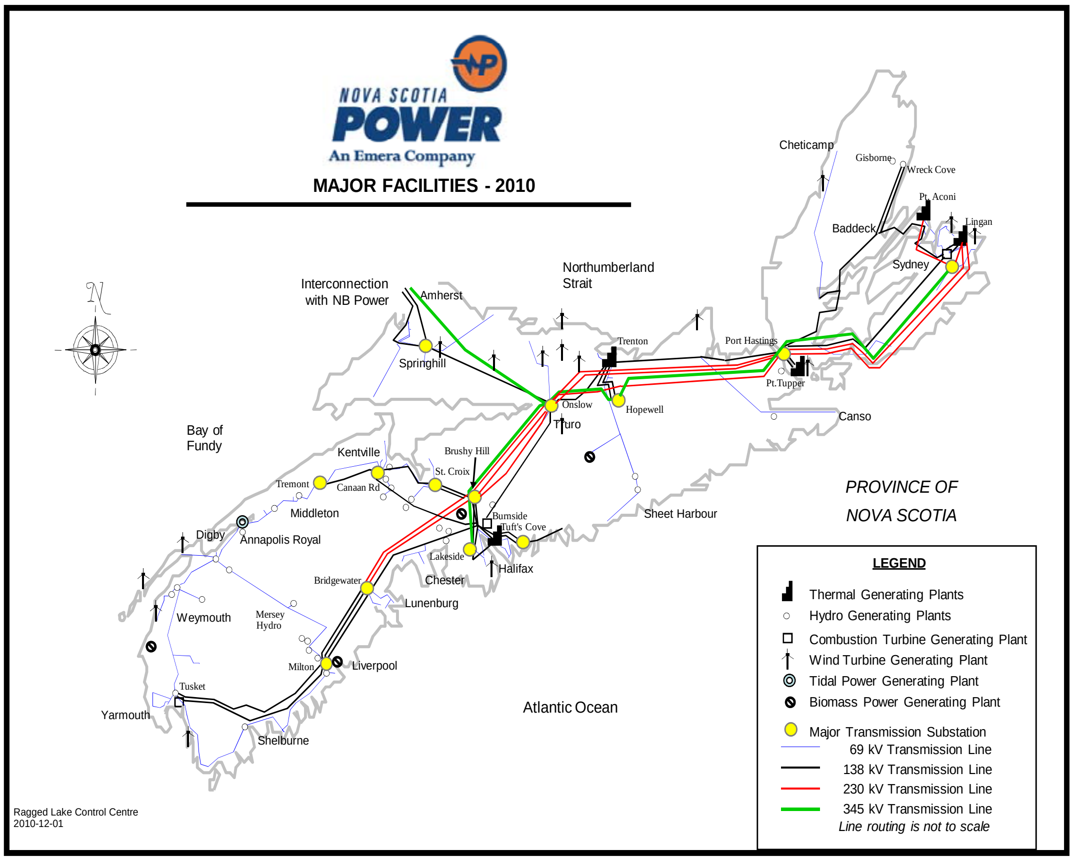
Nova Scotia Power Inc.
2011 Annual Capital Expenditure Program



NOVA SCOTIA POWER
An Emera Company

Forward

Nova Scotia Power Inc. (NSPI, the Company) is in a period of historic change and transformation. In Nova Scotia, the transition to less carbon-intensive electricity generation through the legislated addition of renewable sources is an investment in a cleaner environment. As a regulated utility, government environmental regulation has enabled NSPI to begin making transformational investments which support increased renewable generation in Nova Scotia. These investments, combined with investments in energy efficiency and conservation, cause savings in fossil fuel costs that, due to the Fuel Adjustment Mechanism, customers have already begun to experience. Customers will continue to experience these fuel cost savings over the long term.

While the Company transitions to a generation mix that includes a greater amount of more stable priced renewable energy, fossil fuel and existing hydro generation continues to provide the majority of energy to the system. Maintaining and improving the dependability and operation of NSPI's thermal and hydro generating units serves to preserve lower fuel prices and system stability. Preserving the current hydro generation fleet is also necessary for the Company to achieve Renewable Energy Standard (RES) compliance targets for 2015 and beyond.

To respond to the focus on new renewable generation and deliver this energy, additional investment in the Company's transmission and distribution system ensures customers are provided a stable and reliable source of power.

While lowered fuel costs are experienced promptly through the FAM, customers will not begin to pay for new capital investments until a new Depreciation Study has been approved and the next General Rate Application has been filed and the rate setting process completed. General electricity rates have not changed in Nova Scotia since January 1, 2009. Rate recovery of NSPI's capital investments from customers does not occur until the Company receives approval of a General Rate Application. NSPI did not increase customers' general rates in 2010.

From 2010 until 2015, NSPI forecasts capital investments of approximately $2.8 billion. This extraordinary level of spending was evidenced in 2010 when the Company spent more than $500 million in renewable generation, transmission and distribution system enhancements, and continued investment to maintain existing plant assets and add cleaner generation using natural gas.

In 2010 the Company's Nuttby Wind Project, Digby Wind Project and the Point Tupper Wind Project were constructed. The Port Hawkesbury Biomass Project, and replacement of the Water Street Gas Insulated Substation Project were approved by the Board, providing further examples of NSPI's focus on future reliability and environmental enhancement.

Investment in generation transformation, system reliability and the general maintenance and improvements required to optimize the delivery of electricity to customers is a regular and ongoing process at NSPI. For the first time, NSPI's Annual Capital

Expenditure (ACE) Plan will incorporate stakeholder input in the review and approval process. NSPI respectfully requests UARB approval of the 2011 ACE Plan.

How the ACE Plan is Structured

The **Overview** section of this document provides the reader with a view of NSPI's overall capital expenditure plan.

It begins by providing a graph detailing the previous year's capital investments, projections for the current year and a forecast of the company's capital spend for the next four years.

A chart is provided to illustrate the breakdown of NSPI's 2011 ACE Plan. The budget for 2011 is separated into the following components:

- Capital item approval sought through the ACE 2011 process (including routine capital projects)
- A forecast of capital items to be submitted for approval later in 2011
- 2011 Carryover Projects; these are multi-year projects approved in prior years with spending occurring in 2011.
- Capital Items Less Than $250k. Pursuant to a legislative change to the Public Utilities Act effective May 11, 2010, capital expenditures with a value up to $250,000 may be made by a public utility, without formal approval of the Nova Scotia Utility and Review Board (Section 35 of the Public Utilities Act).
- Point Aconi Capital Items. Pursuant to Section 36 of the Public Utilities Act, investment in the Point Aconi Generating Station does not require Board approval.

Following this graphical summary of NSPI's ACE Plan, the Company provides lists of projects which are included in each of these sections. The 2011 capital investment of the Company is further catagorized by Justification Criteria and by spending category (i.e. new spending, carryover spending and routine capital spending).

Following this summary view, the capital items are then presented in the ACE Plan by functional area in the **Capital Functions** section of the document.

Additionally, the Company's Routine Capital program is provided in this area of the Plan. NSPI's Routine Capital program is an annual allocation of capital to fund repetitive individual capital replacements. These are capital spending items that are regularly needed for routine capital maintenance of the utility's assets. Routine Capital programs are included in the capital program in a pooled approach to reduce the administrative costs associated with identifying and approving individual Routine Capital projects and to provide NSPI with the flexibility required to effectively manage smaller, consistent scope utility capital projects from one year to the next. The overall Routine Capital

Program is presented along with a breakdown of each project within the program and a multi-year overview of the program.

This section concludes with a list and variance explanation of those 2010 ACE Plan projects which have been deferred, or cancelled.

The next four sections, **Generation, Transmission, Distribution and General Plant** provide the reader with details of each capital project for which the Company is seeking Board approval in 2011.

A Glossary of Terms follows the presentation of NSPI's capital projects.

The **NSPI 2011 Quick Reference Sheet** provides the reader with the Company's Allowance for Funds Used During Construction and Overhead rates used in the development of the 2011 capital budget.

The Plan concludes with a final section providing, for reference only, NSPI's **2011 Depreciation Rates (Year 3 of the Phase In)** as approved in the 2009 General Rate Application Decision.

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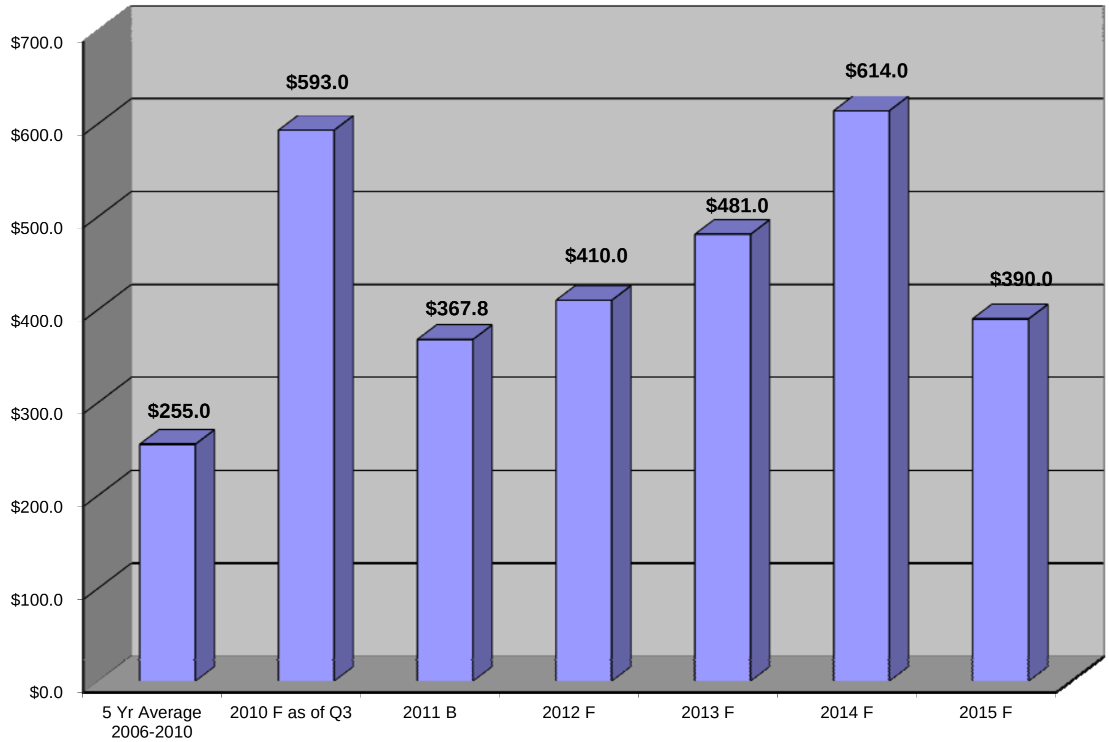
1 OVERVIEW

1.1 Annual Capital Expenditure Plan for 2011 to 2015

(*Millions of Dollars*)



Highlights of Nova Scotia Power Inc.'s 2011 to 2015 capital plan:

- The proposed capital budget for 2011 is $367.8M. NSPI seeks UARB confirmation that this overall budget amount is appropriate for 2011, although several items will have a subsequent approval process and the amount includes a variety of items that do not specifically require UARB approval.

- 2011 capital investment submitted for specific UARB approval in this ACE Plan totals $149.1M. Detailed descriptions and justification for each new item are included in this document, summarized by capital function.

- Carryover projects comprise $124.6M of total spending in 2011. Three large multi-year projects constitute $79.5M of the carryover spending: Port Hawkesbury Biomass Project, TUC6 Waste Heat Recovery and FAC Space 2011, all of which have been previously approved by the UARB.

- Routine Capital spending represents $80.3M of total spending in 2011 and is for replacement of equipment ("like-for-like" replacement), additions to existing equipment base resulting from system growth and the addition of customers to the system.

- Projects totaling an additional $266.4M ($69.4M of spend in 2011) will be brought forward later in 2011 for separate approval.

Capital item justifications are based on the Capital Expenditure Justification Criteria (CEJC) as approved by the Board in 1995 with minor revisions per the 1997 filing. The CEJC provides the Board with assurance that NSPI is using sound economic, financial and technical criteria to ensure that its capital expenditures provide the maximum benefit to its customers. NSPI is working with UARB staff to update the CEJC, which should be completed during 2011.

NOTE: Figures presented in the ACE document reflect whole numbers, which may cause $0.1M in rounding differences on some line items.

1.2 Summary of Annual Capital Expenditure Plan for 2011

The following chart indicates the amounts involved in the various approvals required for NSPI's ACE filing. This Application seeks UARB approval of the 2011 capital routines and other 2011 projects, all of which total $149.1M. Certain items do not require UARB approval, although the Company seeks confirmation from the Board that the overall 2011 ACE Budget is appropriate. This confirmation is subject to later approval processes for specific projects that are not yet ready for consideration, which amount to $69.4M in 2011 spending. The 2011 ACE Budget also includes spending on multi-year projects that were previously approved by the Board.

2011 ACE Budget	**2011 UARB Approval Request ($M)**	**UARB Approval not Required ($M)**	**Capital Items Forecast for Later Filing and Approval in 2011 ($M)**	**NSPI Capital Projects with 2011 Carryover ($M)**	**ACE 2011 Plan ($M)**
Capital Item Approval Sought through the ACE 2011 Process (Including Routine Capital Projects)	149.1				**149.1**
Capital Items Submitted for Later Approval in 2011			69.4		**69.4**
2011 Carryover Projects				124.6	**124.6**
Capital Items Less Than $250k		12.6			**12.6**
Point Aconi New Capital Spend		12.1			**12.1**
	149.1	**24.7**	**69.4**	**124.6**	**367.8**

* Various Carryover Projects are still pending UARB Approval.

1.3 ACE 2011 Capital Items Submitted for Approval

This table provides the list of Capital Items for which NSPI seeks UARB Approval by this Application, totaling $149.1M of spending in 2011.

CI#	Project Title	2011 Budget	Project Total
Hydro			
17583	HYD - BER-GUL - Electrical Refurbishment	$855,393	$855,393
40276	HYD - WRC Tailrace Tunnel Bulkhead Gate Refurbishment	529,557	529,557
40316	HYD - Barteaux Culvert Refurbishment	499,522	499,522
40313	HYD - Annapolis Safety Pumps Refurbishment	387,498	387,498
40301	HYD - Big Falls Spillway - Walkway Replacement	267,491	267,491
12079	HYD - SHH – RUF Unit 1&2 Runner Replacement	77,171	831,591
	Total Hydro New Spending	**$2,616,632**	**$3,371,052**
Steam			
39529	POT - Steam Turbine Overhaul 2011	$3,749,830	$3,749,830
38826	POT - Distribution Control System (DCS) Upgrade	1,287,302	1,287,302
35083	LIN 2011 Ash Site Sealing and Capping	1,112,451	1,112,451
40271	LIN2 Boiler Refurbishment	1,093,704	1,093,704
39903	LIN 2011 Mill Refurbishment	760,079	760,079
40422	LIN3 Boiler Refurbishment	757,323	757,323
40423	LIN4 Boiler Refurbishment	752,389	752,389
28289	POT - Turbine Electro Hydraulic Governor Replacement	725,435	725,435
39933	TRE - Siding Replacement	296,793	603,707
39780	TUC - Unit 1 Cooling Water Intake Structural Refurbishment (Phase II)	562,163	562,163
40344	POT - Waterwall Panel Replacement 2011	517,626	517,626
40244	LIN Boiler Feed Pump Rebuild	508,703	508,703
40246	LIN Cooling Water Pump Refurbishment	452,421	452,421
28393	POT 2A Mill and Feeder Refurbishment	424,712	424,712
39935	TRE - Facilities Improvements	411,950	411,950
39760	TUC - Asbestos Abatement 2011	384,297	384,297
39946	TRE - Wastewater Treatment Plant Upgrades	353,531	353,531
26472	TRE - 6A Cooling Water Pump Refurbishment	349,690	349,690
40427	LIN3 Turbine Fire Suppression	348,710	348,710
40184	LIN2 Turbine Fire Suppression	343,611	343,611
28554	POT - Analytical Panel and Analyzer Replacement	343,220	343,220
40319	TRE - HVAC Replacements (2011)	294,925	294,925
40243	LIN 3 Battery & Charger Replacement	283,106	283,106
39783	TUC - Security System Upgrade	281,247	281,247
39944	TRE6 - Fly Ash Line Replacement	259,172	259,172
39943	TRE6 - 6B CW Screen Refurbishment	257,503	257,503
40210	LIN Fall Protection	254,544	254,544
39940	TRE5 - Bottom Ash Refurbishment	254,370	254,370
40223	LIN-CW Screen Refurbishment	253,879	253,879
39945	TRE - Asbestos Abatement 2011	250,928	250,928
40228	Boiler House Intake Louvers	250,571	250,571
39937	TRE - Fall Protection (Phase 3)	250,242	250,242
40363	LIN3 High Voltage Bushing Refurbishment	114,529	504,168
	Total Steam New Spending	**$18,540,956**	**$19,237,509**
	Total Generation New Spending	**$21,157,588**	**$22,608,561**

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CI#	Project Title	2011 Budget	Project Total
Transmission			
40233	2011 Protection Upgrades TUC	$3,928,932	$3,928,932
40287	Substation Recloser Replacement	3,764,921	3,764,921
40327	Glen Dhu 138 kV Substation	3,200,000	3,200,000
40322	New Prospect Road Substation	3,068,581	3,068,581
40281	2011 Transmission Line Insulator Replacement	3,018,100	3,018,100
40280	2011 Transmission Switch & Breaker Upgrades	2,866,718	2,866,718
40288	2011 Substation PCB Equipment Removal	2,510,193	2,510,193
40260	L-7012 Beaver Narrows Crossing Replacement	1,899,224	1,899,224
40266	L6002 Deteriorated Plant Replacements	1,340,019	1,340,019
40231	2011 Protection Upgrades LAK	1,069,632	1,609,905
40307	L-6033 and L-6035 Water St. Transmission Tower Refurbishment	995,497	995,497
40270	L-5501 Upgrade 69 kV Circuit to Bridge Ave	800,793	800,793
40323	Canaan Road Line Terminal	738,632	738,632
40296	2011 Transmission Steel Tower Painting	587,142	587,142
40279	2011 Pole Retreatment	516,341	516,341
40321	Install Canaan Road to Prospect Road Transmission Line	62,412	2,024,763
	Total Transmission New Spending	**$ 30,367,137**	**$ 32,869,761**

CI#	Project Title	2011 Budget	Project Total
Distribution			
25575	Reliability Keltic Drive New Feeder	$1,205,023	$1,205,023
40224	78W-301 Second Peninsula	1,010,713	1,010,713
40226	Sluice Pt 3rd Phase Addition 102W-312	606,307	606,307
40204	70W-322 Starr Street Rebuild	546,821	546,821
40202	39N Maccan Conversion	538,646	538,646
39272	2011 Distribution Feeder Ties	500,000	500,000
40379	Scotch Village Phase 2	458,177	458,177
39269	2011 Recloser Additions	444,765	444,765
40203	103W-311 Gold River Phase 1	434,415	434,415
40220	2011 Halifax Underground Cable Replacement	418,861	418,861
40338	16W-301 Hebron Reconductor	350,000	350,000
40328	Feeder Exit Cable Replacements	317,587	317,587
40211	2011 3H/6H Replacement Program	306,895	306,895
40385	88W-323G Pinkney's Point Part 2	295,351	295,351
40273	101H-411 Targeted Feeder Replacements	273,399	273,399
40265	77V-401 Targeted Feeder Replacements	267,321	267,321
	Total Distribution New Spending	**$7,974,281**	**$7,974,281**

CI#	Project Title	2011 Budget	Project Total
General Plant			
40298	SAN and Backup Replacement	$947,305	$947,305
40365	MS Sharepoint Platform Upgrade	703,711	908,174
40290	Enterprise Geographic Information System (GIS)	320,381	320,381
40275	Eastlink Outage Information Interface	296,460	296,460
	Total Computers New Spending	**$2,267,857**	**$2,472,320**
40229	Protective Equipment Test Center Upgrade	$875,542	$875,542
40274	New RTU Deployment	509,706	509,706
40245	2011 RTU Replacement Program	459,517	459,517
	Total Equipment Replacement New Spending	**$1,844,765**	**$1,844,765**
40278	OMS Upgrade 2011	$2,050,951	$2,050,951
40299	Field Office Phone System Replacement	833,557	833,557
40249	New Chester Microwave Radio Link	407,925	407,925
40261	Newtonville SR500 Multipoint Radio System Replacement	351,681	351,681
40252	2011 Replace Microwave Radio System	351,658	351,658
40247	2011 Radio Tower Upgrades	324,686	324,686
	Total Telecommunication New Spending	**$4,320,458**	**$4,320,458**
40105	Boiler Condition and Data Tracking Software	$570,643	$570,643
40293	People Soft Workflow	276,578	276,578
	Total Other General Plant	**$847,221**	**$847,221**
	Total General Plant New Spending	**$9,280,301**	**$9,484,764**
	Total Routine Capital Spending	**$80,283,546**	**$80,283,546**
	Total Capital Items Seeking Approval	**$149,062,853**	**$153,220,913**

1.4 Capital Items Forecast for Approval Later in 2011

This table indicates projects that are not yet ready for submission to the UARB, and that NSPI anticipates will be filed for later approval in a separate hearing process in 2011, totaling $69.4M of 2011 spending on projects that are currently estimated to cost approximately $266.4M. The budget numbers indicated below are estimates – NSPI requires additional time and effort to develop specific project budget proposals. This aspect of the Company's filing is designed to provide a general indication of anticipated 2011 projects.

CI#	Project Title	2011 Budget	Project Total
Generation			
38947	Co-firing Biomass	$12,000,000	$ 24,000,000
40555	LIN3 - Bag House Addition	7,000,000	30,000,000
40557	LIN4 - Bag House Addition	7,000,000	30,000,000
14371	HYD - Avon #2 Pipeline Replacement	4,731,316	4,731,316
17830	HYD - STM Big Indian Lake Dam Safety	4,270,026	4,270,026
39803	POT - Unit #2 Generator Major Refurbishment	4,042,450	4,042,450
39932	TRE - Ash Site Development (Phase 2)	3,000,193	3,795,003
39926	TUC - Unit#3 Generator Excitation & AVR System Replacement	1,271,542	1,271,542
37611	LIN3 - Generator AVR Replacement	1,254,995	1,254,995
31583	LIN2 - L-1 Steam Turbine Blading Replacement	1,028,340	2,682,783
39566	LIN2 Steam Turbine Last Stage Blades Replacement	1,025,771	2,691,987
38944	LIN - Unit 2 Rotor Rewind	675,528	2,702,301
40330	LIN2 HT Fastener Replacement	414,003	865,689
	Generation Total	**$47,714,164**	**$112,308,091**
Transmission			
40317	Additional Water Street Transformer & Low Side 25 kV Breakers	$ 2,743,262	$ 2,743,262
40311	50MVA Mobile Substation Transformer	1,598,007	2,640,974
40285	2011 Transmission Substation Cutout and Insulator Replacement	1,500,000	1,500,000
39723	104H-T63 Transformer Refurbishment	921,931	921,931
	Transmission Total	**$ 6,763,200**	**$ 7,806,167**
Distribution			
39270	2011 Dist. Cutout Replacements	$ 2,953,283	$ 2,953,283
40227	2011 Off Road to Roadside	2,500,000	2,500,000
40320	LED Streetlight Replacement	300,000	100,000,000
	Distribution Total	**$ 5,753,283**	**$105,453,283**
General Plant			
40403	Work & Asset Management	$ 5,473,581	$ 6,655,504
40314	Capital Improvements Data Centre	3,500,000	3,500,000
32304	AMI Hardware & Software Installation	152,028	30,694,639
	General Plant Total	**$ 9,125,609**	**$ 40,850,143**
	Total New Spending Forecast for Later Filing and Approval in 2011	**$ 69,356,256**	**$ 266,417,683**

1.5 Capital Items Less than $250,000

This table indicates the list of projects that are valued less than $250,000 and which therefore do not specifically require UARB approval. However, NSPI seeks confirmation that these projects are appropriate for 2011 ACE spending.

CI#	Project Title	2011 Budget	Project Total
Gas Turbine			
37982	CT's - Replace Obsolete AVR Burnside Unit#3	$ 59,380	$ 59,380
40543	CT's - Replace Tusket Dump Tank	55,388	55,388
40542	CT's - Fall Protection	66,356	66,356
Hydro			
40315	HYD - Connell's Dyke Refurbishment	177,371	177,371
40306	HYD - Replacement Front End Loader	157,421	157,421
Steam			
39777	TUC - Ferrous Sulphate System Upgrade	215,409	215,409
40331	POT - Asbestos Abatement Program 2011	214,520	214,520
40332	POT - Selective Superheater Replacement	205,514	205,514
40333	POT - Selective Reheater Replacement	204,595	204,595
40225	LIN - Common Water Lines Upgrades	204,080	204,080
39948	TRE - Ash Site Management 2011	200,351	200,351
40324	POT - Refurbish Boiler Bottom Ash Seal	200,299	200,299
39761	TUC3 - Analytical Panel Replacement	198,336	198,336
38870	TUC1&2 - Closed Cooling Flow Capacity Improvements	193,793	193,793
39762	TUC3 - CW Intake Steel Sheet Piling Refurbishment	191,833	191,833
39787	TUC1 - CW Pumps Refurbishment	188,345	188,345
40230	TRE - Roof Drain Replacements	172,239	172,239
30744	LIN 2010 Main Feedwater CV and Actuator Replacement	170,178	170,178
38850	LIN1&2 - Flyash System Upgrade	162,293	162,293
40222	LIN2 - Replace Boiler Feed Pump Check Valves	159,591	159,591
40207	TUC - Generator CO2 Purge System Upgrade	154,555	154,555
40235	LIN4 - 4160V Motor Refurbishment	154,011	154,011
38820	TRE - Pipe Hanger Replacements	149,831	149,831
40376	LIN Dumper - Car Wheel Lock Replacement	149,357	149,357
40371	LIN - Training Facilities	148,337	240,762
38044	TRE - Plant Lighting Replacement	145,588	145,588
18458	TUC1 - Generator H2 Dryer Replacement	139,061	139,061
39952	TRE6 - Coal Bunkerette Replacement	138,331	138,331
39970	TRE5 - 5-3 Pulverizer Refurbishment	134,913	134,913
39971	TRE5 - 5-4 Pulverizer Refurbishment	134,184	134,184
40297	TRE5 - Boiler House Tundish Drains Replacement	133,979	133,979
39936	TRE5 - 5-2 Pulverizer Refurbishment	133,350	133,350
40326	TUC3 - Generator H2 Dryer Replacement	132,574	132,574
40023	TRE - Sewage Lift Station Upgrades	129,518	129,518
39782	TUC1&3 - CEMS Replacement	128,781	128,781
38108	POT - Generator AVR Refurbishment	128,270	128,270
36762	LIN3&4 - Stack Insulation Upgrades	122,192	122,192
39939	TRE - Security Improvements	122,168	122,168
36702	LIN3 - Boiler Thermoprobe Upgrades	122,053	122,053
40234	LIN - 4160V and 600V Breaker Refurbishment	121,794	121,794
40340	POT - Replace B Depac Transport Vessel	120,096	120,096
40334	POT - Refurbish Underground Valves and Hydrants	119,198	119,198
30044	POT - Ash Cell Capping Cell C	117,423	117,423

CI#	Project Title	2011 Budget	Project Total
30802	POT - Marine Terminal Dust Mitigation	$ 116,169	$ 116,169
40253	POT - Ash Contacted Water Management	114,979	207,497
40024	TRE6 - CO2 Vaporizer Replacement	112,900	112,900
37102	LIN - Coal System CO Monitor	109,230	109,230
39982	TRE - Gauge Replacements	109,047	109,047
40113	POT - Class 3 Fall protection	107,095	107,095
40232	LIN4 - Fire System Panel Upgrade	102,295	102,295
28394	POT - 4KV, 600V Motor Refurbishment	99,331	99,331
39954	TRE5 - 5C Conveyor Belt Replacement	98,844	98,844
37824	TRE5 - Common Water Pipe Upgrade	98,701	201,197
40026	TUC - North Yard Ditch Pipe Extension	97,155	97,155
40337	POT - Replace WTP and WWTP Valves	96,429	96,429
40336	POT - Replace Dionex Instruments	95,133	95,133
40375	LIN - Crane Bus Duct Replacement	94,052	94,052
40339	POT - Replace #5 HP Heater Bled Steam Isolator	85,873	85,873
37544	TRE5 - Coal MCC Transformer Replacement	85,361	85,361
28553	POT - SSC Cooling Water Line Replacement	82,069	82,108
40482	POT - Unit 2 Stack Refurbishments	81,837	81,837
40242	LIN2 - Polisher Resin Replacement	81,804	81,804
40378	TUC- Condenser Drain Improvements	81,190	81,190
39778	TUC - Motor Refurbishment 2011	75,310	75,310
40551	TUC - HFO Piping Containment	71,092	71,092
32823	TUC - Breaker Replacement	70,246	70,246
39959	TRE - 4kV Breakers	69,746	69,746
39786	TUC1 - HP Govenor Valves Refurbishment	87,624	87,624
39960	TRE5 - Boiler Hoist Well Improvements	65,023	65,023
40341	POT - Refurbish SSC Heat Exchangers	61,237	61,237
28152	TRE6 - Bottom Ash Overhead Door Replacement	61,066	61,066
27116	POT - Lab Upgrades	58,238	58,238
40335	POT - Replace GSCW Heat Exchanger Plates & Gaskets	55,379	55,379
40212	LIN3&4 - Burner Fronts	51,889	51,889
38542	TRE - Service Air Compressor	40,333	40,333
40444	TRE6 - Burner Front Fire Protection	39,866	39,866
40342	POT - Refurbish Unit 2 Precipitator	35,444	57,596
	Generation Total	**$ 9,268,843**	**$ 9,578,473**

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CI#	Project Title	2011 Budget	Project Total
Distribution			
40219	2011 Recloser Control Replacements	$ 216,786	$ 216,786
40386	Tusket Islands Phase 2	220,000	220,000
40268	22N-401 Targeted Replacements	214,217	214,217
40263	24C-442 Targeted Replacements	143,254	143,254
40329	Padmount Switchgear Replacements	134,055	134,055
40300	104H-432 Targeted Replacements	124,108	124,108
40545	2011 New Reliability Technologies	110,769	110,769
40291	2C-402 Targeted Replacements	89,209	89,209
40284	82V-423 Targeted Replacements	67,135	67,135
40264	37N-411 Targeted Replacements	54,361	54,361
40343	73W-411 Mossman Lake Road	45,296	45,296
40267	37N-413 Targeted Replacements	37,618	37,618
	Distribution Total	**$ 1,456,808**	**$ 1,456,808**
General Plant			
40364	Oracle Database Infrastructure	$ 247,583	$ 247,583
40373	CIS Replacement	204,100	204,100
40302	Extended Video Conference Systems	190,467	190,467
40251	Mersey Radio System Replacement	181,865	181,865
40485	Mobile WorkForce Technology	161,289	161,289
40556	Minimum Requirements Accountabilities Document	153,628	153,628
40367	Sackville Office Network Redundancy	139,121	139,121
40294	People Soft HRMS Licence	94,190	94,190
40304	MS Office Upgrade for Contact Cente	94,141	94,141
40286	Dictaphone Replacement	92,778	92,778
40259	Ambient Air Monitoring	91,831	91,831
40221	Mercury Monitoring & Testing	83,656	83,656
40366	Network Security Enhancement	60,809	60,809
40305	PI Portal Upgrade	57,440	57,440
25120	Ragged Lake - MCC Environmental System Upgrade	39,060	39,060
40295	Carbon Dioxide Monitoring	27,155	27,155
	General Plant Total	**$ 1,919,113**	**$ 1,919,113**
	Total New Spending less than $250,000	**$ 12,644,764**	**$ 12,954,394**

1.6 Pt. Aconi – New Item Spending

This table indicates the Pt. Aconi capital projects for 2011.

CI #	Project Title	2011 Budget	Project Total
34386	POA Cell 4 Stage 1 Residue Management Site	$5,599,369	$5,599,369
40406	POA - L-0 Low Pressure Steam Turbine Blade Replacen	2,989,721	2,989,721
40034	POA - 2011 Refractory Program	692,044	692,044
40428	POA – Fire Protection Upgrade	401,019	401,019
40409	POA-CW Oulet Piping Refurbishment	221,358	221,358
40032	POA - Boiler Feed Pump Rebuild	216,815	216,815
40029	POA - Battery Replacement	206,604	206,604
34383	POA CW Pump Rebuild	204,670	204,670
40381	POA - Chemical Line Upgrades	199,371	199,371
37262	POA - Elevator Controls Upgrade	142,827	142,827
40027	POA-Arrowhead Replacement Program	104,271	104,271
40035	POA - HVAC Replacement	97,587	97,587
40050	POA - Compressor Rebuild	96,850	96,850
36566	POA PA Positioner Upgrade	90,597	90,597
40407	POA- South LS Main Fan Replacement	90,293	90,293
40408	POA- Ion Chromatographic Meter Repl	81,823	81,823
36582	POA General Access Improvement	75,370	75,370
28781	POA Start-up Burner Optimization	74,983	74,983
40036	POA- Screw Cooler Cover Replacement	68,118	68,118
37522	POA 1A Conveyor Belt Replacement	60,133	60,133
40037	POA - 2011 Fall Protection	59,265	59,265
40038	POA - Security System Upgrade	57,259	57,259
40369	POA-HP Blower Program	51,545	51,545
31725	POA Boiler Expansion Joint Replacement	49,674	49,674
40033	POA - 4KV Breaker Refurbishment	46,971	46,971
37422	POA BA Drag Chain Replacement Progr	40,779	40,779
40051	POA - 4KV Motor Refurb. Project	31,954	31,954
40383	POA-NOx Analyzer/CEM Components	30,752	30,752
37502	POA Truck Scale Electronics Replace	30,066	30,066
40382	POA - Fire Zone Control Valve Replacement	24,679	24,679
	Total Pt. Aconi New Spending	**$12,136,767**	**$12,136,767**
	Pt. Aconi Carryover Spending	**$145,000**	**$146,547**
	Pt. Aconi Routine Spending	**$396,006**	**$396,006**
	Total Pt. Aconi Capital Spending	**$12,677,773**	**$12,679,320**

1.7 2011 Capital Spending by Justification Criteria

(Millions of Dollars)

Items in the 2011 ACE Plan have been developed using the Capital Expenditure Justification Criteria Document of 1995 and 1997. Definitions of the various criteria are included in that document.

Justification Criteria	2011 Budget	Less than $250K	Items for Later Filing	Seeking Approval	Carryover	Routine Spend	Pt. Aconi
Distribution System**	$ 61.0	$ 1.5	$ 5.8	$ 8.0	$ 0.6	$ 45.2	$ -
Thermal	51.4	6.7	9.7	15.5	8.8	4.2	6.5
Work Support**	35.6	1.9	3.5	9.3	6.4	14.5	-
Hydro	11.6	0.3	4.7	2.3	2.5	1.7	-
Health and Safety	13.8	1.1	4.3	2.9	5.5	-	-
Transmission Plant	68.5	-	6.8	30.4	20.4	10.9	-
Environmental	105.7	1.2	29.0	0.4	68.4	1.2	5.6
Metering Equipment	3.5	-	0.2	-	1.0	2.4	-
System Design	5.5	-	5.5	-	-	-	-
Facilites/Land and Right-of-Way	11.1	-	-	-	10.9	0.2	-
Total	$ 367.8	$ 12.6	$ 69.4	$ 68.8	$ 124.6	$ 80.3	$ 12.1

** Details of justification sub-criteria are provided on the following page.

1.7.1 2011 Capital Spending by Justification Sub-Criteria
(Millions of Dollars)

Justification Sub-Criteria	2011 Budget	Less than $250K	Items for Later	Seeking Approval	Carryover	Routine Spend
Distribution System						
Requirement to Serve	$ 30.5	$ 0.3	$ -	$ 1.0	$ -	$ 29.1
Pole Strength	8.5	-	-	-	-	8.5
Joint Use	0.9	-	-	-	-	0.9
Deteriorated Conductor	1.0	-	-	1.0	-	-
Equipment Replacement	1.5	0.2	0.3	1.0	-	-
Outage Performance	8.9	0.9	5.5	2.5	-	-
Overloaded Equipment	2.5	-	-	2.1	0.4	-
System Protection	0.6	-	-	0.3	0.3	-
Other Distribution System	6.7	-	-	-	-	6.7
Total	**$ 61.0**	**$ 1.5**	**$ 5.8**	**$ 8.0**	**$ 0.6**	**$ 45.2**
Work Support						
Buildings	$ 5.5	$ 0.3	$ -	$ -	$ 3.1	$ 2.2
Telecommunications	5.4	0.2	-	4.3	-	0.9
Computers / IT	9.3	1.4	-	2.3	3.3	2.3
Tools & Equipment	1.5	-	-	-	-	1.5
Vehicles	7.2	-	-	-	-	7.2
Equipment Replacement	1.8	-	-	1.8	-	-
Other	5.0	-	3.5	0.8	0.0	0.6
Total	**$ 35.6**	**$ 1.9**	**$ 3.5**	**$ 9.3**	**$ 6.4**	**$ 14.5**

1.8 Capital Categories

Nova Scotia Power Inc. classifies capital expenditures by Function and/or Justification Criteria. NSPI also classifies capital expenditures by Category: New Items, Carryover Items, and Routine Capital Items. For further clarification, each of these latter categories is divided into sub-categories.

1. New Items

This category includes new, non-routine capital items.

A. New Items with 2011 Completion - This category includes all new, non-routine capital items scheduled to start and finish in 2011.

B. New Items with Subsequent Completion - This category includes all new, non-routine capital items scheduled to start in 2011, but which will be completed beyond fiscal 2011.

2. Carryover Items

This category includes items that have been previously approved by the UARB.

A. Carryover Items with 2011 Completion - Includes items that will be completed during 2011.

B. Carryover Items with Subsequent Completion - Includes items that will be completed beyond 2011.

3. Routine Capital Items

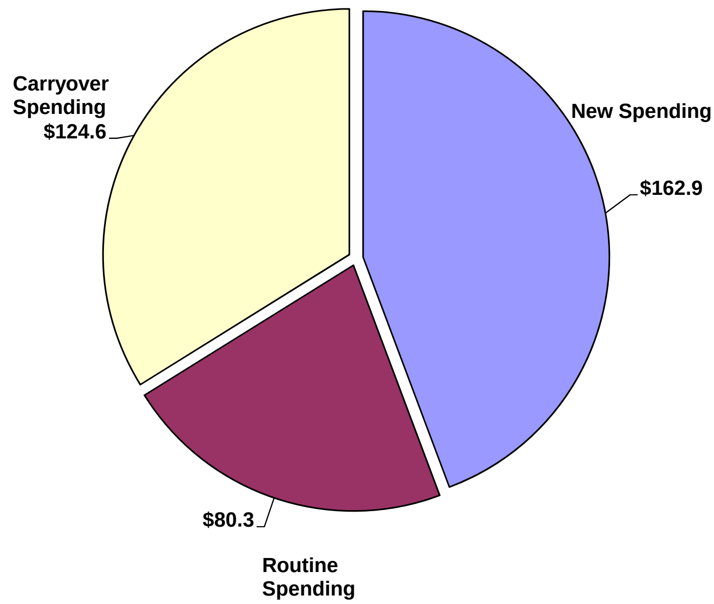
This category is for recurring annual capital expenditures.

A. Replacement equipment (like-for-like replacement).

B. Additions to existing equipment base resulting from system growth.

C. The addition of customers to the system.

1.8.1 2011 Capital Spending by Category
(Millions of Dollars)



	Previous Spending	2011 Budget	Subsequent Spending Commitment	Total Estimated Commitment
New Items				
With 2011 Completion	-	$120.4	-	$120.4
With Subsequent Completion	-	42.5	$203.9	246.4
	-	$162.9	$203.9	$366.8
Carryover Items				
With 2011 completion	$354.5	$54.0	-	$408.5
With Subsequent Completion	90.7	70.5	$62.6	223.8
	$445.2	$124.6	$62.6	$632.4
Routine Items	-	$80.3	-	$80.3
Total	$445.2	$367.8	$266.5	$1,079.4

1.9 Capital Functions

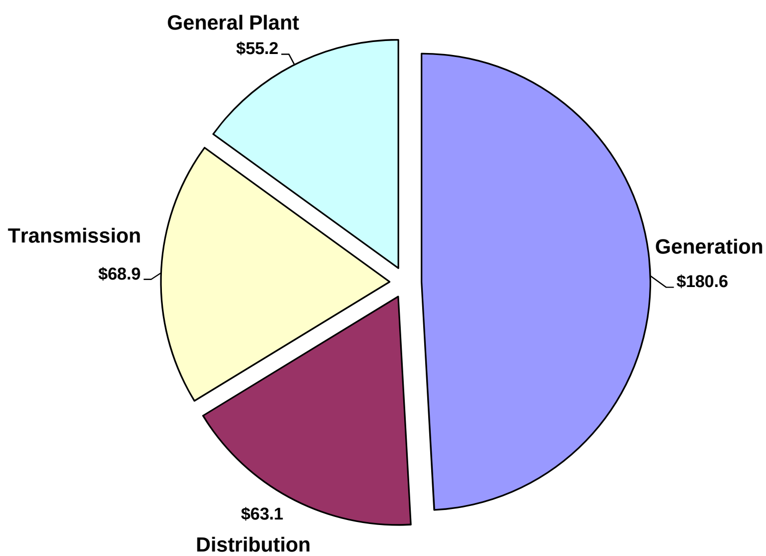
Capital expenditures are categorized into functions for accounting and depreciation purposes. Each category has a different service life.

Generation	Generation includes all items for NSPI's generation facilities. This includes replacements and additions to Thermal, Hydro, Wind, Tidal and Gas Turbine plants.
Transmission	Transmission includes items for replacement, reinforcement or expansion of the transmission system, which transmits electrical energy from the generation plants, the NB/NSPI interconnection and throughout the province. Transmission includes energy transmitted at 69 kV level or higher.
Distribution	Distribution includes replacement of and additions to equipment for delivering electric energy from points on the transmission system to customers served at voltages below 69 kV.
General Plant	General Plant includes computer infrastructure and communication equipment, which comprise the majority of capital expenditures incurred under this function. Other items such as furniture, office equipment and capital tools are also included under this function. The General Plant function also includes vehicles, that is, replacement and additions to transportation and work vehicles, and construction equipment. The General Plant function also includes all buildings except generating and substation facilities. It is primarily customer service and head office facilities.

1.9.1 Total Annual Capital Expenditures by Function
(Millions of Dollars)

	Actuals				Forecast	ACE Plan	Forecast			
	2006	**2007**	**2008**	**2009**	**2010 (as of Q3)**	**2011**	**2012**	**2013**	**2014**	**2015**
Generation	$43.2	$47.2	$78.5	$165.0	$411.7	**$180.6**	$237.0	$305.0	$342.0	$130.0
Transmission	9.2	19.4	18.0	22.7	53.7	**68.9**	70.0	70.0	70.0	77.0
Distribution	36.5	44.5	47.6	52.3	60.2	**63.1**	87.0	88.0	87.0	68.0
General Plant	20.5	14.5	23.2	39.6	67.4	**$55.2**	16.0	18.0	115.0	115.0
Total	**$109.4**	**$125.6**	**$167.3**	**$279.7**	**$593.0**	**$367.8**	**$410.0**	**$481.0**	**$614.0**	**$390.0**

1.9.2 2011 Capital Spending by Function
(Millions of Dollars)



1.10 2011 Routine Capital Spending by Function

This category includes recurring annual capital expenditures for replacement of equipment (like-for-like replacement), additions to existing equipment base resulting from system growth and addition of customers to the system. Routine capital items for the 2011 ACE Plan have been developed using the Capital Expenditure Justification Criteria Document of January 1995 and 1997. Definitions of the various routines are included in that document.

	2011 Project Cost
Generation	
Generation Equipment Replacements	$ 4,315,240
Generation Other Hydro	519,148
Generation Other Thermal	374,834
	$ 5,209,222
Transmission	
Transmission Substation Replacement, Additions/Modifications	$ 3,700,355
Primary Equipment Spares	188,649
Protection Modification & Replacement	841,216
Transmission Line Replacement, Additions/Modifications	6,210,003
	$ 10,940,223
Distribution	
Meters	$ 2,409,631
Distribution Upgrades and Replacement	19,269,971
New Customers	24,139,678
Joint Use	856,694
Right-of-Way Widening	940,833
	$ 47,616,807
General Plant	
Work Vehicles	$ 7,156,591
Tools and Test Equipment	1,773,500
Telecommunications	869,481
Computing Asset Management	2,374,312
Property Improvements and Furniture	2,311,145
Other	2,032,265
	$ 16,517,294
Total 2011 Routine Capital Spending	**$ 80,283,546**

1.10.1 Routine Capital Spending by Function Yr/Yr

	2009 Budget	2009 Actual	2010 Budget	2010 Forecast	2011 Budget
Generation					
Generation Equipment Replacements	$3,271,088	$2,997,348	$3,555,716	$3,527,379	$4,315,240
Generation Other Hydro	205,501	213,928	250,000	257,659	519,148
Generation Other Thermal	418,400	415,974	518,652	476,927	374,834
	$3,894,989	$3,627,250	$4,324,368	$4,261,965	$5,209,222
Transmission					
Transmission Substation Replacement, Additions/Modifications	$2,349,998	$2,346,763	$2,451,586	$2,973,230	$3,700,355
Primary Equipment Spares	128,053	32,119	128,053	128,053	188,649
Protection Modification & Replacement	691,976	456,199	712,220	448,748	841,216
Transmission Line Replacement, Additions/Modifications	5,202,954	5,163,744	5,474,078	5,355,694	6,210,003
	$8,372,981	$7,998,825	$8,765,937	$8,905,725	$10,940,223
Distribution					
Meters	$2,133,939	$1,728,366	$2,151,185	$2,006,587	$2,409,631
Distribution Upgrades and Replacement	15,475,041	20,025,282	17,334,753	19,698,208	19,269,971
New Customers	19,434,154	20,339,542	21,792,479	19,807,123	24,139,678
Joint Use	700,000	1,066,653	748,416	743,607	856,694
Right-of-Way Widening	300,000	303,981	740,833	740,833	940,833
	$38,043,134	$43,463,824	$42,767,666	$42,996,358	$47,616,807
General Plant					
Work Vehicles	$150,590	$100,042	$156,626	$155,127	$7,156,591
Tools and Test Equipment	761,140	753,131	1,772,685	1,785,904	1,773,500
Telecommunications	575,922	711,480	922,192	922,194	869,481
Computing Asset Management	3,187,730	3,052,332	2,388,473	2,120,911	2,374,312
Property Improvements and Furniture	1,250,000	1,262,966	1,425,000	1,306,296	2,311,145
Other	237,130	228,978	1,234,229	1,130,715	2,032,265
	$6,162,512	$6,108,929	$7,899,205	$7,421,147	$16,517,294
Total Routine Capital Spending	**$56,473,616**	**$61,198,828**	**$63,757,176**	**$63,585,195**	**$80,283,546**

1.10.1.1 Routine Capital Spending: Yr/Yr Variance Analysis

Routine Function	ACE 2010 ($M)	ACE 2011 ($M)	Variance Inc/ (Dec)
Generation	4.32	5.21	0.88
Transmission	8.77	10.94	2.17
Distribution	42.77	47.62	4.85
General Plant	7.90	16.52	8.62
Total	63.76	80.28	16.53

Routine Function	Increase/ (Decrease) $ M	Variance Explanation
Generation	0.86	Roofing Routine: Trenton & Tuft's Cove
	(0.23)	Roofing Routine: Pt. Tupper & Pt. Aconi
	0.08	Equipment Replacements: All Plants & Hydro
	(0.14)	Heat Rate Routine: All Plants
	0.26	Oil Release Risk Assessment & Gate Refurbishment: Hydro
	0.06	Tooling Routine
	0.88	
Transmission	0.74	Transmission Line Replacements (T001 & T011)
	1.25	Transmission Substation Replacements
	0.13	Protection Modifications
	0.06	Primary Equipment
	2.17	
Distribution	2.35	New Customers: Increase in Labour/ Material Assumptions
	1.94	Distribution Upgrades and Replacements (D005 - 1.51 & D008 - 0.22)
	0.20	Right of Way Widening
	0.11	Joint Use
	0.26	Meters
	4.85	
General Plant	(0.05)	Telecommunications
	0.04	Security improvements: Hydro
	0.74	Environmental Assessment & Remediation Routine
	0.02	Purchasing Equipment and Warehouse
	0.89	Property Improvement & Furniture
	7.00	Work Vehicles:Creation of 3 routines, formerly special projects
	(0.01)	Computing Asset Management
	8.62	

1.10.1.2 2011 Routine Capital Spending: Project Details

Generation Routines		
Routine #	**Project**	**2011 Project Budget**
	Generation Equipment Replacement	
S001	GS- Routine Equipment Replacement	135,000
	POA - Routine Equipment Replacement	239,143
	POT - Routine Equipment Replacement	257,989
	TRE - Routine Equipment Replacement	325,964
	TUC - Routine Equipment Replacement	360,000
	LIN - Routine Equipment Replacement	556,182
G001	CTS - Routine Spending	138,000
G008	CTS Tooling Routine	75,838
H001	HYD - Equipment Replacement	685,000
S004	TRE-Roofing Routine	499,880
	TUC-Roofing Routine	483,912
	LIN-Roofing Routine	445,073
H004	HYD-Roofing Routine	113,259
	Generation Equipment Replacement Total	**4,315,240**
	Hydro Program	
H005	HYD Oil Release Risk Assessment	269,148
H006	HYD - Gate Refurbishment Routine	250,000
	Sub-Total Hydro Programs	**519,148**
	Generation Other Thermal	
S005	TUC-Heat Rate Routine	61,485
	POA-Heat Rate Routine	49,997
	POT-Heat Rate Routine	73,149
	TRE-Heat Rate Routine	89,988
	LIN-Heat Rate Routine	100,215
	Sub-Total Heat Rate	**374,834**
Generation Routine Total		**5,209,222**

Transmission Substation Replacement, Additions/Modifications		
Routine #	**Description**	**Total Project Budget ($)**
T003	**Transmission Substation Replacements**	
	Trenton Substation - Repair concrete footings	50,000
	Maccan Substation - Remove footings and Steel Lattice Tower	45,000
	L5506 - Repair and Replace Concrete Poles on the Pictou Causeway	190,000
	Lochaber Substation - Repair concrete footings	60,000
	Tuft's Cove, Replace 30, 69kV switches	410,660
	Replace grounding transformer - 2 of	86,840
	6S Terrace St. - replace switchgear with reclosers	105,500
	Wreck Cove Repair Ocean Electrode for Diast. Neutral Grounding	60,000
	Battery Bank Replacements	160,000
	Feeder Exit Cable Replacement	100,000
	Bus Replacement	75,000
	Switch Replacement	35,000
	Cowie Falls Transformr	200,000
	20V-T52 Replace Rads	124,000
	11W - Replace Rads	125,000
	25W - Replace Rads	124,000
	43W - T61 Replace Rads	124,000
	Crushed Stone Replacement	50,000
	Fence Replacement	25,000
	Unplanned Failures	350,000
	Subtotal	**2,500,000**
T004	**Substation Additions/Modifications**	
	Line L-5545A	16,355
	138kV Switch Additions	300,000
	A/C units - 6 stations	120,000
	10 On-Line Oil Filtration Units	233,200
	10 On-Line Gas Monitors	206,650
	GIC Monitor	28,150
	Additional Feeder at 22C-Cleveland	220,000
	Unknown Additions	76,000
	Subtotal	**1,200,355**
Total		**3,700,355**

Primary Equipment Spares

Routine #	Description	Total Project Budget ($)
T018	**Protection Modification and Replacement**	
	Spare Surge Arrestors	78,649
	Tapchanger contact set for Federal Pioneer units (2)	40,000
	Tapchanger spare parts for Ferranti Packard units (2)	25,000
	Unidentified Items	45,000
Total		**188,649**

Protection Modification and Replacement

Routine #	Description	Total Project Budget ($)
T016	**Protection Modification and Replacement**	
	L-6537 Install Fault Location	55,678
	Replace LFCB on L-6047/L-6048	172,070
	L-5011 (58H-99H) Pilot Wire Replacement	61,709
	L-5537 Pilot Wire Replacement	61,709
	L-6535 Add Permissive Channels at 30N	7,411
	Replace 345 kV Line Protection	56,308
	Unplanned Relay Replacement	87,421
	Replace Fault Recorder at Milton	32,783
	L-5563/L-5560 Add Fault Location at 2S	54,001
	67N & 3C Aux Relay Replacement	12,937
	Replace Fault Recorder at Canaan Rd	27,002
	Add Satelite Clocks at 50W, 9W, 99W, 2S	54,774
	Add Lockout relay to 50W-T1 Auto-isolation scheme	11,464
	Replace SPS	34,179
	Add 86 Device to 2S BBU	18,590
	Add Reclose Block to 50W-T63	18,590
	Add Reclose Block to 9W-512, 515	18,590
	Unidentified Projects	56,000
Total		**841,216**

Transmission Line Replacement, Additions/Modifications

Routine #	Line #	Description	Total Project Budget ($)
T011	**Provincial Plan Transmission Replacement**		
	5003	Sackville to Akerley	102,000
	5004	Sackville to Rockingham	58,000
	5011	Farrell to Imperial	82,000
	5019	Canaan Rd to Hollow Bridge	16,000
	5028	Onslow to Stewiacke	360,000
	5044	Tap to Middleton	20,000
	5053	Tremont to Micheclin	6,000
	5510	Bridge Ave to Malay Falls	170,000
	5511	Trafalgar to Upper Musquodobit	83,000
	5512	Malay Falls to Ruth Falls	62,000
	5524	Antigonish to Salmon River	135,000
	5531	Gulch Bear River to Sissiboo	250,000
	5532	Big Falls to Gulch	250,000
	5534	Tusket to Hebron	60,000
	5538	Sissiboo to Weymouth	42,000
	5546	Bridgewater to Westhavers	70,000
	5549	Maccan to Hickman St	52,000
	5550	Maccan to Parrsboro	12,000
	5555	Gannon Rd to Aconi	58,000
	5559	Wycocomaugh to SW Margaree	32,000
	5565	Seaboard to Albert Bridge	30,500
	5571	VJ to Whitney Pier	27,000
	5575	Whitney Pier to Lingan	80,000
	5579	SW Margaree to Cheticamp	20,000
	6008	Sackville to Lakeside	17,000
	6011	Brushy Hill to St Croix	26,000
	6020	Milton to Suriquois	62,000
	6033	Lakeside to Water Street	5,000
	6042	Tufts Cove to Dartmouth East	11,000
	6043	Dartmouth to Musquodobit	150,000
	6051	Brushy Hill to St Croix	27,000
	6503	Onslow to Trenton	97,000
	6513	Onslow to Spring Hill	370,000
	6514	Maccan to Spring Hill	30,000
	6515	Antigonish to Port Hastings	600,000
	6527	Onslow Substation Tie	24,000
	6533	Victoria Junction to Lingan	22,000
	6536	Spring Hill to NB Border	210,000
	6537	Port Hastings to Glen Tosh	20,000
	6538	Glen Tosh to Gannon Road	237,000
	6545	Glen Tosh to Wreck Cove	64,000
	6549	Geln Tosh to Wreck Cove	129,560
	7002	Onslow to Brushy Hill	356,624
	7005	Onslow to Port Hastings	380,000
	7014	Lingan to Woodbine	35,000
	7019	Onslow to Dalhousie Mountain	12,000
	5027A	Tusket to Lower Woods Harbour	13,000
	5540A	Tap to Deep Brook Hydro	85,000
	5545A/5545B	Bridgewater to Auburndale/High St	85,000
	8001	Onslow to New Brunswick	60,000
	Various		253,000
		Subtotal	**5,458,684**

Transmission Line Replacement, Additions/Modifications			
Routine #	**Line #**	**Description**	**Total Project Budget ($)**
T001	**Transmission Line Replacements**		
	The budgetary funding for T001 is generally held at approximately $700k/year. This may vary dependant on things like storms.		751,319
		Subtotal	**751,319**
Total			**6,210,003**

Transmission Routine Total **10,940,223**

Meters

Item#	Prg#	Meter Type	Meter Style	Description	2011 Forecast	Current Unit Cost	Capital for Meters ($)
1.0 Element, 120-240 volt							
1	94	A1D+	ZQB20000R	240V, 10A, 2W, 4 Jaw, 4 dial	200	144.24	28,848.00
2	20	A1T+	QB20130R	T/R, 2W, 4Jaw, TOU (KWH) c/w L.C. (ETS)	180	190.73	34,331.40
3	30	A1R+	QB20200R	T/R, 2W, 4Jaw, KW/KVA dmd	140	154.65	21,651.00
4	39	A1TL+	QB20D3DR	T/R, 2W, 4Jaw, TOU(KWH) c/w modem, L.P,L.C. (ETS)	4	445.76	1,783.04
5	40	A!RL+	QB20F0DR	T/R, 2W, 4Jaw, KW/KVA dmd, c/w modem, L.P.	4	395.67	1,582.68
1.5 Element, 120-240 volt							
	N/A	C1S	Centron	240V, 200A, 3W,4 Jaw, 5 dial	10000	26.50	265,000.00
6	19	A1T+	QC30130R	S/C, 3W, 4Jaw, TOU(KWH) c/w L.C. (ETS)	864	164.28	141,937.92
7	31	A1R+	QC30200R	S/C, 3W, 4Jaw, KW/KVA dmd	240	154.65	37,116.00
8	32	A1R+	QD50200R	T/R, 3W, 4Jaw, KW/KVA dmd	60	154.65	9,279.00
2.0 Element, 120-480 volt							
9	N/A	R2S	ZF532000000	120V,200A,3W,5Jaw(9o,clock pos:), 5 dial	1300	97.00	126,100.00
10	26	A1R+	Q530200R	S/C, 3W, 5Jaw(9 o,clock pos:) KW/KVA dmd,(Mult: 25)	200	158.17	31,634.00
11	33	A1T+	Q530130R	S/C, 3W, 5Jaw(9 o,clock pos:)TOU(KWH) c/w L.C.(ETS)	60	194.25	11,655.00
12	35	A1RL+	Q220F0DR	T/R, 3W, 8Jaw, KW/KVA dmd, c/w modem, L.P.	4	404.78	1,619.12
13	72	A1RL+	Q220F3DR	T/R , 3W, 8Jaw, kW/kVA dwd, Modem, LP (5-min int) KYZ	4	454.78	1,819.12
27	97	A1R+	ZQ220200R	T/R, 3W, 8Jaw, KW/KVA dmd	250	158.17	39,542.50
2.5 Element, 120-347 volt							
14	81	A1D+	Q820000R	T/R,4W, 13Jaw, 120-480V, 0.1-10A (KWH)	40	144.24	5,769.60
15	28	A1R+	Q820200R	T/R, 4W, 13Jaw, KW/KVA dmd	400	158.17	63,268.00
16	29	A1R+	Q820230R	T/R, 4W, 13Jaw, KW/KVA dmd, c/w KYZ	20	208.17	4,163.40
17	34	A1RL+	Q820F0DR	T/R,4W, 13Jaw, KW/KVA dmd c/w modem, L.P.	20	404.78	8,095.60
18	73	A1RL+	Q820F0DR	T/R, 4W, 13 Jaw, kW/kVA dmd, modem, LP (5 min int)	4	404.78	1,619.12
19	74	A1RL+	Q820F3DR	T/R, 4W, 13 Jaw, kW/kVA dmd, modem, LP (5 min int), KYZ	4	454.78	1,819.12
3.0 Element, 120-347 volt							
20	47	A1D+	Q330000R	S/C, 4 W, 7Jaw, (KWH)	500	144.24	72,120.00
21	48	A1D+	Q320000R	T/R, 4W, 13Jaw, (KWH)	20	144.24	2,884.80
22	18	A1RL+	Q320F0DR	T/R, 4W, 13Jaw, KW/KVA dmd, c/w modem, L.P.	20	404.78	8,095.60
23	22	A1R+	Q330200R	S/C, 4W, 7Jaw, KW/KVA dmd, (Mult 25)	800	158.17	126,536.00
24	23	A1R+	Q320200R	T/R, 4W, 13Jaw, KW/KVA dmd	400	158.17	63,268.00
25	75	A1RL+	Q320F0DR	T/R, 4W, 13 Jaw, kW/kVA dmd, modem, LP (5 min int)	4	404.78	1,619.12
26	76	A1RL+	Q320F3DR	T/R, 4W, 13 Jaw, kW/kVA dmd, modem, LP (5 min int), KYZ	4	454.78	1,819.12
				TWACS Modules	500	72.00	36,000.00
				Total Meters	**16246**		**1,150,976**
				Misc Meters "ION"			**50,000**
				CT and PT requirements			**121,569**
				Wire Adapters and switches			**63,991**
				Total Materials			**1,336,536**
				Vehicle Allocation			**137,790**
				Construction Overhead			**391,080**
				Labour			**494,224**
				Total (Materials, Vehicle, Construction OH & Labour)			**2,409,631**

Routine #	Description	Total Project Budget ($)
Distribution Upgrades and Replacements		
D051	**System Performance Improvements**	
	Bridgewater Feeder Tie	168,585
	Electronic Sectionalizer Installation Program	100,000
	Cleveland New Feeder	90,000
	Sydney - Gang Operated Switches	100,000
	Sub-total System Performance Improvements	**458,585**
D055	**Replace Deteriorated Plant - Planned**	
	Packaged D055 (Parts of)	2,003,182
	Bin Work	2,500,000
	Streetlight/service removal	1,600,000
	Padmount replacement	750,000
	Field Driven Work	750,000
	Sub-total Replace Deteriorated Plant - Planned	**7,603,182**
D005	**Replace Deteriorated Plant - Unplanned**	
	The budgetary amount was developed based on any estimated 3,467 mandays of work at a unit cost of $2,307/manday	**7,998,369**
D006	**Regulatory Replacement**	
	The budgetary amount is developed based on past experiences or meetings with various government agencies. This amount could vary based on current year decisions by these agencies.	**838,500**
D008	**Provincial Storm**	
	This budgetary amount is developed based on past experience. There can be significant variation in this amount based on yearly storm activity.	**2,371,335**
Total		**19,269,971**

New Customers

Routine #	Description	Total Project Budget ($)
D004	**New Customer Replacements**	
	This budgetary amount is budgeted as a % of D061 and D062 including capital contributions. In 2011 this is estimated to be 32%.	5,858,803
D018	**Primary Equipment Spares**	
	This budgetary amount was developed based on an estimated amount of distribution spare equipment required during the current year.	150,043
D061	**New Customers- Residential**	
	This budgetary amount is for the costs associated with new residential customers including capital contributions. Costs include metered services, unmetered services, line extensions and underground services.	12,701,508
D062	**New Customers- Commercial**	
	This budgetary amount is for the costs associated with new commercial customers including capital contribution. Costs include metered services, unmetered services, line extensions and underground services.	5,429,324
Total		**24,139,678**

Joint Use

Routine #	Description	Total Project Budget ($)
D007	**Contractual Replacement (Joint Use)**	
	This budgetary amount is developed in discussions with area communication utilities and may vary depending on their level of activity.	**856,694**

Right-of-Way Widening

Routine #	Description	Total Project Budget ($)
D010	**Provincially Widening**	
	This budgetary amount is developed based on the anticipated level of widening in the current year.	**940,833**

Distribution Routine Total **47,616,807**

Work Vehicles

Routine #	Description	Quantity	Price ea. ($)	Total for 2011 ($)
P006	**Replacement & Additional Work Vehicles**			
	Pole Trailer	1	26,000	26,000
	Double Reel Trailer	1	21,000	21,000
	Utility Trailer	1	15,000	15,000
	Single Reel	1	13,000	13,000
	ATV replacements(including tracks) (WFM/COPS)	3	17,000	51,000
	ATV Ramp Systems	3	2,200	6,600
	Snowmobile	1	11,000	11,000
	Miscellaneous Trailers etc		8,000	8,000
	Forgeron and License	1	2,900	2,900
	Commissioning Materials	1	1,000	1,000
	Total Materials		**117,100**	**155,500**
	Commissioning Labour	1	2,000	2,000
	A/O	1	1,411	1,411
	Salvage	1	(7,390)	(7,390)
	Subtotal			**151,521**
P009*	**Mobile Transformer & Track Routine**	1		**383,930**
P063	**Class 3 Work Vehicle Replacements** This budgetary amount is for costs associated with the purchase of light work vehicles. Included is the cost of commissioning, accessories and the salvage value of retired vehicles.	6	144,273	**865,640**
P062	**Work Vehicle Replacements** This budgetary amount is for costs associated with the purchase of work vehicles. Included is the cost of commissioning, accessories, and the salvage value of the retired trucks.	16	240,000	**3,840,000**
P061	**Transportation Vehicle Replacements** This budgetary amount is for costs associated with the purchase of transportation vehicles. Included is the cost of commissioning, accessories, and the salvage value of retired vehicles.	66	29,023	**1,915,500**
Total				**7,156,591**

*This budgetary amount is developed based on a possible repairs or modifications to track machines or the mobile transformer.

