ONTARIO POWER GENERATION

OPG Confidential

Business Case Summary

Darlington Water and Sewer Project 10 - 73802 (Capital)
Partial Release Business Case Summary NK38 - BCS - 72700 - 10008 - R000

Name / Title / Phone	Location	Action	Signature	Date
Jack Ballard Director, Infrastructure & Misc Projects 701-2648	P72-1	Prepare BCS		July 11, 2011
Gary Rose Director, Planning and Control Nuclear Refurbishment 703-5423	O11-2	Review BCS		July 13, 2011
Mark Arnone Vice President, Refurbishment Execution, Nuclear Refurbishment 703-5404	O11-2	Review BCS		13 July 2011
Jamie Lawrie Director, Nuclear Finance 702-5086	P82-3	Review BCS		14 Jul 11
Randy Leavitt Vice President, Nuclear Finance 702-5177	P82-3	Review BCS		July 14, 2011
Don Power Vice President, Corporate Investment and Planning 400-7172	H07-G05	Review BCS		July 21/11
Dietmar Reiner Senior Vice President, Nuclear Refurbishment 703-5400	O11	Submit BCS		Jul
Albert Sweetnam EVP, Nuclear Projects and support 400-7537	H17-G25	Concur with BCS		July 28/2011
Donn Hanbidge SVP & Chief Financial Officer 400-2395	H19-F27	Approve BCS		August 2/2011
Tom Mitchell President & Chief Executive Officer 400-2121	H19-A24	Approve BCS		August 5, 2011
Carolyn Sicard Nuclear Investment Management 702-4082	P82-3B6.2	Return for Distribution		

ROUTING SHEET

Darlington Water and Sewer Project 10 - 73802 (Capital)
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1/ RECOMMENDATION:

We recommend a **Partial** Release of an **additional $16.3** Million **Capital** (Partial Release Estimate of $19 Million minus $2.73 Million under expenditure from the Developmental Release) to fund the:

- design, procurement and construction of the new main water lines,
- design, procurement and construction of the sanitary sewer line to the municipality,
- design of the water and sanitary sewer lines to the new Campus Plan and Refurbishment facililites on DNGS site.

Approval of this request will bring the total to date funding to **$20.3** Million including a contingency of [redacted] Million. The total project is estimated to cost **$36** Million including a contingency of [redacted] with an estimated project closeout completion date of 6/30/2015. There are also estimated removal costs of $2.1 Million.

The business Objectives of this **Sustaining** project are as follows:

a) To ensure adequate and reliable domestic and fire water supply and sanitary sewer system capacity for the continued operation of the station for an additional 25 to 30 years of post refurbishment life.
b) To ensure fire water pressure remains in compliance with Ontario Building and Fire Codes & Regulations.
c) To eliminate employee concerns regarding the quality of the potable water after fire pump tests/spurious operation.
d) To address and mitigate environmental concerns associated with the existing Sewage Treatment Plant (STP).
e) To design and install water (domestic and fire) and sanitary sewer distribution systems to the proposed new facilities for Darlington Refurbishment and the Campus Plan.

The existing water supply line was originally installed for the construction phase of the station. It was not replaced and has deteriorated and represents a single point of vulnerability.

The existing Sewage Treatment Plant (STP) requires extensive maintenance and care for its continued operation and compliance with applicable regulations. The capacity of the plant is not adequate to meet the demand of the station refurbishment project.

$000's (incl contingency)	Type	LTD Dec 2010	2011	2012	2013	2014	2015	2016	Later	Total
Currently Released	Develop	265	3,590	145						4,000
Adj to Current Release	Adjustments	(85)	(2,503)	(145)						(2,733)
Requested Now	Partial		821	8,964	9,248	-	-			19,033
Future Funding Req'd	Full				7,649	7,486	565			15,700
Total Project Costs		180	1,908	8,964	16,897	7,486	565	-	-	36,000
Non Project Costs						-				-
Grand Total		180	1,908	8,964	16,897	7,486	565	-	-	36,000
Investment Type: Sustaining		Class: Capital		NPV: (25,596)			IRR: N/A		Discounted Payback: N/A	

Submitted By: (Date) July 22, 2011
Dietmar Reiner
SVP, Nuclear Refurbishment

Reviewed By: (Date) July 28/2011
Albert Sweetnam
EVP, Nuclear Projects

Financial Approval By: (Date) August 2, 2011
Donn Hanbidge
SVP & Chief Financial Officer

