DARLINGTON NEW NUCLEAR PROGRAM STRUCTURE

1.0 OVERVIEW

This exhibit describes the methods by which OPG will manage the Darlington New Nuclear Program ("DNNP") and delivery of Unit 1 / Common Scope Facilities ("Unit 1"), on behalf of DNNP LP. These methods include the commercial and contracting strategies used and the OPG Management System.

The OPG Management System provides a framework for project execution through established controls. The value of this system has been demonstrated through the effective execution of other major projects, including the Darlington Refurbishment Program ("DRP"). Refer to Attachment 3 for additional information on the OPG Management System.

This exhibit explains how the commercial and contracting structure underpinning the DNNP supports the project's successful execution. It also includes an explanation of the principles and benefits of an Integrated Project Delivery ("IPD") Model and why this model is the best model for the DNNP.

In addition, this exhibit explains how OPG has organized itself to operate in the role of Owner and Licence Holder. It describes the roles of the other main parties to the project, including the structure and governance of the project's Executive Board, Project Leadership Team, and the various Project Management and Functional Teams.

2.0 COMMERCIAL AND CONTRACTING STRATEGIES

The DNNP is a large, complex first-of-a-kind project. To manage the work, OPG developed an overall commercial strategy as well as contracting strategies for specific scopes of work.

The commercial strategy is a commercial framework with guiding principles for establishing and maintaining commercial relationships with third parties to support the DNNP.

Prior to selecting its commercial strategy, OPG reviewed best practices from industry associations and performed benchmarking of other large construction projects. The primary commercial strategy selected by OPG to deliver Unit 1 is an IPD model in which the key parties involved in the design, fabrication and construction of a project are joined together under a single agreement.

The main benefits of an IPD model are:

- integrated people, systems, and processes to enhance team collaboration and optimize project outcomes, reduce waste, improve workflow and maximize value;
- early involvement by all participants such that facilities managers, end users, contractors and suppliers are all involved in the design process;
- processes are outcome-driven, and decisions are made collaboratively by project team members from the various organizations by considering what is “best for project”.
- communications throughout the project are open and transparent; and
- a shared risk and reward structure, appropriately balanced between team members, is used over the life of a project to incent all parties to work towards common project objectives.

This model builds on the successes of the One Team[1] approach that was used by the DRP. It also reflects key learnings from the “Strategic Project Management Lessons Learned and Best Practices for New Nuclear Power Construction” published by the Nuclear Energy Institute.[2] In these reports, the Nuclear Energy Institute concluded that:

> Industry data and our personal experience clearly show that an owner-led integrated project team approach is the best strategic organization practice that has achieved the greatest

[1] The “One Team” approach is based on recognizing that OPG and the Non-Owner Parties have a variety of talent, and that in the interest of the best outcomes for the DNNP, each organization should provide that “best” resource to the team in the position where that person can yield the highest value in terms of DNNP outcomes. The One Team approach was successfully implemented on the Darlington Refurbishment Program as described in EB-2020-0290, Ex. D2-2-3 “Remaining Units Planning” and Ex. D2-2-4 “Contracts”.

[2] The Nuclear Energy Institute (“NEI”) is a trusted resource for member companies, government agencies and officials, and news outlets and publications covering nuclear clean energy. NEI conducts research and provides meaningful insights, enhancing member understanding of the trends that impact their businesses.

degree of success for NNP and other construction first-of-a-kind ("FOAK") projects.[3]

The key parties in the DNNP IPD model are the Owner and Licence Holder (OPG), the technology Designer (GE-Hitachi), the Architect and Engineering Firm (AtkinsRéalis), and the Constructor (AECON Kiewit).

The Owner and Licence Holder is responsible for, among other things, defining the project's requirements, providing access to the site, undertaking all Canadian Nuclear Safety Commission licensing activities (with the assistance of the other parties to the agreement as required), and leading operational commissioning.

The remaining three parties to the agreement (GE-Hitachi, AtkinsRéalis and AECON Kiewit) are responsible for delivering a fully functional facility in accordance with OPG's requirements. Details on the IPD commercial strategy, parties, and their roles and responsibilities are provided in Ex. D2-4-3.

The principles and benefits of this model, as well as a comparison to more traditional design-bid-build ("DBB") or engineering, procurement and construction ("EPC") models, are provided in Section 2.1 below.

2.1 IPD Principles and Benefits

The IPD model is a delivery method that enhances project collaboration and integration between the parties throughout all phases of the project. It employs risk sharing rather than risk transfer. IPD encourages proactive behavior by removing impediments to creativity and collaboration, aligning stakeholders' goals with project objectives, and incentivizing action that adds value to the project.[4]

[3] Nuclear Energy Institute. (2020). "NEI 20-08, Strategic Project Management Lessons Learned & Best Practices for New Nuclear Power Construction", p. 16.
[4] Ashcraft, H. W., "The IPD Framework." White paper (San Francisco, CA: Hanson Bridgett LLP, 2012).

The shift from risk transfer to risk sharing represents a change in project delivery philosophy that is intended to create a high level of trust and to promote open communication among project participants. Figure 1 shows the evolution of project delivery methods and the expected improvements in collaboration, integration, and communication. Figure 2 identifies the components and culture of various delivery models.[5]

Figure 1 - Project Delivery Method Shift from Risk Transfer to Risk Sharing

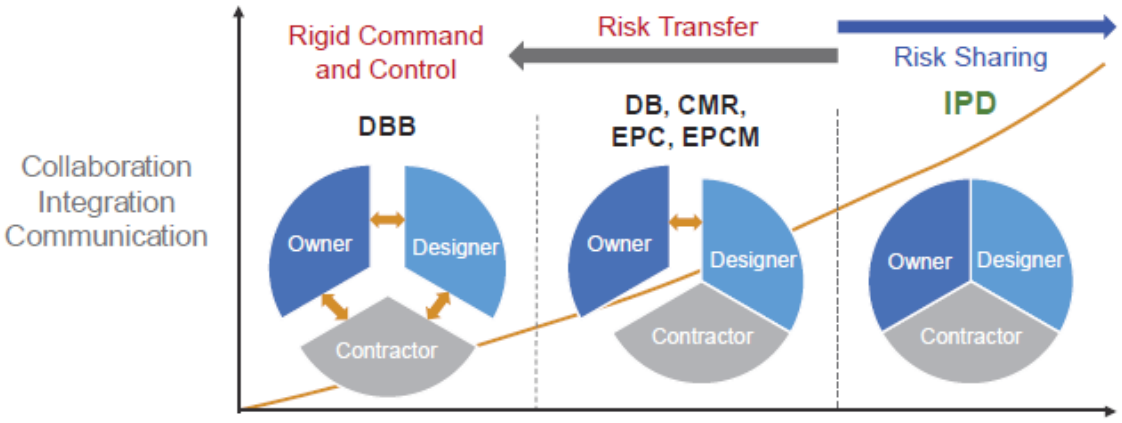
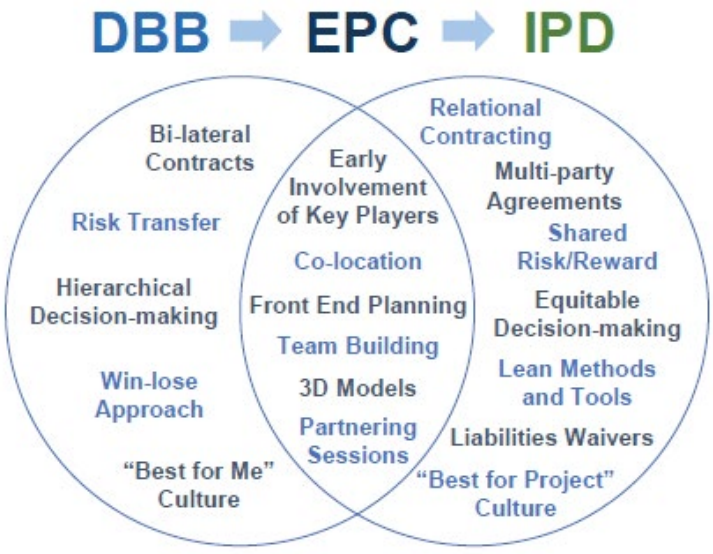


Figure 2 - Components and Culture of Various Project Delivery Methods



[5] Construction Industry Institute Final Report 341 "Integrated Project Delivery for Industrial Projects".

Design-Bid-Build ("DBB") uses bilateral transactional contracts to transfer project risks and create a win-lose or "best for me" culture with a defined decision-making hierarchy.

Engineering, Procurement and Construction ("EPC") adds some elements that increase project collaboration and integration, such as early involvement of key participants, partnering, and front-end planning.

Integrated Project Delivery ("IPD") is a progression to a completely integrated and collaborative project delivery method, shifting from a transactional contract to a relational contract, incorporating shared project risks and rewards and a more collaborative decision-making process, and focusing on what is "best for the project" instead of what is "best for me."

The IPD model is not a replacement of other commercial approaches such as DBB or EPC. Rather, the IPD model represents a commercial strategy option that can be adopted taking into consideration factors including project size, scope, complexity, application of first-of-a-kind technology, regulatory environment, vendor capacity and capability, risk tolerance of owner and vendors, and owner engagement requirements.

For example, the DRP and Pickering Refurbishment Program ("PRP") have implemented a "multi-prime contractor" model in which each program has more than one prime contractor. In this model, the Owner has a separate contract with each prime contractor, and each prime contractor is responsible for completion of the work that is within the scope of its particular contract. The Owner is the integrator among the prime contractors and is responsible for the entire program.

The multi-prime contractor model works well when the project scope definition is more defined, specific and detailed scope can be assigned to a single contractor, and low levels of contractor integration are required. In this model, OPG retains control over the entire refurbishment program, including the deliverables, costs and schedule, and OPG can assign

risks to the parties best able to manage those risks. This strategy allows OPG to agree to a reasonable balance between the transfer of risk to contractors and the costs of the contracted services. Details on the PRP commercial strategy are provided in Ex. D2-3-3 and details on the DRP commercial strategy were provided in EB-2016-0152.[6] In contrast, given the size, complexity and inherent uncertainties associated with the design and construction of a first-of-a-kind nuclear facility, the risk transfer that occurs in a multi-prime model would not be cost-effective for the DNNP.

Instead, OPG selected the collaborative IPD model for Unit 1. The IPD model is a mature commercial strategy that has been successfully applied since the mid 2000s. It has been utilized for many significant infrastructure and industrial projects. The development of the IPD model was partly a response to a lack of productivity growth in the construction industry. Research by the Lean Construction Institute, the American Institute of Architects, California Council, and the Center for Integrated Facility Engineering, Stanford University led to a new model IPD that collaboratively harnesses the talents and insights of all participants to optimize efficiency. Survey results from projects that used IPD showed lower cost and schedule growth over the project and higher owner satisfaction scores.[7]

The American Institute of Architects, National and California Council has identified nine principles necessary for a successful application of an IPD model.[8] These principles have been embedded into the DNNP organization, processes and technology, and are reflected in the commercial arrangements.

- Mutual Respect and Trust – All parties understand the value of collaboration and are committed to work as a team in the best interests of the project.
- Mutual Benefit and Reward – All participants benefit from the IPD. Compensation structures recognize and reward early involvement. Compensation is based on the value

[6] See EB-2016-0152, Ex. D2-2-2 for further information.
[7] IPD: Performance, Expectations, and Future Use, University of Minnesota, September 25, 2015 <https://ipda.ca/site/assets/files/1144/20150925-ipda-ipd-survey-report.pdf>.
[8] Integrated Project Delivery: A Guide, The American Institute of Architects, 2007 <https://assets.aiacontracts.com/ctrzdweb02/zdpdfs/ipd_guide.pdf>.

added by an organization and it rewards “what’s best for project” behavior, such as providing incentives tied to achieving project goals.

- Collaborative Innovation and Decision Making – Ideas are freely exchanged among all participants. Key decisions are evaluated by the project team and, to the greatest practical extent, made unanimously.
- Early Involvement of Key Participants – Key participants are involved from the earliest practical movement. Decision making is improved by the influx of knowledge and expertise of all key participants.
- Early Goal Definition – Project goals are developed early, agreed upon and respected by all participants. Project outcomes are held at the center within a framework of individual participant objectives and values.
- Intensified Planning – The IPD approach recognizes that increased effort in planning results in increased efficiency and savings during execution.
- Open Communication – IPD’s focus on team performance is based on open, direct, and honest communication among all participants. Responsibilities are clearly defined in a no-blame culture leading to identification and resolution of problems. Disputes are recognized as they occur and promptly resolved.
- Appropriate Technology – Technologies are specified early to maximize functionality, generality and interoperability. Open and interoperable data exchanges based on disciplined and transparent data structures are essential to support IPD.
- Organization and Leadership – The project team members are committed to the project’s goals and values. Leadership is taken by the team member most capable of doing the specific work or services with support from the entire team. This is referred to as the ‘best athlete’ approach. Roles are clearly defined, and the environment supports open communication and appropriate risk taking.

In a project with the size, complexity and first-of-a-kind nature of the DNNP, it is critical that the responsibilities and accountabilities for project risks and execution be clear. It is also critical that incentives be put in place to promote the best outcomes for the project, with a focus on cost management, schedule adherence and generation performance. Adoption of an IPD model provides a commercial framework that promotes these best outcomes while

recognizing the uncertainty associated with first-of-a-kind projects and the shared management of risks.

