

BUSINESS CASE SUMMARY

DNGD: EQ Closure and Component Replacement Project 16 - 38457

Full Release Business Case Summary D-BCS-03651-10004-R000

1/ RECOMMENDATION:

We recommend approval of the release of \$33.2M (including contingency), for a total release of \$63.1M. This will allow the Environment Qualification (EQ) Closure and Component Replacement Project to complete the remaining component replacements which have been committed to the Canadian Nuclear Safety Commission (CNSC) and environmental qualification completion assurance activities. It will also permit the project to determine the most efficient means for maintaining full compliance with the environmental qualification requirements of the Darlington Nuclear operating license; and allow for preliminary engineering activities to begin for new EQ issues identified during this process.

The business objective of this project is to align Darlington systems and components with the EQ requirements of its Power Reactor Operating License (PROL). Action Assignment # 28058364 has been raised to track the completion of a Regulatory Commitment (REG C) made to the CNSC for the replacement of non-qualified components with EQ-qualified components by December 31, 2010.

A total of \$29.9M was previously released in accordance with Organizational Authority Register (OAR) element 1.1. The funding was used to:

1. Complete designs associated with regulatory committed component replacements.
2. Replace components in the field in 2005, 2006 and 2007 as per the regulatory committed schedule.
3. Complete EQ List Development Packages (to be completed in November 2007)
4. Complete an EQ Program Self Assessment.
5. Complete a scope optimization study (to be completed in October 2007).

This request is to:

1. Replace the remaining components in the field in 2008, 2009 and 2010 as per the current regulatory committed schedule.
2. Carry out completion assurance activities for the components which have been replaced during the project and for those not expected to be affected by the scope optimization study.
3. Complete analysis to determine the most efficient means for Darlington Nuclear to meet the EQ requirement of its operating license. Develop the scope and business case for a new project to resolve new EQ issues arising from this analysis, if required.
4. Complete the transition the Project to the Station Sustaining EQ Program.

This release does not include any future detailed design, analysis or field work required to resolve anomalies outside of the scope currently committed to the CNSC, as shown in Attachment "D".

\$M (incl contingency)	Funding	LTD 2007	2008	2009	2010	2011		Later	Total
Currently Released	Partial	26.7	3.2						29.9
Requested Now	Full		11.3	10.7	10.4	0.8			33.2
Future Funding Req'd									-
Total Project Costs		26.7	14.5	10.7	10.4	0.8	-	-	63.1
Other Costs									-
Ongoing Costs									-
Grand Total		26.7	14.5	10.7	10.4	0.8	-	-	63.1
Investment Type Regulatory		Class OM&A	(IEV) Impact on Ec Value (38)			IRR N/A	Discounted Payback N/A		

Submitted By:

W. Robbins 2007-11-12

W. Robbins Date:

Senior Site Vice-President Darlington

Finance Approval:

D. Power 2008-01-03

D. Power Date:

Vice-President Corporate Investment Planning

Line Approval (Per OAR Element 1.1 Project in Budget):

J. Hankinson 2008/01/27

J. Hankinson Date:

President & Chief Executive Officer

BUSINESS CASE SUMMARY**2/ BACKGROUND & ISSUES**

The Ontario Power Generation Nuclear (OPGN) Environmental Qualification (EQ) program establishes an integrated and comprehensive set of requirements that provide assurance that essential equipment can perform as required if exposed to harsh design basis accident conditions and that this capability is preserved over the life of the plants. Under License Condition 7.1, Darlington must implement a program that is traceable, auditable and meets the OPGN requirements for EQ.

Requirements for Environmental Qualification (EQ) at Darlington Nuclear Generating Station (DNGS) were first spelled out in the Construction License and then formalized in 1978 with the first issue of the Design Guide. The "science" of EQ was in its infancy and formal EQ requirements did not apply to other CANDU stations. In the absence of Corporate, or National standards for EQ, a Darlington specific program manual was developed to provide governance for implementation of EQ. The list of equipment required to be qualified, the EQ Safety Related Component List (EQSRCL), was developed in a non-procedural, non-auditable manner and EQ was implemented at DNGS over the period 1986 to 1992.

