ONTARIO ENERGY BOARD

EB-2013-0321

IN THE MATTER OF the Ontario Energy Board Act, 1998, S. O. 1998, c. 15, Schedule B;

AND IN THE MATTER OF an application by Ontario Power Generation Inc. pursuant to section 78.1 of the Ontario Energy Board Act, 1998 for an order or orders determining payment amounts for the output of certain of its generating facilities.

ENVIRONMENTAL DEFENCE'S SUPPLEMENTARY CROSS-EXAMINATION DOCUMENT BOOK – PANEL 8

July 15, 2014

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EB-2013-0321 - Cost Overrun Scenarios

	Current Cost Estimate	50% Cost Growth		100% Cost Growth		150% Cost Growth		200% Cost Growth		250% Cost Growth	
		Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG
RFR	1	1.5		2		2.5		3		3.5	
Fuel Handling	1	1.5		2		2.5		3		3.5	
Steam Generators	1	1.5		2		2.5		3		3.5	
Turbine Generators	1	1.5		2		2.5		3		3.5	
Balance of Plant	1	1.5		2		2.5		3		3.5	
Other Costs	1	1.5		2		2.5		3		3.5	
Interest & Escalation											
Total											
LUEC For Each Cost Scenario											

Assumptions:
Current cost estimate is OPG's current "high confidence" estimate.
Project components costs (RFR, Fuel Handling etc.) include all costs, including OPG management costs, contractor costs, and other costs.
Total includes all project component costs and intestest and escalation.
LUEC includes all costs, including interest, escalation, and fixed corporate overheads for pensions and other post employment benefits.
Percent cost growth is applied to all costs and is spread evenly across all costs.

Notes to OPG:
We have included "dummy" values for the current cost estimate and some formulas to help show exactly what we are looking for. The dummy values should be
If the inclusion of "contingency" amounts in the baseline current cost estimate is somehow problematic for the calculations, we ask that OPG produce two copies of this table, one with and one without the contingency amounts included in the baseline current cost estimate.

EB-2013-0321 - Cost Overrun Scenarios - Breakdown by Category

Major Category	Category / Contract Type	Base Case $2014	50% Cost Growth		100% Cost Growth		150% Cost Growth		200% Cost Growth		250% Cost Growth	
			Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG	Gross costs	Costs passed to OPG
RFR	OPG Project Management											
	Contractor Cost											
	Tooling (Fixed Price)											
	Mockup (Fixed Price)											
	Owner Specified Materials (Cost Plus)											
	Definition Phase (Target Price/ Fixed Fee)											
	Execution Phase (Target Price/ Fixed Fee)											
	Contingency											
	Total											
Fuel Handling	OPG Project Management											
	Contractor Cost											
	Defueling - Eng Services (Fixed/Firm Price)											
	Defueling - Eng Services (Misc Reimbursables)											
	Fuel Handling (Fixed Price)											
	Contingency											
	Total											
Steam Generators	OPG Project Management											
	Contractor Cost											
	Fixed Price											
	Target Price/ Fixed Fee											
	EPC Other											
	Contingency											
	Total											
	OPG Project Management											
	Contractor Cost											

Turbine Generators	Eng Serv & Equip Supply (Fixed Price)											
	Eng Serv & Equip Supply (Target Price)											
	Installation - Defn Phase (Target Price/ Fixed Fee)											
	Installation - Exec. Phase (Target Price/ Fixed Fee)											
	EPC											
	Contingency											
	Total											
Balance of Plant	OPG Project Management											
	Contractor Cost											
	EPC & T&M											
	Contingency											
	Total											
Other Costs	Islanding											
	System Shutdown											
	Facilities & Infrastructure											
	Waste Management											
	New Fuel											
	Insurance											
	Regulatory, i.e. ISR, EA, I P											
	Licensing (CNSC Fees)											
	Contingency											
	Retube Waste Containers (Provision)											
	Management Reserve											
	Total											
Interest & Escalation												
Total												
LUEC For Each Cost Scenario												