OPG's use of the IPD model was reviewed by Howard W. Ashcraft, a construction lawyer with extensive experience in major infrastructure projects and an IPD expert. Mr. Ashcraft concluded that IPD was the best choice for the DNNP and further stated:

> The Darlington SMR is a First-of-a-kind (FOAK) project. I believe IPD is well suited to meet the challenges of nuclear generation FOAK projects, even challenges that are unknown at the time of contracting. IPD's flexibility allows it to adjust while adhering to the initial project principles and goals. In addition, the jointly shared risk/reward (profit) pool buffers overruns and is an incentive to meet the agreed goals. Joint validation and project management increases commitment to project success and transparency. Moreover, limiting change orders and claims among the parties, in combination with a risk/reward pool that is allocated based on project rather than individual success, compels the parties to solve problems because it is the most financially fruitful path for all parties. In comparison with traditional project delivery, IPD is a good solution to achieving higher performance, lower risk, and balanced accountability in a FOAK nuclear generation project.
>
> OPG has properly adapted IPD principles to a nuclear generation project, with due consideration of nuclear safety and regulatory constraints and the compromises necessary to make a major project feasible. The IPD contract that has been prepared provides an excellence foundation for organizing and successfully executing the project.[9]

Mr. Ashcraft's opinion on OPG's use of the IPD model is provided as Attachment 1 to this exhibit. In September 2025, Mr. Ashcraft further reviewed OPG's implementation of the IPD model to date, including the execution of a validation agreement as between the IPD partners. This opinion is attached as Attachment 2 to this exhibit.

[9] Ashcraft, H. W., "Use of IPD for the Darlington Small Nuclear Reactor" (Seventh Star LLC, April 2023), p. 2.

Key elements of the IPD contractual model and details on how OPG will use this model to enable successfully delivery of the DNNP are provided in Ex. D2-4-3.

3.0 ORGANIZATION STRUCTURE AND OPG AS OWNER AND LICENCE HOLDER

The organization structure and OPG's role as Owner and Licence Holder reflects the commercial strategy and IPD model adopted for Unit 1. OPG retains overall responsibility for deliverables, costs and schedule and continues to serve as the design authority for the DNNP. OPG will always remain the License Holder of this site in accordance with Canadian Nuclear Safety Commission regulations and license requirements and has established an organization structure to optimize oversight and project management of all contract partners for the DNNP licensed activities.

To effectively perform the various aspects of this role, OPG has established an organization structure that is aligned with its commercial model, which allows for increased integration and collaboration between the IPD partners. Owner oversight is maintained separately from the integrated teams to ensure independence and ultimate accountability as the licensee. Details on oversight and project assurance are provided in Ex. D2-4-9.

OPG will retain overall accountability for the licensed activities conducted during the Licence to Construct phase. GE-Hitachi is the Design Authority[10] for the power block (nuclear and conventional systems in the powerhouse), the intake structure, and switchyard systems and structures. OPG is the Design Authority for site establishment, temporary works, and interfaces with existing OPG structures, systems, and components. GE-Hitachi will maintain Design Authority through the design, construction, inspection and testing, and fuel-out commissioning phases. Design Authority for the entire facility will transfer to OPG prior to fuel load, at the same time as Operational Authority.

[10] The Design Authority is responsible for: the management of design; defining/controlling the design basis, authorizing design changes; maintaining configuration control; ensuring work is performed by qualified and competent people; and ensuring that the requisite knowledge is maintained

Staffing and resourcing needs will vary over the lifecycle of the project to reflect the scope and key deliverables of the project phases. The project scope is comprised of eight Major Work Bundles:

- Owner Program and IPD Project Management Office
- Site Preparation
- Design Engineering
- Nuclear Island
- Conventional Island
- Balance of Plant
- Digital Strategy
- Commissioning and Start-up

With the Site Preparation scope essentially complete, the Design Engineering, Nuclear Island, Conventional Island and Balance of Plant Major Work Bundles contain most of the remaining design and construction scope, which is the focus of the Unit 1 Execution Phase. These four Major Work Bundles are also referred to as “Execution Bundles”. The scope and description of each Major Work Bundle is provided in Ex. D2-4-5 and the project phases are described in Ex. D2-4-4.

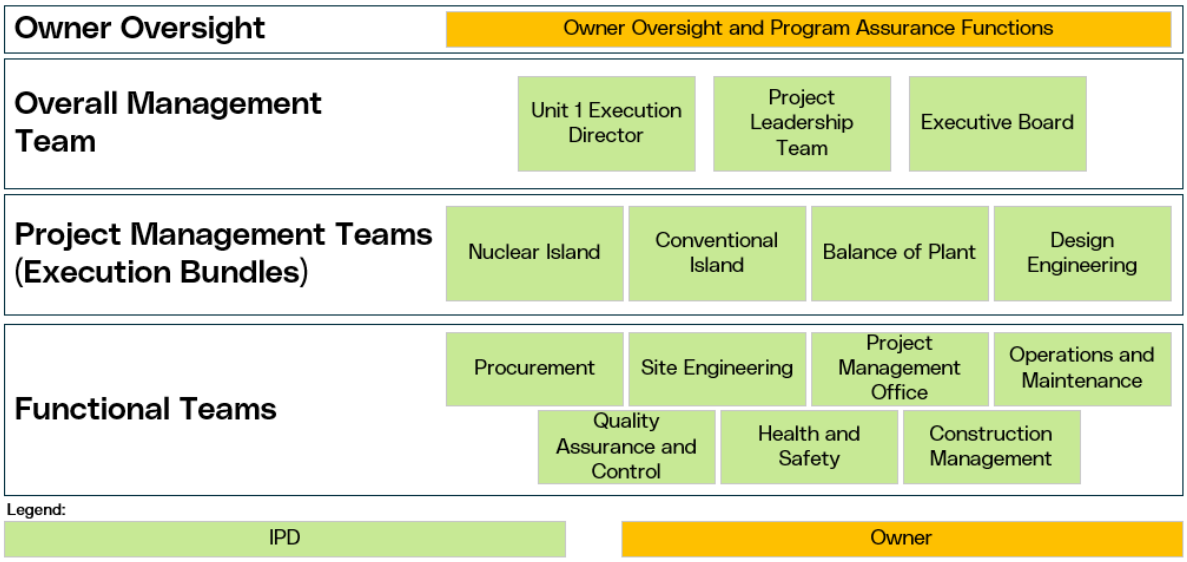
The Execution Phase organization for Unit 1 is designed around the delivery of the Execution Bundles. The organization structure consists of four primary aspects.

- The **Overall Management Team** which has a tiered governance model enabling decisions to be made as close to the workface as possible, with escalation of larger, more strategic decisions for senior level decision making.
- Dedicated **Project Management Teams** (“PMT”) that are responsible for the management, oversight and delivery of the Execution Bundle scope.
- **Functional Teams** that are dedicated to performing specific types of work associated with their functional area, provide program management within that area, and provide support across the Execution Bundles.
- **Owner Oversight** outside of the IPD team.

Most roles within the PMT and Functional Teams are staffed using a "best athlete" approach, where the incumbent to the position may come from any of the four partner companies, avoiding duplication of roles and cost. There are key roles within the PMT and Functional Teams that must be staffed by OPG, as the Owner. Additionally, there are key roles within the PMT and Functional Teams which require the Project Leadership Team ("PLT", described below) to approve the proposed incumbent. A description of these roles is provided in the Darlington New Nuclear Project – Program Management Plan which is included in Attachment 3.

A diagram of how the organization is structured, including the Overall Management Team, dedicated PMTs, the Functional Teams, and Owner Oversight is provided in Figure 3 below.

Figure 3 – DNNP Unit 1 Organizational Structure



The organizational structure for DNNP Unit 1, as well as the roles and responsibilities detailed within the IPD commercial terms, address delivery of the full Unit 1 scope described in Ex. D2-4-5.

3.1 Owner Oversight

In addition to Functional Teams within the IPD, OPG retains its own oversight function to support the project. This oversight function includes support and program assurance from external organizations such as independent oversight bodies and internal oversight provided by functional groups such as Planning and Controls function, Finance, Human Resources, Nuclear Regulatory Affairs and Indigenous Relations. This oversight function is described in further detail in Ex. D2-4-9.

3.2 Overall Management Team

The Overall Management Team structure reflects the collaborative principles of an IPD model and adopts a tiered approach to governance and decision-making. The Overall Management Team consists of the following three levels:

- **Executive Board** – Comprised of four executive members from each of the four IPD parties. The Executive Board is responsible for strategic oversight of the DNNP and will provide executive-level Integrated Project Agreement ("IPA")[11] collaborative guidance for the DNNP to achieve its objectives. Executive Board decisions are made by a majority of the parties, however OPG may override decisions if it does not agree. In addition, since it (and subsequently DNNP LP) carries the most risk, OPG can overrule an Executive Board decision on certain issues set out in the IPA. Additional detail on the Executive Board and OPG's rights can be found in Ex. D2-4-3, Section 4.2.
- **Project Leadership Team** – Comprised of dedicated strategic level leadership with representation from the four parties. The PLT is responsible for providing project oversight, strategic project decisions, staffing, dispute resolution and overall accountability for the DNNP IPD model. The PLT provides management-level collaborative guidance to the parties and to the PMTs for the DNNP to achieve its objectives. The PLT is accountable for monitoring project progress and for developing benchmarks, metrics, and standards for progress evaluation. The PLT has authority to approve changes within their prescribed level of authority and decisions must be

[11] Details on the IPA provided in Ex. D2-4-3.

unanimous. If the PLT cannot reach a unanimous decision, the unresolved issue is escalated to the Executive Board.

- **Unit 1 Execution Director** – Provides overall accountability for the construction of Unit 1, including its delivery within the established cost and schedule. The Execution Director leads the Nuclear Island, Conventional Island, and Balance of Plant Execution Bundles and the Construction Management and Health and Safety Functions. They have authority to set priorities across all work bundles. The Execution Director reports to the PLT.

Details on the change control process and integration of these roles within the broader oversight model for the program is described in Ex. D2-4-9. Details on the IPD commercial agreement are provided in Ex. D2-4-3.

3.3 Project Management Teams

Dedicated PMTs have been established for each of the four Execution Bundles: Design Engineering, Nuclear Island, Conventional Island and Balance of Plant.

Each PMT has a Lead. The PMT Lead reports into the Unit 1 Execution Director (or responsible PLT Lead for the Design Engineering Work Bundle) and is responsible for ensuring the effective planning and successful execution of their major work bundle, and for ensuring that their team (consisting of OPG and IPD partner members) deliver the work safely, to the quality specified, on time and on budget. A PMT Lead is supported by a dedicated PMT, as well as by Functional Teams. The Execution Bundles are:

- Design Engineering Bundle – PMT Lead is responsible for the engineering design of the project from conceptual through detailed site-specific design.
- Nuclear Island Execution Bundle – PMT Lead is responsible for the planning and execution of procurement and installation activities associated with the Reactor Building, Control Building, and Radwaste Building.
- Conventional Island Execution Bundle – PMT Lead is responsible for the planning and execution of procurement and installation activities associated with the Turbine Generator, Turbine Building, Annex Building, and Conventional Island systems.

- Balance of Plant Execution Bundle – PMT Lead is responsible for planning and execution of the procurement and construction activities for the remainder of the facilities outside of the Power Block,[12] as well as the overall site preparation and site management during construction.

Details on the Unit 1 scope consisting of the eight Major Work Bundles, including the four Execution Bundles, is provided in Ex. D2-4-5. As explained in Ex. D2-4-8, the costs associated with this project management role form part of the cost for each of the Major Work Bundles.

3.4 Functional Teams

The Functional Teams are dedicated to performing specific types of support for the Execution Bundles and the DNNP as a whole. Functional Teams set standards, manage the DNNP at the overall level and provide support in specific areas (such as quality, procurement, construction and digital strategy). The Functional Teams are responsible for providing the required support, coordination, integration and oversight of the work that is performed by the PMTs. Each of the Functional Teams is described below.

As explained in Ex. D2-4-8, the costs associated with each Functional Team form part of the cost for each of the Major Work Bundles.

3.4.1 Procurement Function

The Procurement Function is responsible for developing and leading the overall procurement strategy for all major work bundles, ensuring alignment with cost, schedule, quality, and regulatory requirements. This includes overseeing bundle-level procurement teams, standardizing procurement processes, promoting local and Indigenous sourcing, and managing supplier relationships. The function also ensures just-in-time delivery of critical materials, enforces supplier performance standards, coordinates with other project functions, and maintains a strong procurement team to support the project's long-term success.

[12] Power Block refers to the nuclear and conventional systems in the powerhouse.

3.4.2 Site Engineering Office Function

The Site Engineering Office acts as the point of contact for the Design Authority at the site, ensuring all work aligns with design and regulatory requirements. It leads the resolution of technical and design issues during construction, oversees site engineering staff across all disciplines, manages design changes, supports construction and operations teams to uphold design intent, and maintains document control as well as engineering team readiness. The office also plays a role in risk management related to engineering activities.

