# IN-SERVICE AMOUNTS

## 1.0 OVERVIEW

This exhibit presents the capital expenditures for the Darlington Refurbishment Program ("DRP" or "Program") for the years 2016 to 2026 in Table 1. Tables 2 to 5 show the capital in-service amounts, which are presented in the following nine categories:

- Unit Refurbishment – Unit 3 In-service;
- Unit Refurbishment – Unit 1 In-service;
- Unit Refurbishment – Unit 4 In-service;
- Unit Refurbishment – Unit 1 and Unit 4 Early In-Service Projects;
- Unit Refurbishment – Unit 2 In-service (inclusive of Definition Phase of the Program);
- Unit Refurbishment – Unit 2 Early In-Service Projects;
- Safety Improvement Opportunities;
- Facilities and Infrastructure Projects (other than the Heavy Water Storage and Drum Handling Facility) and
- Heavy Water Storage and Drum Handling Facility ("D2O Storage Project").

In EB-2016-0152, the OEB approved an in-service capital envelope of $5,177.4M[1] which reflects in-service additions over the 2016-2021 period in two broad categories:

1. $4,800.2M for the Unit Refurbishment – Unit 2, which includes the refurbishment of Unit 2 and the Definition Phase of the Program, and;
2. $377.2M for the "Campus Plan Projects", which comprises the Unit Refurbishment – Unit 2 Early In-Service Projects ($108.6M), Safety Improvement Opportunities ("SIO") ($201.8M), and Facilities and Infrastructure Projects ("F&IP") ($66.8M).[2]

This exhibit provides a summary of variances relative to these OEB approved amounts.

[1] EB-2016-0152, Decision and Order, p. 36.
[2] EB-2016-0152, Ex. D2-2-10, pp. 2, 4 and 7.

## 2.0 IR TERM CAPITAL IN-SERVICE AMOUNTS

### 2.1 Unit Refurbishment – Remaining Units

The Unit Refurbishment – Units 3, 1, and 4 ("Remaining Units") in-service amounts include costs incurred to complete the refurbishment scope and return the Remaining Units to service. The total in-service amount for the Remaining Units is $6,439.6M ($2,504.0M in 2024 for Unit 3, $1,907.3M in 2025 for Unit 1 and $2,028.3M in 2026 for Unit 4).

A description of the program that gives rise to the requested Remaining Units in-service amounts is provided in Ex. D2-2-3 through Ex. D2-2-8. A breakdown of the costs included within the Remaining Units in-service amounts (together with the minor Remaining Units Early In-Service Amounts discussed in Section 2.2 below) can be found in Section 3 of Ex. D2-2-7. A comparison of unit-over-unit in-service amounts can be found in Sections 3.1 and 3.2 of Ex. D2-2-7.

### 2.2 Unit Refurbishment – Remaining Units Early In-Service Projects

As in EB-2016-0152, some assets arising from work performed for unit refurbishments are placed in service and included in the rate base before the refurbishment of the unit is completed, as they provide immediate benefit to the station. There are two Remaining Units Early In-Service projects. These two projects have a total cost of $3.0M to be placed in service as follows: $1.4M in 2023 and $1.6M in 2024.

## 3.0 D2O STORAGE PROJECT

The D2O Storage Project is a F&IP that was not included in EB-2016-0152 approved in-service amounts.[3] The D2O Storage Project in-service additions include costs incurred to complete the project and make the facility available for service to support the refurbishments of the

[3] An amount of $14.6M placed in service in 2014 for the D2O Storage Project has been approved for inclusion in rate base and is reflected in the rate base approved in EB-2016-0152. In the EB-2013-0321 Decision with Reasons (pp. 58-59), the OEB originally approved a forecast in-service amount greater than $14.6M over 2014-2015 and subsequently approved the Capacity Refurbishment Variance Account ("CRVA") balances at December 31, 2014 (EB-2014-0370) and December 31, 2015 (EB-2016-0152) that trued up the revenue requirement impacts to the $14.6M actual in-service amount (e.g. see EB-2016-0152: Ex. L-2.2-1 Staff-008 and Ex. L-9.1-1 Staff-210).

Remaining Units. The D2O Storage Project, including all requested in-service additions, is discussed in Ex. D2-2-10.[4]

## 4.0 COMPARISON OF IN-SERVICE AMOUNTS

The Release Quality Estimate ("RQE") for the Program was the basis for the pre-filed evidence and OEB approved in-service amounts in EB-2016-0152. The RQE was approved by OPG's Board of Directors in November 2015. In August 2016, subsequent to the RQE, and prior to the start of the Unit 2 refurbishment outage in October 2016, OPG completed a more refined estimate of the Program budget and schedule, known as the Unit 2 Execution Estimate ("U2EE"). The U2EE established the Unit 2 project baselines against which OPG measured its performance, internally and publicly, during the execution of the Unit 2 refurbishment.

A summary of the U2EE was filed in EB-2016-0152.[5] In that proceeding, OEB agreed with OPG's proposed approach not to update its revenue requirement and to record the revenue requirement impacts of any differences between actual and approved in-service amounts in the Capacity Refurbishment Variance Account ("CRVA").[6] Accordingly, the variances relative to OEB approved in-service amounts discussed below include the previously identified differences between the RQE and U2EE.

