

CI# 28726

HYD – Carlton Lake Dam Refurbishment

REDACTED

April 30, 2010

NOVA SCOTIA
POWER
An Emera Company

UARB APPROVAL SHEET

Project Title: **HYD - Carlton Lake Dam Refurbishment**

CI Number: 28726

☒ Capital Project Authorization

Head Office Use:

☐ ATO

Project Number:

☐ Final Cost

Date: April 30, 2010

Location:			Division:	
Expenditure Profile			Schedule	
YEAR	Budget Estimate	Project Estimate		
2010	2,716,723	3,104,448	Estimated Start Date	2010-06
			Estimated In-Service Date	2011-10
			Estimated Close Date	2011-11
Total	\$2,716,723	\$3,104,448		

COMMENTS

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Approved on behalf of NOVA SCOTIA UTILITY AND REVIEW BOARD

M/S

April 29/2010

Authorized Signatory

DATE

DATE

Mark Savory

VP Technical and Construction

CI Number : 28726

- HYD - Carlton Lake Dam Refurbishment

Project Number

Parent CI Number :

-

Cost Centre : 408

- 408-Tusket Hydro

Budget Version - 2010 03/09 Forecast

	<u>Forecast</u>
Start :	05/01/2010
Operational :	10/31/2010
Final Cost :	11/30/2010
2010	\$3,104,447.72
Total :	\$3,104,447.72
Original Cost :	\$0.00

This item covers refurbishing the Carlton dam, spillway and stoplog structures (680 ft long by 25 ft high stop log controlled concrete structure) in order to meet the Canadian Dam Association (CDA) guidelines, and the fish passage to meet Department of Fisheries and Oceans (DFO) requirements.

Summary of related CI's +/- 2 years:

No other projects in 2008,2009,2010,2011 and 2012

CI Number : 28726

- HYD - Carlton Lake Dam Refurbishment

Project Number

Parent CI Number :

-

Approved Date

Cost Centre : 408

- 408-Tusket Hydro

Budget Version 2010 03/09 Forecast

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		48,691	0	48,691
095		095-Hydro Regular Labour AO		4,071	0	4,071
095		095-Thermal & Hydro Contracts AO		157,200	0	157,200
095		095-Hydro Term Labour AO		7,258	0	7,258
095		095-Hydro Overtime Labour AO		1,753	0	1,753
001	007	001 - HYDRO Regular Labour	007 - HGP - Environmental	2,049	0	2,049
004	007	004 - HYDRO Term Labour	007 - HGP - Environmental	1,259	0	1,259
011	007	011 - Travel Expense	007 - HGP - Environmental	646	0	646
012	007	012 - Materials	007 - DP - Environmental		0	
028	007	028 - Consulting	007 - HGP - Environmental	966	0	966
041	007	041 - Meals & Entertainment	007 - HGP - Environmental	231	0	231
066	007	066 - Other Goods & Services	007 - DP - Environmental	0	0	0
066	007	066 - Other Goods & Services	007 - HGP - Environmental	300	0	300
013	028	013 - POWER PRODUCTION Contracts	028 - HGP - Dams & Spillways		0	
001	085	001 - HYDRO Regular Labour	085 Design	18,851	0	18,851
011	085	011 - Travel Expense	085 Design	1,400	0	1,400
028	085	028 - Consulting	085 Design	152,632	0	152,632
041	085	041 - Meals & Entertainment	085 Design	140	0	140
066	085	066 - Other Goods & Services	085 Design	200	0	200
002	087	002 - HYDRO Overtime Labour	087 Field Super.& Ops.	18,000	0	18,000
004	087	004 - HYDRO Term Labour	087 Field Super.& Ops.	36,000	0	36,000
011	087	011 - Travel Expense	087 Field Super.& Ops.	18,000	0	18,000
041	087	041 - Meals & Entertainment	087 Field Super.& Ops.	4,200	0	4,200
066	087	066 - Other Goods & Services	087 Field Super.& Ops.	600	0	600

Total Cost:

3,104,448

0

3,104,448

Original Cost:

CI Number : 28726

- HYD Carlton Lake Dam Refurbishment

Project Number

Parent CI Number :

-

Approved Date

Cost Centre : 408

- 408-Tusket Hydro

Capital Item Justification

Justification Criteria : HYDRO

Sub-Criteria : Maintenance

Name of Report :

Document Location :

Person Responsible : XXXXXXXXXX

Why do this project?