Tools & Test Equipment					
Routine #	Region	Description	Quantity	Budget Unit Cost ($)	Budget Total ($)
P002	Western Territory	2-012-004-735-P002			
		2/0 grounds	3	1,300	3,900
		Phasing Sticks	1	2,100	2,100
		signage	9	2,200	19,800
		Poleboss reel and rope	3	3,810	11,430
		poleboss payout pole mount	3	1,100	3,300
		poleboss payout drive unit	1	15,569	15,569
		12Ton Presses	2	3,900	7,800
		6 ton Battery Operated Press	8	2,200	17,600
		Amp probe with power factor	1	2,600	2,600
		regular amp probe	1	1,900	1,900
		Ground Sets	6	1,300	7,800
	West Total				**93,799**
	Eastern Territory	2-012-004-752-P002			
		12Ton Presses	8	3,900	31,200
		CSA Die sets for 12 ton Press	8	1,400	11,200
		Hydraulic long hot stick saws	6	1,600	9,600
		3 Phase PQ Meter	1	11,000	11,000
		Phasing Sticks	3	1,800	5,400
		Full Set of Burndy U type dies	2	5,000	10,000
	East Total				**78,400**
	Central Territory	2-012-004-623-P002			
		Hydraulic drill	12	1,300	15,600
		Hydraulic Chain saw	3	1,500	4,500
		Grounding set (2/0 grounds, transmission)	7	1,200	8,400
		6 ton press	12	1,400	16,800
		12 ton press	10	5,800	58,000
		sets of dies for y-35 press for new sleeves	10	1,500	15,000
		3 phase patten jumper sets - 15' - 2/0	4	1,200	4,800
		Ground tester	1	6,000	6,000
		U/G large corner guide 5X11" for significant cable pulls	1	1,500	1,500
		Load pickup device (set)	5	2,000	10,000
		cable locator	1	6,500	6,500
		live line phasing sticks	2	2,000	4,000
		Cable locating sonde fish tape	1	2,000	2,000
		Box locator	1	2,000	2,000
		Hydraulic Cutters	2	2,000	4,000
		Battery powered cable cutters	2	1,000	2,000
		Oil Pump and accessories	1	2,000	2,000
		TDR	1	10,000	10,000
		TTR - Transformer Tested 3/0	1	2,500	2,500
		Air Monitors	4	2,000	8,000
		Man hole Retractor	1	3,000	3,000
		AMP Probe with universal attachment	4	1,500	6,000
		DRA's for engineering	1	7,000	7,000
	Central Total				**199,600**
	T&D Asset	2-012-004-800-P002			
		Breakdown Allowance	1	50,698	50,698
		Hot Stick Sets for New Trucks	10	2,500	25,000
		Hydraulic Drills - Boom Tip	86	1,675	144,050
		Data Collection Units	4	1,500	6,000
		Jumper Cable Test Set (PETC)	1	1,500	1,500
		Hydraulic Press and Dies for PETC	1	5,000	5,000
		Cable Cutter for PETC	1	2,500	2,500
		Drill Press and Tooling (PETC)	1	1,400	1,400
		Aisle Stacker (PETC)	1	28,000	28,000
		Dielectric Rope Tester	1	15,000	15,000
		Data Collection Units	3	5,000	15,000
		CAD Plotter	1	18,000	18,000
	T&D Asset Total				**312,148**

Tools & Test Equipment					
Routine #	**Region**	**Description**	**Quantity**	**Budget Unit Cost ($)**	**Budget Total ($)**
P002	**Fleet & Workforce**	2-012-004-863-P002			
		Snap on Boroscope Kit	1	1,350	1,350
		Pressure washer (gas powered)	1	1,280	1,280
		Battery Load Tester	2	1,600	3,200
		Body builder system for scan tool	2	1,500	3,000
		AVR for checking battery and charging system	2	1,495	2,990
		OTC air jack stands	1	1,495	1,495
		Machine for testing and filling A/C on trucks (VIPER 7000)	2	5,009	10,018
		Analytical Software for International Trucks	2	2,000	4,000
	Fleet & Workforce Total				**27,333**
	Telecom	2-012-004-820-P002			
		Variable Attenuator	1	5,500	5,500
		Fibre Splicing Equipment	1	17,000	17,000
		Data Test Set	2	8,000	16,000
		T1 Test Set	1	25,000	25,000
		Attenuators	1	1,500	1,500
		Test Cable Kit	1	3,000	3,000
	Telecom Total				**68,000**
P002	**System Maintenance**	2-012-004-820-P002			
		DOBLE M4000	3	57,000	171,000
		Relay test set (i.e. Manta MTS-5000)	1	52,000	52,000
		SF6 Gas Recovery Unit GRU-4	1	20,000	20,000
		Phasing Sticks 2 sets	1	10,000	10,000
		Ultraphonic Diagnostic Tool	1	5,000	5,000
		CT Test Set	1	7,500	7,500
		Phase Angle Meter	1	2,000	2,000
		70KV DC Bibble Test Set (Hipot)	1	10,000	10,000
		3 phase TTR	2	12,500	25,000
		Asea Current Measuring Test Plug	1	18,000	18,000
		Current Injection Test Set	2	6,000	12,000
		Winding Resistance Test Set	1	5,000	5,000
		289 Fluke Multi-Meters (2 required)	1	1,000	1,000
		12Ton Presses	4	3,900	15,600
		Die Sets for 12 Ton Press	4	5,500	22,000
		PHASING STICKS - 2 sets	5	1,800	9,000
		Meggers 1000Volt	4	1,200	4,800
		hand crank TTR	1	15,000	15,000
		Breaker Analizer (PHA)	1	35,000	35,000
		Battery operated cutters Description : Huskie #REC-S540 ROBO C	3	4,600	13,800
		Thermovision Gun	1	12,000	12,000
		AC Hipot Set	1	10,000	10,000
		Sine Wave Inverters, 3000W	2	2,750	5,500
		Truck Ramps	3	1,295	3,885
		Retracta Jacks for ATV's	3	1,800	5,400
		Cable Height Meter	4	1,200	4,800
		Iridium Satellite Phone	1	1,500	1,500
		Remote Controlled Aerial Inspection Unit	1	5,000	5,000
		Battery Powered Cable Cutters	4	1,800	7,200
		CT Mag Test Set	2	10,000	20,000
		15Amp Variac	2	2,800	5,600
	System Maintenance Total				**534,585**
		Unplanned Tool Purchases			**76,135**
P016		Tools and Equipment			**323,500**
P015		Hydro Production Tools and Test Equipment			**60,000**
Total					**1,773,500**

Telecommunications		
Routine #	**Description**	**Total Project Budget ($)**
P025	**Mobile Radio Routine**	
	Spare Parts	25,823
	Spread Spectrum Radios	47,886
	Test MTR2000 Repeater Spares & Allocate	13,660
	Subtotal	**87,369**
P027	**Telecommunication Radio & Fibre Optics**	
	HVAC and Generator Replacements	111,724
	Maple Ridge, Wittenburg, Horton Lake Repairs	28,329
	Misc. repairs	15,557
	Subtotal	**155,610**
P028	**Telecommunication Systems Replacements & Mods**	
	Memramcook Telecom Changes	3,000
	Circuit Grooming	6,000
	Replace Bayly Multiplex	85,358
	Install Newbridge Shelves	17,508
	Batteries - 12v Repeater	7,175
	Batteries - 8 sites	55,690
	48v DC Charger Systems(Large)-4 sites	65,513
	48v DC Charger Systems(Small)-4 sites	18,345
	RAL 48VDC Charger	15,320
	Misc. Power Supplies	5,000
	UPS Repairs/Replacements	5,000
	Misc. Newbridge eqpt.	8,000
	Remove Dartmouth East Tower	13,300
	NRC to Tusket Microwave Radio	7,520
	Replace Ethernet Spread Spectrum Radios	33,000
	Network Monitoring - replace net guardians	50,130
	Cable & Entrance Protection	10,000
	Switched Communications	5,000
	Wreck Cove Diversity Antenna	12,643
	Misc. Fibre Optics	28,000
	Subtotal	**451,502**
P814	**Telecommunication Spares**	**175,000**
Total		**869,481**

Minor variances due to rounding

Computing Asset Management						
Routine #	**Description**	**Unit**	**Cost per Unit ($)**	**Est. Units**	**Budget Subtotal ($)**	**Budget Total ($)**
P020*	NSPI/CGI Infrastructure	Desktops/Laptops	2,055	100	205,514	
		Intel – Sm server	15,510	3	46,530	
		Intel – Med server	24,978	2	49,956	
						302,000
P031	NSPI Non CGI Infrastructure	Consolidated Server and Infrastructure Replacement	218,265	N/A	218,265	
		Ports	63	154	9,702	
		Network Sites	18,911	9	170,199	
		Power Production PC ServerReplacement	100,000	N/A	100,000	
		Incremental Computers	291,019	N/A	291,019	
		Crystal Report Server	75,000	N/A	75,000	
		Load Balancer	90,000	N/A	90,000	
		Sm. Sun Servers	18,000	6	108,000	
		Sm. Intel Servers	15,000	8	120,000	
		Med. Intel Servers	25,000	4	100,000	
		MS Software Licenses	600	166	99,600	
		UPS Upgrade	55,000	N/A	55,000	
		Maximo Licenses	5,000	50	250,000	
		Misc. Small Equipment Purchases	30,000	N/A	30,000	
						1,716,785
P010**	SCADA Improvements	N/A				125,968
P040	CT's DCMS Routine	N/A				17,000
	POA - DCMS Routine	N/A				27,638
	POT - DCMS Routine	N/A				30,000
	TRE - DCMS Routine	N/A				34,921
	TUC - DCMS Routine	N/A				70,000
	LIN - DCMS Routine	N/A				50,000
Total						**2,374,312**

*For the NSPI/CGI Infrastructure Routine unit pricing is not provided in the contract. Fees for Routine Capital are based on annual amount.

**This budgetary amount is developed based on SCADA equipment/operator interfaces failures or modifications.

Property Improvements & Furniture		
Routine #	**Project**	**Total Project Budget ($)**
P001	FAC - Property Improvements	2,161,145
P030	FAC - Lower Water Street	150,000
Total		**2,311,145**

Other		
Routine #	**Project**	**Total Project Budget ($)**
P012	HYD - Security Improvement	367,397
P041	FAC - Land Acquisition Routine	149,998
P035	POA - Kelly Rock Limestone Quarry	27,728
	FAC Enviro Property Remed Routine	954,004
	FAC Environment Site Assess Routine	233,138
	Purchasing Equip & Warehouse Routine	300,000
Total		**2,032,265**

General Plant Routine Total **16,517,294**

1.10.1.3 Routine Capital Spending: Project Breakdown Yr/Yr

Project #	CI Number	Project Title	2009 Budget ($)	2009 Actual ($)	2010 Budget ($)	2010 Forecast ($)	2011 Budget ($)
G001	10634	CTS - Routine Spending	131,158	133,853	135,092	141,791	138,000
H001	11622	HYD - Equipment Replacement	500,000	534,727	665,000	665,001	685,000
H004	27867	HYD-Roofing Routine	106,320	138,084	109,960	120,698	113,259
S001	23428	GS - Routine Capital	125,660	129,229	129,429	123,192	135,000
	10718	POA - Routine Capital Program	232,313	231,232	239,282	246,802	239,143
	10645	POT - Routine Capital	231,437	219,292	246,845	241,559	257,989
	10673	TRE - Routine Capital	313,312	304,343	322,711	324,520	325,964
	10621	TUC - Routine Plant Spending	324,082	339,341	343,625	343,772	360,000
	10626	LIN - Routine Capital Program	526,892	420,443	542,636	541,371	556,182
S004	27856	TRE-Roofing Routine	126,200	127,381	126,200	125,604	499,880
	27855	POT-Roofing Routine	124,390	20,617	129,913	42,211	-
	27854	TUC-Roofing Routine	228,424	-	-		483,912
	27857	LIN-Roofing Routine	300,900	398,808	449,641	487,213	445,073
	38899	CTS Tooling Routine	-	-	15,000	15,838	75,838
	27858	POA - Roofing Routine	-	-	100,382	107,807	
		Generation Equipment Replacements Total	**3,271,088**	**2,997,348**	**3,555,716**	**3,527,379**	**4,315,240**
H005	35583	HYD - Oil Release Risk Assessment	52,415	53,287	100,000	107,659	269,148
H006	35584	HYD - Gate Refurbishment	153,086	160,641	150,000	150,000	250,000
		Generation Hydro Total	**205,501**	**213,928**	**250,000**	**257,659**	**519,148**
S005	33871	TUC-Heat Rate Routine	104,600	80,752	50,965	42,660	61,485
	33865	POA-Heat Rate Routine	52,300	88,162	52,210		49,997
	33867	POT-Heat Rate Routine	52,300	68,868	59,122	56,045	73,149
	33869	TRE-Heat Rate Routine	78,450	104,546	83,588	79,705	89,988
	33863	LIN-Heat Rate Routine	130,750	73,647	272,768	298,517	100,215
		Generation Thermal Total	**418,400**	**415,974**	**518,652**	**476,927**	**374,834**
T003	23120	Provincial-Trans Substation Primary	1,599,998	1,734,458	1,627,635	2,230,745	2,500,000
T004	23121	Provincial - Substation Additions & Replacements	750,000	612,305	823,951	742,485	1,200,355
		Transmission Subs Replace, Adds/Mods Total	**2,349,998**	**2,346,763**	**2,451,586**	**2,973,230**	**3,700,355**

Project #	CI Number	Project Title	2009 Budget ($)	2009 Actual ($)	2010 Budget ($)	2010 Forecast Actual ($)	2011 Budget ($)
T018	14973	Primary Equipment Spares	128,053	32,119	128,053	128,053	188,649
		Primary Equipment Spares Total	**128,053**	**32,119**	**128,053**	**128,053**	**188,649**
T016	14841	Protection Modification & Replacement	691,976	456,199	712,220	448,748	841,216
		Protection Modification & Replacement Total	**691,976**	**456,199**	**712,220**	**448,748**	**841,216**
T001	23115	Provincial Transmission Line Replace	700,077	659,456	674,078	861,000	751,319
T011	23118	Provincial - Planned Trans Line Replacement	4,502,877	4,504,289	4,800,000	4,494,694	5,458,684
		Transmission Line Replacements Total	**5,202,954**	**5,163,744**	**5,474,078**	**5,355,694**	**6,210,003**
D009	26496	Meter Routine	2,133,939	1,728,366	2,151,185	2,006,587	2,409,631
		Meters Total	**2,133,939**	**1,728,366**	**2,151,185**	**2,006,587**	**2,409,631**
D005	23158	Unplanned Replace Deteriorated	6,000,000	6,822,335	6,487,745	6,805,699	7,998,369
D006	23135	Regulatory Replacements - Province	701,794	1,701,188	748,743	1,480,307	838,500
D008	23361	Provincial Storm	1,883,247	1,552,553	2,152,917	2,152,917	2,371,335
D051	29038	System Performance Improvement Routine	390,000	407,014	445,348	445,348	458,585
D055	23137	Planned Replacement Of Distr	6,500,000	9,542,191	7,500,000	8,813,937	7,603,182
		Distribution Upgrades and Replacement Total	**15,475,041**	**20,025,282**	**17,334,753**	**19,698,208**	**19,269,971**
D002	26715	New Primary Services	1,693,202	1,591,240	2,062,324	1,111,092	-
D004	26716	New Customer Upgrades	4,700,000	5,039,620	5,205,561	4,725,852	5,858,803
D016	26717	New Customers - Unmetered Services	1,005,905	811,087	1,128,609	340,385	-
D017	26718	New Customers - Metered Services	9,100,000	8,938,778	9,874,087	5,027,920	-
D018	23511	Primary Equipment Spares - Distribution	150,000	163,396	150,000	150,000	150,043
D021	26719	New Customers - Line Extensions	2,000,000	3,505,786	2,618,090	1,252,682	-
D022	26720	New Customers - Underground Service	785,047	289,634	753,808	96,356	-
D061	39766	New Customers - Residential	-	-	-	5,502,116	12,701,508
D062	39770	New Customers - Commercial	-	-	-	1,600,720	5,429,324
		New Customers Total	**19,434,154**	**20,339,542**	**21,792,479**	**19,807,123**	**24,139,678**

Project #	CI Number	Project Title	2009 Budget ($)	2009 Actual ($)	2010 Budget ($)	2010 Forecast Actual ($)	2011 Budget ($)
D007	23136	Contractual Replacemens (Joint Use)	700,000	1,066,653	748,416	743,607	856,694
		Joint Use Total	**700,000**	**1,066,653**	**748,416**	**743,607**	**856,694**
D010	23127	Provincially Widening	300,000	303,981	740,833	740,833	940,833
		Right of Way Widening Total	**300,000**	**303,981**	**740,833**	**740,833**	**940,833**
P006	20945	Replacement and Additional Work Vehicles	100,000	92,132	107,646	106,147	151,521
P009	16192	Mobile Transformer & Track Routine	50,590	7,910	48,980	48,980	383,930
	39304	Class 3 Work Vehicle Replacements					865,640
	39305	Work Vehicle Replacements					3,840,000
	40236	Transportation Vehicle Replacements					1,915,500
		Work Vehicles Total	**150,590**	**100,042**	**156,626**	**155,127**	**7,156,591**
P002/P016	-	Meter Shop - Tools and Equipment	761,140	743,119	1,712,685	1,726,274	1,713,500
P015	11611	Hydro Production Tools, Test Equipment	-	10,012	60,000	59,630	60,000
		Tools and Test Equipment Total	**761,140**	**753,131**	**1,772,685**	**1,785,904**	**1,773,500**
P025	16365	Mobile Radio Routine	79,550	70,423	80,498	80,725	87,369
P027	16551	Telecommunication Radio and Fibre Optics	157,231	161,609	216,987	216,977	155,610
P028	16550	Telecommunication Systems Replace & Modification	339,141	479,449	449,673	449,457	451,502
	38243	Telecommunications Spares	-	-	175,035	175,035	175,000
		Telecommunications Total	**575,922**	**711,480**	**922,192**	**922,194**	**869,481**
P010	16073	SCADA Improvements Routine	44,080	35,588	93,269	93,269	125,968
P020	10632	NSPI/CGI Infrastructure	2,805,800	2,761,799	1,895,164	1,616,624	302,000
P031	29114	NSPI Non-CGI Infrastructure	164,320	160,657	218,265	208,597	1,716,785
P040	28522	CT'S Dcms Routine	10,200	8,263	10,506	14,786	17,000
	25647	POA - DCMS Routine Computer Replace	27,060	24,291	27,871	25,853	27,638
	25667	POT - DCMS Equipment Replacement Routine	22,290	-	26,000	26,677	30,000
	25626	TRE - DCMS Equipment Replacement Routine	31,830	27,657	32,784	51,161	34,921
	25646	TUC - DCMS Equipment Replecement Routine	38,640	1,000	39,799	39,778	70,000
	25668	LIN - DCMS Equipment Replacement Routine	43,510	33,075	44,815	44,166	50,000
		Computing Asset Management Total	**3,187,730**	**3,052,332**	**2,388,473**	**2,120,911**	**2,374,312**

Project #	CI Number	Project Title	2009 Budget ($)	2009 Actual ($)	2010 Budget ($)	2010 Forecast Actual ($)	2011 Budget ($)
P001/P030	-	Property Improvement and Furniture	1,250,000	1,262,966	1,425,000	1,306,296	2,311,145
		Property Improvement and Furniture Total	**1,250,000**	**1,262,966**	**1,425,000**	**1,306,296**	**2,311,145**
P012/P041	-	Other (HYD - Security Improvement & FAC - Land Acquisition)	237,130	228,978	475,000	449,659	517,395
P035	21485	POA - Kelly Rock Limestone Quarry	-	-	27,729	703	27,728
	38897	FAC Enviro Property Remed Routine	-	-	212,500	184,953	954,004
	38896	FAC Environment Site Assess Routine	-	-	234,000	209,602	233,138
	38848	Purchasing Equip & Warehouse Routine	-	-	285,000	285,798	300,000
		Other Total	**237,130**	**228,978**	**1,234,229**	**1,130,715**	**2,032,265**
Routine Capital Spending			**56,473,616**	**61,198,828**	**63,757,176**	**63,585,195**	**80,283,546**

1.11 2010 ACE Items – Deferred / Cancelled

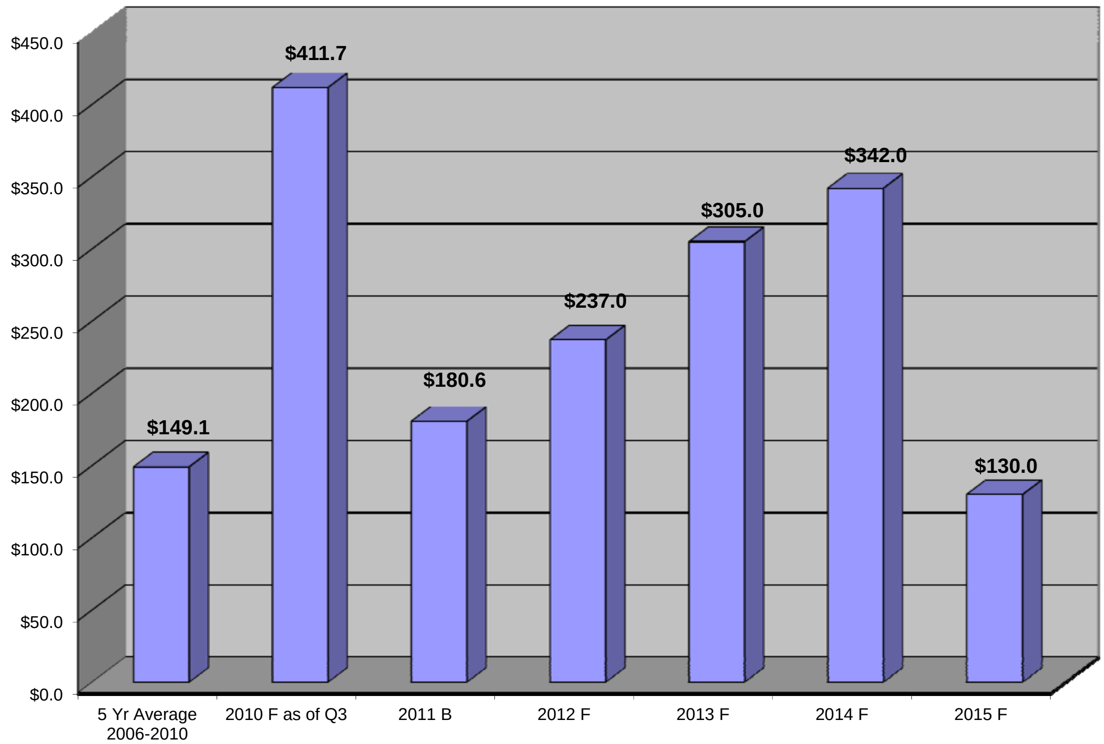
CI Number	Project Title	2010 ACE Project Total	
Generation			
38868	HYD Marshall Falls Hydro Station Further evaluation of this project is ongoing. This project has been deferred until evaluation of the project and economic analysis is complete.	1,801,524	Deferred
30802	POT- Marine Terminal Dust Mitigation This item was submitted for Board approval on December 13, 2010.	746,743	Deferred
38944	LIN - Unit 2 Rotor Rewind The major outage for Lingan Unit#2 is currently scheduled for 2012. This item will be submitted for Board approval in 2011.	423,521	Deferred
38603	TRE6 - LP Turbine Gland Replacement Further evaluation of this project determined it could be deferred until 2012.	403,980	Deferred
38602	TRE - Fire System Upgrades Further evaluation of this project determined that it can be deferred until 2011.	402,653	Deferred
38102	POT - Utilization of Heavy Biofuel Oil This project has been deferred until NSPI considers the impact of the project on meeting the Renewable Energy Standard.	397,966	Deferred
28645	TRE6 - Turbine Controls Power Supplies Upgrades Further evaluation of this project determined it could be deferred until 2012.	331,974	Deferred
35083	LIN 2010 Ash Site Sealing and Capping Further evaluation of this project determined it could be deferred until 2011.	298,795	Deferred
38945	LIN1 - #8 Nozzle Replacement The latest inspection, completed in 2010, showed that the nozzle was acceptable for continued service. Replacement is no longer required.	290,174	Cancelled
26472	TRE - 6A CW Pump Refurbishment Further evaluation of this project determined that it can be deferred until 2011.	262,674	Deferred
34505	TRE - 6B Vacuum Pump Overhaul Further evaluation of this project determined it could be deferred until 2012.	185,504	Deferred
37562	TRE5 - Bunker C Pump Replacement Further evaluation of this project determined it could be deferred until 2012.	160,000	Deferred
22426	TRE - 5-2 Air Heater Outlet Expansion Joint Replacement Further evaluation of this project determined it could be deferred until 2012.	131,615	Deferred
28738	TUC - Waste Water Lagoon Enhancement Further evaluation of this project determined that the risk of over-flow in the lagoon is low and remedial action is not required at this time.	119,038	Deferred
37945	TUC - Condensor Tube Sheet Protection Re-evaluation of the project determined that the installation of an impressed current cathodic protection system is not the most effective solution. Further evaluation of options is ongoing	117,005	Deferred
28694	TRE5 - Pulverizer PA Damper Drive Upgrades Further evaluation of this project determined it could be deferred until 2012.	108,970	Deferred
38730	TRE - Transformer Compound Sprinkler System Upgrade Further evaluation / testing in 2010 determined that upgrades to the transformer compound sprinkler system are no longer required.	100,088	Cancelled
36763	LIN - Laffin Brook Culvert Upgrade This item has been deferred until further environmental assessment has been completed.	82,308	Deferred
37883	TUC - Automate Breaker Closures Further evaluation of this project determined that it can be deferred until frequency of two-shifting operation increases.	52,742	Deferred
37262	POA - Elevator Controls Upgrade Further evaluation of this project determined that it can be deferred until 2011.	40,955	Deferred
37422	POA - Bottom Ash Drag Chain Replacement Program Further evaluation of this project determined that it can be deferred until 2011.	40,779	Deferred

CI Number	Project Title	2010 ACE Project Total	
Transmission			
33504	Upgrade 69 kV Circuit to Pleasant Street L5536 Installation of a 69kV sw itch now allow s for load to be sw itched follow ing a contingency	1,449,970	Cancelled
38893	2010 Steel Tower Life Extension Work associated w ith this project w ill now be completed in 2011 under CI#40296 - 2011 Steel Tow er Life Extension	800,379	Cancelled
Distribution			
25575	Reliability Keltic Drive New Feeder Project required rescoping due to an examination of alternative routes. This item has been deferred to 2011.	708,813	Deferred
General Plant			
32304	AMI Hardware & Software Installation Further evaluation of this project determined that it can be deferred until 2011.	72,644	Deferred
37842	Telecom Management System	50,332	Cancelled

Generation

2 GENERATION
(Millions of Dollars)

2.1 Five Year Plan and Highlights



- The focus for generation capital in 2011 is sustaining the current asset base, air emission control upgrades and incremental generation expansion.

- Year 2011 generation capital is comprised of the following:

  - $21.2M New items with total spend greater than $250K seeking ACE approval
  - $47.7M New items with total spend greater than $250K for individual approval
  - $9.3M New items with total spend less than $250K
  - $12.1M New items at Pt. Aconi
  - $85.2M Carryover Spending
  - $5.2M Routine Capital Spending

2.2 Generation – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2011 Budget	Subsequent Spending	Total Estimate
Hydro								
*	38859	HYD Big Falls Headgate Replacement	2010/09	2011/12	650,203	5,291,163	-	5,941,366
H574	31244	HYD Paradise Wood Stave Pipeline R	2009/12	2011/12	7,122,581	682,305	-	7,804,885
H603	36868	Hyd Lumsden Runner Replacement	2010/07	2011/12	94,802	615,066	-	709,869
H602	16387	HYD- Ruth Falls #3 Runner Replmt	2010/07	2011/11	90,944	500,534	-	591,478
H601	17853	HYD - STM-SAL #4 Runner	2010/06	2011/11	-	406,355	-	406,355
H547	28678	HYD Renewable In-Stream Tidal Gen	2008/09	2011/12	2,900,812	364,102	-	3,264,915
H448	17618	HYD - BER Ridge Tailrace Deck	2008/12	2011/12	1,191	322,841	-	324,032
H517	16374	HYD Gaspereau Dam Safety	2007/04	2011/12	3,850,335	209,940	-	4,060,275
		Total Hydro			**$14,710,868**	**$8,392,306**	**$0**	**$23,103,175**
Steam								
S661	39029	Port Hawkesbury Biomass Project	2010/09	2013/03	89,335,815	65,323,699	53,890,893	208,550,407
S353	28098	TUC 6 Waste Heat Recovery	2008/07	2011/06	86,611,920	6,384,708	-	92,996,628
S587	22467	POT - Condenser Waterbox Replacemen	2010/05	2011/12	-	596,339	-	596,339
S672	39542	Generator Protection Improvements	2010/05	2011/12	53,304	405,536	-	458,840
**	38602	TRE - Fire System Upgrades	2010/10	2011/03	-	399,120	-	399,120
S665	30283	POT - Tupper Vessel Access	2010/02	2012/12	-	288,116	13,301	301,417
S597	22461	POT - Condenser Outlet Valve Replac	2010/04	2011/12	-	238,357	-	238,357
**	37885	POT - Lubrication and Chemical Storage	2010/11	2011/12	16,124	191,666	-	207,790
S391	31726	POA Generator Field Circuit Breaker	2009/01	2011/12	1,547	145,000	-	146,547
S602	37884	POT - Fly Ash Inlet Valve Assembly	2010/05	2012/10	50,663	57,471	-	108,135
S666	36742	Replace F1 Belt	2010/10	2011/02	67,481	48,433	-	115,914
		Total Steam			**$176,136,854**	**$74,078,445**	**$53,904,194**	**$304,119,494**
Wind								
*	39323	Digby Wind Project	2010/11	2011/02	69,323,348	1,435,350	-	70,758,698
W107	36882	Nuttby Mountain Wind Project Dev	2009/12	2011/06	115,262,643	1,246,092	-	116,508,735
		Total Wind			**$184,585,991**	**$2,681,442**	**$0**	**$187,267,433**
		Total Generation Carryover Spending			**$375,433,713**	**$85,152,193**	**$53,904,194**	**$514,490,102**

Note 1: Project Listings are as of December 2010

Note 2: * Pending UARB Approval

Note 3: **UARB Approved, awaiting activation.

2.3 Generation – New Item Spending

CI#	Project Title	2011 Budget	Project Total
Hydro			
17583	HYD - BER-GUL - Electrical Refurbishment	$855,393	$855,393
40276	HYD - WRC Tailrace Tunnel Bulkhead Gate Refurbishment	529,557	529,557
40316	HYD - Barteaux Culvert Refurbishment	499,522	499,522
40313	HYD - Annapolis Safety Pumps Refurbishment	387,498	387,498
40301	HYD - Big Falls Spillway - Walkway Replacement	267,491	267,491
12079	HYD - SHH – RUF Unit 1&2 Runner Replacement	77,171	831,591
	Total Hydro New Spending	**$2,616,632**	**$3,371,052**
Steam			
39529	POT - Steam Turbine Overhaul 2011	$3,749,830	$3,749,830
38826	POT - Distribution Control System (DCS) Upgrade	1,287,302	1,287,302
35083	LIN 2011 Ash Site Sealing and Capping	1,112,451	1,112,451
40271	LIN2 Boiler Refurbishment	1,093,704	1,093,704
39903	LIN 2011 Mill Refurbishment	760,079	760,079
40422	LIN3 Boiler Refurbishment	757,323	757,323
40423	LIN4 Boiler Refurbishment	752,389	752,389
28289	POT - Turbine Electro Hydraulic Governor Replacement	725,435	725,435
39933	TRE - Siding Replacement	296,793	603,707
39780	TUC - Unit 1 Cooling Water Intake Structural Refurbishment (Phase II)	562,163	562,163
40344	POT - Waterwall Panel Replacement 2011	517,626	517,626
40244	LIN Boiler Feed Pump Rebuild	508,703	508,703
40246	LIN Cooling Water Pump Refurbishment	452,421	452,421
28393	POT 2A Mill and Feeder Refurbishment	424,712	424,712
39935	TRE - Facilities Improvements	411,950	411,950
39760	TUC - Asbestos Abatement 2011	384,297	384,297
39946	TRE - Wastewater Treatment Plant Upgrades	353,531	353,531
26472	TRE - 6A Cooling Water Pump Refurbishment	349,690	349,690
40427	LIN3 Turbine Fire Suppression	348,710	348,710
40184	LIN2 Turbine Fire Suppression	343,611	343,611
28554	POT - Analytical Panel and Analyzer Replacement	343,220	343,220
40319	TRE - HVAC Replacements (2011)	294,925	294,925
40243	LIN 3 Battery & Charger Replacement	283,106	283,106
39783	TUC - Security System Upgrade	281,247	281,247
39944	TRE6 - Fly Ash Line Replacement	259,172	259,172
39943	TRE6 - 6B CW Screen Refurbishment	257,503	257,503
40210	LIN Fall Protection	254,544	254,544
39940	TRE5 - Bottom Ash Refurbishment	254,370	254,370
40223	LIN-CW Screen Refurbishment	253,879	253,879
39945	TRE - Asbestos Abatement 2011	250,928	250,928
40228	Boiler House Intake Louvers	250,571	250,571
39937	TRE - Fall Protection (Phase 3)	250,242	250,242
40363	LIN3 High Voltage Bushing Refurbishment	114,529	504,168
	Total Steam New Spending	**$18,540,956**	**$19,237,509**
	Total Generation New Spending	**$21,157,588**	**$22,608,561**

CI Number: 17583

Title: HYD - BER-GUL - Electrical Refurbishment

Start Date: 2011/03

Final Cost Date: 2012/03

Function: Generation

Forecast Amount: $855,393

DESCRIPTION:

This project includes the replacement of the switchgear, controls and generator protection at the Gulch Hydro station.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Equipment Replacement

Why do this project?

The Gulch Hydro Plant went into service in 1952. The existing circuit breakers, power cables, control relays, protective relays, and voltage regulators have reached the end of their useful lives and replacement parts are no longer available.

Why do this project now?

This equipment has reached the end of its reliable operational life. Completing this project now will mitigate the risk of equipment failure. Failure of the switchgear or protective relays could expose the turbine generator to the potential for damage.

Why do this project this way?

Upgrading obsolete equipment of this vintage is not practical. Replacement is required.

CI Number : 17583	- HYD - BER-GUL - Electrical Refurbishment		**Project Number**	
Parent CI Number :	-		**Approved Date**	
Cost Centre : 410	- 410-Bear River Hydro System		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle Cust. Serv. Reg. Labour		2,027	0	2,027
094		094 - Interest Capitalized		30,080	0	30,080
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-COPS Regular Labour AO		3,088	0	3,088
001	025	001 - CUST. SERV. Regular Labour	025 - HGP - Generator	4,000	0	4,000
011	025	011 - Travel Expense	025 - HGP - Generator	2,300	0	2,300
012	025	012 - Materials	025 - HGP - Generator	[redacted]	0	[redacted]
013	025	013 - POWER PRODUCTION Contracts	025 - HGP - Generator	[redacted]	0	[redacted]
028	025	028 - Consulting	025 - HGP - Generator	[redacted]	0	[redacted]
			Total Cost:	855,393	0	855,393
			Original Cost:	0		

CI Number: 40276

Title: HYD - WRC Tailrace Tunnel Bulkhead Gate Refurbishment

Start Date: 2011/05

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $529,557

DESCRIPTION:

This project provides for the refurbishment of the tailrace tunnel isolating bulkhead gate at the Wreck Cove Generating Station.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Equipment Replacement

Why do this project?

The tailrace tunnel bulkhead gate is the only designed means of isolating the tailrace tunnel from the ocean. This gate is installed during routine or emergency work in the tailrace tunnel along the length of the tunnel that is within or below the tidal zone.

Why do this project now?

A recent inspection of the tailrace tunnel indicated some areas of concern. If a rock fall was to occur in the tailrace tunnel with the tailrace tunnel bulkhead gate in its current condition, the Wreck Cove Generating Station could be out of service for several weeks while the gate is repaired. In addition, the coating on the gate has degraded, and the base metal is now exposed to the marine elements and will corrode at an accelerated rate. If the gate is not refurbished in the near future. The base metal loss will be such that major structural repairs or complete replacement would be required, which this project is intending to avoid.

Why do this project this way?

Refurbishing the gate to its original design condition is the most practical and cost effective method of ensuring isolation of the tailrace tunnel from the ocean is maintained. It is also standard industry practice to have a tailrace gate capable of isolating the generating station from the downstream water body.

CI Number	: 40276	- HYD - WRC Tailrace Tunnel Bulkhead Gate Refurbishment	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 480	- 480-Wreck Cove Hydro System	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001		001 - HYDRO Regular Labour		17,000	0	17,000
011		011 - Travel Expense		5,500	0	5,500
094		094 - Interest Capitalized		14,832	0	14,832
095		095-Hydro Regular Labour AO		3,140	0	3,140
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
012	025	012 - Materials	025 - HGP - Generator	0	0	0
013	025	013 - POWER PRODUCTION Contracts	025 - HGP - Generator	[redacted]	0	[redacted]
028	025	028 - Consulting	025 - HGP - Generator	[redacted]	0	[redacted]
			Total Cost:	529,557	0	529,557
			Original Cost:			

Engineering Inspection Report

Report No. WRC-WRC-G-RP-2008-23

Wreck Cove Tailrace Outlet Bulkhead Gate

Date of inspection: November 20, 2008
Inspection crew: [redacted], [redacted]
Inspection report prepared by: [redacted]

Summary of Major Findings

The purpose of the inspection was to determine the condition of the tailrace outlet bulkhead gate for the Wreck Cove powerhouse which is located at the downstream end of the powerhouse tailrace tunnel. The following is a summary of the inspection and associated recommendations. The pictures located at the end of this report serve as a pictorial summary of the condition of the gate at the time of the inspection.

A) Tailrace Tunnel Portal Structure

The tailrace tunnel portal structure appears is in good condition and appears to have had some restoration work in the recent past. Photo 1 shows the gate gains, embedded parts and soffit on the right side. Photo 2 shows the gate gains, embedded parts and soffit on the left side, complete with the access ladder. Photo 3 shows the gate soffit and associated embedded parts to also be in good condition. Photo 4 shows the support for the gate lifting sling when the gate is in position. It is showing some signs of minor corrosion. Photo 5 is a view looking downstream from the tailrace tunnel portal. Note the standing water on the deck of the concrete structure. Given the proximity to the ocean, this standing water is likely laden with salt and this will contribute to premature deterioration of the concrete structure. The drainage in this area should be improved to prevent the accumulation of water.

B) Tailrace Outlet Bulkhead Gate

a) General

The tailrace outlet bulkhead gate is a 22’-8” wide by 20’-8” high structural steel gate with 3/8” skin plate on the upstream side, and four hydraulically operated cylinders (one at each corner) to ensure positive sealing when the gate is in position. The gate is being stored vertically on a purpose-built reinforced concrete frame located immediately to the right of the tailrace outlet, within 50 feet of the ocean. It is also located at the toe of the slope of a steep roadway embankment. The area is accessed via a locked gate in a chain link security fence around the area.

b) Upstream Face

Photos 6 and 7 show an overview of the upstream face of the gate. As these photos show, the coating system has failed and the bare steel is now directly exposed to the salt-laden air of the ocean. Photos 8 and 9 show a closer view of the upstream face of the gate, showing the coating system on the upper two-thirds of the gate is ineffective and is delaminating in sheets. The coating on the bottom third of the gate is also in very poor condition, and is failing more locally. Photo 10 shows the sill of the gate as seen from the upstream side of the gate. The sill of the gate is located near ground level, and is almost constantly engulfed by grass and small vegetation. This is contributing to accelerated deterioration of the gate. Photo 11 shows a close-up view of the skin plate on the upstream face of the gate. This shows the beginnings of pit corrosion of the unprotected steel. Now that the coating system has failed completely and the steel is unprotected, rapid corrosion of the gate is taking place. Photo 11 shows the rubbers seals, and the batten strips and countersunk screws holding the rubber seals in position to be in good condition.

c) Hydraulic Cylinders

As noted previously, the gate is equipped with four hydraulically operated cylinders to ensure positive sealing when the gate is in position. Photos 12 and 13 show the upper right hydraulic cylinder on the gate. The coating in this area has failed completely and corrosion of the unprotected steel stiffeners is progressing. The hydraulic cylinders appear to have no positive means of protection / preservation from the environment and appear to be inoperable due to deterioration. The same is true for the lower right hydraulic cylinder shown in Photos 14 and 15, the upper left hydraulic cylinder shown in Photo 16 and the lower left hydraulic cylinder shown in Photo 17. Photo 17 also shows the accumulation of rocks against the gate due to erosion of the adjacent embankment slope.

d) Downstream Face

Photo 18 shows the downstream face of the gate in the vicinity of the gate valve (right side of gate) used for filling the tailrace tunnel. As seen in that photo, there is significant corrosion of the horizontal and vertical structural steel members and skin plate. Photo 19 is another view of this area more clearly showing the advanced corrosion of the steel members, as well as the accumulation of rock and debris on the bottom horizontal structural steel member of the gate due to erosion of the adjacent embankment slope. The debris is approximately 2 feet deep at this location. This is further accelerating corrosion in this area. Photo 20 shows a similar situation on the right side of the gate, with the depth of accumulated rocks and debris more than 2 feet deep.

The top horizontal structural steel member, hydraulic lines and lifting sling are shown in Photo 21. As that photo shows, the coating has completely failed on the top member and it is essentially bare steel and is starting to show signs of pit corrosion. The condition of the hydraulic lines is unknown, but the lifting sling appears to have no grease coating and is showing rust. This sling should be tagged out-of-service until it is inspected and approved for use. Photo 22 shows another view of the downstream face, highlighting the ongoing corrosion of the structural steel members and skin plate. Photo 23 shows the downstream side of the gate in the vicinity of the upper left hydraulic cylinder. Although the coating has not yet completely failed in this area, this photo illustrates the complexity of the gusset plates and stiffeners in the area of the hydraulic cylinders which must be refurbished.

e) Other

In its stored position, the gate is held in the vertical position by turnbuckles located at the upper left and right corners of the gate. The turnbuckle at the upper left corner of the gate is shown in Photo 24. Based on the size of the turnbuckle, it is likely it was designed to resist the wind load on the gate only. It is unlikely it was designed to resist the significant horizontal loadings resulting from the accumulation of snow behind the gate at the toe of slope of the adjacent embankment. In addition, it is unlikely to meet the current horizontal seismic loadings on the gate.

Conclusions

1) In its current condition, the tailrace outlet bulkhead gate is inoperable. The hydraulic cylinders used to ensure positive sealing of the gate are inoperable.
2) The gate is badly corroded and the rate of corrosion will increase now that most of the coating has failed.
3) The operability of the gate valve in the gate is unknown
4) The lifting sling for the gate cannot be used until it is inspected and approved for use. Given its age and length of exposure to the salt-laden air next to the ocean, it is expected this sling will not be approved, and will need to be replaced.
5) There is a significant depth of debris accumulating against the gate (in its stored position) because the gate is stored at the toe of slope of an embankment, and the embankment is eroding.
6) The means of securing the gate in the vertical position (when not in use) does not meet current seismic design standards, and was likely not designed to resist the significant horizontal loadings resulting from the accumulation of snow behind the gate at the toe of slope of the adjacent embankment.

Recommendations

1) Sandblast and paint the steel support for the gate lifting sling located on the concrete portal structure.
2) Improve drainage on the deck of the concrete portal structure to prevent the accumulation of water.
3) Tag the gate lifting sling “out-of-service” until the sling is inspected and approved for service, or is replaced.
4) Construct a removable enclosure in which the gate can be stored in the flat position, to periodically service it and protect it from the elements. The structure should include a concrete slab-on-grade floor. This removable structure should be located away from the toe of slope of the adjacent embankment.
5) Refurbish the gate. This includes:
   - Remove and replace rubber seals as necessary
   - Remove and refurbish / replace the hydraulic cylinders and hydraulic lines
   - Design and install a lifting arrangement for the gate to tilt the gate from its stored flat position to its vertical installation position
   - Sandblast and coat the gate
   - Paint the weight of the gate on the skin plate

Photo 1: Gate gains and soffit on right side

Photo 2: Gate gains and soffit on left side

Photo 3: Gate soffit

Photo 4: Support for gate sling when gate is in position

Photo 5: Looking downstream from tailrace tunnel portal. Note the standing water on the deck.

Photo 6: Overview of tailrace gate located adjacent to the tailrace tunnel portal. Upstream face of tailrace gate shown here.

Photo 7: Upstream face of the tailrace gate as seen from the right side

Photo 8: Upstream face of tailrace gate – upper half

Photo 9: Upstream face of tailrace gate – lower half

Photo 10: Sill of tailrace gate. Note outlet from gate valve.

Photo 11: Close up of right side of tailrace gate showing bare metal and the starting of pit corrosion.

Photo 12: Upper right corner of gate showing upper right hydraulic cylinder

Photo 13: Upper right hydraulic cylinder. Note the hydraulic line below the cylinder.

Photo 14: Lower right hydraulic cylinder

Photo 15: Close up of lower right hydraulic cylinder

Photo 16: Upper left hydraulic cylinder

Photo 17: Lower left hydraulic cylinder

Photo 18: Downstream face of gate with gate valve used for filling the tunnel

Photo 19: Downstream face of gate, right side, showing rock and debris accumulation on bottom horizontal member. Debris is more than 2 ft deep.

Photo 20: Downstream face of gate, left side, showing rock and debris accumulation on bottom horizontal member. Debris is more than 2 ft deep.

Photo 21: Downstream face of gate showing top horizontal structural member, hydraulic lines and lifting sling

Photo 22: Downstream face of gate

Photo 23: Downstream face of gate in vicinity of upper left hydraulic cylinder

Photo 24: Turnbuckle at upper left corner of gate

NOVA SCOTIA POWER
An Emera Company

Wreck Cove Tailrace Tunnel Gates
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Power Production	**CI Number:**	40276
Department :	Hydro Production	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Tailrace Tunnel Gates	6.68%	27,676,613	1	#NUM!	9.2 years
	0	NA	NA	NA	#NUM!	0.0 years
	0	NA	NA	NA	#NUM!	0.0 years
	0	NA	NA	NA	#NUM!	0.0 years

Recommendation :

Refurbish the tailrace tunnel gates and replace front-end loader.

Notes/Comments :

Tailrace Tunnel Gates

Capital costs included in this analysis are the capital expenditures for the Wreck Cove Generating Station over its 25 year economic life. These capital investments include CI#40276 WRC Tailrace Tunnel Gate, ($517K) and CI#40306 Front-End Loader ($157K) in 2011, Unit #1 Overhaul ($4M) in 2012, Dam Safety ($1.2M) in 2013 and Unit #2 Overhaul ($4M) in 2014, Justification for this project is based on a replacement energy costs of $4.8M in both 2011 and 2012 in the event of an un-planned failure of the tailrace tunnel gates.

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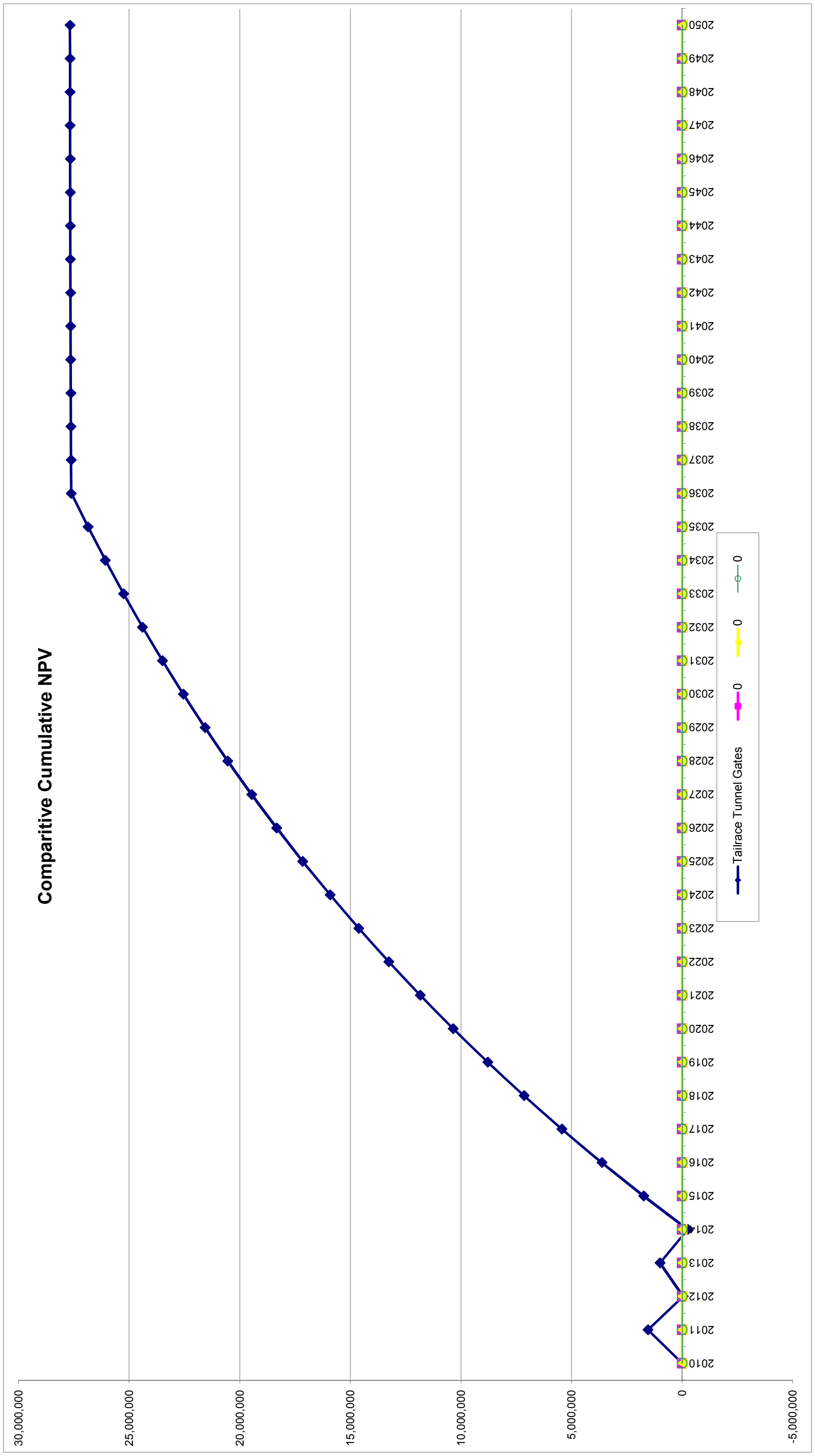
Wreck Cove Tailrace Tunnel Gates
Tailrace Tunnel Gates

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	3,298,725	(686,978)	20,609	666,369	2,611,747	(1,065,725)	1,546,022	1.000	1,546,022	1,546,022
2012	-	3,268,725	(4,000,000)	159,982	4,506,387	(731,275)	(964,488)	(1,695,763)	0.939	(1,591,518)	(45,496)
2013	-	3,334,100	(1,200,000)	306,383	5,400,003	2,134,100	(938,592)	1,195,507	0.881	1,053,041	1,007,545
2014	-	3,400,781	(4,000,000)	444,000	8,956,003	(599,219)	(918,147)	(1,517,366)	0.827	(1,254,382)	(246,837)
2015	-	3,468,797	-	537,360	8,418,643	3,468,797	(908,745)	2,560,052	0.776	1,986,255	1,739,418
2016	-	3,538,173	-	505,119	7,913,524	3,538,173	(940,247)	2,597,926	0.728	1,891,732	3,631,149
2017	-	3,608,937	-	474,811	7,438,713	3,608,937	(971,579)	2,637,358	0.683	1,802,388	5,433,537
2018	-	3,681,115	-	446,323	6,992,390	3,681,115	(1,002,786)	2,678,330	0.641	1,717,868	7,151,406
2019	-	3,754,738	-	419,543	6,572,847	3,754,738	(1,033,910)	2,720,827	0.602	1,637,847	8,789,253
2020	-	3,829,832	-	394,371	6,178,476	3,829,832	(1,064,993)	2,764,839	0.565	1,562,028	10,351,281
2021	-	3,906,429	-	370,709	5,807,767	3,906,429	(1,096,073)	2,810,356	0.530	1,490,139	11,841,419
2022	-	3,984,558	-	348,466	5,459,301	3,984,558	(1,127,188)	2,857,369	0.498	1,421,930	13,263,350
2023	-	4,064,249	-	327,558	5,131,743	4,064,249	(1,158,374)	2,905,875	0.467	1,357,174	14,620,524
2024	-	4,145,534	-	307,905	4,823,839	4,145,534	(1,189,665)	2,955,869	0.438	1,295,658	15,916,181
2025	-	4,228,444	-	289,430	4,534,408	4,228,444	(1,221,094)	3,007,350	0.411	1,237,188	17,153,369
2026	-	4,313,013	-	272,065	4,262,344	4,313,013	(1,252,694)	3,060,319	0.386	1,181,585	18,334,954
2027	-	4,399,273	-	255,741	4,006,603	4,399,273	(1,284,495)	3,114,778	0.362	1,128,683	19,463,636
2028	-	4,487,259	-	240,396	3,766,207	4,487,259	(1,316,527)	3,170,731	0.340	1,078,328	20,541,964
2029	-	4,577,004	-	225,972	3,540,235	4,577,004	(1,348,820)	3,228,184	0.319	1,030,377	21,572,341
2030	-	4,668,544	-	212,414	3,327,821	4,668,544	(1,381,400)	3,287,144	0.300	984,698	22,557,039
2031	-	4,761,915	-	199,669	3,128,151	4,761,915	(1,414,296)	3,347,619	0.281	941,168	23,498,207
2032	-	4,857,153	-	187,689	2,940,462	4,857,153	(1,447,534)	3,409,619	0.264	899,670	24,397,877
2033	-	4,954,296	-	176,428	2,764,034	4,954,296	(1,481,139)	3,473,157	0.248	860,099	25,257,976
2034	-	5,053,382	-	165,842	2,598,192	5,053,382	(1,515,138)	3,538,245	0.232	822,353	26,080,329
2035	-	5,154,450	-	155,892	2,442,301	5,154,450	(1,549,553)	3,604,897	0.218	786,339	26,866,668
2036	-	5,257,539	-	146,538	2,295,763	5,257,539	(1,584,410)	3,673,129	0.205	751,969	27,618,637
2037	-	-	-	137,746	2,158,017	-	42,701	42,701	0.192	8,204	27,626,842
2038	-	-	-	129,481	2,028,536	-	40,139	40,139	0.180	7,238	27,634,080
2039	-	-	-	121,712	1,906,824	-	37,731	37,731	0.169	6,386	27,640,465
2040	-	-	-	114,409	1,792,414	-	35,467	35,467	0.159	5,633	27,646,099
2041	-	-	-	107,545	1,684,870	-	33,339	33,339	0.149	4,970	27,651,069
2042	-	-	-	101,092	1,583,777	-	31,339	31,339	0.140	4,385	27,655,453
2043	-	-	-	95,027	1,488,751	-	29,458	29,458	0.131	3,868	27,659,321
2044	-	-	-	89,325	1,399,426	-	27,691	27,691	0.123	3,412	27,662,734
2045	-	-	-	83,966	1,315,460	-	26,029	26,029	0.116	3,011	27,665,744
2046	-	-	-	78,928	1,236,533	-	24,468	24,468	0.109	2,656	27,668,400
2047	-	-	-	74,192	1,162,341	-	23,000	23,000	0.102	2,343	27,670,743
2048	-	-	-	69,740	1,092,600	-	21,620	21,620	0.096	2,067	27,672,811
2049	-	-	-	65,556	1,027,044	-	20,322	20,322	0.090	1,824	27,674,634
2050	-	-	-	61,623	965,422	-	23,491	23,491	0.084	1,978	27,676,613
Total	-	107,996,966	(9,886,978)	8,921,556	144,714,541	98,109,988	(30,760,821)	67,349,168	15.0	27,676,613	755,546,756


Comparitive Cumulative NPV
30,000,000
25,000,000
20,000,000
15,000,000
10,000,000
5,000,000
0
-5,000,000
Tailrace Tunnel Gates
0
0
0

CI Number: 40316

Title: HYD - Barteaux Culvert Refurbishment

Start Date:	2011/02
Final Cost Date:	2011/10
Function:	Generation
Forecast Amount:	$499,522

DESCRIPTION:

This project consists of refurbishing the Barteaux Culvert stream crossing at Sawmill Creek (a tributary of the Annapolis River). To accommodate the design flood, it's necessary to add an additional culvert and raise the causeway that the culvert is currently in.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Maintenance

Why do this project?

The existing corrugated metal pipe culvert is deteriorated and needs to be refurbished. In addition, the discharge capacity of the existing culvert must be increased to meet the requirements of the Nova Scotia Department of Environment (NSE). These requirements state that stream crossings must be capable of handling the 100 year flood.

Why do this project now?

The corrugated metal pipe culvert recently experienced a partial failure where a portion of the culvert became dislodged, partially blocked the flow area, and needed to be removed. If refurbishment is not completed, there is potential for additional portions of the culvert to become dislodged, and affect the structural integrity of the culvert and earth fill embankment above.

NSPI has been monitoring the deterioration of this culvert and it now requires replacement.

Why do this project this way?

Refurbishment of the culvert and modifying the earth fill embankment above is the most economic means of providing access across Sawmill Creek.

CI Number : 40316 - HYD - Barteaux Culvert Refurbishment

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 435 - 435-Annapolis Tidal Power

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		7,967	0	7,967
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Hydro Regular Labour AO		1,662	0	1,662
001	024	001 - HYDRO Regular Labour	024 - HGP - Turbine (Hydro)	9,000	0	9,000
011	024	011 - Travel Expense	024 - HGP - Turbine (Hydro)	12,000	0	12,000
012	024	012 - Materials	024 - HGP - Turbine (Hydro)	0	0	0
013	024	013 - POWER PRODUCTION Contracts	024 - HGP - Turbine (Hydro)	[redacted]	0	[redacted]
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
			Total Cost:	499,522	0	499,522
			Original Cost:			

CI 40316 – HYD Barteaux Culvert Refurbishment

The following is a breakdown of costs associated with the HYD Barteaux Culvert Refurbishment

Administrative Overheads and Interest	$[redacted]
Labour	$9,000
Contracts	$[redacted]
Consulting	$[redacted]
Other	$12,000
Total	$499,522

The contracts estimate of $[redacted] is based on the attached engineering report and estimate for alternative #2 (multiple culverts and raise access road) for the 100-year flood.

The consulting estimate of $[redacted] is based on the detailed project estimate attached and NSPI engineering staff experience.

Barteaux Culvert Refurbishment
CI 40316

Account		Description	Total
028	**Consulting**	Project Management	[redacted]
		Hydrologic and Hydraulic Analysis	
		Detailed Design	
		Supervision	
		Subtotal for Consulting	[redacted]
013	**Contracts**	Cofferdam installation and removal	
		Earthworks	
		Subtotal for Contracts	[redacted]
011	**Travel**	Travel - Supervision	$12,000
		Subtotal for Travel	**$12,000**
001	**Hydro Regular Labour**	Environmental staff	$9,000
		Subtotal for Hydro Regular Labour	**$9,000**
094	**Interest**		$7,967
095	**AO**		[redacted]
Total			**$499,521**

Pages 90 - 111 have been removed due to confidentiality.

NOVA SCOTIA
Environment and Labour

NOVA SCOTIA WATERCOURSE ALTERATION SPECIFICATIONS (2006)

Culverts:

The following applies to the new installation, construction or total replacement of a single pipe culvert.

C1. The exemption under Section 5(1)(d) of the *Activities Designation Regulations* applies to the installation of a culvert during the period June 1 to September 30 only. Installation of a culvert outside this time frame will require formal approval. Installation of a culvert inside this time frame must be preceded with the submission of a watercourse alteration application with culvert notification indicated in Section 5A of the application at the designated District Office, Nova Scotia Department of Environment and Labour.

