

EQ Discovery Work & Scope Reduction Project 16 - 38458

Partial Release Business Case Summary D - BCS - 03651-10006 – R000

1/ RECOMMENDATION:

Approval is requested for a Partial Release of ^{42.3 OSP} 45.0 M\$ OM&A (including contingency) to allow the Environmental Qualification (EQ) Discovery Work and Scope Reduction Project to continue the work required for Darlington to comply with the EQ requirements in its Power Reactor Operating Licence (PROL) and Design Basis. (This amount includes 9.8 M\$ released previously under a Developmental Release). Total project cost estimate is 75.7 M\$.

The business objective of this project is to align Darlington with the EQ requirements of its design basis and PROL. This project is a follow-up to Project 16-38457 and will execute EQ scope reduction initiatives. The deliverables for this partial release are outlined in section 4 of this Business Case Summary. This project is required for Darlington to be in compliance with the EQ conditions of its PROL by December 31, 2010.

The previous release was used to:

- Initiate / Complete conceptual and preliminary engineering activities for the required modifications.
- Initiate the required revisions to the EQ design basis document set.

The funding under this release will be used to:

- Complete the detailed engineering activities for the required modifications.
- Complete the required revisions to the EQ design basis document set.
- Complete the analysis required to determine if the project's scope can be reduced in order to reduce the cost of the project and the size of Darlington's sustaining EQ program.
- Initiate the installation activities for selected modifications.
- Execute completion assurance activities for selected equipment.

\$000's (incl contingency)	Type	LTD 2008	2009	2010	2011	2012	2013	Later	Total
Currently Released	Developmental		9,779	17,399					9,779
Requested Now	Partial		15,122	20,121				32,521	35,243
Future Funding Req'd	Full			22,893	10,525			33,368	30,646
Total Project Costs		-	24,901	40,242	10,525	-	-	-	75,668
Non Project Costs									-
Grand Total		-	24,901	40,242	10,525	-	-	-	75,668
Investment Type Regulatory		Class OM&A		NPV -36.0 M\$		IRR N/A		Discounted Payback N/A	

Submitted By:

W. Robbins

Senior Site Vice-President Darlington

Date:

Finance Approval:

D. Hanbridge

VP, Corporate Finance

Date:

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

J. Hankinson

President & CEO

Date:

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 Condition 7.1 of its Power Reactor Operating License (PROL), Darlington must implement a program that is traceable, auditable and meets the OPGN requirements for EQ.

Requirements for EQ at the Darlington Nuclear Generation Station (DNGS) were first spelled out in the Construction License and formalized in 1978 with the first issue of the Design Guide. 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 of 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's 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, another project, 16-38457 EQ Closure and Component Replacement was initiated to resolve the outstanding issues by December 31, 2010.

The EQ Closure and Component Replacement Project (16-38457) was initiated in 2004. Under this project Darlington has followed the OPGN EQ list development process to update its EQSRCL; this process provides full traceability and compliance with the EQ design basis. As a result of an unexpected large number of deficiencies being identified a scope optimization study was conducted on Darlington's EQ program which made several recommendations on how Darlington could reduce the size of its EQ program.

This project is a follow up to Project 16-38457 established to execute EQ scope reduction initiatives. Under the developmental release conceptual / preliminary engineering activities have been initiated and revisions to the EQ design basis document set have been initiated. Analysis has been completed to verify the validity of the Critical Breaks Approach to EQ which was established through NSS analysis under Project 16-38457. While this approach does represent a significant reduction in scope it also identified further opportunities for scope reduction.

As outlined in section 4 this partial release will:

1. Continue with the necessary engineering work to implement the critical breaks approach.
2. Initiate the installation of the modifications required to implement the critical breaks approach.
3. Complete the necessary analysis to determine if the scope of the project can be further reduced.
4. Complete the required revisions to affected documents.
5. Execute completion assurance activities.