3.4.3 Project Management Office Function

The Project Management Office ("PMO") leads the governance, integration, and coordination of project execution support functions to enable schedule adherence, cost control, risk management, and effective decision-making. The team ensures that project management processes, tools, and reporting standards are established, implemented, and maintained across all PMT and Functional Teams to support predictable project outcomes. This includes managing the digital platforms for the project, specifically the common data environment shared between the parties. The PMO oversees development and continuous improvement of project performance management systems, including schedule and cost dashboards, earned value metrics, and executive-level reporting, and facilitates cross-functional alignment across engineering, procurement, construction, commissioning, and oversight stakeholders to ensure project-wide integration and issue resolution. The PMO is responsible for managing the risk management and change control processes.

3.4.4 Operations and Maintenance Function

The Operations and Maintenance team provides leadership and oversight of all operational functions required to support the transition from construction to commissioning, startup and ultimately plant operations. The team oversees the integration of operations and maintenance requirements into design, construction and commissioning to ensure readiness for operational turnover, and is a key advisor to the Unit 1 OPG PLT member on operational impacts, strategic planning and transition-to-operations decisions. The scope of activities funded within the DNNP include design and construction reviews to determine and influence the impact to operations; commissioning and startup activities including associated

consumable materials; security costs once site is turned over to DNNP LP; and tools and equipment required for commissioning and commercial operations (fFr example, radiation protection equipment, chemistry laboratory equipment, maintenance tools, and fueling equipment). The scope of activities excluded from the DNNP include training of future operational staff; development of processes, procedures and staff plans for long-term operations of the facility; work management and plant maintenance planning; and development and implementation of the Management System for the facility operations. Details on such operational readiness scope funded through OM&A costs outside of the DNNP is provided in Ex. F2-2-1.

3.4.5 Quality Assurance and Control Function

The Quality Assurance and Control team is responsible for ensuring an aligned approach to DNNP quality assurance in coordination with the IPD partner quality teams and programs. The team develops strategic plans for source surveillance activities for procurements and oversees process improvement programs and initiatives including the Adverse Condition or Event Reporting and Corrective Action Program, Non-Conformance Reporting, human performance programs, and benchmarking.

3.4.6 Health and Safety Function

The Health and Safety team is responsible to lead the development, implementation and continuous improvement of the project's Health, Safety and Environmental programs, aligned with regulatory requirements, project objectives and industry best practices. This includes the establishment and enforcement of a comprehensive risk management framework, including identification, mitigation and monitoring of health, safety and environmental risks across all project phases.

3.4.7 Construction Management Function

The Construction Management team is responsible for managing and executing the assigned scope as per the plan developed by the Execution Bundles, applying construction best practices to deliver the construction works per safety, quality, cost and schedule objectives. The team actively supports the Execution Bundles in planning the construction

works, ensuring readiness, and providing construction insight into the constructability and documentation reviews. The team manages site-wide logistics including space planning, warehousing and material management on site, and equipment fleet strategies. The team is also responsible to ensure that the project is staffed with trained, competent and qualified trades resources, including trades leadership, to meet project execution needs. The Construction Management Function is further described in Ex. D2-4-9.

LIST OF ATTACHMENTS

Attachment 1:	Opinion of Howard Ashcraft on DNNP's use of IPD Contracting Model (April 19, 2023)
Attachment 2:	Opinion of Howard Ashcraft on DNNP's Implementation of IPD Contracting Model and Validation Amendment to the IPA (September 26, 2025)
Attachment 3:	DNNP Program Management Plan (NK054-PLAN-01210-00008) and DNNP Project Charter

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April 19, 2023

VIA EMAIL ONLY

Ms. Krista Hill
Torys LLP
TD South Tower, 30th Fl.
79 Wellington St. West
Toronto, Ontario M5K 1N2

Re: Use of IPD for the Darlington Small Nuclear Reactor

Dear Ms. Hill,

This letter summarizes my opinions regarding the use of Integrated Project Delivery (IPD) for the Darlington Small Modular Nuclear Reactor project (Darlington SMR).

1. Scope and Services Performed

1.1 Background

I have been engaged by Torys LLP on behalf of Ontario Power Generation Inc. as an IPD expert to provide consultation regarding applying IPD to the Darlington SMR project. I am one of the individuals who developed Integrated Project Delivery in the mid-2000s and have led the structuring over 150 pure IPD projects. A number of these projects are in Canada and include several for Canadian Nuclear Laboratories. A complete CV is in an Appendix to this letter.

1.2 Consultation

I have provided advice and consultation regarding IPD principles and their application to the Darlington SMR project. This has included IPD workshops, discrete meetings, and document review with respect to IPD principles. Attendees at the workshops included representatives of OPG and its IPD contracting parties, GE-Hitachi Nuclear Energy Americas LLC and GEH SMR Technologies Canada, Ltd., Candu Energy Inc., and AECON Construction Group Inc. (the Non-Owner Parties).

2. Summary Opinion

There are a variety of considerations that affect the choice of project delivery systems. In choosing a project delivery system, I assess the goals, opportunities and constraints affecting the sponsors, participants, and lenders and then structure the key structural and business elements to achieve the agreed goals. This analysis does not always result in recommending IPD, as each determination is project specific, but where projects are large, complex, faced with significant cost and schedule

challenges, and the team can execute a collaborative project, IPD is often the preferred solution. In my opinion, it is the best choice for this project.

The Darlington SMR is a First-of-a-kind (FOAK) project.[1] I believe IPD is well suited to meet the challenges of nuclear generation FOAK projects, even challenges that are unknown at the time of contracting. IPD's flexibility allows it to adjust while adhering to the initial project principles and goals. In addition, the jointly shared risk/reward (profit) pool buffers overruns and is an incentive to meet the agreed goals. Joint validation and project management increases commitment to project success and transparency. Moreover, limiting change orders and claims among the parties, in combination with a risk/reward pool that is allocated based on project rather than individual success, compels the parties to solve problems because it is the most financially fruitful path for all parties. In comparison with traditional project delivery, IPD is a good solution to achieving higher performance, lower risk, and balanced accountability in a FOAK nuclear generation project.

OPG has properly adapted IPD principles to a nuclear generation project, with due consideration of nuclear safety and regulatory constraints and the compromises necessary to make a major project feasible. The IPD contract that has been prepared provides an excellent foundation for organizing and successfully executing the project.

3. Discussion

3.1 Integrated Project Delivery as a Solution for Challenging Complex Projects.

Traditional project delivery, which relies on contractually shifting risk to vendors, is not always successful. In view of the potential risks in traditional project delivery, project sponsors should consider alternative models for reliably delivering their megaprojects.

> *To move toward best practices, appropriate alternative contracting models such as integrated project delivery (IPD) help build long-term collaborative relationships. Relational contracts will need to become more prevalent than transactional contracts.(McKinsey 2017)*

IPD is part of an overall trend to collaboration in major international projects. The World Economic Forum promulgated a series of recommendations that are nearly identical to the optimal IPD formulation developed by the American Institute of Architects, California Council (AIACC 2014, World Economic Forum 2016). In Finland, IPD is used to deliver major project infrastructure. (Saarinen 2021) Germany has recently issued governmental reports and sample contract information, for using IPD in public and private projects under EU regulations. (Breyer, Boldt et al. 2020, Boldt and Rodde 2022) In the US, the Construction Industry Institute has undertaken a research project to focus on IPD in the industrial sectors (CII 2019). In the UK, the Institution of Civil Engineers has issued the NEC4 Alliance Contract providing a sample agreement that differs somewhat from IPD but is part of the same collaborative trend. And FIDIC, one of the most conservative sources of infrastructure contracts, has instituted Task Group 17 to develop a

[1] I am aware of two other projects currently contemplating IPD for modular nuclear reactor projects and have heard that the traditional Hinkley Point C project in the United Kingdom has been modified to include IPD principles and processes.

collaborative contract. (FIDIC 2021) The upshot is that international experts are turning to collaboration to achieve better and more reliable outcomes.

Canada is also adopting Integrated Project Delivery. Many of the Canadian projects are smaller, private projects but there are also significant infrastructure and industrial projects that are completed or underway. An informal survey disclosed the following:

Name	**Status**	**Owner**
Kingston Third Crossing Bridge	Complete	City of Kingston
Lloydminster Wastewater Treatment Plant	Complete	City of Lloydminster
Drayton Valley Raw Water Pump Station	Complete	Town of Drayton Valley
Barrie Wastewater Treatment Plant Upgrades	In progress	City of Barrie
South Kamloops Water/Wastewater Upgrades	In progress	City of Kamloops
OKIB IPD (Okanagan Indian Band water infrastructure project)	In progress	OKIB
NOWRP (North Okanagan water recovery project)	In progress	Spallumcheen Township
St Albert IPD (water infrastructure)	In progress	City of St Albert
Malahat IPD (water infrastructure project)	In progress	Corix (on behalf of Malahat First Nation)
Cultus Lake IPD (water infrastructure project)	In progress	Town of Chilliwack
Taza Wastewater Treatment Facility	Awarded, not started	Corix (on behalf of Tsuut'ina Nation
Kelowna Community Center (includes infrastructure upgrades)	Early Development	City of Kelowna
Vitalus Nutrition Processing Facility	Design	Vitalus Nutrition
Regional District of Nanaimo	Early Development	Regional District of Nanaimo
Advanced Nuclear Materials Research Centre	In progress	Canadian Nuclear Laboratories
CNL Support Facilities (Chalk River)	Partially complete	Canadian Nuclear Laboratories

There is significant interest and capability in delivering major Canadian projects using an IPD approach, including projects on nuclear sites.

3.1.1 Integrated Project Delivery Briefly Described

(a) Key Elements

A hallmark of IPD is its use of a multi-party contract to tie individual success to overall project outcome. IPD allows parties to define success to meet their specific goals and can include specific performance variables, but always includes consideration of cost and schedule.

The non-owner parties (NOPs) profit is directly tied to the project achieving the agreed goals. In this instance, the NOPs are placing their profit and part of their overhead at risk. This layer is a buffer that protects the sponsor from project overruns. If the project is very successful, a portion of the savings is shared with the NOPs. This provides security and incentive.

Parties have limited ability to assert claims against each other and because their outcomes are tied together must collaborate or suffer reduction in their individual profits. Moreover, the IPD contract typically includes key participants in the supply chain to enhance efficiency, increase project focus, and reduce risk. In the Darlington SMR, there are three key Non-Owner Parties (NOPs), but they cover broad work scopes. For example, the constructor, AECON, is executing key trade work that would often be subcontracted. Thus, almost all of this project is brought under the IPD umbrella.

The IPD formula is more than a contract. In 2014 the AIA California Council set forth the key characteristics of an IPD project combining structural elements (Business Model and Contract Structure) and Behavioral Elements. (AIACC 2014) These elements work synergistically: the contract enables, the business model incentivizes, and the enabling behaviors implement the collaborative working environment. The contract removes impediments to collaboration and creates the opportunity for higher performance and reliability. This holistic approach is the framework of modern IPD projects.[2]

(b) Applicability of IPD to FOAK Nuclear Generation

FOAK projects often encounter issues, discover opportunities, or respond to changes in technology that require modifications of the project. In comparison with other project delivery methods, IPD is highly adaptive. IPD, by aligning the full project team to overall project success, adapts to change instead of retreating into individual defensive positions. Researchers have noted that IPD is a resilient project delivery approach. (Cheng, Allison et al. 2016). The best-for-project decision process used in IPD encourages positive evaluation of alternatives. In addition, because the Owner agrees to pay the NOPs' direct costs in most circumstances, parties need not battle to prove that increased costs resulting from change should be imposed on other parties, thus avoiding corrosive, and wasteful, conflict in mid-project. And because of financial transparency, a change event does not become an opportunity to enhance profits.

The same attributes that function well if changes occur are also present in the initial negotiations. IPD seeks to have reasonable allocations of risk that are visible to all parties. This creates an opportunity to avoid pricing based on excessive contingencies—which can be hidden if projects are not jointly validated and financially transparent.

Given its transparent joint project management structure, the IPD process uncovers problems promptly and allows the parties to resolve them collaboratively and expediently before they become intractable. The early involvement of key members of the supply chain integrates their knowledge into the project design and logistic planning often avoiding problems or detecting them at an early stage when they cost less to resolve.

In addition, IPD projects tend to build a cohesive project culture with decisions and responsibilities shared horizontally amongst the parties. Information is diffused amongst project team members who are used to evaluating and making decisions together. This lessens a major risk on megaprojects, loss of information and control as key personnel retire or transfer to other projects. Because IPD does not rely on hierarchical command-and-control, the loss of a leader is

[2] In 2016, the World Economic Forum issued a report, *Shaping the Future of Construction* that contained recommendations that are virtually identical to the AIACC elements, (WEF 2016) Figure 11, p. 28).

less impactful, information does not leave with the leader, and the replacement will be supported by the collaborative team because it is in their best interest—and consistent with the IPD culture—to do so.

In my opinion, these attributes of IPD provide the sponsor, and the IPD team, with the framework and tools to undertake FOAK projects.

