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DARLINGTON REFURBISHMENT PROGRAM ASSURANCE PROGRAM MANAGEMENT PLAN

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Darlington Refurbishment Program Assurance Program Management Plan

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Revision Summary

Revision Number	Date	Comments
R003	2018-06-29	Updated to reflect latest organizational changes and related processes. Includes the transfer of Program Assurance Group accountabilities to Nuclear Oversight.
R002	2016-02-15	General update to reflect latest organizational structure and processes.
R001	2015-09-01	Program Assurance Group (PAG) model updated to match PAG framework. Added definition for Oversight from INPO 09-002. Added reference to Refurbishment Construction Review Board (RCRB). Added process support document framework in Appendix B.
R000	2014-01-31	This document supersedes NK38-PLAN-09701-10067 Sheet 0011. The changes between NK38-PLAN-09701-10067 Sheet 0011 and this document are as follows: • The document number has been changed to meet the requirements of NK38-NR-MAN-09701-10001, • The security classification has been removed so that the document can be submitted to the CNSC, and • References have been updated.

1.0 PURPOSE AND SCOPE

The purpose of this document is to explain how assurance is achieved in the Darlington Refurbishment Program (DRP). Assurance for the purpose of this document is defined as a set of tools, organizations, and processes that have been implemented to ensure that all DRP business objectives are achieved.

The scope of this document is for the DRP only. This program management plan takes its authority from the D-PCH-09701-10000, Darlington Refurbishment Project Charter.

The flow of information and the organizational hierarchy of oversight and assurance providers are captured in Figure 1 below. The details of the role of each of the oversight and assurance providers are available in Appendix A. In addition, roles and accountabilities of the Nuclear Projects organization are described in NK38-REF-09701-10006, Nuclear Refurbishment Division of Responsibility.

