ONTARIOPOWER GENERATION

Report

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CONTRACTING STRATEGY FOR BALANCE OF PLANT

Contracting Strategy For Balance Of Plant

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Table of Contents

Revision Summary

Revision Number	Date	Comments
R001	2013-12-05	Document rewritten to include Islanding and Shutdown/Layup & Services project scope into Balance of Plant Contracting Strategy.

1.0 EXECUTIVE SUMMARY

The Darlington Refurbishment ("**DR**") Program Commercial Strategy identified the requirement to establish separate contracting strategies for each of the major projects under the DR Program (each a "**Contracting Strategy**"). This document is the overall, parent Contracting Strategy for the Balance of Plant[1] ("**BoP**") Project (the "**Project**"). This Contracting Strategy is based on the business drivers and commercial principles set out in the DR Program Commercial Strategy.

The BoP Project team (the "**Team**") determined that the preferred approach for the project is to allocate work based on a set of criteria (see Appendix A) to leverage existing agreements and the Engineer, Procure, Construct ("**EPC**") model.

This approach to the Project work will allow DR to safely and efficiently:

- Reduce risk to nuclear refurbishment by minimizing delay to start of engineering, thereby minimizing the time between scope definition and start of execution. Involving contractors in the front end planning process is seen as a key success factor (based on operational experience ("**OPEX**")) for a safe, high quality and efficient execution of work;
- Simplify the procurement approach for what is inherently a collection of work;
- Reduce the procurement time required to award the work and capture the value derived from the early engagement of stakeholders and contractors in the front-end planning process;
- Maximize the use of existing contracts and relationships with qualified, experienced contractors; and
- Minimize the risk inherent in OPG integrating a large number of separate but inter-related packages of plant system work.

This Contracting Strategy is based on input provided by the Team, OPG internal stakeholders and a third party service provider performing oversight for the DR Program. This Contracting Strategy considers the following process for review and allocation of the BoP work:

- Identifying and grouping the work based on:
    - Type of work, including uniqueness and complexity;
    - Grouping by work area/geographical location to minimize or eliminate:
        - Termination/isolation points shared by contractors;

[1] *For the purposes of this strategy, Balance of Plant (BoP) includes Islanding, Shutdown/Layup and Services work scopes.*

      - Vertical health and safety risks (i.e., falling objects) associated with separate workgroups working overhead;
      - Minimizing handoffs and site/work ownership issues;
   - Minimizing interferences between contractors;
   - System(s).
- Qualification, capability, capacity, experience and past performance of potential contractors;
- Single point of accountability for work packages and ownership for the work;
- Use of independent estimates of work by OPG to validate value for money for all BoP scope packages; and
- Opportunity to utilize and leverage existing contracts to execute the work packages.

It is recommended that the BoP work be awarded to appropriate contractors by leveraging, as much as possible, existing contracts based on the allocation of work process and criteria. Any work that hasn't been allocated in this manner will follow OPG's procurement process.

This approach provides the best alignment with OPG's current core values (accountability, transparency and value for money), the Project's work scope and schedule requirements.

2.0 INTRODUCTION

2.1 Background Information

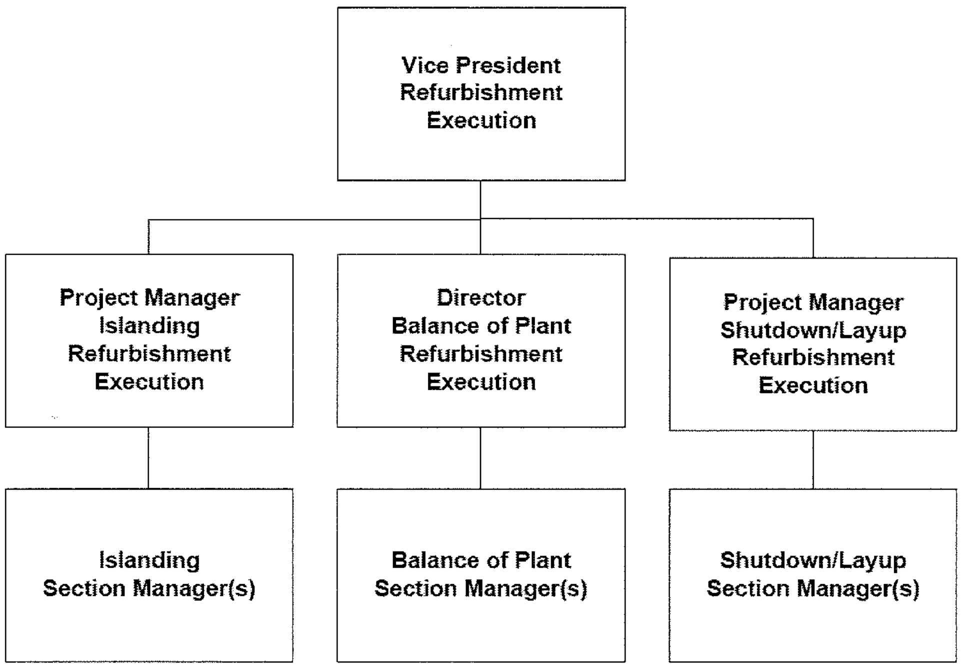
The Project includes rehabilitation and modification work identified in Appendix B. The scope of work has been reviewed by the Darlington Refurbishment Scope Review Board ("**SRB**").[2]

For contracting purposes, a Darlington Scope Request ("**DSR**") line item review was performed by the Team to organize the BoP work.