3.1.2 Summary of research regarding IPD outcomes

I recently summarized the published studies regarding the effectiveness of IPD relative to other project delivery methods and commented on the strengths and limitations of different analytical approaches. (Ashcraft 2022) Case histories and subjective surveys strongly support using IPD and are consistent with studies showing a positive correlation between team integration and cohesiveness (hallmarks of IPD) and project success. In quantitative studies, IPD outperformed "other" project delivery methods. IPD also does well in pair-wise comparisons, for example IPD v. Design/Build, although these are difficult to analyze statistically because of the great variability between projects in relatively small data sets, and the great variability in project structure within a general grouping, such as Design/Build. Even with these limitations, IPD favors well exceeding other project delivery methods on most parameters, although not always to a 95% confidence interval.[3] As noted previously, the choice of project delivery system should be based on the specific characteristics of a project and the project team, but the existing research does support IPD as a high-performance project delivery system.

Project performance is sensitive to many factors. Team composition, chemistry, leadership, production system optimization, collaboration and colocation, and similar issues also affect project success. IPD provides a commercial and legal structure that encourages better behavior and supports many of the elements that lead to positive outcomes and thereby increases the likelihood of success. Nonetheless, it—and all project delivery systems—is sensitive to project execution factors.

Very truly yours,

Howard W. Ashcraft[4]

[3] The 95% confidence interval (p=.05 null hypothesis) is a standard in academic research. It is difficult to achieve when data is "noisy" as it is in comparing projects and outcomes, especially if the data sets are small.

[4] Member, National Academy of Construction
Fellow, American Bar Foundation
Fellow, American College of Construction Lawyers
Hon. Fellow, Canadian College of Construction Lawyers
Associate Fellow, Saïd Business School, Oxford University

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Ms. Krista Hill
Torys LLP

Howard Ashcraft

Education

Stanford University, AB Human Biology 1974

University of California Berkeley Law, JD, 1979

Professional Work Experience

2021-Present, Seventh Star LLC, Owner

Provide consulting services regarding the structure and organization of infrastructure projects that use collaborative project delivery systems.

1993-Present, Hanson Bridgett LLP, Partner.

Specialist lawyer practicing in construction, environmental, and related supporting fields. I have been the lead trial attorney on major complex construction disputes. I have also developed the principles, contracts, and standards for using Integrated Project Delivery, a collaborative, lean and technology intensive project delivery. System that we have applied on over 160 pure IPD projects. In addition, I have served on the Management Committee, and as Section Leader for the Litigation and Construction Sections.

1979-1993, Severson & Werson, Shareholder.

Specialist lawyer practicing in construction, environmental, and related supporting fields. My primary competencies at S&W included trial of complex construction disputes, use of technology in the analysis and presentation of construction claims and management of electronic evidence.

Admitted to Practice

- United States Supreme Court
- California – All Courts
- Nevada—All Courts
- District of Columbia—All Courts

Academic Work Experience

2015—Present, Stanford University, Adjunct Professor, Civil and Environmental Engineering.

Responsibilities include teaching CEE102A*, Legal and Ethical Principles in Design, Construction and Project Delivery*, counseling graduate students regarding theses and research, and participating in the Center for Integrated Facility Engineering.

2019—Present, Saïd Business School, Oxford University, Associate Fellow, Module 5 Leader, MSc Major Programme Management

Responsibilities include designing module curriculum, coordinating with SBS staff, choosing, and reviewing lecturers, delivering lectures, preparing module assignment, marking assignment, counseling student and theses advisees.

Academic Lectures.

In addition to teaching at Stanford and Oxford, lecturing at University of Copenhagen, Yale University School of Architecture, Georgia Tech, Stanford University, University of California, Berkeley, University of North Carolina School of Architecture, and a Joint Harvard Business School/Massachusetts Institute of Technology project management program.

Fellowships and Honorary Memberships

Life Fellow, American Bar Foundation

The American Bar Foundation was founded by the American Bar Association in 1952 as an independent honorary and research organization. The Fellows comprise a global honorary society of attorneys, judges, law faculty, and legal scholars whose public and private careers have demonstrated outstanding dedication to the highest principles of the legal profession and to the welfare of their communities. Membership in the Fellows is limited to one percent of lawyers licensed to practice in each jurisdiction. Fellows are recommended by their peers and elected by the Board of the American Bar Foundation.

Member, National Academy of Construction

The NAC is a national organization honoring engineers, constructors and affiliated professionals that have demonstrated exceptional leadership and services to the construction industry. Membership is limited, with members chosen by nomination and election.

Associate Fellow, Saïd Business School, Oxford University.

Manage and teach Module 5, Commercial Leadership, in the MSc in Major Programme Management.

Fellow, American College of Construction Lawyers

The ACCL is the highest-level US legal organization focused on construction law. Membership is limited, with members chosen by nomination and election.

Honorary Fellow, Canadian College of Construction Lawyers.

The CCCL is similar to the ACCL in goals and structure but focused on Canadian practice. Non-Canadians elected to membership are elected as Honorary Fellows.

Honorary Member AIA California Council.

The AIACC is the largest component within the American Institute of Architects. Individuals who have demonstrated intellectual and professional leadership that benefits architecture may be appointed as honorary members for their contributions upon approval of the Board.

Rankings and Awards

- Chambers and Partners, Band 1
- International Bar Association, International Construction
- Best Lawyers Recommended Attorney
- *Thought Leader*, Who's Who Legal (2023)
- *Pioneer Award,* Lean Construction Institute (2022)
- *Best Lawyers®* Construction Law/Litigation (2023)

- *Best Lawyers in America*,® Lawyer of the Year, Construction Law–Litigation, San Francisco (2013, 2023)
- *Best Lawyers in America*,® Lawyer of the Year, Construction Law, San Francisco (2023)
- Best Lawyers in Northern California - Construction Law, *Best Lawyers*® (2019-2020)
- Recommended Lawyer, The Legal 500 (2019)
- *Best Lawyers in America* (2006-2022)
- Northern California Super Lawyers, Construction Litigation (2004-2023)
- *The Legal 500*, Recommended Construction Attorney (2015-2023)
- Commendation for assistance in developing IPD: An Updated Working Definition and service on the AIACC IPD Taskforce, AIA California Council (2014)
- Special Achievement Award, American Institute of Architects, San Francisco Chapter (2008)
- President's Award, American Institute of Architects, California Counsel (2007)
- Top 10 Northern California Super Lawyers, *San Francisco Magazine* (2004)
- *Who's Who Legal: Construction*
- Martindale-Hubbell AV Rating

Board and Committee Memberships

Founding Board Member, Center for Innovation in the Design and Construction Industry.

Governing Committee Member (former), American Bar Association Forum on the Construction Industry.

Construction Documents Committee Chair (former) American Bar Association Forum on the Construction Industry.

National Building Information Modeling Standard, Versions 1 & 2, Subcommittee Chair.

AIA California Council, Integrated Project Delivery Taskforce.

Publications

Books

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September 26, 2025

VIA EMAIL ONLY

Ms. Krista Hill
Torys LLP
TD South Tower, 30th Fl.
79 Wellington St. West
Toronto, Ontario M5K 1N2

Re: Validation Amendment to the Darlington SMR IPD Agreement.

Dear Ms. Hill:

Overview

Torys LLP has engaged me on behalf of Ontario Power Generation Inc. to consult on the implementation of Integrated Project Delivery (IPD)[1] for the Darlington SMR project. This included advice regarding the concepts expressed in the SMR IPD agreement important in an IPD project. I provided a prior letter outlining my opinion that IPD is an appropriate project delivery system for the Darlington SMR project (the Project).

IPD agreements are not static. The IPD team is expected to analyze, with the owner's full participation, the critical elements of the project to develop a strategy for meeting the owner's requirements. This process, known as Validation, provides additional detail unavailable at contract signing and documents, again with full owner participation, the scope, schedule, and target outturn cost. The Validation details are documented in a Validation Report and incorporated into the IPD agreement with a Validation Amendment.

IPD Agreements also plan for changes in the IPD Parties. New parties may be added to the existing Integrated Project Agreement, or existing parties may be removed when it is in the best interests of the Project. In this case, the "Constructor" in the IPD agreement has been augmented by adding Kiewit Nuclear Partners to AECON Construction Group Inc. in a general partnership. The general partnership is now the overall "Constructor" and each general partner is individually referred to as a "Constructor Partner". This change is entirely consistent with the development of an IPD project. Because these terms are used throughout the IPA, there are a multitude of changes to reference the parties correctly; however, the underlying structure remains unchanged.

[1] Integrated Project Delivery (IPD) is the project delivery methodology being used for this project. Integrated Project Agreement (IPA) is title of the IPD agreement. In this memorandum, I will refer to IPD when describing general principles and practices and IPA where I am referring to the contract that was signed by the parties to implement an IPD approach.

The Project has recently achieved a CNSC License to Construct, completed the Validation phase, and has prepared a Validation Amendment. I have been asked to review the Validation Amendment to determine if it remains consistent with IPD principles. In my opinion, it is and reflects the normal development of an IPD agreement during the Validation phase. Note, also, that the Validation Amendment is a jointly developed document and thus has been agreed by all IPD parties.

Work Performed

I was provided with the Validation Amendment and its myriad exhibits and schedules. I was also provided with a redline prepared by Torys to highlight where the Amendment affected or developed provisions in the existing IPD agreement. During that review, I noted areas where I wanted to confirm that my interpretation of the provisions was consistent with the drafter's intent and requested clarification from Torys. In all cases, our interpretations were consistent. I also asked for additional information to provide context for the provisions in the Validation Amendment.

I did not analyze whether the Target Outturn Cost (TOC) or other financial parameters are correct, as this is outside my remit.

There were a few changes that do not diverge from IPD principles but are worth noting.

The IPA in §6.10(b) required "full completion of the design." This requirement is waived in the Validation Amendment. As noted previously, the design was developed sufficiently to receive a License to Construct from CNSC. This reflects confidence regarding the essential design decisions. In an IPD project, the focus during Validation is on reducing the uncertainty regarding design decisions and project risks to an acceptable level. Completing all design issues, even minor issues, before proceeding into construction can unnecessarily delay the project without providing value. The IPD team's approach in this Project aligns with established IPD practice, and the issuance of the License to Construct indicates that the design has reached a mature stage.

The IPA foreshadowed certain events that might occur or not occur. Where these have occurred, the Validation Amendment documents the status. For example, the Validation Amendment affirms that the Non-Owner Parties will not receive a TOC incentive payment. This is not a change; it documents what has occurred within the possibilities envisioned in the IPA framework.

Similarly, many of the project schedules and exhibits were updated to reflect current information, consistent with regular IPD practice. I closely reviewed those related to governance and the risk-reward program and determined that they added detail to the IPA but were consistent with the executed contract. As noted above, IPD agreements are dynamic with exhibits and schedules being developed by the parties and documented in the Validation Amendment.

The IPA also clarifies several issues or reinforces the applicability of the IPA.

Regarding overhead incurred by Affiliates, i.e., companies substantially related to an IPA party, the Validation Amendment added:

"For greater certainty, no Monthly Overhead or Fixed Fee will be payable by Owner to any Non-Owner Party in respect of Project Operations performed by an Affiliate of such Non-Owner Party." Validation Amendment 2.3(ix).

This does not change the IPD structure and was inferable from the IPA, but is clarified here and is beneficial to OPG.

The Validation Amendment replaces Section 2.7(d) in Schedule 20 to define payment for archiving media following final completion. (Validation Amendment 2.3(xiii)(A)), which does not affect IPD principles.

The IPA anticipated that specified information would be provided in the Validation Amendment. For example, the concept of a Project Critical Milestone is in the initial IPA but the actual dates were to be specified in the Validation Amendment.

"(a) Subject to Section 41, each Party will complete its respective Project Operations in accordance with this Project Agreement to achieve each of the Project Critical Milestones by the ~~date specified for completion thereof in the Validation Amendment~~ Project Critical Milestone Date." 28.1 IPA, showing change by the Validation Amendment.

The related sections and definitions have been updated in the Validation Amendment as intended.

Conclusion

The Validation Amendment is consistent with the Integrated Project Agreement and provides the developed financial terms, additional detail, updates, and confirmation of decisions one would expect in a competent Validation Amendment.

Very truly yours,

Howard W. Ashcraft

ATTACHMENT 3

DNNP MANAGEMENT SYSTEM STRUCTURE AND DNNP CHARTER

An important component of OPG's role as Owner and Licence Holder is its DNNP Management System. The system is a controlled document framework for the DNNP though which program objectives, plans, processes, roles, responsibilities and decision-making are documented.

The overall structure is described in a program management document entitled *Darlington New Nuclear Project Program Management Plan* NK054-PLAN-01210-00008), which is included in this Attachment 3.

This document establishes the framework for the DNNP Management Plans, which are a series of documents that describe how the DNNP is organized to meet the intent of OPG's Nuclear Management System, while also establishing program-specific requirements. The *DNNP Program Management Plan* establishes the following hierarchy of documents:

- **Tier 1** – the *Darlington New Nuclear Project Charter* ("Project Charter"), which is also included in this Attachment 3, and the *Darlington New Nuclear Project Program Management Plan* (NK054-PLAN-01210-00008),
- **Teir 2** – the DNNP Program Management Plans; DNNP Project Execution Plans, and the Functional Management Plans; and
- **Tier 3** – numerous process control and support documents including manuals, guides, instructions, plans, constructor/owner interface requirements, organization charts and forms.