C2. The exemption applies to a single pipe culvert installation with the following maximum dimensions:

a) 1.8 metres in diameter for a single pipe culvert;
b) 18.3 metres in length in all cases.

C3. The size of the culvert shall be based on a minimum of 1:100 year estimated storm flows.

C4. No fording shall take place during the installation of the culvert.

C5. Prior to the culvert installation, erosion and sediment control measures shall be installed to prevent sedimentation of the watercourse and maintained as required, these controls shall remain in place until all exposed erodible soil adjacent to both the watercourse and the road surface are stabilized within 30 m of the watercourse.

C6. The culvert shall be installed during periods of low flow. All work operations shall are be conducted in a manner to protect the watercourse from the release of silt and sediment.

C7. The culvert is to be aligned with the existing watercourse channel.

C8. Water control shall be accomplished using one of the following methods:
a) Diverting the watercourse, temporarily, through a diversionary channel.
b) Pumping the stream flow around the installation.

May 11, 2006

C9. All construction activities must be carried out in isolation of the streamflow (in the dry). Water control devices such as cofferdams or aquadams are to be used to separate the entire work area from the flowing watercourse. Cofferdams must be constructed of sandbags faced with plastic, sheet piling or other material authorized in writing by the Minister or Administrator.

If Cofferdams are to be used, there must be of sufficient height and strength to hold back the 1:2 year return rainfall event (bank full conditions).

C10. Excavation of temporary diversion channels shall be conducted in the dry from the downstream end. Diversion channels constructed in erodible or silt-forming materials are to be stabilized with protective rock, plastic sheeting, or other approved materials authorized in writing by the Minister or Administrator, before any flow is diverted.

C11. The watercourse is not to be disturbed outside the footprint of the culvert. The bottom of the culvert should be embedded at least 0.2D (Defined as 20% or 1/5th of the diameter of the culvert) below the bed of the watercourse at the upstream and downstream end of the structure. For example, 1800 mm culvert x 0.2D = 360 mm of the culvert is to be embedded.)

C12. The pipe culvert must be installed at a maximum slope of 0.5% on firm ground. A soft foundation shall be replaced with clean, granular material to prevent sagging. If the natural stream gradient exceeds 0.5%, an open-bottom structure or bridge shall be considered as an alternative, and a separate approval will be required.

C13. The culvert must extend a minimum of 0.3 metres beyond the upstream and downstream toe of the fill placed around the structure.

C14. When more than one length of corrugated steel culvert is required, the culverts are to be connected with couplings provided by the manufacturer. In any case, the culvert length is not to exceed 18.3 meters.

C15. All erosion protection material used in the installation of the pipe culvert must be clean, non-ore bearing, non-toxic and obtained from a non- watercourse source. Stabilization of fill shall be at a maximum 2 horizontal to 1 vertical slope unless headwalls are to be used.

C16. Lumber treated with creosote must not be used in the construction or maintenance of any part of the structure. Uuntreated hemlock, tamarack/ juniper, or cedar, pre-cast concrete, corrosion resistant steel or plastic; or ACQ (Alkaline Copper Quaternary) or CCA (Chromated Copper Arsenate treated wood, if treated in accordance with Best Management Practices (BMPs) as outlined in the 1997 industry guide published jointly by the Canadian Institute of Treated Wood (CITW) and the US based Western Wood Preservers Institute are considered acceptable materials.

C17. A designed energy dissipation plunge pool is required to prevent scour at the downstream end of the pipe culvert. The width of the pool shall be 2.0 times the culvert diameter; the length of the pool shall be 3.0 times the culvert diameter and the depth shall be a minimum of 1.0 metre.

C18. All excavated material shall be placed in a location where it will not enter the watercourse. All debris resulting from construction activities shall be disposed of at a facility which is Approved to accept the specific material. Any material not regulated by the Department shall be removed to an area where flood water will not come in contact with the debris and excavated material must be removed from the areas adjacent to the watercourse and be disposed of in a manner acceptable to the Department.

C19. The road fill at each end of a culvert must be stabilized to prevent erosion or collapse. Rip rap and or headwalls and wingwalls must be placed at both ends of the culvert to an elevation of at least one half of a pipe diameter above the top of the pipe and a minimum of one pipe diameter on each side of the culvert immediately upon completion of the culvert installation. The following uniformly-graded, stone-rip rap material is to be used for embankment protection unless alternate materials have been authorized in writing by the Minister or Administrator.

Class 1	Class 1
Local velocity up to 3m per second	At least 70% of the riprap shall be between 200mm and 450mm
Class 2	Class 2
Local velocity up to 4m per second	At least 70% of the riprap shall be between 300mm and 760mm
Class 3 Local velocity up to 4.5m per second	Class 3 At least 70% of the riprap shall be between 500mm and 1200mm

May 11, 2006

May 11, 2006

CI Number: 40313

Title: HYD - Annapolis Safety Pumps Refurbishment

Start Date: 2011/02

Final Cost Date: 2011/11

Function: Generation

Forecast Amount: $387,498

DESCRIPTION:

The powerhouse of the Annapolis Tidal Generating Station is located below sea level. Routine leakage must be pumped from the powerhouse to prevent flooding. This project consists of replacing one pump and refurbishing the two existing safety pumps at the Annapolis Tidal Generating Station. These safety pumps safeguard the Annapolis Generating Station against internal flooding in the event of an unexpected failure of the plant's primary leakage pumps.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Equipment Replacement

Why do this project?

Due to the age and condition of the two existing safety pumps (installed in 1984), these pumps must be replaced / refurbished to ensure they can reliably mitigate the risks of internal flooding at the plant in the event of an unexpected failure of the plant's primary leakage pumps.

Why do this project now?

Due to the normal operating environment that the safety pumps are located in (humid, salt laden air), they have deteriorated to the point where they are no longer able to reliably protect the Annapolis Generating Station from internal flooding if the plant's primary leakage pumps were to fail. The pumps have lasted beyond their life expectancy of 15-20 years but need replacing.

Why do this project this way?

Procuring a new safety pump will allow for the existing pumps to be removed from service and refurbished sequentially while ultimately resulting in having a spare safety pump in inventory.

CI Number : 40313 - HYD - Annapolis Safety Pumps Refurbishment | **Project Number**

Parent CI Number : - | **Approved Date**

Cost Centre : 435 - 435-Annapolis Tidal Power | **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		7,326	0	7,326
095		095-IT Regular Labour AO		4,586	0	4,586
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
011	003	011 - Travel Expense	003 - DP - Bldg.,Struct.Grnd.	2,400	0	2,400
012	003	012 - Materials	003 - DP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
013	003	013 - POWER PRODUCTION Contracts	003 - DP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
001	085	001 - IT Regular Labour	085 Design	8,600	0	8,600
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
			Total Cost:	387,498	0	387,498
			Original Cost:			

CI 40313 – HYD Refurbishment Annapolis Safety Pumps

The following is a breakdown of costs associated the Refurbishment Annapolis Safety Pumps:

Administrative Overheads and Interest	$[redacted]
Labour	$8,600
Materials	$[redacted]
Contracts	$[redacted]
Consulting	$[redacted]
Other	$2,400
Total	$387,498

The materials estimate of $[redacted] is based on the vendor quote attached and allowance for miscellaneous pipe and fittings.

The contracts estimate is based on NSPI engineering staff experience with similar pump refurbishment projects completed in the recent past.

Annapolis Safety Pumps
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Power Production	**CI Number:**	40313
Department :	Hydro Production	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Safety Pumps	6.68%	622,841	1	12.67%	13.8 years
	0	NA	NA	NA	#NUM!	0.0 years
	0	NA	NA	NA	#NUM!	0.0 years
	0	NA	NA	NA	#NUM!	0.0 years

Recommendation :

Notes/Comments :

Safety Pumps

Justification for this project is based on a capital cost of approximately $1.2 million (includes $387K for this project and $850K in 2012 for replacement of the governor and controls). In the event of an unplanned failure, the replacement energy cost for 2011 is estimated to be $254,880.

0

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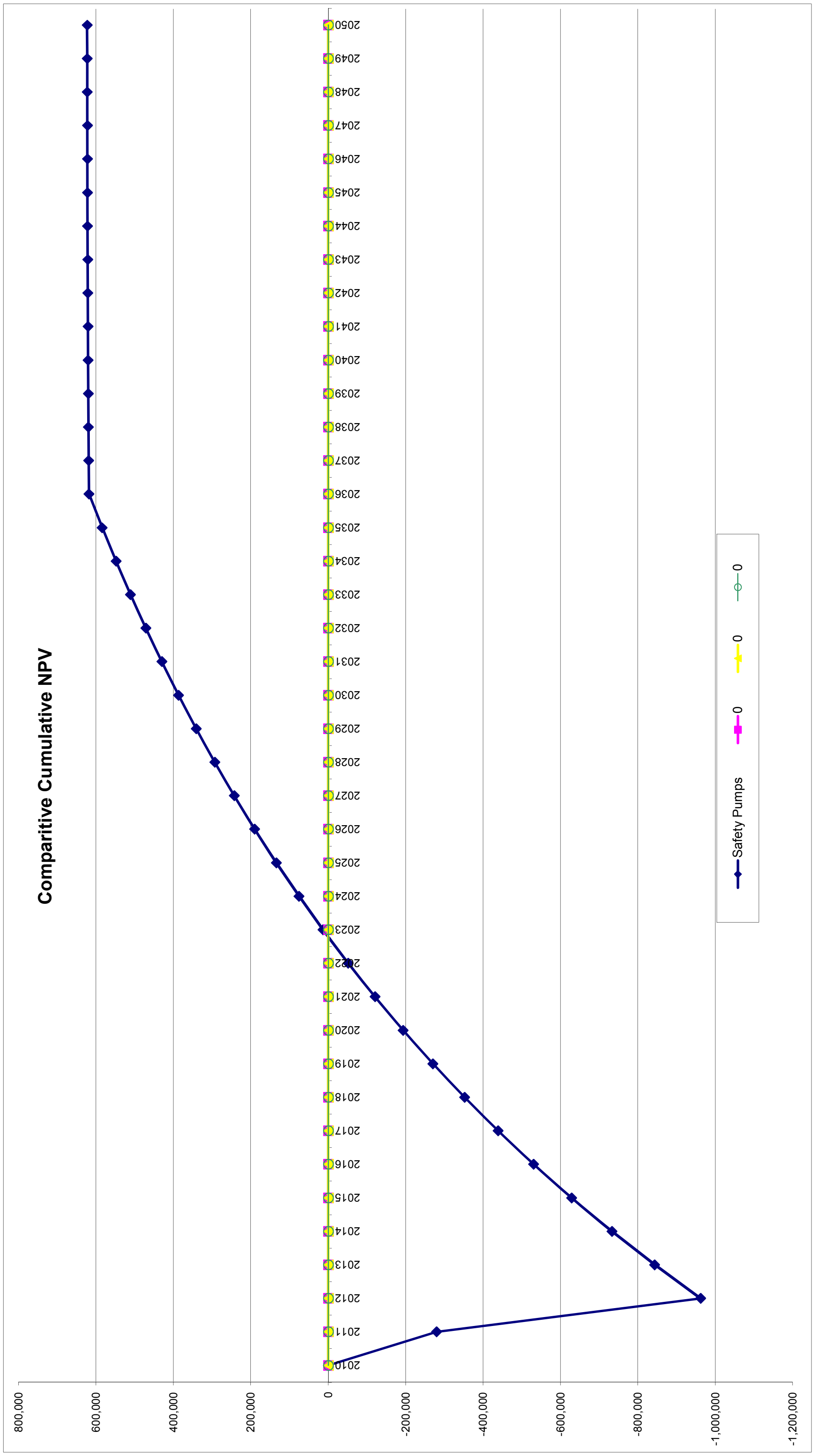
0

Annapolis Safety Pumps
Safety Pumps

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	152,880	(387,498)	15,500	371,998	(234,618)	(44,837)	(279,455)	1.000	(279,455)	(279,455)
2012	-	150,840	(851,700)	63,828	1,159,870	(700,860)	(27,174)	(728,034)	0.937	(682,446)	(961,901)
2013	-	153,857	-	92,790	1,067,081	153,857	(18,931)	134,926	0.879	118,558	(843,344)
2014	-	156,934	-	85,366	981,714	156,934	(22,355)	134,579	0.824	110,848	(732,496)
2015	-	160,073	-	78,537	903,177	160,073	(25,276)	134,797	0.772	104,075	(628,421)
2016	-	163,274	-	72,254	830,923	163,274	(28,216)	135,058	0.724	97,747	(530,673)
2017	-	166,540	-	66,474	764,449	166,540	(31,020)	135,519	0.678	91,940	(438,734)
2018	-	169,870	-	61,156	703,293	169,870	(33,701)	136,169	0.636	86,596	(352,138)
2019	-	173,268	-	56,263	647,030	173,268	(36,271)	136,996	0.596	81,667	(270,471)
2020	-	176,733	-	51,762	595,267	176,733	(38,741)	137,992	0.559	77,109	(193,362)
2021	-	180,268	-	47,621	547,646	180,268	(41,120)	139,147	0.524	72,886	(120,476)
2022	-	183,873	-	43,812	503,834	183,873	(43,419)	140,454	0.491	68,964	(51,512)
2023	-	187,551	-	40,307	463,527	187,551	(45,646)	141,905	0.460	65,313	13,801
2024	-	191,302	-	37,082	426,445	191,302	(47,808)	143,494	0.431	61,909	75,710
2025	-	195,128	-	34,116	392,330	195,128	(49,914)	145,214	0.404	58,728	134,439
2026	-	199,030	-	31,386	360,943	199,030	(51,970)	147,061	0.379	55,751	190,189
2027	-	203,011	-	28,875	332,068	203,011	(53,982)	149,029	0.355	52,959	243,149
2028	-	207,071	-	26,565	305,502	207,071	(55,957)	151,114	0.333	50,338	293,486
2029	-	211,212	-	24,440	281,062	211,212	(57,899)	153,313	0.312	47,872	341,359
2030	-	215,437	-	22,485	258,577	215,437	(59,815)	155,622	0.293	45,550	386,909
2031	-	219,745	-	20,686	237,891	219,745	(61,708)	158,037	0.274	43,361	430,270
2032	-	224,140	-	19,031	218,860	224,140	(63,584)	160,557	0.257	41,294	471,564
2033	-	228,623	-	17,509	201,351	228,623	(65,445)	163,178	0.241	39,340	510,904
2034	-	233,196	-	16,108	185,243	233,196	(67,297)	165,898	0.226	37,492	548,396
2035	-	237,859	-	14,819	170,423	237,859	(69,142)	168,717	0.212	35,741	584,137
2036	-	242,617	-	13,634	156,790	242,617	(70,985)	171,632	0.199	34,082	618,218
2037	-	-	-	12,543	144,246	-	3,888	3,888	0.186	724	618,942
2038	-	-	-	11,540	132,707	-	3,577	3,577	0.174	624	619,566
2039	-	-	-	10,617	122,090	-	3,291	3,291	0.164	538	620,105
2040	-	-	-	9,767	112,323	-	3,028	3,028	0.153	464	620,569
2041	-	-	-	8,986	103,337	-	2,786	2,786	0.144	400	620,969
2042	-	-	-	8,267	95,070	-	2,563	2,563	0.135	345	621,315
2043	-	-	-	7,606	87,465	-	2,358	2,358	0.126	298	621,612
2044	-	-	-	6,997	80,467	-	2,169	2,169	0.118	257	621,869
2045	-	-	-	6,437	74,030	-	1,996	1,996	0.111	221	622,090
2046	-	-	-	5,922	68,108	-	1,836	1,836	0.104	191	622,281
2047	-	-	-	5,449	62,659	-	1,689	1,689	0.098	165	622,446
2048	-	-	-	5,013	57,646	-	1,554	1,554	0.091	142	622,588
2049	-	-	-	4,612	53,035	-	1,430	1,430	0.086	122	622,711
2050	-	-	-	4,243	48,792	-	1,617	1,617	0.080	130	622,841
Total	-	4,984,330.4	(1,239,198.0)	1,190,406.2	14,309,270.3	3,745,132.4	(1,178,432.9)	2,566,699.5	14.768	622,840.5	8,139,455.0


Comparitive Cumulative NPV
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400,000
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-200,000
-400,000
-600,000
-800,000
-1,000,000
-1,200,000
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Safety Pumps
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Pages 122 - 126 have been removed due to confidentiality.

CI Number: 40301

Title: HYD - Big Falls Spillway - Walkway Replacement

Start Date: 2011/05

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $267,491

DESCRIPTION:

This project consists of refurbishing the steel and timber walkway over the spillway at Big Falls dam to meet current design standards.

Summary of Related CI's +/- 2 years:
2010 – 38859 HYD Big Falls Headgate Replacement $5,941,366

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

Using the steel and timber walkway over the spillway at Big Falls dam is critical to managing the dam site. However, the existing walkway is uneven and misaligned due to ice loads. This structure no longer meets current design standards.

Why do this project now?

Due to the unevenness and misalignment of the existing steel and timber walkway and potential for safety issues, the walkway must be refurbished. Personnel are required to access the walkway both day and night and in a variety of weather conditions. Personnel are aware of the issue and take the required precautions when accessing the walkway.

Why do this project this way?

Refurbishing the walkway to meet current design standards is the most cost-effective means of providing safe access to operate the spill planks in the spillway at Big Falls dam.

CI Number : 40301	- HYD - Big Falls Spillway - Walkway Replacement	**Project Number**	
Parent CI Number :	-	**Approved Date**	
Cost Centre : 470	- 470-Mersey Hydro System	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		6,023	0	6,023
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Hydro Regular Labour AO		2,770	0	2,770
001	003	001 - HYDRO Regular Labour	003 - DP - Bldg.,Struct.Grnd.	15,000	0	15,000
012	003	012 - Materials	003 - DP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
013	003	013 - POWER PRODUCTION Contracts	003 - DP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
			Total Cost:	267,491	0	267,491
			Original Cost:			

CI Number: 12079

Title: HYD - SHH – RUF Unit 1&2 Runner Replacement

Start Date: 2011/04

Final Cost Date: 2012/10

Function: Generation

Forecast Amount: $831,591

DESCRIPTION:

This project consists of replacing the runners at Ruth Falls Unit#1 and Unit#2 with runners of a modern and more efficient design. Estimates are based upon similar runner replacements in recent years.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Equipment Replacement

Why do this project?

The existing runners at Ruth Falls Unit#1 and Unit#2 have a history of cracking and cavitation. This requires extended outages to undertake weld repairs. The design of the existing runners is such that the stress cracks are prone to re-appear. Anytime cracks form in a runner, there is potential for the runner to degrade while in operation. This would result in an unscheduled outage of the entire Ruth Falls Generating Station and could result in damage to the Units and water passage.

Why do this project now?

The existing runners at Ruth Falls have reached the end of their useful life. Procurement of materials in 2011 and replacement of the runners in 2012 is required.

Why do this project this way?

Replacing the runners at Ruth Falls Unit#1 and Unit#2 with runners of a modern design is the only practical means of ensuring the long term integrity and performance of these runners.

CI Number : 12079 - HYD - SHH - RUF 1&2 Runner Replacement

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 450 - 450-Sheet Harbour Hydro System

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		21,801	0	21,801
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Hydro Regular Labour AO		36,940	0	36,940
002	024	002 - HYDRO Overtime Labour	024 - HGP - Turbine (Hydro)	0	0	0
004	024	004 - HYDRO Term Labour	024 - HGP - Turbine (Hydro)	0	0	0
011	024	011 - Travel Expense	024 - HGP - Turbine (Hydro)	1,000	0	1,000
012	024	012 - Materials	024 - HGP - Turbine (Hydro)	[redacted]	0	[redacted]
013	024	013 - POWER PRODUCTION Contracts	024 - HGP - Turbine (Hydro)	[redacted]	0	[redacted]
001	085	001 - HYDRO Regular Labour	085 Design	200,000	0	200,000
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
			Total Cost:	831,591	0	831,591
			Original Cost:	0		

Ruth Falls Runner 1 & 2 Replacement
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Power Production	**CI Number:**	12079
Department :	Hydro Production	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Runner Replacement	6.68%	3,899,723	1	#NUM!	4.7 years
	0	NA	NA	NA	#NUM!	0.0 years
	0	NA	NA	NA	#NUM!	0.0 years
	0	NA	NA	NA	#NUM!	0.0 years

Recommendation :

Replace the runners in Unit #1 and Unit #2.

Notes/Comments :

Runner Replacement

Justification of this project is based on a capital cost of $831,591 and an avoided capacity loss of 11,000MWh. Total avoided replacement engery cost for both 2011 and 2012 is $645,700.

0

0

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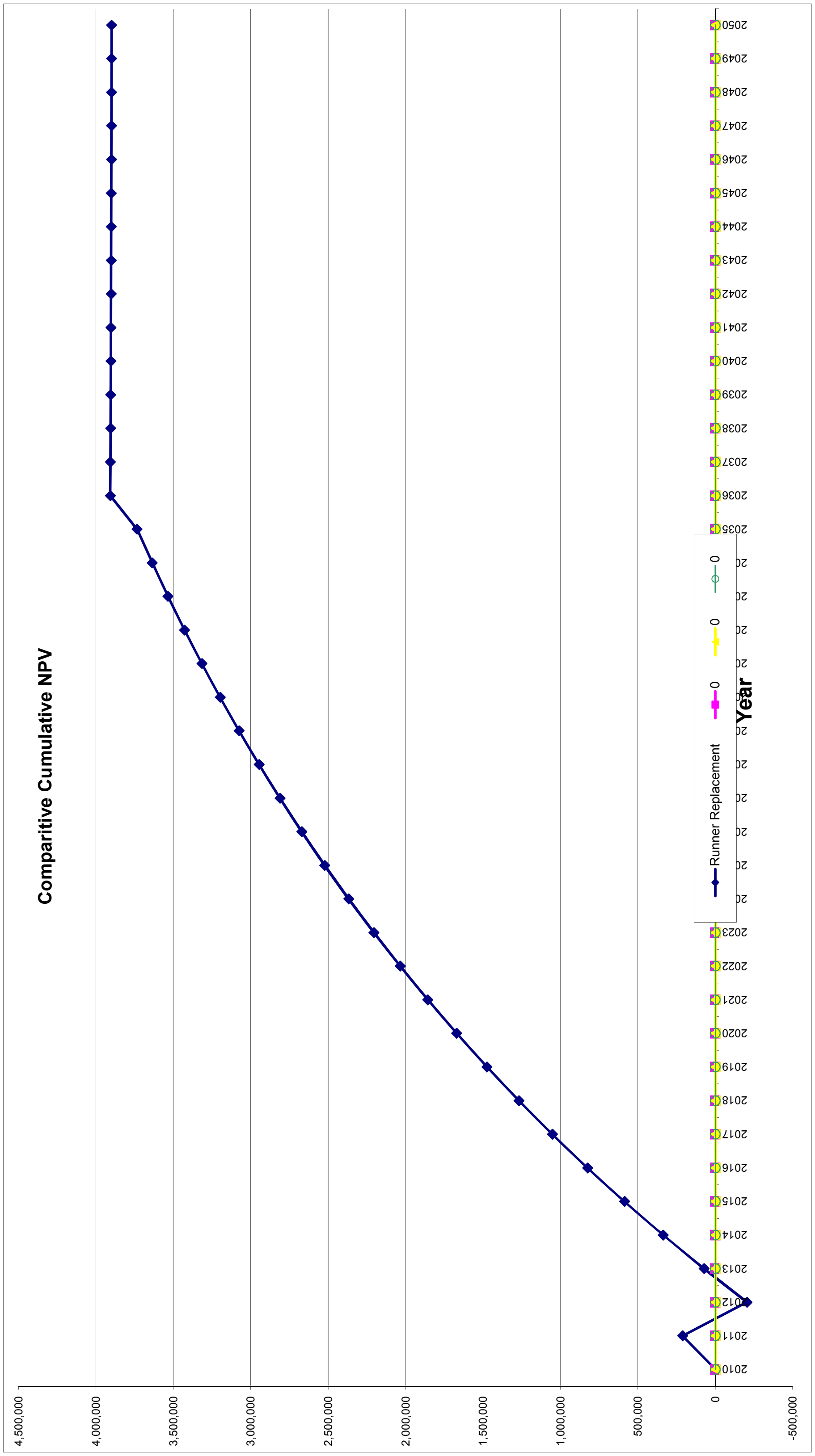
Ruth Falls Runner 1 & 2 Replacement
Runner Replacement

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	425,700	(77,171)	6,174	70,997	348,529	(136,382)	212,147	1.000	212,147	212,147
2012	-	421,300	(754,419)	66,033	759,383	(333,119)	(110,264)	(443,383)	0.937	(415,619)	(203,472)
2013	-	429,726	-	60,751	698,632	429,726	(114,382)	315,344	0.879	277,088	73,616
2014	-	438,321	-	55,891	642,742	438,321	(118,664)	319,656	0.824	263,290	336,906
2015	-	447,087	-	51,419	591,322	447,087	(122,657)	324,430	0.772	250,489	587,395
2016	-	456,029	-	47,306	544,017	456,029	(126,704)	329,325	0.724	238,347	825,742
2017	-	465,149	-	43,521	500,495	465,149	(130,705)	334,445	0.678	226,896	1,052,637
2018	-	474,452	-	40,040	460,456	474,452	(134,668)	339,784	0.636	216,084	1,268,721
2019	-	483,941	-	36,836	423,619	483,941	(138,602)	345,339	0.596	205,864	1,474,586
2020	-	493,620	-	33,890	389,730	493,620	(142,516)	351,104	0.559	196,195	1,670,781
2021	-	503,492	-	31,178	358,551	503,492	(146,417)	357,075	0.524	187,038	1,857,819
2022	-	513,562	-	28,684	329,867	513,562	(150,312)	363,250	0.491	178,358	2,036,177
2023	-	523,834	-	26,389	303,478	523,834	(154,208)	369,626	0.460	170,124	2,206,301
2024	-	534,310	-	24,278	279,200	534,310	(158,110)	376,200	0.431	162,308	2,368,609
2025	-	544,996	-	22,336	256,864	544,996	(162,025)	382,972	0.404	154,883	2,523,492
2026	-	555,896	-	20,549	236,315	555,896	(165,958)	389,939	0.379	147,826	2,671,318
2027	-	567,014	-	18,905	217,409	567,014	(169,914)	397,100	0.355	141,115	2,812,433
2028	-	578,355	-	17,393	200,017	578,355	(173,898)	404,456	0.333	134,729	2,947,162
2029	-	589,922	-	16,001	184,015	589,922	(177,915)	412,006	0.312	128,650	3,075,812
2030	-	601,720	-	14,721	169,294	601,720	(181,970)	419,750	0.293	122,861	3,198,673
2031	-	613,755	-	13,544	155,751	613,755	(186,065)	427,689	0.274	117,346	3,316,019
2032	-	626,030	-	12,460	143,291	626,030	(190,207)	435,823	0.257	112,090	3,428,109
2033	-	638,550	-	11,463	131,827	638,550	(194,397)	444,153	0.241	107,080	3,535,189
2034	-	651,321	-	10,546	121,281	651,321	(198,640)	452,681	0.226	102,302	3,637,490
2035	-	664,348	-	9,702	111,579	664,348	(202,940)	461,408	0.212	97,745	3,735,235
2036	-	677,635	-	(7,298)	118,876	1,083,235	(212,329)	870,906	0.199	172,940	3,908,175
2037	-	-	-	(22,938)	141,814	-	(7,111)	(7,111)	0.186	(1,324)	3,906,852
2038	-	-	-	(21,103)	162,917	-	(6,542)	(6,542)	0.174	(1,141)	3,905,710
2039	-	-	-	(19,415)	182,332	-	(6,019)	(6,019)	0.164	(984)	3,904,726
2040	-	-	-	(17,861)	200,193	-	(5,537)	(5,537)	0.153	(849)	3,903,877
2041	-	-	-	(16,433)	216,626	-	(5,094)	(5,094)	0.144	(732)	3,903,145
2042	-	-	-	(15,118)	231,744	-	(4,687)	(4,687)	0.135	(631)	3,902,513
2043	-	-	-	(13,909)	245,652	-	(4,312)	(4,312)	0.126	(544)	3,901,969
2044	-	-	-	(12,796)	258,448	-	(3,967)	(3,967)	0.118	(470)	3,901,499
2045	-	-	-	(11,772)	270,220	-	(3,649)	(3,649)	0.111	(405)	3,901,094
2046	-	-	-	(10,830)	281,051	-	(3,357)	(3,357)	0.104	(349)	3,900,745
2047	-	-	-	(9,964)	291,014	-	(3,089)	(3,089)	0.098	(301)	3,900,444
2048	-	-	-	(9,167)	300,181	-	(2,842)	(2,842)	0.091	(260)	3,900,184
2049	-	-	-	(8,433)	308,615	-	(2,614)	(2,614)	0.086	(224)	3,899,960
2050	-	-	-	(7,759)	316,374	-	(2,958)	(2,958)	0.080	(238)	3,899,723
Total	-	13,920,065	(831,590)	515,216.4	11,806,188.1	13,494,075.3	(4,162,626.3)	9,331,449.0	14.8	3,899,723	109,189,512


Comparitive Cumulative NPV
Year
Runner Replacement
0
0
0
4,500,000
4,000,000
3,500,000
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
0
-500,000

CI Number: 39529

Title: POT – Steam Turbine Overhaul 2011

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $3,749,830

DESCRIPTION:

The Point Tupper Unit #2 steam turbine consists of high pressure (HP), intermediate pressure (IP) and low pressure (LP) cylinders which convert the energy from the high pressure/high temperature steam received from the boiler to mechanical energy which rotates Unit #2 generator resulting in the production of electrical energy.

Unit #2 at the Point Tupper Generating Station has a design operating temperature of approximately 1000 degrees Fahrenheit and an operating pressure of 1800 psi at the high-pressure turbine. At this operating temperature and pressure, the springback seals, blade closers, bolting, erosion shields, dummy springs, oil baffles, and several other components within the HP section of the turbine and turbine valves have a design service life of 175,000 hours. These turbine components require replacement to restore them to Original Equipment Manufacturer(OEM) specifications and ensure continued reliable operation of the Point Tupper Unit #2 turbine/generator.

Summary of Related CI's +/- 2 years
2011 – 39803 POT – Unit#2 Generator and Auxiliaries Major Refurbishment $2,042,450
2011 - 28289 POT - Turbine Electro-Hydraulic Generator Replacement $687,150
2011 - 38108 POT - AVR Refurbishment $128,270
2011 - 28294 POT - Turning Gear Assembly Overhaul $52,610

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Refurbishing the steam turbine during the planned major outage in 2011 is required in accordance with technical and OEM recommendations to restore components to an acceptable operating condition.

Why do this project now?

Replacement of several steam turbine components in 2011 is required due to the accumulated service hours and OEM recommendations. The OEM recommendations are based on inspection results from the last major outage in 2005. Completing this project in 2011 will allow the Unit to continue to operate safely and reliably.

Why do this project this way?

Steam turbine components require replacement and/or refurbishment based on service hours in order to ensure reliable unit performance. Completing the project scope in a planned manner is the most cost effective approach.

CI Number	: 39529	- POT - Steam Turbine/Generator Major 2011	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 351	- 351-Pt.Tupper Admin./Capital	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		36,609	0	36,609
095		095-Thermal Regular Labour AO		2,401	0	2,401
095		095-Thermal Overtime Labour AO		600	0	600
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		2,401	0	2,401
001	010	001 - THERMAL Regular Labour	010 - SGP - Turbo Gen.Instal.	10,000	0	10,000
002	010	002 - THERMAL Overtime Labour	010 - SGP - Turbo Gen.Instal.	5,000	0	5,000
004	010	004 - THERMAL Term Labour	010 - SGP - Turbo Gen.Instal.	10,000	0	10,000
012	010	012 - Materials	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
013	010	013 - POWER PRODUCTION Contracts	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
011	085	011 - Travel Expense	085 Design	1,000	0	1,000
041	085	041 - Meals & Entertainment	085 Design	1,000	0	1,000
			Total Cost:	3,749,830	0	3,749,830
			Original Cost:			

CI 39529 – POT Steam Turbine Major Overhaul

The following is a breakdown of costs associated with the Steam Turbine Major Overhaul:

Administrative Overheads and Interest	$[redacted]
Labour	$25,000
Materials	$[redacted] ①
Contracts	$[redacted] ②
Other	$2,000
Total	$3,749,830

The contracts estimate of $[redacted] is based on the cost support information provided and the vendor estimate attached.

The materials estimate is based on the vendor estimates attached.

Pages 137 - 206 have been removed due to confidentiality.

Turbine major 2011
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Power Production	**CI Number:**	39529
Department :	Point Tupper Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Perform major overhaul	6.68%	21,023,722	1	46.04%	4.9 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Complete the major overhaul.

Notes/Comments :

Perform Major Overhaul

Justification of this project is based on a capital cost of $3,749,830 with an increasing risk of un-planned failure over the life of the asset if an overhaul is not completed in 2011. Capacity loss would be 150MW for four months in the event of an unplanned failure. Total avoided costs for 2011 and 2012 are $1,199,336 and $1,351,329 respectively. Total avoided costs are based on total avoided replacement energy cost and avoided labour / material costs.

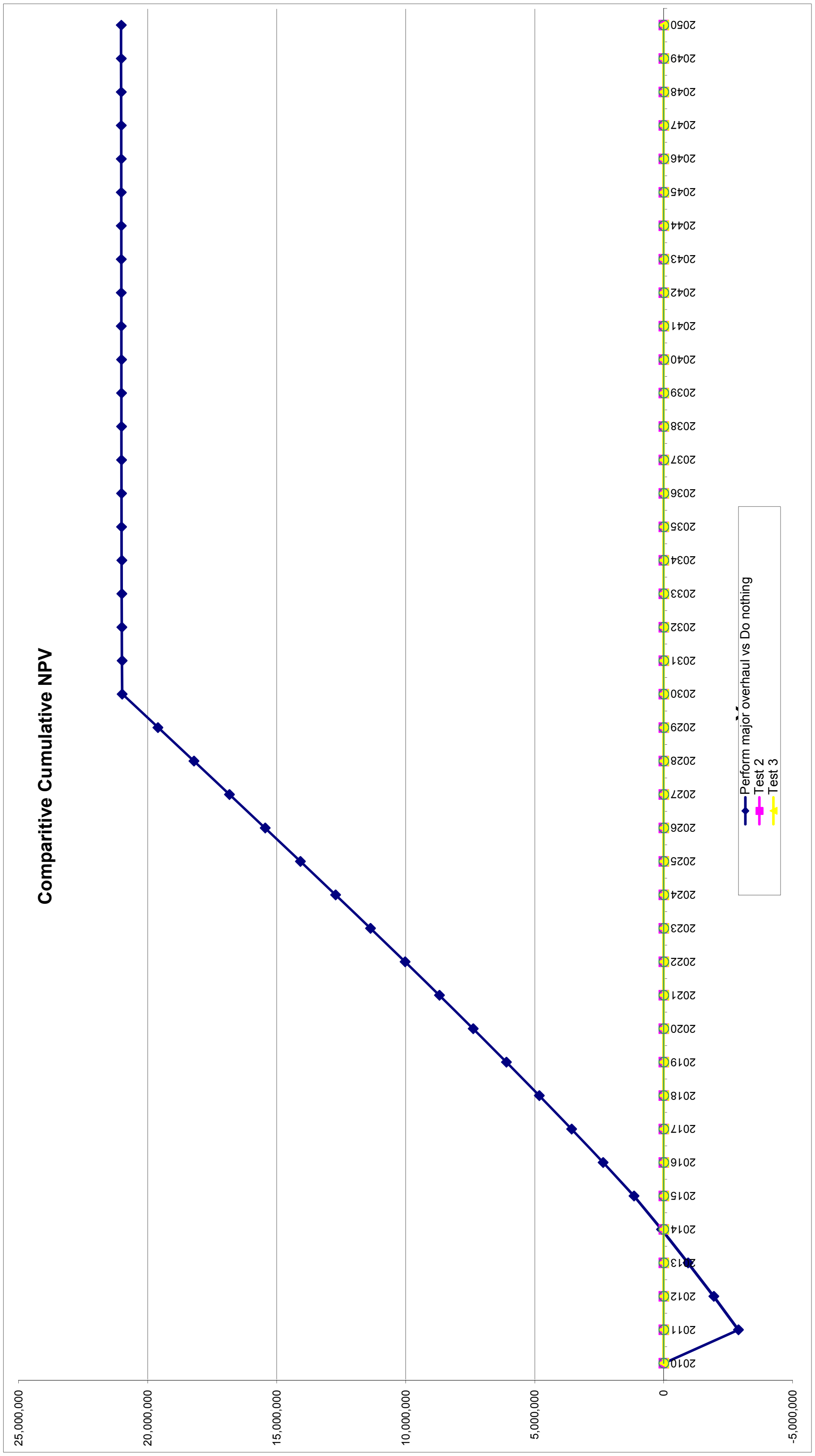
Test 2

Test 3

Test 4

Turbine major 2011
Perform major overhaul vs Do nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	1,199,336	(3,749,830)	149,993	3,599,837	(2,550,494)	(342,859)	(2,893,353)	1.000	(2,893,353)	(2,893,353)
2012	-	1,351,329	-	287,987	3,311,850	1,351,329	(330,207)	1,021,122	0.937	957,182	(1,936,171)
2013	-	1,521,941	-	264,948	3,046,902	1,521,941	(389,668)	1,132,273	0.879	994,913	(941,257)
2014	-	1,702,345	-	243,752	2,803,150	1,702,345	(452,647)	1,249,698	0.824	1,029,333	88,076
2015	-	1,893,037	-	224,252	2,578,898	1,893,037	(517,323)	1,375,714	0.772	1,062,175	1,150,251
2016	-	2,307,394	-	206,312	2,372,586	2,307,394	(651,335)	1,656,058	0.724	1,198,562	2,348,813
2017	-	2,532,177	-	189,807	2,182,779	2,532,177	(726,135)	1,806,042	0.678	1,225,264	3,574,077
2018	-	2,769,487	-	174,622	2,008,157	2,769,487	(804,408)	1,965,079	0.636	1,249,681	4,823,758
2019	-	3,019,955	-	160,653	1,847,504	3,019,955	(886,384)	2,133,571	0.596	1,271,871	6,095,629
2020	-	3,284,240	-	147,800	1,699,704	3,284,240	(972,296)	2,311,944	0.559	1,291,904	7,387,533
2021	-	3,563,034	-	135,976	1,563,728	3,563,034	(1,062,388)	2,500,646	0.524	1,309,852	8,697,384
2022	-	3,857,062	-	125,098	1,438,629	3,857,062	(1,156,909)	2,700,153	0.491	1,325,792	10,023,176
2023	-	4,167,085	-	115,090	1,323,539	4,167,085	(1,256,118)	2,910,966	0.460	1,339,804	11,362,980
2024	-	4,493,900	-	105,883	1,217,656	4,493,900	(1,360,285)	3,133,615	0.431	1,351,968	12,714,948
2025	-	4,838,342	-	97,412	1,120,243	4,838,342	(1,469,688)	3,368,654	0.404	1,362,368	14,077,315
2026	-	5,201,288	-	89,619	1,030,624	5,201,288	(1,584,617)	3,616,671	0.379	1,371,083	15,448,399
2027	-	5,583,656	-	82,450	948,174	5,583,656	(1,705,374)	3,878,282	0.355	1,378,197	16,826,596
2028	-	5,986,407	-	75,854	872,320	5,986,407	(1,832,272)	4,154,136	0.333	1,383,788	18,210,384
2029	-	6,410,551	-	69,786	802,534	6,410,551	(1,965,637)	4,444,914	0.312	1,387,935	19,598,319
2030	-	6,857,144	-	64,203	738,332	6,857,144	(2,105,812)	4,751,332	0.293	1,390,715	20,989,034
2031	-	-	-	59,067	679,265	-	18,311	18,311	0.274	5,024	20,994,058
2032	-	-	-	54,341	624,924	-	16,846	16,846	0.257	4,333	20,998,391
2033	-	-	-	49,994	574,930	-	15,498	15,498	0.241	3,736	21,002,127
2034	-	-	-	45,994	528,936	-	14,258	14,258	0.226	3,222	21,005,349
2035	-	-	-	42,315	486,621	-	13,118	13,118	0.212	2,779	21,008,128
2036	-	-	-	38,930	447,691	-	12,068	12,068	0.199	2,396	21,010,525
2037	-	-	-	35,815	411,876	-	11,103	11,103	0.186	2,067	21,012,591
2038	-	-	-	32,950	378,926	-	10,215	10,215	0.174	1,782	21,014,374
2039	-	-	-	30,314	348,612	-	9,397	9,397	0.164	1,537	21,015,911
2040	-	-	-	27,889	320,723	-	8,646	8,646	0.153	1,326	21,017,236
2041	-	-	-	25,658	295,065	-	7,954	7,954	0.144	1,143	21,018,379
2042	-	-	-	23,605	271,460	-	7,318	7,318	0.135	986	21,019,365
2043	-	-	-	21,717	249,743	-	6,732	6,732	0.126	850	21,020,215
2044	-	-	-	19,979	229,764	-	6,194	6,194	0.118	733	21,020,948
2045	-	-	-	18,381	211,382	-	5,698	5,698	0.111	632	21,021,581
2046	-	-	-	16,911	194,472	-	5,242	5,242	0.104	545	21,022,126
2047	-	-	-	15,558	178,914	-	4,823	4,823	0.098	470	21,022,596
2048	-	-	-	14,313	164,601	-	4,437	4,437	0.091	406	21,023,002
2049	-	-	-	13,168	151,433	-	4,082	4,082	0.086	350	21,023,352
2050	-	-	-	12,115	139,318	-	4,618	4,618	0.080	371	21,023,722
Total	-	72,539,709	(3,749,830)	3,610,512	43,395,800	68,789,879	(21,385,806)	47,404,073	14.768	21,023,722	587,939,867


Comparitive Cumulative NPV
Perform major overhaul vs Do nothing
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Test 3
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CI Number: 38826

Title: POT - Distribution Control System (DCS) Upgrade

Start Date:	2011/05
Final Cost Date:	2011/12
Function:	Generation
Forecast Amount:	$1,287,302

DESCRIPTION:

This project is for the upgrade of the plant's Distributed Control System (DCS) to provide a reliable control system that is designed to current standards and can be maintained for the next equipment life cycle.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The existing DCS technology and equipment is obsolete and no longer supported by the Original Equipment Manufacturer (OEM). This project must be completed to ensure reliable operation of the Point Tupper Generating Station.

Why do this project now?

The existing DCS is a Bailey Net-90 that was installed in 1987 as part of the coal conversion of Unit #2. Although this Net-90 system has undergone minor upgrades to keep up with advancing technology, a number of modules in the control and data acquisition system are now obsolete and are no longer supported by the OEM. This project must be completed now to mitigate the risk of reduced plant reliability. The major outage scheduled for 2011 provides an adequate outage window to complete this project.

Why do this project this way?

The existing equipment is obsolete and no longer supported by the OEM. Replacement with equipment designed to current standards is the only option.

CI Number : 38826 - POT - DCS upgrade | **Project Number**

Parent CI Number : - | **Approved Date**

Cost Centre : 351 - 351-Pt.Tupper Admin./Capital | **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		17,026	0	17,026
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		35,923	0	35,923
095		095-Thermal Overtime Labour AO		12,960	0	12,960
001	011	001 - THERMAL Regular Labour	011 - SGP - Plant Control and Inst	149,617	0	149,617
002	011	002 - THERMAL Overtime Labour	011 - SGP - Plant Control and Inst	107,952	0	107,952
004	011	004 - THERMAL Term Labour	011 - SGP - Plant Control and Inst	0	0	0
012	011	012 - Materials	011 - SGP - Plant Control and Inst	[redacted]	0	[redacted]
013	011	013 - POWER PRODUCTION Contracts	011 - SGP - Plant Control and Inst	[redacted]	0	[redacted]
011	085	011 - Travel Expense	085 Design	12,181	0	12,181
041	085	041 - Meals & Entertainment	085 Design	8,295	0	8,295
			Total Cost:	1,287,302	0	1,287,302
			Original Cost:			

CI 38826 – POT DCS Upgrade

The following is a breakdown of costs associated with the DCS Upgrade:

Administrative Overheads and Interest	$[redacted]
Labour	$257,569
Materials	$[redacted]
Contracts	$[redacted]
Other	$20,476
Total	$1,287,302

The materials estimate of $[redacted] is based on the attached vendor quotations and the detailed estimate attached. A contingency of 10%, or [redacted] is included in the materials estimate.

The contracts estimate $[redacted] is based on the attached vendor quotations and detailed project estimate attached. A contingency of 10%, or [redacted] is included in the contracts estimate.

The labour estimate of $257,569 is based on the detailed project estimate attached.

CI 38826 - Point Tupper - DCS Upgrade of BMS/HMI

PP Contracts	**hour/day**	**# of days**	**# of hours**	**$/day or hour**		**Notes**
[redacted]						Note 1
[redacted]						
Included hours	[redacted]					
regular work days	[redacted]					
OT weekdays	[redacted]					
OT weekends	[redacted]					
Sutotal On-Site Services					[redacted]	
Automation Sentinel Year 1	[redacted]					
Training	[redacted]					
[redacted]						
Contingency					[redacted]	
Subtotal PP Contracts					[redacted]	
Materials						
Engineering Service for Parts					[redacted]	Note 2
Plant Loop Communications Materials					[redacted]	
Misc (cable, desk, printer, etc)					[redacted]	
Spares					[redacted]	
Contingency					[redacted]	
Subtotal Materials					[redacted]	
Labour & Expenses	**hour/day**	**# of days**	**# of hours**	**$/hr**		
Supervision factory acceptance test						
Supervisor - Straight Time	[redacted]				$ 2,100	
Supervisor - Expenses	1	10		$ 200	$ 2,000	
					$ 4,100	
Electrician for Factory Acceptance Test						
Straight Time	[redacted]				$ 7,200	
Expenses	2	11		$ 200	$ 4,400	
					$ 11,600	
Operator for Factory Acceptance Test						
Straight Time	[redacted]				$ 21,600	
Expenses	1	11		$ 200	$ 2,200	
					$ 23,800	
Supervision & Project Management - Site work (13 weeks)						
Straight Time	[redacted]				$ 16,800	
Expenses	1	50		$ 200	$ 10,000	
					$ 26,800	
Electrcian / IT Installation & Commissioning						
Straight Time	[redacted]				$ 86,400	
OT Time weekday	[redacted]				$ 43,200	
OT Time weekend	[redacted]				$ 43,200	
					$ 172,800	
Operator Installation & Commissioning						
Straight Time	[redacted]				$ 14,400	
OT Time weekday	[redacted]				$ 7,200	
OT Time weekend	[redacted]				$ 10,800	
					$ 32,400	
Plant Loop Communications						
OT Labour					$ 3,552	
Regular Labour					$ 1,117	
Other Expenses (Travel, meals)					$ 1,876	
Subtotal Labour					**$ 257,569**	
Subtotal Expenses					**$ 20,476**	
Interest & AO Charges					[redacted]	
Project Total Estimate					***$ 1,287,302***	

Pages 214 - 280 have been removed due to confidentiality.

DCS upgrade
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	38826
Department :	Point Tupper Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Upgrade DCS	6.68%	3,989,403	1	27.90%	7.3 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Complete the upgrade to the DCS

Notes/Comments :

Upgrade DCS

Justification of this project is based on a capital cost of $1,287,302 and an increasing risk of failure over the life of the asset if the upgrade is not completed in 2011. Estimated capacity loss is 150MW for three months in the event of an un-planned failure. Total avoided costs for 2011 and 2012 are $194,186 and $233,810 respectively. Total avoided costs are based on total avoided replacement energy costs and total avoided labour/material costs.

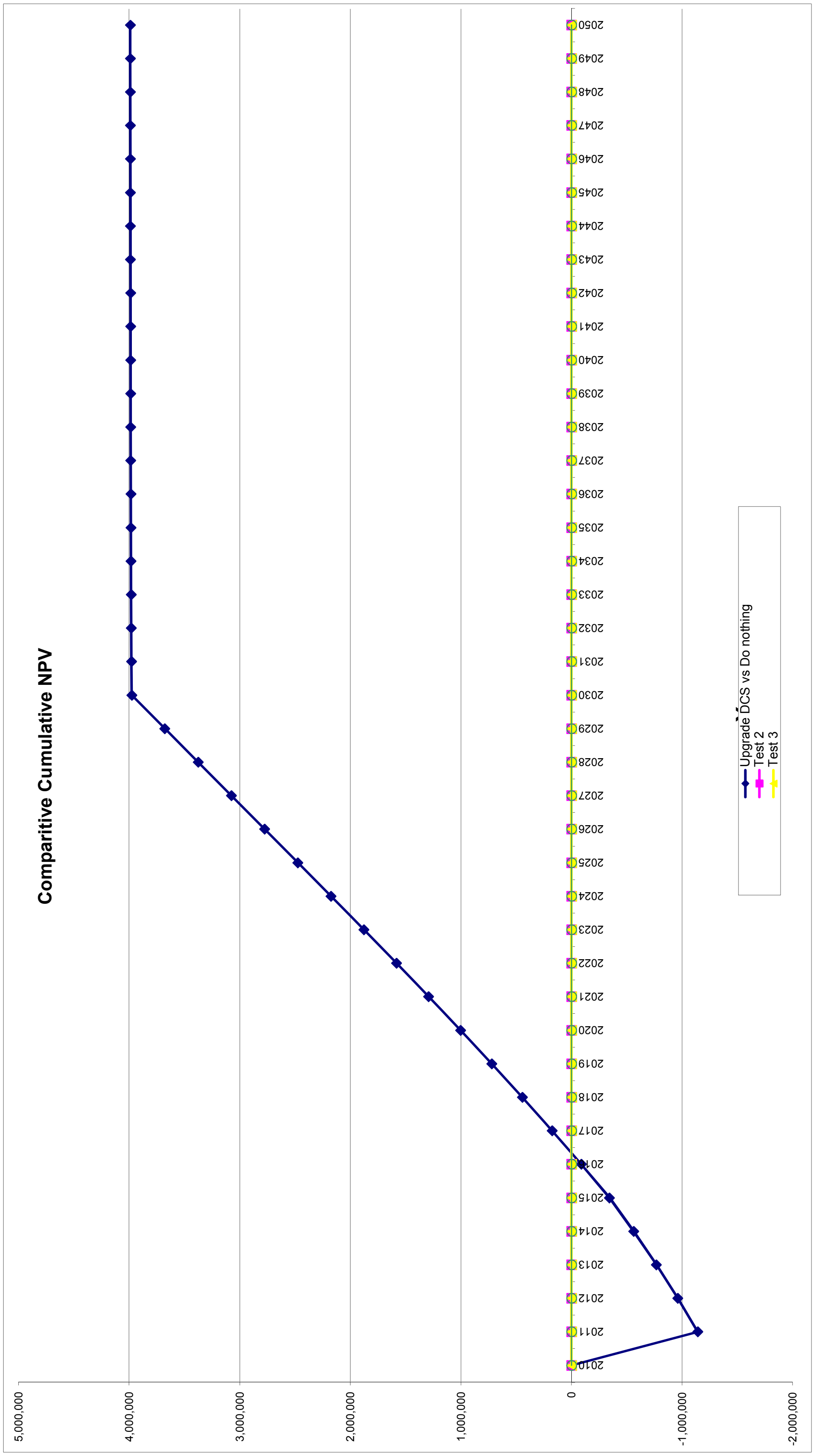
Test 2

Test 3

Test 4

DCS upgrade
Upgrade DCS vs Do nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	194,186	(1,287,302)	51,492	1,235,810	(1,093,116)	(47,001)	(1,140,117)	1.000	(1,140,117)	(1,140,117)
2012	-	233,810	-	98,865	1,136,945	233,810	(42,029)	191,781	0.937	179,772	(960,345)
2013	-	278,713	-	90,956	1,045,990	278,713	(58,205)	220,508	0.879	193,758	(766,587)
2014	-	325,471	-	83,679	962,310	325,471	(75,121)	250,349	0.824	206,204	(560,383)
2015	-	374,145	-	76,985	885,326	374,145	(92,120)	282,025	0.772	217,749	(342,634)
2016	-	477,511	-	70,826	814,499	477,511	(126,072)	351,439	0.724	254,352	(88,283)
2017	-	532,341	-	65,160	749,340	532,341	(144,826)	387,515	0.678	262,900	174,617
2018	-	589,366	-	59,947	689,392	589,366	(164,120)	425,246	0.636	270,433	445,050
2019	-	648,660	-	55,151	634,241	648,660	(183,988)	464,672	0.596	277,002	722,052
2020	-	710,302	-	50,739	583,502	710,302	(204,464)	505,838	0.559	282,660	1,004,711
2021	-	774,372	-	46,680	536,822	774,372	(225,585)	548,788	0.524	287,458	1,292,169
2022	-	840,954	-	42,946	493,876	840,954	(247,383)	593,571	0.491	291,447	1,583,616
2023	-	910,134	-	39,510	454,366	910,134	(269,893)	640,240	0.460	294,677	1,878,294
2024	-	982,000	-	36,349	418,017	982,000	(293,152)	688,849	0.431	297,197	2,175,491
2025	-	1,056,647	-	33,441	384,575	1,056,647	(317,194)	739,453	0.404	299,053	2,474,544
2026	-	1,134,168	-	30,766	353,809	1,134,168	(342,055)	792,113	0.379	300,291	2,774,835
2027	-	1,214,663	-	28,305	325,504	1,214,663	(367,771)	846,892	0.355	300,954	3,075,789
2028	-	1,298,234	-	26,040	299,464	1,298,234	(394,380)	903,854	0.333	301,084	3,376,873
2029	-	1,384,987	-	23,957	275,507	1,384,987	(421,919)	963,068	0.312	300,720	3,677,593
2030	-	1,475,033	-	22,041	253,466	1,475,033	(450,428)	1,024,605	0.293	299,902	3,977,495
2031	-	-	-	20,277	233,189	-	6,286	6,286	0.274	1,725	3,979,220
2032	-	-	-	18,655	214,534	-	5,783	5,783	0.257	1,487	3,980,707
2033	-	-	-	17,163	197,371	-	5,320	5,320	0.241	1,283	3,981,990
2034	-	-	-	15,790	181,582	-	4,895	4,895	0.226	1,106	3,983,096
2035	-	-	-	14,527	167,055	-	4,503	4,503	0.212	954	3,984,050
2036	-	-	-	13,364	153,691	-	4,143	4,143	0.199	823	3,984,873
2037	-	-	-	12,295	141,395	-	3,812	3,812	0.186	709	3,985,582
2038	-	-	-	11,312	130,084	-	3,507	3,507	0.174	612	3,986,194
2039	-	-	-	10,407	119,677	-	3,226	3,226	0.164	528	3,986,722
2040	-	-	-	9,574	110,103	-	2,968	2,968	0.153	455	3,987,177
2041	-	-	-	8,808	101,295	-	2,731	2,731	0.144	392	3,987,569
2042	-	-	-	8,104	93,191	-	2,512	2,512	0.135	338	3,987,907
2043	-	-	-	7,455	85,736	-	2,311	2,311	0.126	292	3,988,199
2044	-	-	-	6,859	78,877	-	2,126	2,126	0.118	252	3,988,451
2045	-	-	-	6,310	72,567	-	1,956	1,956	0.111	217	3,988,668
2046	-	-	-	5,805	66,761	-	1,800	1,800	0.104	187	3,988,855
2047	-	-	-	5,341	61,421	-	1,656	1,656	0.098	161	3,989,017
2048	-	-	-	4,914	56,507	-	1,523	1,523	0.091	139	3,989,156
2049	-	-	-	4,521	51,986	-	1,401	1,401	0.086	120	3,989,276
2050	-	-	-	4,159	47,827	-	1,585	1,585	0.080	127	3,989,403
Total	-	15,435,696	(1,287,302)	1,239,475	14,897,609	14,148,394	(4,403,661)	9,744,733	14.768	3,989,403	104,500,891


Comparitive Cumulative NPV
Upgrade DCS vs Do nothing
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CI Number: 35083

Title: LIN 2011 Ash Site Sealing and Capping

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $1,112,451

DESCRIPTION:

This project is for Phase 1 of permanent capping of the ash site as defined in the 2009 Lingan Ash Laydown management plan (approximately 31,000 sq ft). The work completed under this project will serve the long-term goal of returning the Lingan Ash Management Site to a re-vegetated site. The work is required to reduce potential dusting problems and ensure the water quality of the runoff returned to the lagoon meets regulatory criteria.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The capping of the completed areas of the active cells within the Ash Management Site is a requirement stipulated in the operating permit issued by the Nova Scotia Department of Environment (NSE) to the Lingan Generating Station.

A revised ash lay down management plan was created in 2009. Phase 1 of the 16 identified phases is ready for permanent capping.

Why do this project now?

The operating permit issued to the Lingan Generating Station requires that all completed areas of the Ash Management Site be covered with a layer of natural till and hydro seeded to minimize erosion. This project entails a long term detailed capping plan using a low permeable clay material, geotextile and top soil to seal the ash from downward migration of surface water.

The area to be capped under Phase 1 of this project has reached capacity and must be capped.

Why do this project this way?

Incorporating the recommendations of the engineering consultant's report will meet the hydraulic conductivity limits and requirements defined in the operating permit.

CI Number	: 35083	- LIN 2011 Ash Site Sealing and Capping	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 301	- 301-Lingan Admin./Common Capital	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		32,790	0	32,790
095		095-Thermal Regular Labour AO		960	0	960
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	021	001 - THERMAL Regular Labour	021 - SGP - Ash Handling	4,000	0	4,000
004	021	004 - THERMAL Term Labour	021 - SGP - Ash Handling	0	0	0
012	021	012 - Materials	021 - SGP - Ash Handling	0	0	0
013	021	013 - POWER PRODUCTION Contracts	021 - SGP - Ash Handling	[redacted]	0	[redacted]
028	021	028 - Consulting	021 - SGP - Ash Handling	[redacted]	0	[redacted]
			Total Cost:	1,112,451	0	1,112,451
			Original Cost:			

CI 35083 – 2011 Ash Site Sealing and Capping

The following is a breakdown of costs associated with the 2011 Ash Site Sealing and Capping

Administrative Overheads and Interest	$[redacted]
Labour	$4,000
Contracts	$[redacted]
Consulting	$[redacted]
Total	$1,112,451

The Contracts estimate of $[redacted] is based on the cost support information provided in the attached reports and detailed project estimate.

The Consulting estimate for $[redacted] is for preparation of tender documents, evaluation of tenders and preparation of as-built drawings. This estimate is based on NSPI engineering staff experience on similar projects.

POWER PRODUCTION **LINGAN GENERATING STATION** **ENGINEERING SERVICES**

Station: LINGAN GENERATING STATION

CI Number: 35083

Project: LIN -Ash Capping

Project Description: Capping of Lingan Phase 1

Scope Statements Project to put permanent cap on phase 1 location. Assumption is that Geosynthetic clay liner (GCL) be used (vs compacted clay liner) to reduce clay reqts / cost. Assumption is that no additional drainage diversion for non-ash impacted run off is included in this scope.

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals
1	Regular Plant Labor				
	Plant & TS Engineering (85 hrs) - tenders, monitoring	$47	85	$4,000	
	Sub-Total Plant Resources				$4,000
2	Term Labor				
	na	$32	0	$0	
	Sub-Total Term Resources				$0
3	Consulting				
	Consulting - Develop tender and support evaluation, as builts, drwg mgt, etc	[redacted]	[redacted]	[redacted]	
	Sub-Total Consulting				[redacted]
4	Material				
	Sub-Total Materials				
5	Contracts				
	Capping Subcontract (per sq m - complete profile and re-seed)	[redacted]	31000	[redacted]	
	Construction management , site supervision	[redacted]	320	[redacted]	
	Inspection Contract - On Going (QC , QA)	[redacted]	161	[redacted]	
	Sub-Total Contracts				[redacted]
6	A/O Charges				
	Interest Capitalized/Construction Overhead	$32,790 $960		[redacted]	
	Sub-Total A/O Charges	[redacted]			[redacted]
	Total Project Estimate				$1,112,451

Item	Costing Assumptions:	Comments
1	Phase 1 location and size as per BGC report 0578-002 surface area is 30,600 sq m	Attachment 1
2	[redacted]	Attachment 2
5	[redacted]	per sq m

Pages 288 - 338 have been removed due to confidentiality.

CI Number: 40271

Title: LIN2 Boiler Refurbishment

Start Date: 2011/01

Final Cost Date: 2011/09

Function: Generation

Forecast Amount: $1,093,704

DESCRIPTION:

The scope of work for this project is to inspect, repair and replace tubes, tube bends and shields on the LTSH (Low Temperature Super Heater) and HTSH (High Temperature Super Heater) tubes of the Unit #2 boiler and replace 11 sections of the boiler division wall. Tubes and tube bends will be replaced in the locations where the thickness readings are below American Society of Mechanical Engineers (ASME) specifications. The scope to replace shields will protect the tubes from further ash erosion. As well, shields with armor coating will be installed in high wear locations to improve tube life and increase tube protection.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Ongoing asset management activities have identified the requirement for boiler component replacement to maintain the long term reliability of the boiler and mitigate the risk of unplanned outages due to LTSH, HTSH and division wall tube leaks.

Why do this project now?

A condition assessment of the Unit #2 boiler was completed in June 2010 and identified the need to complete this project scope during the planned outage in 2011. The planned outage for Unit #2 in 2011 is of sufficient duration to complete the work.

Why do this project this way?

The work will be completed in the most cost effective manner to extend the life of the LTSH and HTSH by replacing the tubes, tube bends and shields, the risk of tube leaks in the LTSH and HTSH and an unplanned outage to the Unit 2 boiler will be reduced. Based on boiler life cycle assessments, upgrades are necessary to main boiler reliable operations.

CI Number : 40271 - LIN2 Boiler Refurbishment **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 304 - 304-Lingan 1&2 Prod. Unit **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		17,992	0	17,992
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		3,112	0	3,112
095		095-Thermal Regular Labour AO		3,822	0	3,822
001	013	001 - THERMAL Regular Labour	013 - SGP - Boiler	15,920	0	15,920
004	013	004 - THERMAL Term Labour	013 - SGP - Boiler	12,960	0	12,960
012	013	012 - Materials	013 - SGP - Boiler	[redacted]	0	[redacted]
013	013	013 - POWER PRODUCTION Contracts	013 - SGP - Boiler	[redacted]	0	[redacted]
			Total Cost:	1,093,704	0	1,093,704
			Original Cost:			

CI 40271 – LIN2 Boiler Refurbishment

The following is a breakdown of costs associated with the LIN2 Boiler Refurbishment:

Administrative Overheads and Interest	$[redacted]
Labour	$28,880
Materials	$[redacted]
Contracts	$[redacted]
Total	$1,093,704

The contracts estimate of $[redacted] is based on the attached detailed cost estimate, vendor estimates and NSPI engineering staff experience with similar projects.