A flood study was completed to identify the required spillway capacity for the structures on the Tusket Hydro System in accordance with the CDA guidelines. A dam safety review was also completed in 2005. The dam safety evaluation of Carlton Lake concluded that there is insufficient freeboard to meet the minimum freeboard requirements, and the spillway and stoplog structures do not meet the criteria for stability. The existing fish ladder does not meet DFO requirements and must also be replaced.

Why do this project now?

Since 1986, NSPI has carried out dam safety related work on a priority basis. The work at Carlton Lake is scheduled for 2010.

Why do this project this way?

The dams and/or spillways need to be refurbished to meet the Canadian Dam Safety guidelines for freeboard and stability. Therefore it is necessary to increase the length and stability of the spillway structure and raise the dam crest.

CI Number : 28726

- HYD Carlton Lake Dam Refurbishment

Project Number

Parent CI Number :

-

Approved Date

Cost Centre : 408

- 408-Tusket Hydro

Reason for Variance / Over Expenditure / Final Costing

13604937

The increase in the activation amount request relative to the 2010 ACE budget amount results from detailed engineering being completed following ACE 2010. This includes increased estimates for survey and geotechnical scope of work. Additional scope for bringing the fish passage ladder to DFO requirements and the installation of a Portadam for water control also contributes to this variance.

Due to environmental and fisheries requirements, Carlton Lake cannot be lowered until July 15, 2010. As this leaves an extremely short construction season, a cofferdam must be installed to allow the work to proceed in dry conditions. Department of Environment / DFO will not allow the construction of an earth cofferdam unless it is downstream of another water retention structure (eg. Portadam).

28726 - HYD Carlton Lake Dam Refurbishment

Project #	Account	ACE 2010	Current Submission	Variance
28726	001 - HYDRO Regular Labour	21,678	20,900	(778)
28726	002 - HYDRO Overtime Labour	17,500	18,000	500
28726	004 - HYDRO Term Labour	30,332	37,259	6,927
28726	011 - Travel Expense	20,346	20,046	(300)
28726	012 - Materials			
28726	013 - POWER PRODUCTION Contracts			
28726	028 - Consulting	133,016	153,598	20,582
28726	041 - Meals & Entertainment	4,571	4,571	-
28726	066 - Other Goods & Services	1,150	1,100	(50)
28726	094 - Interest Capitalized	25,644	48,691	23,047
28726	095-Hydro Overtime Labour AO	1,705	1,753	49
28726	095-Hydro Regular Labour AO	4,223	4,071	(152)
28726	095-Hydro Term Labour AO	5,909	7,258	1,349
28726	095-Thermal & Hydro Contracts AO	150,650	157,200	6,550
		2,716,723	3,104,448	387,724

USD Exchange Rate - \$1.05 CDN

HYD - Carlton Lake Dam Refurbishment

Account	Project Total Estimate
001 - HYDRO Regular Labour	\$20,900
002 - HYDRO Overtime Labour	\$18,000
004 - HYDRO Term Labour	\$37,259
011 - Travel Expense	\$20,046
012 - Materials	██████████
013 - POWER PRODUCTION Contracts	██████████
028 - Consulting (Environmental)	\$966
028 - Consulting (Design)	\$152,632
041 - Meals & Entertainment	\$4,571
066 - Other Goods & Services	\$1,100
AFUDC / Interest	\$48,691
Admin Overheads	\$170,282
Project Total	\$3,104,447

①

②

③

USD Exchange Rate - \$1.05 CDN

CI 28726 - Carlton Lake Dam Refurbishment Cost Support Notes

- Note 1 ██████ @ foreign exchange of 1.0526 = ██████. Remaining ██████ in the materials estimate is contingency.
- Note 2 Tenders have not yet been received, but estimated costs according to the detailed break-down provided are based on NSPI engineering staff experience on similar projects.
- Note 3 Total for engineering consulting by AMEC is ██████ per the attached proposal.
Remaining estimate for consulting is for design of the fish ladder (\$27,075) and spillway design contingency ██████.