(OAR Element 1.1 Project in Budget)
Line Approval By: (Date) 2011-08-08
Tom Mitchell
President and Chief Executive Officer

2/ BACKGROUND & ISSUES:

In preparation for the continued operation of the Darlington Nuclear Generating Station (DNGS) for an additional 25 to 30 years, the Domestic Water and Sewage Treatment Project was initiated based on the finding of gaps between the current domestic & fire water and sewage system condition and future incremental requirements. The scope and estimate of this project is a combination of two separately approved charters (D-PCH-72700-10002-R001-Install and tie-in water and sewer systems to municipalities and D-PCH-72700-10003-R000-Install distribution systems to proposed Refurbishment and Campus Plan facilities).

The needs for meeting the above requirements are further explained in the sections below:

2.1 Domestic/Fire Water Supply

The DNGS domestic & fire water line is supplied from the Durham Region Municipal Water System. Presently, a single pipe system supplies both domestic water requirements for powerhouse and site buildings, as well as fire protection water for all site buildings, via a common buried water distribution system. The condition of the existing piping is deteriorating. The current domestic/fire water system peak flow rate capacity is not adequate to meet the estimated demand for major programs such as refurbishment due to the fact that a large number of people will be working on many projects and refurbishment activities on site during that program. Also, there will be some new campus plan and refurbishment facilities during the next decade which would require additional water and sewage system capacity.

A series of reported events resulting from the continued use of the temporary water storage bladders and fire pump raised concerns about the site domestic water system. The source of the concerns was found to be the temporary water storage bladders, which were isolated in 1997, after which the water they contained was not considered to be potable. These bladders are still in service for fire protection purposes only. On several occasions, the fire pump has started unexpectedly due to mechanical problems or pressure transients. This results in water from the bladders entering the active part of the domestic water system. Station procedures require that the domestic water system be quarantined, flushed, and analyzed following operation of the fire water booster pump and for in service declaration. This represents a significant disruption to normal station operation and a considerable cost to the corporation. The cost could be significantly high, should a spurious start of fire water pump occur during an outage. The domestic Water Pump House Compliance issues relate to deficiencies in the fire related separations, lack of sprinkler and ventilation systems, less than adequate diesel tank support structure and spill control, electrical system deficiencies including lighting transformers, power supplies, fire panel and pump controls. The only way to prevent such reported events and to address the fire code compliance issues is to eliminate the need for the Domestic Water Pump House and bladders. As part of this project, these bladders will be removed from service.

As part of the Darlington Refurbishment and Campus Plan projects, a number of facilities are going to be constructed on site as per the campus plan initiative. These new facilities will require water (domestic and fire) system connections to the water main.

2.2 Sanitary Sewer Upgrades

2.2.1 Sewage Treatment Capacity:

The current sewage system average flow rate and treatment capacity is not adequate to meet the estimated demand for major programs such as refurbishment due to the fact that a large number of people will be working on many projects and refurbishment activities on site during that program. Also, there will be some new campus plan and refurbishment facilities during the next decade which would require additional sewage system capacity.

The proposed refurbishment and campus plan facilities to be built as per the campus plan will require connections of sanitary sewer lines to the sewer main.

2.2.2 Environmental Concerns:

In 2007 there was a series of reported events resulting from release of unmonitored sewage due to equipment failure in the Sewage Treatment Plant (STP).

The Federal Government has Proposed Wastewater Systems Effluent Regulations under the Fisheries Act to establish national effluent quality standards. The existing STP would not be able to meet the new regulations that are being proposed..

2.2.3 De-commissioning and removal of existing STP:

Once the Sanitary Sewer Systems are re-directed to the municipality, the existing STP will be de-commissioned and removed. This will eliminate the above stated environmental concerns, as well as eliminate asset maintenance and operating costs.

2.3 Conceptual Study and Preliminary Engineering

2.3.1: Conceptual Study -Complete

In October of 2009, an external consulting company was retained to assess DNGS need and find acceptable water and sewage solutions for the site. The background information on the systems, including reports and drawings, were reviewed and servicing options were developed based on internal meetings, analysis and discussions.

