

# OVERVIEW OF NUCLEAR FACILITIES

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## **1.0 PURPOSE**

This evidence describes OPG's nuclear facilities and sets out an overview of OPG's nuclear mandate, objectives, organization, and governance framework.

The evidence is substantially the same as Ex. A1-4-3 submitted in OPG's last rates application (EB-2013-0321) with the exception of an update to section 3.0, Nuclear Organization.

## **2.0 OPG'S NUCLEAR GENERATING FACILITIES**

OPG's nuclear generating facilities consist of Pickering Generating Station ("Pickering") and Darlington Generating Station ("Darlington") (collectively, the "nuclear generating stations").

All of OPG's nuclear generating stations are based on CANDU technology, a pressurized-heavy-water reactor using natural-uranium technology developed in Canada. CANDU reactors are unique in their use of natural uranium, deuterium oxide (heavy water) as a moderator/coolant, on-line refueling capability and two shut down safety systems. These plants serve as base load resources as they have been designed to operate at full power. Chart 1 below provides basic information about the nuclear generating stations.

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**Chart 1**

**Nuclear Generating Stations Basic Information**

	<b>Pickering</b>		<b>Darlington</b>
	<b>Units 1 and 4<sup>1</sup></b>	<b>Units 5-8</b>	<b>Units 1-4</b>
<b>In-service dates</b>	1971 - 1973	1983 - 1986	1989 - 1992
<b>Net in-service capacity</b>	1,030 MW	2,064 MW	3,512 MW
<b>Number of units in-service and size in MW's</b>	2 x 540	4 x 540	4 x 934

4 1 Pickering Units 2 and 3 were laid up in 1997 and have been placed into a safe store condition for eventual  
5 dismantling.

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7 While OPG's ten nuclear units are based on CANDU principles, they reflect three  
8 generations of design philosophy and technology with Pickering Units 1 and 4, Pickering 5 to  
9 8, and Darlington built in the 1960s, 1970s, and 1980s respectively. This results in significant  
10 variations among the three nuclear stations, including technology system components and  
11 overall design.

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13 Planning is underway to extend the safe operation of Pickering, whereby all six units at  
14 Pickering would operate until 2022, at which point two units would be shut down and the  
15 remaining four units would operate until 2024 (referred to as "Pickering Extended  
16 Operations"). Further details regarding Pickering Extended Operations is provided in Ex. F2-  
17 2-3.

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19 Darlington will be undergoing refurbishment over the period 2016-2025, as discussed in Ex.  
20 D2-2-1 and Ex. F2-7-1.

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22 **3.0 NUCLEAR ORGANIZATION**

23 The nuclear organization is led by the President, OPG Nuclear and Chief Nuclear Officer (per  
24 OPG's organizational chart shown in Ex. A1-5-1). The operating groups within the nuclear

1 organization are described below (all reporting to the President, OPG Nuclear and Chief  
2 Nuclear Officer).

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- 4 • **Darlington and Pickering Stations** – led by the Senior Vice President Darlington  
5 and Senior Vice President Pickering and focused on the operation, maintenance, and  
6 performance of Pickering and Darlington.
- 7 • **Nuclear Engineering** – led by the Senior Vice President, Nuclear Engineering and  
8 Chief Nuclear Engineer and focused on plant safety and reliability by provision of  
9 various engineering services (e.g., design engineering, component engineering,  
10 station engineering).
- 11 • **Fleet Operations and Maintenance** – led by the Vice President, Fleet Operations  
12 and Maintenance and focused on driving improvement across the Nuclear fleet.
- 13 • **Security and Emergency Services** – led by the Vice President, Security and  
14 Emergency Services and responsible for provision of security services for all of OPG  
15 including nuclear sites and facilities, as well as ensuring compliance with all CNSC  
16 security requirements.
- 17 • **Inspection and Maintenance Services** – led by the Vice President, Inspection and  
18 Maintenance Services and responsible for providing inspection and maintenance  
19 services to Darlington and Pickering facilities.
- 20 • **Decommissioning and Nuclear Waste Management** – led by the Senior Vice  
21 President, Decommissioning and Nuclear Waste Management, and responsible for  
22 the ongoing long-term management of nuclear waste produced by its operations,  
23 including low and intermediate level radioactive waste and used fuel. Also  
24 responsible for the planning and conduct of decommissioning of all OPG owned and  
25 operated nuclear facilities. This includes oversight on the Pickering Extended  
26 Operations project and management of the overall planning for the end of commercial  
27 operations at Pickering. Further details on nuclear waste management and  
28 decommissioning including the funding of nuclear liabilities are provided in Exhibit C2.
- 29 • **Nuclear Projects** – led by the Senior Vice President, Nuclear Projects and  
30 responsible for managing the planning and development of all projects in Nuclear.

1           This includes major refurbishment projects at Darlington, as discussed in greater  
2           detail in Ex. D2-2-1.

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4           A more detailed description of the roles and responsibilities of the various operating groups  
5           in the Nuclear organization is provided in Attachment 1 to Ex. F2-2-1.

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7           **4.0    NUCLEAR OBJECTIVES**  
8           OPG Nuclear has the following cornerstone major focus areas with the purpose of making  
9           the existing nuclear facilities more dependable, predictable, and cost effective:

- 10           • **Safety:** The Safety cornerstone makes nuclear safety, employee safety and  
11           environmental safety (e.g., radiation) the overriding priorities. It requires that all laws  
12           and industry/regulatory expectations are met, activities are performed conservatively  
13           and responsibly, and that business decisions are made with the full knowledge of the  
14           risks and potential impacts.
- 15           • **Human Performance/Leadership:** The Human Performance/Leadership  
16           cornerstone recognizes that minimizing individual fallibility and organizational  
17           programs/processes is the basis for operational excellence.
- 18           • **Reliability:** The Reliability cornerstone requires that OPG operate, maintain and  
19           engineer the nuclear facilities such that equipment, performance, availability and  
20           output are optimized.
- 21           • **Value for Money:** The Value for Money cornerstone delivers solutions that are the  
22           best combination of cost, quality and performance.

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24           These cornerstone major focus areas are the basis for the establishment of performance  
25           targets and key initiatives during the benchmarking and business planning process, as  
26           discussed in Ex. F2-1-1.