ONTARIO POWER GENERATION

Plan

General Business	
Document Number: N/A	
Sheet Number: N/A	Revission: R000

Title:
SCOPE OF WORK16-31555, D2O STORAGE FACILITY EXTERNAL COST ESTIMATE PREPARATION

© Ontario Power Generation Inc., 2011. This document has been produced and distributed for Ontario Power Generation Inc. purposes only. No part of this document may be reproduced, published, converted, or stored in any data retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise) without the prior written permission of Ontario Power Generation Inc.

Scope Of Work: 16-31555 D2O Storage Facility External Cost Estimate Preparation

2011-11-21

Order Number: N/A
Other Reference Number: N/A

General Business

Prepared by: Julian Read Nov 21/11
Julian Read — Date
Modification Team Leader

Reviewed by : Nov 21, 2011
Peter Moore — Date
Project Leader II

Approved by: Nov 21, 2011
Vince Tzambazis — Date
Project Manager

1.0 INTRODUCTION

This document sets out the requirements of detailed cost estimating services provided by Faithful and Gould for the Darlington D2O Heavy Water Management and Drum Handling Project are outlined in this scope of work.

1.1 Background

This project will build a Heavy Water Storage Facility at the Darlington site to combine expected D2O storage needs for DN Refurbishment, and for TRF/Darlington Operational Improvements. Reviews of the needs and evaluation of the options for both refurbishment storage and operational improvement have been completed.

The primary driver to add storage capacity in the short term is the refurbishment (Retube and Feeder Replacement) of Darlington units before their predicted end of service life. The start of the refurbishment outages is planned for October 2016 but may occur as early as October 2015. The New D2O Storage Facility at Darlington, as a Campus Plan Project, must be completed and fully functional six months before the earliest start of refurbishment (i.e. by April 2015). The additional facility has to provide sufficient heavy water storage capacity at the Darlington site during simultaneous overhaul of two reactors. This implies two units of heavy water fully drained from the HTS, Moderator System, and additional space for downgraded dirty and clean D2O generated during decontamination activities. The facility will operate during and after refurbishment.

The secondary driver is a consequence of a previously initiated Operational Improvement project, 16-31555, subsequently deferred to be merged with the refurbishment project in order to reduce OPG costs (the cost reduction is estimated between 10% to 15% i.e. $20M to $30M). This storage is required to improve utilization of the Darlington TRF and mitigate threats to the achievement of OPG detritiation objectives (during and after refurbishment) due to constraints. There is a high strategic value in maintaining a standby low-Curie inventory to support in-service units or meet new future needs. The addition of this storage will delay a decision on how best to meet future needs for detritiation capacity to beyond 2020, and could potentially eliminate the need for a major refurbishment of the existing TRF or consideration of a new plant. These operational improvements also mitigate the business risk of losing tritium/isotope sales due to unavailability of the TRF due to insufficient storage capacity to maximize low-curie product.

1.2 Business Case Funding Strategy

1.2.1 Current Business Case Summary Release

A Developmental Release for funding was resumed in December 2010 to complete the following deliverables:

1. Generate Design Requirements for RFP purposes
2. Generate Conceptual Design Report for RFP purposes
3. Establish contracting strategy
4. Complete Front End Planning activities
5. Prepare Partial Release BCS
6. Issue RFP for Scope Definition, Modification Planning, and Detailed Design, evaluate proposals, and select preferred vendor(s)

1.2.2 Future Business Case Summary Releases

1.2.2.1 Partial Release BCS will request funding to complete the following activities:

1. Issue a contract with a design agency for completion of scope definition, modification planning, detailed design
2. OPG to start procurement of long lead materials
3. Construction/installation/commissioning planning
4. Issue RFP for construction/installation of new facility, and select preferred vendor(s)
5. Preparation of Full Release BCS

1.2.2.2 Full Release BCS will request funding to complete the follow activities:

1. Finalize construction/installation/commissioning planning
2. OPG to continue procurement of long lead materials
3. OPG to procure all other materials
4. Issue a contract with a construction company to construct/install the new facility
5. Commissioning of new facility and equipment

6. Final AFS of new facility
7. Design close-out
8. Lessons learned Report

2.0 SCOPE OF WORK

The scope of work is to provide an estimate for the partial release business case summary. This estimate will be broken down by activity as outlined in the basis of estimate within industry standard ranges of accuracies, and by year according to the provided schedule. A summary of costs will be provided using the template in Appendix A.