The water and sewage flow rate demands were determined for the site under steady state and projected peak demand conditions.

The conceptual report focused on providing secure water supply and sanitary services for DNGS from existing Regional Services. The Region has recently installed the piping extensions and tie-ins points for these new systems at planned locations on Holt Road and Solina Road.

2.3.2 Preliminary Engineering – In Progress

In December 2010 the engineering consultant undertook the preliminary engineering of the project. The water demands for domestic and fire use were confirmed and detail Water Supply System/Network Analysis was prepared to finalize the sizing and routing of the piping system. Other preliminary engineering activities and deliverables were as follows:

- Conduct topographical surveys
- Scanning for borehole drilling
- Borehole Drilling (currently in progress) for soil sampling
- Finalize the plan and profile of all the piping systems
- Determine the major equipment and technical specifications
- Complete the Design Requirements for both water and sewer systems
- Liaise with local authorities and stakeholder for planning the Permits and Approvals
- Prepare a release quality estimate for procurement and construction of water and sewer mains

2.4 Ongoing Operational Costs

At this stage, it is estimated that cost savings from abandoning the operation of the Sewage Treatment Plant, Water Bladders and the Chlorination systems, partially offset by costs of municipal water and sewage treatment services, are about $100,000 per year. These cost saving estimates will be refined for the Full Release.

3/ ALTERNATIVES & ECONOMIC ANALYSIS:

$ 000's	Base Case	Alt 1 (Recommended) Full Cost	Alt 1 (Recommended) Incremental Cost	Alt 2 Delay for two years	Alt 3 Build Site Specific Systems	Alt 4 Do Less	Alt 5
Revenue							
Base OM&A	0	4,522	4,522	4,222		4,563	
Outage OM&A							
Project OM&A							
Total OM&A	0	4,522	4,522	4,222	0	4,563	0
Capital	0	(32,842)	(32,012)	(34,897)		(26,302)	
Present Value (PV)	0	(25,596)	(24,869)	(23,767)	Not Calculated	(20,784)	
Net Present Value (NPV)	**N/A**	**(25,596)**	**(24,869)**	**(23,767)**	**#VALUE!**	**(20,784)**	
Internal Rate of Return (IRR) %	N/A	N/A	N/A	N/A	N/A	N/A	
Discounted Payback (Yrs)	N/A	N/A	N/A	N/A	N/A	N/A	

Note: The estimated cost savings and removal costs are included the economic analysis as Base OM&A.

Base Case: × *Not Recommended* - **Do Nothing**

To do nothing is not recommended because this alternative will not allow DNGS to meet the domestic/fire water and sewage treatment demand for refurbishment work and continued station operation. This alternative has not been estimated and is used as a basis to evaluate the incremental cost of other alternatives.

Alternative 1: ✓ *Recommended* - **Install new domestic and fire water mains and redirect the sanitary sewage system to the Municipality**

Installation of domestic water and fire water lines from the municipality of Oshawa at Osborne Road and a new fire water line from the municipality of Bowmanville on Holt Road just south of Highway 401. Install tie-in points in strategic locations for supply of water to various station facilities.

Bypass the domestic water supply to the existing pump house equipment, complemented by the installation of booster pumping systems to maintain required pressures in the site buildings. This will allow the existing bladders, fire pump and chlorination equipment to be removed from the water system which will reduce maintenance and operating costs, simplify the functionality of the system and improve the water quality, thus eliminating employee concerns.

This alternative includes the installation of a sanitary sewer line from the station to the Courtice Water Pollution Control Plant along with the construction of a new pumping station. This would allow OPG to send sewage directly to the municipality and de-commission the existing deteriorating Sewage Treatment Plant.

Installation of water and sewer distribution lines and tie-in points to proposed Refurbishment and Campus Plan facilities..

The project boundaries for the domestic/fire water supply will be from the municipality tie-ins points to the station inlet flange in the existing Pump-house. The project boundaries for the sanitary sewer system discharge will be from a new Lift Station at the west of the existing Project Office to the municipality tie-ins point. The systems conditions and the documentation outside these boundaries are not included in the scope of this project.

Alternative 2: × *Not Recommended* - **Delay for 2 years**

This is not recommended since this project is on critical path to support the refurbishment project. Water and Sewer are basic needs for the personnel working on site during the refurbishment project. Water and Sewer infrastructure need to be developed before any proposed facilities are to be built. Delaying the project will impact the DNGS Refurbishment.