BUSINESS CASE SUMMARY
3/ ALTERNATIVES AND ECONOMIC ANALYSIS

\$ 000's	Base Case	Alt 1 (Recommended)		Alt 2	Alt 3	Alt 4	Alt 5
		Full Cost	Incremental Cost				
Revenue							
OM&A		(75,668)		(71,581)	(68,981)		
Capital							
Present Value (PV)		(39,887)	(35,993)	(37,762)	(36,411)		
Net Present Value (NPV)	N/A	(39,887)	(35,993)	(37,762)	(36,411)		
Internal Rate of Return (IRR) %	N/A						
Discounted Payback (Yrs)	N/A						

Base Case: Not Recommended - Fully Implement EQ to Group 1 & Group 2 Equipment

The base case is to complete the necessary modifications in order to fully EQ all Group 1 support components as per the existing design basis. This is not recommended since it would significantly increase the cost of the project and would result in a sustaining program that the station would not be able to maintain with their current resource levels.

Alt. 1: Recommended - Implement Critical Breaks Approach

The Critical Breaks Approach was developed by NSS and involves implementation of a reduced set of modifications which will ensure that any remaining EQ inadequacies will have a negligible safety impact. The modifications include work on critical breakers and HVAC control circuits in order to support both divisions of Class III power.

This is the recommended approach since it involves implementation of a reduced set of modifications with minimal impact on the current design / licensing basis. In addition to the necessary modification work analysis will be completed to determine if the scope of the project can be reduced further.

Alt. 2: Not Recommended - Implement EQ to Group 2 Equipment Assisted by Standby Generators

This approach assumes that Group 2 heat sinks are qualified for secondary-side line breaks and portions of Class III power are also credited to support Group 2 heat sinks. This would involve a limited set of modifications to the Class III system to allow the Standby Generators to support Group 2. This approach is not recommended at this time because it is based on preliminary analysis and further work is required to verify the assumptions made.

Alt. 3: Not Recommended - EQ only Group 2 Equipment

This approach assumes that only Group 2 heat sinks will be qualified for secondary-side line breaks. All EQ scope related to Group 1 heat sinks would no longer be required. While this approach significantly reduces the project scope it is not recommended since it would also significantly reduce the stations operating margin.

Alt 4: Not Recommended -
Alt. 5: Not Recommended -

4/ THE PROPOSAL

32.5 M

The proposal is for the partial release of \$35.2 M to allow the EQ Discovery work and Scope Reduction Project to:

1. Complete detailed design activities and initiate installation activities to environmentally qualify the following:
 - Deaerator Storage Tank Level Transmitters
 - Solenoid Valves for Low Pressure Service Water Temperature Control Valves
 - Class III Power
 - Class IV Power
 - Heating, Ventilation and Air Conditioning equipment associated with Steam Protected Rooms
 - Power Supply (Motor Control Center 363) for Fan 29
 - Service Water Pneumatic Valve 501
 - Fuelling Machine D₂O Injection Valves
 - Auxiliary Boiler Feed Pumps
 - Shutdown Cooling Temperature Control Valves
 - Primary Heat Transport pressurizer heaters
 - Control Power (Motor Control Center 259/260) for Fan 1/Fan 2/Fan 3/Air Conditioning Unit 1
 - D₂O Recovery Isolation Valve
 - Wet Room Transmitters

In addition, analysis and modification work will be completed as required to credit the Column Line 11 wall as a steam barrier.

Essential project scope comprises equipment and systems which must be qualified to satisfy the license condition. This essential scope will be given priority to ensure that all field modifications on these systems are completed by December 31, 2010 in order to meet the license condition. The balance of scope related to equipment and systems which must be qualified in order to ensure the station has sufficient operating margin.

2. Complete analysis required to pursue scope reductions associated with reactor heat sink qualification methodology (from the "Critical Breaks Approach including Group 1 Heat Sinks" to "Group 2 Heat Sinks assisted by Standby Generators").
3. Complete the necessary updates to:
 - Technical Basis Documents
 - EQ List Development Packages
 - EQ Assessment Part 1's (evaluation of equipment EQ requirements, including configuration, maintenance, and replacement requirements)
 - EQ Assessment Part 2's (establishes basis for EQ of a manufacturer's component by evaluation of test and analysis documentation)
 - Room Conditions Manual
 - Safety Report
 - Operation / Maintenance document set
4. Perform the required completion assurance activities. This will include field verification walk-downs and documentation and PassPort reviews.

