder Replacements ($4.2M) and #84842 Fuel Handling Reliability ($3.4M) along with additional minor modifications projects (+$1.3M).
- Fuel Channel Life Extension (+$1.2M) due to the need to perform additional testing.
- Darlington Unit 3 Fuel Channel Component Retrieval (+$1.3M).
- Pickering Optimized Shutdown U1 Elongation (+$0.2M).
- Darlington Annulus Spacer Life Management (-$1.0M).

The decrease in spending on Infrastructure is due primarily to project removal costs at Darlington (-$4.1M), and Minor Modifications at IRI (+$1.2M).

The reduction in planned spending on Portfolio Projects (Allocated) is due to planned reductions at Pickering (-$6.5M) and Darlington (-$0.2M), offset by planned increases in Operations and Project Support (+$3.7M).

The decrease in planned spending in Pickering is due primarily to Projects #80060 Pickering Equipment Reliability Initiatives (-$3.9M), #83302 Pickering Fuelling Machine Ram Seal Improvement (-$1.9M) and #41024 Pickering Instrumentation and Control Obsolescence (-$1.0M).

The planned increase in Operations and Project Support spending is primarily due to increased spending on Projects #83412 Security Project D (+$2.8M).

The decrease in planned spending in Darlington is primarily due to decreased spending on #80071 Darlington New Heat Transport Pump Seals (OM&A) (-$5.4M), partially offset by Project #84589 Darlington Periodic Safety Review (+$3.1M).

The decrease in Project Portfolio (Unallocated) reflects the increased definition of the Project OM&A Portfolio as new projects have emerged as compared to the EB-2016-0152 submission.

5.0 PERIOD-OVER-PERIOD CHANGES – HISTORICAL YEARS

Period-over-period variances are presented in Ex. F2-3-2, Table 1 and are explained below.

<u>2019 Actual versus 2019 OEB Approved</u>

The increase in actual spending in 2019 compared to the 2019 OEB approved amount (+$6.0M) is due to increases in Portfolio Projects (Allocated) (+$23.9M), Non-Portfolio Projects (+$15.8M), and Infrastructure (+$3.5M), partially offset by Portfolio Projects (Unallocated) (-$37.2M).

The increase in Portfolio Projects (Allocated) was due to increased spending at Darlington (+$10.7M), Pickering (+$9.2M) and Operations and Project Support (+$4.0M). The increase at Darlington was mainly driven by one project not included in EB-2016-0152, #84380 Darlington Resin Transfer Modification (+$4.4M), as well as increased spending on ongoing Projects #80071 Darlington New Heat Transport Pump Seals (+$5.4M) and #80079 Darlington Aging Management (+$1.2M).

There was no planned spending in Pickering and Operations and Project Support included in EB-2016-0152. The variance, therefore, is due to new projects initiated since EB-2016-0152 or projects that extended past their original completion date. The variance at Pickering is primarily due to Projects #80060 Pickering Equipment Reliability Initiatives (+$3.9M), #83302 Pickering Fuelling Machine Ram Seal Improvement (+1.9M) and #80135 Pickering 58 Digital Control Computer Hardware Modernization (+$1.7M). The variance in the Operations and Project Support is due primarily to Projects #83824 Asset Management Implementation (+$1.7M), #62553 DCC Aging Management (+$0.9M) and #83383 NucEng Film Forming Amine Qualification (+$0.9M).

The increase in Infrastructure spending (+$3.5M) is due to increased spending on project support (+$6.3M), unbudgeted capital project write-offs (+$4.2M), and capital project removal costs at Darlington (+$4.1M) offset by reductions in minor modifications spending at Darlington and Pickering (-$6.7M and -$3.6M respectively).