The EQ program was handed over from Design & Construction to Operations in 1992. Lack of focus on the EQ sustaining program and the resultant degradation in component condition prompted the IIP EQ Restoration Program (Project EN009) in 1997. In November 1999, the CNSC proposed an amendment that became a part of the Darlington Power Reactor Operating License (PROL) requiring that the station provide evidence that required systems, components, protective barriers and structures in the facility are environmentally qualified by June 30, 2004.

The IIP Project was closed in 2001, with some scope necessary to comply with the PROL Condition outstanding. The transition plan identified the work to be completed, with an expectation that the majority of the issues would be completed by the end of 2003.

In May 2003 the CNSC provided acceptance criteria to clarify what was required to satisfy the PROL condition. At the direction of the Chief Nuclear Engineer the remaining EQ work was divided into two projects: one to complete activities necessary to satisfy the PROL condition due June 30, 2004 and a second to complete CNSC EQ commitments due after June 30, 2004 and establish a sustaining EQ Program.

The EQ Recovery Project (16-38411), which was completed June 30, 2004, involved completing the outstanding EQ assessments, completing gap analysis for components with a limited life and scheduling the resolution of issues remaining after June 30, 2004. Upon completion of project 16-38411, the current project, 16-38457 EQ Closure and Component Replacement was initiated to resolve the outstanding issues by December 31, 2010.

Under this project (16-38457), Darlington has followed the OPGN EQ list development process, as was done at the Pickering and Bruce sites, to update its EQSRCL; this process provides full traceability and compliance with the EQ design basis. During this exercise unqualified components that were not in the Darlington EQ program have been identified. As a result of these discoveries and other deficiencies the Senior Site Vice-President instructed the project to initiate a Darlington EQ Program Self-Assessment in 2006. One of the actions coming out of the self-assessment was the requirement for the EQ Project to perform a scope optimization study with the goal of identifying ways to reduce the scope and/or the cost of EQ.

The scope optimization study is scheduled to be completed in October 2007 at which time the recommendations will be used by the EQ Project and Darlington management to determine the most practical and economical path forward for EQ at Darlington.

Major deliverables achieved under previous releases of this project were:

1. Completion of EQ List Development Packages (TCD: November 30, 2007).
2. Completion of committed D541, D611, D631, D741, and D721 outage work (On track as per N-PROC-MA-0013).
3. Completion of committed 2007 online work (On track as per N-PROC-MA-0022).
4. Completion of design packages for remaining committed outage and online work (including discovery items for Limitorque actuators and ITT Cannon connectors - U1 packages complete, TCD for remaining packages: March 20, 2008).
5. Completion of an EQ Program Self-Assessment (Complete).
6. Completion of a scope optimization study (TCD: October 26, 2007).

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The previous BCS (Ref. 7) was prepared prior to the current revision of the project charter (Ref. 6) which increased the scope of the project as described below:

1. Additional components which need to be replaced in the field were identified as a result of additional EQLDP packages being completed. (Only components currently committed to the CNSC, as detailed in Attachment "D", will be completed in this project)
2. It was identified that the transition to the EQ sustaining program will require a higher level of effort than originally anticipated from the project.
3. Requirement added to complete a scope optimization study.
4. Requirement to study fiber optical cables and determine a practical method to resolve the issues surrounding the requirement for them to be EQ. (This will not be addressed under this project.)
5. Requirement added to perform completion assurance activities for all EQ components. (In this project, completion assurance activities will only be completed for the components replaced under this project and those not expected to be affected by scope optimization.)

These changes have caused a small increase to the original cost estimate prepared under the previous BCS (Ref. 7), a new project is also expected to be required to address the deficiencies not covered by this project and new deficiencies which may be identified in the future.