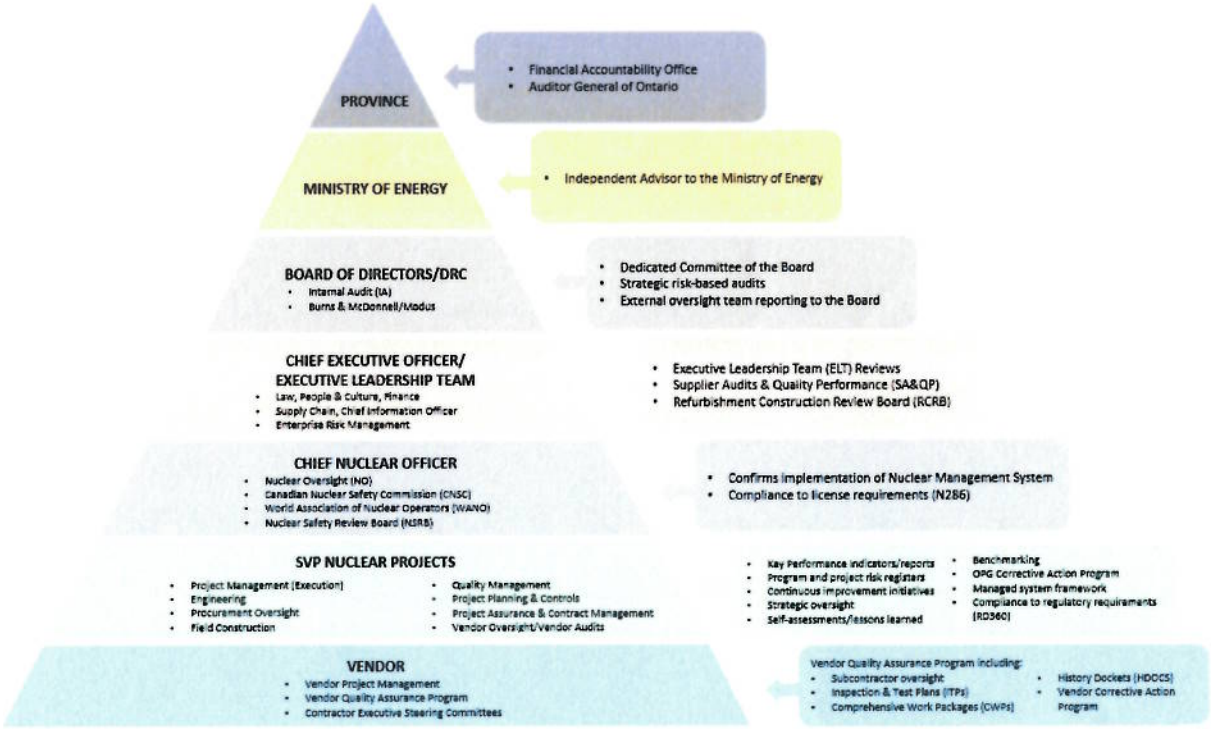

Figure 1 – Hierarchy of Oversight and Assurance Providers

2.0 PROGRAM REQUIREMENTS

As per Institute of Nuclear Power Operations (INPO) 11-007 Principles for Strong Governance and Oversight of Nuclear Power Organizations, Oversight is defined as "...the verification that the standards, expectations, and goals established through governance of the organization are met...; [all employees] identify performance gaps for corrective actions, monitor the effectiveness of corrective actions, and escalate issues to higher levels of line management when necessary. Oversight—through its fundamental elements of audit, evaluation, monitoring, inspection, and investigation—enhances organizational effectiveness, productivity, and integrity."

DRP Assurance is comprised of four main separate elements: External Assurance, Internal Assurance, Project Assurance, and Contractor's Program Assurance, see Figure 2. Each element plays an important role in providing assurance to the stakeholders that the project is being executed safely, to the required quality, on time, and on budget.