The increase Non-Portfolio Projects is due to spending on the following projects:

- Pickering Extended Operations (+$7.0M) is primarily due to timing as outage scope from 2018 was carried over to 2019, which resulted in additional projects undertaken. The 2019 OEB approved budget for Pickering Extended Operations consists of a single project (#82944 Pickering Extended Operations Balance of Plant Projects). Actual 2019 expenditures for Pickering Extended Operations consisted of the following projects:
    - #84182 Pickering Extended Operations Condenser Debris Filter & Expansion Joint Upgrades (+$5.6M)
    - #84127 Pickering Extended Operations U1 FC Positioning Assembly Hardware Mod (+$5.1M)
    - #83982 Pickering Extended Operations HP Turbine Spindle Replacement (+$5M)
    - #83969 Pickering Extended Operations Minor Modification Projects (+$2.8M)
    - #84186 Pickering Extended Operations Unit 4 Boiler De-alloying Mitigation (+$2.6M)
    - #84284 Pickering Extended Operations U56 Calandria Tube to LISS Nozzle

Contact Mitigation (+$1.8M)

- #84194 Pickering Extended Operations FCLE Additional Burst Tests (+$1.1M)
- #83920 Pickering Extended Operations SFCR Tool Mods for PT/CT Sag (+$0.7M)
- #84143 Pickering Extended Operations Fuelling Machine (FM) Tape Drive Improvement (+$0.5M).

- Darlington Annulus Spacer Life Management (+$3.7M), which was initiated in 2017;
- Darlington Unit 3 Fuel Channel Component Retrieval (+$1.2M), which was initiated in 2017; and
- Fuel Channel Life Extension (+$3.9M), due to the addition of contingency testing necessitated by the results of the tests initially included in the scope of the project.

<u>2019 Actual versus 2018 Actual</u>

The decrease in spending in 2019 compared to 2018 (-$13.0M) is due to decreased spending in Infrastructure (-$26.0M), offset by increased spending on Non-Portfolio Projects (+$11.7M) and Portfolio Projects (Allocated) (+$1.3M).

The decrease in Infrastructure was due primarily to reduced spending on unbudgeted capital project write-offs (-$14.8M). Additionally, there was decreased spending in the following infrastructure components:

- #46500 Pickering Minor Modifications Projects (-$4.8M)
- #83914 Darlington Project Removal Costs (-$3.0M)
- #83913 Pickering Project Removal Costs (-$2.3M)
- #38349 Darlington Minor Modifications Projects (-$2.1M)

The increase in spending on Non-Portfolio Projects, are due to the following projects:

- Pickering Extended Operations (+$19.1M). primarily due to the following:
  - #84182 PEXT Condenser Debris Filter & Expansion Joint Upgrades (+$5.3M)
  - #84127 PEXT U1 FC Positioning Assembly Hardware Mod (+$5M)

- #83982 PEXT HP Turbine Spindle Replacement (+$4.1M)

- Fuel Channel Life Extension (-$4.2M). Contingency was released to add additional testing and other cost increases in 2018 and 2019. Additionally, the project was extended by 2.5 years to complete work that was deferred by the CANDU Owners Group.
- Darlington Unit 3 Fuel Channel Component Retrieval (+$0.8M).
- Darlington Annulus Spacer Life Management (-$3.2M).
- Darlington Annulus Spacer Retrieval (-$0.7M).

The increase in Portfolio Projects (Allocated) is due to increased spending at Darlington (+$3.3M) offset by reduced spending in Pickering (-$1.6M) and Operations and Project Support (-$0.4M). The increase at Darlington was driven mainly by increased spending on Projects #84380 Darlington Resin Transfer Modification (+$4.4M) and #80071 Darlington New Heat Transport Pump Seals (+$1.4M), offset by reduced spending on Project #31506 Darlington Boiler Blowdown Piping Refurbishment (-$3.3M).

The reduction in spending at Pickering was driven mainly by reduced spending on Projects #40703 Pickering B Irradiated Fuel Bay Leakage Mitigation (-$2.9M) and #83269 Pickering Unit 4 SG11 and SG12 Nozzle Installation (-$0.9M), offset by increased spending on Project #80060 Pickering Equipment Reliability Initiatives (+$1.9M).