In March 2007 the CNSC conducted an audit of Darlington's EQ program. The audit report (Ref. 5) has been sent to Darlington with several action notices and recommendations, the following are relevant to the EQ project:

- AN2 - Based on the requirements of OPG Environmental Qualification Program, N-PROG-RA-0006 and OPG procedure, N-PROC-RA-0092, Environmental Qualification Implementation and Preservation DNGS is required to expeditiously complete the Technical Basis Documents (TBD), EQSRCL, EQLDPs, EQAs, EQ cables list and On-Line Wiring. DNGS is also required to prepare an auditable EQSRCL, with sufficient references to basis documents and guidance for, how to fill and read this list.
- AN3 - CNSC inspectors observed lot of inconsistencies in the various documents as identified in Section 4.2 (of Ref. 5). DNGS need to revise these documents (EQ design guide, EQLDPs, EQA, EQSRCL, FIN procedure and EQLDP procedure).
- AN5 - DNGS has not qualified the fiber optic cables. We require DNGS to provide a schedule for the completion of EQ of the fiber optic cables.
- R4 - CNSC recommend DNGS that soon after the completion of all EQLDPs, the EQ RCM to be revised to provide conditions for all new rooms and areas, if needed.

3/ ALTERNATIVES AND ECONOMIC ANALYSIS

\$ Millions	Stop the Project	Alt 1 (Recommended)		Alt 2 Delay	Alt 3 Do Less	Alt 4 Do More	Alt 5
		Full Cost	Incremental Cost				
Revenue	-	-	-				
OM&A	(2.67)	(63.11)	(39.08)	N/A	N/A	N/A	
Capital	-	-					
NPV (after tax)	(1.70)	(37.71)	(22.08)				
Impact on Economic Value (IEV)	N/A	(36.01)	(20.38)				
IRR%	N/A	N/A	N/A				
Discounted Payback (Yrs)	N/A	N/A	N/A				

Stop the Project - Not Recommended

Stopping the project is not recommended. This would result in the outstanding committed scope of work to remain incomplete; as a result the REG C commitment would not be met.

Alternative 1 - Complete Committed Replacements & EQ Efficiency Analysis - Recommended

Completing committed component replacements (including completion assurance) and determining the most efficient means for maintaining full compliance with the EQ requirements of the license is recommended. The work is required to bring Darlington in compliance with its PROL and the failure to do so would result in the CNSC REG C remaining incomplete.

In order for Darlington to be successful in meeting its regulatory commitments it is critical that the installation activities for the committed scope of work continue as scheduled in parallel with the scope optimization study and other activities required to determine the most effective path forward for EQ at Darlington.

Alternative 2 - Delay Project - Not Recommended

Delaying the project is not recommended. The component replacements which are being done under this project have been committed to the CNSC for completion by December 31, 2010 under Action Assignment # 28058364.

Alternative 3 - Do Less - Not Recommended

Completing component replacements and not doing the EQ efficiency analysis is not recommended as it would jeopardize Darlington's ability to meet its regulatory commitment. The components which are being replaced in the field under this release are only those which have been previously committed to the CNSC (refer to Ref. 1 and Attachment "D"). The additional work being done is required to determine the best path forward for Darlington to comply with its PROL.

The project is making extensive use of Operating Experience (OPEX) from the Pickering and Bruce sites to ensure that the requirements of the Ontario Power Generation Nuclear (OPGN) EQ Program and Darlington's PROL are met at minimum cost.

Alternative 4 - Do More - Not Recommended

Due to the number of unknowns associated with maintaining full compliance with EQ requirements of the license, it is recommended at this time to release an additional \$33.2M to allow the committed scope of work to be completed in accordance with the schedule. It will also allow the design basis documentation to be completed and an analysis to determine the most efficient method for maintaining full EQ compliance; if future work is found to be required for Darlington to meet its PROL it will be completed under a separate project.

Alternative 5 - Not Recommended

BUSINESS CASE SUMMARY**4/ THE PROPOSAL**

The proposal is for the full release of \$33.2M to allow the Environmental Qualification (EQ) Closure and Component Replacement Project to:

1. Continue work on the following activities that are critical to the REG C committed schedule (Attachment "D"):
 - a. Replace components in the field during the D811, D931, D1041, and D1021 outages.
 - b. Replace components in the field in 2008 through 2010 via the Darlington online program.
2. Prepare completion assurance packages for the components replaced during the project and for those not expected to be affected by the scope optimization study (~ 4000 tags). Address completion assurance requirements for cables.
3. Determine the most cost effective and efficient method for Darlington Nuclear to comply with the EQ requirements in its operating license by December 31, 2010, through the following activities:
 - a. Preparation of draft EQ Technical Basis Documents and initiation of the station review of them.
 - b. Initiation of a gapping analysis to determine the components which, in order to comply with EQ governance, require:
 - i. Modifications.
 - ii. Replacement, due to them being beyond their qualified life span.
 - iii. Documentation updates.
 - iv. Qualification testing.
 - c. Use the scope optimization study as a cost benefit tool to determine the most efficient path forward for Darlington to comply with the EQ requirements of its PROL.
4. Initiate preliminary design / analysis / testing activities for deficiencies identified in the gap analysis and the selected scope optimization options (this may include procurement of long lead time materials). This includes, but is not limited to:
 - a. Qualification of column line 11 as a steam barrier.
 - b. Modification(s) required to address concerns with wet rooms.
 - c. Qualification / replacement of BIW cables outside containment.Detailed engineering activities, procurement of short lead time materials and installation activities for this new scope will not be completed under this project. If required, the business case for a new project to resolve the new EQ issues arising from this new scope will be developed.
5. Complete the transition to the Sustaining EQ Program, this will be done through mentoring, transfer of software tools to the sustaining staff and preparation of desktop guides to promote the consistent application of EQ.

NOTE:

The correction of any configuration management issues identified during completion assurance walk-downs is not within the scope of this project.

The Project Execution Plan will be approved by December 2007.

5/ QUALITATIVE FACTORS

Environmental Qualification compliance and sustainability are licensing requirements. Qualitative benefits of the project are:

1. An improved ability to contain and minimize damage or loss of the asset due to a harsh design basis accident.
2. An increase in public and employee safety.

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6/ RISKS

Description of Risk	Description of Consequence	Risk Before Mitigation	Mitigating Activity	Risk After Mitigation
Cost				
Underestimation of cost.	Higher cost.	Medium	TIS sheets, issued contracts and actuals for similar tasks were used in the preparation of the estimate, general contingency has been included to cover possible cost increases. A independent agency has been contracted to review the estimate for accuracy.	Low
Complete scope of activities for Darlington to comply with it's PROL not defined.	A new project may be required for Darlington to comply with its PROL. Current conceptual estimates for this project are in the range of \$40M to \$140M.	Low	Included in the scope of this project is a scope optimization study whose purpose is to find ways to reduce the overall scope and cost of EQ for Darlington. This project will only complete the scope of work detailed in section 4, any additional work required for Darlington to comply with its PROL will be managed through a new project, the new project will provide a detailed cost estimate for this new scope.	Low
More scaffolding required than estimated.	Higher cost.	Medium	Funding has been included in the estimate for scaffolding and general contingency is available for possible cost increases.	Low
Scope				
Configuration management issues identified during completion assurance walk-downs.	Challenge to schedule, increased station OM&A costs. Based on OPEX there is a risk that correction of these deficiencies could cost up to \$50M.	N/A	Configuration management rework issues are not within the scope of this project however the risk remains for Darlington. A sample set of walk-downs under a "pilot project" will be completed to establish a better estimate for the amount of rework that Darlington should expected.	N/A

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Complete scope of activities required for Darlington to comply with its PROL not defined.	A new project may be required for Darlington to comply with its PROL.	Low	Included in the scope of this project is a scope optimization study whose purpose is to find ways to reduce the overall scope and cost of EQ for Darlington. This project will only complete the scope of work detailed in section 4, any additional work required for Darlington to comply with its PROL will be managed through a new project. This new project will provide a completion date for the new scope.	Low
Uncertainty on the scope of the configuration walk downs.	Higher cost.	Medium	Specific contingency has been included to reduce the risk associated with walk downs.	Low
Schedule Delay in the schedule, increased cost, and missed REG C commitments.	Delay in the schedule, increased cost, and missed REG C commitments.	Medium	All work required to be completed under this project, as outlined in Attachment "D", has been scheduled in accordance with OPG governance. Adherence to this schedule is monitored regularly by the project and any threats will be communicated to Darlington management in a timely fashion.	Low
Complete scope of activities for Darlington to comply with it's PROL not defined.	Inability to complete full scope of work by December 31, 2010. Until the full scope of work required for Darlington to comply with the EQ requirements of its PROL is defined and understood a completion date cannot be provided.	Low	Current committed scope of work (as shown in Attachment "D") has been planned and scheduled to ensure its completion by December 31, 2010. A scope optimization has been initiated in order to find ways to reduce the overall scope. Once the full scope of work required to EQ Darlington is understood a new project may be required. In order to prevent delays funding has been included in this release to initiate preliminary engineering / analysis / testing activities prior to the initiation of the new project.	Low
Configuration management issues identified during completion assurance walk-downs.	Increased scope of work for station resources. If this work is not completed prior to Dec. 31, 2010 there will be a list of open items turned over to the station.	N/A	Configuration management rework issues are not within the scope of this project however the risk remains for Darlington. Walk-downs will be scheduled as early as possible to maximize the time available to station resources for the correction of any issues identified.	N/A