The materials estimate of $[redacted] is based on the attached vendor estimate and similar work completed in 2010 on the Lingan Unit #1 boiler.

POWER PRODUCTION | LINGAN GENERATING STATION | ENGINEERING SERVICES

Station: LINGAN GENERATING STATION

CI Number: 40271

Project: LIN2 - Boiler Refurbishment - Planned Outage

Project Description: Replace division wall panels. Inspect and repair / replace tubes and bends AR, install armoured shields in LTSH

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals	
1	Regular Plant Labor					
	Plant Engineering (engineering hours - on site review)	[redacted]	[redacted]	$1,880		
	Mechanical Trades - contigency			$11,520		
	Maintenance Supervision			$2,520		
	Sub-Total Plant Resources				$15,920	
2	Term Labor					
	Utiltity	[redacted]	[redacted]	$12,960		
	Sub-Total Term Resources				$12,960	
3	Material					
	Replacement Tubes, Bends, Shields	[redacted]	1	[redacted]		
	Division Wall panels		1			Note 2
	Armoured Shields		1			
	Sub-Total Materials				[redacted]	
4	Contracts					
	Boiler Refurb at T & M, 30 day : Division Wall Replacement	[redacted]	1	[redacted]		Note 1
	Boiler Refurb at T & M, LTSH 1 (inspect, repair / replace)		1			
	Boiler Refurb at T & M, SH 5 , HT Platen, RHreplace)		1			
	Sub-Total Contracts				[redacted]	
7	A/O Charges					
	Interest Capitalized/Construction Overhead	17,992		[redacted]		
		[redacted]				
		3,112				
		3,822				
	Sub-Total A/O Charges				[redacted]	
	Total Project Estimate				$1,093,704	

Estimate Assumptions:

Division Wall :

[redacted]

(10) panels x 12' in length X 12 tubes wide

(1) panel x 12' in length X 13 tubes wide

(2) loose finned tubes x 12' in length

Subcontract:

[redacted]

General:

[redacted]

Tubes , Bends Shields - estimate only - inspection will determine specific replace / repair

Pages 343 - 355 have been removed due to confidentiality.

LIN2-Boiler Refurbishment
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Sep-10**
Division :	Power Production	**CI Number:**	40271
Department :	Lingan	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish LIN2 Boiler	6.68%	1,776,833	1	129.06%	2.8 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish LIN2 Boiler

Notes/Comments :

Refurbish LIN2 Boiler

Justification of this project is based on a capital cost of $1,093,704 and a high likelihood of failure if refurbishment is not completed in 2011. In the event of a failure, the capacity loss would be 154MW for a total of approximately 54 hours. The avoided replacement energy costs for 2011 and 2012 are $824,555 and $993,900 respectively.

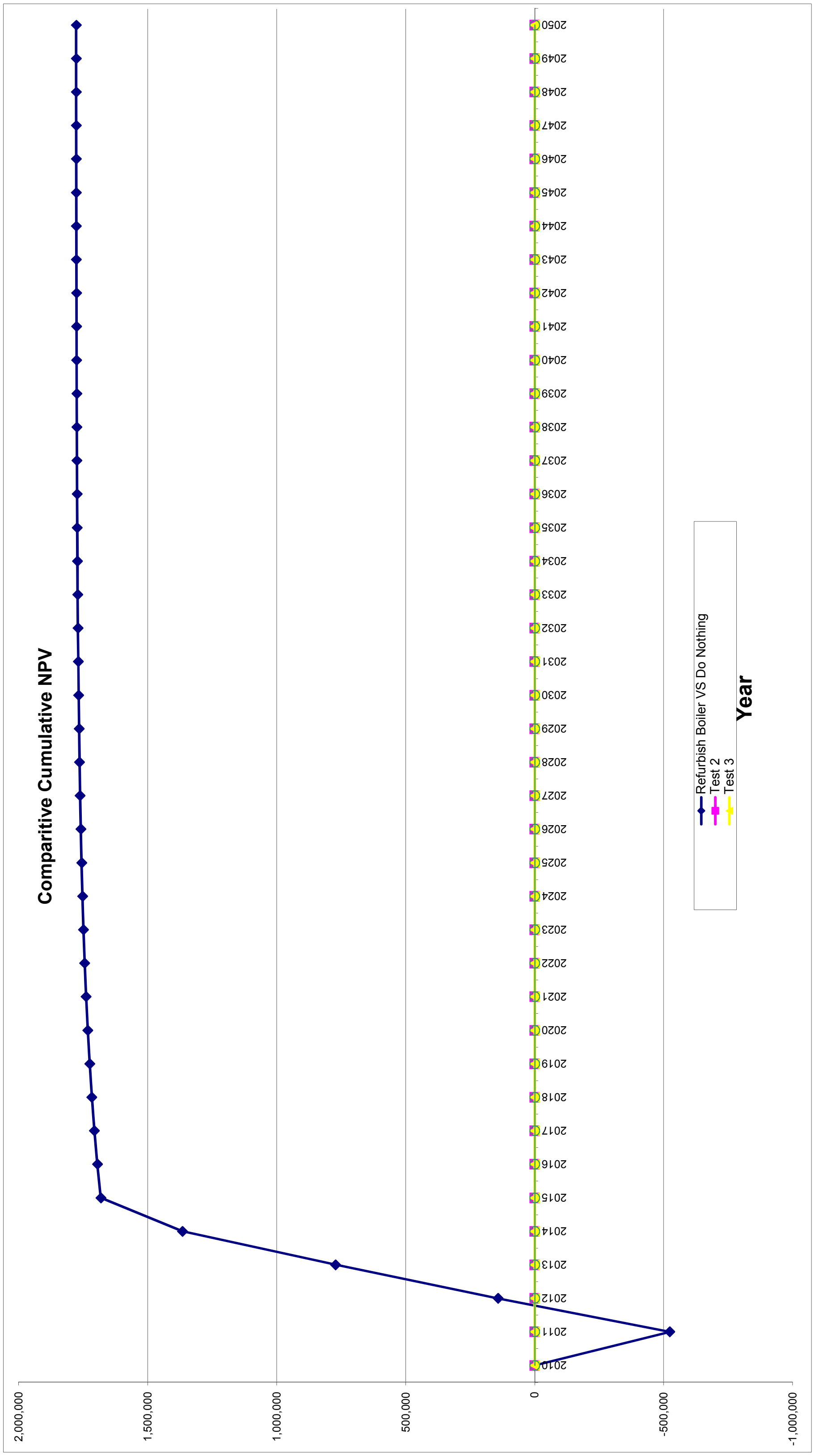
Test 2

Test 3

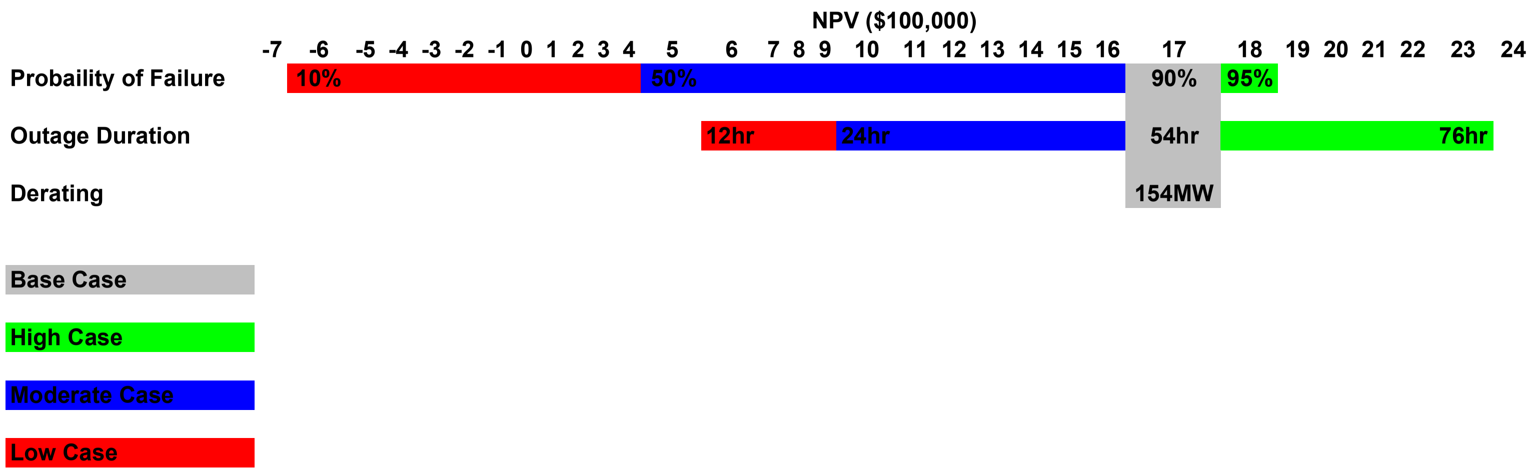
Test 4

LIN2-Boiler Refurbishment
Refurbish Boiler VS Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	824,555.0	(1,093,704.0)	43,748.2	1,049,955.8	(269,149.0)	(254,293.8)	(523,442.8)	1.000	(523,442.8)	(523,442.8)
2012	-	993,900.0	-	83,996.5	965,959.4	993,900.0	(282,236.7)	711,663.3	0.936	665,852.6	142,409.8
2013	-	1,006,569.3	-	77,276.7	888,682.6	1,006,569.3	(288,080.7)	718,488.6	0.875	628,965.8	771,375.6
2014	-	1,019,406.3	-	71,094.6	817,588.0	1,019,406.3	(294,117.6)	725,288.6	0.819	594,048.0	1,365,423.6
2015	-	567,904.7	-	65,407.0	752,181.0	567,904.7	(155,774.3)	412,130.4	0.766	315,826.7	1,681,250.3
2016	-	-	-	60,174.5	692,006.5	-	18,654.1	18,654.1	0.717	13,374.9	1,694,625.3
2017	-	-	-	55,360.5	636,646.0	-	17,161.8	17,161.8	0.671	11,512.9	1,706,138.1
2018	-	-	-	50,931.7	585,714.3	-	15,788.8	15,788.8	0.628	9,910.0	1,716,048.1
2019	-	-	-	46,857.1	538,857.2	-	14,525.7	14,525.7	0.587	8,530.3	1,724,578.5
2020	-	-	-	43,108.6	495,748.6	-	13,363.7	13,363.7	0.549	7,342.7	1,731,921.2
2021	-	-	-	39,659.9	456,088.7	-	12,294.6	12,294.6	0.514	6,320.5	1,738,241.7
2022	-	-	-	36,487.1	419,601.6	-	11,311.0	11,311.0	0.481	5,440.5	1,743,682.2
2023	-	-	-	33,568.1	386,033.5	-	10,406.1	10,406.1	0.450	4,683.1	1,748,365.2
2024	-	-	-	30,882.7	355,150.8	-	9,573.6	9,573.6	0.421	4,031.1	1,752,396.3
2025	-	-	-	28,412.1	326,738.7	-	8,807.7	8,807.7	0.394	3,469.9	1,755,866.2
2026	-	-	-	26,139.1	300,599.6	-	8,103.1	8,103.1	0.369	2,986.8	1,758,853.0
2027	-	-	-	24,048.0	276,551.7	-	7,454.9	7,454.9	0.345	2,571.0	1,761,424.0
2028	-	-	-	22,124.1	254,427.5	-	6,858.5	6,858.5	0.323	2,213.0	1,763,637.0
2029	-	-	-	20,354.2	234,073.3	-	6,309.8	6,309.8	0.302	1,904.9	1,765,542.0
2030	-	-	-	18,725.9	215,347.5	-	5,805.0	5,805.0	0.282	1,639.7	1,767,181.7
2031	-	-	-	17,227.8	198,119.7	-	5,340.6	5,340.6	0.264	1,411.4	1,768,593.1
2032	-	-	-	15,849.6	182,270.1	-	4,913.4	4,913.4	0.247	1,214.9	1,769,808.1
2033	-	-	-	14,581.6	167,688.5	-	4,520.3	4,520.3	0.231	1,045.8	1,770,853.9
2034	-	-	-	13,415.1	154,273.4	-	4,158.7	4,158.7	0.216	900.2	1,771,754.0
2035	-	-	-	12,341.9	141,931.5	-	3,826.0	3,826.0	0.203	774.9	1,772,528.9
2036	-	-	-	11,354.5	130,577.0	-	3,519.9	3,519.9	0.189	667.0	1,773,195.9
2037	-	-	-	10,446.2	120,130.8	-	3,238.3	3,238.3	0.177	574.1	1,773,770.0
2038	-	-	-	9,610.5	110,520.4	-	2,979.2	2,979.2	0.166	494.2	1,774,264.2
2039	-	-	-	8,841.6	101,678.8	-	2,740.9	2,740.9	0.155	425.4	1,774,689.6
2040	-	-	-	8,134.3	93,544.5	-	2,521.6	2,521.6	0.145	366.2	1,775,055.8
2041	-	-	-	7,483.6	86,060.9	-	2,319.9	2,319.9	0.136	315.2	1,775,371.0
2042	-	-	-	6,884.9	79,176.0	-	2,134.3	2,134.3	0.127	271.3	1,775,642.3
2043	-	-	-	6,334.1	72,841.9	-	1,963.6	1,963.6	0.119	233.5	1,775,875.8
2044	-	-	-	5,827.4	67,014.6	-	1,806.5	1,806.5	0.111	201.0	1,776,076.9
2045	-	-	-	5,361.2	61,653.4	-	1,662.0	1,662.0	0.104	173.0	1,776,249.9
2046	-	-	-	4,932.3	56,721.1	-	1,529.0	1,529.0	0.097	148.9	1,776,398.9
2047	-	-	-	4,537.7	52,183.5	-	1,406.7	1,406.7	0.091	128.2	1,776,527.1
2048	-	-	-	4,174.7	48,008.8	-	1,294.1	1,294.1	0.085	110.4	1,776,637.4
2049	-	-	-	3,840.7	44,168.1	-	1,190.6	1,190.6	0.080	95.0	1,776,732.4
2050	-	-	-	3,533.4	40,634.6	-	1,346.9	1,346.9	0.075	100.6	1,776,833.0
Total	-	4,412,335.2	(1,093,704.0)	1,053,069.4	12,657,149.8	3,318,631.2	(1,053,672.1)	2,264,959.1	14.4	1,776,833.0	65,052,375.3


Comparitive Cumulative NPV
Refurbish Boiler VS Do Nothing
Test 2
Test 3
Year
2,000,000
1,500,000
1,000,000
500,000
0
-500,000
-1,000,000
2010
2050

CI 40271 - LIN2 Boiler Refurbishment Tornado Chart



Notes:

Base Case:
Base EAM assumptions: 90% likelihood of tube failure(s) if project is not completed in 2011. Tube failure(s) would result in an un-planned outage of 54 hours and a Unit de-rating of 154MW. Under base case assumptions, NPV of the project is $1.70M

High Case:
If outage duration as a result of unplanned tube failure(s) increases to 76 hours and all other base assumptions remain the same, the NPV of the project is $2.28M

If likelihood of tube failure(s) is increased to 95% and all other base assumptions remain the same, the NPV of the project is $1.84M.

Moderate Case:
If likelihood of tube failure(s) is reduced to 50% and all other base assumptions remain the same, the NPV of the project is $539K.

If outage duration as a result of unplanned tube failure(s) reduces to 24 hours and all other base assumptions remain the same, the NPV of the project is $980K.

Low Case:
If likelihood of tube failure(s) is reduced to 10% if the project is not completed in 2011 and all other base assumptions remain the same, the NPV of the project is -617K.

If outage duration as a result of unplanned tube failure(s) reduces to 12 hours and all other base assumptions remain the same, the NPV of the project is $580K.

CI Number: 39903

Title: LIN 2011 Mill Refurbishment

Start Date:	2011/01
Final Cost Date:	2011/11
Function:	Generation
Forecast Amount:	$760,079

DESCRIPTION:

The purpose of this project is to replace mill components that have reached the end of their useful life. Based on experienced wear characteristics, there is risk that component failures will occur if a replacement plan is not followed. This capital item proposes the replacement of welded steel rollers and tables with ceramic wear components, worm gear & shaft, vertical shaft and other non-repairable mill components. The scope of this project is to refurbish four mills with new ceramic tables and rollers as well as miscellaneous wear items as required. The four mills that will be refurbished under this project are 1D, 3B, 4A and 4D.

Summary of Related CI's +/- 2 years
2009 - 30916 Lin Mill Component Replacement $757,624
2010 - 34702 Lin Mill Components Replacement $760,585

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

A failed mill could limit peak generation of a unit depending on the fuel blend in service. This makes it imperative that the mills are available and able to operate for extended lengths between scheduled outages. The replacement of components and the upgrading of the ceramics help to achieve this initiative.

Why do this project now?

An evaluation of the mills has identified several areas that need to be addressed in order for the mills to meet availability targets. Replacement parts are now needed due to age and wear on many of the mill components. Refurbishment is no longer sustainable and some of the components are worn beyond Original Equipment Manufacturer tolerances.

Why do this project this way?

A phased approach to upgrading the mills allows for scheduled outages of selected mills, reducing the risk of extended unplanned outages. An unplanned outage could require in excess of 16 weeks based on material lead time and labor.

CI Number : 39903 - LIN 2011 Mill Refurbishment

Parent CI Number : -

Cost Centre : 301 - 301-Lingan Admin./Common Capital

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		25,028	0	25,028
095		095-Thermal Regular Labour AO		52,428	0	52,428
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		2,701	0	2,701
001	018	001 - THERMAL Regular Labour	018 - SGP - Fuel Hndlg.Coal	218,360	0	218,360
004	018	004 - THERMAL Term Labour	018 - SGP - Fuel Hndlg.Coal	11,250	0	11,250
012	018	012 - Materials	018 - SGP - Fuel Hndlg.Coal	[redacted]	0	[redacted]
013	018	013 - POWER PRODUCTION Contracts	018 - SGP - Fuel Hndlg.Coal	[redacted]	0	[redacted]
			Total Cost:	760,079	0	760,079
			Original Cost:			

CI 39903 – LIN Mill Refurbishment

The following is a breakdown of costs associated with the LIN Mill Refurbishment

Administrative Overheads and Interest	$[redacted]
Labour	$229,610
Materials	$[redacted]
Contracts	$[redacted]
Total	$760,079

The materials estimate of $[redacted] is based on the attached vendor quotations and detailed project estimate.

The labour estimate is mostly NSPI labour per the attached account breakdown. The estimate is based on the hourly rates per the collective agreement and the hours required to complete the refurbishment. The number of hours required is based on projects of similar scope which were completed in the recent past (reference related CI information in the project description).

Station: LINGAN GENERATING STATION

CI Number: 39903

Project: LIN - Mill Component Replacements -2011

Project Description: Replace mill components which have reached the end of their useful life with Ceramic wear components and other components based on condition.

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals	Cost Support Note
1	Regular Plant Labor					
	Plant Engineering (Evaluation / Planning)	47	40	$1,880		
	Trades Supervision	42	80	$3,360		
	Maint Trades	37	5760	$213,120		
	Sub-Total Plant Resources				$218,360	
2	Term Labor					
	1 Terms - Mics Staging, cleaning , support	31.96	352	$11,250		
	Sub-Total Term Resources				$11,250	
3	Consulting					
	Failed Component Analysis Contigency - shaft, bearings, vanes AR	[redacted]	40	[redacted]		
	Sub-Total Consulting				[redacted]	
4	Material	Rate ($/unit)				
	Purchased materials for Refurbishment					
OEM						
	Worm gear PN 66-101-A	[redacted]	0	[redacted]		Note 1
	Worm Gear Hub PN 66-308		0			Note 2
	Shaft , Worm PN 66-289-A		0			Note 3
	Grinding Roll , Ceramic Design 66-930-XW , XWIN 663		12			Note 4
	Bull Ring Assembly for 663 RPS , 66-931-XW		4			Note 5
	Keyless shaft and bowl hub 66-985 , assembly 663 RS		2			Note 17
	Whizzer Disc and Clip Assembly EX-5731		4			Note 6
	Fan Blade Clip for Exhauster EX-2352-CAN		28			Note 7
	Whizzer Blade – Rev 03 on Drwg A-EX-3729-N-CER		28			Note 8
	Exhauster Fan Blades SKC 65405-AA		16			Note 9
	Ceramic Lined Hub protector EX 5840 per quote 49976 SQ		2			Note 10
	Spider Arm Protector EX 5657		1			Note 11
	Shaft End Cap		0			Note 12
	Shaft End Cap PN 66-184-A		2			Note 13
	Journal head Skirt PN 66-179		2			Note 14
	Journal pressure Spring Cup PN 70-228		2			Note 15
	Journal Head PN 66-178		0			Note 16
	Trunnion Bushing Retainer PN 66-185		2			
Re-engineer						
	Roof Liners 90-49-2120	[redacted]	2	[redacted]		
	Inner Cone 09-25-1200		2			
	Reject Scraper 09-08-4860		1			
	Wall Liners 09-49-9060		2			
	Bowl Ext Ring 09-76-6170		2			
	Vane Wheel 09-80-2230		2			
	Elbow Damper 09-33-0120		1			
	Brushes		1			
	Discharge damper		1			
	Exhaust Damper		0			
	riffle boxes		0			
	Misc harware		1			
	Sub-Total Materials				[redacted]	
6	A/O Charges					
				[redacted]		
	Interest Capitalized/Construction Overhead	25028				
		52428				
		[redacted]			[redacted]	
		2701				
	Sub-Total A/O Charges					
	Total Project Estimate				$760,079	

Pricing based on latest estimates from suppliers - attached
All Mills get Ceramic Upgrade (Grind Rolls and Bull Ring)

Pages 364 - 380 have been removed due to confidentiality.

NOVA SCOTIA POWER
An Emera Company

Refurbish Mills
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Generation Services	**CI Number:**	39903
Department :	Lingan Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish Mills	6.68%	2,554,298	1	55.86%	4.1 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish Mills

Notes/Comments :

Refurbish Mills

Justifcation of this project is based on a capital cost of $760,079 and in increasing probability of failure over the reamining life of the assets if refurbishment is not completed in 2011. The estimated capacity loss in the event of a failure is 10MW for 336 hours. The total avoided costs for 2011 and 2012 in the event of a failure are $238,736 and $425,124 respectively.

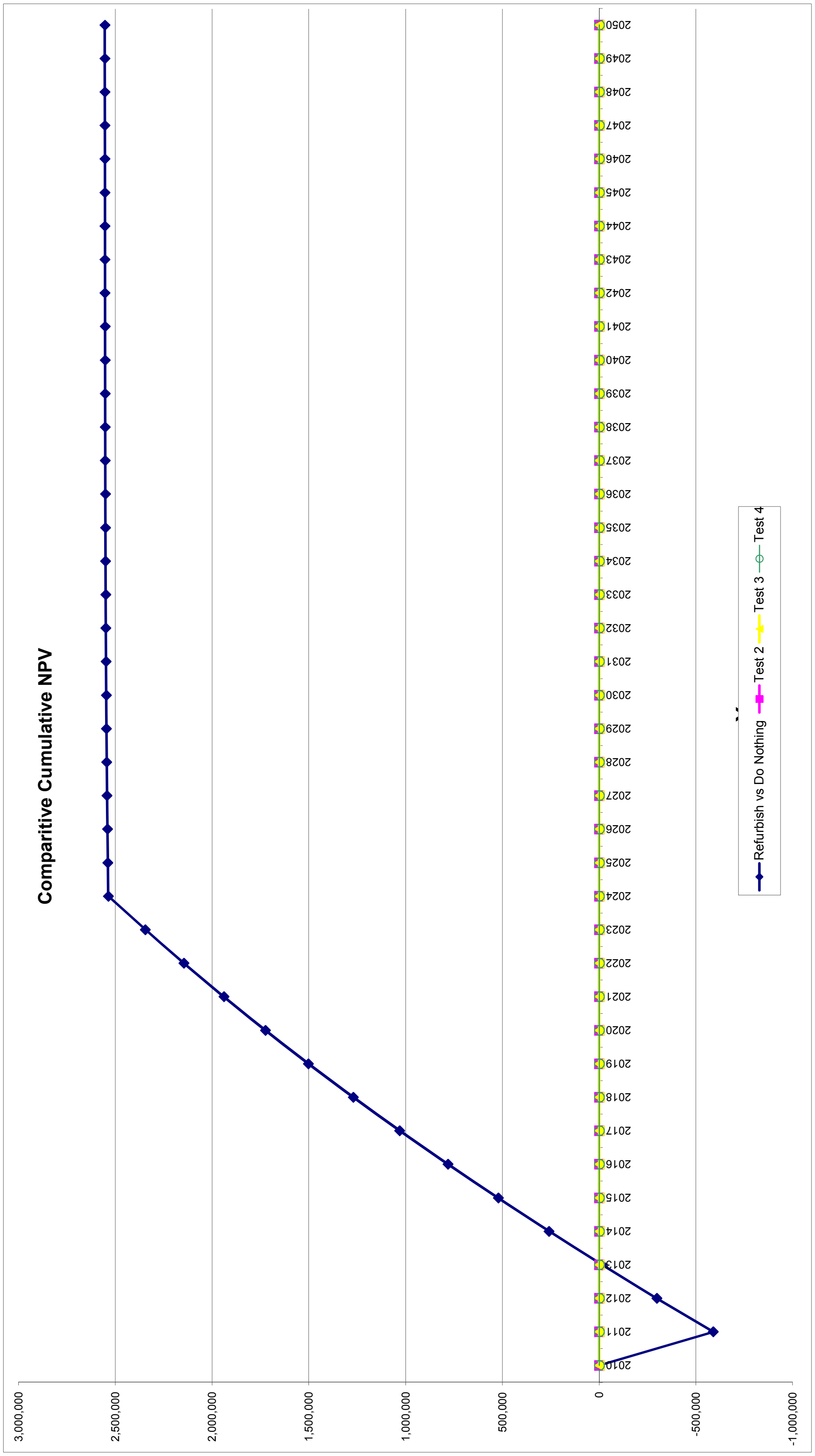
Test 2

Test 3

Test 4

Refurbish Mills
Refurbish vs Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	238,736	(760,079)	30,403	729,676	(521,343)	(68,078)	(589,420)	1.000	(589,420)	(589,420)
2012	-	425,124	-	58,374	671,302	425,124	(113,808)	311,316	0.937	291,822	(297,598)
2013	-	444,136	-	53,704	617,598	444,136	(121,034)	323,102	0.879	283,906	(13,692)
2014	-	457,828	-	49,408	568,190	457,828	(126,708)	331,120	0.824	272,732	259,040
2015	-	471,877	-	45,455	522,735	471,877	(132,191)	339,686	0.772	262,268	521,308
2016	-	501,082	-	41,819	480,916	501,082	(142,372)	358,711	0.724	259,615	780,922
2017	-	516,257	-	38,473	442,443	516,257	(148,113)	368,144	0.678	249,758	1,030,681
2018	-	531,827	-	35,395	407,047	531,827	(153,894)	377,933	0.636	240,344	1,271,025
2019	-	547,800	-	32,564	374,483	547,800	(159,723)	388,077	0.596	231,342	1,502,367
2020	-	564,189	-	29,959	344,525	564,189	(165,611)	398,577	0.559	222,723	1,725,090
2021	-	581,002	-	27,562	316,963	581,002	(171,566)	409,436	0.524	214,465	1,939,555
2022	-	598,251	-	25,357	291,606	598,251	(177,597)	420,654	0.491	206,544	2,146,098
2023	-	615,947	-	23,328	268,277	615,947	(183,712)	432,235	0.460	198,941	2,345,039
2024	-	634,101	-	21,462	246,815	634,101	(189,918)	444,183	0.431	191,638	2,536,678
2025	-	-	-	19,745	227,070	-	6,121	6,121	0.404	2,475	2,539,153
2026	-	-	-	18,166	208,904	-	5,631	5,631	0.379	2,135	2,541,288
2027	-	-	-	16,712	192,192	-	5,181	5,181	0.355	1,841	2,543,129
2028	-	-	-	15,375	176,817	-	4,766	4,766	0.333	1,588	2,544,717
2029	-	-	-	14,145	162,671	-	4,385	4,385	0.312	1,369	2,546,086
2030	-	-	-	13,014	149,658	-	4,034	4,034	0.293	1,181	2,547,267
2031	-	-	-	11,973	137,685	-	3,712	3,712	0.274	1,018	2,548,285
2032	-	-	-	11,015	126,670	-	3,415	3,415	0.257	878	2,549,163
2033	-	-	-	10,134	116,537	-	3,141	3,141	0.241	757	2,549,921
2034	-	-	-	9,323	107,214	-	2,890	2,890	0.226	653	2,550,574
2035	-	-	-	8,577	98,637	-	2,659	2,659	0.212	563	2,551,137
2036	-	-	-	7,891	90,746	-	2,446	2,446	0.199	486	2,551,623
2037	-	-	-	7,260	83,486	-	2,250	2,250	0.186	419	2,552,042
2038	-	-	-	6,679	76,807	-	2,070	2,070	0.174	361	2,552,403
2039	-	-	-	6,145	70,663	-	1,905	1,905	0.164	312	2,552,715
2040	-	-	-	5,653	65,010	-	1,752	1,752	0.153	269	2,552,983
2041	-	-	-	5,201	59,809	-	1,612	1,612	0.144	232	2,553,215
2042	-	-	-	4,785	55,024	-	1,483	1,483	0.135	200	2,553,415
2043	-	-	-	4,402	50,622	-	1,365	1,365	0.126	172	2,553,587
2044	-	-	-	4,050	46,572	-	1,255	1,255	0.118	149	2,553,736
2045	-	-	-	3,726	42,847	-	1,155	1,155	0.111	128	2,553,864
2046	-	-	-	3,428	39,419	-	1,063	1,063	0.104	111	2,553,974
2047	-	-	-	3,154	36,265	-	978	978	0.098	95	2,554,070
2048	-	-	-	2,901	33,364	-	899	899	0.091	82	2,554,152
2049	-	-	-	2,669	30,695	-	827	827	0.086	71	2,554,223
2050	-	-	-	2,456	28,239	-	936	936	0.080	75	2,554,298
Total	-	7,128,158	(760,079)	731,840	8,796,195	6,368,079	(1,986,392)	4,381,687	14.768	2,554,298	81,468,110


Comparitive Cumulative NPV
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Refurbish vs Do Nothing
Test 2
Test 3
Test 4

CI Number: 40422

Title: LIN3 Boiler Refurbishment

Start Date: 2011/03

Final Cost Date: 2011/10

Function: Generation

Forecast Amount: $757,323

DESCRIPTION:

This project is for the boiler refurbishment necessary to maintain the reliable operation of the Lingan Unit #3 boiler. This project will focus on inspection, repair / replacement of tubes, tube bends and shields primarily in sections SH-5, Reheater, LTSH-I and the High Temperature Platen. The scope will be determined as part of inspection, evaluation and prioritization activities undertaken during the outage. The quantity of tubes, tube bends and shields to be replaced will be confirmed during the Unit 3 outage in 2011. Tubes and tube bends will be replaced in the areas where the thickness readings are below American Society of Mechanical Engineers (ASME) specifications. Missing and degraded shielding will be replaced to further protect the tubes from ash erosion). The project scope is based on an expected minimum two week contractor mobilization necessary to refurbish the boiler.

Summary of Related CI's +/- 2 years:
2009 – CI 30682 LIN3 Division Wall Program $202,953
2009 – CI 36282 LIN3 U&U LTSH-1 Bend Replacements $557,798

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The project is required to maintain the long term reliability of the boiler and mitigate the risk of unplanned outages due to SH-5, Reheater, LTSH-I and High Temperature Platen tube leaks.

Why do this project now?

A number of the boiler sections to be inspected and replaced are difficult to access. Sufficient time during a planned outage is required to complete repairs or replacements. Boiler tubes may be susceptible to in-service failure in the near future based on remaining metal thickness. A planned outage is necessary to undertake inspection of the boiler tubes to confirm the sections to be repaired and replaced. The planned outage for Unit 3 in 2011 will be of sufficient duration to complete inspection and repair or replacement of the boiler tubes, tube bends and shields.
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Why do this project this way?

The work will be completed in the most cost effective manner to maintain the reliability of the boiler. By replacing the tubes, tube bends and shields, the risk of tube leaks and unplanned outages to the Unit 3 boiler will be reduced.

CI Number	: 40422	- LIN3 Boiler Refurbishment	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 305	- 305-Lingan 3&4 Prod.Unit	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		11,715	0	11,715
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		7,610	0	7,610
001	013	001 - THERMAL Regular Labour	013 - SGP - Boiler	31,694	0	31,694
012	013	012 - Materials	013 - SGP - Boiler	[redacted]	0	[redacted]
013	013	013 - POWER PRODUCTION Contracts	013 - SGP - Boiler	[redacted]	0	[redacted]
			Total Cost:	757,323	0	757,323
			Original Cost:			

LIN3 Boiler Refurbish
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Generation Services	**CI Number:**	40422
Department :	Lingan Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish LIN3 Boiler	6.68%	1,293,751	1	72.78%	3.6 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish LIN3 Boiler

Notes/Comments :

Refurbish LIN3 Boiler

Justificaiton of this project is based on a capital cost of $757,323 and an increasing probability of failure over the remaining life of the asset if refurbishment is not completed in 2011. In the event of a failure, the capacity loss would be 154MW for approximately 54 hours. Avoided replacement energy costs for 2011 and 2012 are $293,794 and $468,464 respectively.

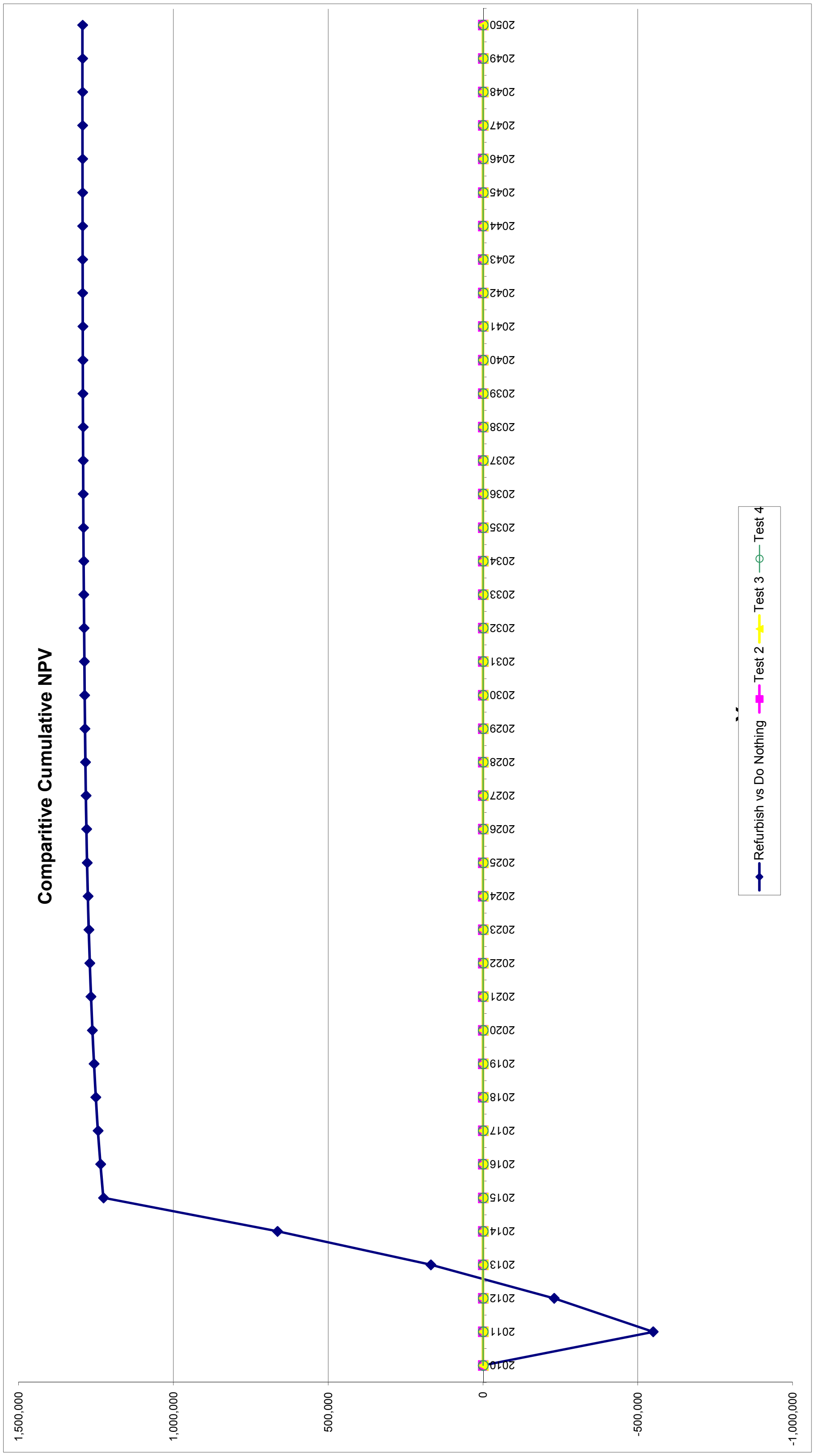
Test 2

Test 3

Test 4

LIN3 Boiler Refurbish
Refurbish vs Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	293,794.5	(757,323.0)	30,292.9	727,030.1	(463,528.5)	(86,006.1)	(549,534.5)	1.000	(549,534.5)	(549,534.5)
2012	-	468,464.6	-	58,162.4	668,867.7	468,464.6	(127,309.1)	341,155.6	0.937	319,793.4	(229,741.2)
2013	-	634,006.6	-	53,509.4	615,358.3	634,006.6	(179,954.1)	454,052.5	0.879	398,969.8	169,228.6
2014	-	849,135.1	-	49,228.7	566,129.6	849,135.1	(248,068.7)	601,066.5	0.824	495,077.8	664,306.5
2015	-	1,034,340.6	-	45,290.4	520,839.2	1,034,340.6	(306,605.6)	727,735.0	0.772	561,877.0	1,226,183.5
2016	-	-	-	41,667.1	479,172.1	-	12,916.8	12,916.8	0.724	9,348.5	1,235,532.0
2017	-	-	-	38,333.8	440,838.3	-	11,883.5	11,883.5	0.678	8,062.0	1,243,594.0
2018	-	-	-	35,267.1	405,571.3	-	10,932.8	10,932.8	0.636	6,952.6	1,250,546.6
2019	-	-	-	32,445.7	373,125.6	-	10,058.2	10,058.2	0.596	5,995.9	1,256,542.5
2020	-	-	-	29,850.0	343,275.5	-	9,253.5	9,253.5	0.559	5,170.8	1,261,713.4
2021	-	-	-	27,462.0	315,813.5	-	8,513.2	8,513.2	0.524	4,459.3	1,266,172.6
2022	-	-	-	25,265.1	290,548.4	-	7,832.2	7,832.2	0.491	3,845.6	1,270,018.3
2023	-	-	-	23,243.9	267,304.5	-	7,205.6	7,205.6	0.460	3,316.5	1,273,334.7
2024	-	-	-	21,384.4	245,920.2	-	6,629.2	6,629.2	0.431	2,860.1	1,276,194.8
2025	-	-	-	19,673.6	226,246.5	-	6,098.8	6,098.8	0.404	2,466.5	1,278,661.3
2026	-	-	-	18,099.7	208,146.8	-	5,610.9	5,610.9	0.379	2,127.1	1,280,788.5
2027	-	-	-	16,651.7	191,495.1	-	5,162.0	5,162.0	0.355	1,834.4	1,282,622.8
2028	-	-	-	15,319.6	176,175.5	-	4,749.1	4,749.1	0.333	1,582.0	1,284,204.8
2029	-	-	-	14,094.0	162,081.4	-	4,369.2	4,369.2	0.312	1,364.3	1,285,569.1
2030	-	-	-	12,966.5	149,114.9	-	4,019.6	4,019.6	0.293	1,176.5	1,286,745.6
2031	-	-	-	11,929.2	137,185.7	-	3,698.1	3,698.1	0.274	1,014.6	1,287,760.3
2032	-	-	-	10,974.9	126,210.9	-	3,402.2	3,402.2	0.257	875.0	1,288,635.3
2033	-	-	-	10,096.9	116,114.0	-	3,130.0	3,130.0	0.241	754.6	1,289,389.9
2034	-	-	-	9,289.1	106,824.9	-	2,879.6	2,879.6	0.226	650.8	1,290,040.7
2035	-	-	-	8,546.0	98,278.9	-	2,649.3	2,649.3	0.212	561.2	1,290,601.9
2036	-	-	-	7,862.3	90,416.6	-	2,437.3	2,437.3	0.199	484.0	1,291,085.9
2037	-	-	-	7,233.3	83,183.3	-	2,242.3	2,242.3	0.186	417.4	1,291,503.3
2038	-	-	-	6,654.7	76,528.6	-	2,062.9	2,062.9	0.174	360.0	1,291,863.2
2039	-	-	-	6,122.3	70,406.3	-	1,897.9	1,897.9	0.164	310.4	1,292,173.7
2040	-	-	-	5,632.5	64,773.8	-	1,746.1	1,746.1	0.153	267.7	1,292,441.4
2041	-	-	-	5,181.9	59,591.9	-	1,606.4	1,606.4	0.144	230.9	1,292,672.2
2042	-	-	-	4,767.4	54,824.5	-	1,477.9	1,477.9	0.135	199.1	1,292,871.3
2043	-	-	-	4,386.0	50,438.6	-	1,359.6	1,359.6	0.126	171.7	1,293,043.0
2044	-	-	-	4,035.1	46,403.5	-	1,250.9	1,250.9	0.118	148.1	1,293,191.1
2045	-	-	-	3,712.3	42,691.2	-	1,150.8	1,150.8	0.111	127.7	1,293,318.8
2046	-	-	-	3,415.3	39,275.9	-	1,058.7	1,058.7	0.104	110.1	1,293,428.9
2047	-	-	-	3,142.1	36,133.8	-	974.0	974.0	0.098	95.0	1,293,523.9
2048	-	-	-	2,890.7	33,243.1	-	896.1	896.1	0.091	81.9	1,293,605.8
2049	-	-	-	2,659.5	30,583.7	-	824.4	824.4	0.086	70.6	1,293,676.4
2050	-	-	-	2,446.7	28,137.0	-	932.7	932.7	0.080	74.9	1,293,751.3
Total	-	3,279,741.6	(757,323.0)	729,186.0	8,764,300.6	2,522,418.6	(795,031.6)	1,727,386.9	14.8	1,293,751.3	46,151,262.4


Comparitive Cumulative NPV
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Refurbish vs Do Nothing
Test 2
Test 3
Test 4

CI Number: 40423

Title: LIN4 Boiler Refurbishment

Start Date: 2011/08

Final Cost Date: 2011/10

Function: Generation

Forecast Amount: $752,389

DESCRIPTION:

This project is for the boiler refurbishment necessary to maintain the reliable operation of the boiler. This project will focus on inspection, repair / replacement of tubes, tube bends and shields primarily in sections SH-5, Reheater, LTSH-I and the High Temperature Platen. The scope will be determined as part of inspection, evaluation and prioritization activities undertaken during the outage. The quantity of tubes, tube bends and shields to be replaced will be confirmed during the Unit 4 outage in 2011. Tubes and tube bends will be replaced in the areas where the thickness readings are below American Society of Mechanical Engineers (ASME) specifications. Missing and degraded shielding will be replaced to further protect the tubes from fly ash erosion).

The project scope is based on an expected minimum two week contractor mobilization necessary to refurbish the boiler.

Summary of Related CI's +/- 2 years:
No other projects in 2009,2010,2011,2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The project is required to maintain the long term reliability of the boiler and mitigate the risk of unplanned outages due to SH-5, Reheater, LTSH-I and High Temperature Platen tube leaks.

Why do this project now?

A number of the boiler sections to be inspected and replaced are difficult to access and sufficient time during a planned outage is required to complete repairs or replacements. A planned outage is necessary to undertake inspection of the boiler tubes to confirm the sections to be repaired and replaced. The planned outage for Unit 4 in 2011 will be of sufficient duration to complete inspection and repair or replacement of the boiler tubes, tube bends and shields.

Why do this project this way?

The work will be completed in the most cost effective manner to maintain the reliability of the boiler. By replacing the tubes, tube bends and shields, the risk of tube leaks and unplanned outages to the Unit 4 boiler will be reduced.

CI Number	: 40423	- LIN4 Boiler Refurbishment	**Project Number**		
Parent CI Number	:	-	**Approved Date**		
Cost Centre	: 305	- 305-Lingan 3&4 Prod.Unit	**Budget Version**	2011 ACE Plan	

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		6,780	0	6,780
095		095-Thermal Regular Labour AO		7,610	0	7,610
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	013	001 - THERMAL Regular Labour	013 - SGP - Boiler	31,694	0	31,694
012	013	012 - Materials	013 - SGP - Boiler	[redacted]	0	[redacted]
013	013	013 - POWER PRODUCTION Contracts	013 - SGP - Boiler	[redacted]	0	[redacted]
			Total Cost:	752,389	0	752,389
			Original Cost:			

LIN4 Boiler Refurbish
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Generation Services	**CI Number:**	40423
Department :	Lingan Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish LIN4 Boiler	6.68%	1,287,397	1	73.47%	3.6 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish LIN4 Boiler

Notes/Comments :

Refurbish LIN4 Boiler

Justification of this project is based on a capital cost of $752,389 and an increasing probability of failure over the life of the asset if refurbishment is not completed in 2011. In the event of a failure the capacity loss would be 154MW for approximately 54 hours. Avoided replacement energy costs fo 2011 and 2012 are $293,794 and $468,464 respectively.

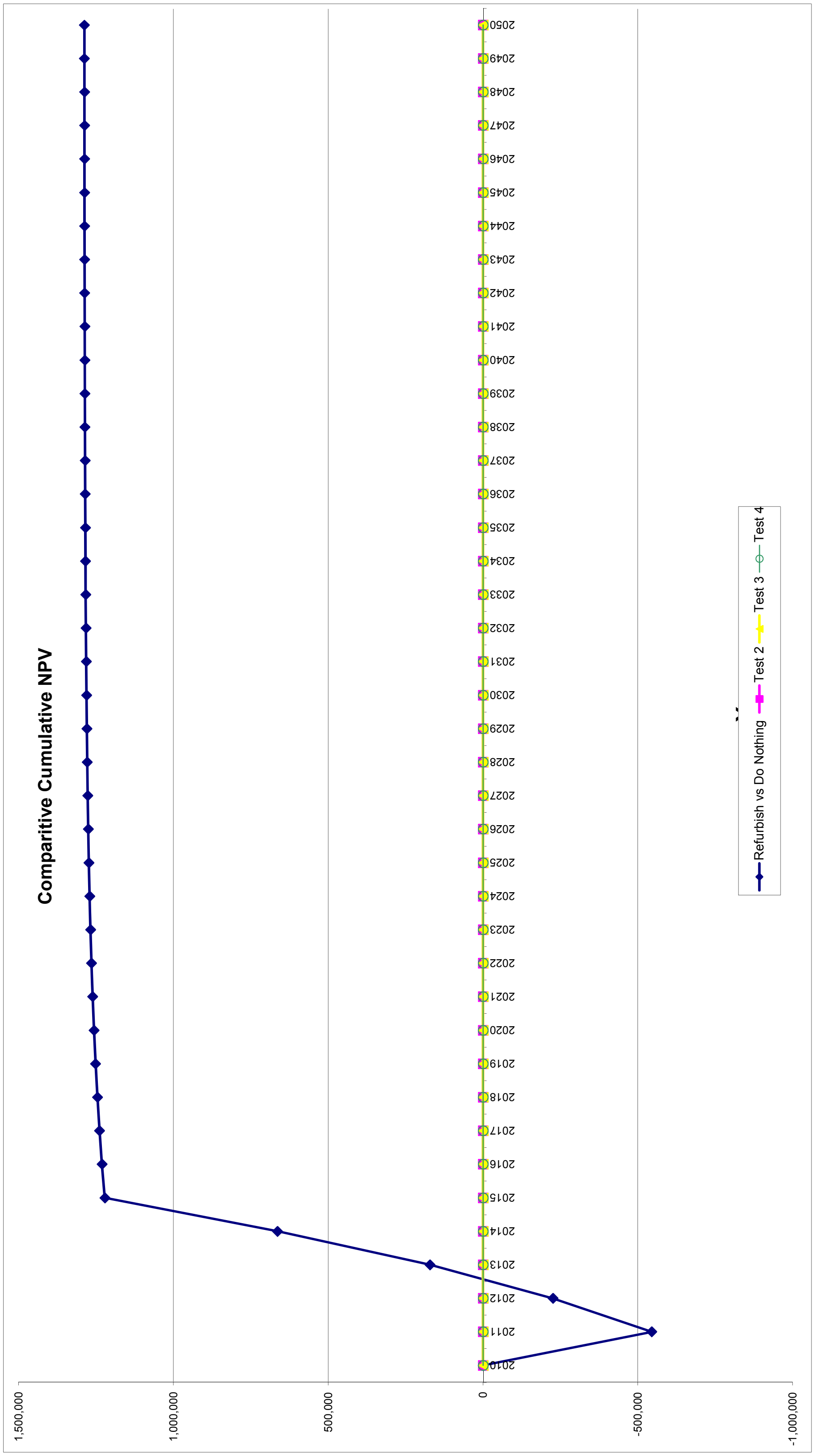
Test 2

Test 3

Test 4

LIN4 Boiler Refurbish
Refurbish vs Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	293,794.5	(752,389.0)	30,095.6	722,293.4	(458,594.5)	(86,067.8)	(544,662.3)	1.000	(544,662.3)	(544,662.3)
2012	-	468,464.6	-	57,783.5	664,510.0	468,464.6	(127,425.8)	341,038.8	0.936	319,085.7	(225,576.5)
2013	-	634,006.6	-	53,160.8	611,349.2	634,006.6	(180,062.2)	453,944.4	0.875	397,383.5	171,806.9
2014	-	849,135.1	-	48,907.9	562,441.2	849,135.1	(248,167.5)	600,967.7	0.819	492,222.9	664,029.8
2015	-	1,034,340.6	-	44,995.3	517,445.9	1,034,340.6	(306,697.1)	727,643.6	0.766	557,613.0	1,221,642.8
2016	-	-	-	41,395.7	476,050.3	-	12,832.7	12,832.7	0.717	9,201.0	1,230,843.8
2017	-	-	-	38,084.0	437,966.2	-	11,806.0	11,806.0	0.671	7,920.0	1,238,763.8
2018	-	-	-	35,037.3	402,928.9	-	10,861.6	10,861.6	0.628	6,817.4	1,245,581.2
2019	-	-	-	32,234.3	370,694.6	-	9,992.6	9,992.6	0.587	5,868.2	1,251,449.4
2020	-	-	-	29,655.6	341,039.1	-	9,193.2	9,193.2	0.549	5,051.3	1,256,500.7
2021	-	-	-	27,283.1	313,755.9	-	8,457.8	8,457.8	0.514	4,348.0	1,260,848.7
2022	-	-	-	25,100.5	288,655.5	-	7,781.1	7,781.1	0.481	3,742.7	1,264,591.4
2023	-	-	-	23,092.4	265,563.0	-	7,158.7	7,158.7	0.450	3,221.6	1,267,813.0
2024	-	-	-	21,245.0	244,318.0	-	6,586.0	6,586.0	0.421	2,773.1	1,270,586.1
2025	-	-	-	19,545.4	224,772.5	-	6,059.1	6,059.1	0.394	2,387.0	1,272,973.2
2026	-	-	-	17,981.8	206,790.7	-	5,574.4	5,574.4	0.369	2,054.7	1,275,027.9
2027	-	-	-	16,543.3	190,247.5	-	5,128.4	5,128.4	0.345	1,768.6	1,276,796.5
2028	-	-	-	15,219.8	175,027.7	-	4,718.1	4,718.1	0.323	1,522.4	1,278,318.9
2029	-	-	-	14,002.2	161,025.5	-	4,340.7	4,340.7	0.302	1,310.5	1,279,629.4
2030	-	-	-	12,882.0	148,143.4	-	3,993.4	3,993.4	0.282	1,128.0	1,280,757.4
2031	-	-	-	11,851.5	136,292.0	-	3,674.0	3,674.0	0.264	971.0	1,281,728.3
2032	-	-	-	10,903.4	125,388.6	-	3,380.0	3,380.0	0.247	835.8	1,282,564.1
2033	-	-	-	10,031.1	115,357.5	-	3,109.6	3,109.6	0.231	719.4	1,283,283.6
2034	-	-	-	9,228.6	106,128.9	-	2,860.9	2,860.9	0.216	619.3	1,283,902.8
2035	-	-	-	8,490.3	97,638.6	-	2,632.0	2,632.0	0.203	533.1	1,284,435.9
2036	-	-	-	7,811.1	89,827.5	-	2,421.4	2,421.4	0.189	458.8	1,284,894.7
2037	-	-	-	7,186.2	82,641.3	-	2,227.7	2,227.7	0.177	395.0	1,285,289.7
2038	-	-	-	6,611.3	76,030.0	-	2,049.5	2,049.5	0.166	340.0	1,285,629.7
2039	-	-	-	6,082.4	69,947.6	-	1,885.5	1,885.5	0.155	292.6	1,285,922.3
2040	-	-	-	5,595.8	64,351.8	-	1,734.7	1,734.7	0.145	251.9	1,286,174.2
2041	-	-	-	5,148.1	59,203.7	-	1,595.9	1,595.9	0.136	216.8	1,286,391.0
2042	-	-	-	4,736.3	54,467.4	-	1,468.3	1,468.3	0.127	186.6	1,286,577.7
2043	-	-	-	4,357.4	50,110.0	-	1,350.8	1,350.8	0.119	160.7	1,286,738.3
2044	-	-	-	4,008.8	46,101.2	-	1,242.7	1,242.7	0.111	138.3	1,286,876.6
2045	-	-	-	3,688.1	42,413.1	-	1,143.3	1,143.3	0.104	119.0	1,286,995.7
2046	-	-	-	3,393.0	39,020.0	-	1,051.8	1,051.8	0.097	102.5	1,287,098.1
2047	-	-	-	3,121.6	35,898.4	-	967.7	967.7	0.091	88.2	1,287,186.3
2048	-	-	-	2,871.9	33,026.6	-	890.3	890.3	0.085	75.9	1,287,262.2
2049	-	-	-	2,642.1	30,384.4	-	819.1	819.1	0.080	65.4	1,287,327.6
2050	-	-	-	2,430.8	27,953.7	-	926.6	926.6	0.075	69.2	1,287,396.8
Total	-	3,279,741.6	(752,389.0)	724,435.3	8,707,200.7	2,527,352.6	(796,504.7)	1,730,847.9	14.4	1,287,396.8	45,951,397.7


Comparitive Cumulative NPV
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Refurbish vs Do Nothing
Test 2
Test 3
Test 4

CI Number: 28289

Title: POT - Turbine Electro Hydraulic Governor Replacement

Start Date: 2011/01

Final Cost Date: 2012/04

Function: Generation

Forecast Amount: $725,435

DESCRIPTION:

The Electro-Hydraulic Governor (EHG) is a dedicated computer designed to instantaneously process operating data and control the operation of the steam turbine. The data collected and processed by the EHG is transferred to the operator interface, turbine control systems and turbine protection system.

The existing EHG was installed in 1987 as part of the coal conversion of Unit #2. The control of the EHG is critical and includes various operating set points for the turbine that ensure safe, efficient and reliable operation of the turbine.

Summary of Related CI's +/- 2 years
2011 - 39529 POT – Steam Turbine/Generator Overhaul 2011 $3,749,830
2011 - 38108 POT - AVR Refurbishment $128,270

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

This project must be completed to ensure the steam turbine and generator are adequately controlled with a reliable EHG that can react to abnormal operating conditions and mitigate the risk of potential failure of this critical equipment.

Why do this project now?

The EHG has reached the end of its useful life. Spare parts are no longer available and the EHG is no longer supported by the Original Equipment Manufacturer (OEM). The project must be completed now to ensure reliable operation of the turbine / generator is maintained and the risk of sudden failure is mitigated. The major outage scheduled for 2011 provides an adequate outage window to complete this project.

Why do this project this way?

The EHG can no longer be repaired. Replacement is the only option.

CI Number : 28289 - POT - Turbine Electro Hydraulic Governor Replacement **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 351 - 351-Pt.Tupper Admin./Capital **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		15,155	0	15,155
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		33,902	0	33,902
095		095-Thermal Overtime Labour AO		1,801	0	1,801
095		095-Thermal Term Labour AO		3,602	0	3,602
001	011	001 - THERMAL Regular Labour	011 - SGP - Plant Control and Inst	119,200	0	119,200
002	011	002 - THERMAL Overtime Labour	011 - SGP - Plant Control and Inst	15,000	0	15,000
004	011	004 - THERMAL Term Labour	011 - SGP - Plant Control and Inst	15,000	0	15,000
012	011	012 - Materials	011 - SGP - Plant Control and Inst	[redacted]	0	[redacted]
013	011	013 - POWER PRODUCTION Contracts	011 - SGP - Plant Control and Inst	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	11,000	0	11,000
011	085	011 - Travel Expense	085 Design	1,400	0	1,400
041	085	041 - Meals & Entertainment	085 Design	1,400	0	1,400
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	11,000	0	11,000
			Total Cost:	725,435	0	725,435
			Original Cost:			

CI 28289 – POT Turbine Electro Hydraulic Governor Replacement

The following is a breakdown of costs associated with the Turbine Electro Hydraulic Governor Replacement

Administrative Overheads and Interest	$[redacted]
Labour	$171,200
Materials	$[redacted]
Contracts	$[redacted]
Other	$2,800
Total	$725,775

The materials estimate of $[redacted] is based on the attached vendor quotation. It includes $[redacted] for the supply of the actuator and $[redacted] of capital spare parts.

The contracts estimate of $[redacted] is based on the attached vendor quotation. It includes $[redacted] for the base governor control system, $[redacted] for automatic run-up integration, $[redacted] for factory training, and $[redacted] for OEM technical support during installation and commissioning. The estimated cost for OEM technical support is based on the rates provided in the attached quotation. A contingency of 10% [redacted] is also included in the contracts estimate.

The labour estimate of $171,200 is based on mostly NSPI regular labour per the attached account breakdown. The estimate is based on the hourly rates per the collective agreement and the hours required to complete the project. The number of hours required is based on NSPI engineering staff experience.

Pages 397 - 404 have been removed due to confidentiality.

Electro Hydraulic Governor replacement
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Power Production	**CI Number:**	28289
Department :	Point Tupper Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Replace Electro Hydraulic Governor (EHG)	6.68%	8,359,072	1	118.70%	3.0 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Replace the Electro Hydraulic Governor

Notes/Comments :

Replace EHG

Justification of this project is based on a capital cost of $725,435 and an increasing risk of failure over the life of the asset if replacement is not completed in 2011. Capacity loss is estimated at 150MW for four months in the event of an unplanned failure. Total avoided costs for 2011 and 2012 are $507,883 and $560,154 respectively.