The reduction in spending in the Operations and Project Support is due to decreased spending on Projects #66105 Inspection Qualification (-$0.8M), #83824 Asset Management Implementation (-$0.4M) and #80072 Nuclear Fleet Safety Systems Functional Assessment (-$0.2M) offset by increased spending on #83383 NucEng Film Forming Amine Qualification (+$0.9M).

<u>2018 Actual versus 2018 OEB Approved</u>

The increase in spending in 2018 compared to 2018 OEB approved (+$10.0M) is due to increased spending on Infrastructure (+$29.6M) and Non-Portfolio Projects (+$2.3M), offset by reductions on Portfolio Projects (Allocated) (-$6.2M) and Portfolio Projects (Unallocated) (-$15.7M).

The increase in Infrastructure spending (+$29.6M) was due mainly to the cancellation and write-off of the Pickering scope in Project #83039 Rapid Delivery Machine (+$16.1M), as well as unbudgeted capital project removal costs (+$9.5M).

The increase in Non-Portfolio Projects is due primarily to increased spending on Fuel Channel Life Extension (+$7.4M), Darlington Spacer Retrieval (+$6.9M) and Darlington Unit 3 Fuel Channel Component Retrieval (+$0.4M), offset by reduced spending on Pickering Extended Operations (-$11.7M) due to timing with scope shifted into 2019 in line with changes to the outage schedule and Darlington Spacer Retrieval (-$0.4M).

Increased spending on Project #80014 Fuel Channel Life Extension (+$7.4M), was necessitated by additional testing prompted by initial test results.

Projects #83280 Darlington Annulus Spacer Life Management (+$6.9M) and #83926 IRI Darlington R3 Reactor Component Harvesting to Displace Single Fuel Channel Replacement ("SFCR") (+$0.4M), which are projects initiated in 2017 to perform additional testing on post-reactor components to improve the modelling necessary to support fitness-for-service determinations.

The 2018 OEB approved budget for Pickering Extended Operations consists of a single project (#82944 Pickering Extended Operations Balance of Plant Projects). Actual 2019 expenditures for Pickering Extended Operations consisted of the following projects:

- #84186 Pickering Extended Operations Unit 4 Boiler De-alloying Mitigation (+$2.3M)
- #83969 Pickering Extended Operations Minor Modification Projects (+$2.1M)
- #83982 Pickering Extended Operations HP Turbine Spindle Replacement Unit 7 and Unit 5 (+$0.9M)
- #83920 Pickering Extended Operations SFCR Tool Mods for PT/CT Sag (+$0.5M)
- #84182 Pickering Extended Operations Condenser Debris Filter and Expansion Joint Upgrades (+$0.2M)

- #84143 Pickering Extended Operations Fuelling Machine (FM) Tape Drive Improvement (+$0.2M)
- #84127 Pickering Extended Operations Unit 1 FC Positioning Assembly Hardware Modification (+$0.1M)

The reduction in spending on Darlington Spacer Retrieval (-$0.4M) is due to the project being completed ahead of schedule and under-budget.

The reduction in Portfolio Project (Allocated) is due to decreased spending at Darlington (-$9.2M) and Pickering (-$1.1M) offset by increased spending in the Operations and Project Support (+$4.1M).

The decrease in spending at Darlington is due primarily to reduced spending on the following projects

- #38933 Darlington PHT LRV Modifications (Waterhammer) (-$4.4M)
- #80071 Darlington New Heat Transport Pump Seals (OM&A) (-$2.4M)
- #80028 Darlington RD-310 Implementation - Safety Analysis Improvement (-$1.6M)
- #80062 Darlington Phase 2 Station Battery Replacement (50310, 50390) (-$1.6M)
- #80110 Darlington Aging Management Scope Defining Inspections (-$1.4M)
- #31514 Darlington Gaseous Fission Product ("GFP") Sample Delay and Alternative PHT Sampling Point (-$1.1M)

These reductions are offset by increased spending on Projects #80079 Darlington Aging Management (+$1.6M) and #31506 Darlington Boiler Blowdown Piping Refurbishment (+$1.5M).