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Resource	Delay in the schedule.	Medium	The project has retained augmented staff with EQ expertise. The corporate strategy with respect to the use of augmented staff remains a risk however CNE agreement has been obtained that the EQ project will be permitted to use augmented staff. Managed task contracts will be used to obtain qualified personnel as required.	Low
Availability of qualified Design Agencies & station resources.	Delay in the schedule.	Medium	The use of preferred vendors is being used to mitigate the risk of Design Agencies not able to support the work due to a lack of internal resources. The project has obtained the Senior Site VP agreement to the priority of the project and signed TIS sheets have been obtained from key support organizations.	Low
Availability of station resources (Regulatory Affairs, Nuclear Safety, Plant Design) to TBD preparation.	Delay in the schedule.	Medium	The project has obtained the Senior Site VP agreement to the priority of the project. Agreement has been obtained from Regulatory Affairs, Nuclear Safety and Plant Design Managers.	Low
Technical				
Modifications do not meet performance requirements.	Additional cost and schedule delays due to rework.	Medium	The use of OPEX, regular technical reviews, and the application of lessons learned is being used to mitigate this risk.	Low
Regulatory				
New CNSC action items being imposed on Darlington as result of the March 2007 audit results being published.	Scope, Cost and schedule increases.	Medium	Regular communication and update with the CNSC. Potential scope additions resulting from the recently completed audit will be managed through a new EQ project.	Low
		Medium		Low
Environmental				
N/A.	N/A.	N/A	N/A.	N/A

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Health & Safety				
Workplace injury or MRPH event.	1. Injury to workers. 2. Impact to the project schedule and cost.	Medium	Installations will be executed under approved work practices, OPG safety requirements, and OPG oversight.	Low
High radiation fields in work areas.	Field resources could reach their one and/or five year limits on radiation dose.	Medium	ALARA principles are applied during work planning / execution.	Low
Investment				
Risk of rework and/or the implementation of unnecessary modifications.	Higher cost.	Medium	Work in this release incorporates OPEX and is required for compliance with the EQ requirements of Darlington's PROL. A scope optimization study is being completed to ensure that unnecessary work is not completed.	Low

BUSINESS CASE SUMMARY
7/ POST IMPLEMENTATION REVIEW PLAN

Type of PIR:	Targeted Final AFS Date:	Targeted PIR Approval Date:	PIR Responsibility (Sponsor Title)
Simplified	Dec 2010	Dec 2011	Director of Engineering - Darlington Nuclear

Comments:

	Measurable Parameter	Current Baseline	Targeted Result	How will it be measured?	Who will measure it? (person / group)
1.	Completion of CNSC REG C committed component replacements, Action Assignment #28058364.	As of Jan. 2007 the committed component replacements (as documented in Action assignment # 28058364) had a due date was December 31, 2010.	Completion of committed component replacements by December 31, 2010. See Attachment "D".	Completion letter submitted to the CNSC.	Regulatory Affairs Manager
2.	No EQ issues on the committed component replacements.	EQ Completion Assurance not completed on committed component replacements.	EQ Completion Assurance on committed component replacements.	EQ Completion Assurance documents in place for all replaced components.	Components & Equipment Manager
3.					
4.					
5.					

