NUCLEAR OPERATIONS FUNCTION DESCRIPTIONS

Since the OEB's Decision and Order in EB-2016-0152, there have been several changes to the structure of Nuclear operations.[1] For purpose of presentation of Base OM&A in F2-1-1 Table 1 and F2-2-1 Tables 3 to 13, Nuclear Operations functions has been segmented into Nuclear Stations, and Operations and Project Support, with the above changes applied to actuals and restated OEB Approved as if effective in 2016, unless otherwise noted below.[2] CRVA Eligible Costs for specific work programs (Pickering Extended Operations, Pickering Optimized Shutdown and FCLE Ongoing) are also individually identified in Ex. F2-1-1 Table 1 and 3-13, whereas in EB-2016-0152 they were grouped within Operations and Project Support.

The following provides details on the operational functions within Nuclear Stations and Operations and Project Support.

1.0 OPERATIONAL FUNCTIONS WITHIN THE GENERATING STATIONS

At each of the generating stations, operational functions are broken down into three main components: Operations and Maintenance, Work Management, and Site and Support Services, as described below. Darlington also operates the Tritium Removal Facility ("TRF")**.**

- <u>Operations and Maintenance is comprised of</u>:
  - Operations, which operates the plant on a 24-hour basis. The CNSC approves the operations organizational structure, including mandating a minimum shift complement to address foreseeable emergency response requirements.
  - Maintenance, which performs:
    - Maintenance activities, which includes all activities directly related to the preventive, elective, and corrective maintenance of structures, systems, or components to

[1] These changes are summarized in Ex. A1-3-1, Attachment 1, along with the normalization of historic Nuclear OM&A categories.

[2] As discussed below, "Operations and Project Support" is inclusive of former Nuclear business unit functions now organizationally reporting into the Enterprise Strategy organization, with the exception of Corporate Business Development & Strategy group that is presented as a Corporate Support group (Ex. F3-1-1), consistent with the nature of the function and its presentation in EB-2016-0152.

address material condition issues, maintain equipment reliability, and optimize equipment life, and,

- Fuel Handling, which includes all activities in support of refuelling the reactor during unit operation; maintenance of the fuelling machines and related systems; support of outage activities requiring the fuelling machine or related systems; and management of new fuel storage.

- <u>Work Management includes</u>:
  - Work Control, which ensures that corrective, elective, and preventive maintenance is planned effectively and efficiently.
  - Outage Planning, which develops specific milestones for scope definition, long lead materials, schedule development, and pre-requisite work.

- <u>Site and Support Services includes</u>:
  - Chemistry, which includes the operation of the chemistry lab and assistance in managing plant chemistry.
  - Common Services (Pickering), which operates and maintains station and site support systems for the Pickering station, specifically management of heavy water and operation of facilities such as heavy water upgraders, station containment systems and radioactive waste management.
  - Site Vice President's office.
  - Interface with World Association of Nuclear Operators ("WANO") and other external parties (including the interface for Darlington refurbishment).
  - Radiation Safety (formerly in Fleet Operations and Maintenance) , which is accountable for radiation protection programming and services including assistance with radiation protection during plant operation and maintenance activities, and administration of the program for keeping radiation As Low As Reasonably Achievable ("ALARA").
  - Performance Improvement, which has oversight of Nuclear's corrective action program, nuclear safety culture, and a self assessment program that conducts research and collects information to resolve a performance gap or to identify opportunities to

achieved industry excellence in specific program areas, with transferred costs shown in Nuclear Stations base OM&A beginning in 2019.

- Tritium Removal Facility
  - Located at Darlington, the TRF provides tritium removal services to all OPG nuclear stations and third party customers (see Ex. G2-1-1).

2.0 OPERATIONAL FUNCTIONS WITHIN OPERATIONS AND PROJECT SUPPORT

Operations and Project Support is accountable for providing specialized services to the stations, as well as establishing the common procedural framework within which the stations operate.

For purpose of presentation of Base OM&A in F2-1-1 Table 1 and F2-2-1 Tables 3 to 13), Operations and Project Support has been segmented into the functional groups shown below. The following are the key functions within each group:

Enterprise Engineering is accountable for the following:

- Components Engineering provides specialized technical support for nuclear station components and equipment, major nuclear plant equipment (including life cycle plans for steam generators and fuel channels), engineering programs, selected systems (such as real-time process computers and security), chemistry, cyber security, human factors engineering, plant information systems, and administration of the nuclear research and development program.
- Design Engineering provides design services such as, preparation of modifications; parts procurement support; and expert-level support on nuclear industry codes and standards for the nuclear stations and Nuclear Waste Management.
- Engineering Strategy provides strategic support to Enterprise Engineering long range planning, develops international relationships and provides strategic advice on matters relating to CANDU technology, represents OPG Nuclear with international nuclear industry bodies and oversees Nuclear Projects executed by Enterprise Engineering.