The reduction at Pickering is due primarily to the cancellation of Projects #49248 Locking Tabs - Boiler Divider Plate (Unit 1 & Unit 4) (-$8.2M) and #82839 PA LP Feedwater Heat Exchanger Replacement (OM&A) (-$3.0M), offset by increased spending on the following projects:

- #40703 Pickering B Irradiated Fuel Bay Leakage Mitigation (+$3.0M)
- #83302 Pickering Fuelling Machine Ram Seal Improvement (+$2.6M)
- #80060 Pickering Equipment Reliability Initiatives (+$2.0M)
- #80135 Pickering 58 Digital Control Computer Hardware Modernization (+$1.0M)
- #83269 Pickering Unit 4 SG11 and SG12 Nozzle Installation (+$0.9M)
- #41024 Pickering Instrumentation and Control Obsolescence (+$0.6M)

The increase in Operations and Project Support spending is primarily due to Projects #83824 Asset Management Implementation (+$2.0M), #66105 Inspection Qualification (+$1.2M) and #62553 DCC Aging Management (+$1.0M).

The 2018 OEB Approved Portfolio Projects (Unallocated) of $16.1M was the difference between the total approved OM&A project budget and the amount of OM&A allocated to projects in the Portfolio Projects (Allocated) category. The reduction of the 2018 Actual Portfolio Projects (Unallocated) to zero therefore reflects the elimination, as anticipated, of this component of the Nuclear project portfolio. All 2018 nuclear project portfolio OM&A expenditures are captured within the Portfolio Projects (Allocated) component.

<u>2018 Actual versus 2017 Actual</u>

The decrease in spending in 2018 compared to 2017 (-$3.6M) is due to decreased spending on Portfolio Projects (Allocated) (-$8.1M) and Infrastructure (-$3.4M), offset by increased spending on Non-Portfolio Projects (+$7.9M).

The decrease in Portfolio Projects (Allocated) is due to reduced spending at Darlington (-$8.0M) and Pickering (-$2.2M), offset by increased spending in the Operations and Project Support (+$2.2M).

The reduction in spending at Darlington is due primarily to reduced spending on the following projects:

- #31506 Darlington Boiler Blowdown Piping Refurbishment (-$3.8M)

- #80028 Darlington RD-310 Implementation - Safety Analysis Improvement (-$2.3M)
- #80071 Darlington New Heat Transport Pump Seals (-$1.5M)
- #80110 Darlington Aging Management Scope Defining Inspections (-$1.1M)

The decrease in Infrastructure spending (-$3.4M) is due mainly to decreased capital project removals (-$5.5M), as well as decreased minor modifications at both Darlington (-$4.2M) and Pickering (-$6.6M). The decrease was offset by an increase in write-offs in 2017 versus 2018 (+$10.3M) and increased project support costs (+$3.0M).

The increase in Non-Portfolio cost is due to increased Pickering Extended Operations costs (+$6.1M), Darlington Spacer Life Management cost (+$4.8M) and Darlington Unit 3 Fuel Channel Component Retrieval (+$0.4M), partially offset by reduced Fuel Channel Life Extension (-$2.9M) and Darlington Spacer Retrieval (-$0.5M) costs.