BUSINESS CASE SUMMARY

Appendix "A"

Glossary (acronyms, codes, technical terms)

AFS:	Available for Service
BCS:	Business Case Summary
BTU:	Building Trades Unions
CNSC:	Canadian Nuclear Safety Commission
EQ:	Environmental Qualification
EQA:	Environmental Qualification Assessment
EQLDP:	Environmental Qualification List Development Package
EQSRCL:	Environmental Qualification Safety Related Components List
IEV:	Impact on Economic Value
IRR:	Internal Rate of Return
LTD:	Life to Date
MRPH:	Maximum Reasonable Potential for Harm
N/A:	Not Applicable
NPV:	Net Present Value
OAR:	Organizational Authority Register
OM&A:	Operating, Maintenance, and Administration
OPEX:	Operating Experience
OPG:	Ontario Power Generation
OPGN:	Ontario Power Generation Nuclear
PCRAF:	Project Change Request Authorization Form
PEP:	Project Execution Plan
PIR:	Post Implementation Review
PROL:	Power Reactor Operating License
PWU:	Power Workers Union
REG C:	CNSC Regulatory Commitment
SCR:	Station Condition Record
TBD:	Technical Basis Document
TIS:	Task Identification Sheet

BUSINESS CASE SUMMARY

Appendix "B"

Project Funding History

\$ Millions		All Existing and Planned Releases (incl contingency)									
Release Type	Month	Year	Cumulative Values					2010	Later	Total	
			2004	2005	2006	2007	2008				2009
Developmental	Oct	2004	4.56	2.64						7.20	
Partial	Feb	2006	0.59	5.81	4.10					10.50	
Partial	Apr	2006	0.59	5.81	11.52	6.95	1.25	1.25	2.50	29.87	
Full	Nov	2007	0.59	5.81	8.52	11.78	14.45	10.73	10.41	0.83	63.11
											0.00
											0.00
											0.00
											0.00

LTD Spent	Aug	2007	0.59	5.81	8.52	7.61					22.53
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Comments:

BUSINESS CASE SUMMARY**Appendix "C"****Financial Model – Assumptions****Project Cost Assumptions:**

The project cost for the committed scope of work was developed using estimates from the supporting work groups combined with historical charges against this project. The quality for this portion of the estimate is in the +30% to -15% range.

The remaining portion of the funding released under this BCS will be used to:

1. Perform completion assurance activities for the components replaced during this project and for those not expected to be affected by scope optimization. This is expected to involve:
 - a. Walk-downs of ~4000 components and up to 9300 cables.
 - b. PASSPORT updates.
 - c. Documentation updates.
2. Determine the most cost effective and efficient method for Darlington Nuclear to comply with its operating license requirements for EQ by December 31, 2010.
3. Complete preliminary engineering / analysis / testing activities for newly identified scope. Money has been included for this activity only in 2008, it is expected that a new project will be initiated by Q4-2008 which will then be responsible for this scope of work.

There is greater uncertainty in this portion of the estimate which is mitigated by the inclusion of specific contingency for completion assurance walk downs and the overall value of the general contingency.

Financial Assumptions:

The PV_{Base} has been set to \$0 for this project since completing this project is a CNSC Regulatory commitment and not doing the project is not a viable alternative.

Project / Station End of Life Assumptions:

Darlington's end of life was assumed to be 2020.

Energy Price / Production Assumptions:

N/A.

Operating Cost Assumptions:

N/A.

Other Assumptions:

It was assumed that the EQ project will be split from Darlington Design Projects prior to 2008, as a result overhead costs for a Stratum IV manager, an Administrative Assistant and a new Stratum III manager have been included in the estimate.

A new project is expected to be initiated by Q4-2008 at which time it was assumed that overhead costs would be shared by the two projects.