Relative to the OEB approved in-service envelope amount of $5,177.4M, the forecast variance for the Unit Refurbishment - Unit 2 and the Campus Plan Projects is $132.7M or +2.5%, as discussed below. As detailed in Ex. D2-2-2, Section 8, in this application OPG is not seeking inclusion of this variance in rate base or the clearance of DRP-related amounts in the CRVA.[7] Therefore, detailed explanations of the variance are not provided. A summary is provided below by project category and also by year.

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[4] Capital in-service amounts for the D2O Storage Project are included in this Ex. D2-2-9, Tables 2 and 5.
[5] EB-2016-0152, L-04.3-1 Staff-055.
[6] EB-2016-0152 Decision and Order, p. 39.
[7] With the exception of the D2O Storage Project (Ex. D2-2-10) and the impacts of capital cost allowance deductions arising from changes in income tax legislation since EB-2016-0152 (Ex. F4-2-1)

Unit Refurbishment – Unit 2 (-$38.5M)

The Unit Refurbishment - Unit 2 in-service amount comprises costs incurred to complete the refurbishment scope and return to service of Unit 2. This includes Definition Phase costs but does not include any Early In-Service Projects that are used or useful to the Darlington station in advance of Unit 2 return to service.

Compared to the OEB approved in-service amounts of $4,799.8M in 2020 and $0.4M in 2021 for Unit Refurbishment - Unit 2, OPG is forecasting amounts of $4,761.8M for 2020 and $0 for 2021. The variance (-$38.5M) results from five projects that have been re-evaluated since EB-2016-0152 and were placed in-service prior to Unit 2 as Early In-Service Projects (-$70.3M), rather than with Unit 2 (see discussion of Early In-service Projects below), partially offset by higher spend on Unit Refurbishment - Unit 2 (+$31.8M).

Facilities & Infrastructure Projects (other than D2O Storage Project) (+$5.9M)

F&IP are pre-requisites for unit refurbishments and were placed in service and included in rate base when they became used or useful to OPG. The projects are expected to remain useful to OPG's current and future nuclear operations, independent of whether the DRP is completed. The variance is a result of higher spend on the Refurbishment Project Office (+$4.9M), Retube & Feeder Replacement Island Support Annex (+$3.7M) and GM Facility Interim Office (+$1.9M), partially offset by lower cost for the Water & Sewer Project (-$2.7M).

Safety Improvement Opportunities (+$85.0M)

The need for the SIO, and OPG's commitment to undertake them, was established through the Environmental Assessment that was approved by the Canadian Nuclear Safety Commission. They are regulatory commitments made pursuant to the Integrated Implementation Plan. The variance is a result of higher than planned project spend on the Third Emergency Power Generator (+$35.0M), Containment Filtered Venting System (CFVS) modifications (+$29.4M) and Shield Tank Overpressure Protection (STOP) (+$21.3M).

Early In-Service Projects (+$82.3M):

The variance is primarily attributable to the five projects, described in the bullets below, which were re-evaluated since EB-2016-0152 and placed in-service prior to Unit 2 (the "New Early In-service Projects"). The New Early In-service Projects were originally scheduled to be placed in-service in February 2020 as part of the OEB approved Unit Refurbishment – Unit 2 in-service amount of $4,800.2M. They are:

- Breathing Air Capacity Enhancement ($27.4M): This project provides breathing air to plastic suits worn by personnel working in the vault. The air is provided via a station wide header supplied by compressors and air receivers located in Units 1, 2 and 4 on the 107.5 elevation of the station. In order to meet the breathing air demands of work crews, the breathing air system must be connected to the vault following bulkhead installation. This project benefits the station immediately because the additional compressors and associated equipment enhance reliability and performance of the overall station breathing air system, as well as meeting additional DRP demands. This project did not have a separate business case because of its original inclusion in the Unit Refurbishment – Unit 2 in-service category.
- Fuel Handling Power Track Refurbishment ($24.1M): This project is to refurbish major components of the three existing power tracks which are integral to the operation of the fuel handling system. The fuel handling system at Darlington performs routine online fuelling operations using fuelling machines mounted on trolleys. The power track provides a flexible avenue for power, control and signal cables to be connected to the trolleys from the central service area. This project benefits Darlington immediately because the refurbished trolleys support the fuelling of the operating units. This project did not have a separate business case because of its original inclusion in the Unit Refurbishment – Unit 2 in-service category.
- Service Air Capacity Enhancement ($13.5M): This project includes installation and commissioning of three new service air compressors and two new air receivers, including all associated piping, valves and support. The purpose of the project was to increase the capacity of the station service air system to handle the larger demand resulting from DRP execution work. This project benefits the station immediately because the additional

compressors and associated equipment enhance the reliability and performance of the overall station service air system, as well as meeting additional DRP demands.[8]

- Lube Oil Tank Repairs ($3.6M): This project benefits the station immediately because the repaired tanks are used by the whole station.
- Holt Road Services Relocation ($1.8M): This project benefits the station immediately because the road changes support the Holt Road Interchange development to meet the current traffic plan that addresses both station operations and refurbishment.