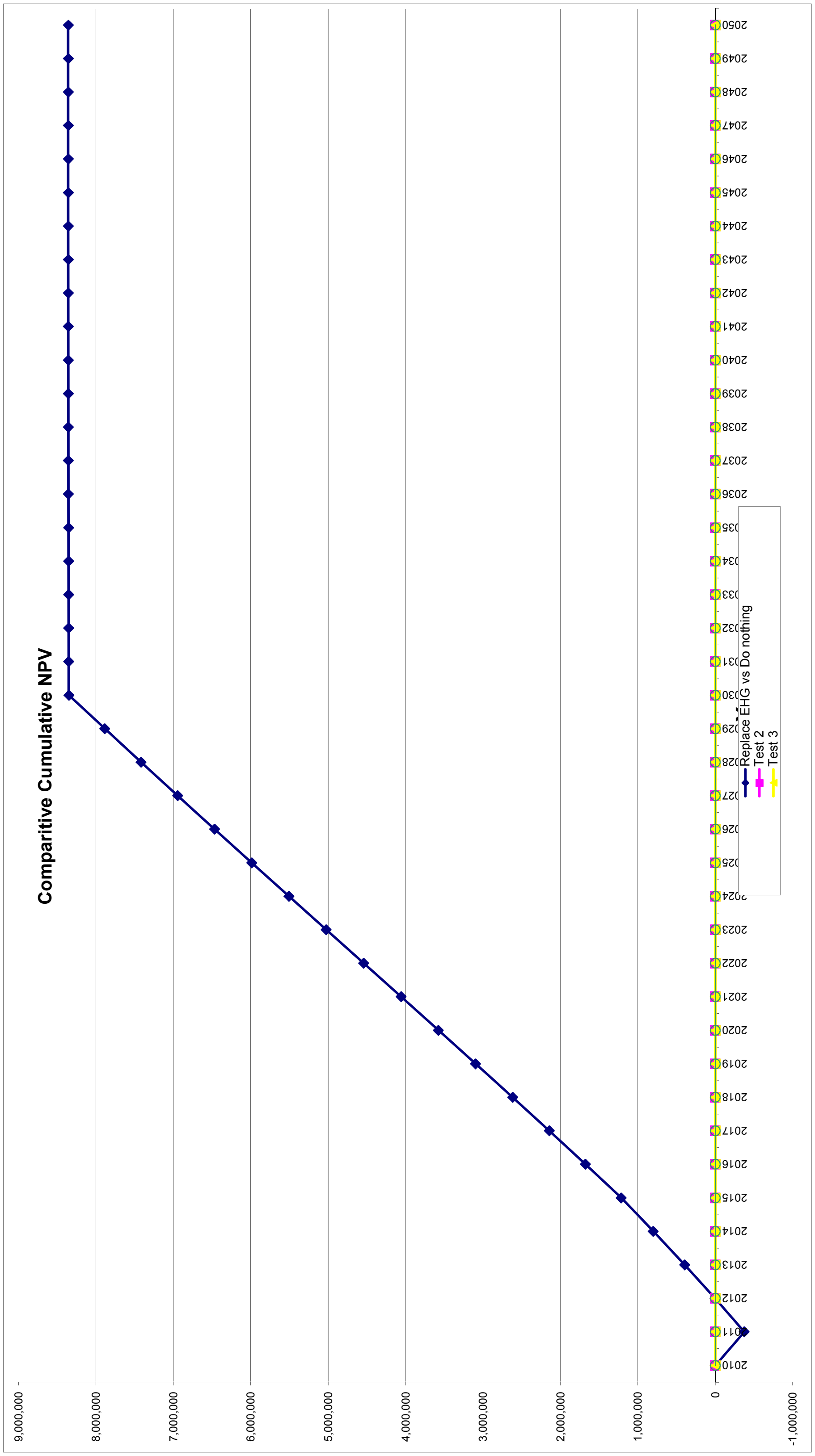
Test 2

Test 3

Test 4

Electro Hydraulic Governor replacement
Replace EHG vs Do nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	507,883	(725,435)	29,017	696,418	(217,552)	(155,984)	(373,536)	1.000	(373,536)	(373,536)
2012	-	560,154	-	55,713	640,704	560,154	(156,487)	403,667	0.937	378,391	4,855
2013	-	624,145	-	51,256	589,448	624,145	(177,595)	446,549	0.879	392,377	397,232
2014	-	690,633	-	47,156	542,292	690,633	(199,572)	491,062	0.824	404,471	801,702
2015	-	759,702	-	43,383	498,909	759,702	(222,059)	537,643	0.772	415,109	1,216,811
2016	-	905,922	-	39,913	458,996	905,922	(268,463)	637,459	0.724	461,357	1,678,169
2017	-	983,253	-	36,720	422,276	983,253	(293,425)	689,828	0.678	467,996	2,146,165
2018	-	1,063,520	-	33,782	388,494	1,063,520	(319,219)	744,301	0.636	473,334	2,619,499
2019	-	1,146,822	-	31,080	357,415	1,146,822	(345,880)	800,942	0.596	477,460	3,096,959
2020	-	1,233,257	-	28,593	328,821	1,233,257	(373,446)	859,811	0.559	480,459	3,577,417
2021	-	1,322,928	-	26,306	302,516	1,322,928	(401,953)	920,975	0.524	482,412	4,059,829
2022	-	1,415,943	-	24,201	278,315	1,415,943	(431,440)	984,503	0.491	483,397	4,543,226
2023	-	1,512,412	-	22,265	256,049	1,512,412	(461,945)	1,050,466	0.460	483,488	5,026,715
2024	-	1,612,447	-	20,484	235,565	1,612,447	(493,509)	1,118,938	0.431	482,755	5,509,470
2025	-	1,716,167	-	18,845	216,720	1,716,167	(526,170)	1,189,997	0.404	481,264	5,990,735
2026	-	1,823,692	-	17,338	199,383	1,823,692	(559,970)	1,263,722	0.379	479,078	6,469,813
2027	-	1,935,148	-	15,951	183,432	1,935,148	(594,951)	1,340,197	0.355	476,256	6,946,069
2028	-	2,050,665	-	14,675	168,757	2,050,665	(631,157)	1,419,508	0.333	472,854	7,418,922
2029	-	2,170,376	-	13,501	155,257	2,170,376	(668,631)	1,501,745	0.312	468,923	7,887,846
2030	-	2,294,420	-	12,421	142,836	2,294,420	(707,420)	1,587,000	0.293	464,515	8,352,361
2031	-	-	-	11,427	131,409	-	3,542	3,542	0.274	972	8,353,333
2032	-	-	-	10,513	120,897	-	3,259	3,259	0.257	838	8,354,171
2033	-	-	-	9,672	111,225	-	2,998	2,998	0.241	723	8,354,894
2034	-	-	-	8,898	102,327	-	2,758	2,758	0.226	623	8,355,517
2035	-	-	-	8,186	94,141	-	2,538	2,538	0.212	538	8,356,055
2036	-	-	-	7,531	86,609	-	2,335	2,335	0.199	464	8,356,518
2037	-	-	-	6,929	79,681	-	2,148	2,148	0.186	400	8,356,918
2038	-	-	-	6,374	73,306	-	1,976	1,976	0.174	345	8,357,263
2039	-	-	-	5,865	67,442	-	1,818	1,818	0.164	297	8,357,560
2040	-	-	-	5,395	62,046	-	1,673	1,673	0.153	256	8,357,817
2041	-	-	-	4,964	57,083	-	1,539	1,539	0.144	221	8,358,038
2042	-	-	-	4,567	52,516	-	1,416	1,416	0.135	191	8,358,229
2043	-	-	-	4,201	48,315	-	1,302	1,302	0.126	164	8,358,393
2044	-	-	-	3,865	44,450	-	1,198	1,198	0.118	142	8,358,535
2045	-	-	-	3,556	40,894	-	1,102	1,102	0.111	122	8,358,657
2046	-	-	-	3,271	37,622	-	1,014	1,014	0.104	105	8,358,763
2047	-	-	-	3,010	34,612	-	933	933	0.098	91	8,358,854
2048	-	-	-	2,769	31,843	-	858	858	0.091	78	8,358,932
2049	-	-	-	2,547	29,296	-	790	790	0.086	68	8,359,000
2050	-	-	-	2,344	26,952	-	893	893	0.080	72	8,359,072
Total	-	26,329,488	(725,435)	698,483	8,395,269	25,604,053	(7,953,185)	17,650,869	14.8	8,359,072	244,516,776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Replace EHG vs Do nothing
Test 2
Test 3

CI Number: 39933

Title: TRE - Siding Replacement

Start Date: 2011/04

Final Cost Date: 2011/11

Function: Generation

Forecast Amount: $603,707

DESCRIPTION:

The exterior siding on the building housing the boilers and turbines for Units 1 through 5 at the Trenton Generating Station ranges in age from 40 to 60 years. The siding needs to be replaced due to normal age-related deterioration.

The scope of this project includes replacement of siding in the following areas:
1) North wall of Units 1-4 coal conveyor gallery.
2) Sloped roof of Units 1-4 coal conveyor gallery.
3) South wall of Units 1-4 boiler house.
4) North wall of Unit 5 turbine house.
5) Unit 5 Cooling Water Pump house.
6) Replacement of louvers in #5 turbine house north wall and #5 boiler house north & south walls.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

Replacing the siding will address deterioration issues with the existing siding that has resulted in leakage of water into the building structure. An added benefit of completing this project will be the replacement of the existing asbestos-containing siding.

Why do this project now?

Replacing the siding now and addressing issues with water leakage into the building structure will mitigate the risk of more extensive water damage and costly repairs. Completing the majority of this project in 2011, during a time when the Unit shutdown requirements for both operating units are minor, will allow the siding replacement to proceed without significant interference with other projects.

Why do this project this way?

Due to the age and condition of the existing siding, replacement is the most practical option. The replacement will be completed in the most economically feasible manner, which includes replacing the existing siding with sheet metal siding and completing wall sections in their entirety.

CI Number	: 39933	- TRE - Siding Replacement		**Project Number**	
Parent CI Number	:	-		**Approved Date**	
Cost Centre	: 341	- 341-Trenton Admin./Common Capital		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		29,064	0	29,064
095		095-Thermal Regular Labour AO		7,203	0	7,203
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	003	001 - THERMAL Regular Labour	003 - SGP - Bldg.,Struct.Grnd.	20,000	0	20,000
012	003	012 - Materials	003 - SGP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
013	003	013 - POWER PRODUCTION Contracts	003 - SGP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
016	003	016 - Tools & Equipment	003 - SGP - Bldg.,Struct.Grnd.	2,500	0	2,500
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	10,000	0	10,000
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	603,707	0	603,707
			Original Cost:			

CI Number: 39780

Title: TUC - Unit 1 Cooling Water Intake Structural Refurbishment (Phase II)

Start Date: 2011/06

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $562,163

DESCRIPTION:

This project includes the structural refurbishment of the Unit#1 Cooling Water (CW) Intake Structure to ensure the structural integrity of the structure is restored. The existing concrete infrastructure supports two local control stations, two travelling screens (North and South), one lighting pole, two CW pumps (North and South), and two discharge valves (North and South). In order to facilitate the replacement of the concrete infrastructure, the existing local control stations, lighting pole, travelling screens, CW pumps, and the discharge valves (including their respective power and control cables) must be removed. Once the new concrete slabs are installed, the existing CW pumps, travelling screens, lighting pole and new local control stations will be re-installed in the same locations complete with their respective new cables, cable tray and support system.

The work associated with this project includes the following:

- Installation of temporary stop logs and dewatering the CW intake.
- Disconnecting and removing the existing electrical equipment; including local control stations, CW pumps, travelling screens and lighting pole.
- Demolition and disposal of concrete, structural steel cover plates, steel beams and ladders.
- Installation of scaffolding to access the work area.
- Civil / structural work for the new suspended concrete slab (including all formwork and placing and finishing of concrete).
- Fabrication and installation of new galvanized reinforcing steel beams and cover plates.
- Fabrication and installation of new stainless steel ladders.
- Re-installation of the existing CW pumps, discharge valves, travelling screens, lighting pole.
- Installation of new local control stations with new cable tray, cable and support system.
- Removal of all staging and stop logs

Summary of Related CI's +/- 2 years:
2010 – 28747 TUC - Unit #1 Cooling Water Intake Structures Refurbishment (Phase I) $179,326

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

Recent inspection of the Unit #1 cooling water intake structure indicated that concrete slabs, concrete beams, and structural steel components have reached a deteriorated state and must be replaced. Replacement of these components is required to restore the structural integrity of the intake structure.

Why do this project now?

The intake structure components are over 40 years old and must be replaced now to restore the structural integrity of the cooling water intake structure.

Why do this project this way?

The recent engineering study indicates that repairs are no longer an option due to the existing condition of the concrete slab and steel components. Replacement is the only option.

CI Number	: 39780	- TUC - Unit 1 Cooling Water Intake Structural Refurbishment (Phase II)	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 311	- 311-Tufts Cove Admin./Common Capita	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		15,912	0	15,912
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		2,401	0	2,401
001	014	001 - THERMAL Regular Labour	014 - SGP - Circ.Water Sys.	10,000	0	10,000
013	014	013 - POWER PRODUCTION Contracts	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
028	014	028 - Consulting	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
			Total Cost:	562,163	0	562,163
			Original Cost:			

CI 39780 – TUC Unit 1 Cooling Water Intake Structural Refurbishment

The following is a breakdown of costs associated with the Unit 1 Cooling Water Intake Structural Refurbishment:

Administrative Overheads and Interest	$[redacted]
Labour	$10,000
Contracts	$[redacted]
Consulting	$[redacted]
Total	$562,163

The contracts estimate of $[redacted] is based on the detailed estimates attached.

Pages 414 - 444 have been removed due to confidentiality.

CI Number: 40344

Title: POT - Waterwall Panel Replacement 2011

Start Date: 2011/03

Final Cost Date: 2012/03

Function: Generation

Forecast Amount: $517,626

DESCRIPTION:

This project will include waterwall panel replacement for Point Tupper Unit #2 and is based on tube survey in the furnace.

Timely replacement of waterwall panels avoids unplanned repair and replacement energy costs. The replacement of waterwall panels is an integral component of the boiler tube failure reduction program. It serves to maintain target heat rates and support reliable boiler operations.

Summary of Related CI's +/- 2 years
2009 - CI 32582 POT - Front Waterwall Panel Replacement $386,291

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The replacement scope for 2011 was determined through the analysis of extensive tube wall surveys. Replacing tubes that have experienced wastage from erosion/corrosion will ensure reliable operation is maintained.

Why do this project now?

Timely replacement of selected waterwall panels is required to maintain target heat rates and mitigate the risk of unplanned Unit outages due to waterwall tube leaks.

Why do this project this way?

The waterwall panel replacement program is required to support reliable Unit performance.

CI Number : 40344 - POT - Waterwall Panel Replacement 2011 **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 351 - 351-Pt.Tupper Admin./Capital **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		6,723	0	6,723
095		095-Thermal Regular Labour AO		360	0	360
095		095-Thermal Overtime Labour AO		360	0	360
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		4,802	0	4,802
001	013	001 - THERMAL Regular Labour	013 - SGP - Boiler	1,500	0	1,500
002	013	002 - THERMAL Overtime Labour	013 - SGP - Boiler	3,000	0	3,000
004	013	004 - THERMAL Term Labour	013 - SGP - Boiler	20,000	0	20,000
011	013	011 - Travel Expense	013 - SGP - Boiler	500	0	500
012	013	012 - Materials	013 - SGP - Boiler	[redacted]	0	[redacted]
013	013	013 - POWER PRODUCTION Contracts	013 - SGP - Boiler	[redacted]	0	[redacted]
041	013	041 - Meals & Entertainment	013 - SGP - Boiler	500	0	500
			Total Cost:	517,626	0	517,626
			Original Cost:			

CI 40344 – POT Waterwall Panel Replacement

The following is a breakdown of costs associated with the Waterwall Panel Replacement

Administrative Overhead and Interest	$[redacted]
Labour	$24,500
Materials	$[redacted]
Contracts	$[redacted]
Other	$500
Total	$517,626

The estimate for this project is based on CI 32582 – POT Front Water Wall Panel Replacement, which was completed in 2010. This project is similar in scope to CI 32582. The actual expenditures for CI 32582 were as follows:

Administrative Overhead and Interest	$35,900
Labour	$21,857
Materials	$[redacted]
Contracts	$[redacted]
Other	$1,733
Total	$488,113

Pages 448 - 450 have been removed due to confidentiality.

Waterwall replacement 2011
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	40344
Department :	Point Tupper Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Replace Waterwall Panels	6.68%	5,688,318	1	200.24%	2.5 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Replace the waterwall panels

Notes/Comments :

Replace waterwall panels

Justification of this project is based on a capital cost of $517,626 and an increasing risk of failure over the life of the asset if replacement is not completed in 2011. The estimated capacity loss is 150MW for one week in the event of an un-planned failure. Total avoided costs for 2011 and 2012 are $482,569 and $506,335 respectively. Total avoided costs are based on total avoided replacement energy cost and total avoided labour/material costs.

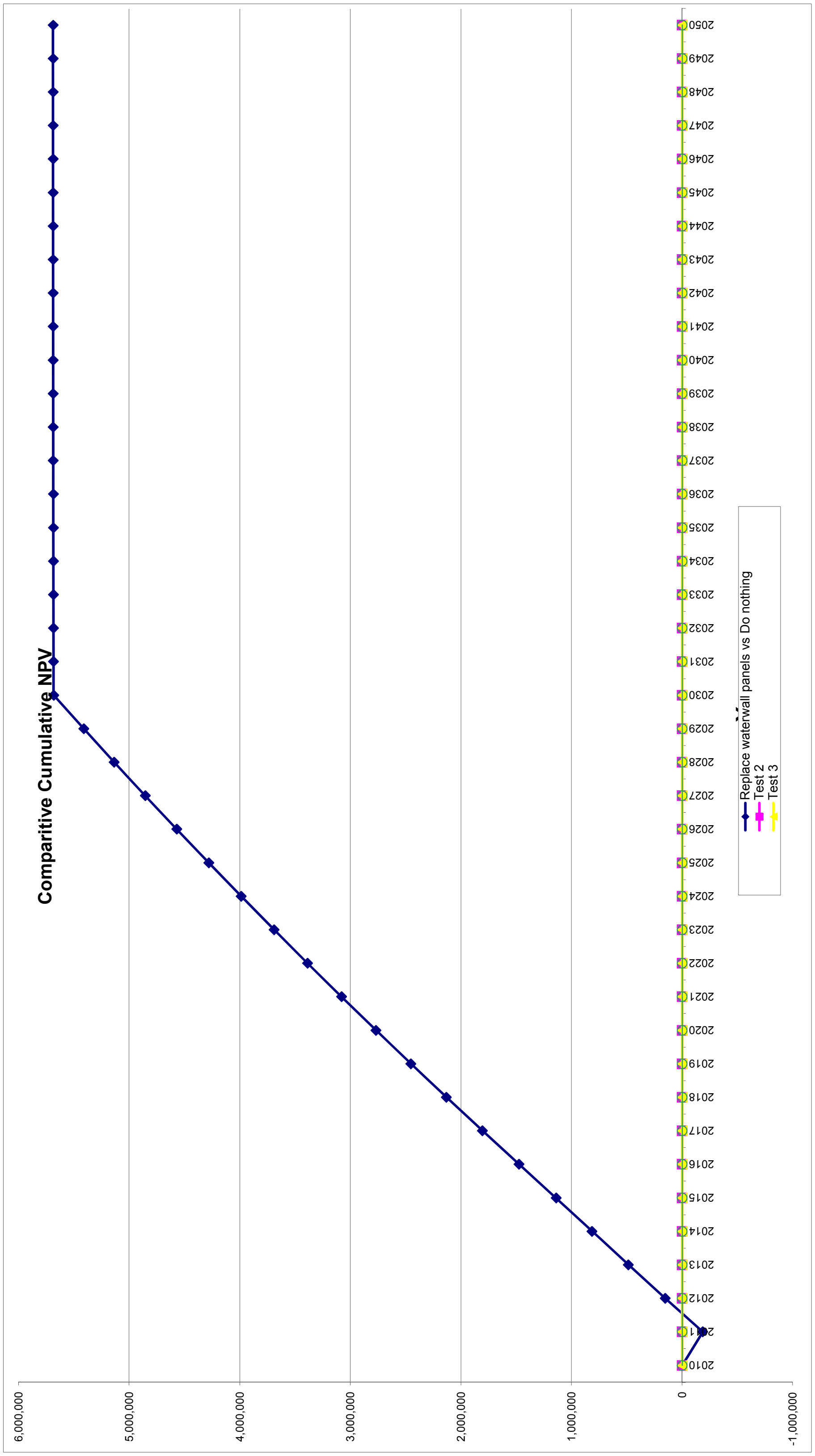
Test 2

Test 3

Test 4

Waterwall replacement 2011
Replace waterwall panels vs Do nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	482,569	(517,626)	20,705	496,921	(35,057)	(150,357)	(185,414)	1.000	(185,414)	(185,414)
2012	-	506,335	-	39,754	457,167	506,335	(144,719)	361,616	0.937	338,973	153,558
2013	-	534,111	-	36,573	420,594	534,111	(154,237)	379,874	0.879	333,790	487,349
2014	-	563,245	-	33,648	386,946	563,245	(164,242)	399,003	0.824	328,645	815,994
2015	-	593,801	-	30,956	355,991	593,801	(174,482)	419,319	0.772	323,752	1,139,746
2016	-	659,456	-	28,479	327,511	659,456	(195,603)	463,853	0.724	335,711	1,475,457
2017	-	694,698	-	26,201	301,311	694,698	(207,234)	487,464	0.678	330,708	1,806,165
2018	-	731,652	-	24,105	277,206	731,652	(219,340)	512,313	0.636	325,802	2,131,967
2019	-	770,399	-	22,176	255,029	770,399	(231,949)	538,450	0.596	320,982	2,452,949
2020	-	811,022	-	20,402	234,627	811,022	(245,092)	565,930	0.559	316,239	2,769,189
2021	-	853,611	-	18,770	215,857	853,611	(258,801)	594,811	0.524	311,565	3,080,754
2022	-	898,259	-	17,269	198,588	898,259	(273,107)	625,152	0.491	306,953	3,387,707
2023	-	945,061	-	15,887	182,701	945,061	(288,044)	657,017	0.460	302,399	3,690,106
2024	-	994,120	-	14,616	168,085	994,120	(303,646)	690,474	0.431	297,899	3,988,005
2025	-	1,045,542	-	13,447	154,638	1,045,542	(319,950)	725,593	0.404	293,448	4,281,452
2026	-	1,099,438	-	12,371	142,267	1,099,438	(336,991)	762,447	0.379	289,045	4,570,497
2027	-	1,155,924	-	11,381	130,886	1,155,924	(354,808)	801,116	0.355	284,687	4,855,184
2028	-	1,215,121	-	10,471	120,415	1,215,121	(373,442)	841,680	0.333	280,373	5,135,556
2029	-	1,277,157	-	9,633	110,782	1,277,157	(392,933)	884,225	0.312	276,101	5,411,658
2030	-	1,342,166	-	8,863	101,919	1,342,166	(413,324)	928,842	0.293	271,872	5,683,530
2031	-	-	-	8,154	93,766	-	2,528	2,528	0.274	694	5,684,223
2032	-	-	-	7,501	86,264	-	2,325	2,325	0.257	598	5,684,821
2033	-	-	-	6,901	79,363	-	2,139	2,139	0.241	516	5,685,337
2034	-	-	-	6,349	73,014	-	1,968	1,968	0.226	445	5,685,782
2035	-	-	-	5,841	67,173	-	1,811	1,811	0.212	384	5,686,166
2036	-	-	-	5,374	61,799	-	1,666	1,666	0.199	331	5,686,496
2037	-	-	-	4,944	56,855	-	1,533	1,533	0.186	285	5,686,782
2038	-	-	-	4,548	52,307	-	1,410	1,410	0.174	246	5,687,028
2039	-	-	-	4,185	48,122	-	1,297	1,297	0.164	212	5,687,240
2040	-	-	-	3,850	44,273	-	1,193	1,193	0.153	183	5,687,423
2041	-	-	-	3,542	40,731	-	1,098	1,098	0.144	158	5,687,581
2042	-	-	-	3,258	37,472	-	1,010	1,010	0.135	136	5,687,717
2043	-	-	-	2,998	34,474	-	929	929	0.126	117	5,687,834
2044	-	-	-	2,758	31,717	-	855	855	0.118	101	5,687,935
2045	-	-	-	2,537	29,179	-	787	787	0.111	87	5,688,023
2046	-	-	-	2,334	26,845	-	724	724	0.104	75	5,688,098
2047	-	-	-	2,148	24,697	-	666	666	0.098	65	5,688,163
2048	-	-	-	1,976	22,721	-	612	612	0.091	56	5,688,219
2049	-	-	-	1,818	20,904	-	563	563	0.086	48	5,688,267
2050	-	-	-	1,672	19,231	-	637	637	0.080	51	5,688,318
Total	-	17,173,689	(517,626)	498,395	5,990,350	16,656,063	(5,176,547)	11,479,516	14.768	5,688,318	170,872,859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Replace waterwall panels vs Do nothing
Test 2
Test 3

CI Number: 40244

Title: LIN Boiler Feed Pump Rebuild

Start Date: 2011/01

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $508,703

DESCRIPTION:

This project includes the complete rebuild of one of the boiler feedwater pumps (BFP) for the Lingan Generating Station and refurbishment of a pump cartridge. This work will restore all BFP fits and dimensions to Original Equipment Manufacturer (OEM) specifications. In addition to rebuilding the pump cartridge, the pump refurbishment includes inspection, measurement and refurbishment or replacement (replacement only as required) of all other pump components; including the balancing piston assembly, pump casing and barrel, journal and thrust bearing assemblies, seals, internal valves, fasteners, tubing, lubrication systems, sensors, controls and cooling water components.

The Boiler Feed Pump design operating parameters are continuously monitored. On detection of variance from normal operating parameters or unexpected failure, a pump refurbishment is completed. To limit down-time, a previously rebuilt pump cartridge is used for the refurbishment. A cartridge rebuild typically requires between 16 and 20 weeks and a typical pump refurbishment takes four weeks with an available cartridge. The extracted cartridge is refurbished and made ready for future use.

There are eight boiler feed pumps at Lingan (2 per Unit). Not including this project, six of the eight pumps have already been rebuilt to OEM specifications. The last of the eight boiler feed pumps will be rebuilt in 2012. After 2012, annual rebuilds of the pump cartridges (and not the complete pump) will be required.

Summary of Related CI's +/- 2 years
2009 - 30917 LIN Boiler Feed Pump Rebuild $454,421
2010 - 34690 LIN Boiler Feed Pump Rebuild $509,535
2012 – CI TBD LIN Boiler Feed Pump Rebuild $TBD

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

This project is required in order to restore one BFP to OEM operating condition and to ensure the availability and reliability of this pump. The Lingan Generating Station needs to be in a position to respond quickly to potential BFP problems to increase BFP availability. This will mitigate the risk of lost generating capacity or a forced unit outage and the associated replacement energy costs. As part of this BFP rebuild program, one fully restored cartridge assembly is maintained ready for use in the event of an unplanned failure or to support the refurbishment activity.

Why do this project now?

When the existing back up pump is placed into service another pump will be available for refurbishment. This project is required to repair a BFP and restore the BFP back-up capacity for the units in order to ensure continued unit reliability.

Why do this project this way?

Refurbishment of pump cartridges and components is more cost effective than replacement of the cartridge or pump. After refurbishment of a pump is completed, the cartridge requires refurbishment approximately every five years.

CI Number : 40244 - LIN Boiler Feed Pump Rebuild

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 301 - 301-Lingan Admin./Common Capital

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		22,813	0	22,813
095		095-Thermal Term Labour AO		2,305	0	2,305
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		17,138	0	17,138
001	016	001 - THERMAL Regular Labour	016 - SGP - Feed Water Sys.	71,380	0	71,380
004	016	004 - THERMAL Term Labour	016 - SGP - Feed Water Sys.	9,600	0	9,600
012	016	012 - Materials	016 - SGP - Feed Water Sys.	[redacted]	0	[redacted]
013	016	013 - POWER PRODUCTION Contracts	016 - SGP - Feed Water Sys.	[redacted]	0	[redacted]
028	016	028 - Consulting	016 - SGP - Feed Water Sys.	[redacted]	0	[redacted]
			Total Cost:	508,703	0	508,703
			Original Cost:			

CI 40244 – LIN Boiler Feed Pump Rebuild

The following is a breakdown of costs associated with the LIN Boiler Feed Pump Rebuild

Administrative Overheads and Interest	$[redacted]
Labour	$80,980
Materials	$[redacted]
Contracts	$[redacted]
Consulting	$[redacted]
Total	$508,703

The contracts estimate of $[redacted] is based on the attached vendor quotations and detailed cost estimate.

The labour estimate is based on the hourly rates per the collective agreement and the hours required to complete the refurbishment. The number of hours required is based on projects of similar scope which were completed in the recent past.

The materials estimate includes consumables that will be used during the refurbishment. This estimate is based on projects of similar scope completed in the recent past.

Station: LINGAN GENERATING STATION

CI Number: 40244

Project: LIN BOILER FEED PUMP REBUILD

Project Description: Lingan generating station boiler feedwater pump rebuild

Scope Statements : Scope is complete refurbishment of one the 8 BFP's. A major rebuild on Pump 3b plus rebuild on one other pump cartridge in 2011 is estimated. All teardown and rebuild work to remove the cartridge and install the back up cartridge is done by Lingan. The cartridge is evaluated and rebuilt to OEM condition by an outside

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals	
1	Regular Plant Labor					
	G/S Engineering	[redacted]		$6,580		
	E&MS Supervision	[redacted]		$3,360		
	E&MS Trades	[redacted]		$61,440		
	Sub-Total Plant Resources				$71,380	
2	Term Labor					
	Trades $30		320	$9,600		
	Sub-Total Term Resources				$9,600	
3	Consulting	[redacted]	120	[redacted]		
	HP weld stress relieving processes, weld procedure development, etc. 2 events AR					
	ND inspection	[redacted]	120	[redacted]		
	Sub-Total Consulting				[redacted]	
4	Material					
	Replacement misc parts, fasteners, gaskets, etc. required to complete the rebuild	[redacted]	2	[redacted]		
	Sub-Total Materials				[redacted]	
5	Contracts					
	Cartridge dismantle, evaluation inspection / test / report, re-assembly	[redacted]	2	[redacted]		Note 2
	Cartridge #1 typical re build / re fit incl matls + 10% Cont	[redacted]	1	[redacted]		Note 1
	Cartridge # 2 refurb AR - Contigency	[redacted]	1	[redacted]		
	Transportation - 2 events	[redacted]	2	[redacted]		
	Sub-Total Contracts				[redacted]	
6	A/O Charges					
	Interest Capitalized/Construction Overhead	$22,813	1			
	AO - Therm and Hydro Contracts	[redacted]	1			
	AO- thermal Re labor	$17,138	1			
	AO- Thermal Term labor	$2,305	1			
	Sub-Total A/O Charges			[redacted]	[redacted]	
	Total Project Estimate				$508,703	

Estimate Assumptions:
Refurb cost is typical tear down costs and repair plus
10% contigency on repair costs Note 1
[redacted]

Pages 459 - 475 have been removed due to confidentiality.

LIN-Boiler Feedpump Replacement 2011
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Power Production	**CI Number:**	40244
Department :	Lingan	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish / Rebuild Boiler Feed Pump	6.68%	238,590	1	29.19%	4.5 years
B	Replace Boiler Feed Pump	6.68%	-549,651	4	1.81%	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Rebuild / Refurbish the Boiler Feed Pump

Notes/Comments :

Refurbish / Rebuild Boiler Feed Pump

Justification of this project is based on a captial cost of $508,702 and an increasing probability of failure over the remaining life of the pump. The capacity loss in the event of a failure would be 154MW for 168 hours. Total avoided costs of failure for 2011 and 2012 are $195,932 and $218,389 respectively

Replace Boiler Feed Pump

Assumptions include an estimated captial cost of $2,300,000 to replace the existing pump and an increasing probability of failure over the life of the existing asset if replacement is not completed in 2011. The capacity loss in the event of a failure would be 154MW for 168 hours (assuming a replacement pump was purchased in advance of the un-planned failure and ready to be installed). Total avoided costs associated with a potential failure for 2011 and 2012 are $195,932 and $218,389 respectively.

Test 3

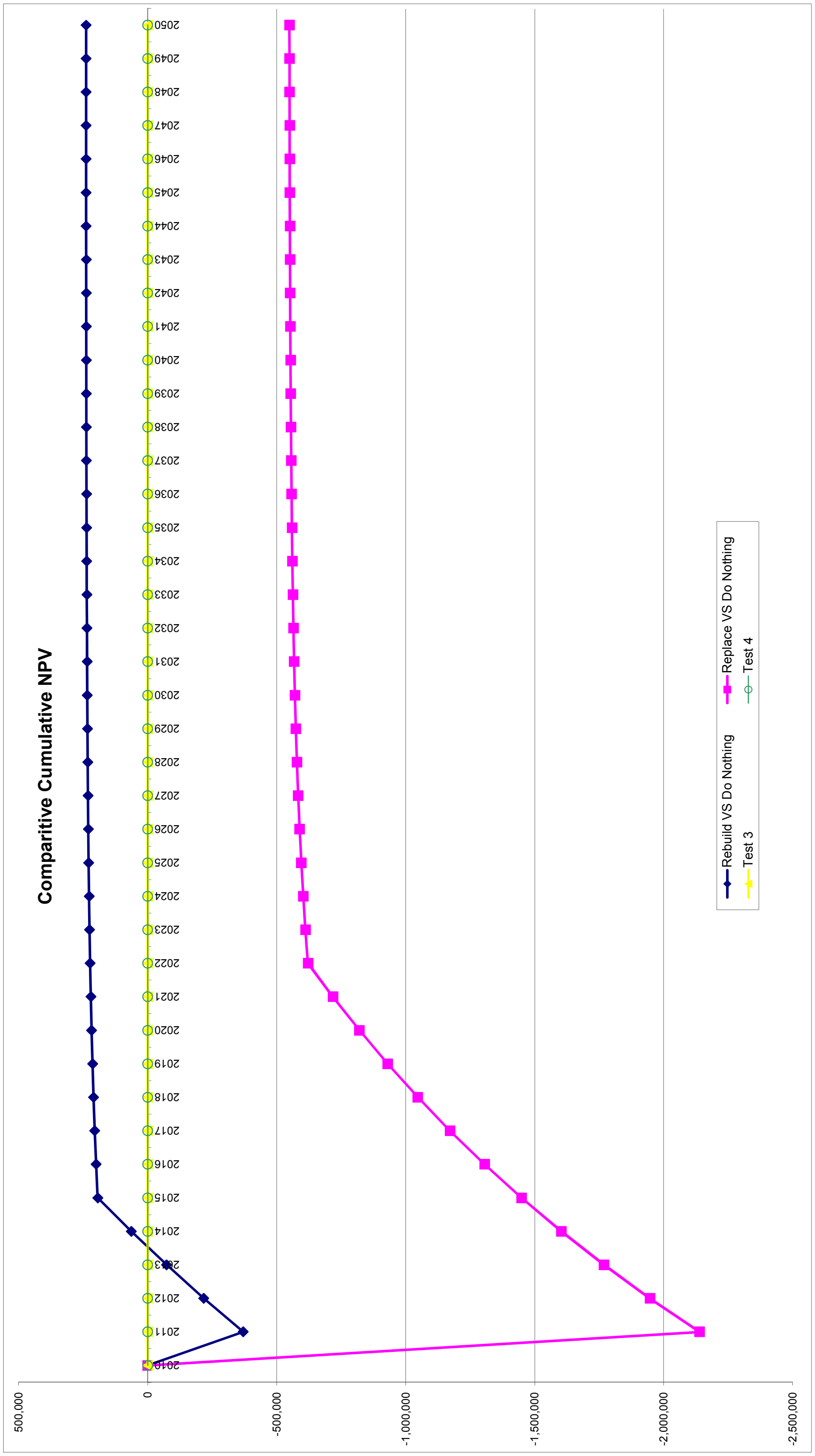
Test 4

LIN-Boiler Feedpump Replacement 2011
Rebuild VS Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	195,932	(508,702)	20,348	488,354	(312,770)	(57,312)	(370,082)	1.000	(370,082)	(370,082)
2012	-	218,390	-	39,068	449,286	218,390	(55,667)	162,722	0.937	152,533	(217,548)
2013	-	222,064	-	35,943	413,343	222,064	(57,697)	164,366	0.879	144,426	(73,122)
2014	-	225,804	-	33,067	380,275	225,804	(59,814)	165,990	0.824	136,720	63,598
2015	-	229,613	-	30,422	349,853	229,613	(61,749)	167,864	0.772	129,606	193,204
2016	-	-	-	27,988	321,865	-	8,676	8,676	0.724	6,279	199,484
2017	-	-	-	25,749	296,116	-	7,982	7,982	0.678	5,415	204,899
2018	-	-	-	23,689	272,427	-	7,344	7,344	0.636	4,670	209,569
2019	-	-	-	21,794	250,632	-	6,756	6,756	0.596	4,028	213,597
2020	-	-	-	20,051	230,582	-	6,216	6,216	0.559	3,473	217,070
2021	-	-	-	18,447	212,135	-	5,718	5,718	0.524	2,995	220,065
2022	-	-	-	16,971	195,164	-	5,261	5,261	0.491	2,583	222,649
2023	-	-	-	15,613	179,551	-	4,840	4,840	0.460	2,228	224,876
2024	-	-	-	14,364	165,187	-	4,453	4,453	0.431	1,921	226,797
2025	-	-	-	13,215	151,972	-	4,097	4,097	0.404	1,657	228,454
2026	-	-	-	12,158	139,814	-	3,769	3,769	0.379	1,429	229,883
2027	-	-	-	11,185	128,629	-	3,467	3,467	0.355	1,232	231,115
2028	-	-	-	10,290	118,339	-	3,190	3,190	0.333	1,063	232,178
2029	-	-	-	9,467	108,872	-	2,935	2,935	0.312	916	233,094
2030	-	-	-	8,710	100,162	-	2,700	2,700	0.293	790	233,884
2031	-	-	-	8,013	92,149	-	2,484	2,484	0.274	682	234,566
2032	-	-	-	7,372	84,777	-	2,285	2,285	0.257	588	235,154
2033	-	-	-	6,782	77,995	-	2,102	2,102	0.241	507	235,661
2034	-	-	-	6,240	71,755	-	1,934	1,934	0.226	437	236,098
2035	-	-	-	5,740	66,015	-	1,780	1,780	0.212	377	236,475
2036	-	-	-	5,281	60,734	-	1,637	1,637	0.199	325	236,800
2037	-	-	-	4,859	55,875	-	1,506	1,506	0.186	280	237,080
2038	-	-	-	4,470	51,405	-	1,386	1,386	0.174	242	237,322
2039	-	-	-	4,112	47,293	-	1,275	1,275	0.164	209	237,531
2040	-	-	-	3,783	43,509	-	1,173	1,173	0.153	180	237,710
2041	-	-	-	3,481	40,029	-	1,079	1,079	0.144	155	237,865
2042	-	-	-	3,202	36,826	-	993	993	0.135	134	237,999
2043	-	-	-	2,946	33,880	-	913	913	0.126	115	238,115
2044	-	-	-	2,710	31,170	-	840	840	0.118	99	238,214
2045	-	-	-	2,494	28,676	-	773	773	0.111	86	238,300
2046	-	-	-	2,294	26,382	-	711	711	0.104	74	238,374
2047	-	-	-	2,111	24,271	-	654	654	0.098	64	238,438
2048	-	-	-	1,942	22,330	-	602	602	0.091	55	238,493
2049	-	-	-	1,786	20,543	-	554	554	0.086	47	238,540
2050	-	-	-	1,643	18,900	-	626	626	0.080	50	238,590
Total	-	1,091,803	(508,702)	489,802	5,887,075	583,101	(189,527)	393,573	14.768	238,590	7,670,989

LIN-Boiler Feedpump Replacement 2011
Replace VS Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	195,932	(2,300,000)	92,000	2,208,000	(2,104,068)	(34,896)	(2,138,963)	1	(2,138,963)	(2,138,963)
2012	-	218,390	-	176,640	2,031,360	218,390	(13,293)	205,097	1	192,254	(1,946,709)
2013	-	221,319	-	162,509	1,868,851	221,319	(18,231)	203,088	1	178,450	(1,768,259)
2014	-	224,288	-	149,508	1,719,343	224,288	(23,478)	200,810	1	165,400	(1,602,859)
2015	-	227,299	-	137,547	1,581,796	227,299	(27,823)	199,476	1	154,013	(1,448,846)
2016	-	230,351	-	126,544	1,455,252	230,351	(32,180)	198,170	1	143,425	(1,305,421)
2017	-	233,445	-	116,420	1,338,832	233,445	(36,278)	197,167	1	133,763	(1,171,658)
2018	-	236,582	-	107,107	1,231,725	236,582	(40,137)	196,445	1	124,928	(1,046,730)
2019	-	239,763	-	98,538	1,133,187	239,763	(43,780)	195,983	1	116,830	(929,900)
2020	-	242,987	-	90,655	1,042,532	242,987	(47,223)	195,764	1	109,392	(820,508)
2021	-	246,257	-	83,403	959,130	246,257	(50,485)	195,772	1	102,546	(717,961)
2022	-	249,571	-	76,730	882,399	249,571	(53,581)	195,990	0	96,233	(621,729)
2023	-	-	-	70,592	811,807	-	21,884	21,884	0	10,072	(611,657)
2024	-	-	-	64,945	746,863	-	20,133	20,133	0	8,686	(602,971)
2025	-	-	-	59,749	687,114	-	18,522	18,522	0	7,491	(595,480)
2026	-	-	-	54,969	632,145	-	17,040	17,040	0	6,460	(589,020)
2027	-	-	-	50,572	581,573	-	15,677	15,677	0	5,571	(583,449)
2028	-	-	-	46,526	535,047	-	14,423	14,423	0	4,804	(578,644)
2029	-	-	-	42,804	492,243	-	13,269	13,269	0	4,143	(574,501)
2030	-	-	-	39,379	452,864	-	12,208	12,208	0	3,573	(570,928)
2031	-	-	-	36,229	416,635	-	11,231	11,231	0	3,081	(567,846)
2032	-	-	-	33,331	383,304	-	10,333	10,333	0	2,657	(565,189)
2033	-	-	-	30,664	352,640	-	9,506	9,506	0	2,292	(562,897)
2034	-	-	-	28,211	324,429	-	8,745	8,745	0	1,976	(560,921)
2035	-	-	-	25,954	298,474	-	8,046	8,046	0	1,704	(559,216)
2036	-	-	-	23,878	274,596	-	7,402	7,402	0	1,470	(557,746)
2037	-	-	-	21,968	252,629	-	6,810	6,810	0	1,268	(556,479)
2038	-	-	-	20,210	232,418	-	6,265	6,265	0	1,093	(555,385)
2039	-	-	-	18,593	213,825	-	5,764	5,764	0	943	(554,443)
2040	-	-	-	17,106	196,719	-	5,303	5,303	0	813	(553,630)
2041	-	-	-	15,738	180,981	-	4,879	4,879	0	701	(552,929)
2042	-	-	-	14,479	166,503	-	4,488	4,488	0	605	(552,324)
2043	-	-	-	13,320	153,183	-	4,129	4,129	0	521	(551,802)
2044	-	-	-	12,255	140,928	-	3,799	3,799	0	450	(551,353)
2045	-	-	-	11,274	129,654	-	3,495	3,495	0	388	(550,965)
2046	-	-	-	10,372	119,281	-	3,215	3,215	0	334	(550,630)
2047	-	-	-	9,543	109,739	-	2,958	2,958	0	288	(550,342)
2048	-	-	-	8,779	100,960	-	2,722	2,722	0	249	(550,093)
2049	-	-	-	8,077	92,883	-	2,504	2,504	0	215	(549,879)
2050	-	-	-	7,431	85,452	-	2,833	2,833	0	227	(549,651)
Total	-	2,766,182	(2,300,000)	2,214,548	26,617,297	466,182	(173,802)	292,381	15	(549,651)	(31,329,912)


Comparitive Cumulative NPV
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CI Number: 40246

Title: LIN Cooling Water Pump Refurbishment

Start Date: 2011/02

Final Cost Date: 2011/09

Function: Generation

Forecast Amount: $452,421

DESCRIPTION:

This project is for refurbishment of the 1A Cooling Water (CW) pump at the Lingan Generating Station.

This refurbishment includes re-surfacing and coating of worn, corroded and damaged surfaces and components, a new sleeveless, chromed stainless pump shaft, new marine bearings, and verification of all mating fits and alignments. The refurbishment project includes the installation of an additional bearing on the pump shaft. This bearing will help to maintain alignment and will reduce the movement of the pump shaft if misalignment occurs, protecting related bearings and running surfaces.

Summary of Related CI's +/- 2 years
2009 - 28914 LIN CW Pump Replacement $574,640
2010 - 39623 LIN U&U 3A Pump Refurbishment 381,736
2010 - 40127 LIN U&U A Pump Refurbishment $232,000

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Each operating unit is equipped with two 50% duty CW pumps, which supply cooling water to each unit's condenser and to various smaller heat exchangers serving the unit. Adequate condenser cooling is necessary to ensure proper condenser vacuum, which is a major contributor to unit efficiency. During the cooler months, one CW pump per operating unit is capable of providing adequate condenser cooling. During warmer months, simultaneous operation of both pumps is required to maintain condenser vacuum. If one of a unit's two pumps is unavailable during the warmer months, the Unit's heat rate and/or ability to generate full load will be restricted. The loss of both pumps would lead to an unplanned outage. The availability of these pumps is critical to ensure reliable unit operation. The CW pumps range in age from 18 to 23 years. Over the years, these pumps have developed normal operating wear and component erosion and corrosion due to solid particle and salt water exposure which has been managed through periodic maintenance overhauls.

Why do this project now?

The station's CW pumps are currently exhibiting wear profiles that indicate rebuilds must be completed as routine maintenance has extended the life but cannot address the age without this work. Completing this project now will mitigate the risk of unit de-rating or forced outages. This project will mitigate the risk of unit de-rating or forced outage due to the age and condition of CW pumps and long lead times on repairs and fabricated parts for these pumps.

Why do this project this way?

Refurbishing large pumps with new component and design features is more cost effective than procuring a replacement pump.

CI Number : 40246 - LIN Cooling Water Pump Refurbishment

Parent CI Number : -

Cost Centre : 301 - 301-Lingan Admin./Common Capital

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		11,735	0	11,735
095		095-Thermal Regular Labour AO		17,664	0	17,664
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	014	001 - THERMAL Regular Labour	014 - SGP - Circ.Water Sys.	73,568	0	73,568
004	014	004 - THERMAL Term Labour	014 - SGP - Circ.Water Sys.	0	0	0
012	014	012 - Materials	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
013	014	013 - POWER PRODUCTION Contracts	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
028	014	028 - Consulting	014 - SGP - Circ.Water Sys.	0	0	0
			Total Cost:	452,421	0	452,421
			Original Cost:			

CI 40246 – LIN Cooling Water Pump Refurbishment

The following is a breakdown of costs associated with the LIN Cooling Water Pump Refurbishment

Administrative Overheads and Interest	$[redacted]
Labour	$73,568
Materials	$[redacted]
Contracts	$[redacted]
Total	$452,421

The contracts estimate of $[redacted] is based on the attached vendor quotation for the refurbishment of the 3A CW pump, completed under CI 39623 in 2010. The estimate for this project has increased 15% to allow for added scope for pump bearings.

The labour estimate is based on the hourly rates per the collective agreement and the hours required to complete the refurbishment. The number of hours required is based on projects of similar scope which were completed in the recent past.

POWER PRODUCTION | **LINGAN GENERATING STATION** | **ENGINEERING SERVICES**

Station: LINGAN GENERATING STATION

CI Number: 40246

Project: LIN-CW PUMP Rebuild

Project Description: Extract , Rebuild and Install a CW pump to meet NSPI - Lingan CW pump technical specification plus added bearing support.

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals	
1	Regular Plant Labor					
	Engineering	[redacted]	[redacted]	$3,008		
	E&MS Supervision	[redacted]	[redacted]	$3,360		
	E&MS Trades	32	2,100	$67,200		
	Sub-Total Plant Resources				$73,568	
2	Material					
	Piping replacement		1	[redacted]		
	Consumables		1	[redacted]		
	Miscellaneous Materials		1	[redacted]		
	Sub-Total Materials				[redacted]	
3	Contracts					
	CW Pump rebuild subcontract -		1	[redacted]		Note 1
	Machine and Mech contracts - local		1	[redacted]		
	Transportation and Loading		1	[redacted]		
	Sub-Total Contracts				[redacted]	
4	A/O Charges					
	Interest Capitalized/Construction Overhead	11,735		[redacted]		
		[redacted]				
		17,664				
	Sub-Total A/O Charges				[redacted]	
	Total Project Estimate				$452,421	

Assumptions:

Note 1 [redacted]

Pages 485 - 494 have been removed due to confidentiality.

Refurbish BFP
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**21-Dec-10**
Division :	Generation Services	**CI Number:**	40246
Department :	Lingan Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish CW Pump	6.55%	1,727,054	1	128.26%	2.9 years
B	Test 2	6.55%	0	2	#NUM!	0.0 years
C	Test 3	6.55%	0	2	#NUM!	0.0 years
D	Test 4	6.55%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish Pump

Notes/Comments :

Refurbish CW Pump

Justification of this project is based on a capital cost of $452,421 and an increasing probability of failure over the life of the asset. Capacity loss in the event of a failure is 154MW for 504 hours. Total avoided costs for 2011 and 2012 in the event of a failure are $317,024 and $370,560 respectively.

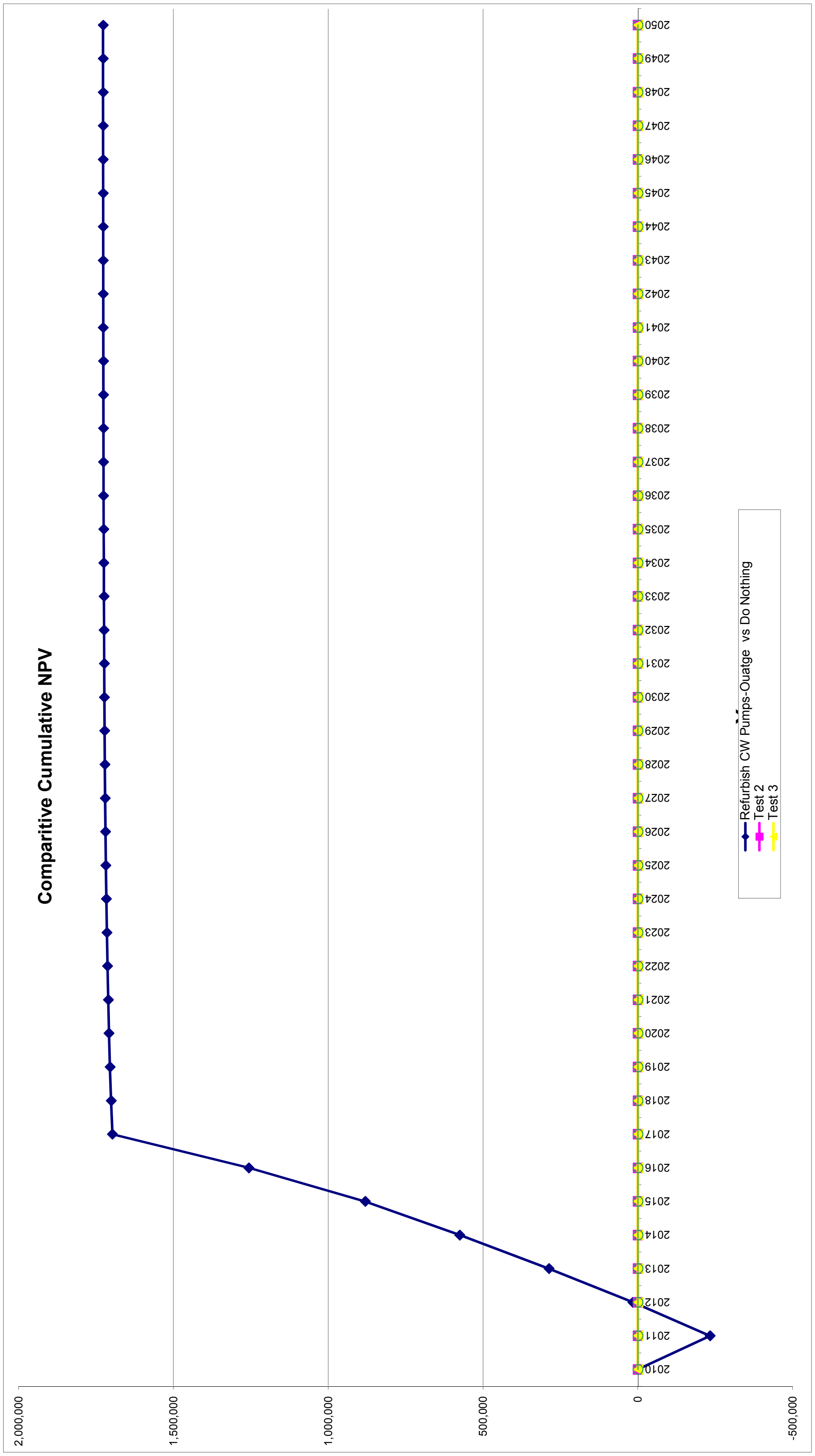
Test 2

Test 3

Test 4

Refurbish BFP
Refurbish CW Pumps-Ouatge vs Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	317,024	(452,421)	18,097	434,324	(135,397)	(97,371)	(232,768)	1.000	(232,768)	(232,768)
2012	-	370,561	-	34,746	399,578	370,561	(104,172)	266,389	0.937	249,709	16,941
2013	-	431,565	-	31,966	367,612	431,565	(123,876)	307,690	0.879	270,363	287,303
2014	-	494,697	-	29,409	338,203	494,697	(144,298)	350,400	0.824	288,612	575,915
2015	-	560,016	-	27,056	311,147	560,016	(165,218)	394,799	0.772	304,820	880,736
2016	-	741,877	-	24,892	286,255	741,877	(222,266)	519,612	0.724	376,066	1,256,802
2017	-	930,272	-	22,900	263,355	930,272	(281,285)	648,986	0.678	440,289	1,697,090
2018	-	-	-	21,068	242,286	-	6,531	6,531	0.636	4,153	1,701,244
2019	-	-	-	19,383	222,903	-	6,009	6,009	0.596	3,582	1,704,826
2020	-	-	-	17,832	205,071	-	5,528	5,528	0.559	3,089	1,707,915
2021	-	-	-	16,406	188,665	-	5,086	5,086	0.524	2,664	1,710,579
2022	-	-	-	15,093	173,572	-	4,679	4,679	0.491	2,297	1,712,876
2023	-	-	-	13,886	159,686	-	4,305	4,305	0.460	1,981	1,714,857
2024	-	-	-	12,775	146,911	-	3,960	3,960	0.431	1,709	1,716,566
2025	-	-	-	11,753	135,159	-	3,643	3,643	0.404	1,473	1,718,039
2026	-	-	-	10,813	124,346	-	3,352	3,352	0.379	1,271	1,719,310
2027	-	-	-	9,948	114,398	-	3,084	3,084	0.355	1,096	1,720,406
2028	-	-	-	9,152	105,246	-	2,837	2,837	0.333	945	1,721,351
2029	-	-	-	8,420	96,827	-	2,610	2,610	0.312	815	1,722,166
2030	-	-	-	7,746	89,081	-	2,401	2,401	0.293	703	1,722,869
2031	-	-	-	7,126	81,954	-	2,209	2,209	0.274	606	1,723,475
2032	-	-	-	6,556	75,398	-	2,032	2,032	0.257	523	1,723,998
2033	-	-	-	6,032	69,366	-	1,870	1,870	0.241	451	1,724,449
2034	-	-	-	5,549	63,817	-	1,720	1,720	0.226	389	1,724,837
2035	-	-	-	5,105	58,711	-	1,583	1,583	0.212	335	1,725,173
2036	-	-	-	4,697	54,014	-	1,456	1,456	0.199	289	1,725,462
2037	-	-	-	4,321	49,693	-	1,340	1,340	0.186	249	1,725,711
2038	-	-	-	3,975	45,718	-	1,232	1,232	0.174	215	1,725,926
2039	-	-	-	3,657	42,060	-	1,134	1,134	0.164	185	1,726,112
2040	-	-	-	3,365	38,696	-	1,043	1,043	0.153	160	1,726,271
2041	-	-	-	3,096	35,600	-	960	960	0.144	138	1,726,409
2042	-	-	-	2,848	32,752	-	883	883	0.135	119	1,726,528
2043	-	-	-	2,620	30,132	-	812	812	0.126	103	1,726,631
2044	-	-	-	2,411	27,721	-	747	747	0.118	88	1,726,719
2045	-	-	-	2,218	25,504	-	687	687	0.111	76	1,726,796
2046	-	-	-	2,040	23,463	-	632	632	0.104	66	1,726,861
2047	-	-	-	1,877	21,586	-	582	582	0.098	57	1,726,918
2048	-	-	-	1,727	19,859	-	535	535	0.091	49	1,726,967
2049	-	-	-	1,589	18,271	-	493	493	0.086	42	1,727,009
2050	-	-	-	1,462	16,809	-	557	557	0.080	45	1,727,054
Total	-	3,846,013	(452,421)	435,612	5,235,750	3,393,592	(1,061,951)	2,331,641	14.768	1,727,054	61,294,328


Comparitive Cumulative NPV
Refurbish CW Pumps-Ouatge vs Do Nothing
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Test 3
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CI Number: 28393

Title: POT 2A Mill and Feeder Refurbishment

Start Date: 2011/06

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $424,712

DESCRIPTION:

This project is to refurbish the Point Tupper 2A Mill and Feeder system. The scope of work will include:

- Replace rotating elements such as journals, shafts
- Replace mill liners, tables and vane wheels
- Upgrade the mill's coal feeder
- Replace obsolete speed controller
- Upgrade drive assembly

The journal assemblies, table and mill rotating elements are nearly twenty years old and many of the rotating component clearances now exceed Original Equipment Manufacturer (OEM) recommendations.

Replacement of the vane wheel and various liners throughout the mill will result in increased throughput in the mill, allowing the Unit to achieve full load operation.

The upgrade of the coal feeder related to this mill includes upgrading the obsolete speed controller.

Summary of Related CI's +/- 2 years
2009 – CI 28392 – POT 2B Mill and Feeder Refurbishment $488,457

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Timely refurbishments of the plant’s mills are important to ensure unit availability is maximized. A number of initiatives have been undertaken to extend component life, reduce mill forced outages, maximize mill availability and extend running hours between overhauls. Completing this project will improve mill performance and extend the maintenance lifecycle on mill rotating elements.

Why do this project now?

Based on an evaluation completed by plant personnel with the assistance of the OEM, refurbishment of the 2A mill is now required. This is based on the operating hours and normal wear of the mill's components.

Why do this project this way?

Refurbishment is the most practical and cost effective option.

CI Number	: 28393	- POT 2A Mill and Feeder Refurbishment		**Project Number**	
Parent CI Number	:	-		**Approved Date**	
Cost Centre	: 351	- 351-Pt.Tupper Admin./Capital		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
095		095-Thermal Overtime Labour AO		1,801	0	1,801
095		095-Thermal Regular Labour AO		14,526	0	14,526
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		14,406	0	14,406
001	018	001 - THERMAL Regular Labour	018 - SGP - Fuel Hndlg.Coal	60,500	0	60,500
002	018	002 - THERMAL Overtime Labour	018 - SGP - Fuel Hndlg.Coal	15,000	0	15,000
004	018	004 - THERMAL Term Labour	018 - SGP - Fuel Hndlg.Coal	60,000	0	60,000
012	018	012 - Materials	018 - SGP - Fuel Hndlg.Coal	[redacted]	0	[redacted]
013	018	013 - POWER PRODUCTION Contracts	018 - SGP - Fuel Hndlg.Coal	[redacted]	0	[redacted]
041	018	041 - Meals & Entertainment	018 - SGP - Fuel Hndlg.Coal	3,000	0	3,000
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
			Total Cost:	424,712	0	424,712
			Original Cost:			

CI 28393 – POT 2A Mill and Feeder Refurbishment

The following is a breakdown of costs associated with the POT 2A Mill and Feeder Refurbishment

Administrative Overheads and Interest	$[redacted]
Labour	$135,500
Materials	$[redacted]
Contracts	$[redacted]
Other	$[redacted]
Total	$424,712

The estimate for this project is based on CI 28392 – POT 2B Mill and Feeder Refurbishment, which was completed in 2009. This project is similar in scope to CI 28392. The actual expenditures for CI 28392 were as follows:

Administrative Overheads and Interest $35,217
Labour $135,736
Materials $309,727
Total $488,457

2A Mill and Feeded refurbishment
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	28393
Department :	Point Tupper Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish mill and feeder	6.68%	2,086,639	1	63.13%	3.8 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Complete refurbishment of the mill and feeder

Notes/Comments :

Refurbish mill and feeder

Justification of this project is based on a capital cost of $424,711 with an increasing probability of failure over the life of the asset if the refurbishment is not completed in 2011. Total capacity loss for this low-cost energy source is estimated to be 10MW for two months in the event of an un-planned failure. Total avoided replacement energy and repair costs for 2011 and 2012 are $214,144 and $220,892 respectively.

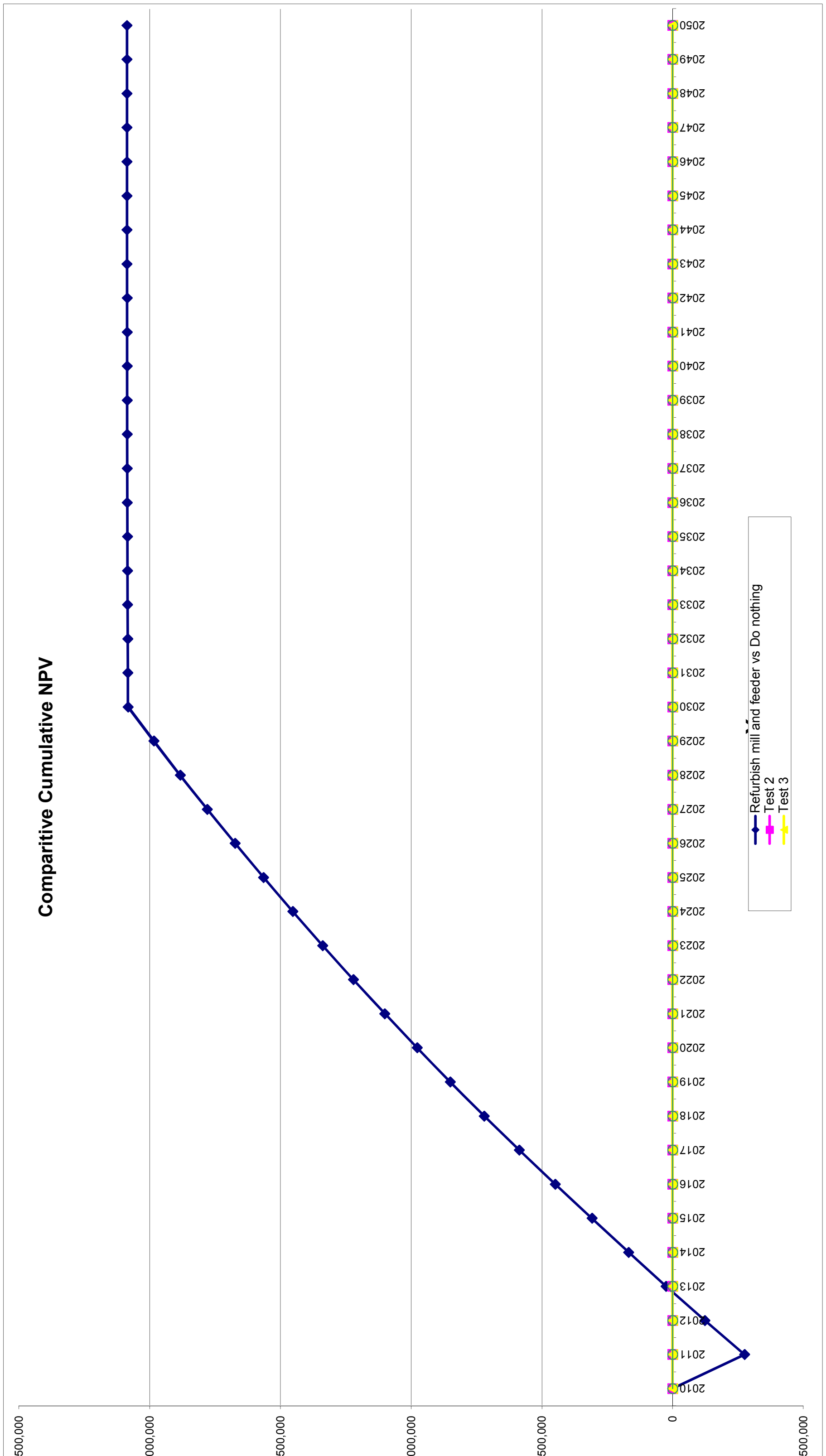
Test 2

Test 3

Test 4

2A Mill and Feeded refurbishment
Refurbish mill and feeder vs Do nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	214,144	(424,711)	16,988	407,723	(210,567)	(64,282)	(274,849)	1	(274,849)	(274,849)
2012	-	220,892	-	32,618	375,105	220,892	(58,430)	162,462	1	152,289	(122,559)
2013	-	230,336	-	30,008	345,096	230,336	(62,102)	168,235	1	147,825	25,266
2014	-	240,166	-	27,608	317,489	240,166	(65,948)	174,218	1	143,498	168,764
2015	-	250,399	-	25,399	292,090	250,399	(69,750)	180,649	1	139,477	308,241
2016	-	272,139	-	23,367	268,722	272,139	(77,119)	195,019	1	141,144	449,385
2017	-	283,682	-	21,498	247,225	283,682	(81,277)	202,405	1	137,316	586,701
2018	-	295,699	-	19,778	227,447	295,699	(85,536)	210,164	1	133,652	720,354
2019	-	308,210	-	18,196	209,251	308,210	(89,905)	218,306	1	130,137	850,491
2020	-	321,236	-	16,740	192,511	321,236	(94,394)	226,842	1	126,759	977,249
2021	-	334,799	-	15,401	177,110	334,799	(99,013)	235,785	1	123,506	1,100,755
2022	-	348,920	-	14,169	162,941	348,920	(103,773)	245,147	0	120,369	1,221,124
2023	-	363,624	-	13,035	149,906	363,624	(108,682)	254,941	0	117,339	1,338,463
2024	-	378,935	-	11,992	137,913	378,935	(113,752)	265,183	0	114,411	1,452,874
2025	-	394,878	-	11,033	126,880	394,878	(118,992)	275,886	0	111,575	1,564,449
2026	-	411,482	-	10,150	116,730	411,482	(124,413)	287,069	0	108,828	1,673,277
2027	-	428,772	-	9,338	107,392	428,772	(130,024)	298,748	0	106,164	1,779,441
2028	-	446,779	-	8,591	98,800	446,779	(135,838)	310,941	0	103,578	1,883,019
2029	-	465,533	-	7,904	90,896	465,533	(141,865)	323,668	0	101,066	1,984,085
2030	-	485,066	-	7,272	83,624	485,066	(148,116)	336,950	0	98,625	2,082,710
2031	-	-	-	6,690	76,935	-	2,074	2,074	0	569	2,083,279
2032	-	-	-	6,155	70,780	-	1,908	1,908	0	491	2,083,770
2033	-	-	-	5,662	65,117	-	1,755	1,755	0	423	2,084,193
2034	-	-	-	5,209	59,908	-	1,615	1,615	0	365	2,084,558
2035	-	-	-	4,793	55,115	-	1,486	1,486	0	315	2,084,873
2036	-	-	-	4,409	50,706	-	1,367	1,367	0	271	2,085,144
2037	-	-	-	4,056	46,650	-	1,258	1,258	0	234	2,085,379
2038	-	-	-	3,732	42,918	-	1,157	1,157	0	202	2,085,580
2039	-	-	-	3,433	39,484	-	1,064	1,064	0	174	2,085,754
2040	-	-	-	3,159	36,326	-	979	979	0	150	2,085,905
2041	-	-	-	2,906	33,419	-	901	901	0	129	2,086,034
2042	-	-	-	2,674	30,746	-	829	829	0	112	2,086,146
2043	-	-	-	2,460	28,286	-	762	762	0	96	2,086,242
2044	-	-	-	2,263	26,023	-	701	701	0	83	2,086,325
2045	-	-	-	2,082	23,941	-	645	645	0	72	2,086,397
2046	-	-	-	1,915	22,026	-	594	594	0	62	2,086,458
2047	-	-	-	1,762	20,264	-	546	546	0	53	2,086,512
2048	-	-	-	1,621	18,643	-	503	503	0	46	2,086,558
2049	-	-	-	1,491	17,152	-	462	462	0	40	2,086,597
2050	-	-	-	1,372	15,779	-	523	523	0	42	2,086,639
Total	-	6,695,692	(424,711)	408,932	4,915,069	6,270,981	(1,952,081)	4,318,900	15	2,086,639	61,481,584


Comparitive Cumulative NPV
Refurbish mill and feeder vs Do nothing
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CI Number: 39935

Title: TRE - Facilities Improvements

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $411,950

DESCRIPTION:

The Trenton Generating Station was built in phases over the period of time from 1950 to 1991. This project addresses the last of a 5 phase facility upgrade.