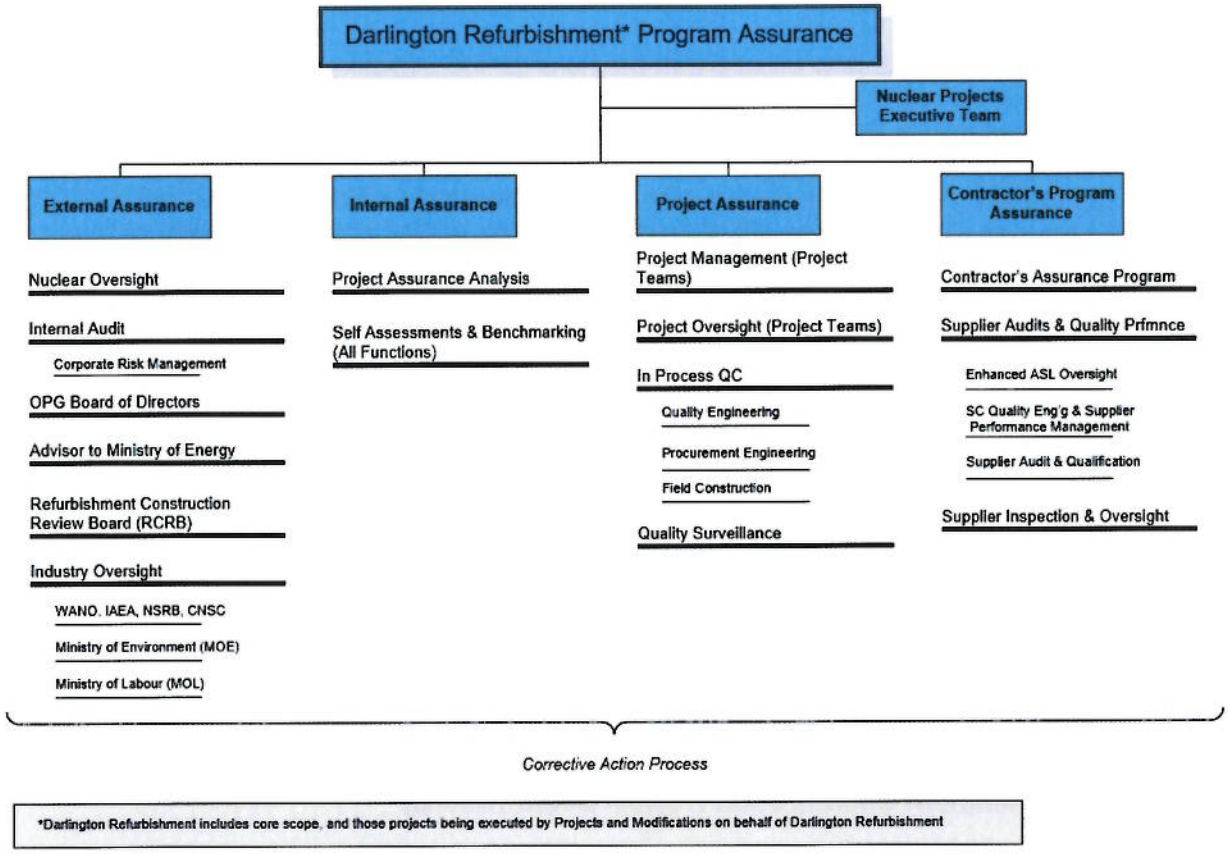

Figure 2 – Darlington Refurbishment Program Assurance Model

The DRP Assurance Model, by design, incorporates multiple layers of oversight to support building and maintaining internal and external confidence. The intent of the Assurance Model is to ensure the DRP (1) meets all safety, quality, cost, and schedule expectations; (2) that any issues will be identified and resolved expeditiously; and (3) that transparent and accurate information flows up to the Board in a way that supports Board oversight effectiveness and decision making. The following sections explain key requirements the DRP which focus to establish consistency in oversight across the program.

2.1 External Assurance

2.1.1 Nuclear Oversight (NO)

NO's audit mandate includes audit of the Darlington Refurbishment Project. The role of this group is to audit the OPG Management System to ensure that it meets the requirements of N286 and N-CHAR-AS-0002, Nuclear Management System. The audit results are shared with the OPG Darlington Refurbishment Management Team and when required, the results are escalated to the Senior Management Team.

2.1.2 Internal Audit (IA)

IA's audit mandate is to ensure that the risks for the company are being adequately managed through proper planning, cost control and schedule adherence. This group audits Enterprise Risk Management processes in accordance with the Strategic Audit Plan approved by the Board. This audit plan includes risk-based audits aligned with the top strategic and enterprise risks per the assurance section in OPG-PROG-0004, Enterprise Risk Management. In addition periodic audits of business processes are also performed.

2.1.3 Darling Refurbishment Committee (DRC) Independent Oversight

Reporting directly to the DRC, a sub-committee of the Board of Directors (BoD), Burns & McDonnell independently assess and evaluate the accuracy and completeness of project information provided by the Refurbishment management team. They evaluate the robustness of internal oversight and assurance and identify high-level risks to the project that could impact the high confidence schedule and budget, are identified.

2.1.4 Independent Oversight

A Ministry of Energy (MoE) appointed person has been embedded in the DRC. This individual monitors and reports on the progress and performance of the DNR project on a confidential basis to the MoE.

2.1.5 Refurbishment Construction Review Board (RCRB)

The RCRB advises OPG on overall project management, as well as management of specific projects within the DRP. The RCRB makes impartial assessments to help ensure that the project teams' actions are meeting expectations, and that

commitments and industry-proven project management practices are in place in all areas of safety, human performance, cost, schedule, and quality.

The RCRB is comprised of external members who have expertise in nuclear plant operations, regulatory matters, and construction mega-projects. It conducts multiple site visits per year and reports on the results of its assessments to management, including recommendations on actions for improving performance. The Chair of the RCRB presents a summary of findings to the Darlington Refurbishment Committee annually.

2.1.6 Auditor General

The Auditor General is responsible for auditing the Province of Ontario's finances and also have authority to carry out "value for money" audits of provincial agencies such as OPG, including DNR.

2.1.7 Industry and other Oversight

Industry regulatory and oversight bodies, including Canadian Nuclear Safety Commission (CNSC) and World Association of Nuclear Operators (WANO) perform routine audits, assessments, and inspections of the Darlington Nuclear Generating Station (DNGS) performance. As the DR Project progresses, these reviews will include insights into the project's compliance with our Power Reactor Operating License (PROL) and WANO best practices. The Ministry of Environment and Climate Change and the Ministry of Labour may also provide oversight during the Darlington Refurbishment Project as required.

2.2 Internal Assurance

2.2.1 Project Assurance Analysis

Performance monitoring and reporting are key components of the assurance model and process controls. Regular performance reviews and status meetings are held to ensure processes are implemented as designed, results are achieved as anticipated, and corrective actions are identified where results are not meeting expectations. A variety of performance reports are provided to all levels of the organization and the stakeholders to assist in executing oversight roles. Program Management Plans for each function provide more detail on specific metrics being tracked.