[2] *The purpose of the SRB is to:*
- *challenge the proposed refurbishment work scope to ensure work is necessary for the successful refurbishment of Darlington;*
- *align the scope with the objectives of maintaining/improving reliability and lowering production costs; and*
- *ensure investments in refurbishment deliver value for money.*

2.2 Development Process

The Team was formed in mid-2011 and evolved through 2012 with representatives from Refurbishment Engineering, Execution, Supply Chain, Project Controls and Nuclear Commercial Development. With support from Engineering, Operations and Maintenance departments in both Refurbishment and Darlington, the Team began clarifying and rationalizing the project scope to get a better understanding of what is required for refurbishment. The Project's execution organization is outlined below:



The scope definition process began by familiarizing the Team with equipment that needed replacement and work that has to be completed. Members of the team reviewed the DSR and Component Condition Assessment ("**CCA**") records for information on the scope of work which included:

- Work type (e.g., analysis, inspection, obsolescence, replacement, contingency);
- Scheduling time-frame (i.e., pre-refurbishment, refurbishment execution, post-refurbishment);
- Recommended source(s) for engineering, testing and field execution;
- Any long lead items; and
- If any of the work (i) must be performed by the OEM(s); or, (ii) could be performed by others.

Pre-refurbishment work will be managed through the Projects and Modifications group on DR's behalf and performed by the Extended Services Master Service Agreements ("**ESMSA**") contractors. Background information on the ESMSA can be found in Appendix C.

OPEX has been and continues to be collected and analyzed. The Team considered bundling of work with the work logically grouped into the scopes of work and subsequent scope IDs. Separate sub-project teams have been established for each of the sub-projects to manage the planning and execution for the scope of work within each sub-project. The individual sub-project teams are responsible for identifying and analyzing the potential options around work packaging, contracting approaches/models and pricing options. Inputs were also solicited from other key stakeholders within OPG and a third party providing oversight for the DR Program.

Major points from OPEX discussions included:

- OPEX from a refurbishment project showed that a number of required subcontractor agreements were not implemented by the prime contractor. This required the utility to implement direct contracts with construction companies and additional engineering firms, effectively abandoning the EPC model. For DR, EPC contractors are required to identify and receive approval for subcontractors from OPG. Additionally, EPC agreements with ESMSA contractors require that the contractors flow the terms and conditions down to all of their subcontractors.

- OPEX from a refurbishment project' lessons learned include developing a consistent and thorough approach for planning and estimating nuclear construction projects including a range of estimates with probabilities, key risk assumptions and contingency amounts. Project mitigation plans include engaging the contractor(s) as early as possible in the planning process.

- A refurbishment project had engaged a single entity with the required nuclear regulatory certification to act as prime, limiting their alternatives to replace the contractor when it was realized the project was not progressing well. In contrast, OPG plans to use multiple EPC contractors holding Certificate of Authorization ("**C of A**") for Pressure Boundary Work. Under the ESMSAs, contractors can work under their or OPG's programs.

- At Pickering Unit 4, construction work was underway before engineering, planning and assessing and procurement of materials had been completed. Engaging contractors early enough in the refurbishment schedule and including them in the project planning phase will mitigate this.

- A refurbishment project did work by equipment (e.g., valves, motor control centres) without consideration for how these groups interacted & interfaced, with issues only becoming understood during commissioning phase. This led to a number of expensive and onerous rework situations such as having newly installed valves (by contractor A) removed during piping work (by contractor B).

Mitigation: consider a system-based work approach and single contractor accountable for the work area and work ownership.

- A refurbishment project did Engineering Change Control ("**ECC**") integration after install ~$30M – and numerous issues with valves (e.g., code cases) had been lost during interim handovers and were not brought to light until commissioning and Available for Service ("**AFS**"). This required a great deal of firefighting and concession requests from the Canadian Nuclear Safety Commission ("**CNSC**"). Mitigation: valve scope will be clarified down to an equipment code basis by the Project then allocated into the EPC contract(s).

- Field efficiency should drive how the work is ultimately packaged and bid/sourced. Recent OPG experience with Pickering-A Fuel Handling rehabilitation work performed in 2011 with a multidisciplinary contractor showed the advantages of reduced interfaces while performing a large scope of work. Mitigation: limit handoffs and field interferences between different workgroups and contractors and early award of work for better planning and engagement of resources.

2.3 Stakeholder Identification

Key stakeholders and groups who provided input included representatives from Balance of Plant, Islanding, Shutdown, Layup & Services, Refurbishment Execution, Nuclear Projects, Contract Management, Supply Chain, Finance, Law and contractors to validate experience and capability.