Assumptions:
Cost growth is applied to all costs except contingency.
Contingency amounts are decreased by the cost overruns and are accounted for in the total costs for each scenario.
Current cost estimate is OPG's current "high confidence" estimate.
Project components costs (RFR, Fuel Handling etc.) include all costs, including OPG management costs, contractor costs, and other costs.
Total includes all project component costs and intestest and escalation.
LUEC includes all costs, including interest, escalation, and fixed corporate overheads for pensions and other post employment benefits.
Percent cost growth is applied to all costs and is spread evenly across all costs.

- Value for Money
- Responsible Management
- Geographical Neutrality and Reciprocal Non-Discrimination

The Contracting Strategy Core Team reviewed OPEX. See Appendix E for full details of OPEX reviewed,

The Team met between July and December 2009 to develop contracting strategy options and recommendations. The Team examined project related OPEX from other large projects (both internal OPG and external projects) including PARTS, Darlington VBO, Bruce A Restart, Point Lepreau, Brown's Ferry Restart, and Fort Calhoun Lessons Learned, BAA Terminal 5. Contracting and strategy background from Pickering A Units 1 and 4, contracting options completed for Pickering A Units 2 and 3, and analysis completed for Pickering B prepared by Faithful and Gould were also reviewed (See Appendix E).

In December 2009 the Team recommended strategies to the EVP Refurbishment for Retube and Feeder Replacement, Reactor Mock-Up, Fuel Handling & Turbine Generator Refurbishment, and Balance of Plant Refurbishment.

The Core Team expanded in 2010 to incorporate additional stakeholders including Commercial Strategy, Projects, and Finance. Additionally Faithful & Gould was engaged to provide third party support for contracting development.

As the Contracting Strategy progressed additional stakeholders were engaged including a Cross Functional Sourcing Team, Advisory Team, and Steering Committees.

The Contracting Strategy Team meetings and milestones are documented in Appendix A.

2.3.1.2 Retube and Feeder Replacement Strategy 2009

The contracting strategy recommended by the Contracting Strategy Team included specific strategy recommendations for Retube and Feeders based on the concept of OPG and its contractors working to a common set of goals and incentives. While OPG would retain ultimate control and risk, contractors would have an active role jointly developing methodology, constructability, price and schedule. Selection of contractors would be based on selecting the right partner rather than on price since scope, cost, and schedules at that time would be preliminary subject to a high degree of uncertainty.

Fundamental principles of this type of arrangement would include:

- Integrated co-located team

contracting model could have been a contractual partnership, corporation, or limited partnership with OPG retaining ultimate control and risk.

7.0 RECOMMENDED CONTRACTING STRATEGY

The recommended strategy was a partnering-based model where OPG and its contractor work to a common set of goals and incentives. Essential to the anticipated partnering arrangement is:

- Integrated co-located team
- Shared incentives, with OPG bearing the primary risk
- Clear common vision & project objectives
- Full transparency, based on open-book method
- Joint risk register
- Common IT and project management systems
- Integrated project reporting

The recommended contracting strategy was similar to the approach OPG took on the Lower Mattagami Redevelopment Project which incorporated a design-build target price and fixed fee pool. The base contract for RFR was based on the Lower Mattagami precedent.

In November 2010, Faithful and Gould prepared a report entitled "Benchmarking Report on Contracts Strategy and Overhead & Profit Levels for Large-Scale International Projects" to compare the RFR contracting approach to other large international programs across multiple energy sectors and geographic regions (see Appendix E). This report concluded that the contracting approach for RFR was in line with the overall contracting approach adopted on complex long term projects.

After receipt of the F&G report during the Prequalification process proposed Key Terms were reviewed and discussed with Proponents to gauge market acceptance of the proposed Terms. Some Proponent feedback was incorporated into the strategy and contract model prior to RFP issuance in March 2011.