All scope additions and changes are reviewed by a Darlington EQ Steering Committee for approval, in addition to normal Project Approval Committee and Site Management Board meetings. In addition, field walk downs are being conducted to resolve outstanding configuration management issues.

5/ QUALITATIVE FACTORS

Environmental Qualification compliance and sustainability are license 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.
3. A manageable EQ program which Darlington will be able to sustain.

BUSINESS CASE SUMMARY

6/ RISKS (see Attachment D for details)

Low = 1 to 3			Medium = 4 to 9			High = 10 to 25			Probability x Impact								Probability x Impact																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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BUSINESS CASE SUMMARY

Low = 1 to 3			Medium = 4 to 9			High = 10 to 25			Probability x Impact							Probability x Impact									
Risk Rating			Impact					Before Mitigation							After Mitigation										
			1	2	3	4	5	Finance	Schedule	Quality	Corporate Reputation	Regulatory	Health & Safety	Environment	Nuclear Safety	Risk Rating (1 to 25)	Finance	Schedule	Quality	Corporate Reputation	Regulatory	Health & Safety	Environment	Nuclear Safety	Risk Rating (1 to 25)
Probability	5	5	10	15	20	25																			
	4	4	8	12	16	20																			
	3	3	6	9	12	15																			
	2	2	4	6	8	10																			
	1	1	2	3	4	5																			
Risk Description			Mitigating Activities						Before Mitigation							After Mitigation									
schedules.			design phase. 2. Supply Chain has appointed a SPOC to assist in material procurement. 3. Where possible Design Agencies are taking material lead times into account when selecting material.																						
Unavailability of Design resources.			1. The project is utilizing all of OPGs preferred vendors as well as additional vendors with EQ expertise. 2. Selected designs are being completed by internal resources.						3	12	3	3	3	3	3	12	2	8	2	2	2	2	2	2	8
Unavailability of OPG support group resources.			Issues with obtaining support from internal resources are communicated upward so station management can set appropriate work priorities.						3	9	3	3	3	3	3	9	2	4	2	2	2	2	2	4	
Significant discoveries during the inspection of column line 11.			1. Standard repairs details have been developed for expected deficiencies. 2. Use of OPEX from previous inspection campaigns at PNGS / DNGS.						3	9	3	3	3	3	3	9	3	6	3	3	3	3	3	3	6
Cost estimates for several designs were based on preliminary information since conceptual design has not been completed.			Contingency has been included to account for potential cost increases.						6	9	3	3	3	3	3	9	3	4	2	2	2	2	2	4	
Material quality issues with components being replaced causing delays to the schedule / cost increases.			1. Use of qualified suppliers / 3 rd party dedicators. 2. Use of OPG Source Surveillance Dept. 3. Additional testing / receipt inspection will be specified if deemed necessary.						2	10	8	2	2	2	2	10	2	6	4	2	2	2	2	2	
Discovery of significant issues during field verification walkdowns during			1. OPEX from D811 / 2008 online walkdowns showed that no significant						3	9	3	6	3	3	3	9	3	3	3	3	3	3	3	3	

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EB-2013-0321
Ex. F2-3-3
Attachment 1
Page 6

BUSINESS CASE SUMMARY

Low = 1 to 3			Medium = 4 to 9				High = 10 to 25				Probability x Impact								Probability x Impact																									
Probability			Impact											Before Mitigation								After Mitigation																						
			1	2	3	4	5	Risk Rating (1 to 25)	Finance	Schedule	Quality	Corporate Reputation	Regulatory	Health & Safety	Environment	Nuclear Safety	Risk Rating (1 to 25)	Finance	Schedule	Quality	Corporate Reputation	Regulatory	Health & Safety	Environment	Nuclear Safety	Risk Rating (1 to 25)																		
5	10	15	20	25	2	4	8	12	16	20	25	2	4	8	12	16	20	25	2	4	8	12	16	20	25																			
4	8	12	16	20	3	6	9	12	16	2	4	6	8	10	1	2	3	4	5																									
3	6	9	12	15	2	4	6	8	10	1	2	3	4	5																														
2	4	6	8	10	1	2	3	4	5																																			
1	2	3	4	5																																								
Risk Description					Mitigating Activities																																							
D1041 / D1021.					findings are expected. 2. Contingency plans will be developed prior to the 2010 outages based on OPEX from previous walkdowns.					2					8					2					4																			
Equipment which is believed to be qualifiable through an EQA is found not to be.					1. A feasibility analysis is being completed to identify if there are any risks associated with EQA preparation / revision. (TCD: Q2-2009) 2. EQA Part 2s are being prepared / revised on an accelerated schedule.					2					8					2					4																			
Identification of new modification scope during EQLDP / TBD revisions.					1. All high risk EQLDP revisions have been completed. 2. A review of the TBDs has been completed to identify any potential areas of concern. 3. Remaining EQLDP / TBD revisions are scheduled to be completed by the end of 2009.					8					16					4					4					16					2					8				