3.0 CONTRACTING CONSIDERATIONS

In developing the Contracting Strategy for the Project, OPG considered how the work required under the Project will be contracted in order to ensure the achievement of OPG's core business objectives and values of safety, including nuclear safety, accountability, fairness, transparency and value for money.

The following business drivers have also been considered in evaluating the Contracting Strategy:

i) Major modification and refurbishment projects to align as far as possible and practical with the EPC contracting model.

ii) Utilize existing agreements as much as possible and practical, insofar as the service provider's skill set matches the services required.

iii) A single point of accountability (contractor) for each area of the BoP work execution is preferred to ensure proper oversight, jobsite work coordination and flexibility of implementation

iv) OPG's future business direction:

- Smaller fleet, fewer staff, more strategic labour and contracting strategies, improved long-term inspection and maintenance strategy, different outage strategy (longer periods between subsequent outages), develop contractor capabilities for future services and support.
- Operate in a safe, efficient and cost effective manner, with prudent investments to improve reliability and lower production costs.
- Nuclear Refurbishment to work collaboratively with Darlington station to support its objective of striving toward top global decile performance post refurbishment.

v) Cost and schedule related considerations:

- Completion of the full work scope within the approved and released refurbishment work budget.
- Completion of the full work scope within the approved schedule.

The guiding commercial principles from the DR Commercial Strategy (NK38-REP-00150-10001) were considered in developing and evaluating the contracting options.

3.1 Contracting Alternatives Analysis

3.1.1 Bundling of Work

A number of alternatives were examined by the Team in order to align the work packaging with how the team plans to manage the sub-projects. Options examined included:

1) Contract the BoP scope by sub-projects per the original project work breakdown structure ("**WBS**") (eg., contract out all the Reactor Systems, Safety & Controls, Common Systems Work etc. as bundles). Each of these would require an assessment for the best alternative contracting option. This was felt to be unmanageable from an execution point of view with too many blurred lines and execution interferences between groups. This breakdown of Project work does not fit well into the area and system approach, and is no longer being considered.

2) Maintain a single major BoP Project, competitively sourced as a complete EPC contract (200+ DSRs). This would contain all the modifications and maintenance work considered a part of the BoP scope. A single EPC contract would result in a large [redacted] project, concentrating all work with one contractor. In the event of poor contractor performance during execution, the lack of immediately available options to pick up required work could pose a significant risk to the overall DR Program.

3) Redefine the sub-projects to more directly align with the station systems through a packaged scope approach. Advantages to this approach include execution, commissioning and turn-over benefits associated with aligning in this fashion. It would enhance the strong objective of packaging the work to best suit field

execution. Station planning, operations support, permitry application and AFS turn-over work is all aligned in this way. Appendix B outlines the current BoP scope packaging.

3.1.2 Work Packaging, Contractor Fit and Contracting Models

Alternative procurement strategies were examined for the work packages that will make up the BoP work.

Bulkhead and Islanding and Shutdown/Layup and Services alternatives were examined independently by their respective projects teams. The consistent theme that emerged from analysis was to leverage existing agreements to place work scope with appropriate contractors. This is summarized as follows:

Bulkhead and Islanding preferred alternatives:

- Bulkhead and containment isolation work EPC was included in the Retube and Feeder Replacement ("**RFR**") competitive process as an optional scope in order to minimize risk and realize schedule advantages, both for up front conceptual work, and for critical path field execution activities.

- Prerequisite work scope be performed by the Projects and Modifications group via the ESMSA secondary compete on behalf of the BoP DR projects including Islanding.

- Refurbishment Outage Modifications/Islanding contracted as EPC via the ESMSA contractors. A single exception to this has been identified, where field execution of the special safety system logic modifications should be retained by trained OPG maintenance staff.

- Barrier engineering work is recommended to be contracted with either OSS or ESMSA, with procurement and construction executed via the ESMSA contractors.

Shutdown/Layup and Services preferred alternatives:

- Shutdown/Layup work be consolidated into the individual DR project's scope(s) of work and assigned to that specific project's contractor where possible using the EPC model. Scope added to existing agreements will follow the change process set out in those agreements. Any remaining work that does not fit within a specific DR project is recommended to be sourced with the ESMSA contractors using the EPC model.

- Services work is recommended to be consolidated into the individual DR project's scope(s) of work and assigned to that specific project's contractor where possible using an EPC model. Scope added to existing agreements will follow the change process set out in those agreements. Any remaining work that does not fit within a specific DR project or requires specialized resources is recommended to be sourced with the ESMSA contractors. OPG will maintain overall co-ordination of station supplies to support the Services Work within each project.

3.2 Decision Options and Constraints

The ESMSA contracts were negotiated as a result of a competitive procurement process and awarded in an effort to engage long-term development and support from the contractor community to service OPG's requirements through DR and beyond. Given the potential work to be awarded, the base workload of the ESMSA contractors needs to be considered while assessing their ability to adequately absorb additional work. This point may require further evaluation as additional DR contracts are issued.

OPG has engaged contractors and put in place the ESMSAs to move the contractors quickly through the learning curve in preparation of the refurbishment. This early engagement will help to ensure the safe, quality, efficient and effective execution of work. Appendix D presents a comparative timeline with estimated durations for the direct award, ESMSA secondary compete and competitive RFP procurement approaches.