8.0 CHOICE OF PRICING MODEL

Based on a shared goals and incentives a cost-reimbursable Target Price model incorporating fixed fee and incentive/disincentive components was recommended in December 2009. Specific components would be fixed price and incentives/disincentives would be paid on cost or schedule overruns or under-runs. OPG would pay actual costs (based on negotiated allowed costs) plus a base profit/fee. Contractors would have meaningful fee at risk.

Contractors would have the ability to earn enhanced profit based on contingency savings and would share any cost over-run based on an agreed-to formula. Incentives and disincentives would be assessed at various intervals during the course of the

experts. Those vendors will assist Ontario Power Generation with the oversight function by providing relevant expertise developed from other major projects.

Consistent with Ontario Power Generation's gated review and approval process for proceeding with each phase of the Project, Concentric believes all of the agreements that result from this strategy should include sufficient off-ramps and hold points at which continuing with the Project will be fully reconsidered. These milestones include, but are not limited to:

- Issuance of a release quality estimate,
- The start of each unit outage, and
- Instances when prime vendor performance is substantially below expectations.

D. ALTERNATIVES CONSIDERED

Prior to selecting its multi-prime contractor model strategy, Ontario Power Generation considered several alternative commercial strategies. Those alternative strategies included partnering, a lump sum turnkey agreement, and a project management organization structure. Ontario Power Generation rejected each of those strategies for the reasons described below.

Beginning in December 2009, the Project team was focused on a partnering concept that would seek to utilize a single agreement with multiple vendors, possibly combined in a joint venture, for the purpose of designing and executing the work packages. That agreement would have tied the vendors' financial performance to the overall success of the entire project rather than just a vendor's performance on its scope of work. The partnering concept was initially favored because, in its optimal form, the concept would better align the interests of all involved vendors and potentially promote a cooperative work environment. This concept was advocated in the 1990s by several industry participants, but experience with the partnering model has shown that alignment is difficult to achieve, and vendors largely rejected this model due to their inability to "control their own fate." That is to say, vendors have expressed a concern that their financial performance is tied to actions that are beyond their own control (*i.e.,* the performance of another vendor on the project). As a result, projects that utilized the partnering strategy often fostered less cooperative project environments where vendors were engaged in disputes with each other over the cause of delays or cost over-runs.

The Darlington Refurbishment Project team also considered a fixed price, lump sum, turnkey model similar to that employed by NB Power at Point Lepreau. At a basic level, this strategy would have turned over the entire Project to a single vendor and required the vendor to complete the entire scope of work and return an operable unit back to Ontario Power Generation. This strategy, when coupled with a fixed or target price, is expected to provide greater price certainty and greater risk transfer. However, the fixed-price, lump sum, turnkey strategy would have largely eliminated Ontario Power Generation's control over the final design, pace, and management of the Project. In addition, recent experience with this strategy has demonstrated that although the model proposes to transfer significant risk to a vendor, such risk transfer is largely unachievable in a nuclear safety environment due to exemptions for excused events and force majeure, the owner's liability for nuclear safety, and a lack of complete, detailed designs. As a result, the price premium paid to transfer risk is usually not commensurate with actual risk transferred to a vendor. At Point Lepreau, the fixed price, lump sum, turnkey strategy has largely protected NB Power from cost overruns, but has provided limited protection from schedule slippage and the extensive cost of replacement power that resulted. Lastly, a fixed-

price, lump sum, turnkey agreement for a nuclear power project of this magnitude is not likely to be commercially feasible in the current market. SNC Lavalin, the acquirer of the commercial reactor division assets of Point Lepreau's contractor (AECL), has indicated that it is unwilling to accept the same level of risk that AECL accepted in past contracts.[10]