7/ POST IMPLEMENTATION REVIEW PLAN

Type of PIR:	Targeted Final AFS Date:	Targeted PIR Approval Date:	PIR Responsibility (Sponsor Title)
Simplified	TBD in Next Release	TBD in Next Release	Director of Engineering

	Measurable Parameter	Current Baseline	Targeted Result	How will it be measured?	Who will measure it? (person / group)
1.					
2.					
3.					
4.					
5.					

Appendix "A"

Glossary (acronyms, codes, technical terms)

AFS:	Available for Service
BCS:	Business Case Summary
CNSC:	Canadian Nuclear Safety Commission
DNGS:	Darlington Nuclear Generating Station
EQ:	Environmental Qualification
EQA:	Environmental Qualification Assessment
EQLDP:	Environmental Qualification List Development Package
EQSRCL:	Environmental Qualification Safety Related Components List
FM:	Fueling Machine
HVAC:	Heating, Ventilation and Air Conditioning
IEV:	Impact on Economic Value
IRR:	Internal Rate of Return
IPP:	Integrated Improvement Plan
LPSW:	Low Pressure Service Water
LT:	Level Transmitter
LTD:	Life to Date
MCC:	Motor Control Center
N/A:	Not Applicable
NPV:	Net Present Value
NSS:	Nuclear Safety Solutions Inc.
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
PHT:	Primary Heat Transport
PIR:	Post Implementation Review
PNGS:	Pickering Nuclear Generating Station
PROL:	Power Reactor Operating License
PV:	Pneumatic Valve
SG:	Standby Generator
SPOC:	Single Point of Contact
T&M:	Time and Material
TBD:	Technical Basis Document

BUSINESS CASE SUMMARY

 EB-2013-0321
 Ex. F2-3-3
 Attachment 1 Tab 6

Appendix "C"
Financial Model – Assumptions
Financial Assumptions:

Discount Rate	7%	Cost Escalation (yr)	None	SR & D Opportunity	No
Progress Payments	No	Foreign Currency	No	Retainer Fee	No
Income Tax Rate	Non Generation	PST	N/A	Interest Rate (Capital)	OMA N/A
Depreciation Rate (Capital)	N/A	Leasing	No	Indexed Priced Contract	No

Comments:
Project Cost Estimate:

Design Complete	Up to - 40%	Quality of Estimate	Budget + 30% to - 15%	3 rd Party Estimate	No
Reviewed by Sponsor	No	OPEX used	Yes	Lessons Learned	Yes
Similar Projects	Yes	Budgetary Quote(s)	No	First Unit Actual Used	No
Cost Sharing	No	Contracts in place	Some in place	Competitive Bid	No
Fixed Price Contract	No	Fee for Service	No	Firm Vendor Proposal	No

Comments:
Rationale for Cost Classification:
Generation Plan Assumptions:

Station	Unit	EOL		MW	Capacity	Planned Outages for Project Work (eg P1071)						
Pickering A	1	N/A										
	4	N/A										
Pickering B	5	N/A										
	6	N/A										
	7	N/A										
	8	N/A										
Darlington	1	Jun	2018	935	88%							
	2	Sep	2016									
	3	Mar	2020									
	4	Dec	2021									

Comments:

Appendix “C”

Financial Model – Assumptions

[illegible]

Comments:

[illegible]

Comments:

Cash flows and committed milestones assume that this BCS receives OAR approval by 15Jun2009.