The increase in Pickering Extended Operations (+$6.1M) period over period is due to the following new projects that were approved in 2018:

- #84186 Pickering Extended Operations Unit 4 Boiler De-alloying Mitigation (+$2.3M)
- #83969 Pickering Extended Operations Minor Modifications Projects (+$2.1M)
- #83982 Pickering Extended Operations HP Turbine Spindle Replacement Unit 7 and Unit 5 (+$0.9M;
- #83920 Pickering Extended Operations Single Fuel Channel Replacement ("SFCR") Tool Mods for PT/CT Sag (+$0.5M)
- #84182 Pickering Extended Operations Condenser Debris Filter and Expansion Joint Upgrades (+$0.2M)
- #84143 Pickering Extended Operations Fuelling Machine (FM) Tape Drive Improvement (+$0.2M)

Project #83280 Darlington Annulus Spacer Life Management (+$4.8M) was initiated in 2017 and Project #83926 IRI Darlington R3 Reactor Component Harvesting to Displace SCFR (+$0.4M), which started in 2018.

The decrease in spending in Project #80014 Fuel Channel Life Extension (-$2.9M) is due to deferral of work by the CANDU Owners Group.

The decrease in Darlington Spacer Retrieval (-$0.4M) is due to the completion of the project in 2018 ahead of schedule and under budget.

2017 Actual versus 2017 OEB Approved

The increase in spending in 2017 compared to 2017 OEB approved (+$9.0M) is due to increased spending on Infrastructure (+$25.9M), and Portfolio Projects (Allocated) (+$0.3M). This increase is offset by a decrease in Portfolio Projects (Unallocated) (-$11.6M) and Non-Portfolio Projects (-$5.6M).

The increase in Infrastructure spending (+$25.9M) was due mainly to unbudgeted capital project removal costs (+$15.0M) and write-offs (+$8.9M). The increase in project removal costs is spread over twenty-one projects but is primarily due to #31710 DN Shutdown Cooling Heat Exchanger Replacement ($5.0M) and #73566 PHT Pump Motor Replacement ($4.9M). Project write-off was primarily due to #31518-Restore Emergency Service Water ($7.3M) as the project was suspended due to an alternative solution.

The increase in Portfolio Projects (Allocated) spending is due to increased spending at Pickering (+$2.8M) offset by decreases in the Operations and Project Support (-$2.4M) and in Darlington (-$0.1M).

The increase at Pickering is due primarily to increased spending on Projects #83302 Pickering Fuelling Machine Ram Seal Improvement (+$5.2M), #40703 Pickering B Irradiated Fuel Bay Leakage Mitigation (+$4.3M) and #83269 Pickering Unit 4 SG11 and SG12 Nozzle Installation (+$1.8M), offset by reductions in Projects #82839 Pickering A LP Feedwater Heat Exchanger Replacement (OM&A) (-$5.9M) and #80060 Pickering Equipment Reliability Initiatives (-$2.7M).

The decrease in Operations and Project Support Division Portfolio Projects (Allocated) spending (-$2.4M) is due to reduced spending on Projects #80072 Nuclear Fleet Safety Systems Functional Assessment (-$1.4M), #80002 Security Project D (-$0.9M) and #66105 Inspection Qualification (-$0.6M) offset by increased spending on #62553 DCC Aging Management (+$0.5M).

The reduction in Non-Portfolio Project spending is due to reduced spending on Pickering Extended Operations (-$2.3M), Darlington Spacer Retrieval (-$2.1M) and Fuel Channel Life Extension (-$1.3M), partially offset by increased spending on Darlington Spacer Life Management (+$2.1M).

Pickering Extended Operations spending decreased due to the completion of Project #80157 Pickering Nuclear Fuel Channel Life Assurance (-$1.7M) and no spending on Project #82944 Pickering Extended Operations Balance of Plant Projects (-$0.8M), offset by spending on new Project #83651 Pickering Extended Operations Fire Water Supply Project (+$0.2M).

Spending on Darlington Spacer Retrieval was less than OEB approved (-$2.1M) due to the 2017 scope of work being completed under-budget.

Fuel Channel Life Extension spending decreased (-$1.3M) as work on Project #80014 Fuel Channel Life Extension was extended by 2.5 years to complete work deferred by the CANDU Owners Group.