Finally, Ontario Power Generation considered retaining a project management organization similar to the strategy initially employed by Bruce Power for the refurbishment of Bruce A. Pursuant to this model, Ontario Power Generation would have retained a qualified firm experienced in the management of megaprojects similar to this Project. The project management organization would have been responsible for planning the Project, negotiating agreements with prime contractors for the execution of the Project work, and managing the various work packages. This strategy would allow Ontario Power Generation to rely on an experienced project management organization that is expected to utilize industry best practices to plan and implement the Project. However, a project management organization strategy often suffers from a lack of alignment between the project management organization, the owner, and the prime contractors responsible for completing the work. This is particularly true in a tight market for such services, as is the case in Canada's market for nuclear services, because the project management organization may also be responsible for a portion of the execution phase work. Consequently, other vendors would have been expected to reject a project management organization due to concerns over future disputes between the vendors and the project management organization. Even if the model was accepted by capable vendors, Ontario Power Generation could expect to pay a substantial premium for the risk of project management organization and contractor disputes. Bruce Power has encountered difficulties with the project management organization strategy related to conflicts between the project management organization and its vendors and the project management organization's alignment with Bruce Power's interests. As a result, Bruce Power largely abandoned the project management organization strategy after approximately two years and moved to a multi-prime strategy.

As discussed above, Concentric agrees with Ontario Power Generation that it was reasonable and prudent to select the multi-prime model under the current market circumstances and to reject the alternatives considered by the Company.

VII. RETUBE AND FEEDER REPLACEMENT

A. OVERVIEW

The Retube & Feeder Replacement work package is expected to determine the Project's critical path[11] and includes the removal and replacement of each reactor's 480 pressure tubes and calandria tubes and the removal and replacement of the existing feeders. Because of the critical nature of this work, Ontario Power Generation has focused significant resources on selecting a reasonable commercial strategy and securing a vendor to perform the Retube & Feeder Replacement work prior to advancing the other work packages. Just

[10] In June 30, 2011 article in *Canadian Business*, SNC Lavalin Executive Vice President Patrick Lamore was quoted as saying, "We don't want to go backwards but obviously we would only bid the projects that have acceptable terms and conditions to our risk profile and where we make the margins that are expected for a commercial business to survive."

[11] At a basic level, the critical path of a project is made up of those activities that must be completed on time in order for the project to proceed to each new phase of the project on schedule.

train thousands of new employees exclusively for the Retube & Feeder Replacement work. As a result, this option was ultimately not considered a viable strategy given the high cost and the significant number of direct hire employees required to complete the project with this strategy.

The design-bid-build strategy would allow Ontario Power Generation and its design engineering vendor to define the Retube & Feeder Replacement scope of work and complete the detailed design before issuing a competitive solicitation for the execution phase work, potentially under a fixed or target price. That aspect of the design-bid-build strategy is similar to Ontario Power Generation's selected strategy. However, due to the lack of constructor involvement during the definition phase, the design produced under the design-bid-build model may not have been executable. This would ultimately lead to a risk of substantial rework to fix designs that could not be constructed. Additionally, the actual risk transferred to the construction vendor under a fixed price agreement may be less than expected despite the risk premium Ontario Power Generation would expect to pay for the price certainty.

Ontario Power Generation also considered seeking a fixed price, lump sum turnkey agreement for the Retube & Feeder Replacement work package in order to achieve greater price certainty and risk transfer. This model was deemed to be unavailable at a reasonable cost based on market feedback and recent experiences at Point Lepreau. In addition, Ontario Power Generation previously entered into fixed price, lump sum turnkey agreements, yet the Company's experience was that those agreements failed to achieve actual price and schedule certainty due to undefined and unknown scope. Thus, Ontario Power Generation rejected this model as failing to provide sufficient value for money.