Alternative 3 : × *Not Recommended* - Build site specific water supply and sanitary treatment systems with the latest technology

This is not recommended since this alternative would be significantly more expensive both in terms of capital and incremental operating and maintenance costs over the life of the plant. An order of magnitude estimate for these facilities is in the order of $150M capital and about $200M of incremental OM&A for the life of the station (PV has not been calculated for this option).

Alternative 4: × *Not Recommended* - Do Less (only water supply and Sewer discharge, not distribution).

This is not recommended since entire scope of this project is the required infrastructure for the station refurbishment initiative and continued operation of the station to end of life.

4/ THE PROPOSAL

Approval of this release of funds will allow the project to complete the following tasks:

- Complete the design of water main connections from Holt Rd and Solina Rd to the station inlet.
- Complete the design of the sanitary sewer main from a new force main (west of Building 116 – Project Office) to the Solina Rd tie-in point.
- Complete the design of water and sanitary sewer connections to the Campus Plan and Refurbishment facilities.
- Supply and construction of sanitary sewer mains.
- Supply and construction of water mains
- Obtain a full release BCS for the balance of the project.

Project Execution Strategy for Water and Sewer Mains

The preliminary engineering of the project is in progress and will be completed by September 2011. The project will complete the design, necessary approvals and permits for the Holt Road water main first. This is a part of the project base scope but will be done as first priority due to concerns regarding the condition and the reliability of the existing, and the only, 200mm domestic and fire water supply line to the station as well as meeting Darlington New Nuclear Project's (DNNP) request for vacating the proposed property for the new build by May 2012 in alignment with its contracting strategies. This priority setting will not have a negative impact on the project cost and schedule. Once abandoned, the existing line will be removed by the DNNP's site preparation program.

The design and start of the construction for the sewer system will be concurrent with the Holt Rd water main. The construction of the Solina Rd water main will start once the Holt Rd water main is in service.

Future release of funds will provide for the following:

- Procurement and construction of the water and sewer distribution systems and tie-in points to the new Refurbishment support buildings and Campus Plan facilities,
- De-commissioning and removal of the abandoned systems such as Pumphouse, Water Bladders with associated Chlorination systems and Sewage Treatment Plant.
- Potential installation of new fire booster pumps for some large buildings.

5/ QUALITATIVE FACTORS

The qualitative factors resulting from this project are:

- Eliminate employee concerns regarding of domestic water for staff consumption.
- Provide redundancy in supply of domestic and fire water to the station from the municipality.

6/ RISKS ANALYSIS (See Attachment D for details)

Low 1 to 3	Medium 4 to 9	[redacted]

Probability \ Impact	1	2	3	4	5
5	5	[redacted]	[redacted]	[redacted]	[redacted]
4	4	8	[redacted]	[redacted]	[redacted]
3	3	6	9	[redacted]	[redacted]
2	2	4	6	8	[redacted]
1	1	2	3	4	5

Risk Description	Mitigating Activities	Mitigation	Probability X Impact: Finance	Schedule	Quality	Corporate Reputation	Regulatory	Health & Safety	Environmental	Nuclear Safety	Risk Rating (1 to 25)
Potential environmental requirements/impacts may result in higher cost and schedule complaints from public using the environmentally sensitive areas, and potential delay to permits.	Project plans have been communicated to the local authorities and the environmentally sensitive areas have been identified. The Environmental Impact Statement will establish necessary mitigating measures for any potential risk. Adjustments have been made to the base cost and schedule.	Before	[redacted]	[redacted]	0	[redacted]	[redacted]	0	0	0	[redacted]
		After	3	9	0	3	3	0	0	0	9
Interference with the Campus plan proposed facilities. Additional water flow capacity requirement may arise.	The water flow demand is based on: historical use, previous studies based on fixtures, current and future station population for refurbishment, maintenance and normal operations. Modification Design requirements developed and approved.	Before	[redacted]	[redacted]	[redacted]	0	0	0	0	0	[redacted]
		After	2	6	4	0	0	0	0	0	6
Elevation changes for gravity flow/pressure could cause redesign and rerouting of piping lines.	Flow conditions (rate and pressure) will be modeled by engineering and provisions will be made in the design to ensure adequate flow rate and pressure at the inlet to the station.	Before	[redacted]	[redacted]	[redacted]	0	0	0	0	0	[redacted]
		After	6	9	3	0	0	0	0	0	9
Pressure differentials between Oshawa and Bowmanville water mains.	Engineering consultant has performed nodal analysis and will provide for the pressure balancing devices in the design.	Before	[redacted]	[redacted]	5	0	5	0	0	0	[redacted]
		After	2	2	1	0	1	0	0	0	2