COST SUPPORT - NOTE 1

3082 South Black Horse Pike
Williamstown, NJ 08094
www.portadam.com

Office: (856) 740-0606
Toll Free: (800) 346-4793
Fax: (856) 740-0614

PORTADAM, INC.
DIVERSION AND COFFERDAM STRUCTURES

March 3, 2010

Senior Civil Engineer
Nova Scotia Power Inc.
P.O. Box 910,
Halifax, NS B3J 2W5
Canada

Reference: Purchase of 10' High Portadam System

As we discussed, Portadam will agree to sell 400 linear feet (two straight 200 linear foot sections) of its 10' high system to Nova Scotia Power ("NS Power") under the following terms and conditions. Table 1 provides FOB, Williamstown, New Jersey pricing, which does not include broker fees, duty, local, sales or other taxes that may apply to the transaction. As for transportation of the equipment, two 48' flat bed trucks with 12 chains and binders will be required. Please note that step-deck flat bed trucks will not be suitable. The estimated freight cost to your location is [REDACTED]. Portadam is not in a position to estimate any other transportation, customs or other fees that may apply to the shipment or sale.

Table 1 - Purchase Price			
System Height	Approx. Ln. Footage	US\$/Ln.Ft.	Purchase Price
10 Foot System	400	[REDACTED]	[REDACTED]

In addition to the Portadam system, NS Power will need to have the following items available for installation of the Portadam system.

I. Installation scope and materials at NS Powers' expense:

- Lifting rig services to handle Portadam equipment, to reach cofferdam perimeter, each day at site.
- Access, clearing, offloading & reloading at site.
- Sandbags as required (estimated at 800 per 400 linear foot job).
- Structure security
- All pumping (initial de-watering and 24 hr. maintenance pumping as required, to include any and all seepage, infiltration, groundwater, overflow and precipitation)
- Clearing of any subsurface conditions, rip rap, debris, i.e. trees, stumps, branches, boulders vegetation etc, which would impede placement, sealing or tie-in of the Portadam system.
- On-site labor (min. 2 men).
- Dive Crew to meet Canadian dive requirement

The frames would arrive in 10 frames per bundle and each frame weighs approximately 220 pounds. Each fabric section will weigh approximately 600 pounds, please count on approximately 8 fabric sections.

II. Storage Requirements

The fabric materials, sandbags and component parts will need to be stored in an inside location and away from direct sunlight. The metal frames can be stored in a secure outdoor location.

III. Installation and Removal Requirements

This offer contemplates that NS Power will provide its own in-water team and on-site labor. Portadam can supply on-site labor and technical assistance at the below rates.

- a) Portadam in-water crew onsite assistance; standard weekday rate..... [REDACTED]
- b) Crew travel; each round trip..... [REDACTED]
- c) Overtime, Saturday, Sunday and Holiday rates available upon request
- d) Any additional trade union or prevailing wage requirements are not included in these labor rates.

IV. Additional Terms and Conditions

Portadam's Standard Terms and Conditions are attached hereto and are incorporated in this offer. Payment terms are [REDACTED] percent upon acceptance of the offer with the balance due [REDACTED] after delivery to NS Power.

We look forward to working with you on this project. If you have any questions please feel free to contact me at [REDACTED] or [REDACTED]. If the proposed terms are acceptable please sign this offer letter in the space set forth below and return a copy to me with your deposit.

Best regards,

[REDACTED]

Chief Executive Officer
Portadam, Inc.

AGREED TO AND ACCEPTED:

Nova Scotia Power, Inc.

By:

Its:

TERMS and CONDITIONS

These Terms and Conditions apply to our offer to sell equipment. There are no other agreements, representations or promises between us, either expressed or implied, regarding the sale. Your acceptance of our attached offer shall serve as your agreement that these terms and conditions are accepted.