Title:
Darlington New Nuclear Project – Program Management Plan

Darlington New Nuclear Project (DNNP) – Program Management Plan

NK054-PLAN-01210-00008-R002
2023-November-30

Order Number: N/A
Other Reference Number:

Internal Use Only

Prepared By: 11/29/23
Audrey Lowry — Date
Sr. Planning & Reporting Specialist, Project Assurance

Reviewed By: 29-Nov-2023
Carol Lam — Date
Project Director, DNNP

Reviewed By: 04DEC2023
Scott Ritzie — Date
Project Director, DNNP

Approved By: 06-Dec-2023
Dragan Popovic — Date
SVP, SMR Execution

Table of Contents

Revision Summary

Revision Number	Date	Comments
R000	2020-12-07	Initial issue.
R001	2022-06-14	Comprehensive update to reflect revised Program governance structure, and support documents.
R002	2023-11-30	Comprehensive update to reflect programs applicable to the Licence to Construct Phase and the Integrated Project Delivery model.

1.0 PROJECT OVERVIEW

As part of the Darlington New Nuclear Project (DNNP), Ontario Power Generation (OPG) intends to develop small modular reactor (SMR) technology for a proposed facility at the Darlington new build site, located on OPG lands, east of the existing Darlington Nuclear Generating Station (DNGS).

The primary objectives of this program are listed in NK054-PCH-01210-00002, Darlington New Nuclear Project Charter.

This Program Management Plan describes the overall program required to design, construct and bring an SMR online. In many cases, the details of individual projects or program requirements refer to sub-documents that will be updated as the program progresses. The terms ‘program’ and ‘project’ are used interchangeably in this plan document when referring to the overall DNNP.

The DNNP will utilize an Integrated Project Delivery (IPD) contract model for the Licence to Construct (LTC) phase that will maximize integration and collaboration with contract partners:

- OPG: Owner
- GE-Hitachi: Designer
- AtkinsRéalis: Architect & Engineering Firm
- Aecon: Constructor

Each contract partner is required to follow their quality assurance program and management system and is required to meet the applicable requirements of CSA N286-12 for the activities they will perform in compliance with the Nuclear Site License. As the Owner partner and licensee, OPG maintains overall ownership and authority of the DNNP commensurate with the Integrated Project Agreement (IPA).

Integration between the quality assurance programs and management systems of OPG and the IPA Non-Owner partners (NOPs) will be required for which project specific documentation will be produced to clarify such integration details and define processes necessary to deliver IPA agreement deliverables. Any documentation created to support this collaborative effort will be referenced within the DNNP Project Execution Plan.

2.0 PROGRAM GOVERNANCE, STRUCTURE, AND PLANNING

2.1 DNNP Governance Structure

The DNNP governance structure and hierarchy is shown in Appendix A.

The highest level documents include the following OPG corporate governing documents that sets the overall direction for how OPG will administer the DNNP:

1. N-CHAR-AS-0002, Nuclear Management System

   This Charter provides overall direction regarding administration of Nuclear licensing activities and establishes requirements to which OPG employees shall comply.

2. OPG-PROG-0039, Project Management Program

   This Program establishes how the requirements, objectives, and commitments for the management of projects across all business areas within OPG are fulfilled.

DNNP specific governance defines the overall management system compliance and associated implementation as well as execution requirements associated with the project. These include:

Tier 1

1. NK054-PCH-01210-00002, Darlington New Nuclear Project Charter

   This Charter describes the business vision and scope of the project as defined by the line of business.

2. NK054-PLAN-01210-00008, DNNP Program Management Plan

   This Plan receives authority from the DNNP Charter and describes the overall program required to design, construct and bring an SMR online, including program governance, structure and planning. The details of individual projects or program requirements are further detailed in sub-document Program Management Plans and Project Execution Plans, as detailed in Section 2.2 and 2.23 below. These will be refined as the program progresses.

Tier 2

3. DNNP Program Management Plans (PgMPs) detailed in Section 2.2 below.

4. DNNP Project Execution Plans (PEPs) & Functional Management Plans detailed in Section 2.3 below.

Tier 3

5. Process Control & Support Documents: Manuals, Guides, Instructions, Contractor/Owner Interface Requirements (COIR), Organization Charts, Forms, etc.

Document mapping to management system compliance for the LTC phase been captured in DA1-IPD-NN-NN-LLIS-PM-0001, DNNP N286-12 Compliance Matrix.

2.2 DNNP Program Management Plans

The PgMPs takes authority from NK054-PCH-01210-00002, Darlington New Nuclear Project Charter and NK054-PLAN-01210-00008, DNNP Program Management Plan.

The PgMPs describe how DNNP is managed to meet the intent of OPG's Nuclear Management System while establishing program-specific requirements, and outlines OPG's specific oversight accountabilities for the program. The PgMPs are designed to provide assurance that all aspects of the program applicable to the LTC phase of the project will be conducted in accordance with the requirements of:

- Canadian Standards Association Standard N286-12, Management System Requirements for Nuclear Facilities
- N-CHAR-AS-0002, Nuclear Management System
- OPG Corporate and Nuclear governance

The PgMPs may also refer to key implementing documents as required. In cases where no specific DNNP program requirements apply, the program will default to the program documents under N-CHAR-AS-0002, Nuclear Management System.

Typical content of PgMPs is provided in Appendix B – Program Management Plan Section Requirements.

2.3 DNNP Project Execution Plans

The PEPs takes authority from NK054-PCH-01210-00002, Darlington New Nuclear Project Charter and NK054-PLAN-01210-00008, DNNP Program Management Plan.

DA1-IPD-NN-NN-TPLN-PM-0003, Darlington Small Modular Reactor – Project Execution Plan (PEP) presents the top-level management plan that provides the overarching framework for executing the mandate under the IPA. The PEP outlines the plans, resources, mechanisms, and procedures expected to be implemented for the successful Project Management, Engineering, Procurement, Construction, Commissioning and Closeout of the project.

The PEP will govern the activities during the execution of the project and will be used in conjunction with each partner's governance, meeting the applicable requirements of CSA N286-12.

The Execution Management Plans describes aspects related to specific projects or project bundles under the IPA and are sub-plans to the PEP.

The Functional Management Plans set out specific requirements for implementation/execution of the specific function (e.g. Quality, Project Controls, etc.) on the project and are sub-plans to the PEP.

2.4 Revision Cycle Requirements

Program owners shall review their PgMPs annually and revise as required.

PEPs and Functional Management Plans are reviewed and revised as required when the project goes through each gate.

Revisions may be required to support business planning or significant project milestones.

3.0 PROGRAM SCOPE

The scope of DNNP will be defined and controlled in accordance with the, OPG-MAN-00120-0011, Project Scope Management.

As a First-Of-A-Kind (FOAK) deployment of a boiling water reactor (BWR) technology, the scope of the project is expected to evolve through the development phase. External stakeholders and factors, as well as internal decisions on the direction of the project, will mold the scope to meet the objectives set out for DNNP. OPG Engineering has developed a Nuclear Facility Site Requirements Document, which will form the basis of the OPG design requirements.

A DNNP scope review and approval process has been developed and is described in NK054-PLAN-01210-00100 Sheet 0015, Darlington New Nuclear Project (Project Controls) Program Management Plan and DA1-IPD-NN-NN-TPLN-PM-0004, Darlington New Nuclear Project (DNNP) Project Controls Plan

The scope of the DNNP consists of all the work required to design, procure, construct and commission an on-grid SMR for Unit 1. Additionally, work is required to ensure successful start-up and operation, which is included in the project scope. The scope is broken down into bundles of work that include the projects and activities required for successful execution of the program. These bundles are further described below and shown in Appendix C – DNNP Work Breakdown Structure, which outlines scope that falls under the IPD model.

3.1 Site Preparation

This bundle includes the work authorized to be performed under the Nuclear Power Reactor Site Preparation Licence (PRSL 18.00/2031).

As described in the Licence, site preparation activities include:

(a) Construction of site access control measures;
(b) Clearing and grubbing of vegetation;
(c) Excavation and grading of the site to a finished elevation of approximately +78 metres above sea level;
(d) Installation of services and utilities (domestic water, fire water, sewage, electrical, communications, natural gas) to service the future nuclear facility;
(e) Construction of administrative and support buildings;

(f) Construction of environmental monitoring and mitigation systems; and,
(g) Construction of flood protection and erosion control measures.

It also allows possession and use of required prescribed information. The Site Preparation bundle is broken down into three main projects: Early Works, Main Site Preparation (Front Eng Engineering), and Geotechnical Surveys & Studies.

3.1.1 Early Works

Early works scope includes the scope that may be performed at a very early state of nuclear facility design. It is planned to be the first construction activities on the site, and includes: modification of existing roads, installation of domestic and fire water, IT duct banks, public announcement system, sanitary lines, construction power, trailer complex, temporary parking, and laydown areas. Also, site excavation, grubbing, leveling of the site to meet design specifications of the planned nuclear facility is included in the scope. This project is described in NK054-PMP-01210-00036, DNNP – Site Preparation Early Works – Project Management Plan.

3.1.2 Main Site Preparation (Front End Engineering)

The Main Site Preparation scope includes Front End Engineering and the Preliminary Design of the following:

- Sanitary system, domestic and firewater distribution system within the DNNP site
- Administrative building which will also house a full scope simulator
- Permanent warehouse
- Stormwater management system
- PA/LAN/telephone and tie-in of utilities that were installed in the Early Works phase

This project is described at high-level in NK054-PMP-01210-00006, Main Site Preparation Project Management Plan, and NK054-SOW-01210-00007 Scope of Work.

3.1.3 Geotechnical Surveys & Studies

This work includes a series of onshore and offshore core drillings and testing to provide the required data for site characterization and design of the power block, buildings, intake structure (geotechnical survey phase 1 and 2).

3.2 Design Engineering & Major Procurement

3.2.1 Power Block

The Power Block is defined as the Reactor Building, Turbine Building, Control Building, and Radwaste Building and the corresponding structures, systems, and components (SSCs) within these buildings. Additionally, this project includes the Protected Area

(PA) fence and yard, security systems within the PA, and the cooling water building and related SSCs. This project is further described in DA1-IPD-NN-NN-TPLN-PM-0001, DNNP – Nuclear Island Project Management Plan.

3.2.2 Grid Connection

The scope includes design and construction to connect the unit to electrical grid. The transmission line from OPG-Hydro One demarcation point to the Hydro One transmission station, is being owned and implemented by Hydro One with support and oversight by this project team.

3.3 Nuclear Island

The Nuclear Island bundle consists of all the work required to design, procure, and construct the Reactor Building, Control Building and the Radiation Waste Building of the Nuclear Facility. This includes all systems, components and structures (SSCs) contained within the Reactor, Control, and Radwaste Buildings. Major systems include the Nuclear Boiler System, Isolation Condensers, Control Rod Drive System, as well as I&C/DCS systems (including the Simulator system). The project is described in DA1-IPD-NN-NN-TPLN-PM-0001, DNNP – Nuclear Island Project Management Plan.

3.4 Conventional Island

The Conventional Island bundle consists of all the work required to design, procure, construct, and commission the Turbine, Generator, Moisture Separator, Feed Water Heaters, Condenser and supporting systems, structures and components in the turbine building, diesel generator, BOP, as well as the Turbine Building itself. This project is described in DA1-IPD-NN-NN-TPLN-PM-0002, DNNP – Conventional Island and Balance of Plant Project Management Plan.

3.5 Balance of Plant

3.5.1 Cooling Water & Shoreline Protection

This scope includes design and construction of a cooling water intake and discharge that will provide lake-water cooling to the condensers as well as any other loads. This project also involves design and construction of shoreline protection to prevent erosion of the shoreline of Lake Ontario in proximity to the nuclear facility. The engineering of the shoreline is included in the IPD model. Construction is not included in the IDP model and will be completed by OPG facilities. This project is described in NK054-PMP-01210-00003, DNNP – CCW and Shoreline Protection Project Management Plan.

3.5.2 Security Building

The scope includes design and construction of the security system. It includes the security building and associated security systems and plant physical security features, including but not limited to, fencing, lighting, cameras, and access control points. This

project is described in DA1-IPD-NN-NN-TPLN-PM-0002, DNNP – Conventional Island and Balance of Plant Project Management Plan.

3.5.3 Site Establishment

This area includes design, construction and commissioning of the site perimeter, temporary facilities, temporary services and utilities, lunchrooms/site offices, roads and walkways, snow removal, site access, initial site earthworks and grading, storm water management, logistics for first fills, and removal of temporary facilities services upon completion of the work. It also includes detailed design and construction of the Administration Building, Warehouse, Fabrication Shop, Utility corridor, and the supporting geotechnical survey and required studies. This project is described at high-level in DA1-SNC-ZZ-ZZ-TPLN-ZZ-0009, Site Establishment Project Management Plan.

3.6 Digital Strategy

The Digital Strategy is divided into two projects – Digital Project Delivery (DPD) and SMR Digital Operations.

DPD focuses on development and implementation of digital processes and tools for the project lifecycle including design, testing, installation, commissioning and handover to Operations and is further described in DA1-IPD-NN-TPLN-DI-0001, DNNP Information Management Plan and DA1-IPD-NN-NN-TPLN-0008, DNNP Information Technology Plan.