The Project Assurance organization establishes and maintains the DNR assurance model and ensures its ongoing adequacy at covering the management system and four project pillars: safety, quality, schedule and cost. This includes reporting on the results of both internal and external assurance, co-ordinating all external oversight assurance activities, and providing a "check and adjust" function to ensure effective oversight and assurance is in place, with a focus on key risk areas.

Trends are identified, and all planned internal and external assurance activities are captured, in a storyboard and accompanying heat map which is presented on a

quarterly basis to the Nuclear Projects Executive Team by the Project Assurance group.

2.2.2 Self-Assessment and Benchmarking

Self-assessments and benchmarking are an element of the DRP Assurance. Self-assessments place an increased emphasis on individual accountability and robust management systems. Self-assessments and benchmarking evaluations provide a structured method to compare performance with management expectations, industry standards of excellence, and regulatory requirements to identify areas that require improvement. Self-assessments and benchmarking are conducted in accordance with N-PROC-RA-0097, Self-Assessment and Benchmarking.

2.3 Project Assurance

2.3.1 Project Management

Each Project has matrixed resources who are equipped with the expertise to provide clarity around the contracted requirements, and who are able to judge the competency of the Contractor's resources. Project Management is the day to day interactions of the project and removal of barriers when required to progress work. The focus of this layer is to keep the projects moving while ensuring that they meet the quality requirements within contract cost and timing.

2.3.2 Project Oversight

Project oversight principles and requirements are applicable to all projects initiated and executed within OPG. Oversight is the independent assessment necessary to ensure OPG and project objectives are achieved.

Project Oversight Plans (POP) are developed in accordance with OPG-STD-0148, Project Management Standard. The POP outlines the strategy for oversight activities. Guidance for POPs is provided in N-MAN-00120-10004 Sht OS-PLAN, Project Oversight Planning and Implementation. The oversight results, performance metrics, Station Condition Records (SCR), and trends may be reviewed to determine if there is an unidentified risk or opportunity surfacing across the projects. This may result in changes to the POPs.

Project oversight activities and findings are recorded in the RMO database.

2.3.3 In Process Quality Control

One of the assurance elements is the In Process Quality Control (QC) for Engineering, Procurement and Construction. OPG has stipulated in the Contractor Owner Interface Requirements (COIR) a number of quality hold points to confirm that the products meet all requirements before advancing to the next stage. The hold points are based on OPEX along with Lessons Learned from working with contractors over the years.

2.3.4 Quality Surveillance (QS)

The last layer of Project Assurance is Quality Surveillance (QS). Project personnel conduct surveillances on the Contractor's QC activities to verify the integrity of the Contractor's QC process. This is an important process to verify that the Contractor's resources are adhering to their own QC processes and are identifying areas which have failed within their corrective action program.

2.4 Contractor's Program Assurance

2.4.1 Contractor's Assurance Program

Each of the contracts requires that the prime contractors and their sub-contractors have a Quality Program which complies with Canadian Standards Association (CSA) N286, Management System Requirements for Nuclear Power Plants. It is a contractual requirement that the Contractor's Quality Organization will provide sufficient oversight to confirm that their management system is rigorously followed and that all deficiencies are documented in their corrective action system. It is further expected that the Contractor Quality organization is independent of production pressures.

This layer of assurance reviews all Contractors' and Subcontractors' Management Systems to ensure they meet the requirements of CSA N286. The audits look for programmatic issues that could negatively impact the success of the overall project.

2.4.2 Supplier Audits & Quality Performance

2.4.2.1 Approved Supplier List Audits

Supply Chain (SC) is accountable for the Approved Supplier List (ASL) for OPG. Supplier qualification is established by a graded approach for each type and scope of item or service based on Codes, Standards, and OPGN Design and Quality requirements. Supply Chain shall not be permitted to place a purchase order with any supplier requiring a Quality Program until an acceptable qualification status has been established by Supplier Audits & Quality Performance (SA&QP). Requirements of N-PROC-MM-0010, Establishing and Maintaining OPG ASL apply to both Safety Related and Augmented Quality items and services suppliers.