In 2007, Phase One of the Facilities Improvement Project was initiated to address issues related to the age of the facilities. Phase Two, completed in 2008, was a maintenance locker room / shower room renovation, control room renovation, and a storeroom improvement. Phase Three of this Facilities Improvement project was completed in 2009 and focused on upgrading the electrical / instrumentation locker room / shower room, additional locker / shower facilities for term employees, renovation of the administration washrooms, as well as the relocation of the equipment room of the Emergency Response Team. In 2010, the scope of the project included control room desk replacements, permit room improvements, and exterior plant improvements.

The final phase of this project will be completed in 2011 and includes remaining washroom upgrades, roadway remediation to address what had been maintained through normal patching but no longer possible, lunch area upgrades, removal of obsolete equipment, and remaining maintenance shop upgrades.

Summary of Related CI's +/- 2 years:
2009 - 30830 Facilities Improvement Phase 3 $102,798
2010 - 37622 Facilities Improvement Project – Ph.4 $499,499

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

Although regular maintenance and upkeep has been ongoing in these areas, the facilities have experienced normal wear over time and must be improved to provide suitable working areas for employees. Improvements completed in the first four phases have addressed all concern areas intended.

Why do this project now?

This project should proceed now to provide suitable washroom and lunch room areas as planned. Roadway conditions must be addressed to mitigate the risk of safety incidents and avoid increasing maintenance costs. Removal of large obsolete equipment from an older area of the maintenance shop that is now a high-volume pedestrian area will mitigate the potential for safety incidents.

Why do this project this way?

Completing the final phase of this project in this manner will provide suitable facilities for plant employees, mitigate the risk of minor safety incidents and have a positive impact on employee morale.

CI Number : 39935 - TRE - Facilities Improvements

Parent CI Number : -

Cost Centre : 341 - 341-Trenton Admin./Common Capital

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001		001 - THERMAL Regular Labour		[redacted]	0	[redacted]
002		002 - THERMAL Overtime Labour		10,000	0	10,000
004		004 - THERMAL Term Labour		60,000	0	60,000
012		012 - Materials		[redacted]	0	[redacted]
016		016 - Tools & Equipment		10,000	0	10,000
033		033 - Rental and Maintenance of		6,000	0	6,000
094		094 - Interest Capitalized		12,274	0	12,274
095		095-Thermal Overtime Labour AO		1,323	0	1,323
095		095-Thermal Regular Labour AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		15,882	0	15,882
			Total Cost:	411,950	0	411,950
			Original Cost:			

CI Number: 39760

Title: TUC - Asbestos Abatement 2011

Start Date: 2011/02

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $384,297

DESCRIPTION:

Asbestos insulation is being removed from Tuft's Cove Generating Station as part of a multi-year plan. This project includes building a type-3 asbestos enclosure at the auxiliary boiler, completely dismantling the auxiliary boiler, removal of asbestos and disposing of all of the waste. Upon completing the work in 2011, approximately 85% of the asbestos inventory will be removed from the plant.

Summary of Related CI's +/- 2 years
2009 - 30464 TUC Asbestos Abatement 2009 $200,924
2010 - 34484 TUC Asbestos Abatement 2010 $ 201,165

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

Removing asbestos insulation reduces the risk of asbestos particles becoming air-borne in those areas where encapsulating is no longer viable for sustained protection due to frequency of repair due to vibration or operating condition.

Why do this project now?

The removal of asbestos-contaminated insulation is being completed in a staged program in accordance with NSPI’s asbestos management plan. The areas to be addressed in 2011 are in accordance with the plant's asbestos management plan and inventory.

Why do this project this way?

The removal of the asbestos contaminated material is based on applied industry practices. Encapsulating is used to seal asbestos where practical. Removal is then planned to reduce the level of asbestos in a controlled manner in the operating plant.

CI Number : 39760	- TUC - Asbestos Abatement 2011	**Project Number**	
Parent CI Number :	-	**Approved Date**	
Cost Centre : 311	- 311-Tufts Cove Admin./Common Capita	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001		001 - THERMAL Regular Labour		6,080	0	6,080
013		013 - POWER PRODUCTION Contracts		[redacted]	0	[redacted]
094		094 - Interest Capitalized		19,123	0	19,123
095		095-Thermal Regular Labour AO		1,460	0	1,460
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
			Total Cost:	384,297	0	384,297
			Original Cost:			

CI 39760 – TUC Asbestos Abatement 2011

The following is a breakdown of costs associated with the Asbestos Abatement 2011:

Administrative Overheads and Interest	$[redacted]
Labour	$6,080
Contracts	$[redacted]
Total	$384,297

The contracts estimate of $[redacted] is based on the vendor quotes attached and NSPI engineering staff experience with asbestos abatement projects completed in the recent past.

Pages 509 - 512 have been removed due to confidentiality.

CI Number: 39946

Title: TRE - Wastewater Treatment Plant Expansion Joint Replacement

Start Date: 2011/04

Final Cost Date: 2011/10

Function: Generation

Forecast Amount: $353,531

DESCRIPTION:

The operating permit for the Trenton Generating Station requires that the integrity of the wastewater basins be maintained to ensure that water discharged from the site meets environmental guidelines, based on the Environmental Code of Practice for Steam Electric Power Generation. The basins were commissioned in 1991 with the commissioning of Unit #6.

Preliminary inspections in September 2008 revealed that the expansion joints in the basins were in a state of degradation, consistent with 20 years of service and would need to be refurbished in the future. Follow-up inspections, with a basin drained, resulted in evidence of small leaks between the basins, not to the exterior of the basins. The scope of this project includes inspection and refurbishment of the wastewater basins to ensure their integrity is maintained and the risk of uncontrolled release of wastewater is mitigated. The refurbishment includes replacement of the expansion joint in the A Basin and repair of the basin's protective coating and sealant.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Equipment Replacement

Why do this project?

Remedial action is required to ensure the integrity of the wastewater basins is maintained.

Why do this project now?

This project must be completed now to ensure the integrity of the basins is maintained and mitigate the risk of wastewater being released in an uncontrolled manner. Completing this project now in a planned manner will avoid more costly repairs and remedial work in the event that an external leakage suddenly occurred.

Why do this project this way?

Complete inspection of the wastewater basins and refurbishment is the most practical and cost effective solution.

CI Number : 39946 - TRE - Wastewater Treatment Plant Upgrades **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 341 - 341-Trenton Admin./Common Capital **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		6,859	0	6,859
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		720	0	720
001	015	001 - THERMAL Regular Labour	015 - SGP - Waste Water	0	0	0
002	015	002 - THERMAL Overtime Labour	015 - SGP - Waste Water	0	0	0
004	015	004 - THERMAL Term Labour	015 - SGP - Waste Water	0	0	0
012	015	012 - Materials	015 - SGP - Waste Water	[redacted]	0	[redacted]
013	015	013 - POWER PRODUCTION Contracts	015 - SGP - Waste Water	[redacted]	0	[redacted]
016	015	016 - Tools & Equipment	015 - SGP - Waste Water	0	0	0
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	3,000	0	3,000
			Total Cost:	353,531	0	353,531
			Original Cost:			

CI Number: 26472

Title: TRE - 6A Cooling Water Pump Refurbishment

Start Date: 2011/02

Final Cost Date: 2011/04

Function: Generation

Forecast Amount: $349,690

DESCRIPTION:

The Trenton Unit #6 circulating water (CW) system supplies cooling water to the steam condenser. Cooling water is drawn from a shoreline intake through a pair of traveling screens by two vertical single-stage pumps. The water is then pumped through the CW piping and into the steam condenser inlet. These pumps also supply cooling water to the turbine lube-oil coolers, general service cooling water coolers, hydrogen coolers and vacuum pump heat exchangers.

The 6A CW pump is a salt water service, single stage, vertical mixed-flow pump rated at approximately 61,000 US gpm, with a 950 horsepower motor. Completing a pump overhaul and refurbishment will reduce the risk of an unexpected pump failure and associated replacement energy costs, resulting from a forced unit derating.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The overhaul and refurbishment of the 6A cooling water pump is required in 2011 based on the plant's Life Cycle Management Program. The pump was last inspected in the mid 1990's. Based on the duration the pump has been in operation since the last inspection, it is anticipated that the shafts, shaft sleeves, impeller and inlet casing will require refurbishment or replacement. The pump will be disassembled and inspected to confirm components requiring refurbishment or replacements. Based on the inspection results, the worn components will be refurbished or replaced as required. During certain times of the year (typically April to October), the Trenton Generating Station must operate both CW pumps to achieve full load. If one CW pump is forced out of service, the average output drops by 48 MW due to loss of vacuum.

Why do this project now?

The pump must be overhauled and refurbished in 2011. Not completing this pump overhaul could reduce the availability of cooling water to Trenton Unit #6. An unplanned outage in the spring, summer or fall would reduce the volume of cooling water to Unit #6 such that it could not operate at full load. This would decrease generation output and could result in the purchase of replacement energy. Even though there are minimal diagnostic concerns in performance, completing internal inspection and overhaul now will ensure a more costly in-service failure does not occur.

Based on experience and condenser design data, the pump can be shut down when river water temperatures drop to 4 degrees Celsius without having to reduce generation. With these cooler water temperatures, the 6B CW pump can provide cooling water demand while the 6A CW pump is refurbished. Historical data indicates that the best timeframe to complete this work is between November and March. This refurbishment would ensure the continued reliability of the pump, while minimizing the risk of unplanned failure and associated maintenance costs.

Why do this project this way?

The most cost-effective option is to refurbish the CW pump during a planned outage. The option to replace the pump with a new pump was evaluated and is not the most cost-effective option. The worn components that require replacement or refurbishment will be identified when the pump is shut down and inspected.

CI Number : 26472 - TRE - 6A Cooling Water Pump Refurbishment

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 345 - 345-Trenton unit 6 Capital

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		3,775	0	3,775
095		095-Thermal Regular Labour AO		26,171	0	26,171
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	014	001 - THERMAL Regular Labour	014 - SGP - Circ.Water Sys.	100,000	0	100,000
012	014	012 - Materials	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
013	014	013 - POWER PRODUCTION Contracts	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	6,000	0	6,000
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	3,000	0	3,000
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	349,690	0	349,690
			Original Cost:			

TRE6 - 6A CW Pump Refurbishment
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	26472
Department :	Trenton GS	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish 6A CW Pump	6.68%	968,901	1	53.82%	4.1 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish 6A CW Pump

Notes/Comments :

Refurbish 6A CW Pump

Justification of this project is based on a capital cost of $349,690, an avoided capacity loss of 47.5MW for 1 week, and a total avoided replacement energy cost in 2011 and 2012 of $163,590 and $166,861 respectively.

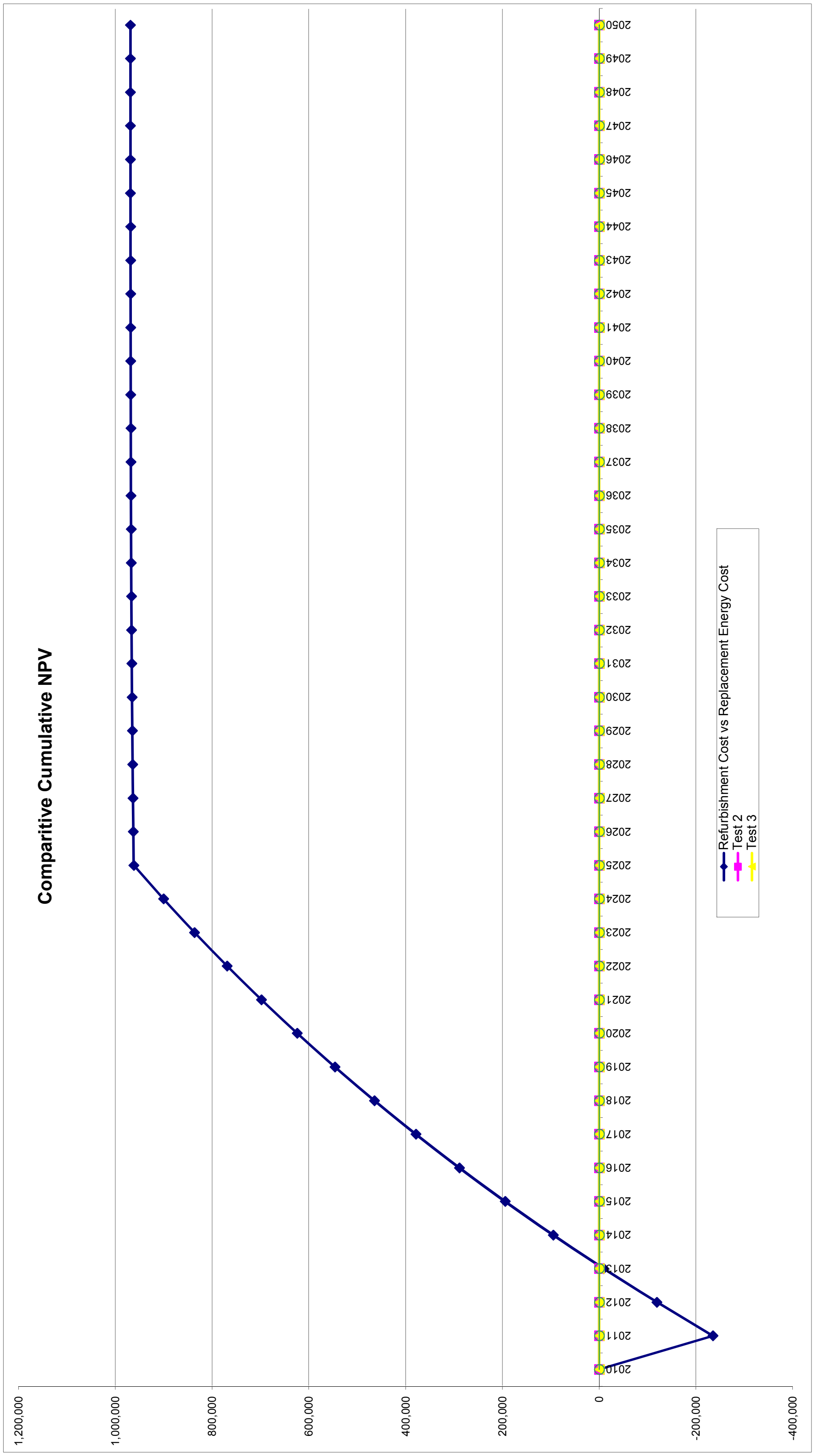
Test 2

Test 3

Test 4

TRE6 - 6A CW Pump Refurbishment
Refurbishment Cost vs Replacement Energy Cost

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	163,590	(349,690)	13,988	335,702	(186,100)	(48,791)	(234,891)	1.000	(234,891)	(234,891)
2012	-	166,862	-	26,856	308,846	166,862	(43,455)	123,407	0.937	115,679	(119,211)
2013	-	170,199	-	24,708	284,139	170,199	(45,102)	125,097	0.879	109,921	(9,291)
2014	-	173,603	-	22,731	261,407	173,603	(46,815)	126,788	0.824	104,431	95,140
2015	-	177,075	-	20,913	240,495	177,075	(48,410)	128,665	0.772	99,341	194,481
2016	-	180,617	-	19,240	221,255	180,617	(50,027)	130,590	0.724	94,514	288,994
2017	-	184,229	-	17,700	203,555	184,229	(51,624)	132,605	0.678	89,963	378,957
2018	-	187,913	-	16,284	187,270	187,913	(53,205)	134,708	0.636	85,667	464,624
2019	-	191,672	-	14,982	172,289	191,672	(54,774)	136,898	0.596	81,608	546,232
2020	-	195,505	-	13,783	158,506	195,505	(56,334)	139,171	0.559	77,768	624,000
2021	-	199,415	-	12,680	145,825	199,415	(57,888)	141,527	0.524	74,133	698,133
2022	-	203,404	-	11,666	134,159	203,404	(59,439)	143,965	0.491	70,688	768,821
2023	-	207,472	-	10,733	123,426	207,472	(60,989)	146,483	0.460	67,420	836,241
2024	-	211,621	-	9,874	113,552	211,621	(62,542)	149,080	0.431	64,319	900,560
2025	-	215,854	-	9,084	104,468	215,854	(64,098)	151,755	0.404	61,374	961,934
2026	-	-	-	8,357	96,111	-	2,591	2,591	0.379	982	962,916
2027	-	-	-	7,689	88,422	-	2,384	2,384	0.355	847	963,763
2028	-	-	-	7,074	81,348	-	2,193	2,193	0.333	730	964,493
2029	-	-	-	6,508	74,840	-	2,017	2,017	0.312	630	965,123
2030	-	-	-	5,987	68,853	-	1,856	1,856	0.293	543	965,666
2031	-	-	-	5,508	63,345	-	1,708	1,708	0.274	469	966,135
2032	-	-	-	5,068	58,277	-	1,571	1,571	0.257	404	966,539
2033	-	-	-	4,662	53,615	-	1,445	1,445	0.241	348	966,887
2034	-	-	-	4,289	49,326	-	1,330	1,330	0.226	300	967,188
2035	-	-	-	3,946	45,380	-	1,223	1,223	0.212	259	967,447
2036	-	-	-	3,630	41,749	-	1,125	1,125	0.199	223	967,670
2037	-	-	-	3,340	38,409	-	1,035	1,035	0.186	193	967,863
2038	-	-	-	3,073	35,337	-	953	953	0.174	166	968,029
2039	-	-	-	2,827	32,510	-	876	876	0.164	143	968,173
2040	-	-	-	2,601	29,909	-	806	806	0.153	124	968,296
2041	-	-	-	2,393	27,516	-	742	742	0.144	107	968,403
2042	-	-	-	2,201	25,315	-	682	682	0.135	92	968,495
2043	-	-	-	2,025	23,290	-	628	628	0.126	79	968,574
2044	-	-	-	1,863	21,427	-	578	578	0.118	68	968,643
2045	-	-	-	1,714	19,712	-	531	531	0.111	59	968,702
2046	-	-	-	1,577	18,135	-	489	489	0.104	51	968,752
2047	-	-	-	1,451	16,685	-	450	450	0.098	44	968,796
2048	-	-	-	1,335	15,350	-	414	414	0.091	38	968,834
2049	-	-	-	1,228	14,122	-	381	381	0.086	33	968,867
2050	-	-	-	1,130	12,992	-	431	431	0.080	35	968,901
Total	-	2,829,030	(349,690)	336,698	4,046,871	2,479,340	(775,055)	1,704,285	14.768	968,901	30,577,881


Comparitive Cumulative NPV
Refurbishment Cost vs Replacement Energy Cost
Test 2
Test 3
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
-200,000
-400,000
2010
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CI Number: 40427

Title: LIN3 Turbine Fire Suppression

Start Date: 2011/04

Final Cost Date: 2011/09

Function: Generation

Forecast Amount: $348,710

DESCRIPTION:

This project includes the addition of a fixed fire protection system for the Unit #3 steam turbine generator at the Lingan Generating Station. At the time of construction, fire protection requirements were adequate, but a recent risk analysis identified that existing fire protection around the turbine generator no longer meets current industry standards.

Summary of Related CI's +/- 2 years
2009 - 29039 LIN4 Fire Protection Turbine Hall $607,020
2010 - 38846 LIN1 Fire Protection Turbine Hall $293,891
2011 – 40184 LIN2 Turbine Fire Suppression $343,611

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

In a recent assessment of fire protection systems at all NSPI thermal plants, the highest risk items identified were those associated with the turbine generator area of the plants. This risk is best mitigated by applying a fixed fire protection system around the equipment in this area as well as drainage for hydraulic oils and lubricants. A system of similar design was installed on Lingan's Unit #4 in 2009 and Unit #1 in 2010. The system design and construction on these two units is similar to the fire suppression system to be installed on Unit #3. In the event of a turbine fire, it is industry experience that these fire systems reduce outage durations and repair costs.

Why do this project now?

As a result of recent inspections, NSPI's insurance providers have recommended the need to introduce additional fire protection system modifications. Completing this project now will ensure the fire protection system is returned to current industry standards providing adequate loss control.

Why do this project this way?

The benchmark study used for assessing loss control practices are NFPA 850 and FM DS7-1 01. Although they are recommended practices, they have become accepted industry guidelines that are widely used by insurers for risk assessments in power generation facilities. The new fire protection system will be integrated into the existing current system.

CI Number	: 40427	- LIN3 Turbine Fire Suppression		**Project Number**	
Parent CI Number	:	-		**Approved Date**	
Cost Centre	: 305	- 305-Lingan 3&4 Prod.Unit		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		11,973	0	11,973
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		10,084	0	10,084
095		095-Thermal Regular Labour AO		9,282	0	9,282
095		095-Thermal Overtime Labour AO		240	0	240
001	010	001 - THERMAL Regular Labour	010 - SGP - Turbo Gen.Instal.	38,660	0	38,660
002	010	002 - THERMAL Overtime Labour	010 - SGP - Turbo Gen.Instal.	2,000	0	2,000
004	010	004 - THERMAL Term Labour	010 - SGP - Turbo Gen.Instal.	42,000	0	42,000
011	010	011 - Travel Expense	010 - SGP - Turbo Gen.Instal.	6,000	0	6,000
012	010	012 - Materials	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
013	010	013 - POWER PRODUCTION Contracts	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
			Total Cost:	348,710	0	348,710
			Original Cost:			

CI 40427 – LIN3 Turbine Fire Suppression

The following is a breakdown of costs associated with the LIN3 Turbine Fire Suppression

Administrative Overheads and Interest	$[redacted]
Labour	$82,660
Materials	$[redacted]
Contracts	$[redacted]
Other	$6,000
Total	$348,710

The contracts estimate of $[redacted] is based on the attached vendor quotation for the work completed in 2010 under CI 38846 – LIN1 Fire Protection Turbine Hall. The contracts estimate for this project has been increased by 10% over the amount in the attached vendor quote to account for price escalation and minor differences in project scope.

The labour estimate is mostly regular labour per the attached account breakdown and detailed estimate. The estimate is based on the hourly rates per the collective agreement and the hours required to complete the project. The number of hours required is based on experienced gained in completion of CI 38846 – LIN1 Fire Protection Turbine Hall.

Station: LINGAN GENERATING STATION

CI Number: 40427

Project: LIN3-Fire Suppression Turbine & Generator

Project Description: Installation of a Fire Suppression System, Lingan Unit 3 Turbine and Generator

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals
1	Regular Plant Labor				
	Engineering	[redacted]	[redacted]	$6,580	
	Maintenance Supervision	[redacted]	[redacted]	$3,360	
	Mechanical Trades	$32	960	$30,720	
	Sub-Total Plant Resources				$40,660
2	Term Labor				
	Utilities Trades. Staging , forms , etc	$30	1400	$42,000	
	Sub-Total Term Resources				$42,000
3	Material				
	Misc Materials - welding, brackets , curbs, etc	[redacted]	1	[redacted]	
	Sub-Total Materials				[redacted]
4	Contracts				
	Fire Protection System Fixed Price Contract	[redacted]	1	[redacted]	
	Misc Rentals and services - (access boom, MacTron tie in and commission)	[redacted]	1	[redacted]	
	Sub-Total Contracts				[redacted]
5	Travel Expense				
	Gen Services. Supplier technical review and progress monitor	$2,000	3	$6,000	$6,000
6	A/O Charges				
	Interest Capitalized/Construction Overhead	$11,973	1	[redacted]	
	AO - Therm and Hydro Contracts	[redacted]	1		
	AO- Thermal Regular labor	$9,282	1		
	AO- Thermal OT labor	$240	1		
	AO- Thermal Term labor	$10,084	1		
	Sub-Total A/O Charges				[redacted]
	Total Project Estimate				$348,710

Estimate Assumptions:
Scope is very similar to LIN project in 2010.
[redacted]

Pages 525 - 547 have been removed due to confidentiality.

Generating Station	Area	Protection	Investment Timeframe				
			2010	2011	2012	2013	2014
Lingan	Unit 1 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler	X				
	Fire System Electrical Panel Upgrades		X				
	Fire System Valve Replacement		X				
	Unit 1 Burner Front	Wet Automatic Sprinkler	X				
	Unit 2 Burner Front	Wet Automatic Sprinkler	X				
	Unit 2 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler		X			
	Unit 3 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler		X			
	Unit 3 Burner Front	Wet Automatic Sprinkler		X			
	Unit 4 Burner Front	Wet Automatic Sprinkler		X			
	Unit 1/2 Cable Spreading Room Elev. 112.5 m (4 m X 12 m X 36 m) 1728 cubic metres, 61,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action			X		
	Unit 1/2 Cable Spreading Room Elev. 120.2 m (3 m X 12 m X 42.3 m) 1522 cubic metres, 54,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action			X		
	Unit 3/4 Cable Spreading Room Elev. 112.5 m (4 m X 12 m X 36 m) 1728 cubic metres, 61,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action			X		
	Unit 3/4 Cable Spreading Room Elev. 120.2 m (3 m X 12 m X 42.3 m) 1522 cubic metres, 54,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action			X		
Point Aconi	Unit 1 Burner Fronts	Wet Automatic Sprinkler		X			
	Unit 1 Switch Gear Room Elevation 107.2 m (25 m X 14.5 m X 6 m) 2175 cubic metres, 77,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action		X			
	Unit 1 Relay Room Elevation 113.2 m (25 m X 14.5 m X 6 m) 2175 cubic metres, 77,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action		X			
	Unit 1 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler					X
Point Tupper	Unit 1/2 Cable Spreading Room Elevation (100 m X 5 m X 2.5 m) 1250 cubic metres, 45,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action				X	
	Fire System Electrical Panel Upgrade					X	
	Unit 1 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler					X
	Replace Fire Pumps - More Capacity						X
Trenton	Fire System Upgrades		X				
	Unit 5 Burner Front	Wet Automatic Sprinkler	X				
	Unit 6 Burner Front	Wet Automatic Sprinkler		X			
	Unit 5 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler			X		
	Unit 6 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler			X		
	Unit 6 4160 Switchgear Cable Spreading Room Elevation 29.8 m (7.6 m X 37.8 m X 3 m) 860 cubic metres, 30,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action			X		
	Unit 6 MCC Cable Spreading Room Elevation 22.7 m (7.6 m X 37.8 m X 3 m) 860 cubic metres, 30,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action			X		
	Unit 5 Relay Room Elev 42 ft (50 ft X 30 ft X 12 ft) 18,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action				X	
	Unit 5 4160 v Switch Gear Room Elev. 73' 0" (100' X 20' X 15') 30,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action				X	
	Unit 5 4160 v Switch Gear Cable Area Elev. 57' 6" (100' X 20' X 15') 30,000 cubic feet	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action				X	
Tufts Cove	Unit 1 Burner Front	Wet Automatic Sprinkler	X				
	Unit 2 Burner Front	Wet Automatic Sprinkler	X				
	Unit 3 Burner Front	Wet Automatic Sprinkler	X				
	TUC 6 Turbine-Generator and Lube Oil Sprinkler, Transformer Deluge.	Pre Action Water Sprinkler and Deluge	X				
	Unit 2 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler				X	
	Unit 3 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler				X	
	Fire System Electrical Panel Upgrade					X	
	Unit 1 Turbine - Generator Sprinkler System	Pre-Action Water Sprinkler					X
	Cable Spreading/Relay Room	Clean Gaseous (Novec 1230, Inergen), Victaulic Vortex or VEWFD with Pre-Action					X

CI Number: 40184

Title: LIN2 Turbine Fire Suppression

Start Date: 2011/04

Final Cost Date: 2011/09

Function: Generation

Forecast Amount: $343,611

DESCRIPTION:

This project includes the addition of a fixed fire protection system for the Unit #2 steam turbine generator at the Lingan Generating Station. At the time of construction, fire protection requirements were adequate, but a recent risk analysis identified that existing fire protection around the turbine generator no longer meets current industry standards.

Summary of Related CI's +/- 2 years
2009 - 29039 LIN4 Fire Protection Turbine Hall $607,020
2010 - 38846 LIN1 Fire Protection Turbine Hall $293,891
2011 – 40427 LIN3 Turbine Fire Suppression $348,710

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

In a recent assessment of fire protection systems at all NSPI thermal plants, the highest risk items identified were those associated with the turbine generator area of the plants. This risk is best mitigated by applying a fixed fire protection system around the equipment in this area as well as drainage for hydraulic oils and lubricants. A system of similar design was installed on Lingan's Unit #4 in 2009 and Unit #1 in 2010. The system design and construction on these two units is similar to the fire suppression system to be installed on Unit #2. In the event of a turbine fire, it is industry experience that these fire systems reduce outage durations and repair costs.

Why do this project now?

As a result of recent inspections, NSPI's insurance providers have recommended the need to introduce additional fire protection system modifications. Completing this project now will ensure the fire protection system is returned to current industry standards providing adequate loss control.

Why do this project this way?

The benchmark study used for assessing loss control practices are NFPA 850 and FM DS7-1 01. Although they are recommended practices, they have become accepted industry guidelines that are widely used by insurers for risk assessments in power generation facilities. The new fire protection system will be integrated into the existing current system.

CI Number : 40184 - LIN2 Turbine Fire Suppression | **Project Number**

Parent CI Number : - | **Approved Date**

Cost Centre : 304 - 304-Lingan 1&2 Prod. Unit | **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		7,504	0	7,504
095		095-Thermal Regular Labour AO		9,282	0	9,282
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Overtime Labour AO		240	0	240
095		095-Thermal Term Labour AO		10,084	0	10,084
001	010	001 - THERMAL Regular Labour	010 - SGP - Turbo Gen.Instal.	38,660	0	38,660
002	010	002 - THERMAL Overtime Labour	010 - SGP - Turbo Gen.Instal.	2,000	0	2,000
004	010	004 - THERMAL Term Labour	010 - SGP - Turbo Gen.Instal.	42,000	0	42,000
011	010	011 - Travel Expense	010 - SGP - Turbo Gen.Instal.	6,000	0	6,000
012	010	012 - Materials	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
013	010	013 - POWER PRODUCTION Contracts	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
			Total Cost:	343,611	0	343,611
			Original Cost:			

CI 40184 – LIN2 Turbine Fire Suppression

The following is a breakdown of costs associated with the LIN2 Turbine Fire Suppression

Administrative Overheads and Interest	$[redacted]
Labour	$82,660
Materials	$[redacted]
Contracts	$[redacted]
Other	$6,000
Total	$343,611

The contracts estimate of $[redacted] is based on the attached vendor quotation for the work completed in 2010 under CI 38846 – LIN1 Fire Protection Turbine Hall. The contracts estimate for this project has been increased by 10% over the amount in the attached vendor quote to account for price escalation.

The labour estimate is mostly regular labour per the attached account breakdown and detailed estimate. The estimate is based on the hourly rates per the collective agreement and the hours required to complete the project. The number of hours required is based on experienced gained in the completion of CI 38846 – LIN1 Fire Protection Turbine Hall.

Please refer to CI 40427, Confidential Attachment 3 for the recent assessment of fire protection systems and Confidential Attachment 4 for the 5 year Plan.

POWER PRODUCTION | **LINGAN GENERATING STATION** | **ENGINEERING SERVICES**

Station: LINGAN GENERATING STATION

CI Number: 40184

Project: LIN2-Fire Suppression Turbine & Generator

Project Description: Installation of a Fire Suppression System, Lingan Unit 2 Turbine and Generator

Scope statements: Pre-action suppression system on the turbine and generator bearings and electrical components and the necessary standard wet sprinkler coverage of the area including the various grated mezzanines present. Coverage flow rates for the aforementioned sprinklers are as prescribed in NFPA 850 and NFPA 13. Subcontract installation with LIN support for special access to turbine sections , bracket welds and floor level containment curbs

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals
1	Regular Plant Labor				
	Engineering	[redacted]	[redacted]	$6,580	
	Maintenance Supervision	[redacted]	[redacted]	$3,360	
	Mechanical Trades	$32	960	$30,720	
	Sub-Total Plant Resources				$40,660
2	Term Labor				
	Utilities Trades. Staging , forms , etc	$30	1400	$42,000	
	Sub-Total Term Resources				$42,000
3	Material				
	Misc Materials - welding, brackets , curbs, etc	[redacted]	1	[redacted]	
	Sub-Total Materials				[redacted]
4	Contracts				
	Fire Protection System Fixed Price Contract	[redacted]	1	[redacted]	
	Misc Rentals and services - (access boom, MacTron tie in and commission)	[redacted]	1	[redacted]	
	Sub-Total Contracts				[redacted]
5	Travel Expense				
	Gen Services. Supplier technical review and progress monitor	$2,000	3	$6,000	$6,000
6	A/O Charges				
	Interest Capitalized/Construction Overhead	$7,504	1	[redacted]	
	AO - Therm and Hydro Contracts	[redacted]	1		
	AO- thermal Re labor	$9,282	1		
	AO- Thermal OT labor	$240	1		
	AO- Thermal Term labor	$10,084	1		
	Sub-Total A/O Charges				[redacted]
	Total Project Estimate				$343,612

Estimate Assumptions:
Scope is similar to LIN project in 2010.
[redacted]

Page 553 has been removed due to confidentiality.

CI Number: 28554

Title: POT - Analytical Panel and Analyzer Replacement

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $343,220

DESCRIPTION:

The scope of this project includes the replacement of the existing analytical panel at the Point Tupper Generating Station. The existing panel was originally installed in 1973 and was refurbished in 1987. The equipment is now obsolete and must be replaced with current technology that will result in reliable performance and accuracy of the readings obtained to ensure water chemistry accuracy.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The analytical equipment is crucial to the operation and life expectancy of the boiler. Having accurate knowledge of the feed water condition at all times allows for appropriate treatment of the water through dosing with the correct chemicals at the right concentrations. The existing panel and analyzer must be replaced to ensure reliable analysis of boiler and steam chemistry. Current technology for sample analysis must be employed to ensure long term performance of the analytical system for boiler chemistry monitoring and adequate protection of the boiler.

Why do this project now?

The analytical equipment is obsolete and must be replaced.

Why do this project this way?

Replacement of the analytical panel is the only solution to provide reliable analysis of boiler and steam chemistry.

CI Number : 28554 - POT - Analytical Panel and Analyzer Replacement **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 351 - 351-Pt.Tupper Admin./Capital **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		4,462	0	4,462
095		095-Thermal Regular Labour AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		1,345	0	1,345
001	011	001 - THERMAL Regular Labour	011 - SGP - Plant Control and Inst	[redacted]	0	[redacted]
004	011	004 - THERMAL Term Labour	011 - SGP - Plant Control and Inst	5,600	0	5,600
011	011	011 - Travel Expense	011 - SGP - Plant Control and Inst	250	0	250
012	011	012 - Materials	011 - SGP - Plant Control and Inst	[redacted]	0	[redacted]
015	011	015 - Frt, Post & Delivery	011 - SGP - Plant Control and Inst	5,000	0	5,000
041	011	041 - Meals & Entertainment	011 - SGP - Plant Control and Inst	250	0	250
001	085	001 - THERMAL Regular Labour	085 Design	5,250	0	5,250
			Total Cost:	343,220	0	343,220
			Original Cost:			

CI 28554 – POT Analytical Panel and Analyzer Replacement

The following is a breakdown of costs associated with the Analytical Panel and Analyzer Replacement

Administrative Overheads and Interest	$[redacted]
Labour	$[redacted]
Materials	$[redacted]
Other	$5,500
Total	$343,220

The materials estimate is based on the attached vendor quotation.

The labour estimate is based on NSPI engineering staff experience with projects of similar scope.

Pages 557 - 560 have been removed due to confidentiality.

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Analytical panel and analyzer replacement
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	28554
Department :	Point Tupper Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Replace panel and analyzer	6.68%	452,205	1	14.49%	14.6 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Replace the panel and analyzer

Notes/Comments :

Replace panel and analyzer

Justification of this project is based on an a capital cost of $343,220 and an increasing probability of failure if the replacement is not completed in 2011. Total capacity loss is estimated at 150MW for a 2-day period with increasing outage duration as the equipment continues to age. Total avoided replacement energy costs in 2011 and 2012 are $9,101 and $11,170 respectively. Avoided replacement energy costs continue to escalate over the life of the equipment as the Unit outage duration in the event of an un-planned equipment failure continues to escalate.

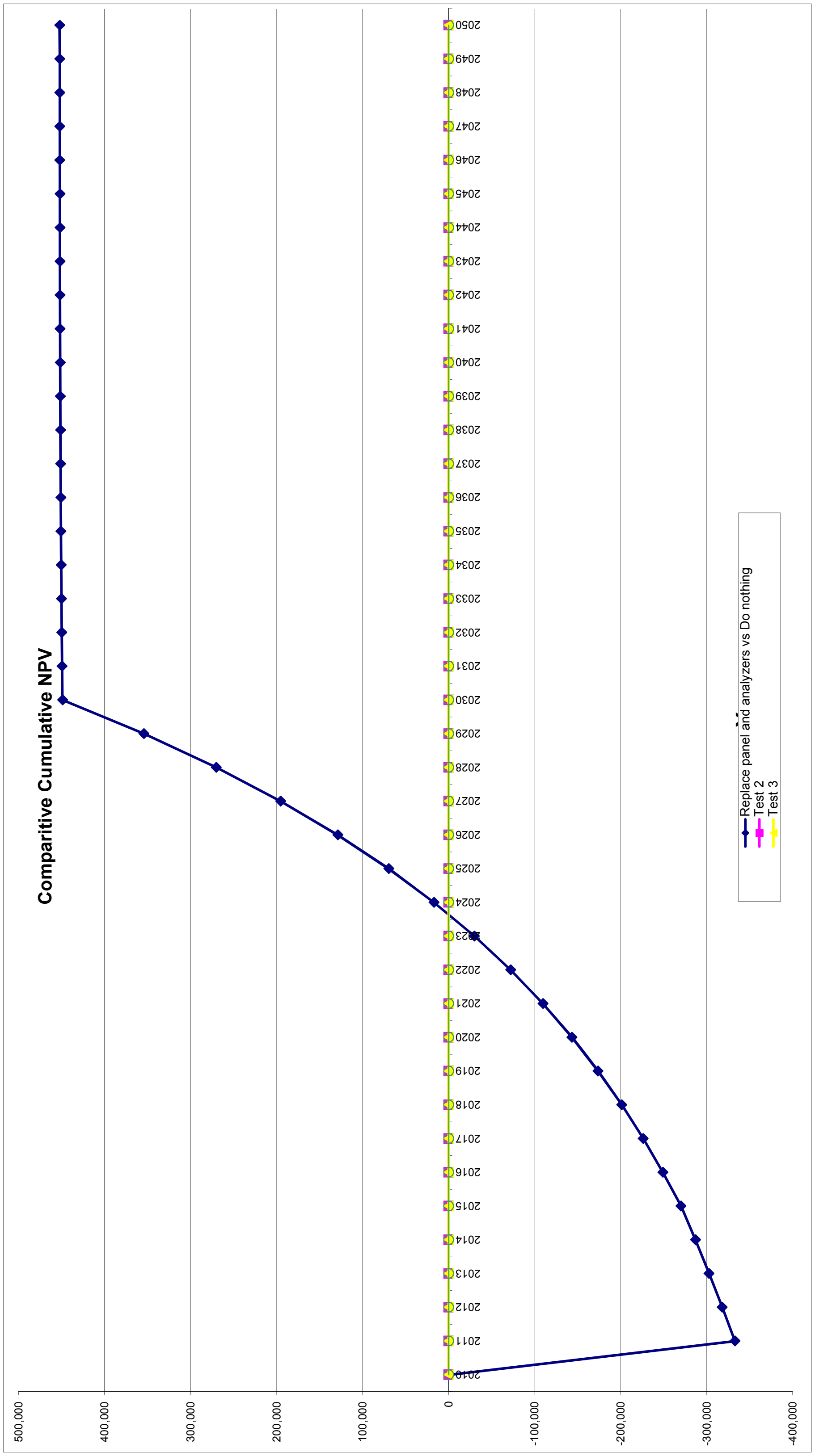
Test 2

Test 3

Test 4

Analytical panel and analyzer replacement
Replace panel and analyzers vs Do nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	9,101	(343,220)	13,729	329,491	(334,119)	1,337	(332,782)	1	(332,782)	(332,782)
2012	-	11,170	-	26,359	303,132	11,170	4,656	15,826	1	14,835	(317,947)
2013	-	14,290	-	24,251	278,881	14,290	3,088	17,378	1	15,270	(302,677)
2014	-	17,973	-	22,311	256,571	17,973	1,300	19,274	1	15,875	(286,802)
2015	-	22,333	-	20,526	236,045	22,333	(560)	21,773	1	16,810	(269,992)
2016	-	33,659	-	18,884	217,162	33,659	(4,581)	29,079	1	21,046	(248,946)
2017	-	40,993	-	17,373	199,789	40,993	(7,322)	33,671	1	22,843	(226,103)
2018	-	49,750	-	15,983	183,806	49,750	(10,468)	39,282	1	24,981	(201,121)
2019	-	60,222	-	14,704	169,101	60,222	(14,110)	46,111	1	27,488	(173,633)
2020	-	72,761	-	13,528	155,573	72,761	(18,362)	54,399	1	30,398	(143,236)
2021	-	87,794	-	12,446	143,127	87,794	(23,358)	64,436	1	33,752	(109,484)
2022	-	105,833	-	11,450	131,677	105,833	(29,259)	76,574	0	37,598	(71,885)
2023	-	127,495	-	10,534	121,143	127,495	(36,258)	91,237	0	41,993	(29,892)
2024	-	153,523	-	9,691	111,451	153,523	(44,588)	108,935	0	46,999	17,107
2025	-	184,812	-	8,916	102,535	184,812	(54,528)	130,284	0	52,690	69,797
2026	-	222,437	-	8,203	94,332	222,437	(66,413)	156,024	0	59,149	128,946
2027	-	267,691	-	7,547	86,786	267,691	(80,645)	187,047	0	66,469	195,415
2028	-	322,129	-	6,943	79,843	322,129	(97,708)	224,421	0	74,757	270,172
2029	-	387,614	-	6,387	73,456	387,614	(118,180)	269,434	0	84,131	354,304
2030	-	466,388	-	5,876	67,579	466,388	(142,758)	323,629	0	94,726	449,030
2031	-	-	-	5,406	62,173	-	1,676	1,676	0	460	449,490
2032	-	-	-	4,974	57,199	-	1,542	1,542	0	397	449,886
2033	-	-	-	4,576	52,623	-	1,419	1,419	0	342	450,228
2034	-	-	-	4,210	48,413	-	1,305	1,305	0	295	450,523
2035	-	-	-	3,873	44,540	-	1,201	1,201	0	254	450,777
2036	-	-	-	3,563	40,977	-	1,105	1,105	0	219	450,997
2037	-	-	-	3,278	37,699	-	1,016	1,016	0	189	451,186
2038	-	-	-	3,016	34,683	-	935	935	0	163	451,349
2039	-	-	-	2,775	31,908	-	860	860	0	141	451,490
2040	-	-	-	2,553	29,356	-	791	791	0	121	451,611
2041	-	-	-	2,348	27,007	-	728	728	0	105	451,716
2042	-	-	-	2,161	24,847	-	670	670	0	90	451,806
2043	-	-	-	1,988	22,859	-	616	616	0	78	451,884
2044	-	-	-	1,829	21,030	-	567	567	0	67	451,951
2045	-	-	-	1,682	19,348	-	522	522	0	58	452,009
2046	-	-	-	1,548	17,800	-	480	480	0	50	452,059
2047	-	-	-	1,424	16,376	-	441	441	0	43	452,102
2048	-	-	-	1,310	15,066	-	406	406	0	37	452,139
2049	-	-	-	1,205	13,861	-	374	374	0	32	452,171
2050	-	-	-	1,109	12,752	-	423	423	0	34	452,205
Total	-	2,657,967	(343,220)	330,468	3,971,995	2,314,747	(721,640)	1,593,107	15	452,205	7,797,849


Comparitive Cumulative NPV
Replace panel and analyzers vs Do nothing
Test 2
Test 3
500,000
400,000
300,000
200,000
100,000
0
-100,000
-200,000
-300,000
-400,000
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CI Number: 40319

Title: TRE - HVAC Replacements (2011)

Start Date: 2011/03

Final Cost Date: 2011/09

Function: Generation

Forecast Amount: $294,925

DESCRIPTION:

The Trenton Generating Station has a variety of heating, ventilating and air conditioning (HVAC) equipment. This includes condensing units, an automated control system, air-handlers, exhaust fans, rooftop package units, and water-cooled packaged units. This equipment provides heating, ventilation and air conditioning to offices, control rooms, and critical plant equipment. The focus of this HVAC replacement project will be to replace the condensing unit and make-up air unit for the Control Room, the evaporator air handler for Motor Control Centre (MCC) Room #6 and Relay Room #6, the evaporator air handler for MCC Room #5, and the water-cooled package unit for Relay Room #5. HVAC is necessary in order to provide an acceptable operating environment for temperature sensitive components utilized within the Control Room, MCC Room and Relay Room.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Replacing the HVAC units will ensure adequate cooling is available for the control room, MCC rooms, and relay rooms and support reliable operation of the Trenton Generating Station.

Why do this project now?

Replacement of the units is required now based on Original Equipment Manufacturer (OEM) and service provider recommendations.

Why do this project this way?

The most practical and cost effective solutions to ensure continuing HVAC reliability in these areas is to replace the existing HVAC units. Replacing the units prior to an unplanned failure will avoid more costly repairs and replacements.

CI Number	: 40319	- TRE - HVAC Replacements (2011)	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 341	- 341-Trenton Admin./Common Capital	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		6,663	0	6,663
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		5,282	0	5,282
001	003	001 - THERMAL Regular Labour	003 - SGP - Bldg.,Struct.Grnd.	22,000	0	22,000
012	003	012 - Materials	003 - SGP - Bldg.,Struct.Grnd.	180,000	0	180,000
013	003	013 - POWER PRODUCTION Contracts	003 - SGP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	294,925	0	294,925
			Original Cost:			

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TRE - HVAC Replacements (2011)
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	40319
Department :	Trenton Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Replace HVAC Equipment	6.68%	198,668	1	85.94%	2.9 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Replace HVAC equipment

Notes/Comments :

Replace HVAC equipment

Justification of this project is based on a capital cost of $294,925 and an increasing probability of equipment failure if replacement is not completed in 2011. Capacity loss is estimated at 160MW for 48 hours once per year for each Unit. Total avoided replacement energy costs for 2011 and 2012 are $225,024 and $229,524 respectively.

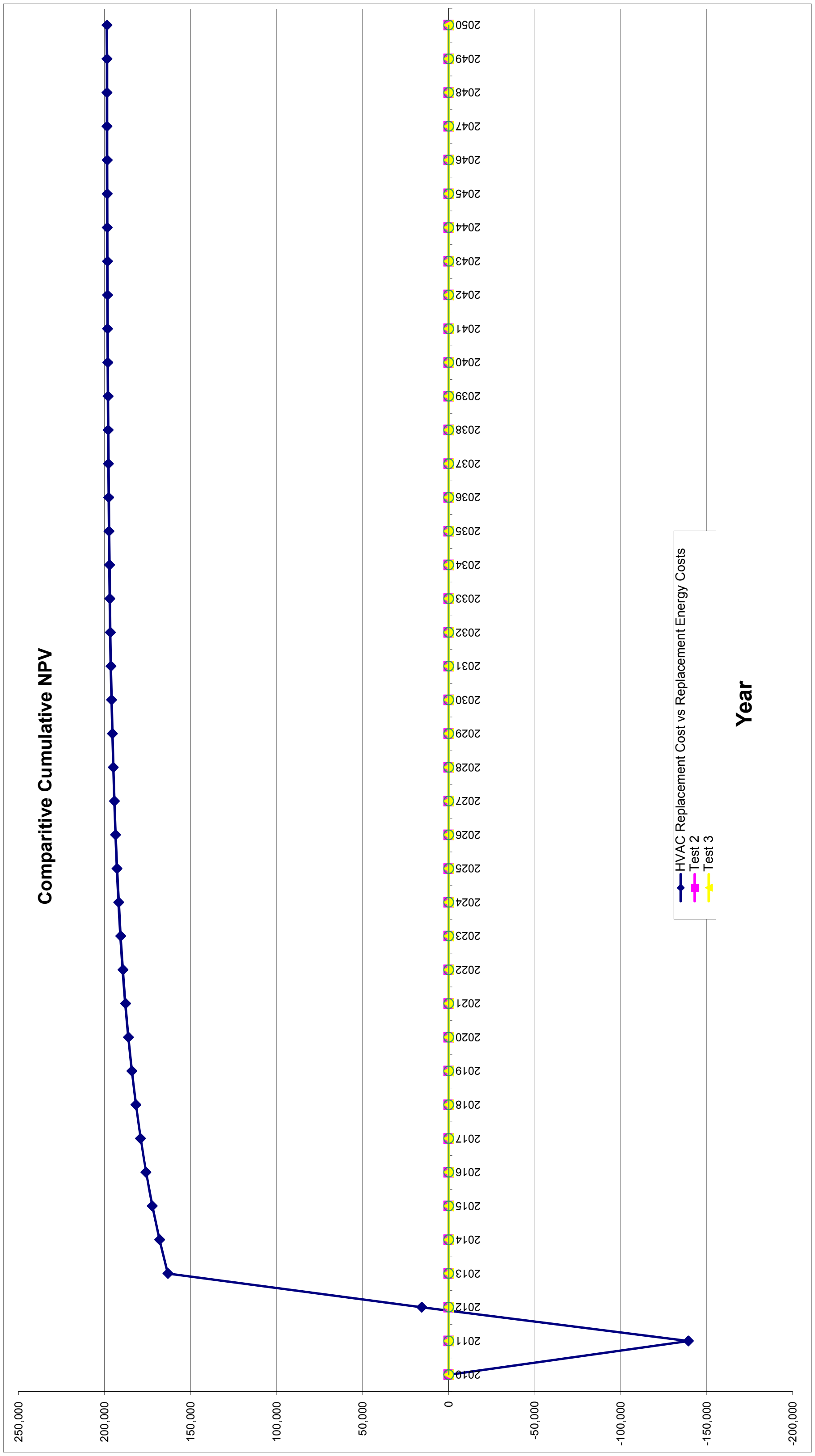
Test 2

Test 3

Test 4

TRE - HVAC Replacements (2011)
HVAC Replacement Cost vs Replacement Energy Costs

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	225,024	(294,925)	11,797	283,128	(69,901)	(69,442)	(139,343)	1	(139,343)	(139,343)
2012	-	229,524	-	22,650	260,478	229,524	(64,176)	165,348	1	154,995	15,651
2013	-	234,115	-	20,838	239,640	234,115	(66,116)	167,999	1	147,619	163,270
2014	-	-	-	19,171	220,468	-	5,905	5,905	1	4,864	168,134
2015	-	-	-	17,637	202,831	-	5,468	5,468	1	4,221	172,355
2016	-	-	-	16,226	186,604	-	5,030	5,030	1	3,641	175,996
2017	-	-	-	14,928	171,676	-	4,628	4,628	1	3,140	179,136
2018	-	-	-	13,734	157,942	-	4,258	4,258	1	2,708	181,843
2019	-	-	-	12,635	145,307	-	3,917	3,917	1	2,335	184,178
2020	-	-	-	11,625	133,682	-	3,604	3,604	1	2,014	186,192
2021	-	-	-	10,695	122,988	-	3,315	3,315	1	1,737	187,928
2022	-	-	-	9,839	113,149	-	3,050	3,050	0	1,498	189,426
2023	-	-	-	9,052	104,097	-	2,806	2,806	0	1,292	190,718
2024	-	-	-	8,328	95,769	-	2,582	2,582	0	1,114	191,831
2025	-	-	-	7,662	88,107	-	2,375	2,375	0	961	192,792
2026	-	-	-	7,049	81,059	-	2,185	2,185	0	828	193,620
2027	-	-	-	6,485	74,574	-	2,010	2,010	0	714	194,335
2028	-	-	-	5,966	68,608	-	1,849	1,849	0	616	194,951
2029	-	-	-	5,489	63,120	-	1,701	1,701	0	531	195,482
2030	-	-	-	5,050	58,070	-	1,565	1,565	0	458	195,940
2031	-	-	-	4,646	53,424	-	1,440	1,440	0	395	196,335
2032	-	-	-	4,274	49,150	-	1,325	1,325	0	341	196,676
2033	-	-	-	3,932	45,218	-	1,219	1,219	0	294	196,970
2034	-	-	-	3,617	41,601	-	1,121	1,121	0	253	197,223
2035	-	-	-	3,328	38,273	-	1,032	1,032	0	219	197,442
2036	-	-	-	3,062	35,211	-	949	949	0	188	197,630
2037	-	-	-	2,817	32,394	-	873	873	0	163	197,793
2038	-	-	-	2,592	29,803	-	803	803	0	140	197,933
2039	-	-	-	2,384	27,418	-	739	739	0	121	198,054
2040	-	-	-	2,193	25,225	-	680	680	0	104	198,158
2041	-	-	-	2,018	23,207	-	626	626	0	90	198,248
2042	-	-	-	1,857	21,350	-	576	576	0	78	198,326
2043	-	-	-	1,708	19,642	-	529	529	0	67	198,393
2044	-	-	-	1,571	18,071	-	487	487	0	58	198,450
2045	-	-	-	1,446	16,625	-	448	448	0	50	198,500
2046	-	-	-	1,330	15,295	-	412	412	0	43	198,543
2047	-	-	-	1,224	14,072	-	379	379	0	37	198,580
2048	-	-	-	1,126	12,946	-	349	349	0	32	198,612
2049	-	-	-	1,036	11,910	-	321	321	0	28	198,639
2050	-	-	-	953	10,957	-	363	363	0	29	198,668
Total	-	688,663	(294,925)	283,968	3,413,090	393,738	(128,812)	264,926	15	198,668	7,173,608


Comparitive Cumulative NPV
HVAC Replacement Cost vs Replacement Energy Costs
Test 2
Test 3
Year
250,000
200,000
150,000
100,000
50,000
0
-50,000
-100,000
-150,000
-200,000
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
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CI Number: 40243

Title: LIN 3 Battery and Charger Replacement

Start Date: 2011/02

Final Cost Date: 2011/10

Function: Generation

Forecast Amount: $283,106

DESCRIPTION:

The purpose of this project is to replace obsolete and unreliable batteries and chargers that are part of the Unit #3 emergency back-up power supply system. The emergency batteries are employed in the event of a power outage, providing back-up power to emergency auxiliary devices (lube oil and seal water DC pump motors, emergency lighting, 120V AC to DCS and other controls). The project involves replacing all existing batteries (60 cell station) with new batteries and two new chargers.

Summary of Related CI's +/- 2 years:
2010 CI 36602 LIN1 Battery and Charger Replacement $286,231

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The batteries are original equipment (over 28 years old) and have reached the end of their useful life. The batteries are showing signs of degradation (case bulging) and three cells have been removed after failing capacity tests. Replacing the batteries and chargers will ensure a reliable back-up power system is available.

Why do this project now?

The batteries and chargers are obsolete and must be replaced now.

Why do this project this way?

Replacing the existing components is the only option as this equipment is obsolete.

CI Number : 40243 - LIN 3 Battery & Charger Replacement

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 305 - 305-Lingan 3&4 Prod.Unit

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		8,626	0	8,626
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		240	0	240
095		095-Thermal Regular Labour AO		4,641	0	4,641
001	004	001 - THERMAL Regular Labour	004 - SGP - Misc.Equipment	19,330	0	19,330
004	004	004 - THERMAL Term Labour	004 - SGP - Misc.Equipment	999	0	999
012	004	012 - Materials	004 - SGP - Misc.Equipment	[redacted]	0	[redacted]
013	004	013 - POWER PRODUCTION Contracts	004 - SGP - Misc.Equipment	[redacted]	0	[redacted]
028	004	028 - Consulting	004 - SGP - Misc.Equipment	0	0	0
			Total Cost:	283,106	0	283,106
			Original Cost:			

CI 40243 – LIN3 Battery & Charger Replacement

The following is a breakdown of costs associated with the LIN3 Battery Charger Replacement

Administrative Overheads and Interest	$[redacted]
Labour	$20,329
Materials	$[redacted]
Contracts	$[redacted]
Total	$283,106

The materials estimate of $[redacted] is based on the attached vendor quotes and detailed project estimate.

The labour estimate is mostly regular labour per the attached account breakdown. The estimate is based on the hourly rates per the collective agreement and the hours required to complete the project. The number of hours required to complete this project is based on CI 36602 – LIN1 Battery & Charger Replacement, which was completed in 2010.

POWER PRODUCTION | LINGAN GENERATING STATION | ENGINEERING SERVICES

Station: LINGAN GENERATING STATION

CI Number: 40243

Project: LIN -BATTERY AND CHARGERS REPLACEMENT

Project Description: Replace obsolete chargers and station batteries for unit 3.
Lingan labor to install.

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals
1	Regular Plant Labour				
	Plant Engineering	[redacted]	[redacted]	$2,000	
	Supervision	[redacted]	[redacted]	$1,080	
	Mech Trades	$37	50	$1,850	
	Electrical Trades	$40	360	$14,400	
	Sub-Total Plant Resources				$19,330
2	Term Labor				
	Utility Trades	$27	37	$999	
	Sub-Total Term Resources				$999
3	Contracting				
	Commissioning Services	[redacted]	1	[redacted]	
	hoisting/removal of Batteries and Chargers	[redacted]	1	[redacted]	
	Sub-Total Contracting				[redacted]
4	Material				
	Chargers 2 ea Saft 300A	[redacted]	2	[redacted]	
	battery packs 60 cells x 900Ahr	[redacted]	2	[redacted]	
	battery racks for 60 cell station	[redacted]	2	[redacted]	
	Misc. wiring and connectors	[redacted]	1	[redacted]	
	Sub-Total Materials				[redacted]
5	Interest & A/O Charges				
	Interest Capitalized/Construction Overhead	$8,625		[redacted]	
		[redacted]			
		$4,641			
		$239			
	Sub-Total Interest & A/O Charges				[redacted]
	Total Project Estimate				$283,104

Estimate Assumptions:
based on scope of previous project completed in 2010. All units have similar configuration.
Quotes for 2010 battery and charger project as follows:
[redacted]

Pages 573 - 576 have been removed due to confidentiality.

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Replace Batteries
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Generation Services	**CI Number:**	40243
Department :	Lingan Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Replace Batteries	6.68%	719,628	1	45.79%	4.4 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Replace Batteries

Notes/Comments :

Replace Batteries

Justification of this project is based on a capital cost of $283,105 and a low probability of failure of (estimated at 1%). Capacity loss in the event of a failure would be 154MW for 540 hours. Total avoided costs for 2011 and 2012 are $142,578 and$111,827 respectively.