1. Portadam hereby sells to Buyer the equipment described in the Agreement attached hereto, (hereinafter referred to as the "Equipment").
2. Portadam shall deliver the Equipment to the location specified in the Agreement.
3. In consideration for the sale, Buyer shall pay to Portadam, at the address set forth above, the sum specified in the Agreement on or before the specified payment dates.
4. a. Portadam warrants to Buyer that Equipment shall be free from defects in material and workmanship under normal use for a period of one year. The obligation of Portadam under this warranty shall be limited to the replacement or repair of defective parts within the warranty period with respect to the Equipment. Portadam reserves the right to allow or disallow any warranty claim after making an examination of alleged defects and cause. THIS LIMITED WARRANTY TO BUYER IS IN LIEU OF ALL OTHER WARRANTIES EXPRESS OR IMPLIED BY OPERATION OF LAW OR OTHERWISE INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN NO EVENT SHALL PORTADAM BE LIABLE FOR INCIDENTAL, SPECIAL OR CONSEQUENTIAL DAMAGES. THIS WARRANTY IS AN EXCLUSIVE REMEDY. Portadam makes no warranty with regard to the installation of the equipment, subsurface conditions, or suitability of the area of installation. Portadam makes no warranty against the development of sink or scour holes, subsurface river or lake bed conditions, debris in the waterway, weather events, or conditions affecting the operation of the equipment that are beyond its control.

b. Buyer shall indemnify Portadam and hold Portadam harmless against and from any and all damages, claims, losses, expenses, obligations, and liabilities, including attorneys' fees, which arise from or are caused by the negligence of Buyer in the use of the Equipment.

c. This Agreement may not be amended or modified unless in writing signed by each party hereto.
5. Portadam warrants to Buyer that the Equipment leased hereunder is patented under the laws of the United States, and, to the best of its knowledge, is not subject to any claim for patent infringement by any other third party. Portadam will defend and hold the Buyer harmless from any patent infringement claims.
6. Buyer agrees that the rights and obligations of the parties hereunder shall in all respects be governed by and construed in accordance with the internal laws of the State of New York, without regard to principles of conflicts of law, and excluding the Convention on Contracts for the International Sale of Goods, including all matters of construction, validity and performance, regardless of the location of the Products or the State and/or Country of incorporation or principal place of business of Buyer. The parties expressly agree that the transaction described in this Agreement bears a reasonable relationship to the State of New York, that this Agreement should be governed by the laws of the State of New York, and that this choice of law provision is a negotiated item that forms part of the bargained-for consideration to the parties. No action may be brought against Portadam unless it is commenced within six (6) months of the date of delivery of the last item furnished by Portadam to Buyer. Buyer (i) consents to the exclusive jurisdiction and venue of the state courts situated in Albany County, New York, or, if they can acquire jurisdiction, the federal courts, situated in Albany County, New York, (ii) waives any objection to improver venue and forum non conveniens, and (iii) consents to service of process by certified mail, postage prepaid, to Buyer at its address as set forth herein, which service shall be deemed complete within ten (10) days after the date of mailing thereof. In the event this lease is referred to an attorney for collection or enforcement and the Portadam prevails in any action arising out a claim or the defense of a claim, the Buyer agrees to pay the Portadam's reasonable attorneys fees.