2.4.2.2 Quality Engineering & Supplier Performance Management

Supply Chain is accountable for measuring and managing supplier's quality performance, investigation and management of supplier corrective actions related to SCR and Operating Experience (OPEX), reduction of initial receipt inspection material quarantine, management of supplier reported non-conformances and development of suppliers. This includes maintaining ASL Critical Supplier List, Quality Key Performance Indicators, ASL Critical Supplier Quality Health Index, and supplier quality escalation process per N-PROC-MM-0041, Quality Engineering and Supplier Performance Management.

2.4.3 Supplier Inspection and Oversight

The Supplier Inspection and Oversight group supports the project teams with oversight of all procurement related quality activities. These oversights provide key inputs to NSC ASL Audit Group and Quality Engineering and Supplier Performance.

2.5 Nuclear Projects Executive Team (NPET)

NPET meetings provide a cross-project and cross-functional forum to discuss cognitive trends and determine whether appropriate assurance coverage is in place for the DNR. This review is typically held quarterly.

2.6 Corrective Action Program

DRP follows N-PROG-RA-0003, Corrective Action Program (CAP). OPG and each of its Engineer Procure Construct (EPC) contractors have requirements to address adverse conditions that trigger the use of OPG's, and/or EPC contractors' CAP Programs. These requirements are documented in NK38-NR-PLAN-09701-10001 Sheet 0010, Nuclear Projects Oversight Program Management Plan and N-GUID-00120-10012, Use of OPG Contractor Corrective Action Program vs OPG CAP for further details.

3.0 ROLES AND ACCOUNTABILITIES

Refer to Appendix A for details.

4.0 DEFINITIONS & ACRONYMS

4.1 Definitions

Oversight: Oversight is the accountability to critically monitor, assess, and evaluate the conduct of the project managers and their organizations. This includes the review of action plans that address gaps between current performance and governance standards, as well as the independent analysis of trends, data, and performance information that provides assurance that functional outcomes are achieved and policy boundaries are being respected.[2]

4.2 Acronyms

ASL	Approved Supplier List
BoD	Board of Directors
CAP	Corrective Action Program
CEO	Chief Executive Officer
CNSC	Canadian Nuclear Safety Commission
CRO	Chief Risk Officer
CSA	Canadian Standards Association
DRC	Darlington Refurbishment Committee
DRP	Darlington Refurbishment Program

[2] INPO 09-002 – Excellence in Nuclear Project Management; Section 19.1.9 Integrated Process Control

EPC	Engineer Procure Construct
IA	Internal Audit
INPO	Institute of Nuclear Power Operations
MoE	Ministry of Energy
NO	Nuclear Oversight
NSC	Nuclear Supply Chain
POP	Project Oversight Plans
PROL	Power Reactor Operating License
QC	Quality Control
QS	Quality Surveillance
RMO	Risk Management and Oversight database
RRB	Refurbishment Construction Review Board
SA&QP	Supplier Audits & Quality Performance
SCR	Station Condition Record
WANO	World Association of Nuclear Operators

5.0 REFERENCES

1) CSA N286-05, Management System Requirements for Nuclear Facilities
2) D-PCH-09701-10000, Darlington Refurbishment Project Charter
3) INPO 09-002: Excellence in Nuclear Project Management
4) INPO 09-007: Principles for Excellence in Nuclear Project Construction
5) INPO 11-007 Principles for Strong Governance and Oversight of Nuclear Power Organizations
6) N-CHAR-AS-0002, Nuclear Management System
7) N-GUID-00120-10012, Use of Contractor Corrective Action Programs vs OPG CAP
8) N-GUID-01070-10001, Nuclear Oversight Audit Handbook
9) OPG-STD-0148, Project Management Standard
10) N-MAN-00120-10004 Sht OS-PLAN, Project Oversight Planning and Implementation
11) N-PROC-MM-0010, Establishing and Maintaining Ontario Power Generation Approved Suppliers List
12) N-PROC-MM-0041, Quality Engineering and Supplier Performance Management
13) N-PROG-RA-0003, Corrective Action Program
14) N-PROG-RA-0010, Independent Assessment
15) N-PROC-RA-0048, Conducting Audits
16) N-PROC-RA-0097, Self Assessment and Benchmarking
17) NK38-GUID-09701-10032, Program Assurance Group Guide
18) NK38-NR-PLAN-09701-10001 Sheet 0010, Nuclear Projects Oversight Program Management Plan for Darlington Refurbishment
19) OPG-PROG-0004, Enterprise Risk Management