The New Early In-Service Projects were placed in service ahead of Unit 2 because, once ready for intended use, they provided immediate benefit to Darlington as detailed above, and support the operating units before and after the completion of the DRP.

The overall Early In-Service Projects variance is also attributable to slightly higher spends on D2O Islanding Modifications (+$4.8M), Unit 2 Stopple projects (+$3.4M). Also contributing to this variance is the forecast in-service of the Unit 3 Stopple project (+$1.9M) in 2021.[9]

### 4.1 2021 Budget versus 2021 OEB Approved

The forecasted 2021 in-service amount of $8.6M is higher than the OEB approved amount of $0.4M due to closeout costs for the CFVS project (+$6.7M) and early in-service of the Unit 3 Stopple project (+$1.9M), partially offset by Unit 2 close-out costs advanced into 2020.

### 4.2 2020 Budget versus 2020 OEB Approved

The forecasted 2020 in-service amount of $4,782.7M is lower than the OEB approved amount of $4,809.2M. The key drivers of the variance are:

- Lower Unit Refurbishment – Unit 2 in-service amount (-$38.0M) due to advanced in-service of the New Early In-service Projects, as described above.
- Higher Unit Refurbishment – Unit 2 Early In-Service Project amounts due to delayed in-service of Low Pressure Service Water from 2018 (+$6.7M) and closeout costs for

[8] Breathing Air Capacity Enhancement, Fuel Handling Power Track Refurbishment, and Service Air Capacity Enhancement projects were previously identified and described in EB-2016-0152, Ex J2.9.
[9] The Unit 3 Stopple project was not included in the EB-2016-0152 Early In-Service Project approvals.

advanced in-service of three of the New Early In-service Projects described above (i.e., Holt Road Services Relocation, Breathing Air Capacity Enhancement and Fuel Handling Power Track) (+$3.8M).

- Timing of delayed SIO in-service project closeout costs (-$1.3M) for the EPG3, CFVS and STOP projects.
- Higher F&IP (+$2.4M) project costs related to closeout costs for GM Facility Interim Office, Refurbishment Project Office, R&FR Island Support Annex, and Water & Sewer Project.

### 4.3 2019 Actual versus 2019 OEB Approved

The actual 2019 in-service amounts of $16.0M are higher than the OEB approved amount of zero dollars. The key drivers of the variance in the in-service amounts are:

- Advanced in-service of one of the New Early In-Service Projects described above (i.e., Fuel Handling Power Track Refurbishment) (+$7.4M).
- Delayed in-service of the STOP project from 2018 to 2019 (+$8.2M).

### 4.4 2018 Actual versus 2018 OEB Approved

The actual 2018 in-service amounts of $34.5M are higher than the OEB approved amount of $8.9M. The key drivers of the variance in the in-service amounts are:

- Advanced in-service of one of the New Early In-Service Projects described above (i.e., the Fuel Handling Power Track Refurbishment) (+$16.0M), and higher costs for Unit 2 Stopple projects (+$3.4M), partially offset by delay of in-service of Low Pressure Service Water (-$6.4M).
- Higher SIO in-service projects (+$10.8M) due to closeout costs for the delayed in-service of the EPG3, CFVS and Powerhouse Steam Venting System Improvements, partially offset by the delay of the in-service of the STOP from 2018 to 2019.
- Costs related to F&IP post-closeout activities (+$0.9M).

### 4.5 2017 Actual versus 2017 OEB Approved

The actual 2017 in-service amounts of $305.9M are higher than the OEB approved amount of $8.5M. The key drivers of the variance in the in-service amounts are:

- Advanced in-service of some of the New Early In-Service Projects described above (i.e., Breathing Air Capacity Enhancement, Service Air Capacity Enhancement and Lube Oil Tank Repairs) (+$43.8M).
- Higher SIO in-service projects (+$236.7M) due to the delayed in-service of EPG3 and CFVS projects from 2016 to 2017.
- Higher F&IP in-service projects (+$16.9M) due to post close-out activities for Refurbishment Project Office, Vehicle Screening Facility and Electrical Power Distribution System.

### 4.6 2016 Actual versus 2016 Budget

The actual 2016 in-service amounts of $164.4M are lower than the OEB approved amount of $350.4M. The key drivers of the variance in the in-service amounts are:

- Higher costs on the Heavy Water Islanding Modifications (+$4.5M).
- Lower SIO in-service projects (-$176.2M) due to the delayed in-service of EPG3, CFVS and Powerhouse Steam Venting System projects and lower costs for Emergency Service Water Buried Services, partially offset by higher in-service of STOP.
- Lower F&IP in-service projects (-$14.4M) mainly due to delayed close-out costs for Refurbishment Projects Office, Water & Sewer Project, Electrical Power Distribution System and delayed in-service of Vehicle Screening Facility to 2017; partially offset by higher in-service amount for Retube & Feeder Replacement Island Support Annex.