Cost Support Note 2

CARLTON DAM			UNITS	UNIT\$	TOTAL
Cofferdam Construction					
Low Permeability Fill	5500	CY	\$		\$
Excavation - Unsuitable Material	1200	CY	\$		\$
Cofferdam SubTotal					\$
Demolition (Concrete)					
Right Abutment Wall	280	CY			
Gate Structure	110	CY			
Stop Log Structure	150	CY			
Existing Spillway	170	CY			
Left Pier Wall	20	CY			
Demolition (Timber and Rock)	340	CY			
Demolition SubTotal	1070	CY	\$		\$
Right/Left Abutment Dams					
1- Impervious Fill	4700	CY			
1- Impervious Fill	3500	CY			
Impervious Sub-Total	8200	CY	\$		\$
2- Granular Filter Material	1000	CY			
2- Granular Filter Material	500	CY			
3- Rip-Rap Bedding Material and Erosion Protection	800	CY			
3- Rip-Rap Bedding Material and Erosion Protection	1350	CY			
Granular Sub Total	3650	CY	\$		\$
4- Rip-Rap	1050	CY			
4- Rip-Rap	400	CY			
Riprap Sub Total	1450	CY	\$		\$
5- Gravel	200	CY			
5- Gravel	100	CY			
Gravel Sub-Total	300	CY	\$		\$
Excavation					
Right Abutment	6000	CY			
Left Abutment	6000	CY			
Spillway and Surroundings	2100	CY			
Gate Structure	630	CY			
Excavation Sub-Total	14730	CY	\$		\$
New Concrete					
Right Abutment Wall	760	CY			
Left Abutment Wall	380	CY			
Spillway	1260	CY			
Fishway and Gate structure	270	CY			
Corewall	100	CY			
Concrete Sub-Total	2770	CY	\$		\$
Formwork					
Right Abutment Wall	590	SY			
Left Abutment Wall	410	SY			
Spillway	780	SY			
Fishway and Gate structure	370	SY			
Corewall	200	SY			
Formwork Sub-Total	2350	SY	\$		\$
Rebar					
Right Abutment Wall	18960	LB			
Left Abutment Wall	13060	LB			
Spillway	26550	LB			
Fishway and Gate structure	12170	LB			
Corewall	3360	LB			
Rebar Sub-Total	74100	LB	\$		\$
Concrete sub-Total					\$
Sub-total					\$
Quantity variation/unknown extra work (15%)	1	LS	\$		\$
Sub total					\$
Supply and Installation of gate	1	LS	\$		\$
Environment /Water Control	1	LS	\$		\$
Installation/removal of Portadam	1	LS	\$		\$
Clearing	1	LS	\$		\$
Access Road	1	LS	\$		\$
Fishladder					
Concrete/formwork/rebar	250	CY	\$		\$
Grating etc	1600	SF	\$		\$
Stoplogs	1	LS	\$		\$
Contract total					\$

COST SUPPORT NOTE 3



October 9, 2008

[REDACTED]
Nova Scotia Power Inc.
25 Lakeside Drive
Lakeside Industrial Park
Halifax, NS B3T 1M9

Dear [REDACTED]

Re: Conceptual/Detailed Design of Modifications to the Carleton Dam, Tusket Hydro System, NS ✓

AMEC is pleased to submit this proposal to provide assistance to Nova Scotia Power Inc. (NSPI) to undertake conceptual and detailed design, capital cost estimate and construction support for the Carleton Dam which forms part of NSPI's Tusket Hydro System. We have prepared our understanding of the project requirements and an associated scope of work and estimate of fees and disbursements for the engineering services.

1.0 PROJECT DESCRIPTION

In January 2006, AMEC completed a Dam Safety Review (DSR) of the Carleton Dam. At the time, it was recommended that the dam be upgraded in order to meet the minimum criteria of the 1999 Canadian Dam Association (CDA) Dam Safety Guidelines. The major concerns with the current structure are that the embankment dam does not meet the minimum freeboard requirements and the concrete spillway and stoplog structures do not meet the stability requirements as outlined in CDA (1999). In addition, some of the timbers in the timber crib structure that are in contact with the concrete and bedrock are in poor condition. CDA Dam Safety Guidelines (2007) were not available at the time of the DSR but these guidelines will now be taken into account as much as possible, in consultation with NSPI.

Some of the key dimensions of the dam are as follows:

- Crest elevation = 52 feet.
- Crest length = 680 feet.
- Full supply level (FSL) = 46 feet.
- In-flow design flood (IDF) = 51.4 feet.

During the 2006 DSR, the following design modifications were recommended:

- Raise the earthen embankments by 2 ft;
- Install a concrete overlay onto the existing ogee spillway with a crest elevation of 48.0 ft;



- Install rock anchors into the piers of the stoplog structure to increase their stability; and
- Remove the timber crib structure on the left abutment of the spillway and replace with a short section of embankment dam.