As discussed previously, the partnering strategy was considered due to the anticipated ability to align Ontario Power Generation's interests with those of the vendor and its sub-vendors. The partnering model was rejected due to Ontario Power Generation's prior experience employing a similar model during the Pickering A Return to Service Project as documented by Ontario Power Generation in its operational experiences for that project. In addition, many vendors have rejected the partnering strategy due to the additional risk posed to each vendor by the partnering model.

F. STRATEGY EXECUTION

During 2010 and 2011, Ontario Power Generation began executing the Retube & Feeder Replacement commercial strategy. To do so, Ontario Power Generation initially conducted market outreach in spring 2010. This included the identification of seven vendors who could potentially execute the Retube & Feeder Replacement scope of work. From this information, Ontario Power Generation issued a request for expressions of interest to the seven potential vendors ("Proponents"). Ontario Power Generation received limited responses and proposed feedback on Ontario Power Generation's terms and conditions from four of the seven Proponents regarding the Retube & Feeder Replacement work package. Two of those Proponents later joined the teams of the remaining two Proponents as either consortium members or sub-vendors of the lead Proponent.

In March 2011, Ontario Power Generation issued a request for proposals ("RFP") to the remaining two Proponents: 1) a consortium consisting of B&W, GEH-C, and Black & MacDonald (the "B&W Consortium"); and 2) a consortium of SNC-Lavalin Nuclear Incorporated and AECON Industrial, a division of AECON Construction Group Incorporated (the "SNC/AECON Consortium"). A meeting with both Proponents was held following the issuance of the RFP and the Proponents were provided with an

UNDERTAKING JT3.16

Undertaking

To advise whether OPG is going to answer the question; if not, why not.

To provide the detailed table used to calculate JT2.2 part (c) , so that 50, 100 percent, 150, 200 and 250 percent cost overruns with respect to all of OPG project management cost, contractor costs and other costs can be performed.

Response

The table below includes data as previously submitted in JT2.2 and JT2.3. A description of the cost overrun assumptions passed on to OPG as summarized in JT2.2 (c) have been added. Further, the amounts have been updated per JT3.15 to reflect an allocation of $260 Million to Facility and Infrastructure Projects and to decrease Management Reserve by the same amount.

OPG believes applying escalation of all costs would be incorrect and misleading for the following reasons:

- As noted in ED-11 part (c) assumption (2), each project bundle includes contingency that is "reduced prior to incurring cost growth to the project". It would not be reasonable to escalate this contingency
- As noted in ED-11 part (c) assumption (3), there is additional contingency and management reserve that was not reduced. If cost overruns were to be incurred on top of the major contracts, the contingency and management reserve would be reduced.
- OPG Project Management Costs are not subject to the same cost growth risks as contractor costs.

The following provides a summary of the pricing models utilized by OPG in the Refurbishment contracts:

- **Fixed Price** is used for well defined scope and/or when the vendor controls the majority of the risk associated with the scope of work, i.e. Re-tube and Feeder Replacement Tooling and Mockups.
- **Reimbursable Cost** is used where costs could be variable based on market conditions outside of the contractor's control, with full transparency over costs, i.e. Reactor Component Purchases – OPG agrees with the quantities required and the vendor procures at cost.
- **Target Price** is used where full transparency of scope, schedule and cost are required, where scope may not be well defined, and risk associated with the execution of the specified scope performed by the contractor rests with the contractor. OPG has full transparency of costs and pays for contractor's actual costs without profit or overhead. A Target Price is based on OPG and contractor's agreement of estimated actual costs once sufficient planning is complete. As an incentive to control contractor expenditures, contractor profit and overheads are incorporated into a fixed fee and a meaningful portion is put at risk. If the contractor actual costs are above the Target Price, disincentives are in place to reduce the fixed fee; if the contractor actual costs are below the

target price, the contractor shares in the savings in addition to the receipt of their fixed fee.

The use of the Target Price model was chosen after benchmarking other projects both internal and external to OPG and reviewing different contracting models and their results.