Productivity losses due to weather and alternate construction methods due to restrictive environmental conditions.	The project will monitor this closely with the PC company and will deal with upcoming issues in a case by case method.	Before	[redacted]	[redacted]	0	0	[redacted]	0	0	0	[redacted]
		After	5	5	0	0	5	0	0	0	5
Discovery above and below ground work due to land and environmental conditions during construction.	The risk will be transferred to the PC company with a fixed price contract. Specific Contingency of [redacted] has been requested in the BCS for this risk.	Before	9	9	0	3	3	0	0	0	9
		After	2	4	0	2	2	0	0	0	4

7/ POST IMPLEMENTATION REVIEW

Type of PIR:	Targeted Final AFS Date:	Targeted PIR Approval Date	PIR Responsibility (Sponsor Title)
Simplified	27-Nov-14	27-May-15	Mgr Nuclear E Facil

	Measurable Parameter	Current Baseline	Targeted Result	How will it be measured?	Who will measure Person / Group?
1.	Domestic water	One 200 mm Line from Durham Region	One 300 mm line from Durham Region	New line in service/project AFS	Nuclear East Facilities
2.	Fire water	Water Bladders and Diesel Fire Pump	Two new fire water mains (400mm) from two townships.	New lines in service/project AFS	Nuclear East Facilities
3..	Fire water pressure	586 kPa	586 kPA	Pressure Gage	Nuclear East Facilities
4.	Sewage Treatment Plant	Operating	Abandoned	Flow of sanitary sewer to the municipality/project AFS	Nuclear East Facilities
5.	Fire Pumphouse	Operating	Abandoned	Pumphouse by-passed/part of project AFS	Nuclear East Facilities
6.	Water Bladders	Operating	Abandoned	Bladders by-passed/part of project AFS	Nuclear East Facilities

APPENDIX "A' GLOSSARY (acronyms, codes, technical terms)

AFS	Available for Service
Bladders	reservoirs or bags for water supply.
BOE	Basis Of Estimate.
BU	Business Unit.
CBDO	Carbonaceous Biochemical Oxygen Demand.
CNR	Canadian National Railway.
CWPCP	Courtice Water Pollution and Control Plant.
DNGS	Darlington Nuclear Generating Station
DNNP	Darlington New Nuclear Project
L/S	Liter Per Second.
MOE	Ministry of Environment.
RFP	Request For Proposal.
SCR	Station Condition Record.
SOW	Scope Of Work.
SPS	Sanitary Pumping Station.
STP	Sewage Treatment Plant.
TRC	Total Residual Chlorine
VBO	Vacuum Building Outage.

APPENDIX "B"

Comparison of Total Project Estimates

$ 000's		This Appendix compares the Total Project Estimate for each BCS										
			Total Project Estimate (by Year incl Contingency)									Total
BCS Type	Class	Mth	Yr	2010	2011	2012	2013	2014	2015	2016	Later	Project Est
Developmental	Capital	Jul	2010	265	3,590	11,542	9,980	8,380	4,800	1,443		40,000
Partial	Capital	Aug	2011	180	1,908	8,964	16,897	7,486	565			36,000
												0
												0
												0
												0
LTD Spent	Capital	May	2011	180	830							1,010
LTD Spent												0
LTD Spent												0

Comments:

See comments in Project Variance Analysis.