Discussions were held with NSPI on September 8, 2008 regarding the back spillway and fish ladder. We understand that the back spillway will be reconstructed as an earthen embankment and that a new fishway will be incorporated into the new dam. It is understood that NSPI will undertake the design of the fishway ladders.

It will be necessary to examine the incorporation of the fishway into the main dam. Consideration will also be given to construction options that may include cofferdamming the river above the dam and allowing water to continue to flow over the back spillway during construction at the main dam.

AMEC's current proposed scope of work for the Carleton Dam will involve considering the options noted above, selecting the preferred option, developing the conceptual design for the preferred option and providing a capital cost estimate for the proposed construction. Our understanding of the scope of work is described in the following sections.

2.0 SCOPE OF WORK

2.1 General

NSPI's request for proposal comprised two phases:

- Phase 1 - Conceptual design and capital cost estimate.
- Phase 2 - Detailed design and construction support.

AMEC's proposed scope of work will also comprise of two phases. The proposed Phase 1 scope of work for the Carleton Dam will involve developing the preferred conceptual design and providing a capital cost estimate for the proposed construction. A one-day workshop was also included in the Phase 1 scope and is described below. The recommended Phase 2 scope of work has been sub-divided into Phases 2A, 2B and 2C, feasibility design, detailed design and construction support, respectively. Phase 2A will develop the conceptual design to a feasibility level to work out some of the design and constructability issues prior to detailed design. A feasibility report memo will be completed as part of Phase 2A as well as refining the capital cost estimate. Phase 2B will involve the completion of the detailed design and issue for Construction (IFC) drawings. Phase 2C will provide construction support services and post construction as-built report. Our understanding of the scope of work is described in the following sub-sections.

A one-day workshop with NSP personnel is proposed to discuss the preferred remedial options prior to undertaking the conceptual designs. The workshop will be an overview of the options outlined in the four proposals submitted by AMEC; this current proposal for the Carleton Dam, the Tuskent Main Dam, the Ridge Spillway, and the Soldier Lake Spillway Dam and Wing Dam No. 1. The cost of the workshop has been included in the Tuskent Main Dam Conceptual Design proposal but may be substituted into the other cost estimates.

2.2 Geotechnical Investigations and Surveying

In order to proceed with the designs, it is recommended that additional survey information be gathered at the site. A geotechnical investigation including some laboratory testing is also recommended to confirm embankment composition and soil properties. The survey work and the geotechnical investigation would form part of the work included in this proposal. For construction scheduling purposes, it is recommended that both programs of work be undertaken in 2008. Following the geotechnical investigation, we will review and compare the soil design parameters that were used in the 2005 stability analyses to the findings of the recent investigation. Depending on the results of the review, it may be appropriate to re-run the analysis as part of this design. As the analyses may not be needed, we have provided an estimated cost for that portion of the work separately.

2.3 Work Included -- Phase 1

AMEC will undertake the following for the Phase 1 conceptual design:

1. Review documents and conceptual design alternatives to support the selection of the preferred option;
2. Undertake a one-day workshop with NSPI, prior to the commencement of the project, to select and develop the preferred conceptual design;
3. Conceptual design of the new embankment and wing walls to replace the current timber bulkhead in accordance with the 2007 CDA Dam Safety Guidelines, *addition to the existing ogee spillway*, rock anchors for adding additional stability to the sluice gate piers, 2 foot dam raise and new embankment dam to replace the existing back spillway timber structure. Conceptual design will include the completion of the conceptual design drawings;
4. Prepare a capital cost estimate for the construction of the preferred alternative. Based on the level of detail in the conceptual design, the cost estimate will have an accuracy in the range of 25 to 35 percent; 25%.
5. Prepare conceptual design memo describing the preferred alternative and the design criteria and assumptions; and
6. Carry out project management to ensure that the work is completed in an efficient and timely manner.