- Examples:

Extended Services Master Service Agreements (ES-MSA) Contracts

- An ES-MSA agreement was put in place that allows OPG to contract to two vendors to delivery certain scopes of work. The contract allows for either fixed price, reimbursable, or target price contracts.
- Darlington Refurbishment uses the ES-MSA contracts for Facility and Infrastructure Projects and Balance of Plant related projects.
- Both these contracts are competitively bid.
- Generally, the contracts are based on target price, with some fixed price scopes of work.
  - The ES MSA contract requires that for Performance Fee Work (ie target price) [redacted] of the Contractor's overheads and profits are put at risk in a Performance Fee pool.The payout is based on the contractor's overall performance assessed quarterly related to safety, cost, human performance and schedule for all work performed.
  - For example, if a contractor scores [redacted] on their performance score card, they will receive [redacted] of the amount in the Performance Fee Pool. If a contractor scores 1.0 then they will receive the full amount contributed to the Performance Fee Pool.
  - The target price or estimate can be changed by an approved Project Change Authorization (PCA). This would occur when there are specific changes to the contracted work requested by OPG. If the target price is going to be exceeded due to contractor actions. The contract disallows the contractor from earning a profit on the exceeding amounts..

Major EPC Contracts – Re-tube and Feeder Replacement (RFR) Contract

- OPG entered into an agreement with SNC-Lavalin/Aecon Joint Venture (JV) in 2012 through a competitive bid process. A Fixed Price pricing model was put in place to complete Re-tube and Feeder Replacement Tooling and to construct a full-scale mock-up. A Target Price pricing model was put in place for the planning activities during Definition Phase. At the end of the Definition Phase, based on terms and conditions approved in the overall contract, OPG may proceed with a Target Price pricing model for the Execution Phase. OPG also established a Reimbursable Cost plus transparent markup pricing model for the Contractor to purchase Owner Specified Materials (i.e. reactor components) and other Goods required to execute the work.
- Overall [redacted] the Contractor's profit and overheads is at risk. There is an opportunity for the Contractor to earn up to [redacted] additional profit and overheads for improved cost and schedule performance below the target.

- This model, in whole or in part, has been applied to other major EPC contracts in place including Turbine Generator, Steam Generator, and Defueling contracts. Each of these contracts has a combination of both fixed price, cost reimbursable, and Target Price components.

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Major Category	Category/ Contract Type	Base Case 2013$	Base Case 2014$	Cost Overun Assumptions from JT2.2
RFR	OPG Project Management	690	704	OPG Project Management extends across entire program (4 units) and will not increase in relation to level of cost growth of project.
	Contractor Cost			
	Tooling (Fixed Price)	[redacted]		Cost overrun risk held with vendor
	Mockup (Fixed Price)			Cost overrun risk held with vendor
	Owner Specified Materials (Cost Plus)			OPG reimburses actual costs, plus a markup of [redacted] Contracts are generally in place, with quantiies of these materials known - low risk of cost growth.
	Definition Phase (Target Price/ Fixed Fee)			OPG reimburses actual costs plus fixed fee for overhead and profit. [redacted] of the fixed fee is at risk based on contractor cost and schedule performance.
	Execution Phase (Target Price/ Fixed Fee)			OPG reimburses actual costs plus fixed fee for overhead and profit. [redacted] of the fixed fee is at risk based on contractor cost and schedule performance.
	Contingency			Project contingency will be utilized to offset contract growth, when required.
Fuel Handling	OPG Project Management	83	85	OPG Project Management extends across entire program (4 units) and will not increase in relation to level of cost growth of project.
	Contractor Cost		-	
	Defueling - Eng Services (Fixed/Firm Price)	[redacted]		Cost overrun risk held with vendor
	Defueling - Eng Services (Misc Reimbursables)			OPG reimburses actual costs, plus a markup
	Fuel Handling (Fixed Price)			Cost overrun risk held with vendor
	Contingency			Project contingency will be utilized to offset contract growth, when required.
Steam Generators	OPG Project Management	63	64	OPG Project Management extends across entire program (4 units) and will not increase in relation to level of cost growth of project.
	Contractor Cost			
	Fixed Price	[redacted]		Cost overrun risk held with vendor
	Target Price/ Fixed Fee			OPG reimburses actual costs plus fixed fee for overhead and profit. 100% of the fixed fee is at risk based on contractor cost and schedule performance.
	EPC Other			OPG reimburses actual costs, plus a markup
	Contingency			Project contingency will be utilized to offset contract growth, when required.