APPENDIX "C" FINANCIAL MODEL – ASSUMPTIONS

Financial Assumptions:

Discount Rate:	7%	Cost Escalation (Yr)	3%	SR&D Opportunity	No
Progress Payments	Yes	Foreign Currency	No	Retainer Fee	No
Depreciation Rate (Capital)	Bigs Oth Structures 4%	PST	No	Interest Rate (Capital)	6%
Revenue Rate	Nuclear Est	Leasing	No	Indexed Priced Contract	No

Comments:

Project Cost Estimate:

Design Complete:	Up to ~ 15%	Fixed Price Contract	Yes	3rd Party Estimate	Yes
Quality of Estimate	Release +15% to -10%	OPEX used	Yes	Lessons Learned	Yes
Similar Projects	Yes	Budgetary Quote	No	First Unit Actual Used	N/A
Firm Vendor Proposal	No	Cost Sharing	No	Competitive Bid	Yes
Reviewed by Sponsor	Yes	Fee for Service	No	Contracts in place	No

Comments:

Project Cost Estimate Assumptions:

1. The cost estimate for detailed engineering is based on a fixed price contract with an engineering company.
2. The estimate for procurement and construction of the project is based on the cost report provided by the company who completed the preliminary engineering and is experienced with this type of work in Durham Region. Allowances for environmental mitigation and remediation as well as provisions for productivity loss due to working in busy areas of the site and outdoor weather conditions are included in the estimate.
3. Specific Contingency of [redacted] is allocated for potential discovery work including aboveground and underground findings.
4. The project will retain the services of a Procurement and Construction contractor (PC) - on fixed price basis - for the supply and construction of the project. OPG's role in this contract will be the Owner Only as per OHSA.
5. General Contingency for the partial release is [redacted]% according to the contingency calculation tool.
6. General Contingency for future release is [redacted]% according to the contingency calculation tool.
7. On-going operation and maintenance cost for the new systems, estimated at $0.6 Million per year, represents a cost saving of $0.1 Million and is included in the NPV analysis.
8. Decommissioning and removal cost has been estimated at $2.1 Million and is included in the financial evaluations.
9. The projects responsible for construction of the proposed Refurbishment and Campus Plan facilities will be responsible to install connections to the tie-in points that this project will provide for the said facilities in a close proximity of the proposed facilities as per the latest plan at time of detailed design.

Rationale for Capital Cost Classification:

Replacement of existing domestic and fire water supplies with higher capacity supplies that support extension of the life of Darlington facilities as well as the addition of a new sewage system to replace the life-expired site Sewage Treatment Plant.

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Generation Plan Assumptions:

Station	Unit	EOL or Refurb	MW	Planned Outages for Project Work						
Pickering A	1	Jun-20	515	N/A						
	4	Jun-20	515	N/A						
Pickering B	5	Nov-18	516	N/A						
	6	Nov-18	516	N/A						
	7	Jun-20	516	N/A						
	8	Jun-20	516	N/A						
Darlington	1	Sep-16	878	N/A						
	2	Feb-18	878	N/A						
	3	Sep-19	878	N/A						
	4	Jan-21	878	N/A						

Comments:

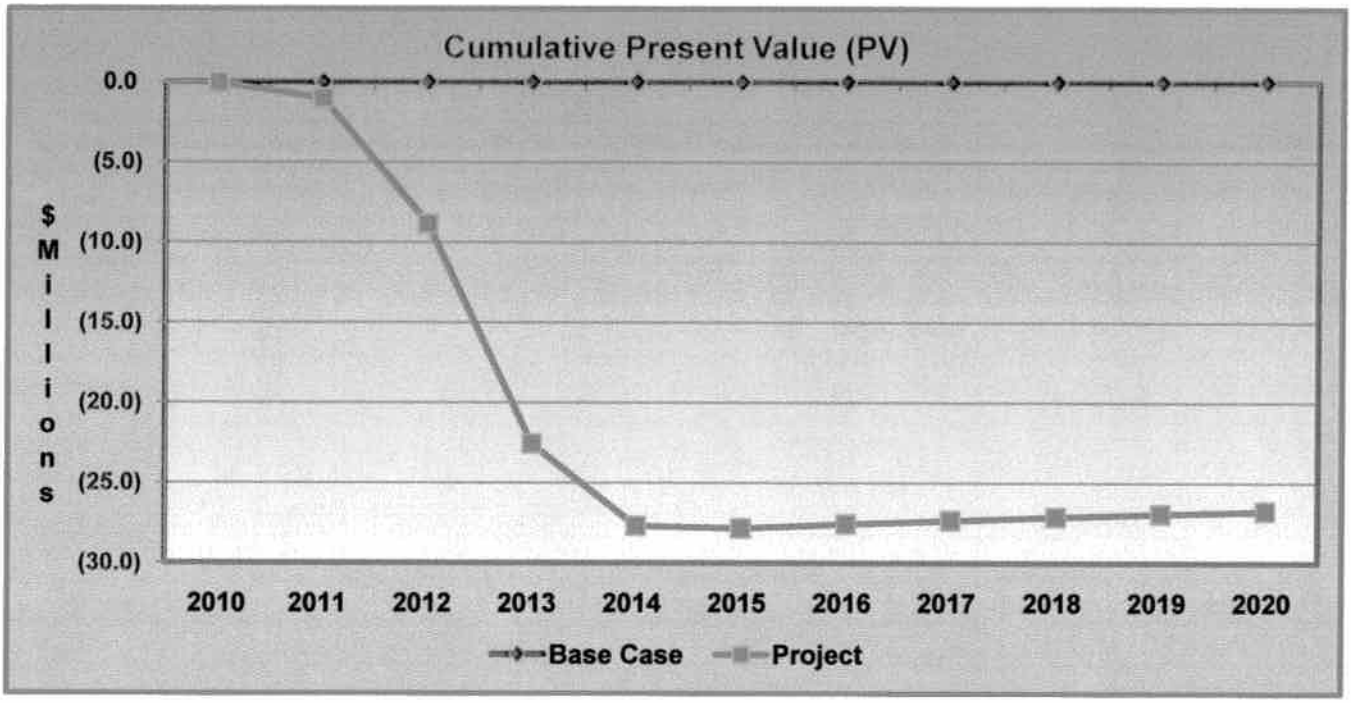
APPENDIX "D"