Confirm

2.4 Work Included -- Phase 2A

AMEC will undertake the following for the Phase 2A feasibility design:

1. Undertake a geotechnical investigation by drilling three 30 ft deep boreholes at the main structure and back spillway to confirm strength properties of foundations and earthfill materials. The boreholes will be drilled into bedrock and are intended to determine the properties of the bedrock and the rock cores will be logged by AMEC personnel. Laboratory work consisting of index testing of granular materials and unconfined compressive strength tests on selective rock core will also be undertaken;
2. Site surveying will be undertaken along the existing alignment. The surveying will extend from the left abutment of the main structure to the back spillway and will

NSPI will do the surveying

allow us to assess the topography at the left abutment and at either side of the back spillway for the design of the embankment dams;

3. Undertake a stability analysis of the embankments, if required;
4. Feasibility design of the new embankment and wing walls, addition to the existing ogee spillway, rock anchors, embankment raise and new embankment dam to replace the existing back spillway timber structure;
5. Revise the capital cost estimate for the construction based on the feasibility design. The revised estimate will have an accuracy of 15 to 20 percent;
6. Prepare feasibility design memo outlining the design criteria and assumptions; and
7. Carry out project management to ensure that the work is completed in an efficient and timely manner.

2.5 Work Included – Phase 2B

AMEC will undertake the following for the Phase 2B detailed design:

1. Complete the detailed design of the new embankment and wingwalls, spillway, rock anchors, embankment raise and back spillway replacement embankment. The IFC drawings will also be completed as part of the Phase 2B scope.

2.6 Work Included – Phase 2C

AMEC will provide the following for Phase 2C construction support services. These services include the following:

1. Provide construction support services consisting of 1 week of engineering support and 4 site visits (geotechnical and structural engineer or their representatives); and
2. Prepare an as-built report which will include an overview of the construction and the as-built drawings.

2.7 Work Not Included – Phase 1 and Phase 2

The following items of work are not included in this estimate but can be provided as extra work items if required:

1. Confirmation of land ownership;
2. Confirmation of flowage rights;
3. HADD determination;
4. Permit applications including environmental permits;
5. Archaeology study; and
6. Review of Freeboard analysis in reference to the 2007 CDA Guidelines.

Some of these items may be required during the time between the conceptual design and the detailed design. Sedimentation and erosion control issues would also be undertaken as part of the detailed design. It is understood that an archaeology study may be required at the Carleton Dam. We have not included a cost for this in this proposal pending more details as to the study requirements. However, we can undertake the work, and when appropriate, will provide a scope of work and cost estimate to NSPI.



3.0 PROJECT PERSONNEL

██████████ will be the overall project manager for this project. ██████████
 ██████████ will be lead geotechnical and ██████████ will be the lead structural
 engineer. ██████████ will take the lead on the geotechnical investigation.
 ██████████ will be the project reviewer.

4.0 WORK PLAN AND ESTIMATED COST

The attached Tables 1 and 2 for the conceptual and feasibility designs, respectively, show the key personnel that will be assigned to the project, and the estimated number of hours each individual will spend on each task. The tables also show the hourly rates for each individual as well as the estimated cost of services, disbursements, and the total project. The estimated cost for the Phase 2B Detailed Design is given below as a range as the cost will depend on the design option selected. Once the capital cost estimate has been revised in Phase 2A, we should be able to estimate the cost of Phase 2B with more accuracy.

The project cost is summarized as follows:

Phase 1 – Conceptual Design	2008	After 2008
Develop Conceptual Design Alternatives	██████████	
One-Day Workshop	██████████	
Conceptual Design		██████████
Capital Cost Estimate		██████████
Memo		██████████
Project Management		██████████
Yearly Subtotals	██████████	██████████ ✓
Total – Phase 1		\$11,810

Phase 2A – Feasibility Design	2008	After 2008
Geotechnical Investigation (lab testing)	██████████	
Site Surveying	██████████	
Slope Stability Analysis (if required)		██████████
Feasibility Design		██████████
Capital Cost Estimate		██████████
Reporting	██████████	
Project Management	██████████	██████████
Yearly Subtotals	██████████	██████████
Subtotal – Phase 2A		\$44,040

Phase 2B – Detailed Design	After 2008
Detailed Design	██████████
Subtotal – Phase 2B	\$20,000 to \$25,000

NSPI
 will do
 this.