EQ Discovery Work & Scope Reduction Project 16 - 38458
Partial Release Business Case Summary D - BCS - 03651 - 10006 - R000

Attachment "A"
Project Cost Summary

\$000's OM&A	LTD 2008	This BCS 2009	This BCS 2010	Future 2010	Future 2011	2012	2013	Later	Total
Scores Basis	Project Mgmt & Support		2,412	1,993	1,993	3,450			9,847
	Engineering		13,914	3,716	3,716	2,575			23,921
	Procurement		564	1,244	1,244				3,052
	Construction		1,011	6,919	6,919				14,848
	Other		500	1,500	1,500				3,500
									-
									-
									-
									-
	Interest (Capital Project Only)								-
	Project Costs	-	18,401	15,371	15,371	6,025	-	-	55,168
	General Contingency		6,500	2,028	7,472	4,500			20,500
	Specific Contingency								-
	Project Costs	-	24,901	17,399	22,843	10,525	-	-	75,668
Cash	Adjust to Cash Basis +/-							-	-
	Project Costs	-	24,901	17,399	22,843	10,525	-	-	75,668
Funding	Currently Released		9,779						9,779
	This Release		15,122	17,399					32,521
	Future Release				22,843	10,525		(0)	33,368
	Project Funding	-	24,901	17,399	22,843	10,525	-	(0)	75,668
Note: Scores Basis = Cash Basis = Funding Basis (Timing differences only)									
Budget	2009-2013 Business Plan		18,401	24,950		3,650			47,001
	Variance to Business Plan	-	(0)	5,792		2,375	-	-	8,167
Other	Removal Costs included above								-
	Inventory to be written off								-
	Spare Parts in Inventory								-

The estimated variance(s) to the **2009-2013 Business Plan** will be addressed through the portfolio management process.
 A PCRAF is not required.

Reviewed By:

 D. Somerville
 Project Manager

Date:

Approved By:

 T. Chong
 Strat IV Manager

Date:

BUSINESS CASE SUMMARY

EQ Discovery Work & Scope Reduction Project 16 - 38458
Partial Release Business Case Summary D - BCS - 03651 - 10006 – R000

Attachment “B”
Project Variance Analysis

	OM&A	LTD Mar 2009	Total Project		Variance	Comments
			Last BCS Feb 2009	This BCS Apr 2009		
Scores Basis	Project Mgmt & Support		6,040	9,847	3,807	See Note 1.
	Engineering		21,620	23,921	2,301	See Note 1.
	Procurement		6,675	3,052	-3,623	See Note 2.
	Construction		14,685	14,848	163	
	Other			3,500	3,500	See Note 3.
					0	
					0	
					0	
					0	
	Interest (Capital Project Only)				0	
	Project Costs (Scores Basis)	0	49,020	55,168	6,148	
	General Contingency		12,000	20,500	8,500	
	Specific Contingency		15,000		-15,000	
	Project Costs (Scores Basis)	0	76,020	75,668	-352	
Other	Removal Costs included above				0	
	Inventory to be written off				0	
	Spare Parts in Inventory				0	

Comments:
Note 1:

The developmental BCS assumed that there would be 12 modifications with the possibility of additional packages discovered during TBD / EQLDP preparation / revision. The cost estimates for these modification packages were based on preliminary information and contingency was included to account for the quality of estimates.

The projects scope now has 16 modification packages included in it and engineering has progressed on several packages allowing more detailed estimates to be prepared. This has resulted in additional funding requirements for design contracts and additional project management staff being hired to adequately monitor and progress the work.

Note 2:

Material costs are low compared to the total cost of the project because several modifications require only EQ qualified splice kits and/or qualified solenoid valves / transmitters which are relatively inexpensive. The installation cost is primarily driven by the labour requirements to perform and verify the work.

Note 3:

This \$3,500K is the estimated contract cost for the EQ completion assurance packages. This is not actually a variance, in the previous estimate this cost was included in the Contract – Design line.