Due to the overall value and amount of work contained within the Project, further consideration must be given to how the work is distributed. Per the previous section, it was determined that the bulk system and valve/commodity work best fits with an EPC contracting model to be sourced through the ESMSA contractors by leveraging existing agreements.

Options for executing this strategy include:

I) Keep all ESMSA work bundled in one mega-package;

II) Keep each system, or system component index ("**SCI**") package separate;

III) Look for logical breakdown of work that both mitigates risks of over-extending a single contractor and keeps the work sufficiently separate geographically and from a system isolation (work protection permit) point of view.

A single EPC contract of bulk system work would result in a large [redacted] winner-takes-all mega-project. In the event of poor contractor performance or outright failure during execution, a lack of competitive options available to immediately assist if required could pose a very large risk, including the concentration risk, to the overall DR Program. This option also fails to utilize resources that could be offered by other potential contractors which should be considered given the Project's size.

Conversely, running a secondary competitive process with the ESMSA contractors for each individual system would largely fail to utilize OPEX concerned with limiting field execution rub points and integration issues. A greater corresponding risk for correctly integrating and scheduling system isolations falls back to OPG, and also results in greater OPG management and oversight requirements. Procurement delays are also seen as potential for driving increased schedule risk to the project.

A logical split of the work destined for the ESMSA contractors is therefore considered beneficial. In the event of contractor performance issues during execution, there will be at least one other contractor currently engaged in similar work, minimizing OPG's risk exposure to the extent possible.

In considering these issues, the Team has determined that a selective and organized split of all Project work based on a combination of factors including system, location and/or type of work will determine the scope packages and best meet all Project objectives. This approach will require flexibility in placing scope packages with the most appropriate contractor to utilize the existing agreements and to ensure that the same contractor will be working on the same component system(s), in the same work area and subject to the same isolation requirements. Flexibility in sourcing scope on a selective basis using criteria shown in Appendix A would allow direct award of work to ESMSA contractors as an option for the Project. In the event of direct award, value for money, which is inherent in the ESMSAs as they were the result of a primary competitive process, could additionally be verified through the use of third-party estimates.

The Refurbishment outage scope has changed as a result of Life Extension work moving out of the Refurbishment outage window and into regular planned station maintenance or planned outages. The bundling of work had to account for the resultant changes in Refurbishment outage scope.

4.0 RECOMMENDED CONTRACTING STRATEGY

Work scope packages will be grouped logically by the project according to system, work area and type of work. These BoP scope packages will incorporate Islanding and Shutdown/Layup work in order to maximize contracting efficiency and minimize field execution interference.

1. It is recommended that work leverage the ESMSA Agreement. The criteria presented in Appendix A will be utilized to determine how work is awarded to the current ESMSA Contractors. OPEX has shown that planning and execution of BoP work has significant impacts on the execution of the Refurbishment program. It is therefore important that early engagement of the ESMSA Contractors be undertaken to ensure safe, efficient and cost effective execution of work.

2. It is recommended that scope packages identified by the Team leverage existing agreements where possible to contract the work. If an existing DR project area or system has a contract in place or planned (i.e., Retube & Feeder Replacement, Turbine Generators, Steam Generators, Fuel Handling) where a BoP scope package would logically fit, efforts should be made to place the work with that contractor. Scope added to existing agreements will follow

OPG governance and the contract change process set out in those agreements.

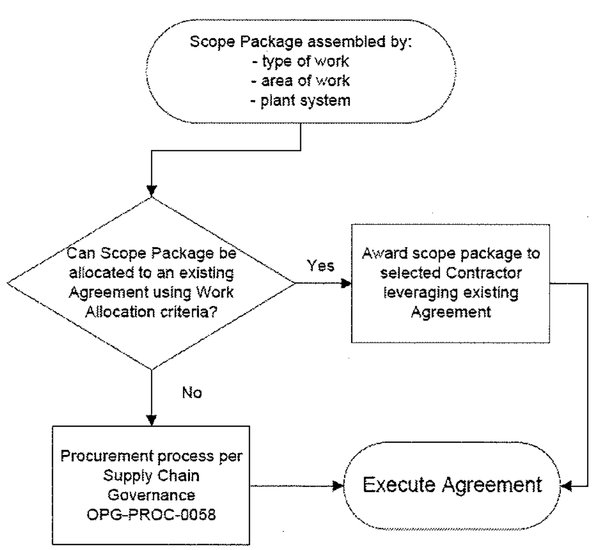
3. If work cannot be awarded by leveraging existing contracts as described in items 1 or 2 as recommended above, then the regular procurement process (i.e., OPG-PROC-0058) will be followed. OPG's procurement governance and contract change processes embedded with each contract will be complied with when executing the recommended strategy.

Third party estimates will be used to evaluate Contractor estimates and ensure value for money. Once work has been awarded to a contractor, scope changes under the award will follow the change process set out in the relevant agreement.