Phase 2C – Construction support services		After 2008
Construction Support		
As-Built Report		
Subtotal – Phase 2C		\$29,590
Total – Phase 2		
Summary		
	2008	After 2008
Phase 1 – Conceptual Design		
Phase 2 – Detailed Design		
Total	\$18,760	\$86,680 to \$91,680

3

~ \$ 110,000

The estimated cost for Phase 2 work was sub-divided into feasibility level design and detailed design in order to reduce and resolve the design and constructability issues prior to the development of the detailed designs. As discussed with NSPI, construction support services may consist of one week of engineering services and four site visits and are included in the Phase 2C costs.

Invoices will be issued monthly for time and expenses incurred during that period. Expenses will be invoiced at cost. Invoices will show applicable taxes; Harmonized Sales Tax (HST), Goods and Services Tax (GST), and Provincial Sales Tax (PST) separately.

5.0 SCHEDULE

AMEC will undertake the work outlined immediately upon award of contract. It is understood that, depending on funding, the surveying and geotechnical investigation would be carried out in 2008 with the remainder to be completed in 2009. We recommend that surveying and geotechnical work be completed first as the results of these programs of work have a direct impact on the remainder of the work.

6.0 CHANGES TO THE WORK

When a change in scope, requirements or schedule is identified, a change order will be prepared and issued to Nova Scotia Power. Changes will be subject to mutual agreement prior to proceeding with the work. Changes will be quoted based on the hourly rates outlined in tables herein, and the estimate of hours and disbursements for the change.

7.0 INSURANCES AND AGREEMENT

AMEC intends to perform this work under the terms and conditions of the Master Consulting Services Agreement between AMEC and NSPI, subject to the following:

- Scope of work as described in this proposal; and
- AMEC's standard disclaimer to be included in all reports.

Nova Scotia Power Inc.
Carleton Dam - Design Proposal
October 2008



8.0 LIMITATION OF OFFER

The estimated fees and terms quoted in this proposal will remain open until the end of December 2008.

We trust the above meets your requirements at this time. If you have any questions, please call.

Sincerely,

AMEC Earth and Environmental
A Division of AMEC Americas

[Redacted signature block]

Project Manager

Direct Tel.: [Redacted]

Direct Fax: [Redacted]

E-mail: [Redacted]

Reviewed by: [Redacted]

[Redacted]

attachment

NSPI - 2010 Annual Capital Expenditure Plan (2010-2014) - P-128.09
NSPI Responses to UARB Information Requests

REDACTED

Generation Responses

Request IR-G7:

With respect to page 25, CI# 28726, HYD - Carlton Lake Dam Refurbishment,

What is the value of energy from the Tuskett system? Has a 10 year or longer replacement capital budget been prepared for the whole system and its components and a study completed to address the cost of capital vs the generating revenue from the system? Provide a copy of any studies and reports that address this issue.

Response IR-G7:

The average annual generation of the Tuskett hydro system is 12.45 GWh. With respect to the Tuskett hydro system, the current 10 year capital works plan identifies projects for Mink Lake dam, Kempt Back Lake dam, the main dam, and the powerhouse. Please refer to Confidential Attachment 1.

Attachment 1, the Dam Safety Capital Works Program, is confidential to protect value for customers. The more potential proponents and suppliers are aware of NSPI's specific plans and estimated project budgets, the better their ability is to obtain the highest price for their services or products. This reduces competition and ultimately increases the cost for NSPI and its customers.

The cost of such transparency is not always immediately evident. Information from regulatory proceedings can provide competitive advantages over other suppliers, and that could be advantageous in bidding or negotiation. Higher prices, or avoidable contractual constraints, will result in unnecessary higher costs to customers.

DAM SAFETY CAPITAL WORKS PROGRAM - February 16, 2010

[illegible]