Increased spending Darlington Spacer Life Management is due to the start of Project #83280 Darlington Annulus Spacer Life Management in 2017 to analyze the spacers removed in the Darlington Spacer Retrieval project.

The 2017 OEB Approved Portfolio Projects (Unallocated) of $13.7M was the difference between the total approved OM&A project budget and the amount of OM&A allocated to projects in the Portfolio Projects (Allocated) category. The reduction of the 2017 Actual Portfolio Projects (Unallocated) to zero therefore reflects the elimination, as anticipated, of this

component of the Nuclear project portfolio. All 2017 nuclear project portfolio OM&A expenditures are captured within the Portfolio Projects (Allocated) component.

2017 Actual versus 2016 Actual

The increase in spending in 2017 compared to 2016 (+$33.6M) is due mainly to increased Infrastructure spending (+$28.8M), and the Portfolio Projects (Allocated) (+8.4M) which is offset by reduced spending on Non-Portfolio Projects (-$3.6M).

The increase in Infrastructure spending (+$28.8M) is due mainly to unbudgeted capital project removal costs (+$10.8M) and write-offs (+$5.3M) noted above. Additionally, minor modifications at Darlington (+$4.6M), Pickering (+$5.7M), Security (+$0.6M) and IRI (+$0.4M) increased as well as project Support (+$2.0M). Decreased Initiation Phase funding (-$0.7M) provided a slight offset to these increases.

Increased spending on Portfolio Projects (Allocated) was due to increased spending at Pickering (+$5.9M), Darlington (+$4.2M) and offset partially by reduced spending in the Operations and Project Support (-$1.7M).

Increased Pickering spending (+$5.9M) is due primarily to increased spending in Projects #83302 Pickering Fuelling Machine Ram Seal Improvement (+$4.0M), #40703 Pickering B Irradiated Fuel Bay Leakage Mitigation (+$1.8M) and #83269 Pickering Unit 4 SG11 and SG12 Nozzle Installation (+$1.0M). Spending on these projects is partly offset by Projects #80060 Pickering Equipment Reliability Initiatives (-$0.4M) and #41024 Pickering Instrumentation and Control Obsolescence (-$0.4M).

Increased spending at Darlington (+$4.9M) is primarily due to the start of Project #80071 Darlington New Heat Transport Pump Seals (+$5.5M) as well as Project #31506 Darlington Boiler Blowdown Piping Refurbishment (+$2.8M). These projects are partially offset by reduced spending on Projects #80016 Darlington Reduced HTS Pressure-Temperature Envelope Modifications (-$2.1M) and #31514 Darlington GFP Sample Delay and Alternative PHT Sampling Point (-$1.3M).

Decreased Operations and Project Support spending (-$1.7M) is primarily due to reduced spending on Project #62553 DCC Aging Management (-$1.7M).

The reduction in Non-Portfolio Project spending is due to decreases in Fuel Channel Life Extension (-$3.9M), Pickering Extended Operations (-$1.0M), Darlington Spacer Retrieval (-$0.6M) and Fuel Channel Life Cycle Management (-$0.3M), partially offset by spending in Darlington Spacer Life Management (+$2.1M).

Fuel Channel Life Extension spending decreased as work on Project #80014 Fuel Channel Life Extension (-$3.9M) ramped down in August 2017. Pickering Extended Operations spending decreased due to reduced spending on Project #80157 Pickering Fuel Channel Life Assurance (-$1.2M), which was partly offset by new Project #83651 PEXT Fire Water Supply Project (+$0.2M).

The reduction in Darlington Spacer Retrieval (-$0.6M) is due to the scope of work in 2017 being completed under-budget. Fuel Channel Life Cycle Management (-$0.3M) was completed in 2016.

Increased spending on Darlington Annulus Spacer Life Management (+$2.1M) is due to the start of Project #83280 Darlington Annulus Spacer Life Management in 2017 to analyze the spacers removed in the Darlington Spacer Retrieval project.