BUSINESS CASE SUMMARY
DNGD: EQ Closure and Component Replacement Project 16 - 38457
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Attachment "A"
Project Cost Summary

\$Millions OM&A	LTD Prior Yr 2006	2007	This Release 2008	This Release 2009	This Release 2010	This Release 2011		Later	Total
Project Management (OPG)	1.08	0.52	1.54	0.90	0.90	0.44			5.37
Engineering & Drafting (OPG)	0.81	0.57	1.30	0.48	0.35	0.14			3.65
Material	0.75	1.20	0.74	0.46	0.26				3.41
Installation - PWU, BTU	2.20	2.09	1.74	1.03	1.35				8.40
Contract - Design			0.50						0.50
Contract - Installation	0.41	2.26	2.58	1.11	1.93				8.29
Contract - Other	5.01	3.27	1.90	1.80	1.10				13.07
Augmented Staff	4.67	1.87	1.96	1.21	0.82				10.52
									-
Interest (Capital Project Only)									-
Project Costs (excl contingency)	14.92	11.78	12.25	6.98	6.71	0.58	-	-	53.21
General Contingency			2.00	2.50	2.70	0.25			7.45
Specific Contingency			0.20	1.25	1.00				2.45
Project Costs (incl contingency)	14.92	11.78	14.45	10.73	10.41	0.83	-	-	63.11
2008-2012 Business Plan	14.93	11.78	5.40	5.20	5.50	6.90			49.71
Variance to Business Plan	(0.01)	-	6.85	1.78	1.21	(6.32)	-	-	3.50
Committed Cost									-
Inventory Write Off Required									-
Spare Parts / Inventory									-
Total Release (excl contingency)	14.92	11.78	12.25	6.98	6.71	0.58	-	-	53.21
Total Release (incl contingency)	14.92	11.78	14.45	10.73	10.41	0.83	-	-	63.11
Ongoing OM&A (non-project)									-
Removal Costs (incl in above)									-

Basis of Estimate

Design Complete	100%		Quality of Estimate		Budget + 30% to - 15%
3 rd Party Estimate	No	OPEX used	Yes	Lessons Learned	Yes
Reviewed by Sponsor	Yes	Budgetary Quote(s)	Yes	Phase 1 Actual Used	Yes
Similar Projects	Yes	Contracts in place	Yes	Competitive Bid	Yes

Variance to Business Plan

The estimated variance(s) to the 2008-2012 Business Plan will be addressed through the portfolio management process. A PCRAF is not required

Reviewed By:

B. Beaudette
 B. Beaudette
 Project Manager

01 NOV 2007

Date:

Approved By:

T. Chong
 T. Chong
 Eng & Mods Manager (Strat IV)

01 Nov 2007

Date:

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DNGD: EQ Closure and Component Replacement Project 16 - 38457

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Attachment "B"

Project Variance Analysis

OM&A	LTD Aug 2007	Full Release		Variance	Comments
		Last BCS Apr 2006	This BCS Nov 2007		
Project Management (OPG)	1.38	1.39	5.37	3.98	See below
Engineering & Drafting (OPG)	1.19	0.60	3.65	3.05	See below
Material	1.58	7.98	3.41	-4.57	See below
Installation – PWU, BTU	3.55	2.76	8.40	5.64	See below
Contract - Design			0.50	0.50	See below
Contract - Installation	1.69	3.56	8.29	4.73	See below
Contract - Other	7.25	6.07	13.07	7.00	See below
Augmented Staff	5.90	5.10	10.52	5.42	See below
Future Funding Req'd		27.13		-27.13	See below
Interest (Capital Project Only)				0.00	
Project Costs (excl contingency)	22.53	54.59	53.21	-1.38	See below
General Contingency		2.41	7.45	5.04	See below
Specific Contingency			2.45	2.45	See below
Project Costs (incl contingency)	22.53	57.00	63.11	6.11	See below
Committed Cost				0.00	
Inventory Write Off Required				0.00	
Spare Parts / Inventory				0.00	
Total Release (incl contingency)	22.53	57.00	63.11	6.11	
Total Release (excl contingency)	22.53	54.59	53.21	-1.38	

Ongoing OM&A (non-project)				0	
Removal Costs (incl in above)				0	

Comments:

Explanation of Variance:

The previous Partial Release BCS had an overall estimate of \$27.1M for future release; it did not break down the estimate into the various categories. Hence, the high variances between the Last BCS and This BCS for the categories.