FINANCIAL MODEL – ASSUMPTIONS

Impact on Operations

Comments: The project will not require unit outages,therefore,no impact on production of electricity.

Cumulative Present Value Graph:



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APPENDIX "E" *PROJECT DELIVERABLES*

Item	Description	Deliverable	Cost ($000's)
1	Detail design water and sewer systems	From Holt Rd & Solina Rd to station inlet	[redacted]
		From new force main to Solina Rd tie-in point	
		Connections to Campus Plan and Refurbishment facilities	
2	Sanitary sewer main to municipality	Installation of Sewer Main	
3	Water main connections	Installation of Water Main	
4	Project Management	SOWs	50
		RFPs	50
		Procurement and Construction contract	**25**
		Full Release BCS	25
		Project Execution Plan	10
		P6 Schedule	**10**
		Project coordination and reporting	513
5	Installation support	Contract Administration	300
		Quality Surveillance	**50**
6	Contingencies	General	[redacted]
		Specific	
7	Interest	Interest	
Total			**19,033**

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ATTACHMENT "A" PROJECT COST SUMMARY

	$ 000's Capital	LTD Dec 2010	2011	2012	2013	2014	2015	2016	Later	Total
Accounting Basis	Project Mgmnt & Support	156	305	355	355	335	185			1,691
	Engineering	24	830	662	462	475	175			2,628
	Procurement									-
	Construction	[redacted]								
	Other									
										-
										-
										-
	Interest (Capital Project)	[redacted]								
	Project Costs									
	General Contingency									
	Specific Contingency									
	Project Costs	180	1,908	8,964	16,897	7,486	565	-	-	36,000

	$ 000's Capital		LTD Dec 2010	2011	2012	2013	2014	2015	2016	Later	Total
Funding Basis	Current Release	Project Costs	[redacted]								
		Contingency									
		Total	265	3,590	145	-	-	-	-	-	4,000
	Adj to Current Release	Project Costs	[redacted]								
		Contingency									
		Total	(85)	(2,503)	(145)	-	-	-	-	-	(2,733)
	This Release	Project Costs	[redacted]								
		Contingency									
		Total	-	821	8,964	9,248	-	-	-	-	19,033
	TTD Released	Project Costs	[redacted]								
		Contingency									
		Total	180	1,908	8,964	9,248	-	-	-	-	20,300
	Future Releases	Project Costs	[redacted]								
		Contingency									
		Total	-	-	-	7,649	7,486	565	-	-	15,700
	Project Funding		[redacted]								
	Contingency Funding										
	Total Funding		180	1,908	8,964	16,897	7,486	565	-	-	36,000