<u>2016 Actual versus 2016 Budget</u>

The decrease in spending in 2016 compared to 2016 Budget (-$9.1M) is due to decreased spending on the Portfolio Projects (Allocated) (-$22.2M) as well as decreased spending on Non-Portfolio Projects (-$3.9M). This decrease is partially offset by increased Infrastructure spending (+$5.3M) and the Portfolio Projects (Unallocated) (+$11.7M).

The 2016 Budget Portfolio Projects (Unallocated) was the difference between the total approved OM&A project budget and the amount of OM&A allocated to projects in the Portfolio

Projects (Allocated) category. The reduction of the 2016 Budget Portfolio Projects (Unallocated) of (-$11.7M) to zero therefore reflects the elimination, as anticipated, of this component of the Nuclear project portfolio. All 2016 nuclear project portfolio OM&A expenditures are captured within the Portfolio Projects (Allocated) component.

The decrease in Portfolio Projects (Allocated) spending is due to decreased spending at Darlington (-$10.5M), Pickering (-$6.3M) and in the Operations and Project Support (-$5.4M).

Reduced spending on Darlington projects is primarily due to the cancellation of Project #80062 Darlington Phase 2 – Station Battery Replacements (-$3.6M) as well as reduced spending on the following projects:

- #80071 Darlington New Heat Transport Pump Seals (-$3.1M)
- #80110 Darlington Aging Management Scope Defining Inspections (-$2.5M)
- #80067 Darlington Irradiated Fuel Bay Stacking Stacking Frame Replacement (Long Bundle) (-$1.0M)
- #80079 Darlington Aging Management (-$0.8M)

The decrease in Portfolio Projects (Allocated) spending at Pickering (-$6.3M) is primarily due to delays in Project #80060 Pickering Equipment Reliability Initiatives (-$5.5M) as well as variances in the following projects:

- #82839 Pickering A LP Feedwater Heat Exchanger Replacement (-$3.0M)
- #41024 Pickering Instrumentation and Control Obsolescence (-$1.2M)
- #41041 Pickering A Replace SDSE Fission Chamber Amplifiers for Unit 1 and Unit 4 (-$0.3M)
- #40703 Pickering B Irradiated Fuel Bay Leakage Mitigation (+$1.7M)
- #83302 Pickering Fuelling Machine Ram Seal Improvement (+$1.2M)
- #83269 Pickering Unit 4 SG11 and SG12 Nozzle Installation (+$0.7M)

The decrease in Operations and Project Support Division spending (-$5.4M) is primarily due

to reduced spending in the following projects:

- #80072 Nuclear Fleet Safety Systems Functional Assessment (-$2.1M)
- #80002 Security Project D (-$1.8M)
- #66105 Inspection Qualification (-$0.8M)
- #62448 Fukushima Oversight Project (-$0.4M)

The increase in Infrastructure spending (+$5.3M) was due mainly to unbudgeted capital project removal costs (+$4.2M) and write-offs (+$3.4M), offset by decreased project support (-$1.7M) and Security minor modifications (-$0.8M).

The reduction in Non-Portfolio Project spendingis due to decreases in Pickering Extended Operations (-$2.8M), Fuel Channel Life Extension (-$0.7M), Darlington Spacer Retrieval (-$0.3M) and Fuel Channel Life Cycle Management (-$0.1M).

Pickering Extended Operations spending decreased due to reduced spending on Project #80157 Pickering Fuel Channel Life Assurance (-$2.8M) due to reductions in scope and reduced vendor estimates.

Fuel Channel Life Extension spending was lower than budgeted as work on Project #80014 Fuel Channel Life Extension (-$0.7M) due to late issuance of CANDU Owners Group work packages for the 2016 scope of work.

Spending on Darlington Spacer Retrieval was lower than budgeted (-$0.3M) due to lower costs from the vendor than originally assumed. Fuel Channel Life Cycle Management was lower than budgeted (-$0.1M) due to lower close-out costs than expected.