OPG requires a class 3 estimate for partial releases presented to the Refurbishment Review Board for the next release, and a detailed explanation and disposition will be required by Faithful and Gould if a class 3 estimate is not achievable. The final submission of the estimate shall be no later than December 23, 2011 at noon.

The following will be available to Faithful + Gould at the time of estimate preparation:

Current Project Documentation

- Project Charter (N-PCH-09701-10001)
- Preliminary Design Requirements (NK38-DR-38000-10001)
- Conceptual Design Report (NK38-REP-38000-10002)
- Scope of Work for engineering contract: Darlington Heavy Water Storage Facility Project: (NK38-SOW-38000-10003)
- Draft modification outline and supporting forms
- Site access for maximum of 2 walk downs in the field
- Access to the Master EC files
- Basis of Estimate for Partial Release
- P6 Schedule outlining activities and durations

Legacy Project Documentation for information purposes

- Legacy NSS Design Documentation for previous scope of the project (accessible in Master EC file)
    - Nuclear Safety Solutions Technical Evaluation Packages (Nov 2007):
        - PN005-RP-001 R00 Civil
        - PN005-RP-002 R00 Mechanical
        - PN005-RP-003 R00 Services
        - PN005-RP-004 R00 OPEX Report (OPG # NK38-DRT-38000-10001)
        - PN005-RP-005 R00 SCL Report
        - PN005-RP-006 R00 Preliminary Environmental Assessment

- PN005-RP-008 Preliminary Nuclear Safety Assessment
- PN005-RP-009 R00 Site Preparation Report
- PN005-PL-021 R00 Preliminary Quality Plan
- PN005-PL-023 R00 Licensing Plan

- Wardrop Engineering Inc. Preliminary Design Package (Nov 2007) including:
  - Preliminary drawings
  - Design Requirement / Design Description
  - Preliminary System Classification List
  - Preliminary Safety and Licensing Assessment
  - Specifications and Data Sheets
- Kinetrics:
  - N-REP-38000-10000 "OPG Heavy Water Storage Management and Drum Handling – Study of Preferred Solution"

– Darlington Refurbishment D2O Facility Evaluation (NK38-REP-09701-0265054)

2.1 Project Estimate Deliverables

The estimate of cost shall include an evaluation of all costs of the elements of a project or effort as scoped in BOE document. It shall include (but not necessarily be limited to):

- OPG Management Support Cost
- OPG Engineering Support Cost
- OPG CMO, FE Support Cost
- OPG Station Support Cost
- External Engineering Cost
- Procurement (Material) Cost with Long Lead Materials (> 6 months from PO approval to delivery) provided separately
- Equipment Cost
- Installation/Commissioning Cost (Trades Cost)

The estimate should be provided in accordance with OPG standard Work Breakdown Structure and Project Breakdown Structure and also it should be built in Success Estimator software.

2.2 Project Estimate Schedule

All documents required for the estimation report preparation will be submitted to Faithfull + Gould via email or access on the Darlington NK38 drive by November 30, 2011.

OPG requires that Faithfull + Gould will submit the final and approved estimation report on or before noon on Friday December 23, 2011.

3.0 FEE PROPOSAL

OPG expects that Faithful+Gould will provide a fixed price proposal and a Level 3 schedule showing all activities and their interdependencies required to complete the expected deliverables by November 30, 2011.

The fee proposal should clearly explain what included or excluded from the proposal; generally it should at least include the following:

- The cost to develop the estimate
- The cost to attend various required estimating meetings
- The cost to perform necessary estimating walk-down(s)
- The cost to review the estimate with OPG
- The cost to issue final estimates once comments from OPG received, and prepare two final reports
- The level of accuracy of the expected estimate for each releases based the provided document
- The date which Faithful+Gould can deliver the final estimate
- Any other related costs and expenses necessary to complete the estimates

Appendix A: BCS Attachment A Template

	$ 000's OM&A	LTD Dec 2010	2011	2012	2013	2014	2015	2016	Later	Total
Accounting Basis	Project Mgmnt & Support									-
	Engineering									-
	Procurement									-
	Construction									-
	Other									-
										-
										-
										-
										-
	Project Costs	-	-	-	-	-	-	-	-	-