Budget	2011 - 2015 Business Plan	971	3,390	7,602	5,046	5,152	5,255	5,203	0	32,619
	Variance to Budget	(791)	(1,724)	(214)	8,425	85	(4,835)	(5,203)	0	(4,257)
Other	Removal Costs (above)					2,122				2,122
	Inventory W / O									-
	Spare Parts in Invent									-

Reviewed by: (Date) July 6, 2011
Morad Solaimani
Project Manager

Approved by: (Date) July 7, 2011
Carm Agosta
Manager

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ATTACHMENT "B" PROJECT VARIANCE ANALYSIS

	$ 000's Capital	LTD May 2011	Total Project Last BCS Jul 2010	Total Project This BCS Aug 2011	Variance	Comments
Scores Basis	Project Mgmnt & Support	583	3,940	1,691	(2,249)	Note 1
	Engineering	[redacted]				Note 2
	Procurement					Note 3
	Construction					Note 3
	Other					Note 4
					-	
					-	
					-	
					-	
	Interest (Capital Project Only)	[redacted]				Note 5
	Project Costs (Scores Basis)					
	General Contingency					Note 6
	Specific Contingency					Note 6
	Project Costs (Scores Basis)	**994**	**40,000**	**36,000**	**(4,000)**	

Other	**Removal Costs included above**		**1,460**	**2,122**	662	Note 7
	Inventory to be written off				-	
	Spare Parts in Inventory				-	

Note 1 Lower OPG resources required to manage a fixed price Owner Only procurement and construction contract.
Note 2 Engineering included OPG and contractor resources which have now been refined. .
Note 3 Materials and construction have been refined and include as a single contract. Contract Management office was included in PM costs
Note 4 Support of other OPG departments
Note 5 Reduced due to multiple in-service declarations.
Note 6 Quality of estimate is improved. Added specific contingency to mitigate environmental discovery issues.
Note 7 Refined scope of work for removals

ATTACHMENT "C" SCHEDULE

Key Milestones

Completion Date	Description
15-Sep-11	Partial BCS OAR Approved
21-Sep-11	Design Contract Awarded
24-Nov-11	Supply and Installation Contract Awarded for Holt Road Watermain
27-Jan-12	Design Complete for Holt Road Watermain
17-Feb-12	Start of Installation Holt Road Watermain
12-Apr-12	Design Complete for Sewer and Solina Rd Watermains
17-May-12	Supply and Installation Contract Awarded for Sewer and Solina Rd Watermains
31-May-12	Partial AFS Holt Road Watermain
18-Jun-12	Start of Installation of Sewer and Solina Rd Watermains
30-Oct-12	Design complete for Distribution systems
23-May-13	Full Release BCS OAR Approved
25-Jul-13	Partial AFS of Sewer and Solina Rd Watermains

A Project Execution Plan (PEP) will be approved by 15-Mar-12

In Service Declarations: (Capital only)

Date	Description	$000's (Total = Project Cost Incl contg)	% In Service (= 100%)
31-May-12	Partial AFS for Holt Road water main	5,000	15%
25-Jul-13	Partial AFS Main Headers for Sewer, Domestic and Fire water	14,200	38%
24-Apr-14	Partial AFS Distribution lines for Sewer, Domestic and Fire water	11,000	30%
28-Aug-14	Partial AFS for decommissioning and removal of some water and sewer systems	4,000	12%
27-Nov-14	Final AFS for sewer, and domestic water system upgrades	1,800	5 %

Comments:

Darlington Water and Sewer Project 10 - 73802 (Capital)
Partial Release Business Case Summary NK38 - BCS - 72700 - 10008 - R000

Risk Probabilities Chart

Likelihood	Improbable	Unlikely	Possible	Likely	Probable
Probability	<= 1 in 100	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 month	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 > $15MCat. 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 ORMajor 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 OrderCat. 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 finesORPotential 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 spillsEmission in exceedance of regulatory or legal limitsField orders or AMP'sPublic complaints with OPG implicationsDanger 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 scheduleORPossibility 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 - reportableAdministrative infractionsPublic 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 qualityRoutine non-conformance, can be easily dispositioned	Complaints from local public	Isolated non-complianceORRoutine approval / notification	No medical attention beyond first aid, no impairment to worker or complete recovery of worker	Administrative, non-reportable eventsCat. C spills non-reportable and spills resulting from Acts of God	