This recommended approach accomplishes the following:

- Aligns with the preferred DR EPC contracting model;
- Utilizes existing agreements in a manner that is both practical and a good fit;
- Reduces interfaces and enforces single point of accountability for each contract;
- Engages multiple contractors and provides options to OPG in the event of poor contractor performance or failure;
- Distributes the work using a logical methodology to maintain a focus on field execution efficiency, system commissioning and turnover.

Recommended Strategy - Overview



5.0 CHOICE OF PRICING MODEL

Due to the expected level of scope definition, the pricing model for most of the BoP work packages is expected to be target price with a performance fee. Further evaluation and validation respecting the pricing model will be required prior to procuring the work to determine if any work packages will require different pricing models.

Contingency scope, as a result of inspections and discovery work during execution, will be based on the cost reimbursable pricing model.

6.0 INTERFACE AND INTEGRATION ISSUES

Due to the large volume of plant system work and the and the continuing refinement of scope with respect to when it will be completed over the Life Extension window, the level of interference for this project with other DR projects or their associated contracts has the potential to increase execution risk and will require further evaluation as the project matures. The Team will continue to work with other DR projects, in particular those that are planning to utilize the existing contracts in order to avoid conflicting contracting strategies. This has already been largely mitigated by amalgamating Islanding, Shutdown/Layup and Services scope packages into this BoP contracting strategy.

A great deal of effort is already being placed into assessing and executing pre-refurbishment work via Projects and Modifications on behalf of DR.

These areas will be continually assessed as the definition phase progresses further for dependencies or integration requirements with other DR Projects.

7.0 KEY RISK AND PROPOSED MITIGATION

Project risks are documented and tracked in the risk register.

Some of the key risks and proposed mitigation associated with the recommended contracting strategy include:

- The Terms & Conditions (“**T’s & C’s**”) in the existing agreements may not be sufficient to address the needs and risks for the BoP project scope of work to be done during DR execution outage. The Team will work with the Contract Managers to review the T’s & C’s and ensure that any additional requirements are properly addressed. In respect of the ESMSAs, a template for DR specific contract documents (COIR Deviation list and Work Sheet) is being developed with input from Contract Managers for work during DR execution outage. It is anticipated the majority of potential issues will be resolved through the ESMSA worksheets. Performance indicator scorecards specific to the DR work will be used if and as required.

- The proposed BoP contracting strategy will result in engaging contractors for combined scopes of work that are currently managed by separate DR project teams (i.e., Balance of Plant, Islanding and Shutdown/Layup & Services). A plan will be required to mitigate overlap of these management functions.

- The failure of a contractor to successfully execute awarded scope (or the outright failure of the contractor) presents a risk to the Project. There are multiple fully qualified contractors capable of executing the BoP work. The mitigation strategy (ie., Plan 'B') would include engaging one or more of the other contractors already involved in performing DR work to incorporate the additional scope from a failed contractor.

8.0 SUCCESS CRITERIA & KEY PERFORMANCE INDICATORS

Critical success factors for the proposed contracting strategy include successfully awarding EPC contract(s) for the scope of work in the Project. The contract(s) will incorporate OPG's core business values of Accountability, Transparency and Value for Money taking into account the overall DR Program objectives to Maintain OPG Control, Minimize Impact on Existing Units, Achievable Schedule and Budget and the Appropriate Allocation of Risks as outlined in the DR Program Commercial Strategy (NK38-REP-00150-10001).

Appendix A: Work Allocation Criteria

The following are the criteria utilized to determine what work may be direct awarded to a specific contractor and more specifically, to one of the ESMSA contractors:

1. Type of work;
2. Capability, capacity and experience of the contractors with work of a similar nature;
3. Experience with OPG's Engineering Change Control process;
4. Experience with OPG's maintenance procedures;
5. Work area (i.e., if a contractor is already working in the area, then to avoid conflicts, safety and human performance, and co-ordination issues, OPG will strive to allocate work to the same contractor);
6. Constraint on the number of contractors engaged in the Refurbishment (i.e., a large number of contractors has an adverse impact on OPG's oversight and management capacity);
7. Contractor's capacity to effectively supervise and manage trades staff;
8. Whether or not secondary competitive process or even primary competitive process for work will have a significant impact on overall work schedule for the DR Program;
9. The contractors basing their planning and estimating on the schedule provided by OPG for the work; the contractors providing input to these schedules;
10. As part of the work allocation to the contractors, the contractors providing OPG with a resource management plan (optimizing resources) for the work;
11. Considering other input from the contractors as part of the allocation of work; and
12. Considering balance for dose when allocating work.