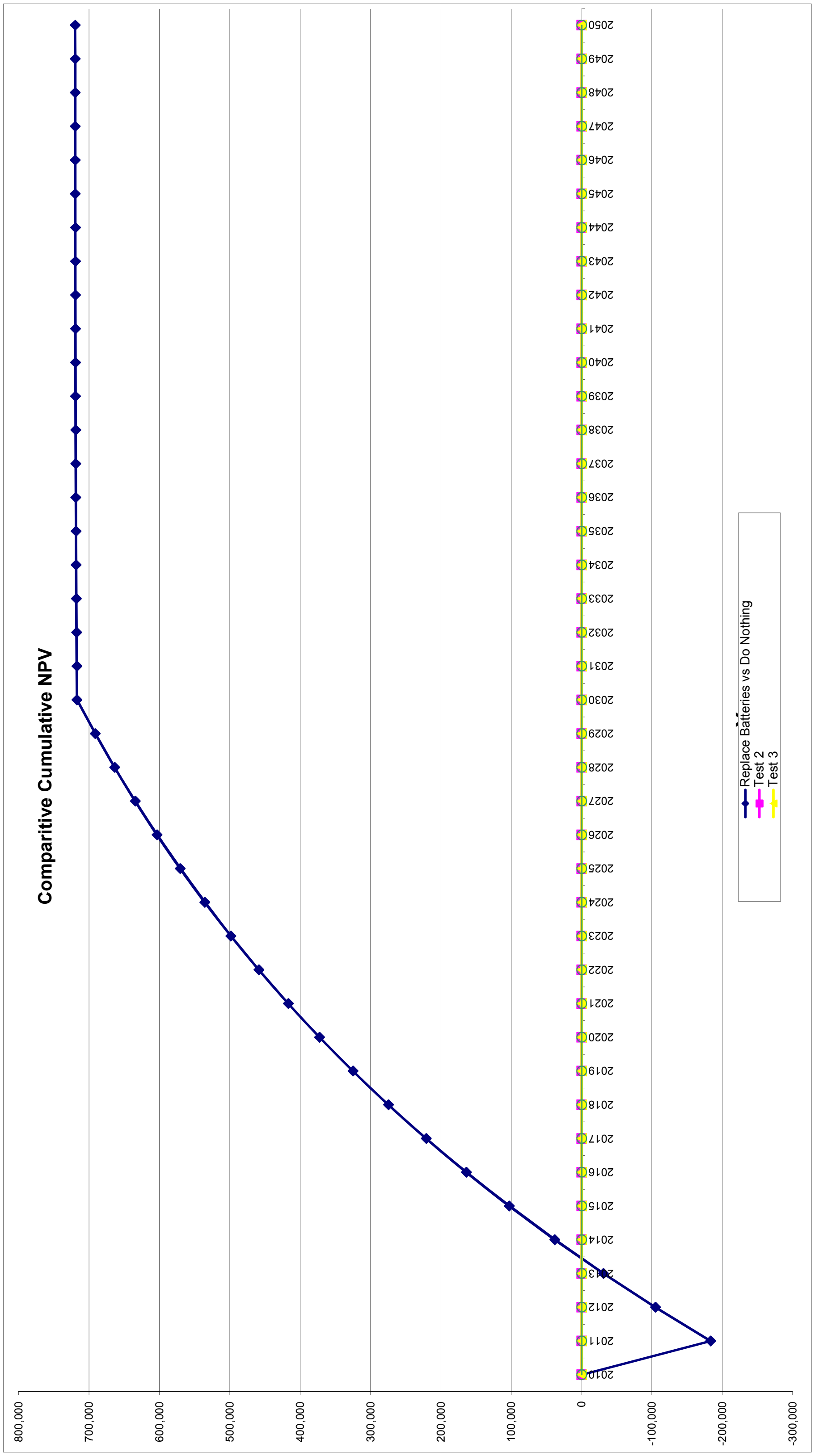
Test 2

Test 3

Test 4

Replace Batteries
Replace Batteries vs Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	142,578	(283,105)	11,324	271,781	(140,527)	(42,795)	(183,322)	1.000	(183,322)	(183,322)
2012	-	111,828	-	21,742	250,038	111,828	(27,970)	83,858	0.937	78,607	(104,715)
2013	-	112,564	-	20,003	230,035	112,564	(28,694)	83,870	0.879	73,696	(31,019)
2014	-	113,308	-	18,403	211,632	113,308	(29,457)	83,851	0.824	69,065	38,046
2015	-	114,059	-	16,931	194,702	114,059	(30,110)	83,949	0.772	64,816	102,862
2016	-	114,818	-	15,576	179,126	114,818	(30,765)	84,053	0.724	60,833	163,695
2017	-	115,584	-	14,330	164,796	115,584	(31,389)	84,195	0.678	57,120	220,815
2018	-	116,358	-	13,184	151,612	116,358	(31,984)	84,374	0.636	53,657	274,472
2019	-	117,139	-	12,129	139,483	117,139	(32,553)	84,586	0.596	50,424	324,896
2020	-	117,929	-	11,159	128,324	117,929	(33,099)	84,830	0.559	47,403	372,298
2021	-	118,726	-	10,266	118,058	118,726	(33,623)	85,103	0.524	44,578	416,876
2022	-	119,532	-	9,445	108,614	119,532	(34,127)	85,405	0.491	41,934	458,810
2023	-	120,346	-	8,689	99,925	120,346	(34,614)	85,732	0.460	39,459	498,269
2024	-	121,168	-	7,994	91,931	121,168	(35,084)	86,084	0.431	37,140	535,409
2025	-	121,999	-	7,354	84,576	121,999	(35,540)	86,459	0.404	34,966	570,375
2026	-	122,838	-	6,766	77,810	122,838	(35,982)	86,856	0.379	32,927	603,303
2027	-	123,687	-	6,225	71,585	123,687	(36,413)	87,273	0.355	31,014	634,316
2028	-	124,544	-	5,727	65,859	124,544	(36,833)	87,711	0.333	29,217	663,534
2029	-	125,410	-	5,269	60,590	125,410	(37,244)	88,166	0.312	27,530	691,064
2030	-	126,286	-	4,847	55,743	126,286	(37,646)	88,640	0.293	25,945	717,009
2031	-	-	-	4,459	51,283	-	1,382	1,382	0.274	379	717,388
2032	-	-	-	4,103	47,181	-	1,272	1,272	0.257	327	717,715
2033	-	-	-	3,774	43,406	-	1,170	1,170	0.241	282	717,997
2034	-	-	-	3,472	39,934	-	1,076	1,076	0.226	243	718,240
2035	-	-	-	3,195	36,739	-	990	990	0.212	210	718,450
2036	-	-	-	2,939	33,800	-	911	911	0.199	181	718,631
2037	-	-	-	2,704	31,096	-	838	838	0.186	156	718,787
2038	-	-	-	2,488	28,608	-	771	771	0.174	135	718,922
2039	-	-	-	2,289	26,320	-	709	709	0.164	116	719,038
2040	-	-	-	2,106	24,214	-	653	653	0.153	100	719,138
2041	-	-	-	1,937	22,277	-	601	601	0.144	86	719,224
2042	-	-	-	1,782	20,495	-	552	552	0.135	74	719,299
2043	-	-	-	1,640	18,855	-	508	508	0.126	64	719,363
2044	-	-	-	1,508	17,347	-	468	468	0.118	55	719,418
2045	-	-	-	1,388	15,959	-	430	430	0.111	48	719,466
2046	-	-	-	1,277	14,682	-	396	396	0.104	41	719,507
2047	-	-	-	1,175	13,508	-	364	364	0.098	36	719,543
2048	-	-	-	1,081	12,427	-	335	335	0.091	31	719,573
2049	-	-	-	994	11,433	-	308	308	0.086	26	719,600
2050	-	-	-	915	10,518	-	349	349	0.080	28	719,628
Total	-	2,400,698	(283,105)	272,587	3,276,300	2,117,593	(661,835)	1,455,758	14.768	719,628	21,345,920


Comparitive Cumulative NPV
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Replace Batteries vs Do Nothing
Test 2
Test 3

CI Number: 39783

Title: TUC - Security System Upgrade

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $281,247

DESCRIPTION:

This project includes upgrades to the video surveillance security system, access control at the plant's main gate, north and south yard security perimeter lighting and addition of a closed circuit television with intrusion detection to ensure compliance with Federal Emergency Management Agency (FEMA) and American Society for Industrial Security (ASIS). The industry standards are used throughout North America for infrastructure safety and security.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013.

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

The risk assessment completed for the Tufts Cove Generating Station indicated that these security upgrades are required to ensure compliance with accepted industry standards.

Why do this project now?

This project must be completed now to mitigate the risk of security breach at the Tuft's Cove Generating Station.

Why do this project this way?

Completing this project will ensure compliance with industry standards.

CI Number	: 39783	- TUC - Security System Upgrade	**Project Number**
Parent CI Number	:	-	**Approved Date**
Cost Centre	: 311	- 311-Tufts Cove Admin./Common Capita	**Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001		001 - THERMAL Regular Labour		20,000	0	20,000
013		013 - POWER PRODUCTION Contracts		[redacted]	0	[redacted]
028		028 - Consulting		[redacted]	0	[redacted]
094		094 - Interest Capitalized		6,285	0	6,285
095		095-Thermal Regular Labour AO		4,802	0	4,802
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
			Total Cost:	281,247	0	281,247
			Original Cost:			

CI 39783 – TUC Security System Upgrade

The following is a breakdown of costs associated with Security System Upgrade:

Administrative Overheads and Interest	$[redacted]
Labour	$20,000
Contracts	$[redacted]
Consulting	$[redacted]
Total	$281,247

The contracts estimate of $[redacted] is based on the vendor quotes attached and NSPI engineering staff experience.

The breakdown of the contracts estimate is as follows:

CCTV upgrades: $[redacted]

Access control / main gate upgrades:

- Base scope of work per attached quote: $[redacted]
- Electrical modifications and other modifications: $[redacted]

North Yard Lighting Upgrades: $[redacted] 1

South Yard Lighting Upgrades: $[redacted] 1

Pages 583 - 598 have been removed due to confidentiality.

CI Number: 39944

Title: TRE6 - Fly Ash Line Replacement

Start Date: 2011/05

Final Cost Date: 2011/09

Function: Generation

Forecast Amount: $259,172

DESCRIPTION:

Trenton Unit #6 utilizes a Flakt Depac fly ash conveying system to transport ash from the precipitator hoppers to the silo. This system was installed as part of the original equipment when Unit #6 was constructed in the early 1990's. One of the key elements of the fly ash transport system is the piping from the precipitator hoppers to the silo. This pipe system is comprised of 2 inch and 3 inch diameter carbon steel pipes. Over the past few years, the fly ash has worn the pipes to the point where line leaks are frequent.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

This project must be completed to minimize the leaks of fly ash at the plant, minimize maintenance costs and support unit reliability by not having to shut down the ash system for repair which causes the ash system to get back logged.

Why do this project now?

This project must be completed now to mitigate the risk of leaks, ensure Unit reliability and environmental performance is maintained.

Why do this project this way?

The original ash transport piping has provided almost 20 years of operations and due to pipe wall thickness wastage has reached the point where replacement is the most cost effective approach.

CI Number : 39944 - TRE6 - Fly Ash Line Replacement

Parent CI Number : -

Cost Centre : 345 - 345-Trenton unit 6 Capital

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		3,369	0	3,369
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		4,802	0	4,802
095		095-Thermal Regular Labour AO		16,807	0	16,807
095		095-Thermal Overtime Labour AO		1,201	0	1,201
001	021	001 - THERMAL Regular Labour	021 - SGP - Ash Handling	65,000	0	65,000
002	021	002 - THERMAL Overtime Labour	021 - SGP - Ash Handling	10,000	0	10,000
004	021	004 - THERMAL Term Labour	021 - SGP - Ash Handling	20,000	0	20,000
012	021	012 - Materials	021 - SGP - Ash Handling	[redacted]	0	[redacted]
013	021	013 - POWER PRODUCTION Contracts	021 - SGP - Ash Handling	[redacted]	0	[redacted]
016	021	016 - Tools & Equipment	021 - SGP - Ash Handling	2,000	0	2,000
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	5,000	0	5,000
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	259,172	0	259,172
			Original Cost:			

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TRE6 - Fly Ash Line Replacement
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	39944
Department :	Trenton Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Replace Flyash Line	6.68%	379,305	1	28.59%	6.1 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Replace flyash line

Notes/Comments :

Cost of Replacements vs Replacement Energy Costs

Justification of this project is based on a capital cost of $259,172, an avoided capacity loss of 30MW for an unplanned failure of 12 hour duration and avoided replacement energy costs for 2011 and 2012 of $73,800 and $75,276 respectively.

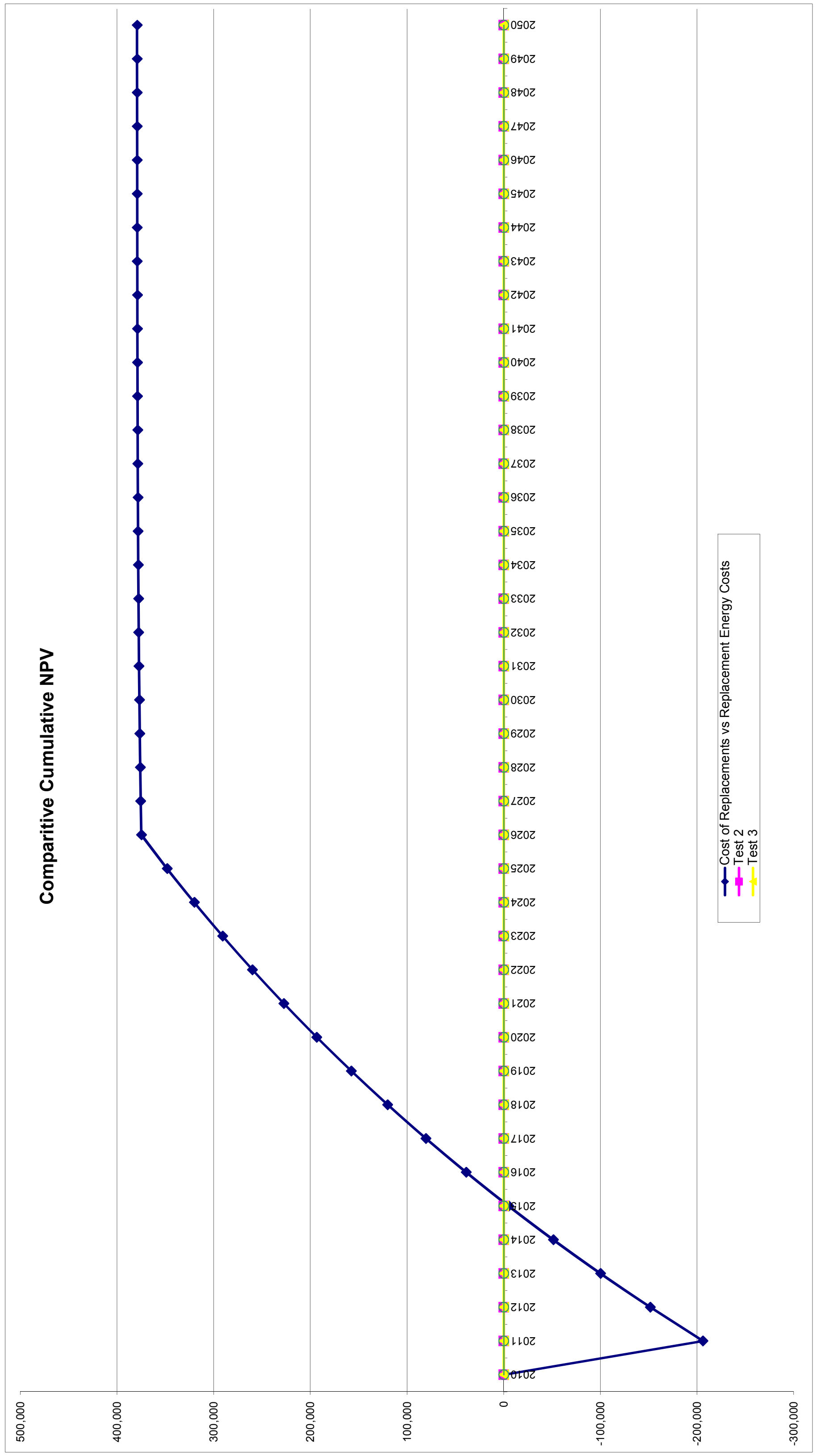
Test 2

Test 3

Test 4

TRE6 - Fly Ash Line Replacement
Cost of Replacements vs Replacement Energy Costs

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	73,800	(259,172)	10,367	248,805	(185,372)	(20,742)	(206,114)	1.000	(206,114)	(206,114)
2012	-	75,276	-	19,904	228,901	75,276	(17,205)	58,071	0.937	54,435	(151,679)
2013	-	76,782	-	18,312	210,589	76,782	(18,126)	58,656	0.879	51,540	(100,138)
2014	-	78,317	-	16,847	193,742	78,317	(19,089)	59,228	0.824	48,784	(51,354)
2015	-	79,883	-	15,499	178,242	79,883	(19,959)	59,924	0.772	46,267	(5,087)
2016	-	81,481	-	14,259	163,983	81,481	(20,839)	60,642	0.724	43,890	38,802
2017	-	83,111	-	13,119	150,864	83,111	(21,698)	61,413	0.678	41,664	80,467
2018	-	84,773	-	12,069	138,795	84,773	(22,538)	62,235	0.636	39,578	120,044
2019	-	86,468	-	11,104	127,691	86,468	(23,363)	63,105	0.596	37,619	157,663
2020	-	88,198	-	10,215	117,476	88,198	(24,175)	64,023	0.559	35,776	193,439
2021	-	89,962	-	9,398	108,078	89,962	(24,975)	64,987	0.524	34,041	227,479
2022	-	91,761	-	8,646	99,432	91,761	(25,766)	65,995	0.491	32,404	259,884
2023	-	93,596	-	7,955	91,477	93,596	(26,549)	67,047	0.460	30,859	290,743
2024	-	95,468	-	7,318	84,159	95,468	(27,326)	68,142	0.431	29,399	320,142
2025	-	97,378	-	6,733	77,426	97,378	(28,100)	69,278	0.404	28,018	348,160
2026	-	99,325	-	6,194	71,232	99,325	(28,871)	70,454	0.379	26,709	374,869
2027	-	-	-	5,699	65,534	-	1,767	1,767	0.355	628	375,497
2028	-	-	-	5,243	60,291	-	1,625	1,625	0.333	541	376,038
2029	-	-	-	4,823	55,468	-	1,495	1,495	0.312	467	376,505
2030	-	-	-	4,437	51,030	-	1,376	1,376	0.293	403	376,908
2031	-	-	-	4,082	46,948	-	1,266	1,266	0.274	347	377,255
2032	-	-	-	3,756	43,192	-	1,164	1,164	0.257	299	377,554
2033	-	-	-	3,455	39,737	-	1,071	1,071	0.241	258	377,812
2034	-	-	-	3,179	36,558	-	985	985	0.226	223	378,035
2035	-	-	-	2,925	33,633	-	907	907	0.212	192	378,227
2036	-	-	-	2,691	30,942	-	834	834	0.199	166	378,393
2037	-	-	-	2,475	28,467	-	767	767	0.186	143	378,536
2038	-	-	-	2,277	26,190	-	706	706	0.174	123	378,659
2039	-	-	-	2,095	24,095	-	650	650	0.164	106	378,765
2040	-	-	-	1,928	22,167	-	598	598	0.153	92	378,857
2041	-	-	-	1,773	20,394	-	550	550	0.144	79	378,936
2042	-	-	-	1,631	18,762	-	506	506	0.135	68	379,004
2043	-	-	-	1,501	17,261	-	465	465	0.126	59	379,063
2044	-	-	-	1,381	15,880	-	428	428	0.118	51	379,113
2045	-	-	-	1,270	14,610	-	394	394	0.111	44	379,157
2046	-	-	-	1,169	13,441	-	362	362	0.104	38	379,195
2047	-	-	-	1,075	12,366	-	333	333	0.098	33	379,227
2048	-	-	-	989	11,377	-	307	307	0.091	28	379,255
2049	-	-	-	910	10,466	-	282	282	0.086	24	379,279
2050	-	-	-	837	9,629	-	319	319	0.080	26	379,305
Total	-	1,375,579	(259,172)	249,543	2,999,330	1,116,407	(350,162)	766,245	14.768	379,305	10,975,894


Comparitive Cumulative NPV
Cost of Replacements vs Replacement Energy Costs
Test 2
Test 3
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400,000
300,000
200,000
100,000
0
-100,000
-200,000
-300,000
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CI Number: 39943

Title: TRE6 - 6B CW Screen Refurbishment

Start Date: 2011/02

Final Cost Date: 2011/04

Function: Generation

Forecast Amount: $257,503

DESCRIPTION:

The Unit #6 traveling water screens are an integral part of the intake cooling water (CW) system for the Trenton Generation Station. The screen system consists of two separate units, each of which consists of numerous framed screens that rotate through the CW intake. The main function of these units is to filter out the foreign material from the water as it is being extracted from the river. A failure of one or both of the screens would either allow foreign matter into the CW system or result in a blockage of the screen system and reduction of CW flow to the pumps.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The CW screens are original equipment that have been in service since the commissioning of Unit #6 in 1991. Normal wear has been experienced due to the effects of brackish water corrosion. Although the equipment has been adequately maintained since the CW screens were commissioned, inspections completed in 2010 indicated that a number of the components (screen baskets (excluding s/s mesh), carrier chain, pins bushings, bearings / seals and spray nozzles) need to be replaced.

Why do this project now?

A number of the components (screen baskets excluding s/s mesh), carrier chain, pins bushings, bearings / seals, spray nozzles) have reached the end of their useful life and must be replaced. Completing the refurbishment in 2011 will mitigate the risk of unplanned equipment failure and ensure reliability of the Unit.

Why do this project this way?

Refurbishment of the 6B screen in a planned manner is the most practical and cost effective solution.

CI Number	: 39943	- TRE6 - 6B CW Screen Refurbishment	Project Number	
Parent CI Number	:	-	Approved Date	
Cost Centre	: 345	- 345-Trenton unit 6 Capital	Budget Version	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		2,591	0	2,591
095		095-Thermal Term Labour AO		7,941	0	7,941
095		095-Thermal Regular Labour AO		16,941	0	16,941
095		095-Thermal Overtime Labour AO		1,721	0	1,721
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	014	001 - THERMAL Regular Labour	014 - SGP - Circ.Water Sys.	53,000	0	53,000
002	014	002 - THERMAL Overtime Labour	014 - SGP - Circ.Water Sys.	13,000	0	13,000
004	014	004 - THERMAL Term Labour	014 - SGP - Circ.Water Sys.	30,000	0	30,000
012	014	012 - Materials	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
013	014	013 - POWER PRODUCTION Contracts	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	5,000	0	5,000
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	6,000	0	6,000
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	257,503	0	257,503
			Original Cost:			

TRE6 - 6B CW Screen Refurbishment
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Power Production	**CI Number:**	39943
Department :	Trenton Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish 6B CW Screen	6.68%	411,443	1	32.18%	5.6 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish 6B CW Screen

Notes/Comments :

Refurbish 6B CW Screen

Justification for this project is based on a capital cost of $257,503, an avoided capacity loss of 55MW for an un-planned failure of 36 hours (estimating two failures per year) and avoided replacement energy costs for 2011 and 2012 of $81,180 and $82,803 respectively.

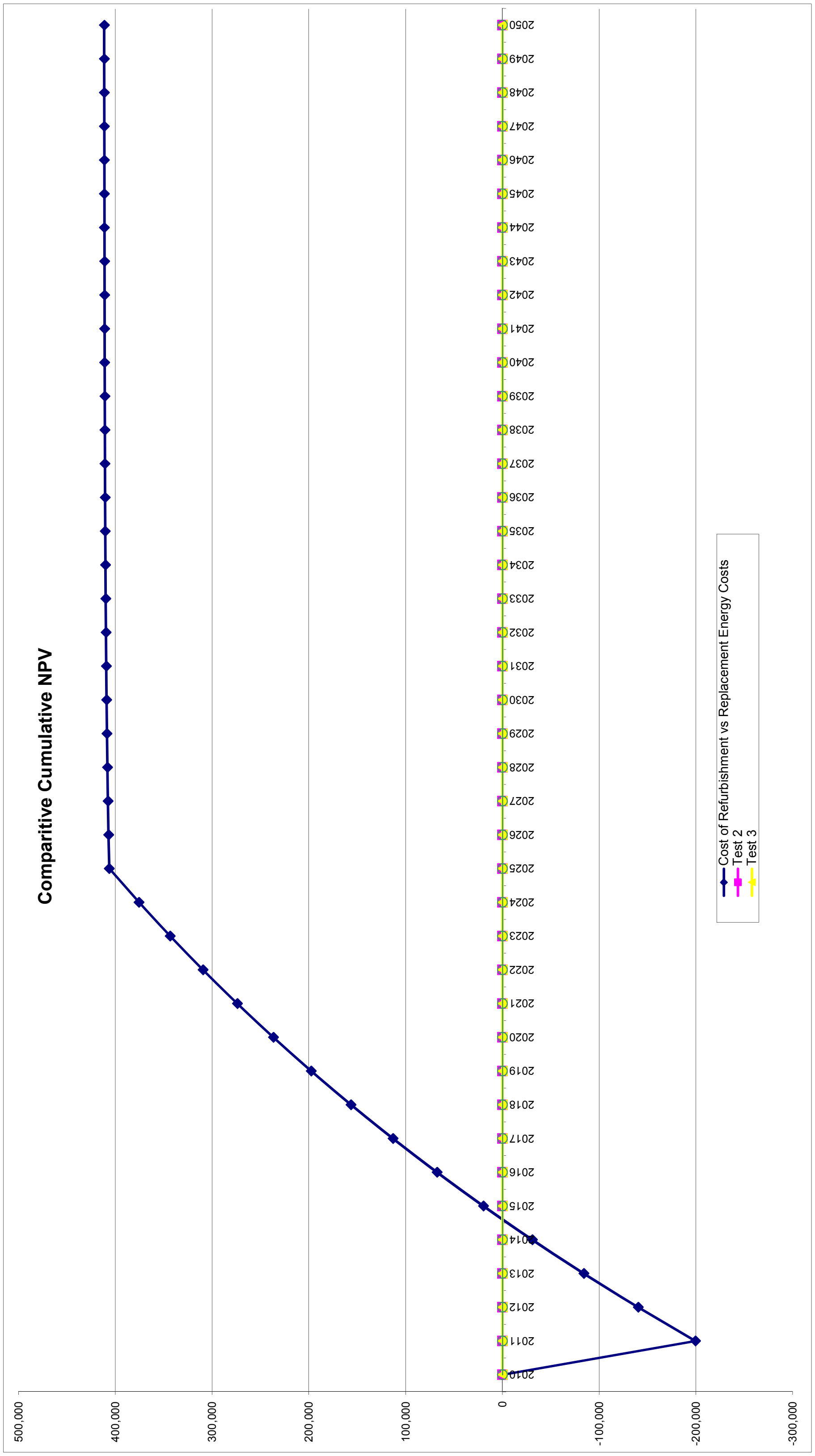
Test 2

Test 3

Test 4

TRE6 - 6B CW Screen Refurbishment
Cost of Refurbishment vs Replacement Energy Costs

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	81,180	(257,503)	10,300	247,203	(176,323)	(23,161)	(199,484)	1.000	(199,484)	(199,484)
2012	-	82,804	-	19,776	227,427	82,804	(19,578)	63,226	0.937	59,267	(140,217)
2013	-	84,460	-	18,194	209,233	84,460	(20,542)	63,917	0.879	56,163	(84,054)
2014	-	86,149	-	16,739	192,494	86,149	(21,550)	64,598	0.824	53,208	(30,846)
2015	-	87,872	-	15,400	177,094	87,872	(22,466)	65,405	0.772	50,499	19,652
2016	-	89,629	-	14,168	162,927	89,629	(23,393)	66,236	0.724	47,938	67,591
2017	-	91,422	-	13,034	149,893	91,422	(24,300)	67,122	0.678	45,537	113,128
2018	-	93,250	-	11,991	137,901	93,250	(25,190)	68,060	0.636	43,282	156,410
2019	-	95,115	-	11,032	126,869	95,115	(26,066)	69,050	0.596	41,162	197,572
2020	-	97,018	-	10,150	116,720	97,018	(26,929)	70,089	0.559	39,165	236,737
2021	-	98,958	-	9,338	107,382	98,958	(27,782)	71,176	0.524	37,282	274,019
2022	-	100,937	-	8,591	98,792	100,937	(28,627)	72,310	0.491	35,505	309,524
2023	-	102,956	-	7,903	90,888	102,956	(29,466)	73,490	0.460	33,824	343,348
2024	-	105,015	-	7,271	83,617	105,015	(30,301)	74,714	0.431	32,235	375,583
2025	-	107,115	-	6,689	76,928	107,115	(31,132)	75,983	0.404	30,730	406,312
2026	-	-	-	6,154	70,774	-	1,908	1,908	0.379	723	407,036
2027	-	-	-	5,662	65,112	-	1,755	1,755	0.355	624	407,659
2028	-	-	-	5,209	59,903	-	1,615	1,615	0.333	538	408,197
2029	-	-	-	4,792	55,111	-	1,486	1,486	0.312	464	408,661
2030	-	-	-	4,409	50,702	-	1,367	1,367	0.293	400	409,061
2031	-	-	-	4,056	46,646	-	1,257	1,257	0.274	345	409,406
2032	-	-	-	3,732	42,914	-	1,157	1,157	0.257	298	409,704
2033	-	-	-	3,433	39,481	-	1,064	1,064	0.241	257	409,960
2034	-	-	-	3,158	36,322	-	979	979	0.226	221	410,182
2035	-	-	-	2,906	33,417	-	901	901	0.212	191	410,372
2036	-	-	-	2,673	30,743	-	829	829	0.199	165	410,537
2037	-	-	-	2,459	28,284	-	762	762	0.186	142	410,679
2038	-	-	-	2,263	26,021	-	701	701	0.174	122	410,801
2039	-	-	-	2,082	23,939	-	645	645	0.164	106	410,907
2040	-	-	-	1,915	22,024	-	594	594	0.153	91	410,998
2041	-	-	-	1,762	20,262	-	546	546	0.144	78	411,076
2042	-	-	-	1,621	18,641	-	503	503	0.135	68	411,144
2043	-	-	-	1,491	17,150	-	462	462	0.126	58	411,202
2044	-	-	-	1,372	15,778	-	425	425	0.118	50	411,253
2045	-	-	-	1,262	14,516	-	391	391	0.111	43	411,296
2046	-	-	-	1,161	13,354	-	360	360	0.104	37	411,334
2047	-	-	-	1,068	12,286	-	331	331	0.098	32	411,366
2048	-	-	-	983	11,303	-	305	305	0.091	28	411,394
2049	-	-	-	904	10,399	-	280	280	0.086	24	411,418
2050	-	-	-	832	9,567	-	317	317	0.080	25	411,443
Total	-	1,403,880	(257,503)	247,936	2,980,015	1,146,377	(359,544)	786,833	14.768	411,443	12,302,363


Comparitive Cumulative NPV
Cost of Refurbishment vs Replacement Energy Costs
Test 2
Test 3
500,000
400,000
300,000
200,000
100,000
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-100,000
-200,000
-300,000
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CI Number: 40210

Title: LIN Fall Protection

Start Date: 2011/02

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $254,544

DESCRIPTION:

The work associated with this project will repair "Hazard Class 3" Locations as identified in the CJ MacLellan Fall Protection Survey Report dated February 20, 2009. This report was filed with the Board on August 7, 2009.

Summary of related CI's +/- 2 years;
2009 - 36243 LIN-U&U Fall Protection $38,663
2010 – 38910 LIN Fall Protection $239,260

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

This project will address Hazard Class 3 areas with identified potential fall hazards as per the CJ MacLellan Fall Protection Survey Report dated February 20, 2009. Class 1 and Class 2 hazards were addressed in 2009 and 2010 projects. This work is a continuation of the fall protection work undertaken in 2009 and 2010 to improve fall protection and ensure compliance with regulations.

Why do this project now?

With the assistance of NSPI, an inspection for the Fall Protection Survey was completed by C.J. MacLellan and Associates. The survey included all areas of the facility that may be considered to have potential for fall issues. This work order includes the materials, labour, and contracts to address the Hazard Class 3 locations. The class 3 hazards are the last hazards that require action.

Why do this project this way?

Upgrades are required to bring fall protection into compliance with the applicable codes and standards.

CI Number : 40210 - LIN Fall Protection

Parent CI Number : -

Cost Centre : 301 - 301-Lingan Admin./Common Capital

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		9,128	0	9,128
095		095-Thermal Regular Labour AO		36,015	0	36,015
095		095-Thermal Term Labour AO		2,401	0	2,401
001	004	001 - THERMAL Regular Labour	004 - SGP - Misc.Equipment	150,000	0	150,000
004	004	004 - THERMAL Term Labour	004 - SGP - Misc.Equipment	10,000	0	10,000
012	004	012 - Materials	004 - SGP - Misc.Equipment	[redacted]	0	[redacted]
013	004	013 - POWER PRODUCTION Contracts	004 - SGP - Misc.Equipment	0	0	0
028	004	028 - Consulting	004 - SGP - Misc.Equipment	[redacted]	0	[redacted]
			Total Cost:	254,544	0	254,544
			Original Cost:			

CI 40210 – LIN Fall Protection

The following is a breakdown of costs associated with the LIN Fall Protection project:

Administrative Overheads and Interest	$47,544
Labour	$160,000
Materials	$[redacted]
Consulting	$[redacted]
Total	$254,544

The estimate for this project is based on the work completed under CI 38910 – Fall Protection, completed in 2010 and CI 36243 – U&U Fall Protection, completed in 2009. The work to be completed under this project is very similar in nature to work completed under these previous projects.

Pages 612 - 700 have been removed due to confidentiality.

CI Number: 39940

Title: TRE5 - Bottom Ash Refurbishment

Start Date: 2011/05

Final Cost Date: 2011/10

Function: Generation

Forecast Amount: $254,370

DESCRIPTION:

An inspection report was commissioned in June 2010 on the bottom ash system for Unit #5. Inspection results identified several deficiencies which must be addressed to maintain reliability of Unit #5.

Scope of refurbishment will include bottom door cylinder replacement, replacement of return idlers and carrying idlers, chain and scraper replacements, and pneumatic box and cylinders replacements.

Summary of Related CI's +/- 2 years:
No other projects in 2009,2010,2011,2012 and 2013.

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

This project must be completed to ensure long term reliability of the bottom ash system. Inspection has confirmed that several key components require prompt replacement in order to effectively refurbish the system.

Why do this project now?

The project must be completed due to the condition of the bottom ash system components. Delaying this work will increase the likelihood of an unplanned outage to complete more costly repairs.

Why do this project this way?

Replacing the components identified in the June 2010 inspection report is the most feasible option.

CI Number	: 39940	- TRE5 - Bottom Ash Refurbishment		**Project Number**	
Parent CI Number	:	-		**Approved Date**	
Cost Centre	: 340	- 340-Trenton Unit 5 Capital		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		2,761	0	2,761
095		095-Thermal Regular Labour AO		21,609	0	21,609
001	021	001 - THERMAL Regular Labour	021 - SGP - Ash Handling	90,000	0	90,000
012	021	012 - Materials	021 - SGP - Ash Handling	[redacted]	0	[redacted]
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	254,370	0	254,370
			Original Cost:			

CI Number: 40223

Title: LIN-CW Screen Refurbishment

Start Date: 2011/01

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $253,879

DESCRIPTION:

This project will address the condition of the cooling water (CW) traveling screens and the associated sealing issues. The screens consist of bottom, top and intermediate sections. The bottom section includes the tail sprocket assembly and support structure. The top section is comprised of the drive sprocket assembly and the support structure. The intermediate section spans vertically between the bottom and top sections and supports the entire structure. The screens' intermediate sections and top sections require replacement, as they have corroded over time. These sections will be replaced with stainless steel components.

There are eight CW Screens installed in the Lingan pumphouse (two per unit). During periods of low seaweed loading, one of the two screens on each unit is taken out of service and refurbished. The plan is to refurbish two screens per year until all eight screens have been upgraded. Screens 1A and 3B were completed in 2010. Screens 1B and 4A are planned for 2011.

Summary of Related CI's +/- 2 years
2010 - 37744 LIN CW Travelling Screen Refurbish $255,014
2009 - 31546 LIN CW Travelling Screen Refurbish $310,673

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Eel-grass passing through degraded or non functioning traveling screen panels results in downstream fouling of strainers and increases the risk of unit de-rating or outages due to inadequate cooling capacity, particularly during the late summer and fall. The degree of fouling can also result in high mechanical loading on the screens and cooling water pumps. This high loading causes component failures at the screens and CW pumps. This increases the risk of Unit de-rating or outages due to the loss of cooling water.

Why do this project now?

Completing this project will reduce occurrence of existing issues with the circulating water system during periods of heavy seaweed and debris. This will reduce the risk of unit de-ratings and subsequent associated replacement energy costs.

Why do this project this way?

The screens operate in an aggressive sea water environment and have experienced normal corrosion and wear. The most cost effective solution is to replace the corroded and worn components as opposed to replacing the complete screen infrastructure. Primary components to be refurbished include the top drives (sprocket refurbishment, bearing replacement, shaft refurbishment, top boot replacement with stainless steel material), Intermediate Section (guides, supports and screen panels replacement), Lower Section (sprocket refurbishment, bearing replacement, shaft refurbishment, bottom boot replacement with stainless steel material).

CI Number : 40223 - LIN-CW Screen Refurbishment

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 301 - 301-Lingan Admin./Common Capital

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		9,836	0	9,836
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		615	0	615
095		095-Thermal Regular Labour AO		18,853	0	18,853
001	014	001 - THERMAL Regular Labour	014 - SGP - Circ.Water Sys.	78,520	0	78,520
004	014	004 - THERMAL Term Labour	014 - SGP - Circ.Water Sys.	2,560	0	2,560
012	014	012 - Materials	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
013	014	013 - POWER PRODUCTION Contracts	014 - SGP - Circ.Water Sys.	[redacted]	0	[redacted]
			Total Cost:	253,879	0	253,879
			Original Cost:			

CI 40223 – LIN CW Screen Refurbishment

The following is a breakdown of costs associated with the LIN CW Screen Refurbishment

Administrative Overheads and Interest	$[redacted]
Labour	$81,080
Materials	$[redacted]
Contracts	$[redacted]
Total	$253,879

The materials estimate of $[redacted] is based on the inventory costs of the materials required to complete the refurbishment. A detailed description of the materials required and inventory costs are attached.

The labour estimate of $81,080 is mostly regular labour per the attached account breakdown and detailed project estimate. The estimate is based on the hourly rates per the collective agreement and the hours required to complete the project. The number of hours required is based on projects of similar scope completed in the recent past.

Station: LINGAN GENERATING STATION

CI Number: 40223

Project: LIN - CW Screen Refurbishment

Project Description: Refurbish two (2) CW Screens.

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals
1	Regular Plant Labor				
	Plant Engineering	[redacted]	[redacted]	$940	
	Trades Supervision	[redacted]	[redacted]	$2,100	
	Maint Trades-Mech. Inc Crane Ops	$37	2000	$74,000	
	Maint Trade-Elect	$40	37	$1,480	
	Sub-Total Plant Resources				$78,520
2	Term Labor				
	Misc Utilities support (40 hrs per screen)	[redacted]	[redacted]	$2,560	
	Sub-Total Term Resources				$2,560
3	Material				
	Top boot screen components	[redacted]	2	[redacted]	
	Screen Section Panels -stainless	[redacted]	2	[redacted]	
	Bottom Boot screen components	[redacted]	2	[redacted]	
	Sub-Total Materials				[redacted]
4	Contracts				
	Machining and Refurb Contingecy	[redacted]	2	[redacted]	
	Sub-Total Contracts				[redacted]
6	A/O Charges				
	Interest Capitalized/Construction Overhead	$9,836	1		
	AO - Therm and Hydro Contracts	[redacted]	1		
	AO- thermal Re labor	$18,853	1		
	AO- Thermal Term labor	$615	1		
	Sub-Total A/O Charges			[redacted]	[redacted]
	Total Project Estimate				$253,879

Primary Materials List and Cost

Inv Number	Inventory Description of Components	Cost	Qty	Total	
	Top Section				
520608-6791	Take Up Bearing Assembly	1,900	1.00	1,900	
522981-0200	Shaft for Travelling Water Screen	2,149	1.00	2,149	
523290-2480	SPROCKET, GT HEAD FOR #3241 CHAIN STAINLESS STEEL INSERTS,	1,420	1.00	1,420	
523290-3520	SPROCKET 52 TOOTH DRIVEN TRAVELING WATER SCREEN	1,140	1.00	1,140	
523290-1030	DRIVE SPROCKET 8 TOOTH FOR REXNORD TRAVELLING SCREEN-SHOP CODE 2/64	1,300	1.00	1,300	
523208-6002	Chain Cover - Bottom Half			-	
523225-0040	Chain - Chabelco	13,483 1.00		13,483	
523231-0010	TAKE-UP SEALING PLATE FOR CW SCREENS, 316SS, 11 GAUGE	875	1.00	875	
	Subtotal Screen Top				**22,267**
	Bottom Boot Section			**-**	
523208-0400	ASSY. BOOT SECTION BOTTOM TRAY C/W SCW SYSTEM SCREENS	7,500	1.00	7,500	
52329-01040	FOOT SPROCKETS, 304 STAINLESS STEEL FABRICATED POSITIVE TRACKING STYLE WITH STOODY BUSHINGS FOR A 2 15/16" DIAMETER SHAFT SLEEVE.	3,600	1.00	3,600	
523225-2470	CHAIN CARRYING "CHABELCO" MATERIAL SPECIFICATION 304 SS.	5,250	1.00	5,250	
	Subtotal Bottom Boot				**16,350**
	Screen Panels				
523208-6900	BASKET ASSEMBLIES, DWG# PD100342, 14 GUAGE 316SS WIRE MESH PANELS WITH 5/16" SQ OPENINGS & 316SS ASS'Y HARDWARE	967	20.00	19,340	
523254-1000	LIP UPPER, SCREEN BASKET ASSEMBLY 10" X 24" FOR WATER SCREENS, FLAT MESH DESIGN COATED WITH RED OXIDE PRIMER.	132	12.00	1,584	
523254-1010	LIP LOWER SCREEN BASKET ASSEMBLY 10" X 24" FOR TRAVEL SCREENS, FLAT MESH DESIGN COATED WITH RED OXIDE PRIMER.	132	12.00	1,584	
523220-6900	CLOTH, WIRE SCREEN CLOTH 10'-316 S/S#14GA(080 DIA) 5/16" SQ. OPENING FOR CW TRAVELLING SCREENS.	223	10.00	2,225	
	subtotal screen panels				**24,733**
	Subtotal Materials for One (1) Unit				**63,350**

NOVA SCOTIA POWER
An Emera Company

Refurbish CW Screens
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**22-Dec-10**
Division :	Generation Services	**CI Number:**	40223
Department :	Lingan Generating Station	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Refurbish Screens	6.68%	421,109	1	46.06%	4.6 years
B	Test 2	6.68%	0	2	#NUM!	0.0 years
C	Test 3	6.68%	0	2	#NUM!	0.0 years
D	Test 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Refurbish Screens

Notes/Comments :

Refurbish Screens

Justification of this project is based on a capital cost of $253,878 and an increasing risk of failure over the life of the asset if refurbishment is not completed in 2011. Capacity loss in the event of a failure would be 60MW for 48 hours. Total avoided costs for 2011 and 2012 are: $88,477 and $100,681 respectively.

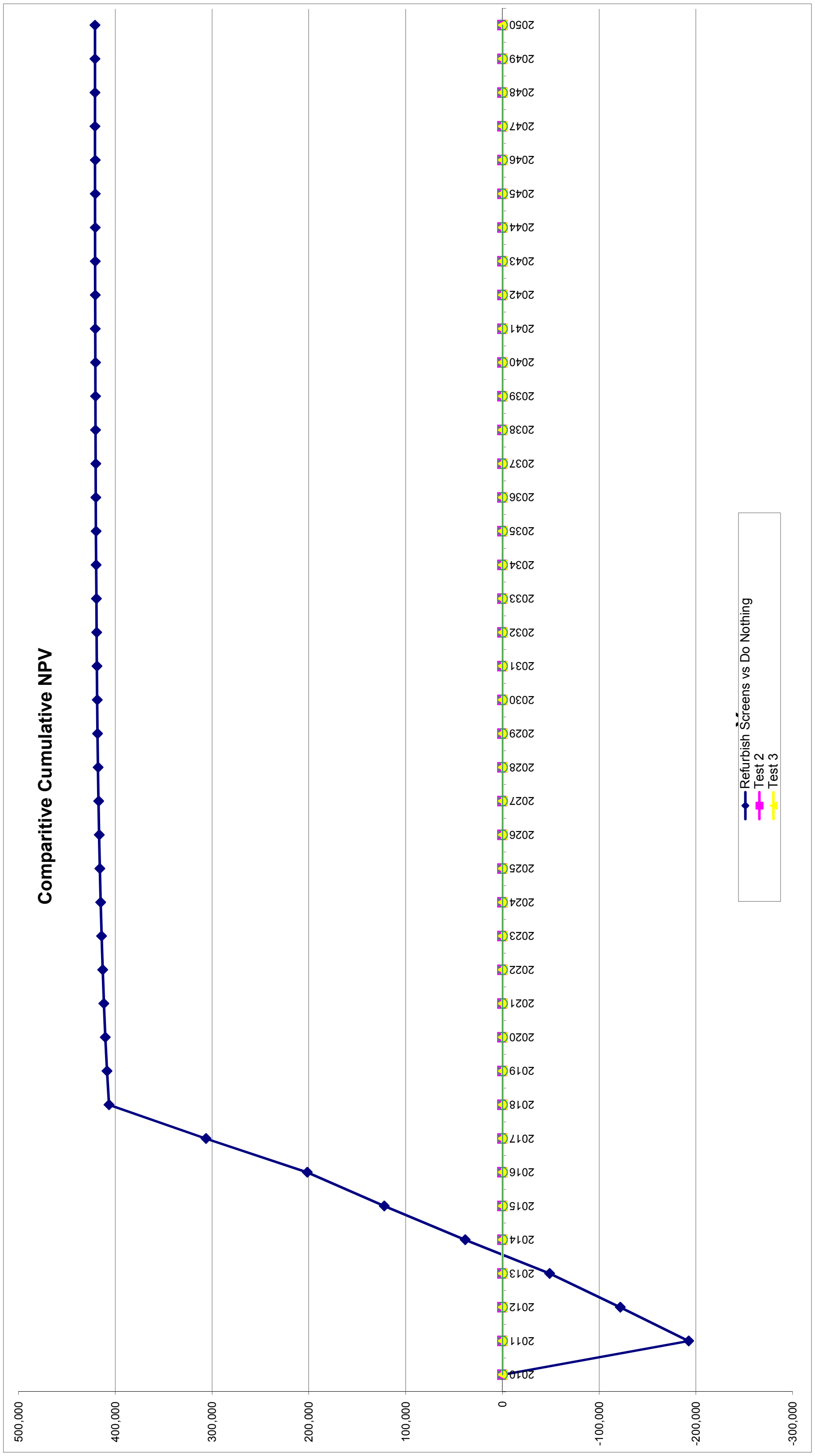
Test 2

Test 3

Test 4

Refurbish CW Screens
Refurbish Screens vs Do Nothing

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2011	-	86,478	(253,878)	10,155	243,723	(167,400)	(24,928)	(192,328)	1.000	(192,328)	(192,328)
2012	-	100,682	-	19,498	224,225	100,682	(25,206)	75,476	0.937	70,750	(121,579)
2013	-	111,932	-	17,938	206,287	111,932	(29,138)	82,794	0.879	72,750	(48,829)
2014	-	146,545	-	16,503	189,784	146,545	(40,346)	106,199	0.824	87,473	38,644
2015	-	149,896	-	15,183	174,601	149,896	(41,761)	108,135	0.772	83,490	122,134
2016	-	153,328	-	13,968	160,633	153,328	(43,202)	110,126	0.724	79,703	201,837
2017	-	217,838	-	12,851	147,783	217,838	(63,546)	154,292	0.678	104,675	306,513
2018	-	222,838	-	11,823	135,960	222,838	(65,415)	157,423	0.636	100,112	406,625
2019	-	-	-	10,877	125,083	-	3,372	3,372	0.596	2,010	408,635
2020	-	-	-	10,007	115,077	-	3,102	3,102	0.559	1,733	410,369
2021	-	-	-	9,206	105,870	-	2,854	2,854	0.524	1,495	411,863
2022	-	-	-	8,470	97,401	-	2,626	2,626	0.491	1,289	413,153
2023	-	-	-	7,792	89,609	-	2,416	2,416	0.460	1,112	414,264
2024	-	-	-	7,169	82,440	-	2,222	2,222	0.431	959	415,223
2025	-	-	-	6,595	75,845	-	2,045	2,045	0.404	827	416,050
2026	-	-	-	6,068	69,777	-	1,881	1,881	0.379	713	416,763
2027	-	-	-	5,582	64,195	-	1,730	1,730	0.355	615	417,378
2028	-	-	-	5,136	59,059	-	1,592	1,592	0.333	530	417,908
2029	-	-	-	4,725	54,335	-	1,465	1,465	0.312	457	418,366
2030	-	-	-	4,347	49,988	-	1,348	1,348	0.293	394	418,760
2031	-	-	-	3,999	45,989	-	1,240	1,240	0.274	340	419,100
2032	-	-	-	3,679	42,310	-	1,141	1,141	0.257	293	419,394
2033	-	-	-	3,385	38,925	-	1,049	1,049	0.241	253	419,647
2034	-	-	-	3,114	35,811	-	965	965	0.226	218	419,865
2035	-	-	-	2,865	32,946	-	888	888	0.212	188	420,053
2036	-	-	-	2,636	30,310	-	817	817	0.199	162	420,215
2037	-	-	-	2,425	27,886	-	752	752	0.186	140	420,355
2038	-	-	-	2,231	25,655	-	692	692	0.174	121	420,476
2039	-	-	-	2,052	23,602	-	636	636	0.164	104	420,580
2040	-	-	-	1,888	21,714	-	585	585	0.153	90	420,670
2041	-	-	-	1,737	19,977	-	539	539	0.144	77	420,747
2042	-	-	-	1,598	18,379	-	495	495	0.135	67	420,814
2043	-	-	-	1,470	16,909	-	456	456	0.126	58	420,871
2044	-	-	-	1,353	15,556	-	419	419	0.118	50	420,921
2045	-	-	-	1,244	14,311	-	386	386	0.111	43	420,964
2046	-	-	-	1,145	13,166	-	355	355	0.104	37	421,001
2047	-	-	-	1,053	12,113	-	327	327	0.098	32	421,032
2048	-	-	-	969	11,144	-	300	300	0.091	27	421,060
2049	-	-	-	892	10,253	-	276	276	0.086	24	421,084
2050	-	-	-	820	9,432	-	313	313	0.080	25	421,109
Total	-	1,189,537	(253,878)	244,446	2,938,064	935,659	(294,259)	641,399	14.768	421,109	14,101,706


Comparitive Cumulative NPV
Refurbish Screens vs Do Nothing
Test 2
Test 3

CI Number: 39945

Title: TRE - Asbestos Abatement 2011

Start Date: 2011/03

Final Cost Date: 2011/11

Function: Generation

Forecast Amount: $250,928

DESCRIPTION:

Asbestos insulation is being removed from the Trenton Generating Station as part of a multi-year plan. This project continues the removal of asbestos-contaminated insulation materials that may become exposed through regular operation and maintenance activities and equipment vibration (e.g. pipe insulation).

With no planned Unit outages in 2011, the focus of this project will be on areas which can be isolated during normal plant operation. This will include building heating systems that are comprised of steam and condensate piping with asbestos-containing insulation. Some of the auxiliary steam piping systems will also be addressed. The scope of work includes scaffolding to access the piping, installation of temporary enclosures, removal and disposal of asbestos-contaminated insulation and re-insulation of the piping with asbestos-free insulation.

Summary of related CI's +/- 2 years.
2009 - 30826 TRE5 Asbestos Program $115,248
2010 – 34502 TRE5 Asbestos Abatement $242,000

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

Removing asbestos insulation reduces the risk of asbestos particles becoming air-borne where encapsulating specific areas is no longer viable for sustained protection.

Why do this project now?

The removal of asbestos-contaminated insulation is being completed in a staged program. The areas to be addressed in 2011 are in accordance with the plant's asbestos work plan and inventory. The work plan for future years will be updated under this project.

Why do this project this way?

The removal of the asbestos contaminated material is based on accepted industry standards. Encapsulating is used to seal asbestos where practical, removal is then planned to reduce the level of asbestos in a controlled manner in the operating plant.

CI Number : 39945 - TRE - Asbestos Abatement 2011 **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 341 - 341-Trenton Admin./Common Capital **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		8,009	0	8,009
095		095-Thermal Term Labour AO		3,602	0	3,602
095		095-Thermal Regular Labour AO		3,602	0	3,602
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	007	001 - THERMAL Regular Labour	007 - SGP - Environmental	10,000	0	10,000
004	007	004 - THERMAL Term Labour	007 - SGP - Environmental	15,000	0	15,000
012	007	012 - Materials	007 - SGP - Environmental	[redacted]	0	[redacted]
013	007	013 - POWER PRODUCTION Contracts	007 - SGP - Environmental	[redacted]	0	[redacted]
016	007	016 - Tools & Equipment	007 - SGP - Environmental	10,000	0	10,000
033	007	033 - Rental and Maintenance of	007 - SGP - Environmental	5,000	0	5,000
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	5,000	0	5,000
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	250,928	0	250,928
			Original Cost:			

CI Number: 40228

Title: LIN Unit 3 & 4 Boiler House Intake Louvers

Start Date: 2011/04

Final Cost Date: 2011/08

Function: Generation

Forecast Amount: $250,571

DESCRIPTION:

There are 14 louver sets that run the length of the west side wall of the plant to admit air into the boiler house and to supply air to the forced draft fans located in the building. The louvers have degraded and are no longer functional. The louvers are installed in banks of three with three louvers per set. The louvers for Unit #1 and Unit # 2 (seven locations) were replaced in 2010. This project includes the replacement of the intake louvers for Unit #3 and Unit #4 (seven locations).

Summary of related CI's +/- 2 years.
2010 - 28898 LIN- Replace Boiler House Intake Louvers - $231,210

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

The Unit #3 and Unit #4 louvers are no longer functional and have had sections fall out during periods of high winds. The flashing in the louvers has deteriorated resulting in water leaking inside the wall. The system requires replacement with louvers that will withstand wind load conditions and function remotely.

Why do this project now?

Due to the condition of the louvers and surrounding flashing, replacement is now required. Completing this project now will mitigate the potential of future safety risks under high wind conditions.

Why do this project this way?

Replacing the existing louvers specified for the application and with ground level actuator control is the most practical solution. Repair of the existing louvers is not possible due to degraded metal housings and deteriorated mechanisms.

CI Number : 40228 - LIN Unit 3 & 4 Boiler House Intake Louvres **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 301 - 301-Lingan Admin./Common Capital **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		4,705	0	4,705
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Term Labour AO		3,241	0	3,241
095		095-Thermal Regular Labour AO		4,216	0	4,216
001	004	001 - THERMAL Regular Labour	004 - SGP - Misc.Equipment	17,560	0	17,560
004	004	004 - THERMAL Term Labour	004 - SGP - Misc.Equipment	13,500	0	13,500
012	004	012 - Materials	004 - SGP - Misc.Equipment	[redacted]	0	[redacted]
013	004	013 - POWER PRODUCTION Contracts	004 - SGP - Misc.Equipment	[redacted]	0	[redacted]
028	004	028 - Consulting	004 - DP - Misc.Equipment	[redacted]	0	[redacted]
			Total Cost:	250,571	0	250,571
			Original Cost:			

CI 40228 – LIN Unit 3 & 4 Boiler House Intake Louvers

The following is a breakdown of costs associated with the LIN Unit 3 & 4 Boiler House Intake Louvers

Administrative Overheads and Interest	$[redacted]
Labour	$31,060
Materials	$[redacted]
Contracts	$[redacted]
Consulting	$[redacted]
Total	$250,571

The materials estimate of $[redacted] is based on the attached vendor quote.

The contracts estimate of $[redacted] is based on the attached bid summary and detailed project estimate.

The labour estimate is mostly regular labour per the attached account breakdown and detailed project estimate. The labour estimate is based on the hourly rates per the collective agreement and the hours required to complete the project.

POWER PRODUCTION | **LINGAN GENERATING STATION** | **ENGINEERING SERVICES**

Station: LINGAN GENERATING STATION

CI Number: 40228

Project: LIN- REPLACE WEST BOILER HOUSE INTAKE LOUVERS - Units 3 -4

Project Description: Replacement of intake louvers. Includes staging built for access and electrical tie for remote damper control.

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals
1	Regular Plant Labor				
	Plant Engineering	[redacted]	[redacted]	$1,880	
	Electrical	[redacted]	[redacted]	$11,840	
	Mechanical	[redacted]	[redacted]	$3,840	
	Sub-Total Plant Resources				$17,560
2	Term Labor				
	Utility Trades stage to louvres	[redacted]	[redacted]	$13,500	
	Sub-Total Term Resources				$13,500
3	Consulting				
		[redacted]	100	[redacted]	
	Sub-Total Consulting (constr mgt)				[redacted]
4	Material				
	7 Louvers	[redacted]	7	[redacted]	
	Flashing 7	[redacted]		[redacted]	
	Miscelaneous Supplies	[redacted]	1	[redacted]	
	Sub-Total Materials				[redacted]
5	Contracts				
	Labour to install louvers	[redacted]	1	[redacted]	
	Contigency for flashing mount repairs. Assess during Const.	[redacted]	1	[redacted]	
	Sub-Total Contracts				[redacted]
6	Interest & A/O Charges				
	Interest Capitalized/Construction Overhead	$4,705		[redacted]	
		[redacted]			
		$3,241			
		$4,216			
	Sub-Total Interest & A/O Charges				[redacted]
	Total Project Estimate				$250,571

[redacted]

[redacted]

Pages 717 - 718 have been removed due to confidentiality.

CI Number: 39937

Title: TRE - Fall Protection (Phase 3)

Start Date: 2011/03

Final Cost Date: 2011/11

Function: Generation

Forecast Amount: $250,242

DESCRIPTION:

The work associated with this project will repair "Hazard Class 3" locations as identified in the Fall Protection Survey Report dated February 20, 2009. This report was filed with the Board on August 7, 2009.

Summary of related CI's +/- 2 years:
2009 - 36242 TRE - Fall Protection (Phase 1) $66,162
2010 - 38894 TRE - Fall Protection (Phase 2) $132,922

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

This project will address Hazard Class 3 areas with identified potential fall hazards as per CJ MacLellan Fall Protection Survey Report dated February 20, 2009. This work is a continuation of the fall protection work undertaken in 2009 and 2010 to improve fall protection and ensure compliance with regulations.

Why do this project now?

With the assistance of NSPI, an inspection for the Fall Protection Survey was completed by CJ MacLellan and Associates. The survey included all areas of the facility that may be considered to have potential for fall issues. This work order includes the materials, labour, and contracts to address the Hazard Class 3 locations.

Why do this project this way?

Upgrades are required to bring fall protection into compliance with the applicable codes and standards.

CI Number : 39937 - TRE - Fall Protection (Phase 3)

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 341 - 341-Trenton Admin./Common Capital

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		5,095	0	5,095
095		095-Thermal Term Labour AO		5,294	0	5,294
095		095-Thermal Regular Labour AO		18,529	0	18,529
095		095-Thermal Overtime Labour AO		1,324	0	1,324
001	023	001 - THERMAL Regular Labour	023 - SGP - Power Equip.-Station S	60,000	0	60,000
002	023	002 - THERMAL Overtime Labour	023 - SGP - Power Equip.-Station S	10,000	0	10,000
004	023	004 - THERMAL Term Labour	023 - SGP - Power Equip.-Station S	20,000	0	20,000
012	023	012 - Materials	023 - SGP - Power Equip.-Station S	[redacted]	0	[redacted]
016	023	016 - Tools & Equipment	023 - SGP - Power Equip.-Station S	5,000	0	5,000
033	023	033 - Rental and Maintenance of	023 - SGP - Power Equip.-Station S	5,000	0	5,000
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
001	087	001 - THERMAL Regular Labour	087 Field Super.& Ops.	10,000	0	10,000
028	087	028 - Consulting	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	250,242	0	250,242
			Original Cost:			

CI 39937 – TRE Fall Protection (Phase 3)

The following is a breakdown of costs associated with the LIN Fall Protection project:

Administrative Overheads and Interest	$30,242
Labour	$100,000
Materials	$[redacted]
Consulting	$[redacted]
Other	$10,000
Total	$250,242

The estimate for this project is based on the work completed under CI 38894 – Fall Protection, completed in 2010 and CI 36242 –Fall Protection, completed in 2009. The work to be completed under this project is very similar in nature to work completed under these previous projects.

Pages 722 - 800 have been removed due to confidentiality.

CI Number: 40363

Title: LIN3 High Voltage Bushing Refurbishment

Start Date: 2011/01

Final Cost Date: 2012/02

Function: Generation

Forecast Amount: $504,168

DESCRIPTION:

High voltage bushings are installed on the three phases of the generator primary electrical connections to seal hydrogen gas in the generator. Each phase requires two bushings for phase connections. As a result of hydrogen leakage observed around the bushings on Unit #1 and Unit #2, Unit #2 bushings were replaced in 2009 under CI 33662 and Unit #1 bushings were replaced in 2010 under CI 38946. Similar to the work previously completed on Unit #1 and Unit #2, the scope of this project is to refurbish and replace the bushings on Unit #3 to reduce the risk of a hydrogen leaks and an unplanned generator outage. New bushings were installed in Unit #2 and the existing bushings from Unit #2 were refurbished and installed in Unit #1.

Summary of Related CI's +/- 2 years
2009 – CI 33662 Lin 2 Replace HV Bushings $530,311
2010 – CI 38946 Lin1 Replace HV Bushings $605,671

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Lingan operational experience on Units 1 & 2 indicate there is a risk of hydrogen leaks occurring around the generator bushings and based on the Original Equipment Manufacturer (OEM) recommendations, refurbishment and replacement of the generator bushings and o-ring gaskets is required to ensure integrity of the bushings.

Why do this project now?

The planned Unit #3 outage in 2011 is the next available opportunity to complete this work. Completing this project in 2011 will mitigate the risk of unplanned generator failures.

Why do this project this way?

Replacing the original installed generator bushings and o-ring gaskets with refurbished bushings and new seal components is the most cost effective approach of ensuring long-term reliability of the generator.