The second project is SMR Digital Operations which focuses on Digital Systems and Processes that are envisioned to support project and operational decision-making at the facility, which takes guidance from DA1-OPG-NN-NN-TREP-DI-0001, DNNP Digital Strategy Business Requirements Document.

3.7 Operational Readiness, Commissioning & Startup

The Operations bundle includes activities to support the design of the plant, development of operating and maintenance processes and transition from project to an operational organization to support of the full range of operational commissioning and commercial operations. These activities are described in NK054-PLAN-01210-00100 sheet 0005, Operations and Maintenance Program Management Plan, which includes process descriptions and accountabilities.

Specific activities for commissioning, turnover of systems to the operational organization and start-up and testing of the nuclear facility are described in NK054-PLAN-01210-00100 Sheet 0019, Darlington New Nuclear Project Turnover and Commissioning Program Management Plan. This document describes the processes that will ensure compliance with both regulatory requirements and internal OPG governance to ensure eventual safe operation of the plant.

Training encompasses activities that support operation of the facility during operational readiness, commissioning and operating unit. Training is described in NK054-PLAN-01210-00029 sheets 0001 and 0002, Darlington New Nuclear Project (DNNP) – Training Plan and NK054-PLAN-01210-00100 Sheet 7, DNNP – Project Training Program Management Plan.

4.0 PROGRAM MANAGEMENT

The Program Management bundle contains program activities and costs that are programmatic in nature, and not included in other bundles. This includes managing scope, budget, schedule, risks, and stakeholder communications.

The Program Management bundle is broken down into three distinct projects to manage activities and costs. These projects include Program Management & Support, EA & Licensing, and Engineering.

4.1 Program Management & Support

The Program Management & Support project contains program activities and costs that are programmatic in nature. This includes: project staffing and expenses, DNNP governance development, training, stakeholder management, Indigenous engagement and capacity funding, utilities and site expenses, decommissioning plans and financial guarantees, and project insurance.

4.2 Environmental Assessment & Licensing

Activities related to licensing requirements of the facility including licence applications, licence fees, managing regulatory commitments, Environmental Assessment related activities and follow-up monitoring can be found in NK054-PMP-01210-00005, DNNP – Environmental Assessment & Licensing Project Management Plan.

The main objectives of the Environment Assessment & Licensing project are to obtain the required regulatory licences and permits for DNNP and to complete all the remaining DNNP regulatory commitments. This is to support the DNNP objective to deploy the SMR BWRX-300 at DNNP site. The scope for Environment Assessment & Licensing project is to address the licensing and environmental needs for site preparation, construction and operation phases of DNNP, and to address the DNNP regulatory commitments.

The Environmental Program is described in NK054-PLAN-01210-00100 Sheet 0014, DNNP – Environmental Program Management Plan.

4.3 Licensing

Nuclear Regulatory Affairs activities will be governed by N-PROG-RA-0002, Conduct of Regulatory Affairs. Regulatory requirements and commitments with the CNSC and other regulatory agencies are currently documented in the DNNP Power Reactor Site Preparation Licence (PRSL) PRSL 18.00/2031 and associated DNNP Licence

Conditions Handbook. Future requirements include a LTC prior to nuclear facility construction, and a Licence to Operate (LTO) prior to nuclear operation.

NK054-PLAN-01210-00100 Sheet 0008, DNNP – Licensing Program Management Plan includes a description of how the Licensing program will be managed.

4.4 Corporate Regulatory Affairs

Compliance with the IESO Market Rules and engagement of stakeholders through the IESO Connection Assessments and Approval process is a critical part of this project. Corporate Regulatory Affairs is supporting the project and communications with the IESO to inform the status of the project and discuss the requirements. A System Impact Assessment is planned as part of the initiation phase. Details of the project that will connect to the electrical grid can be found in NK054-PMP-01210-00004, DNNP – Grid Connection Project Management Plan.

4.5 Engineering

OPG Engineering activities and funding is captured in its own project within the Program Management bundle.

The DNNP Engineering Program is described in NK054-PLAN-01210-00100 Sheet 0004, DNNP – Engineering Program Management Plan and DA1-IPD-NN-NN-TPLN-PM-0005, Darlington New Nuclear Project (DNNP) Design Plan.

It describes how describes how Engineering will manage engineering work for the DNNP and outlines engineering scope, roles and responsibilities, integrated design requirements, design oversight, division of design authority (DA), software, and other requirements.

4.6 Procurement and Contract Management

Procurement activities to support materials and services required during the project will be completed in accordance with OPG-PROG-0009, Items and Services Management.

The selection of IPD partner(s) is considered to be a business development process, not a procurement process, which is documented in the associated contract order approvals.

Commercial Management and Supply Chain will provide unified support to fulfil DNNP's procurement and contracting needs including developing procurement strategy, contracting methodology and terms and conditions. NK054-PLAN-01210-00100 Sheet 0016, DNNP – Contract Program Management Plan and NK054-PLAN-01210-00100 Sheet 0017, DNNP – Supply Chain Program Management Plan describes how major contracts within the DNNP will be managed and controlled.

DA1-IPD-NN-NN-TPLN-PM-0006, Master Subcontractor Management Plan describes the strategy and subcontract management processes that will be used by the NOPs for

the procurement of engineered and nonengineered equipment, construction material and services associated with DNNP under the IPA.

4.7 Construction and Quality Management

Project Quality for DNNP is managed through DA1-IPD-NN-NN-TPLN-PM-0003, DNNP Project Execution Plan which gives authority to DA1-IPD-NN-NN-TPLN-QA-0001, DNNP – Quality Management Plan.

NK054-PLAN-01210-00100 Sheet 0009, DNNP Construction and Quality Program Management Plan describes OPG's role in construction and quality oversight during the planning and construction of DNNP including vendor activities in Engineering, Procurement and Construction (NK054-PLAN-01210-00100 Sheets 0004, 0017 and 0009, respectively).

4.8 Project Assurance & Performance Improvement

NK054-PLAN-01210-00100 Sheet 0002, DNNP – Project Assurance Program Management Plan describes the program assurance model for DNNP and sets out the performance improvement and corrective action processes throughout the LTC phase of the project.

4.9 Operations & Maintenance

NK054-PLAN-01210-00100 Sheet 0005, DNNP – Operations & Maintenance Program Management Plan details how DNNP Operations & Maintenance programs will support the project phase, develop programs for the operational phase and develop processes to transition from a project to an operational organization.

A separate DNNP Program Management Plan exists for turnover and commissioning – tightly linked to the Operations and Maintenance programs. This plan is issued as NK054-PLAN-01210-00100 Sheet 0019, DNNP – Turnover and Commissioning Program Management Plan.

4.10 Safety

4.10.1 Nuclear Safety

N-POL-0001, Nuclear Safety & Security Policy governs the overall treatment of Nuclear Safety at OPGN facilities. It recognizes that nuclear power poses unique hazards, and that protection of workers, public and the environment from these hazards is the overriding priority. This policy states that nuclear safety shall have clear priority over schedule, cost and production.

N-PROG-MP-0014, Reactor Safety Program for DNNP is owned by Engineering under NK054-PLAN-01210-00100 Sheet 0004, DNNP – Engineering Program Management Plan.

4.10.2 Health & Safety

The safety program as it applies to DNNP is described in NK054-PLAN-01210-00100 Sheet 0012, DNNP – Health and Safety Program Management Plan,

4.10.3 Radiological Safety

There are no governance requirements for radiological safety because there are no radiological hazards associated with the licensed activities covered under the DNNP Licence to Construct. If required, the temporary use of radioactive sources (e.g., nuclear gauges) will be covered under licenses and radiological safety programs specific to those activities.

4.11 Security and Emergency Management

Security programs for DNNP are described in NK054-PLAN-01210-00100 Sheet 0020, DNNP – Nuclear Security Program Management Plan.

Emergency Management program for DNNP is described in NK054-PLAN-01210-00100 Sheet 0011, DNNP – Project Emergency Management Program Management Plan.

The construction phase does not include any activities that require management of a nuclear fire protection program, therefore this program is not applicable at this time. DNNP Business Continuity has been incorporated into OPG-PROC-0209, Enterprise Projects Business Continuity Plan.

4.12 Nuclear Waste

The construction phase does not include any activities that require management of radioactive wastes, therefore there are no governance requirements for nuclear waste during this phase.

4.13 Stakeholder and Indigenous Relations

NK054-PLAN-01210-00100 sheet 0013, DNNP – Stakeholder Relations and Indigenous Relations Program Management Plan, DA1-IPD-NN-NN-TPLN-PM-0007, Integrated Communication Framework, and DA1-IPD-NN-NN-TPLN-PM-0008, DNNP Indigenous Engagement Implementation Plan describes the internal and external interfaces and communication protocols applied for the life cycle of DNNP.

Project bundles may also have specific stakeholder and Indigenous engagement plans that speak to requirements of the various projects.

4.14 Decommissioning

NK054-PLAN-01210-00100 sheet 0021, DNNP – Decommissioning Management Plan describes the programs applicable to the LTC phase of the project.

4.15 Document Management

The document management program, as applied to DNNP, defines and controls the processes and records that comprise the management system as well as maintain objective evidence to demonstrate effective implementation of the management system through project execution.

The requirements are detailed in NK054-PLAN-01210-00100 Sheet 0018, DNNP – Document Management Program Management Plan, DA1-IPD-NN-NN-TPRO-DI-0001, DNNP Document Management Procedure, and DA1-IPD-NN-NN-TPLN-DI-0001, Information Management Plan.

4.16 Project Controls

OPG-PROG-0039¸ Project Management Program governs DNNP to ensure successful integration and control each of the projects within the program, including requirements for monitoring project performance.

Specific aspects of Project Controls for DNNP is detailed in NK054-PLAN-01210-00100 Sheet 0015, Darlington New Nuclear (Project Controls) Program Management Plan and DA1-IPD-NN-NN-TPLN-PM-0004, Darlington New Nuclear Project (DNNP) Project Controls Plan. This includes management of scope, schedule, cost, change, decisions, reporting, risk, and lessons learned.

4.17 Resource Management

OPG resource management and planning is reviewed and reconfirmed on an annual basis as part of the business planning cycle.

Staffing and resourcing requirements will vary over the life cycle of the project and is captured in DA1-IPD-NN-NN-TPLN-PM-0003, Darlington Small Modular Reactor – Project Execution Plan (PEP). DNNP will be staffed by OPG and IPD partners with a combination of permanent and temporary, augmented, or seconded staff to fulfill project needs throughout its lifetime.

Onboarding of staff onto the project is done in accordance with established OPG HR processes, as well as DA1-IPD-NN-NN-TPLN-PM-0009, DNNP – Onboarding and Training Plan.

Training requirements are to be consistent with that of OPG's Project and Engineering organizations. The DNNP training program is described in NK054-PLAN-01210-00100 sheet 0007, DNNP – Training Program Management Plan.

5.0 PROJECT ORGANIZATION

The integrated project organization is captured in DA1-IPD-NN-NN-TPLN-PM-0010, DNNP – IPD Project Organization Chart.

The DNNP project organization is based on a matrix organization, with many interfaces to existing OPG functional groups supporting the DNNP objectives.

Key OPG project personnel are as follows:

DNNP Key Role Identification and Description

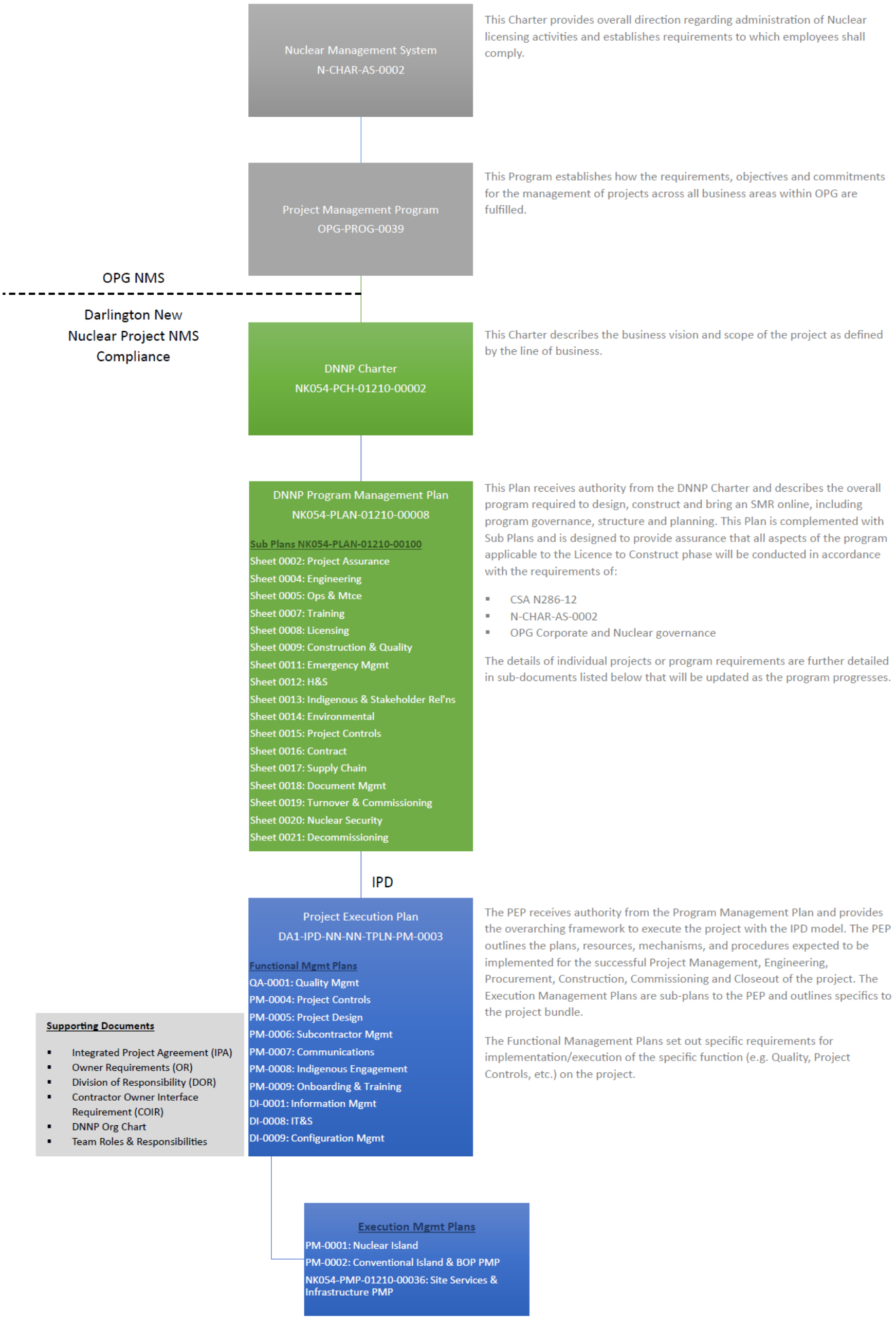
Role	Role Description for DNNP
Chief Projects Officer	Sponsor for the Darlington New Nuclear Project.
Chief Nuclear Engineer	DNNP Licence holder.
SVP SMR Execution	Overall accountability for successful execution of the Darlington New Nuclear Project.
DNNP Project Director(s)	Accountability for successful execution of their respective areas of the Darlington New Nuclear Project. Primary responsibility for scope/schedule/cost development, project reporting, risk management, contract management, decisions related to strategic direction, resourcing, stakeholder relations, and management of program contingency within given authority.
DNNP Manager(s) – Projects	On behalf of the DNNP Project Director, accountable for developing scope, schedule, cost through all phases of the project(s) under their responsibility. Accountable for project monitoring to ensure cost/schedule/scope stays within the approved envelope. Working with Engineering, develop scopes of work for contracts, and provide oversight of staff to ensure safety and quality.
Director, Project Controls	Overall accountability for Project Controls, including cost, risk, estimating, gating, change control, schedule management, Reporting and ensure the enterprise project management systems are updated with quality for DNNP to meet the requirements of the Project Management Program.
Sr. Manager Project Controls	Responsible to lead and provide project controls support in cost, risk, estimating, gating, change control, schedule management, reporting and ensure the enterprise project management systems are updated with quality for DNNP to meet the requirements of the Project Management Program.
VP Enterprise Commercial Management	Overall accountability to develop contracting strategies for partnerships and vendor services, negotiating contracts, providing project with advice for managing contracts, and leading contract disputes. This position works closely with Law and Supply Chain on behalf of projects for major contract awards.
Operations & Maintenance Director – DNNP	Overall accountability for Operations & Maintenance programs as they apply to the DNNP project through the project lifecycle. This includes design reviews for operability and maintainability, oversight of training, operations and maintenance staffing, and development of programs for operation of the site. As the senior license owner of the operating plant, accepts turnover from construction and accountable for ensuring the systems and processes are in place to safely operate the plant.
Operations & Maintenance Manager – DNNP	Accountability for the turnover and commissioning aspects of the program. Matrixed to Director Ops & Maintenance.
Manager Operations Training – DNNP	Accountability for DNNP training programs.
Engineering Director	Accountable for Engineering aspects of OPG's New Build programs, and OPG Design Authority for aspects of DNNP. Provides design direction and guidance for the scope related to DNNP and site. Includes development of owners' requirements and engineering scope. Responsible to ensure adequate qualified resources for the OPG design and engineering support activities. Responsible to ensure all design-related regulatory requirements, applicable design standards, and OPG policies and procedures are met. Responsible for developing the Management Systems Plan for Construction and O&M phases.
Manager, Engineering Programs & Methods	Prepare and direct the Overall Management System and QA requirements for DNNP. Accountable to develop the Engineering Oversight Model, Engineering Contract Management, and Engineering Quality Oversight Plan.
Manager, Design Engineering	Accountable for execution and oversight of design engineering and technical

Role	Role Description for DNNP
	acceptance of Engineering products and service through the owners Engineers.
Corporate Relations Senior Manager – DNNP	Provide strategic advice to maintain relationships with the public and local government (Host Communities). Accountable to ensure regulatory requirements with respect to public information are met. Responsible to develop public and stakeholder management plans. Leads public and OPG messaging for DNNP. Supports Indigenous community relations planning and activities.
Manager, Projects EA & Licensing	Project Management accountability for the EA & Licensing Project which primarily includes management of activities supporting Licensing. Working closely with Regulatory Affairs Licensing Manager, supports licence application activities, licence hearings, and other related requirements. In addition to licensing, this role includes managing commitments related to the licensing process and supports PMTs with permitry as required.
Manager, Regulatory Affairs DNNP Licensing	Accountable to ensure licence and other regulatory requirements are met. Strategic planning and advice to strengthen relationships with the CNSC and manage issues related to regulatory concerns. Overall accountability for communications with CNSC related to DNNP. Responsible to develop licensing protocols with CNSC. Working closely with Manager, Projects EA & Licensing, to plan and manage licensing process, licence application activities, licence hearings, and other requirements.
Nuclear Environment, Director Environment Health & Safety	Responsible for supporting completion of Environment commitments for DNNP Site Preparation, including supporting various permits required prior to the start of site preparation activities. Provides support to the project regarding the Environmental Assessment commitments and licensing applications. Provide environmental support for site preparation and construction activities.
VP Construction Services	Overall accountability for Construction programs and execution oversight for the project, including expectations for safety, quality, cost and schedule.
Director(s) Construction Services	Accountable for the implementation of the DNNP Project with respect to Construction, ensuring that the DNNP work program is executed in accordance with expectations for safety, quality, cost and schedule.
Director Nuclear Waste NSS	Overall accountability for Nuclear Waste aspects of the project.
Nuclear Waste Manager – DNNP	Accountable for aspects of the project related to Nuclear Waste, including waste minimization, handling, storage, and licenses.
Director Security & Emergency Services	Overall accountability for Emergency Management and Security programs.

6.0 REFERENCES

- CSA N286-12, Management System Requirements for Nuclear Facilities
- Reactor Site Preparation Licence (PRSL 18.00/2031)
- N-CHAR-AS-0002, Nuclear Management System
- N-POL-0001, Nuclear Safety & Security Policy
- N-PROG-MP-0014, Reactor Safety Program
- OPG-STD-0001, Requirements for Administrative Governance Documents
- OPG-PROG-0039, Project Management Program
- OPG-PROC-0209, Enterprise Projects Business Continuity Plan

7.0 APPENDIX A – DNNP GOVERNANCE DOCUMENT STRUCTURE



8.0 APPENDIX B – PROGRAM MANAGEMENT PLAN SECTION REQUIREMENTS

The Darlington New Nuclear Project (DNNP) follows OPG's Nuclear Management System as documented in N-CHAR-AS-0002, Nuclear Management System.

Program Management Plan Section Requirements

PgMPs describe how program requirements and processes support project execution while meeting the intent of existing OPG's Management System for DNNP. The structure and minimum content requirements for PgMPs are as follows:

Section 1.0, Purpose
This section:
- Provides a clear and concise description of the fundamental intent or focus of the PgMP.
- Outlines high-level rationale, background, and process details.

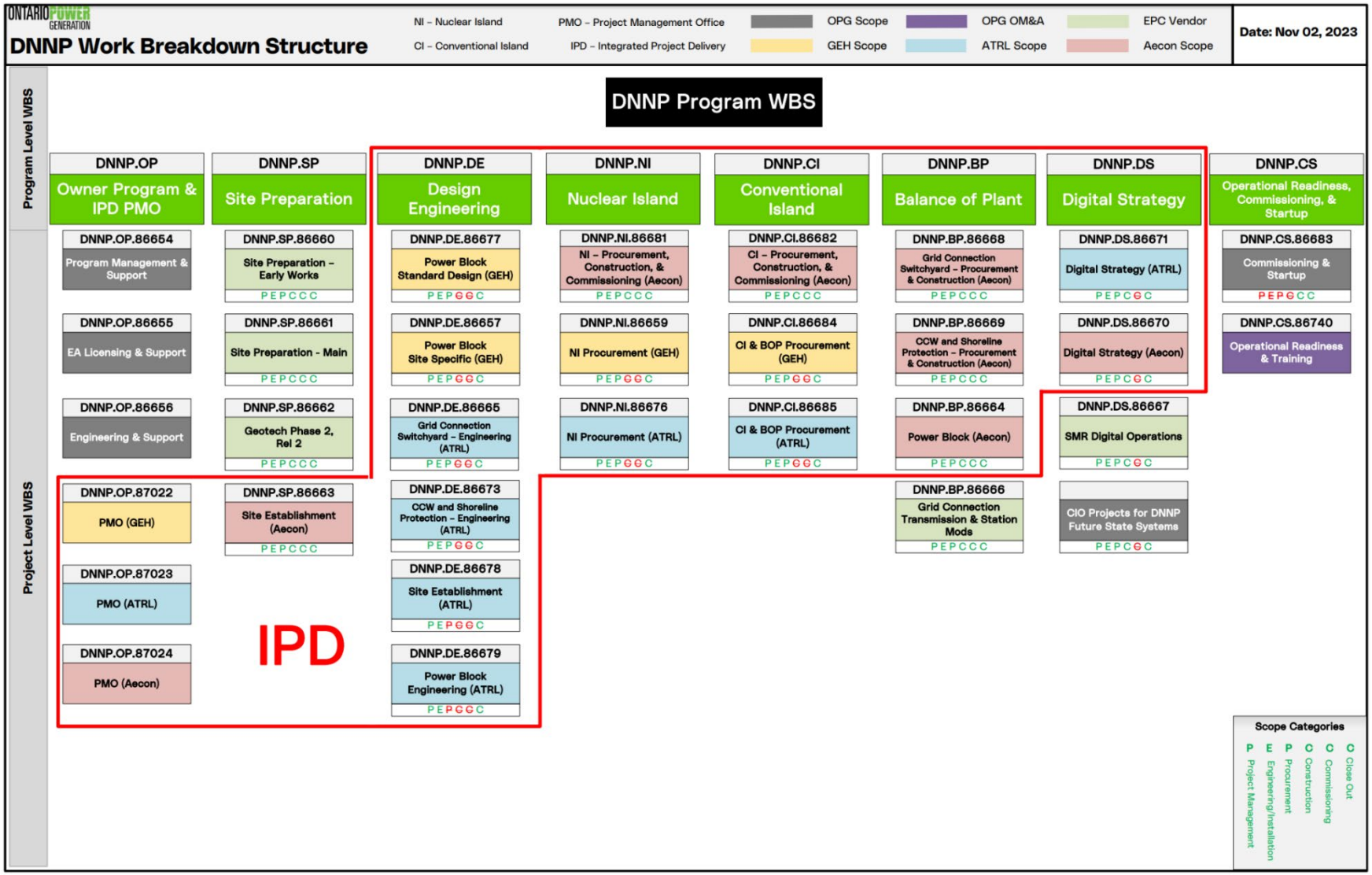
Section 2.0, Program Requirements
This section provides a "roadmap" that conveys how the program will meet DNNP requirements.
- Briefly describe any nuclear, corporate, or other business unit governance, governance support, and non-governance documents that provide implementing details for requirements, activities, and processes described by the PgMP.
- State requirements that have been mandated by functions for projects to follow as part of contract development and project execution.
- Illustrate (through figures or flowcharts) the entire PgMP framework, implementing and interfacing documents.
- Metrics/reporting requirements.

Section 3.0, Roles and Accountabilities
This section provides a high-level summary of accountabilities for manager level (Stratum IV) or higher positions or roles concerning the accomplishment and oversight of activities related to the implementation of the document, in accordance with the standards outlined in OPG-STD-0001, Requirements for Administrative Governance Documents.

Section 4.0, Definitions and Acronyms
This section lists definitions and acronyms in accordance with the standards outlined in OPG-STD-0001.

Section 5.0, References
This section lists the documents required to be used in conjunction with the PgMP and identifies each document in accordance with the standards outlined in OPG-STD-0001.

9.0 APPENDIX C – DNNP WORK BREAKDOWN STRUCTURE



ONTARIO POWER GENERATION

Project Charter

Internal Use Only

Document Number:
NK054-PCH-01210-00002

Revision:
R002

Title:
DARLINGTON NEW NUCLEAR PROJECT

The Project Charter describes the business vision and scope of the project as defined by the line of business. Sections 1.0 through 5.0 are mandatory. Sections 6.0 onwards are recommended however not compulsory. The sponsor should determine whether completion of these sections is required based on the project cost, complexity and needs.