Appendix A: Organizational Accountabilities

Vendor	
Vendor Quality Assurance Program	Vendors follow their own approved Quality Management programs (required to be on the OPG Approved Supplier List). This includes but not limited to processes for the following: • Sub-contractor oversight • Equipment and materials • Drawings • Inspection and Test Plans (ITPs) • Comprehensive Work Packages (CWPs) • History Dockets (HDOCs)
Contractor Executive Steering Committees	Established for each major vendor to address any emerging issues, ensure issues are escalated, ensure ongoing dialogue at all levels, and share oversight findings.
SVP Nuclear Projects	
Project Management (Execution)	Oversees project deliverables and the day-to-day progress of the projects, removing barriers to expedite the work and ensuring that quality requirements are achieved on time and on budget. Project Managers maintain specific metrics for safety, quality, cost and schedule and promptly document and escalate any significant performance shortfalls.
Engineering Oversight	Engineering reviews of Comprehensive Work Packages (CWPs), Inspection & Test Plans (ITPs) before releasing to the field for execution. Adds OPG hold and witness points as required. Provides oversight on vendor engineering activities, including OPG acceptance of Non-Conformance Reports (NCRs). Confirms compliance to RD369 including tracking of Integrated Implementation Plan commitments.
Procurement Oversight	Performs oversight on manufacturing, final inspection and storage of materials, including review of History Dockets (HDOCs).
Field Construction Oversight	Performs oversight on health and safety activities, including Foreign Material Exclusion (FME), Work Protection, Space Allocation and Transient Material (SATM), material movement/housekeeping, and hoisting and rigging.
Quality Management	Through direct detailed assessments and intervention (both project vertical slice and program horizontal slice), conducts reviews on Engineer, Procure, Construction (EPC) documentation to confirm that contractors, sub-contractors, and suppliers are meeting quality and regulatory requirements.
Project Planning & Controls	Ensures cost and schedule compliance and complete and accurate metrics and reports.
Project Assurance & Contract Management	Performs oversight of the vendors' corrective action programs, oversees the DRP management system. Manages, reports, and analyzes all assurance activities across the Darlington Refurbishment Project (DRP). Provides commercial support for contracts used for Darlington Refurbishment

Chief Nuclear Officer	
Nuclear Oversight	Conducts audits, surveillances, and assessments to ensure that the DRP meets the requirements of the Nuclear Management System (N286).
Nuclear Safety Review Board	Provides independent assessment of continued safe operation of the units, and the safe Return to Service (RTS) of the units.
Canadian Nuclear Safety Commission	Performs inspections to ensure licence conditions (N286) are met.
World Association of Nuclear Operators	Provides assistance in risk significant areas (e.g. RTS) to help the team understand the current state of performance to industry standards and helps develop gap closure plans.
Chief Executive Officer/Executive Leadership Team	
Executive Leadership Team Reviews	Reviews the performance of the DRP on a quarterly basis, including: • SVP Nuclear Projects review on safety, quality, schedule and cost (monthly to ELT and DRC) • Chief Financial Officer report on financial controls • Chief Risk Officer report on risks • General Council report on legal and ethics issues • People & Culture report on staffing, training and safety
Refurbishment Construction Review Board	Independent oversight of the project by industry experts with regulatory, mega-project, and nuclear experience. Provides recommendations based on strong industry operating experience (OPEX).
Supplier Audits & Quality Performance	Performs periodic Engineer, Procure, Construct (EPC) implementation audits on all EPC vendors to qualify and maintain vendors on the Approved Supplier List (ASL).
Board of Directors	
Internal Audit	Verifies management has designed and operated processes and controls to meet project and enterprise objectives. Includes strategic risk based audits aligned with top risks and objectives identified by management.
Burns & McDonnell	Independently assesses and evaluates the accuracy and completeness of information provided by the Refurbishment management team to the Board. Evaluates robustness of internal oversight and assurance, and identifies high-level risks to the project that could impact the high confidence schedule and budget.
Shareholder (Ministry of Energy)	
Ministry of Energy's Independent Advisor	Retained individual through Infrastructure Ontario who routinely monitors and reports on progress of the project and has full access to all documents and project meetings. Reports on status, performance and risk, on a confidential basis exclusively to the Ministry of Energy and Infrastructure Ontario.