Major Category	Category/ Contract Type	Base Case 2013$	Base Case 2014$	Cost Overun Assumptions from JT2.2
Turbine Generator	OPG Project Management	195	199	OPG Project Management extends across entire program (4 units) and will not increase in relation to level of cost growth of project.
	Contractor Cost			
	Eng Serv & Equip Supply (Fixed Price)	[redacted]		Cost overrun risk held with vendor
	Eng Serv & Equip Supply (Target Price)			OPG reimburses actual costs up to the negotiated Target Price. For cost overruns, OPG and the contractor share the cost[redacted]
	Installation - Defn Phase (Target Price/ Fixed Fee)			OPG reimburses actual costs plus fixed fee for overhead and profit. [redacted] of the fixed fee is at risk based on contractor cost and schedule performance.
	Installation - Exec. Phase (Target Price/ Fixed Fee)			OPG reimburses actual costs plus fixed fee for overhead and profit. [redacted] of the fixed fee is at risk based on contractor cost and schedule performance.
	EPC			OPG reimburses actual costs, plus a markup
	Contingency			Project contingency will be utilized to offset contract growth, when required.
Balance of Plant	OPG Project Management	216	220	OPG Project Management extends across entire program (4 units) and will not increase in relation to level of cost growth of project.
	Contractor Cost			
	EPC & T&M	[redacted]		The ES MSA contract requires that for Performance Fee Work (ie target price) [redacted] of the Contractor's overheads and profits are put at risk and held in a Performance Fee Pool. Payout is based on overall contractor performance, assessed on a quarterly basis.
	Contingency			Project contingency will be utilized to offset contract growth, when required.
Other Costs	Islanding	219	223	The ES MSA contract requires that for Performance Fee Work (ie target price) [redacted] of the Contractor's overheads and profits are put at risk and held in a Performance Fee Pool. Payout is based on overall contractor performance, assessed on a quarterly basis.
	System Shutdown	136	139	
	Operations & Maintence Support	863	880	OPG cost centre for purposes of work control, station maintenance, commissioning support, and unit control, during Refurbishment. Resources extends across entire program (4 units) and will not increase in relation to level of cost growth on major EPC project work.
	Facilities & Infrastructure	820	836	The ES MSA contract requires that for Performance Fee Work (ie target price) [redacted] of the Contractor's overheads and profits are put at risk and held in a Performance Fee Pool. Payout is based on overall contractor performance, assessed on a quarterly basis.
	Waste Management	10	10	
	New Fuel	132	135	Fixed cost to OPG to fuel refurbished units.
	Insurance	114	116	Estimate includes latest broker estimate based on our current Program scope and duration assumptions.
	Regulatory, i.e. ISR, EA, IP	80	82	Program level Oversight, Support, and Project Management extends across entire program (4 units) and will not increase in relation to level of cost growth at project level.
	Licensing (CNSC Fees)	73	74	Estimate from our regulator
	Contingency	[redacted]		Additional contingency for discrete risks held at the Program Level.
	Retube Waste Containers (Provision)	220	224	Waste containers are materials provided to the Program for storing waste. The quantity and estimate per container is known.
	Management Reserve	[redacted]		Additional management reserve for discrete risks held at the Program Level.
		10,000	10,200	

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