- Nuclear Safety provides oversight of technical support provided to the stations by the Reactor Safety Engineering Departments, and specialized services in the areas of Fuel, Nuclear Safety Analysis and Probabilistic Risk Assessment.
- Station Engineering is responsible for specifying engineering requirements, concurrence to schedule and acceptance of engineering products and services provided to support safe operation of the plant. It also ensures the Safety Operating Envelope and the Design and Licensing Basis for the plant are maintained by exercising prescriptive authority for the definition of operating and outage scope of work associated with these basis documents.
- Inspection and Reactor Innovation (formerly Inspection and Maintenance Services) ("IRI") is accountable for providing inspection and maintenance services to supplement those carried out by station staff, where the nature of the skills or equipment required makes the work more effectively managed as a centralized function. The direct costs associated with the provision of inspection and maintenance services during outages are included in outage OM&A costs (Ex. F2-4-1). IRI indirect costs such as administration are included in base OM&A as are the provision of inspection and maintenance services during normal (i.e. non-outage) operation.
- Machine dynamics and performance testing services, formerly based in Renewable
- Generation Engineering & Technical Services, are now included as part of Inspection and Reactor Innovation

<u>Enterprise Projects</u> includes Nuclear Projects (formerly Projects and Modifications) as well as the Enterprise Project Management Office and Commercial Management & Project Assurance.

- Nuclear Projects, which is responsible for the planning, developing and execution of all nuclear projects (other than the Darlington Refurbishment Program).
- Entreprise Project Management Office, which is responsible for oversight of the processes, tools and project expertise necessary to deliver successful projects; serves as a source for best practices, training programs and an organizational focus for improving project performance across all portfolios.

- Commercial Management & Project Assurance, which is responsible for commercial relationships to support effective management of contracts during the post award, execution and close out phases, including Nuclear Extended Services Master Services Agreements and Engineering contracts.

Project work (in contrast to base OM&A work) is discussed in Ex. D2-1-1. While the Projects function is primarily funded by project OM&A and capital (Ex. F2-3-1 and Ex. D2-1-1, respectively), a limited amount of operational support to the stations is funded by base OM&A.

Integrated Fleet Management has three main functions:

- Generation Strategy & Innovation, which drives improvement across the Nuclear fleet by developing, implementing and monitoring nuclear-wide programs and procedures for the nuclear stations in the areas of Operations, Maintenance, Performance Improvement Support and Human Performance. It is also responsible for nuclear fleet-wide asset management and generation planning, to ensure a strategic and streamlined approach to determining future investments considering cost, risk and performance. Enterprise Innovation is also part of this organization, developing and implementing value-based fleet initiatives and improvements. Generation Strategy & Innovation will oversee the strategy for data-driven decision making in all areas of Enterprise Operations, through a dedicated Data Analytics team who will provide insights into operations areas through the application of analytics on a broad range of available data, manage data governance, collaborate on architecture development, and will include the operation of the Monitoring & Diagnostics Centre.
- Nuclear Oversight (transferred from Corporate Support) accountable for independent internal audits to evaluate compliance with regulatory, provincial and federal requirements and performance to industry standards of excellence and examinations of plant functional areas or various plant activities to evaluate the effectiveness of work practices and/or management controls.
- Nuclear Regulatory Affairs and Stakeholder Relations accountable for obtaining required CNSC approvals in a timely manner, ensuring that OPG complies with its

licences, regulatory requirements and commitments, and managing regulatory issues while maintaining good working relations with the CNSC.

Security and Training, while reporting to SVP Darlington, provides two main functions across the Nuclear fleet:

- Security services for nuclear sites and facilities (and across OPG), and ensures compliance with all CNSC security requirements. Emergency Preparedness and Fire Protection services are also included within this division.
- Nuclear Training (transferred from Corporate Support) has the role of training personnel to safely operate, maintain and improve performance of the Pickering and Darlington nuclear stations. The most effective way to ensure public safety and a reliable source of electricity to the grid for public safety and national security, is to ensure that the personnel that operate, maintain and engineer these commercial nuclear power plants have been trained, evaluated and qualified to consistently high standards. The group is responsible for all Training Analysis, Design, Development, Implementation and Evaluation activities associated with Nuclear Training that leads to working rights (qualifications). It is also responsible for all Nuclear Plant Access Training (regular and contractor staff) and the Training Information Management System for all of the OPG Nuclear Fleet.

Other Support is an aggregate of a number of smaller functions including centralized or fleet-wide costs for services required to manage the Nuclear business that are not directly attributable to any one plant or support organization.

- Costs include executive officers, inventory adjustments and, as applicable, Hydro One share awards expenses and standard labour price variances that are captured at the aggregate level as opposed to the individual Nuclear stations and support groups.
- Costs also include the limited amount of base OM&A in Enterprise Strategy, such as Nuclear Waste Management and Commercial Services (formerly in Corporate Support).

- Renewable Generation Operations functions providing support for the Nuclear fleet, such as Energy Markets (formerly in Corporate Support), with costs shown in Nuclear base OM&A actuals and plan