Appendix B: Balance of Plant Scope Summary

No.	Project	Area	Sub-Area	DSRs	DSR Description/Detail
					Nuclear
1.1	BoP	PHT + Aux.	PHT Motor	TS0320-1	Refurb PHT Pump Motors - field work scope
1.2	BoP	PHT + Aux.	PHT Cabling	TS0090-7	Replace PHT pump switches/cblg
1.3	BoP	PHT + Aux.	PHT Pump	TS0090-12	Contingency - PHT Pump Refurb
1.4	BoP	PHT + Aux.	PHT Pump	TS0090-1	Inspect & Overhaul PHT Pumps
1.5	BoP	PHT + Aux.	ESW to PHT Mod	SI0050-1	EHS - ESW to PHT tie
2.1	ISLN	Containment	Button-up logic	TS0780-1	Modify button-up logic after refurb unit isolated from station containment
2.2	ISLN	Containment	airlock/transfer chamber logic	TS0780-13	Modify airlock and transfer chamber door logic to allow 2 doors open
2.3	ISLN	Containment	airlock/transfer chamber logic	TS0890-6	Restrain airlock and transfer chamber doors open
2.4	ISLN	Containment	Dryer Bypass	TS0780-7	Install VVRS bypass to allow airlock and transfer chamber doors to be opened after refurb unit is isolated from containment
2.5	BoP	Containment	Dryers	TS1370-2	Replace 3 way AOVs + replace key components
3.1	BoP	Regulating	Flux Detectors	TS0220-5	Replace Flux Detectors
3.2	BoP	Regulating	Flux Detectors	TS0240-10	Replace Vertical Flux Detectors
3.3	BoP	Regulating	Flux Detectors	TS0260-8	Replace SDS2 Flux Detectors
3.4	BoP	Regulating	Adjusters	TS0220-3	Contingency - Replace Adjusters

4.1	BoP	Other	Ventilation	IP0420-2	Contingency - ASME N510 mods
4.2	BoP	Other	LISS Tank	TS0260-9	Contingency - Replace 34710-TK4
4.3	BoP	Other	ESC Tk Coating	TS0070-3	Contingency ESC tk coating replace
4.4	BoP	Other	Calandria	TS2180-2	Calandria Relief duct repair
4.5	BoP	Other	Spiroid Gear	TS0220-13	Contingency - spiroid gear replace
					Conventional
5.1	BoP	Electrical Systems	Class II MCC	TS0540-1	MCC Maintenance
5.2	BoP	Electrical Systems	Transformer	TS0570-4	Replace cooling system
5.3	BoP	Electrical Systems	MOT	TS0570-23	Contingency - Refurb Transformer
5.4	BoP	Electrical Systems	UST	TS0570-24	Contingency - Refurb Transformer
5.5	BoP	Electrical Systems	Bus Mtce	TS0840-3	BU1-8 Maintenance
5.6	BoP	Electrical Systems	Components	TS0570-7	Replace Various Components
5.7	BoP	Electrical Systems	500kV Bushings	TS0570-20	Replace 500kV Bushings
6.1	BoP	Service Water	Stopple Plug	TS0630-6	Duplicate from valve contract - stopple Plug mod component only
6.2	BoP	Service Water	NV409 Mod	TS0630-4	NV409 mod
6.3	BoP	Service Water	Copper Lines	TS0630-5	Replace Copper Lines
6.4	SDYLP	Service Water	Alternate LPSW Cooling	TS0840-4	Alternate cooling to LPSW loads during LPSW layup (which is contingent on discovery scope)
7.1	BoP	Structures	RB structures	TS0510-16	Contingency RB structure repair
7.2	BoP	Structures	RB internals	TS0510-17	Contingency RB internal structure repair
7.3	BoP	Structures	RAB structures	TS0510-18	Contingency RAB structure repair
7.4	BoP	Structures	CSA - Nuclear	TS0510-19	Contingency CSA structure repair
7.5	BoP	Structures	CSA - WLA & SAB	TS0510-27	Contingency CSA structure repair
7.6	BoP	Structures	TG structures	TS0510-20	Contingency Turbine structure repair

7.7	BoP	Structures	TAB	TS0510-26	Contingency TAB repair
7.8	BoP	Structures	Pumphouse structures	TS0510-22	Contingency Pumphouse repair
7.9	BoP	Structures	Pipes, Ducts etc	TS0510-23	Contingency Pipes, Ducts ... repair
7.10	BoP	Structures	EPS	TS0510-24	Contingency EPS repair
7.11	BoP	Structures	FFAA	TS0510-25	Contingency FFAA repair
7.12	BoP	Structures	IFB	TS0510-28	Contingency IFB repair
7.13	BoP	Structures	FH Serv area	TS0510-29	Contingency FH Serv Area repair
7.14	BoP	Structures	CCA	TS0510-30	Contingency CCA repair
7.15	BoP	Structures	SG	TS01590-2	Contingency SG Building repair
8.1	BoP	Fire Protection	Fire Water	IP1220-1	Fire Protection Mod - Fire Water
8.2	BoP	Fire Protection	Shafts, dikes	IP1220-2	Fire Protection Mod - Shafts, dampers & dikes
8.3	BoP	Fire Protection	Separation & seals	IP1220-3	Fire Protection Mod - fire separation and penetration seals
8.4	BoP	Fire Protection	Lighting	IP1220-4	Fire Protection Mod - emergency lighting
8.5	BoP	Fire Protection	Alarms	IP1220-5	Fire Protection Mod - fire alarms
9.1	SRVCS	Air	Breathing	TS0800-3	Modifications to breathing air system
9.2	SRVCS	Air	Service	TS0930-1	Modifications to service air system
9.3	SDYLP	Air	Dryers	TS0830-1	TMODs - various secondary side systems
9.4	SDYLP	Air	Dryers	TS0830-2	TMODs - various secondary side systems
9.5	SDYLP	Air	Dryers	TS0830-3	TMODs - various secondary side systems
9.6	SDYLP	Air	Dryers	TS0830-4	TMODs - various secondary side systems
9.7	SDYLP	Air	Dryers	TS0830-5	TMODs - various secondary side systems
9.8	SDYLP	Air	Dryers	TS0830-9	TMODs - various secondary side systems
10.1	SDYLP	TG	FRF	TS0830-2	Breather cap mod
10.2	SDYLP	TG	Excitation	TS0830-10	TMODs on excitation cubicle desiccant and heater

