NEW NUCLEAR AT DARLINGTON

1.0 PURPOSE

This evidence presents an overview of the activities and expenditures associated with New Nuclear at Darlington which includes work being undertaken at the Darlington site related to the planning and preparation for a new technology known as a Small Modular Reactor ("SMR").

2.0 OVERVIEW

OPG's nuclear revenue requirement for the IR term includes costs to preserve the option to build new nuclear generation at the Darlington site. This is consistent with prior government direction that OPG should continue with the environmental process and site licencing process given long lead times for nuclear procurement and construction.[1] OPG is seeking approval of annual OM&A costs of $2.2M, $2.2M, $2.3M, $2.3M, and $2.3M for the years 2022-2026, respectively, as presented in Ex. F2-1-1, Table 1. The forecast OM&A costs during the IR term are for work to preserve the option to build new nuclear at Darlington, and do not assume development of an SMR generating station, pending the investment decision on the project. Any differences between these forecasts and OPG's actual non-capital OM&A costs will be recorded in the Nuclear Development Variance Account ("NDVA"), in accordance with O. Reg. 53/05.[2]

In addition, OPG's 2020-2026 Business Plan is forecasting OM&A expenses of $66M in 2020 and $206M in 2021 for preliminary planning and preparation expenditures for an SMR generating station at the Darlington site. There was no forecast of planning and preparation expenditures for the development of an SMR included in EB-2016-0156. OPG will record the preliminary planning and preparation amounts in 2020 and 2021 related to the SMR project in the NVDA.

[1] EB-2016-0152, Ex. L-6.01-7 ED-017 and EB-2013-0321, Ex. D2-2-1, Attachment 1.
[2] The NDVA is discussed in Ex. H1-1-1.

Virtually all OM&A costs incurred prior to 2020 were to preserve the option to develop new nuclear at Darlington.[3] This included maintaining the environmental assessment for site license renewal and advancing a number of environmental assessment commitments necessary to be ready for eventual site preparation. These preservation and licensing activities continue, and their costs are included in the $272M in SMR planning and preparation costs in 2020 and 2021 described above.

Section 3.0 below provides a brief overview of the SMR project.

3.0 SMR PROJECT

SMRs are next generation nuclear reactors designed to have enhanced safety and economic benefits. Specifically, SMRs are smaller in both physical size and output than previous generations, modular in construction to enable shorter construction timeframes, and virtually emissions free. Small Modular Reactors are expected to have designed-in safety characteristics incorporating the learnings from the Fukushima events, to substantially reduce potential for off-site consequences from a nuclear accident and thus improve public confidence and social license. These attributes make SMRs extremely safe and quicker to build than traditional reactors, while providing the reliable baseload generation capability of other reactors.

Subject to approvals from the Canadian Nuclear Safety Commission ("CNSC"), OPG is planning to construct an SMR nuclear generating station at the Darlington site with a projected in-service by the end of this decade, meeting anticipated energy and capacity needs in Ontario with a clean energy source. Adding incremental, baseload, non-CO_2 emitting generation capability by 2030 will allow the system to meet the expected increased demand largely driven by modest growth in the residential, commercial and agricultural sectors, as well as the increased electrification of transportation. An SMR will also help to address projected summer capacity needs arising after the planned shutdown of the Pickering generation station and

[3] OPG incurred total costs of $0.7M in 2018 and 2019 related to preliminary planning and preparation activities for an SMR generating station at the Darlington site that were recorded in the NDVA. As discussed in Ex. H1-2-1, OPG is not seeking clearance of this amount in this application.

replace some of the baseload generation previously provided by Pickering. The need to begin this process now reflects the lead-time required to meet the projected in-service target.

The provinces of Ontario, New Brunswick, and Saskatchewan signed a Memorandum of Understanding ("MOU") in 2019 committing to collaborate on the development and deployment of SMRs in Canada.[4] Small Modular Reactors are seen as a source of safe, clean, reliable and low-cost energy for both on-grid and off-grid communities, driving economic growth and export opportunities across the country and around the world. OPG and the Province of Ontario are uniquely positioned to lead the emerging worldwide market for clean, zero-carbon SMRs. This opportunity presents economic benefits for the province's nuclear industry, creating jobs and supporting the retention of advanced manufacturing; while simultaneously meeting the province's capacity and energy needs.

The initial planning and preparation phase of SMR development includes the following tasks: 1) select a technology developer, 2) prepare for a construction license application, 3) develop the necessary project and engineering organizations, and 4) obtain more certainty on project costs, as outlined below, by the end of 2021. Progress on these activities will enable a decision whether to proceed with the next phase gated releases in order to meet an in-service date by the end of the decade.

More detail on the extensive and interconnected activities to be undertaken during the 2020-2021 period is provided below:

- <u>Technology Developer Selection</u>: There are many different SMR technology developers in the market currently. The first objective of this phase was to narrow the pool of potential technology partners to two or three SMR technology developers and determine which developers would provide the greatest overall benefit to Ontario. As of September 2020, this objective was completed. The next objective is to conduct further due diligence and

[4] On August 12, 2020 the Province of Alberta entered into the MOU with Ontario, Saskatchewan and New Brunswick to support the development of SMRs.

development work in order to arrive at a single technology developer by the end of 2021. OPG will fund activities to advance development and produce the necessary information for OPG to make a final technology partner selection. OPG forecasts that the cost of these activities and the preparation of a Class 5 cost estimate and project schedule will be approximately $190M.

- Licensing: OPG has an approved environmental assessment and holds a 10-year Site Preparation Licence ("SPL") for the Darlington site, which was issued in 2012 and expires in August 2022. The licence allows OPG to undertake site preparation activities required for new nuclear generation and is the first in a series of licences required in order to construct and operate any new reactor. The Licence to Construct ("LTC") is the second licence required, and an application for this licence would need to be submitted during the second quarter of 2022 in order to maintain the option of starting construction by the middle of the decade. On June 30, 2020 OPG submitted an application to the CNSC to renew and extend the existing Darlington SPL to ensure an SPL is in effect until such time as an LTC is approved. This recent SPL renewal application is more advanced and costly than the prior application as the preparation work moves from the option maintenance phase to actual development of the site. At the same time, significant effort is required for OPG to prepare the LTC application, which forms a material portion of the licensing costs. The estimated cost of licensing activities is approximately $20M.

- Project Development and Oversight: As owner of the SMR, OPG will manage the project and provide oversight. This includes developing a framework to address:

  - project management approach and governance;
  - project controls to ensure effective oversight of external parties (technology developer, engineering, procurement and construction contractor, etc.);
  - cost and scheduling; and
  - development of nuclear support functions.

Other activities will include preliminary engineering assessments of proposed developers' designs. The estimated cost of these initial planning activities is approximately $62M.

The activities described above are key components to developing a Class 5 estimate by November 2021 upon which an investment decision can be made for continued project development work, leading to an application for a LTC.