The project has achieved savings of approximately \$4.9M through scope reductions relating to the Limitorque Actuators and PAWCS heat Exchanger packages.

Additions in scope including the ITT Cannon work and the increased number of Deltrol / Norgren valves which required modifications added approximately \$5.0M to project costs. 60 addition EQLDP packages were also completed at a cost of \$0.9M. The scope optimization study which was completed at the request of the Senior Site VP added \$0.85M to the project's cost. Given the uncertainty surrounding completion assurance activities a specific contingency of \$2.45M has been included.

\$0.5M has been included to allow the project to initiate preliminary engineering activities to begin of newly identified scope of work prior to the establishment of the new project.

Additionally issues such as delays in obtaining vault access during outages, high radiation fields and legacy issues discovered during the project have caused challenges to the project team leading to increased costs.

Attachment "C"

Key Milestones

Completion Date			Description
Day	Mth	Yr	
07	Jan	2008	PMM: Conceptual Design Input Complete (Scope Optimization)
19	Jan	2008	DCP: Design Pkgs App'd & issued – ITT Cannon Connectors (Online)
16	Feb	2008	LLA: Mat'l Contracts Awarded for D931S Outage
28	Mar	2008	SOI: Start of Installation for D811S Outage
15	Apr	2008	PTA: Passport Tasks set to Ready – Limitorque Valves (Online)
16	Apr	2008	DCP: Design Packages Approved & Issued for D931S Outage
16	May	2008	ICA: Installation Contracts Awarded for D931S Outage
30	Jun	2008	AFS: D811S Outage
07	Jul	2008	SOI: Start of Installation – Limitorque Valves (Online)
07	Jul	2008	PMM: Preliminary Design Input Complete (Scope Optimization)
25	Jul	2008	SOI: Start of Installation – A/L Hoses (Online)
20	Aug	2008	SOI: Start of Installation – ITT Cannon Connectors (Online)
15	Sept	2008	ICA: Installation Contracts Awarded for 2008 Online Packages
18	Sept	2008	PTA: Work Package Assessments Complete for D931S Outage
28	Oct	2008	PTA: Work Package Assessments Complete for 2008 Online Packages
19	Dec	2008	AFS: 2008 Online Packages
26	Jan	2009	LLA: Mat'l Contracts Awarded for D1041S Outage
30	Jan	2009	SOI: Start of Installation – Gould Transmitters (Online)
05	Mar	2009	ICA: Installation Contracts Awarded for D1041S Outage
20	Mar	2009	DCP: Design Packages Approved & Issued for D1041S Outage
16	Apr	2009	SOI: Start of Installation for D931S Outage
11	Jul	2009	AFS: D931S Outage
01	Aug	2009	LLA: Mat'l Contracts Awarded for D1021F Outage
18	Sep	2009	PTA: Work Package Assessments Complete for D1041S Outage
25	Sept	2009	DCP: Design Packages Approved & Issued for D1021F Outage
17	Oct	2009	ICA: Installation Contracts Awarded for D1021F Outage
28	Oct	2009	PTA: Work Package Assessments Complete for 2009 Online Packages
18	Dec	2009	AFS: 2009 Online Packages
26	Mar	2010	SOI: Start of Installation for D1041S Outage
26	Mar	2010	PTA: Work Package Assessments Complete for D1021F Outage
19	May	2010	AFS: D1041S Outage
01	Oct	2010	SOI: Start of Installation for D1021F Outage
24	Nov	2010	AFS: D1021F Outage
24	Jul	2011	PCM: Project Completion Milestone

A Project Execution Plan (PEP) will be approved by Dec 2007.

BUSINESS CASE SUMMARY

Attachment "D"

[illegible]

Notes:

Non-Outage Items identified are non-unitized schedule. Date indicated is for completion of all station IPG work for the particular item.

C² - Airlock 2 Complete

X¹ - Airlock 1 moved to D931 by Outage Management

X² - Added by Charter Rev 2 to be committed to CNSC November 2007

C* - Removed from replacement program through exemption/QL extension

C** - Replacement is being completed every outage through regular PMs

I/P - In progress

Completion dates highlighted in yellow indicate schedule changes from CNSC submission.