General Project Information

Project Number:	83274	**Project Level:**	A
Project Name:	Darlington New Nuclear Project	**Facility/Site:**	Darlington
Project Manager:	N/A	**Executing Org:**	Enterprise Projects
Project Manager R2:	N/A	**Sponsor:**	Subo Sinnathamby

Project Charter Approval

Prepared by: Carol Lam Project Director, DNNP	
Reviewed by: Ryan Howard Vice President, SMR Unit 1 Execution	
Approved by: Boris Vulanovic Senior Vice President, SMR Execution **Project Sponsor**	
Accepted by: Subo Sinnathamby Chief Projects Officer **Executing Organization Approval Authority**	 April 13, 2026

Project Charter

Internal Use Only	
Document Number: NK054-PCH-01210-00002	
Revision: R002	Page: 2 of 9

Title: **DARLINGTON NEW NUCLEAR PROJECT**

Table of Contents

Page

1.0 NEED BACKGROUND AND PROPOSAL

Ontario Power Generation (OPG) is seeking to grow its business and be a leader in energy innovation via the development of Small Modular Reactors (SMRs). Clean energy alternatives to reduce dependencies on fossil fuels is a priority growth opportunity for OPG. As the province moves to electrification additional generation will be needed to fulfill the expected increase in demand for energy.

To supply the capacity and energy needed, a diverse supply mix will be required. SMRs have the potential to be cost competitive against other clean energy options and provide job and economic benefits that intermittent renewables cannot. Consistent with OPG's Strategic Objectives and Climate Change Plan, enabling additional nuclear generation through SMRs will position OPG as an Energy Industry Leader and be a catalyst for a net-zero economy.

OPG has reviewed multiple SMR technologies and, over the course of 2021, worked with three developers to assess whether they would be a good fit at the Darlington site as well as for future deployments in the province. In December 2021 OPG selected GE Hitachi Nuclear Energy's BWRX-300 as its DNNP SMR technology, and OPG's shareholder, the Minister of Energy, instructed OPG to continue planning and preparation at the Darlington site. In July of 2023 the Minister instructed OPG to commence the planning and licencing for three additional SMRs at the Darlington New Nuclear site. In May 2025, the Province of Ontario, following review of the cost estimate for the DNNP, further announced its approval of OPG's plan to begin construction of the first of four SMRs at the Darlington site.

SMR technology will support addressing the following for the Ontario electricity market:

- Initiate path towards zero emissions (Immediate)
- Summer and winter capacity deficit (Short Term)
- Increased energy demand (Long Term)

The IESO has completed an analysis of the impact of one SMR on Ontario's electricity system. The analysis concluded that the addition of any of the three SMR technologies OPG considered for Darlington would help meet system capacity needs, reduce energy shortfalls, and reduce carbon emissions at a cost that is in line with the federal government's carbon rate of $170/tonne by 2030, with a minimal impact on the average annual system cost.

This project charter covers Darlington New Nuclear Project (DNNP) – the first four SMR generating stations in Ontario. OPG already holds an Environmental Assessment ("EA") approval and a CNSC Licence to Prepare Site, which are necessary and valuable assets to start an SMR project. Through the first phase of the capital project, OPG partnered with GE-Hitachi (GEH) to progress design and engineering work. Successful completion of this phase further demonstrated the viability and business case for an SMR at Darlington. In October 2022, OPG completed a significant project milestone with the submission for the Licence to Construct application to the CNSC. The Licence to

Construct for Unit 1 was subsequently issued in April 2025, marking the next step in the deployment of Canada's first SMR at the Darlington site.

1.1 Preliminary Project Level (Cost and Complexity Assessment) and Gate Strategy

The DNNP will be a highly complex program. Table 1-2 lists a preliminary breakdown of major scope areas. Within each of these areas there may be multiple projects.

Given the complexity of developing, designing, and building new nuclear technology, it will be broken down into phases with appropriate decision points and gates for progression. The gate strategy is documented in the Program Management Plan.

Table 1-2. Major Scope Phases

Scope Area		Description	Outcome
I	**Technology Development and Design**	Technology development and design of an SMR for on-grid application. Constructability Reviews including incorporation of modular manufacturing techniques.	Management Plan Strategy. Final technology/partner selection decision. Business Case Approval. CNSC Construction license.
II	**Site Preparation**	Activities required to prepare the site for reactor construction in accordance with the PRSL [1].	Site prepared for reactor construction activities. PRSL commitments met.
III	**Procurement & Manufacture**	Progress long lead items. Develop modular manufacturing capability.	Long Lead item procurement. Manufacture of modular components.
IV	**Construction**	Construction and testing of Reactor and supporting structures & systems.	Construction complete and turnover to Operations for commissioning.
V	**Operations Preparation**	Implementing the Management System, training staff, developing procedures, defining the operating organization, and implementing other tools (software/hardware).	Operations, Maintenance, and Engineering readiness. Procedures issued. CNSC Operating licence.
VI	**Commissioning & Unit Start up**	Commissioning & functional tests, fuel load, and synchronization.	First unit in-service for commercial operation.
VII	**Subsequent Unit Construction**	Complete sequential construction, licensing and turnover to Operations for commissioning.	Units 2, 3 and 4 unit in-service for commercial operation.

2.0 PROJECT OBJECTIVES (CRITICAL SUCCESS FACTORS)

The principal objective of the DNNP is to lead new nuclear technology development to provide safe, clean, efficient, and sustainable power to the Ontario electrical grid in the next decade via an SMR at Darlington. The current goal is to commence construction of the first SMR in 2025, complete construction by the end of 2029, and commercially available by the end of 2030.

Primary Objectives and Success Factors:

1. SMR technology development and design
   (i) Safe
      a. Inherently safe design and passive safety response systems.
      b. Off-site releases resulting from a bounding accident scenario are sufficiently low that the need for emergency actions outside the exclusion zone is eliminated.
      c. Security resilience.
      d. As low as reasonably achievable operator radiation dose and operating radiation emissions.
   (ii) Clean – minimizes environmental impact over the project lifecycle and supports net zero carbon goals.
   (iii) Sustainable – acceptable lifecycle fuel and waste management strategy.
   (iv) Efficient – total cost of generation competitive in the Canadian energy market (carbon cost factored in).
   (v) Adaptable – able to adapt to a range of site specific conditions which will enable deployment of the technology in a fleet approach.
2. Confirm the business case for design and construction of an SMR facility at Darlington.
3. Construction of an SMR facility on the Darlington site, with up to approximately 300MWe to the grid, complete by the end of 2029.
4. Design the site and infrastructure and construct up to 3 additional reactors of the same design on the site.

Supporting Objectives:

5. Support the establishment of a Canadian supply chain related to SMR build and maintenance, maximizing benefits to Durham Region, Ontario and Canada.
6. Partner with Government and other stakeholders to advance SMR regulatory and technical standard frameworks.
7. Engage and provide opportunities to Indigenous communities.
8. Engage, educate and seek support from key stakeholders, local government, and the surrounding community.
9. Support the vision of a Canadian fleet of SMRs, and specifically an SMR in western Canada in 2030=.

3.0 COMMITMENTS, CONSIDERATIONS

3.1 Regulatory Commitments

CNSC licensing required for this project include:

- Site Preparation Licence (current licence 2021-2031)
- Construction Licence
- Operating Licence
- Waste related licence

A primary assumption of this project is that the new nuclear technology/design will fit into the existing Environmental Assessment (EA). This assumption will be reviewed periodically in the design phase of the project to ensure any gaps to this are recognized and managed.

With respect to the licensing processes for construction and operation, OPG has developed the necessary administrative protocols with the CNSC to ensure deliverables are provided and reviewed in accordance with an agreed schedule and key regulatory interfaces are managed. In order to increase regulatory confidence and reduce risk of late design changes related to regulatory approvals, designs should undergo the first two phases of the Pre-licensing Vendor Design Reviews [2].

A Notice of Project has been provided to the Ministry of Labour notifying the Ministry of construction activities on the site. A variety of other Permits will be required and will be managed through the Project.

3.2 Safety Considerations

☐ No **additional safety considerations.**

☑ Yes**, additional safety considerations (provide details).**

Nuclear Safety shall be the primary consideration in the design. The design should incorporate passive safety features. Nuclear safety considerations will be documented in a supporting Safety Analysis Report.

In addition to the Nuclear Safety aspects, the design should incorporate security resilience features.

Conventional and construction safety requirements will follow all applicable municipal, provincial, and federal regulations as a minimum.

3.3 Environmental Considerations

An Environmental Assessment (EA), which includes the Environmental Impact Statement, was prepared and submitted to the Joint Review Panel (JRP) for the DNNP in 2009. The JRP's EA Report concluded that the DNNP Project was not likely to cause significant adverse environmental effects, provided the mitigation measures proposed and commitments made are implemented. Detailed regulatory and environmental commitments are tracked in the DNNP Commitments Report NK054-REP-01210-00078 [3].

As discussed in Section 3.1, a periodic review of the assumptions of the PRSL with respect to the technology design and site preparation activities is required to ensure any gaps to this are recognized and managed.

☐ **No, environmental impact assessment is NOT required for the project.**

☑ **Yes, environmental impact assessment IS required for the project.**

4.0 MAJOR MILESTONES

The DNNP schedule has been developed as part of the definition and front-end planning processes. Milestone targets for the program are provided in Table 4-1.

Table 4-1. Major Milestones

Name	Deliverables/Acceptance Criteria/Rationale for Date	Date
Licence to Construct Application	Regulatory licencing period of 2 years	Q4 2022 (Complete)
Class IV Business Case and Release	Basis for a decision to proceed to Site Preparation construction	Q4 2022 (Complete)
Class III Business Case and Release	Basis for a decision to proceed to Nuclear Construction	Q1 2025 (Complete)
Licence to Construct Issued	Regulatory license required to start construction	Q2 2025 (Complete)
Start of Nuclear Construction	Major phase of project	Q2 2025 (Complete)
Nuclear Construction Complete	Business objective	Q1 2030
Commercially Available	Business objective	Q4 2030

5.0 STAKEHOLDER SUMMARY

Stakeholders of this project include:

- Indigenous Communities with rights or interests in the project
- All levels of government (Province of Ontario, the municipality of Clarington, Durham Region, the Federal Government)
- General public (particularly residents and businesses in close proximity to the Darlington site)
- Other nuclear utilities and nuclear industry organizations
- Special interest groups
- Independent Electricity System Operator (IESO)
- Hydro One
- CN Rail
- Nuclear Waste Management Organization (NWMO)
- St Mary's Cement
- Nuclear suppliers of goods and services

Stakeholders also include potential future business partners of OPG in SMR build and operation.

The project will develop a comprehensive Indigenous & Stakeholder Relations Plan as part of the overall Program Management Plan.

6.0 FUNDING/COST

The full project cost was estimated during the Definition phase, followed by a business case submitted to the OPG Board of Directors for approval. Funding will be requested and released in phases, based on successful completion of key work programs and program milestones, in accordance with an approved release strategy. This strategy will be documented in the DNNP Program Management Plan.

7.0 RESOURCING (PROJECT TEAM)

A partnership between OPG, GE Vernova Hitachi, AtkinsRéalis, and Aecon Kiewit Nuclear Partners (Aecon Kiewit), has been contracted to collectively develop and deploy the BWRX-300 SMR, and its supporting infrastructure at the Darlington Nuclear site in Ontario by the end of the decade. An Integrated Project Delivery (IPD) model has been selected to maximize integration and collaboration with contract partners.

The SVP, SMR Execution, will establish the OPG organization and resources necessary for successful completion of the DNNP.

7.1 Risks

A formal risk management process has been implemented within the DNNP to ensure that risks are identified, managed, and reported on a routine basis. These risks and associated actions are managed in a central database and form the basis of planning as well as on-going risk management.

Key risks within the program include:

(a) Issues related to First of a Kind (FOAK) technology development and design may delay the overall schedule of the project and result in increased cost.
(b) Issues with amendments/interpretation/application of Regulatory requirements for new technology and/or new nuclear construction may delay the overall schedule of the project and result in increased cost.
(c) Delays in contract negotiation/issuance or delays in long lead item procurement may delay the overall schedule of the project.
(d) Specialized resources required to execute the project may not be available due to other competing large nuclear and infrastructure projects, which may delay the overall schedule of the project.
(e) Lack of a positive business case or shareholder support may result in project cancellation.
(f) The Ontario Energy Board (OEB) may not approve full cost recovery through the rate case if the project exceeds the approved budget.

(g) Public and/or Indigenous opposition to new nuclear development may result in legal challenges, and delays or cancellation of the project.
(h) The selected technology may result in gaps to the existing EA resulting in additional public consultation and regulatory reviews/approvals, delaying the project and adding cost.

8.0 REFERENCES

[1] Power Reactor Site Licence, PRSL 18.00/2022, OPG New Nuclear at Darlington Generating Station, Nuclear Power Reactor Site Preparation Licence. Licence to Prepare Site e-Doc 3990795

[2] REGDOC 3.5.4 Pre-Licensing Review of a Vendor's Reactor Design, 2018

[3] NK054-REP-01210-00078 Darlington New Nuclear Project Commitments Report