10.3	SDYLP	TG	Stator Cooling	TS0830-7	TMOD for N2 blanket on stator
10.4	SDYLP	TG	H2 Cooling	TS0830-9	TMOD for N2 blanket on H2 coolers
11.1	RAF	Facilities		CP410-1	T-MODs for service
11.2	RAF	Facilities		CP410-2	T-MODs for service
11.3	RAF	Facilities		CP410-3	T-MODs for service
11.4	RAF	Facilities		CP410-4	T-MODs for service
11.5	RAF	Facilities		CP410-5	T-MODs for service
11.6	RAF	Facilities		CP410-6	T-MODs for service
11.7	RAF	Facilities		CP410-7	T-MODs for service
11.8	RAF	Facilities		CP410-8	T-MODs for service
11.9	RAF	Facilities		CP410-9	T-MODs for service
11.10	RAF	Facilities		CP410-10	T-MODs for service
11.11	RAF	Facilities		CP410-11	T-MODs for service
11.13	RAF	Facilities		CP480-1	T-MODs for service
11.14	RAF	Facilities		CP480-2	T-MODs for service
11.15	RAF	Facilities		CP480-3	T-MODs for service
11.16	RAF	Facilities		CP480-4	T-MODs for service
11.17	RAF	Facilities		CP480-5	T-MODs for service
11.18	RAF	Facilities		CP480-6	T-MODs for service
11.19	RAF	Facilities		CP480-7	T-MODs for service
11.20	RAF	Facilities		CP480-8	T-MODs for service
11.21	RAF	Facilities		CP480-9	T-MODs for service
11.22	RAF	Facilities		CP0050-1	T-MODs for toilets
11.23	ISLN	Facilities	Barriers	TS0790-1	Barriers to separate refurb units from operating units
12.1	SRVCS	Other	Cranes	TS01020-1?	TMODs, NICRs and Mods
12.2	SDYLP	Other	SGECs	TS0830-11	TMODs to SGECs to allow N2 gas to secondary side of SG
12.3	BoP	Other	LP Heaters	TS0610-17	Main Condenser LP Heater - inspect & replace
12.4	BoP	Other	Condenser Struts	TS0610-18	Strut Repair

					SPECIALTY WORK
13	BoP	PHT + Aux.	SDC Heatsink	TS0500-1	Alternate SDC Heatsink
14	BoP	PHT + Aux.	PHT Motor	TS0320-1	Refurb PHT Pump Motors - rehab of motor s only
15	BoP	Regulating	Adjuster Flexibility	SI0410-1	Contingency - Adjuster Rod Flexibility
16.1	BoP	PM - Other	Cranes		Scheduled Preventative Mtce WO's
16.2	BoP	PM - Other	PM - Main Steam & SRV's		includes OR & NV radiography
16.3	BoP	PM - Other	SDS2		NOP EQ component replacement
16.4	BoP	PM-Other	NPC	TS0120-3	Replace A/L Door Seals
17.1	BoP	Components	EP	TS0990-4	Contingency - Replace Electrical Penetration Modules
17.2	BoP	Components	EQ Cable	TS0900-3	Replace EQ Cables
17.3	BoP	Components	Fibre Cable	TS0960-4	Contingency - Fibre Optic Replace
17.4	BoP	Components	Term Block	TS0970-3	Contingency - Replace Term Blocks
17.5	BoP	Components	Cable	TS0980-4	Contingency - Replace Low/Med Voltage Cables
17.6	BoP	Computers	DC&M	TS0360-8	Contingency - replace I/O cables
18.1	BoP	Valves	PHT + Aux.	TS0090-2	Inspect representative sample of isolation/interconnect MOVs
18.2	BoP	Valves	PHT + Aux.	TS0090-9	Repack PHT MOVs
18.3	BoP	Valves	PHT + Aux.	TS0090-13	Contingency - Overhaul / replace PHT loop/interconnect MOVs
18.4	BoP	Valves	PHT + Aux.	TS0110-8	Repack manual valves (SDC)
18.5	BoP	Valves	PHT + Aux.	TS0110-7	Repack PHT/MOD/ESC MOVs