Attachment "C"

Milestones and In Service Declarations

Key Milestones

Completion Date			Description
Day	Mth	Yr	
30	Apr	2009	EQ Program Draft PEP
15	May	2009	CNSC Submission for Group 1 Heat Sinks
19	May	2009	NOC Meeting
21	May	2009	Partial Release approved by Board of Directors
30	Jun	2009	EQ Design Inputs Complete
30	Jun	2009	All Modifications & Baseline Maintenance (BM) & Dispositions Identified
30	Jun	2009	Strategic Sourcing Plan in place
30	Jul	2009	EQA Part II's Complete
30	Oct	2009	Long Lead Material Ordered (CAT ID identified)
30	Nov	2009	Technical Basis Documents Final Completion
15	Dec	2009	EQL Complete
15	Dec	2009	Room Conditions Complete
31	May	2010	Engineering Complete
31	May	2010	Final Release approved by Board of Directors
30	Jun	2010	Assessing Complete
30	Jun	2010	EQPR Complete
29	Oct	2010	All Baseline Maintenance Identified (last walk-down)
01	Dec	2010	Field Implementation Complete
30	Jun	2011	EQ Installation Instruction Complete
30	Jun	2011	EQ Training Program
30	Jun	2011	Closeout Complete

A Project Execution Plan (PEP) will be approved by Jun 2009

In Service Declarations: (Capital Only)

[illegible]

BUSINESS CASE SUMMARY

Attachment "D"

Risk Probabilities Chart

Likelihood	Improbable	Unlikely	Possible	Likely	Probable
Probability	<= 1 in 1000	About 1 in 100	About 1 in 10	About 1 in 5	>= 3 in 4
Rank	1	2	3	4	5

Risk Impact Chart

Impact Rating	Financial	Project Schedule (12 months)	Quality	Corporate Reputation	Regulatory / Legal	Health & Safety	Environment	Nuclear Safety
5	>80% of Total Project \$	> 90 day delay	Significant, unacceptable non-conformance requiring extensive rework	National and international adverse coverage or impacts	Non-compliance with potential for significant implications for personnel, potentially large damages or Criminal Charges OR Potential loss of operating licenses	Potential for fatality(s)	Spill or release causing immediate and extended impact with off-site impacts, e.g.: Clean-up costs > \$15M Cat. A spill (>55 pts)	Loss or serious degradation of a safety system
4	30% - 80% of Total Project \$	30 - 90 day delay	Unacceptable non-conformance requiring some rework, but not major	Long-term local or national impact	Legislative non-compliance with potential for fines, charges, and damages OR Major degradation of reputation with regulatory bodies	Potential for life-threatening critical injury or permanent total disability, including occupational disease	Exceedances resulting in charges or Director's Order Cat. A spill (45 - 55 pts) Public complaints with OPG implications Explosion and/or major fire	Reduced effectiveness of a safety system
3	15% - 30% of Total Project \$	10 - 30 day delay	Non-conformance bordering design tolerances, potential to require rework	Major local impact or minor national impact. Minor local damage	Systematic non-compliance with potential for fines OR Potential to cause strained relationship with regulator, increased surveillance and/or regulations	Potential for less serious critical injuries (e.g. fractures), permanent partial disabilities and temporary total disabilities of a significant nature	Cat. B spills Emission in exceedance of regulatory or legal limits Field orders or AMP's Public complaints with OPG implications Danger to health, life, or property	Reduced effectiveness of redundant safety system components
2	5% - 15% of Total Project \$	3 - 10 day delay	Acceptable non-conformance, within design tolerances, no rework required	Complaints from local officials / politicians	Systematic non-compliance with impacts to project schedule OR Possibility of regulatory / legal implications	Potential for less serious temporary disabilities and injuries requiring off-site medical attention other than first-aid. Complete recovery by worker.	Cat. C spills - reportable Administrative infractions Public Complaints with plant level implications	Impact on a safety support or safety related system
1	<5% of Total Project \$	< 3 day delay	Minimal impact on quality Routine non-conformance, can be easily dispositioned	Complaints from local public	Isolated non-compliance OR Routine approval / notification	No medical attention beyond first aid, no impairment to worker or complete recovery of worker.	Administrative, non-reportable events Cat. C spills non-reportable and spills resulting from Acts of God	