18.6	BoP	Valves	PHT + Aux.	TS0110-15	Contingency - Replace PHT/MOD/ESC Man Vlvs
18.7	BoP	Valves	PHT + Aux.	TS0110-13	Contingency - Refurb PHT/MOD/ESC MOVs
18.8	BoP	Valves	PHT + Aux.	TS0100-5	Replace 33840-NV21
18.9	BoP	Valves	MOD + Aux.	TS1450-1	Refurb Moderator NVs
18.10	BoP	Valves	MOD + Aux.	TS1070-3	Contingency - Replace Mod Vlvs
18.11	BoP	Valves	MOD + Aux.	TS0080-4	Replace MV20/27/29 Facing
18.12	BoP	Valves	ESC	TS1550-1	ESC - Replace/inspect PV50/51
18.13	BoP	Valves	ESC	TS1550-2	Contingency - Replace PV50/51 other units
18.14	BoP	Valves	Vault Vapour Recovery	TS0290-5	Contingency - Replace Vapour Recovery Valves
18.15	BoP	Valves	ECI	TS0150-7	Contingency - replace NVs <3" (ECI)
18.16	BoP	Valves	Containment	TS0670-5	Contingency - Refurb NPC Isoln vlv
18.2	BoP	Valves	Serv Water	TS0630-6	Serv Water - valve work only (not stopple plug mod)
19.1	BoP	Valves	PM		PHT+Aux - RVs
19.2	BoP	Valves	PM		Mod+Aux - RVs
19.3	BoP	Valves	PM		ECI - RVs
19.4	BoP	Valves	PM		LISS - RVs
19.5	BoP	Valves	PM		AGS - RVs
19.6	BoP	Valves	PM		SGECs - RVs
19.7	BoP	Valves	PM		Main Steam & SRVs - RVs
19.8	BoP	Valves	PM		Condensate & Feedwater - RVs
19.9	BoP	Valves	PM		Extraction Steam & Feedheaters - RVs
19.10	BoP	Valves	PM		Airlocks - RVs
19.11	BoP	Valves	PM		Serv Water - various - RVs
19.12	BoP	Valves	PM		TG + Aux - RVs
19.13	BoP	Valves	PM		PHT+Aux - Actuators
19.14	BoP	Valves	PM		Mod+Aux - Actuators
19.15	BoP	Valves	PM		ECI - Actuators
19.16	BoP	Valves	PM		LISS - Actuators
19.17	BoP	Valves	PM		Main Steam & SRVs - Actuators
19.18	BoP	Valves	PM		SGECs - Actuators
19.19	BoP	Valves	PM		Condensate & Feedwater - Actutators

19.20	BoP	Valves	PM		Extraction Steam & Feedheaters - Actuators
19.21	BoP	Valves	PM		LZCS - Actuators
19.22	BoP	Valves	PM		TG+Aux - Actuators
19.23	BoP	Valves	PM		LPSW - various - Actuators
19.24	BoP	Valves	PM		Mod + Aux - Misc (man valves & NVs)
20.1	SDLYP	Vac/Air Dry	PHT	TS0890-2	Vacuum dry tie-in mod
20.2	SDYLP	Vac/Air Dry	Moderator	TS0890-1	Lay-up modification to allow moderator drain & dry
20.3	SDYLP	Vac/Air Dry	Steam Generators	TS0050-1	Tie-in mod for the Steam Generator primary side to allow vacuum and air drying
21	ISLN	Bulkhead	Bulkhead		Bulkhead installation for Islanding

BoP – Balance of Plant

ISLN – Islanding

RAF – Refurbishment Additional Facilities

SDYLP - Shutdown & Layup

SRVCS - Services

Appendix C: ESMSA Background Information

On November 2, 2010 OPG issued a Request for Information (RFI) to the following 20 proponents for their interest, capability, experience and capacity to support Engineering, Procurement and Construction needs of OPG going into a longer period of time for these services:

[redacted]

The responses to the RFI were evaluated and the following proponents were progressed to the RFP stage as a primary competition for the ES MSA. NOTE: The RFP included OPG's intention to utilize the ESMSA contractors for nuclear refurbishment work, specifically BoP work.

[redacted]

Through the formal competitive process conducted in accordance with the principles and processes specified in OPG-PROC-0058 Procurement Activities and based on the proposal evaluations and negotiations, the following two proponents were awarded the ES MSAs on February 15, 2012:

- Black & McDonald with RCMT
- E.S. Fox Ltd. with Hatch and Crosby Dewar

The ESMSAs were developed to increase OPG's flexibility to award work of different scopes (E, P, C, EP, EC, PC, EPC, etc.) for a wide range of work. In addition, they were developed with the understanding that the cost (value) and complexity of work should be protected by the terms and conditions of the ESMSAs. It is believed this has been successfully achieved with the ESMSAs relative to the previous MSAs (e.g., Engineering Services MSA and Construction Labour MSA) for comparable work at nuclear. In addition to the value improvements achieved in pricing, both ESMSA Contractors have accepted terms and conditions which are viewed as favourable to OPG.

Any work, where there is substantial change to the terms and conditions, would not flow to the ES MSA and would follow the normal procurement process.

Appendix D: Procurement Timeline Comparison

Alternative Procurement Timeline Comparison (Estimated Durations)