CI Number : 40363 - LIN3 High Voltage Bushing Refurbishment **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 305 - 305-Lingan 3&4 Prod.Unit **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		24,150	0	24,150
095		095-Thermal Term Labour AO		5,186	0	5,186
095		095-Thermal Regular Labour AO		16,449	0	16,449
095		095-Thermal & Hydro Contracts AO		[redacted]	0	[redacted]
001	010	001 - THERMAL Regular Labour	010 - SGP - Turbo Gen.Instal.	68,510	0	68,510
004	010	004 - THERMAL Term Labour	010 - SGP - Turbo Gen.Instal.	21,600	0	21,600
012	010	012 - Materials	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
013	010	013 - POWER PRODUCTION Contracts	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
028	010	028 - Consulting	010 - SGP - Turbo Gen.Instal.	[redacted]	0	[redacted]
			Total Cost:	504,168	0	504,168
			Original Cost:			

CI 40363 – LIN3 High Voltage Bushing Refurbishment

The following is a breakdown of costs associated with the LIN3 High Voltage Bushing Refurbishment:

Administrative Overheads and Interest	$[redacted]
Labour	$90,110
Materials	$[redacted]
Contracts	$[redacted]
Other	$[redacted]
Total	$504,168

The contracts estimate of $[redacted] is based on the attached vendor quotes and detailed project estimate.

The labour estimate of $90,110 is mostly regular labour per the attached account breakdown and detailed project estimate. The estimate is based on the hourly rates per the collective agreement and the hours required to complete the project. The number of hours required is based on projects of similar scope completed in the recent past.

The materials estimate of $[redacted] is based on the attached vendor quotes and detailed project estimate.

POWER PRODUCTION | LINGAN GENERATING STATION | ENGINEERING SERVICES

Station: LINGAN GENERATING STATION

CI Number: 40363

Project: Unit 3 High Voltage Bushing Replacement

Project Description: Replace HVB on U3 Generator. Scope is similar to Unit 1 bushing replacement - refurbished bushings used. Include contigency for standoff damage per Unit 1 experience

Item	Description	Rate ($/hr)	Qty	Cost Est	Totals	Notes
1	Regular Plant Labor					
	Plant Engineering	[redacted]	[redacted]	$8,750		
	Supervision	[redacted]	[redacted]	$3,600		
	Electrical trades	$40	960	$38,400		
	Mechanical Trades	$37	480	$17,760		
	Sub-Total Plant Resources				$68,510	
2	Term Labor					
	Utility Trades	$27	800	$21,600		
	Sub-Total Term Resources				$21,600	
3	Consulting					
	Technical Consultation	[redacted]	[redacted]	[redacted]		
	As Built and Design Drawing	[redacted]	[redacted]	[redacted]		
	Sub-Total Consulting				[redacted]	
4	Material					
	HVB Consumables Kit	[redacted]	[redacted]	[redacted]		MKEQ-0359
	Replacement of damaged standoffs AR	[redacted]	[redacted]	[redacted]		
	Sub-Total Materials				[redacted]	
5	Contracts					
	HVB Refurbishment plus 10%	[redacted]	[redacted]	[redacted]		XCL02-09-P022 REV 0
	Technical Representatives & Winding Specialists T&M	[redacted]	[redacted]	[redacted]		1-2FP030
	Project Coordinator - Tech Support	[redacted]	[redacted]	[redacted]		
	Silver Plate contacts	[redacted]	[redacted]	[redacted]		
	Tech Evaluation	[redacted]	[redacted]	[redacted]		
	Sub-Total Contracts				[redacted]	
6	A/O Charges					
	Interest Capitalized/Construction Overhead	$24,150		[redacted]		
		[redacted]				
	Sub-Total A/O Charges	$16,449			[redacted]	
		$5,186				
	Total Project Estimate				$504,168	

Materials to be ordered in year 1 , ready for exchange in year 2

[redacted]

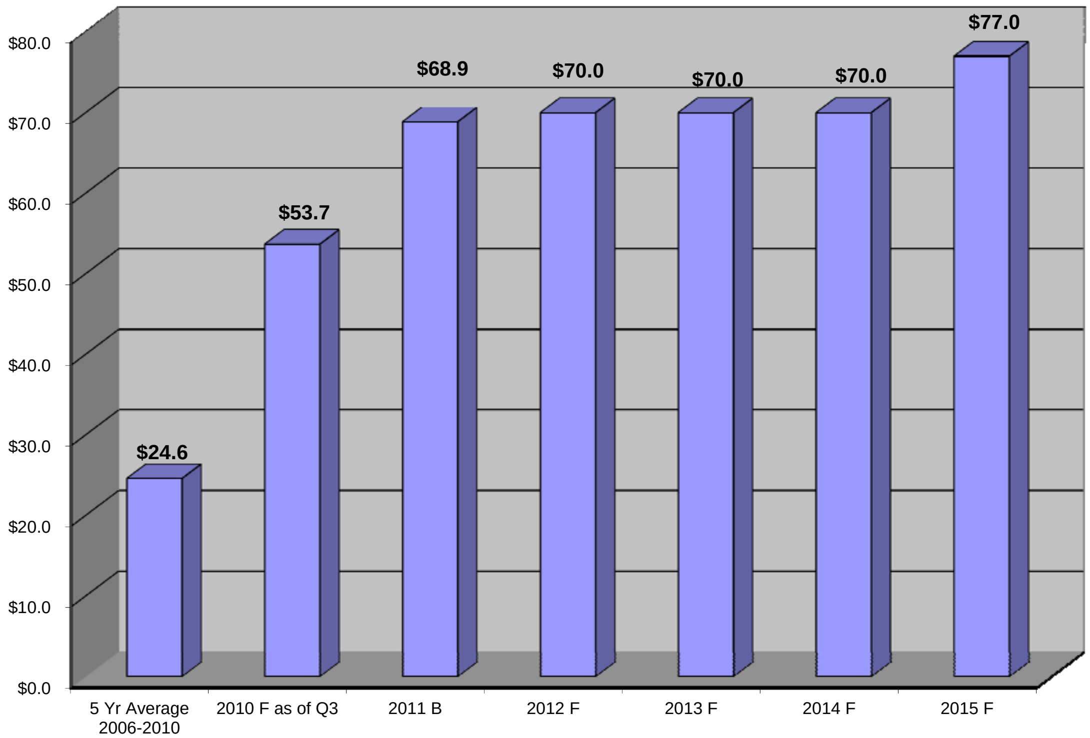
Pages 805 - 821 have been removed due to confidentiality.

Transmission

3 TRANSMISSION

(Millions of Dollars)

3.1 Five Year Plan and Highlights



- The focus for Transmission capital in 2011 is growth in customer base and customer reliability.

- Year 2011 transmission capital is comprised of the following:

    - $30.4M New items with total spend greater than $250K seeking ACE approval
    - $ 6.8M New items with total spend greater than $250K for individual approval
    - $ 0.0M New items with total spend less than $250K
    - $20.8M Carryover Spending
    - $10.9M Routine Capital Spending

3.2 Transmission – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2011 Budget	Subsequent Spending	Total Estimate
T650	38732	1H Water St Replace 138 kV GIS	2010/04	2011/12	1,349,136	7,021,904	-	8,371,040
*	38819	51V Tremont Circuit Breaker & Bus	2010/08	2011/12	1,522,583	5,929,928	-	7,452,511
*	33525	Canaan Rd 43V to Tremont 51V Line	2010/08	2011/07	6,188,759	1,827,676	-	8,016,435
*	34622	Upgrade L-8002	2010/09	2011/12	1,022,592	1,200,047	-	2,222,639
*	11004	Canaan Rd Circuit Breaker Additions	2010/08	2011/03	855,850	1,134,781	-	1,990,631
T639	33624	Spare Generator Transformer	2010/06	2012/05	9,394	1,045,147	3,296,023	4,350,564
*	40425	Kempt Road Transformer	2010/10	2011/08	280,115	813,584	-	1,093,699
**	40185	104H-T61 Transformer Refurbishment	2010/12	2011/12	224,709	721,966	-	946,675
*	25391	25 kV Bus Keltic Dr	2010/04	2011/07	296,398	375,445	-	671,843
*	39628	Digby Wind Project Interconnect	2010/05	2011/02	2,986,580	283,480	-	3,270,060
*	38266	2010 Protection Upgrades	2010/08	2011/01	61,333	251,998	-	313,331
T549	28478	L6033 & L6035 Tower Footing Restora	2007/03	2011/12	11,234	187,476	-	198,710
		Total Transmission			**$14,808,683**	**$20,793,432**	**$3,296,023**	**$38,898,138**

Note 1: Project Listings are as of December 2010.

Note 2: * Pending UARB Approval

Note 3: **Will be submitted as a U&U in 2010 Q4 Package.

3.3 Transmission – New Item Spending

Tab#	CI#	Project Title	2011 Budget	Project Total
T1	40233	2011 Protection Upgrades TUC	$3,928,932	$3,928,932
T2	40287	Substation Recloser Replacement	3,764,921	3,764,921
T3	40327	Glen Dhu 138 kV Substation	3,200,000	3,200,000
T4	40322	New Prospect Road Substation	3,068,581	3,068,581
T5	40281	2011 Transmission Line Insulator Replacement	3,018,100	3,018,100
T6	40280	2011 Transmission Switch & Breaker Upgrades	2,866,718	2,866,718
T7	40288	2011 Substation PCB Equipment Removal	2,510,193	2,510,193
T8	40260	L-7012 Beaver Narrows Crossing Replacement	1,899,224	1,899,224
T9	40266	L6002 Deteriorated Plant Replacements	1,340,019	1,340,019
T10	40231	2011 Protection Upgrades LAK	1,069,632	1,609,905
T11	40307	L-6033 and L-6035 Water St. Transmission Tower Refurbishment	995,497	995,497
T12	40270	L-5501 Upgrade 69 kV Circuit to Bridge Ave	800,793	800,793
T13	40323	Canaan Road Line Terminal	738,632	738,632
T14	40296	2011 Transmission Steel Tower Painting	587,142	587,142
T15	40279	2011 Pole Retreatment	516,341	516,341
T16	40321	Install Canaan Road to Prospect Road Transmission Line	62,412	2,024,763
		Total Transmission New Spending	**$ 30,367,137**	**$ 32,869,761**

Where NSPI has forecast contract forces to perform Transmission and Distribution work, certain assumptions have been included with regards to the activities and items in the contract price to make the rate essentially all inclusive versus the NSPI labor rate. These same items are accounted for separately and are not reflected in the labour accounts/ person day rate the NSPI cost estimate provides when NSPI is to perform the work activity.

CI Number: 40233

Title: 2011 Protection Upgrades TUC

Start Date: 2011/06

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $3,928,932

DESCRIPTION:

This project provides for the costs to upgrade the protection system at 91H-Tuft's Cove to comply with Northeast Power Coordination Council (NPCC) criteria for bulk power systems.

Summary of Related CI's +/- 2 years:
2010 – 38266 2010 Protection Upgrades $313,311
2011 – 40231 2011 Protection Upgrades LAK $1,609,905
2012 – 2012 Protection Upgrades Brushy Hill & Onslow $TBD

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: System Protection

Why do this project?

In 2008, NPCC approved new criteria (Criteria Document A-10) for determining whether a substation bus is categorized as bulk power. This criteria is used to identify substation busses that, if a fault (short circuit) was not successfully cleared by protection, the situation could result in disturbances outside the local operating area. Stations identified through this criterion are required to have fully redundant protection, control and communication schemes as defined in NPCC Directory #4.- Bulk Power System Protection Criteria. The A-10 Criteria requires the 91H-Tufts Cove substation bus to be upgraded to satisfy the A-10 Criteria.

Why do this project now?

Implementation of the redundant protection, control and communication schemes is required to be completed by the end of 2012. Because this work is significant, NSPI has chosen to complete the five stations requiring this upgrade over a three year period. A portion of 79N-Hopewell was completed in 2010 as CI 38266. This item when originally submitted within the 2010 ACE Plan was intended to include the costs for upgrading to NPCC standards 79N-Hopewell, 91H – Tuft's Cove and 208H – Burnside. Prior to requesting full approval of the project, and due to removal of the bulk power designation for the Burnside substation and an increase in the scope of the work required at Tuft's Cove, CI 38266 was modified to include only the scope Hopewell protection system upgrades. 91H-Tuft's Cove will be completed in 2011, as will the 138kV portion of 103H-Lakeside, submitted as a separate CI. 1N-Onslow and 120H-Brushy Hill will be submitted in 2012.

Why do this project this way?

To comply with NPCC standards, fully redundant protection, control and communication systems must be installed for all bulk power elements identified under the A-10 Criteria.

CI Number : 40233	- 2011 Protection Upgrades TUC	**Project Number**	
Parent CI Number :	-	**Approved Date**	
Cost Centre : 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		149,052	0	149,052
094		094 - Interest Capitalized		74,644	0	74,644
095		095-COPS Regular Labour AO		227,064	0	227,064
095		095-Thermal Regular Labour AO		30,196	0	30,196
095		095-COPS Contracts AO		[redacted]	0	[redacted]
012	003	012 - Materials	003 - TP - Bldg.,Struct.Grnd.	22,218	0	22,218
013	003	013 - COPS Contracts	003 - TP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
066	003	066 - Other Goods & Services	003 - TP - Bldg.,Struct.Grnd.	2,925	0	2,925
001	022	001 - T&D Regular Labour	022 - TP - Elec Contr.Equip.	76,757	0	76,757
012	022	012 - Materials	022 - TP - Elec Contr.Equip.	1,089,050	0	1,089,050
013	022	013 - COPS Contracts	022 - TP - Elec Contr.Equip.	[redacted]	0	[redacted]
066	022	066 - Other Goods & Services	022 - TP - Elec Contr.Equip.	156,000	0	156,000
012	023	012 - Materials	023 - TP - Power Equip.-Station S	135,700	0	135,700
013	023	013 - COPS Contracts	023 - TP - Power Equip.-Station S	[redacted]	0	[redacted]
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	42,536	0	42,536
012	043	012 - Materials	043 - TP - Substn Dev.	688,942	0	688,942
066	043	066 - Other Goods & Services	043 - TP - Substn Dev.	46,904	0	46,904
001	061	001 - T&D Regular Labour	061 - TP - Switched Telecomm. Sys	4,901	0	4,901
012	061	012 - Materials	061 - TP - Switched Telecomm. Sys	46,460	0	46,460
001	085	001 - THERMAL Regular Labour	085 Design	125,764	0	125,764
028	085	028 - Consulting	085 Design	23,000	0	23,000
001	086	001 - T&D Regular Labour	086 Commissioning	169,969	0	169,969
013	087	013 - COPS Contracts	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	3,928,932	0	3,928,932
			Original Cost:	685,089		

CI 40233 - 2011 Protection Upgrades TUC

The following is a breakdown of costs associated with the 2011 Protection Upgrades TUC Project.

Administrative Overhead and Interest	$[redacted]
Materials	$1,982,370
Contracts	$[redacted]
Other	$228,830
COPS Labour	$419,927
Total	$3,928,932

The contracts cost estimate for this project is based on work being performed in the Tufts Cove substation by contractors and is not expected to be completed by an affiliate. NSPI COPS labour will be carried out by internal technicians and electricians at a rate of approximately $[redacted]/ person day along with engineering design work. This is a major redesign of the Tufts Cove 69 kV substation. It will include a second control building, batteries and a second protection scheme. In addition, the majority of the 69 kV circuit breakers will be changed out. The estimates for the new circuit breakers are based on quotes associated with the circuit breaker replacement program in 2010.

NSPI carried out the A-10 test for Nova Scotia. A list of substations that A-10 test criteria identified as Bulk Power was submitted to Northeast Power Coordinating Council (NPCC). Once a bus (a substation at a given voltage level) is identified as Bulk Power as per the A-10 test, the requirement for redundant protection schemes is an absolute requirement. The only possibility of eliminating the redundant protection criteria is to find a solution that allows the substation to be removed from the Bulk Power designation. In 2010, NSPI reduced the number of substations within the province that were to be classified as Bulk Power through successful justification for removal of four from the list of nine. Those that were removed were 104H-Kempt Road, 90H-Sackville, 47C-NewPage and 108H-Burnside.

NSPI plans to complete the remainder of the projects as follows:

79N- Hopewell	2010/2011
91H-Tuft's Cove	2011
103H-Lakeside	2011/2012
1N-Onslow	2012
20H-Brushy Hill	2012

NPCC, Inc.

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Implementation Plan for Revised NPCC Document A-10

Approved by Full Member Ballot – December 01, 2009

This Implementation Plan provides for testing in accordance with the revised NPCC *Classification of Bulk Power System Elements*, Document A-10, to be completed as follows:

- Testing in accordance with the revised A-10 methodology shall be performed on all facilities that have not been evaluated under the existing A-10 methodology as of the date the revised A-10 is approved.
- Testing in accordance with the revised A-10 methodology shall be performed on all facilities within five years from the date the revised A-10 is approved.

Each **Area** shall ensure that this Implementation Plan is followed within its **Area**.

Document A-10

NPCC, Inc.

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Classification of Bulk Power System Elements

Adopted by the Members of the Northeast Power Coordinating Council Inc., this April 28, 2007 based on recommendation by the Reliability Coordinating Committee, in accordance with Section VIII of the NPCC Inc. Bylaws dated May 18, 2006 as amended to date.

1.0 Introduction

NPCC defines specific requirements applicable to design, operation, and **protection** of the **bulk power system**. The object of this *Classification of* ***Bulk Power System Elements*** (Document A-10) is to provide the methodology to identify the **bulk power system elements**, or parts thereof, of the interconnected NPCC Region.

The methodology in this document is used to classify **elements** of the **bulk power system** and may result in **elements** being added to or removed from the NPCC **Bulk Power System** List. The methodology in this document is based on the following:

- Results of an analysis done on a bus basis can be applied to identify which **elements,** or portions thereof, connected to the bus are part of the **bulk power system**.

- **Elements** shall not automatically be included or excluded from the **bulk power system** based on voltage class. Application of this methodology may be omitted at buses that can be logically excluded from the **bulk power system** based on study results at other buses tested using this methodology. If a bus is determined to be **bulk power system**, all other buses with elements connected to that bus must be tested.

- **Elements** shall be evaluated based on this methodology when significant changes occur on the system that could change an **element**'s **bulk power system** status; the evaluation may be limited to the affected part of the system.

- **Areas** and facility owners may adopt methodologies that exceed the requirements set forth in this document for their own purposes. However, only **elements** classified as **bulk power system** as a result of testing described in this document shall be included on the NPCC's list of **bulk power system elements**. NPCC criteria and compliance monitoring shall consider only the system **elements** listed on NPCC's list of **bulk power system elements**.

The Classification of **Bulk Power System Elements** is based on three defined terms: **bulk power system**, **local area** and **significant adverse impact**.

2.0 Definitions

Terms in italics in this document are defined in this section.

Terms in bold are defined in the *NPCC Glossary of Terms* (Document A-7).

2.1 *Bus*

Within this document the term *bus* refers to a junction with sensing or **protection** equipment within a substation or switching station at which the terminals of two or more **elements** are connected, regardless of whether circuit breakers are provided. In this context, *bus* may not have a direct correlation to the use of this term in substation design or a power flow data set.

In some configurations a *bus* may include more than one physical *bus*, such as in a breaker-and-a-half arrangement or a single-line-single-breaker arrangement in which two physical *buses* are connected through a *bus*-tie breaker. The examples in Figure 1 depict two of many possible configurations where two physical *buses* are tested as a single *bus*. *Buses* that are separated by normally open *bus*-tie breakers are considered as separate *buses*. The termination of line sections through switches should not be considered as a *bus* requiring testing unless the switches are activated as part of a **protection system** for the line which they sectionalize as part of normal **protection system** actions.

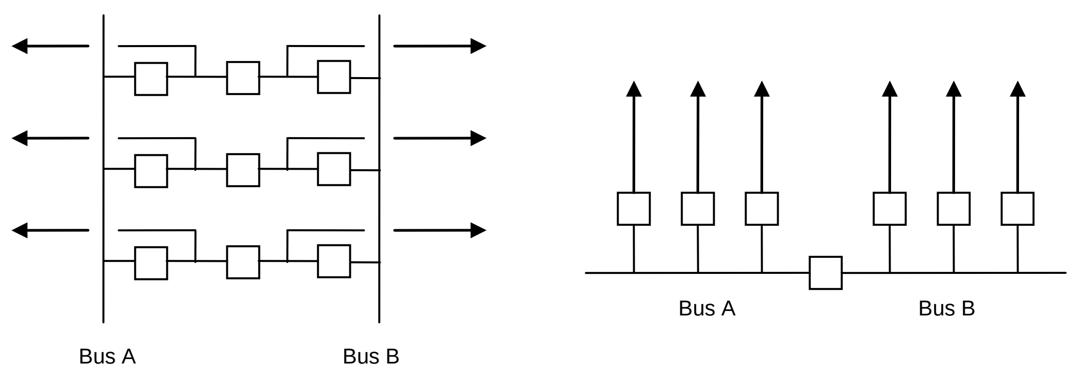

Figure 1 – Configurations where *Bus* A and *Bus* B are tested as one *bus*.

In some configurations **elements** may not be terminated to the *bus* through circuit breakers, such as the generator *bus* for a unit connected generator or a *bus* between a transmission line and transformer that are switched as a single circuit. The examples in Figure 2 depict two of many configurations where two physical *buses* are tested as separate *buses*.

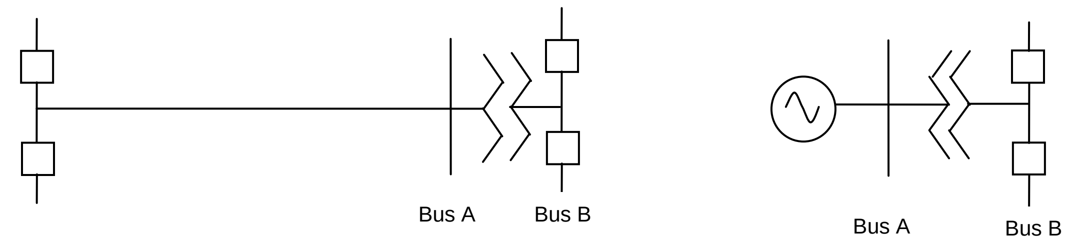

Figure 2 – Configurations where *Bus* A and *Bus* B are tested as two separate *buses*.

2.2 *Uncleared Locally*

Within this document the phrase *uncleared locally* is used to denote failure of the **protection** including **Special Protection Systems** for the *bus* under test to initiate tripping of all associated interrupting devices regardless of their location.

Protection located at other *buses* is assumed to operate as designed when that **protection** cannot be disabled by failure of a single component in common with the **protection** at the *bus* under test. For example, consider the case where the **protection** for **elements** connected to higher voltage level and lower voltage level *buses* in the same station share a dc source, and an independent dc source is provided for second **protection groups** associated with **elements** connected to the higher voltage level *bus*. In this case, it is acceptable when testing the lower voltage level *bus* to assume correct operation of any **protection groups** associated with **elements** connected to the higher voltage level *bus* capable of detecting the **fault** and supplied by the independent dc source.

In cases where circuit breakers are not provided at the terminals of the **element** at the *bus* under test (as shown in Figure 2, *bus* A), *uncleared locally* includes a failure to clear a **fault** by circuit breakers located at another *bus* within the same substation, unless back-up **protection** at that other *bus* using an independent dc source would detect the **fault** and initiate clearing.

3.0 Classification of Bulk Power System Elements

3.1 Testing Conditions and Assumptions

Studies conducted for the purpose of determining the **elements** of the **bulk power system** shall assume the following conditions:

3.1.1. Power flow transfers, **load** and **generation** patterns expected to exist for the period under study which stress the system in a manner critical to the classification of the *bus* to be tested. All **reclosing** facilities rendered inoperative.

3.1.2. Operation of **Special Protection Systems**, undervoltage **load shedding** and underfrequency **load shedding** modeled as designed.

3.1.3. Load models used in the **Transient Stability** Test are consistent with **Area** practices for the studies of rotor angle stability.

3.1.4. Load models used for steady state testing are either constant MVA or are based on actual system testing with LTC movement.

3.1.5. Stability simulation runs until the system response can be clearly determined.

3.1.6. Generic or detailed relay models to monitor, after tripping of remote terminals, the potential for tripping of un-faulted **elements**.

3.2 Test Methodology

Both **transient stability** and steady-state tests are used to determine the impact on system performance resulting from power system **faults**.

Testing is based on application of a *bus* **fault** at a single voltage level that is *uncleared locally*. Tripping of un-faulted **elements** associated with clearing the test **fault** does not constitute a **significant adverse impact**.

Depending on system configuration or topology, testing only **faults** at *buses* can fail to uncover **significant adverse impacts** arising from a design criteria contingency involving the loss of two adjacent transmission circuits on a common tower. Hence, specific tests in 1c and 2c below are designed to assess this contingency for its potential **significant adverse impact** outside of the **local area**.

A **transient stability** test may be done first to identify *buses* at which **faults** may cause a **significant adverse impact** outside of the **local area**.

For those *buses* which are not classified as **bulk power system** in the **transient stability** test, a steady-state test is used to identify *buses* at which **faults** may cause a **significant adverse impact** outside of the **local area**.

Step 1 - Transient Stability Test

Simulate the **transient stability** condition of a three-phase **fault** with delayed clearing at the *bus* under test (step 1a). If the test results in a positive **bulk power system** determination, more detailed testing (step 1b) may be applied to obtain a more precise determination.

1a. Apply a three-phase **fault** for at least 10 seconds at the *bus* that is being tested. Do not open any of the **elements** connected to the *bus* for the duration of the **fault**. After 10 seconds, simulate tripping of all terminals of each **element** connected to the *bus* under test. In cases where there is no **fault** interrupting device at the remote terminal of an **element**, open all terminals of all **elements** between the *bus* under test and the interrupting device(s) that will open to clear the **fault**. This test is performed as an efficient, but conservative method for evaluating the impacts of:

- *bus* **faults** which would result in faster clearing time, and
- **faults** off the *bus*.

It is recognized that due to the conservative nature of this test some **elements** could be classified unnecessarily as part of the **bulk power system**. If the above test results in a positive **bulk power system** determination, the following additional testing may be utilized to obtain a more precise determination. Subsequent testing utilizes design clearing times for the conditions being tested, as stated below.

1b. Apply a three-phase **fault** at the *bus*, which is *uncleared locally* and trip the remote terminals of all **elements** that will open to clear the **fault**. Remote clearing times shall be based on design **fault clearing** times, assuming no communications from the station under test to the remote terminals.

Transformers and other **elements** connected to the *bus* shall only be tripped by operation of independent remote **protection groups** capable of clearing a **fault** on the *bus* under test.

Some **protection groups** (e.g. directional comparison blocking) at remote terminals may provide high-speed **fault clearing** for faults at the bus under test. In order to test the effects of longer **fault clearing** times for fault conditions when these remote **protection**

groups would not provide high speed **fault clearing**, for either test (1a) or (1b) above:

- High-speed **fault clearing** at remote terminals must be ignored; or
- Testing must vary the placement of the 3-phase **fault** on the elements connected to the bus under test to include locations beyond the reach of the high-speed tripping relay element at the remote terminal.

However, the **protective relay** settings may be reviewed to determine whether the *bus* could be classified as not part of the **bulk power system** if faster remote **fault** clearing can be achieved. If **protective relay** settings are modified, an assessment shall be conducted to ensure that the faster clearing time does not compromise the security of the **protection system**. Until the **protective relay** settings are modified, the *bus* must be classified as **bulk power system**.

1c. The test above is meant to cover the majority of design criteria contingencies. However, the **elements** associated with the *bus* under test must be reviewed to ensure adverse consequences resulting from a design criteria contingency involving the loss of two adjacent transmission circuits on a common tower are not overlooked.

If a circuit terminating at the *bus* under test shares a multiple circuit tower with an adjacent circuit that does not terminate at the *bus* under test, the adjacent circuit design contingency must also be assessed. In such cases, simultaneous permanent phase to ground **faults** on different phases of each of two adjacent transmission circuits shall be applied at critical common tower locations. The **fault** on the circuit associated with the *bus* under test which is *uncleared locally*, shall be simulated with **normal fault clearing** at the remote terminal and on the adjacent circuit.

If the **fault** has a **significant adverse impact** outside of the **local area**, the *bus* is classified as part of the **bulk power system**.

For *buses* not classified as part of **bulk power system** in Step 1, continue with the Steady State Test in step 2.

Step 2 - Steady State Test

Simulate the post-**contingency** steady-state conditions based on one of the following outcomes of the **fault** applied to the *bus* under test:

2a. If the **fault** was cleared based on design **fault clearing** times in the **Transient Stability** Test, open the same **elements** that were opened to clear the **fault** in the Transient Test. Post-**contingency** conditions shall reflect operation of all automatic devices.

2b. If the **fault** was not cleared based on design **fault clearing** times in the **Transient Stability** Test, assume that the **fault** propagates to the nearest location where it can be detected by independent **protection groups** and open the **elements** that would be opened by the **protection groups** to clear the **fault**. Note that because **fault clearing** will occur at interrupting devices capable of clearing the **fault**, it may be necessary to open multiple **elements** between the *bus* under test and the relevant interrupting devices, for example, a transmission line and transformer in series as shown in Figure 2.

2c. As in Step 1, the steady state test above is meant to cover the majority of design criteria contingencies. However, the **elements** associated with the *bus* under test must be reviewed to ensure adverse consequences resulting from a design criteria contingency involving the loss of two adjacent transmission circuits on a common tower are not overlooked. The post-contingency analysis must assess the loss of any adjacent circuit on common towers with a circuit terminating at the *bus* under test in addition to the **elements** associated with the *bus* under test.

Voltages and thermal loading will be assessed for **significant adverse impact** outside of the **local area** following automatic actions. In cases where a power flow solution is not obtained, other techniques shall be used to assess the impact of the event on the power system.

If the **fault** has a **significant adverse impact** outside of the **local area**, the *bus* is classified as part of the **bulk power system**.

Note that Step 2 can be done prior to Step 1. If a *bus* is classified as part of the **bulk power system** by the Steady State Test (Step 2), the **Transient Stability** Test (Step 1) need not be done for that *bus*.

3.3 Utilization of Test Results to Classify on an **Element**-by-**Element** Basis.

Classification of **bulk power system elements** is achieved by applying the results of the above tests to the **elements** connected to the tested *bus*.

An **element** with only one terminal such as a generator, shunt reactor, or capacitor bank, is classified as part of the **bulk power system** if the *bus* at which it is connected is classified as part of the **bulk power system**.

An **element** with multiple terminals such as a transformer or transmission line is classified as part of the **bulk power system** if any terminal of the **element** is connected to a *bus* that is classified as part of the **bulk power system**. The **bulk power system** classification may be limited to only a portion of the **element** if all of the following conditions are met:

- At least one terminal is connected to a *bus* that is not part of the **bulk power system**.
- The Steady State Test has been applied at the *buses* connected to all terminals of the **element** and none of these *buses* have been classified as part of the **bulk power system** based on results of the Steady State Test.
- The **Transient Stability** Test has been applied between the terminals of the **element** to identify those portions of the **element** for which the **Transient Stability** Test will not result in a **significant adverse impact** outside of the **local area**.

3.4 <u>Documentation</u>

Documentation for **Bulk Power System** classification shall include:

3.4.1 The rationale for the test conditions and assumptions used that are not listed above in 3.1.

3.4.2 The criteria used in evaluating the result of the testing including but not limited to stability, voltage, and thermal performance.

3.4.3 Detailed result of the testing shall be provided upon request.

4.0 Application and List Maintenance

Each **Area** shall be responsible for the application of the *Classification of* **Bulk Power System** *Elements* as described in this document and shall submit proposed changes and supporting documentation to the Task Force on System Studies (TFSS).

The "NPCC **Bulk Power System** List" will be maintained by the TFSS. Additions to and removals from the NPCC **Bulk Power System** List will be submitted by TFSS to the Reliability Coordinating Committee (RCC) for approval.

4.1 Addition of **Elements** to the **Bulk Power System** List

When application of this methodology identifies an **element** that was not part of the **bulk power system** should be classified as a **bulk power system element**, documentation of the analysis shall be presented to the TFSS. Once classification of the **element** is recommended by TFSS and approved by the RCC the **element** will be added to the NPCC **Bulk Power System** List with the appropriate comments and information. All task forces and the Compliance Committee will be notified once an **element** is approved by the RCC to be added to the **Bulk Power System List**. Within three months of an element being added to the **Bulk Power System** List, a plan and schedule for achieving compliance shall be provided to TFSP for review and acceptance. TFSP may require modifications to the proposed plan and schedule.

4.2 Removal of **Elements** from the **Bulk Power System** List

When application of this methodology identifies a **bulk power system element** that no longer should be classified as a **bulk power system element**, documentation of the analysis shall be submitted to the TFSS. If reclassification of the **element** is recommended by TFSS and approved by the RCC, the **element** will be removed from the NPCC **Bulk Power System** List.

Lead Task Force:	Task Force on Coordination of Planning
Reviewed for concurrence by:	TFSS, TFCO, TFSP, and TFIST
Review frequency:	4 years
References:	*Basic Criteria for Design and Operation of Interconnected Power Systems* (Document A-2) *NPCC Glossary of Terms* (Document A-7)

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NPCC
Regional Reliability Reference Directory # 4
Bulk Power System Protection Criteria

Task Force on System Protection Revision Review Record:
December 01, 2009

Adopted by the Members of the Northeast Power Coordinating Council, Inc. December 01, 2009 based on recommendation by the Reliability Coordinating Committee, in accordance with Section VIII of the NPCC Amended and Restated Bylaws dated July 24, 2007 as amended to date.

This document, when downloaded or printed, becomes UNCONTROLLED. Users should check the NPCC website for the current CONTROLLED version of this document.

Revision History

Version	Date	Action	Change Tracking (New, Errata or Revisions)

Table of Content

1.0 Introduction

1.1 Title Protection Criteria

1.2 Directory Number 4

1.3 Objective

The purpose of this Directory is to provide the **protection** criteria, for **protection** of the NPCC **bulk power system**. It is not a design specification.

1.4 Effective Date December 01, 2009

1.5 Background

This Directory was developed from the draft NPCC A-05 Bulk Power Protection Criteria document dated December 4, 2008 and approved B-05, B-07, B-24 and C-22 documents. Guidelines and procedures for consideration in the implementation of this Directory are provided in Appendix A.

1.6 Applicability

1.6.1 Functional Entities

Transmission Owners
Generator Owners

1.6.2 Facilities

1.6.2.1 New Facilities

These criteria shall apply to all new Bulk Power System (BPS) facilities.

1.6.2.2 Existing Facilities

It is the responsibility of individual companies to assess the **protection systems** at existing facilities and to make modifications which are required to meet the intent of these criteria as follows.

1.6.2.2.1 Planned Renewal or Upgrade to Existing BPS Facilities

It is recognized that there may be portions of the **bulk power system,** which existed prior to each member's adoption of the *Bulk Power System Protection Criteria* (Document A-5) that do not meet these criteria. However, if **protection systems** or sub-systems of these facilities are replaced as part of a planned renewal or upgrade to the facility and do not meet all of these criteria, then an assessment shall be conducted for those criteria that are not met.

The result of this assessment shall be reported, It is recommended this reporting be in accordance with the procedure stipulated in Section 4.0 of Appendix A of this Directory and using the appropriate portion of the "Protection System Review forms" (formerly C-22 forms), for review and disposition by the TFSP, or in a form consistent with the intent of the procedure.

1.6.2.2.2 Facility Classification Upgraded to **Bulk Power System**.

These criteria apply to all existing facilities which become classified as **bulk power system**. A mitigation plan shall be required to bring such a facility into compliance with these criteria.

Where the owner of the **protection system** has determined that the cost and risks involved to implement physical separation, as per Section 5.12, cannot be justified, the reason for this determination and an assessment shall be reported to the TFSP.

It is recommended this reporting be in accordance with the procedure stipulated in Section 4.0 of Appendix A of this Directory and using the appropriate portion of the "Protection System Review forms" (formerly C-22 forms), for review and disposition by the TFSP, or in a form consistent with the intent of the procedure.

1.6.2.2.3 Additions to **Bulk Power System** Facilities

If a **bulk power system element** is added to an existing **bulk power system** facility that is recognized under Section 1.6.2.2.1, Planned Renewal or Upgrade to Existing Facilities, these criteria apply to the **protection systems** for the new **element**.

1.6.2.2.4 "In-Kind" Replacement of **Bulk Power System** Equipment

If a **bulk power system element** (e.g., breaker, transformer, capacitor bank, reactor, etc.) or a **protective relay** is replaced "in kind" as a result of an unplanned event, then it is not required to upgrade the associated **protection system** to comply with these criteria.

1.6.2.2.5 Change in **Bulk Power System** Facility Status

When a facility was originally on the BPS list of April 2007 and has been shown to be non-BPS but later was determined to be BPS again, Section 1.6.2.2.1 would apply. When the facility returns to BPS status, it shall be maintained in accordance with Directory #3 within two years timeframe.

1.6.3 Responsibility

Whenever changes are anticipated in generating sources, transmission facilities, or operating conditions, Generator Owners and Transmission Owners shall review those **protection system** applications (i.e., settings, ac and dc supplies) which can reasonably be expected to be impacted by those changes.

2.0 Terms Defined in this Directory

The definitions of terms found in this Directory appearing in bold typeface, can be found in Document A-07, NPCC *Glossary of Terms*.

3.0 NERC ERO Reliability Standard Requirements

The NERC ERO Reliability Standards containing requirements that are associated with this Directory include, but may not be limited to:

3.1 PRC-001
3.2 PRC-002
3.3 PRC-012

4.0 NPCC Regional Reliability Standard Requirements

None.

5.0 NPCC Full Member, More Stringent Criteria

These Criteria are in addition, more stringent or more specific than the NERC or any Regional Reliability standard requirements.

5.1 General Criteria

The intent of the criteria established in this Directory is to ensure dependable and secure operation of the **protection systems** for **Bulk Power System** facilities. For those **protective relays** intended for removal of **faults** from the **bulk power system**, dependability is paramount, and the redundancy provisions of the criteria shall apply. For **Protective relays** installed for reasons other than **fault** sensing such as overload, etc., security is paramount, and the redundancy provisions of the criteria do not apply. The relative effect on the **bulk power system** of a failure of a **protection system** to operate when desired versus an unintended operation shall be weighed carefully in selecting design parameters as follows.

5.2 Criteria for Dependability

5.2.1 Except as identified otherwise in these criteria, all elements of the **bulk power system** shall be protected by two protection **groups**, each of which is independently capable of performing the specified protective function for that **element.** This requirement also applies during energization of the **element.**

5.2.2 Except as identified otherwise in these criteria, the two **protection groups** shall not share the same component**.**

5.2.3 Means shall be provided to trip all necessary local and remote breakers in the event that a breaker fails to clear a fault. This **protection** need not be duplicated.

5.3 Criteria for Security

Protection systems shall be designed to isolate only the faulted **element**, except in those circumstances where additional **elements** are tripped intentionally to preserve system integrity, or where isolating additional **elements** has no impact outside the local area.

5.4 Criteria for Dependability and Security

5.4.1 The thermal capability of all **protection system** components shall be adequate to withstand rated maximum short time and continuous loading of the associated **protected elements**.

5.4.2 Communication link availability, critical switch positions, and trip circuit integrity, shall be monitored to allow prompt attention by appropriate operating authorities.

5.4.3 When remote access to **protection systems** is possible, the design shall include security measures to minimize the probability of unauthorized access to the protection systems.

5.4.4 Short Circuit Models used to assess **protection** scheme design and to develop **protection** settings shall take into account minimum and maximum fault levels and mutual effects of parallel transmission lines. Details of neighboring systems shall be modeled wherever they can affect results significantly.

5.5 Operating Time Criteria

Bulk power system protection shall take corrective action within times determined by studies with due regard to security, dependability and selectivity.

5.6 Current Transformer Criteria

Current transformers (CTs) associated with **protection systems** shall have adequate steady-state and transient characteristics for their intended function as follows:

5.6.1 The output of each current transformer secondary winding shall be designed to remain within acceptable limits for the connected burdens under all anticipated **fault** currents to ensure correct operation of the **protection system**.

5.6.2 The thermal and mechanical capabilities of the CT at the operating tap shall be adequate to prevent damage under maximum **fault** conditions and normal or **emergency** system loading conditions.

5.6.3 For **protection groups** to be independent, they shall be supplied from separate current transformer secondary windings.

5.6.4 Interconnected current transformer secondary wiring shall be grounded at only one point.

5.6.5 Current transformers shall be connected so that adjacent **protection** zones overlap.

5.7 Voltage Transformer and Potential Devices Criteria

Voltage transformers and potential devices associated with **protection systems** shall have adequate steady-state and transient characteristics for their intended functions as follows:

5.7.1 Voltage transformers and potential devices shall have adequate volt-ampere capacity to supply the connected burden while maintaining their **relay** accuracy over their specified primary voltage range.

5.7.2 The two **protection groups** protecting an element shall be supplied from separate voltage sources. The two protection groups may be supplied from separate secondary windings on one transformer or potential device, provided all of the following requirements are met:

5.7.2.1 Complete loss of one or more phase voltages does not prevent all tripping of the protected **element**;

5.7.2.2 Each secondary winding has sufficient capacity to permit fuse **protection** of the circuit;

5.7.2.3 Each secondary winding circuit is adequately fuse protected.

5.7.3 The wiring from each voltage transformer secondary winding shall not be grounded at more than one point.

5.8 Batteries and Direct Current (DC) Supply Criteria

DC supplies associated with **protection** shall be designed to have a high degree of dependability as follows:

5.8.1 No single battery or dc power supply failure shall prevent both independent **protection groups** from performing the intended function. Each battery shall be provided with its own charger. Physical separation shall be maintained between the two station batteries or dc power supplies used to supply the independent **protection groups**.

5.8.2 Each station battery shall have sufficient capacity to permit operation of the station, in the event of a loss of its battery charger or the ac supply source, for the period of time necessary to transfer the **load** to the other station battery or re-establish the supply source. Each station battery and its associated charger shall have sufficient capacity to supply the total dc **load** of the station.

5.8.3 A transfer arrangement shall be provided to permit connecting the total **load** to either station battery without creating areas where, prior to failure of either a station battery or a charger, a single event can disable both dc supplies.

5.8.4 The battery chargers and all dc circuits shall be protected against short circuits. All protective devices shall be coordinated to minimize the number of dc circuits interrupted.

5.8.5 Dc systems shall be continuously monitored or annunciated to detect abnormal voltage levels (both high and low), dc grounds, and loss of ac to the battery chargers, in order to allow prompt attention by the appropriate operating authorities.

5.8.6 **Protection group** dc sources shall be continuously monitored to detect loss of voltage in order to allow prompt attention by the appropriate operating authorities.

5.9 Station Service ac Supply Criteria

On **bulk power system** facilities there shall be two sources of station service ac supply, each capable of carrying at least all the critical **loads** associated with **protection systems**.

5.10 Circuit Breaker

No single trip coil failure shall prevent both independent **protection groups** from performing the intended function. The design of a breaker with two trip coils shall be such that the breaker will operate if both trip coils are energized simultaneously. The correct operation of this design shall be verified by tests.

5.11 Teleprotection Criteria

5.11.1 Communication facilities required for **teleprotection** shall be designed to have a level of performance consistent with that required of the **protection system**, and shall meet the following:

5.11.1.1 Where each of the two **protection groups** protecting the same **bulk power system element** requires a communication channel, the equipment and channel for each **protection group** shall be separated physically and designed to minimize the risk of both **protection groups** being disabled simultaneously by a single event or condition.

5.11.1.2 **Teleprotection** equipment shall be monitored to detect loss of equipment and/or channels to allow prompt attention by the appropriate operating authorities.

5.11.1.3 **Teleprotection** equipment shall be provided with means to test for proper signal adequacy.

5.11.1.4 **Teleprotection** equipment shall be powered by the substation batteries or other sources independent from the power system.

5.11.1.5 Except as identified otherwise in these criteria, the two **teleprotection** groups shall not share the same component.

5.11.1.5.1 The use of a single communication tower for the radio communication systems used by two **protection groups** protecting a single **element** is permitted as long as directional diversity of the communication signals is achieved.

5.12 Environment

5.12.1 Each separate **protection group** and **teleprotection** protecting the same system **element** shall be on different non-adjacent vertical mounting assemblies or enclosures.

5.12.2 Wiring for separate **protection groups** and **teleprotections** protecting the same system **element** shall not be in the same cable.

5.12.3 Cabling for separate **protection groups** and **teleprotections** protecting the same system **element** shall be physically separated. This can be accomplished by being in different raceways, trays, trenches, etc.

5.12.4 In the event a common raceway is used, cabling for separate **protection groups** protecting the same system **element** shall be separated by a fire barrier.

5.13 Grounding Criteria

Station grounding is critical to the correct operation of **protection systems**. The design of the ground grid directly impacts proper **protection system** operation and the probability of false operation from **fault** currents or transient voltages. Each member shall have established as part of its substation design procedures or specifications, a mandatory method of designing the substation ground grid, which:

5.13.1 Can be traced to a recognized calculation methodology

5.13.2 Considers cable shielding

5.13.3 Considers equipment grounding

5.14 Transmission Line Protection Criteria

5.14.1 **Protection system** settings shall not constitute a loading limitation as per NERC requirement/standard. In cases where NERC approved exceptions are used the limits thus imposed shall be adhered to as system operating constraints.

5.14.2 A **pilot protection** shall be so designed that its failure or misoperation will not affect the operation of any other **pilot protection** on that same **element**.

5.15 Breaker Failure Protection Criteria

Means shall be provided to trip all necessary local and remote breakers in the event that a breaker fails to clear a **fault**, as follows.

5.15.1 Breaker failure **protection** shall be initiated by each of the **protection groups** which trip the breaker, with the optional exception of a breaker failure **protection** in an adjacent zone.

5.15.2 Fault current detectors shall be used to determine if a breaker has failed to interrupt a **fault.**

5.16 Generating Station Protection Criteria

All under- and over-frequency **protection systems** designed to disconnect generators from the power system shall be coordinated with automatic under frequency **load shedding** programs, in accordance with the *Emergency Operation Criteria* (Directory #2).

5.17 Automatic Under frequency Load Shedding Protection System Criteria

5.17.1 The requirements and guides for the operation of these **Protection Systems** are detailed in the *Emergency Operation Criteria* (Directory #2). The guideline for automatic under frequency **load shedding protective relaying** design is provided in Appendix A of this Directory.

5.18 HVdc System Protection Criteria

5.18.1 The ac portion of an HVdc converter station, up to the valve-side terminals of the converter transformers, shall be protected in accordance with these criteria.

5.18.2 Multiple commutation failures, unordered power reversals, and **faults** in the converter bridges and the dc portion of the HVdc link which are severe enough to disturb the **bulk power system** shall be detected by more than one independent control or **protection group** and appropriate corrective action shall be taken, in accordance with the considerations in these criteria.

5.19 Protection System Testing and Maintenance Criteria

5.19.1 **Protection systems** shall be maintained in accordance with the *Maintenance Criteria for Bulk Power System Protection* (Directory #3).

5.19.2 The design of **protection systems** both in terms of circuitry and physical arrangement shall facilitate periodic testing and maintenance.

5.19.3 Each **protection group** shall be functionally tested to verify the dependability and security aspects of the design, when initially placed in service and when modifications are made.

5.20 Analysis of Protection Performance Requirements

5.20.1 **Bulk power system** automatic operations shall be analyzed to determine proper **protection system** performance. Corrective measures shall be taken promptly if a **protection group** fails to operate or operates incorrectly.

5.20.2 Event and fault recording capability shall be provided to the extent required to permit analysis of **system disturbances** and **protection system** performance.

5.20.3 Internal clocks in event and **fault** recording equipment shall be time synchronized to within 2 milliseconds or less of Universal Coordinated Time scale. The time zone shall be clearly identified as either universal time zone or local time zone.

5.20.4 Each **protective relay** which trips **Bulk Power System** equipment shall provide separate target indication.

6.0 Measures and Assessments

None developed at this time.

7.0 Compliance Monitoring

7.1 Each member shall provide the Task Force on System Protection (TFSP) with advance notification of any of the member's new **bulk power system protection systems**, or significant changes in the member's existing **bulk power system protection systems**.

7.2 Each member shall also provide the TFSP with advance notification of non-member **protection** facilities as required per *NPCC Bylaws*.

7.3 Each new or revised **protection system** shall be reported to the TFSP. It is recommended this reporting be in accordance with the procedure detailed in Section 4.0 of Appendix A of this Directory, or in a form consistent with the intent of the procedure.

7.4 Adherence to these Criteria shall be reported by the responsible entity in a manner and form designated by the Compliance Committee.

Prepared by: Task Force on System Protection

Review and Approval: Revision to any portion of this Directory will be posted by the lead Task Force in the NPCC Open Process for a 45 day review and comment period. Upon satisfactorily addressing all the comments in this forum, the Directory document will be sent to the remaining Task Forces for their recommendation to seek RCC approval.

Upon approval of the RCC, this Directory will be sent to the Full Member Representatives for their final approval if sections pertaining to the Requirements and Criteria portion have been revised. All voting and approvals will be conducted according to the most current "NPCC. Bylaws" in effect at the time the ballots are cast.

Revisions pertaining to the Appendices or any other portion of the document such as Links glossary terms, etc., only RCC Members will need to conduct the final approval ballot of the document.

This Directory will be updated at least once every three years and as often as necessary to keep it current and consistent with NERC, Regional Reliability Standards and other NPCC documents.

Appendix A
Guideline and Procedure for Bulk Power System Protection

1.0 Introduction

This Appendix provides the guidance for consideration in the implementation of the **bulk power system Protection** criteria stipulated in this Directory, and the procedure on reporting new and revised **bulks power system protection** facilities.

2.0 Design Considerations

2.1 General Considerations

In general, the function of a **protection system** is to limit the severity and extent of **system disturbances** and possible damage to system equipment.

The Directory's criteria objectives can be met only if **protection systems** have a high degree of dependability and security. In this context dependability relates to the degree of certainty that a **protection system** will operate correctly when required to operate. Security relates to the degree of certainty that a **protection system** will not operate when not required to operate.

Often increased security (fewer unintended operations) results in decreased dependability (more failures to operate), and vice versa. As an example, consideration is given to the consequence of applying permissive line **protection** schemes, which often are more secure, but less dependable, than blocking line protection schemes. The relative effect on the **bulk power system** of a failure of a **protection system** to operate when desired versus an unintended operation should be weighed carefully in selecting design parameters. Considerations for specific aspects of **protection** design are provided below.

2.2 Issues Affecting Dependability

2.2.1 Some portions of **elements** may not in themselves be part of the **bulk power system**. Those portions do not require two **protection groups**.

2.2.2 Two identical measuring **relays** should not be used in independent **protection groups** due to the risk of simultaneous failure of both groups because of design deficiencies or equipment problems.

2.2.3 In addition to the separation requirements in the criteria, areas of common exposure should be kept to a minimum to reduce the possibility of both **protection groups** being disabled by a single

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event such as fire, excavation, water leakage, and other such incidents.

2.2.4 On installations where free-standing or column-type current transformers are provided on one side of the breaker only, resulting in a **protection** blind spot, **protection** should be provided to detect a **fault** to ground on the primaries of such current transformers. When frame ground **protection** is used, then frame ground and breaker failure **protections** are the two local independent **protections** for the blind spot between the current transformer and the circuit breaker. Neither of these **protections** need be duplicated. Both of these **protections** should be designed so as to not be disabled by the same failure. The frame ground **protection** and breaker failure **protection** will in fact provide independent **protections** for the blind spot.

2.3 Issues Affecting Security

2.3.1 For **faults** external to the protected zone, each **protection group** should be designed either to not operate, or to operate selectively with other groups and with breaker failure **protection**.

2.3.2 For planned system conditions, **protection systems** should not operate to trip for stable power swings.

2.4 Issues Affecting Dependability and Security

2.4.1 **Protection systems** should be no more complex than required for any given application.

2.4.2 The components and software used in **protection systems** should be of proven quality, as demonstrated either by actual experience or by stringent tests under simulated operating conditions.

2.4.3 **Protection systems** should be designed to minimize the possibility of component failure or malfunction due to electrical transients and interference or external effects such as vibration, shock and temperature.

2.4.4 **Protection system** circuitry and physical arrangements should be designed so as to minimize the possibility of incorrect operations due to personnel error.

2.4.5 **Protection system** automatic self-checking facilities should be designed so as to not degrade the performance of the **protection**

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system.

2.4.6 Consideration should be given to the consequences of loss of instrument transformer voltage inputs to **protection systems**.

2.4.7 **Protection systems**, including intelligent electronic devices (IEDs) and communication systems used for **protection**, should comply with applicable industry standards for utility grade **protection** service. Utility Grade **Protection System** Equipment are equipment that are suitable for protecting transmission power system elements, that are required to operate reliably, under harsh environments normally found at substations. Utility grade equipment should meet the applicable sections of all or some of the following types of industry standards, to ensure their suitability for such applications:

- IEEE C37.90.1-2002 (oscillatory surge and fast transient)
- IEEE C37.90.1-2002 (service conditions)
- IEC 60255-22-1, 2005 (1 MHz burst, i.e. oscillatory)
- IEC 61000-4-12, 2001 (oscillatory surge)
- IEC 61000-4-4, 2004 (EFT)
- IEC 60255-22-4, 2002 (EFT)
- IEEE C37.90.2-2004 (narrow-band radiation)
- IEC 60255-22-3, 2000 (narrow-band radiation)
- IEC 61000-4-3, 2002 (narrow-band radiation)
- IEEE 1613 (communications networking devices in Electric power Substations)

2.5 Operating Time

Adequate time margin should be provided taking into account study inaccuracies, differences in equipment, and **protection** operating times. In cases where clearing times are deliberately extended, consideration should be given to the following:

- Effect on system **stability** or reduction of **stability** margins.
- Possibility of causing or increasing damage to equipment and subsequent extended repair and/or outage time.
- Effect of **disturbances** on service to customers.

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2.6 Current Transformer

None.

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2.7 Voltage Transformers and Potential Devices

Voltage transformer installations should be designed with due regard to ferroresonance.

2.7.1 Special attention should be given to the physical properties (e.g. resistance to corrosion, moisture, fatigue) of the fuses used in **protection** voltage circuits.

2.8 Batteries and Direct Current (dc) Supply

2.8.1 The circuitry between each battery and its first protective device cannot be protected and therefore should be designed so as to minimize the possibility of electrical short circuit.

2.8.2 The design for the regulation of the dc voltage should be such that, under all anticipated charging and loading conditions, voltage within acceptable limits will be supplied to all devices, while minimizing ac ripple and voltage transients.

2.9 Station Service ac Supply

None.

2.10 Circuit Breakers

The indication of the circuit breaker position in **protection systems** should be designed to reliably mimic the main contact position.

2.11 Teleprotection

2.11.1 **Teleprotection** systems should be designed to prevent unwanted operations such as those caused by equipment or personnel.

2.11.2 Two identical **teleprotection** equipments should not be used in independent **protection groups**, due to the risk of simultaneous failure of both groups because of design deficiencies or equipment problems.

2.11.3 Areas of common exposure should be kept to a minimum to reduce the possibility of both groups being disabled by a single event such as fire, excavation, water leakage, and other such incidents.

2.11.4 **Teleprotection** systems should be designed to mitigate the effects of signal interference from other communication sources and to

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assure adequate signal transmission during **bulk power system disturbances**.

2.12 Environment

Means should be employed to maintain environmental conditions that are favorable to the correct performance of **protection systems.**

2.13 Grounding

None.

2.14 Transmission Lines Protection

For planned system conditions, line **protection systems** associated with transmission facilities should not operate to trip for stable **power swings**.

2.15 Breaker Failure Protection

2.15.1 It is not necessary to duplicate the breaker failure **protection** itself.

2.15.2 Auxiliary switches may also be required in instances where the **fault** currents are not large enough to operate the **fault** current detectors. In addition, auxiliary switches may be necessary for high-speed detection of a breaker failure condition.

2.16 Generating Station Protection

2.16.1 Each **protection system** should be designed to minimize the effects to **the bulk power system** of **faults** and **disturbances**, while itself experiencing a single failure.

2.16.2 Generators should be protected to limit possible damage to the equipment. The following are some of the abnormal (not necessarily **fault**) conditions that should be detected:

- Unbalanced phase currents, loss of excitation
- Overexcitation, generator out of step, field ground
- inadvertent energization.

2.16.2.1 **Protections** for the above conditions, which are applied for equipment **protection**, need not be duplicated.

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2.16.2.2 When a directional over current or distance **relay** is applied to remove the generator for slowly cleared **faults** on the external system, such **protection** is a backup and need not be duplicated.

2.16.2.3 The apparatus should be protected when the generator is starting up or shutting down as well as running at normal speed; this may require additional **relays** as the normal **relays** may not function satisfactorily at low frequencies.

2.16.2.4 Generator **protection systems** should not operate for stable **power swings** except when that particular generator is out of step with the remainder of the system. This does not apply to **Special Protection Systems** designed to trip the generator as part of an overall plan to maintain **stability** of the power system.

2.16.2.5 Loss of excitation and out of step **relays** should be set with due regard to the performance of the excitation system.

2.16.2.6 It is recognized that the overall **protection** of a generator involves non-electrical considerations that have not been included as a part of the criteria in this Directory.

2.16.2.7 All over frequency, overvoltage and under voltage **protection systems** designed to disconnect generators from the power system should be coordinated with automatic under frequency **load shedding** programs.

2.17 Automatic Under frequency Load Shedding Protection Systems

2.17.1 Automatic under frequency **load shedding protection systems** are not generally located at **bulk power system** stations; however, they have a direct effect on the operation of the **bulk power system** during major **emergencies**.

2.17.2 Automatic under frequency **load shedding protection** need not be duplicated.

2.17.3 Under frequency **relays** which operate at a discrete frequency value are called "under frequency threshold **relays**." Selection of under frequency sensing devices should be on a threshold basis. Alternatively, rate of change of frequency **load shedding** may be used when the requirements of the Balancing Authority indicate that this method will achieve the intent of the **load shedding** program.

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Appropriate studies are necessary to determine the application and settings of the rate of change of frequency **relays** for a particular Balancing Authority area.

2.17.4 In order for each Balancing Authority within NPCC to **shed** approximately the same proportion of **load**, given the same frequency condition, all styles and manufacture of under frequency **relays** should trip at essentially the same time. For electromechanical **relays**, time delay depends on rate of frequency decline, and it is not possible to achieve uniform response for different rates of decline. The recommendations in this guideline are based on the goal of a uniform response at a rate of frequency decline of 0.2 Hz per second.

2.17.5 Additional Application Considerations

2.17.5.1 Where undesired under frequency **relay** operation can be caused by decaying frequency due to isolated generation or motor load, additional supervising undercurrent or voltage **relays** may be used to prevent misoperation.

2.17.5.2 Where the AC voltage source for an under frequency **relay** is derived from a potential device connected to a cable circuit, care should be taken to estimate the voltage present during deenergization of the circuit. The natural frequency of the decaying cable voltage may be less than 60 Hz, and thus cause an incorrect **relay** operation.

2.17.5.3 The AC Voltage Inhibit feature available on some relays may be useful as a security tool to restrain operation during cable deenergization, depending on the voltage decay time constant

2.17.5.4 Due regard should be given to the expected power system voltage during events for which the underfrequency **relays** are expected to operate. The **relay's** minimum AC voltage operating characteristic should not inhibit proper **relay** operation, nor should the Voltage Inhibit feature, where it exists, be set to prevent proper operation.

2.17.6 Settings and Maintenance Recommendations

2.17.6.1 Pickup Time Delay Settings

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Pickup and time delay settings of underfrequency threshold **relays** should be applied in accordance with the requirements specified in Section 5.2 and Section 5.4 of *Emergency Operation Criteria* (Directory #2).

2.17.6.2 Relay Performance Considerations

Any underfrequency **relay** which has been found to have drifted more than ±0.2 Hz from its set point or ±0.1 seconds from its time delay should be recalibrated and then retested in six months. If, at that time, the **relay** has drifted ±0.2 Hz or more from its set point or ±0.1 seconds or more from its fixed time delay, the cause of the drift should be corrected or the **relay** should be replaced.

2.17.6.3 Maintenance

Underfrequency **load shedding relays** have a direct effect on the operation of the **bulk power system** during major **emergencies**. These **relays** should be maintained in accordance with requirements stipulated in *Maintenance Criteria for Bulk Power System Protection* (Directory 3), even though they are usually located in non-**bulk power system** stations**.**

2.18 HVdc Systems Protection

2.18.1 Converter terminals should be protected to avoid excessive equipment stresses and to minimize equipment damage and outage time. These **protections** are usually specific to the design of the converter station(s) and are determined by the manufacturer to comply with availability guarantees. The followings are some conditions which should be detected:

- ac and dc undervoltage,
- ac and dc overvoltage,
- valve misfire,
- excessive harmonics on the dc,
- dc ground **faults** and open circuits,
- dc switching device failures,
- thyristor failures,
- valve and snubber circuit overloads.

2.18.2 The overall **protection** and control of an HVdc link may also involve the initiation of actions in response to abnormal conditions

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on the ac interconnected system. The control and **protection systems** associated with such conditions are not considered part of the HVdc systems **protection**.

2.19 Protection System Testing and Maintenance

Test facilities and test procedures should be designed such that they do not compromise the independence of **protection groups** protecting the same **bulk power system element**. Test devices or switches should be used to eliminate the necessity for removing or disconnecting wires during testing.

2.20 Analysis of Protection System

Insofar as possible, each active protective function within a **protective relay** should provide separate target information.

2.21 Transmission Station Protection

2.21.1 The **protection systems** should operate properly for the anticipated range of currents.

2.21.2 For planned system conditions, all station **protection systems** should not operate for **load** current or stable **power swings.**

2.21.3 **Load** responsive **protection relays** applied to transmission autotransformers should allow all possible load ability, consistent with equipment **protection** requirements.

2.21.4 Fault pressure or Buchholz **relays** used on transformers, phase shifters or regulators should be applied so as to minimize the likelihood of their misoperation due to through **faults**.

2.22 Capacitor Banks

2.22.1 Each **protection system** should be designed to minimize the effects to the **bulk power system** of **faults** and **disturbances**, while itself experiencing a single failure.

2.22.2 Capacitor bank **protection** should be applied with due consideration for capacitor bank transients, power system voltage unbalance, and system harmonics.

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2.22.3 Protection may be provided to minimize the impact of failures of individual capacitor units on the remaining capacitor units, however, these types of **protections** do not need to be duplicated:

a. Overvoltage Protection
b. Individual fuses for each capacitor unit
c. Overvoltage Protection for each capacitor units

2.23 Static Var Compensation (SVC) Protection

2.23.1 The low voltage branch circuits contain the reactive controlling equipment, filters, etc. These may include all or some of the following:

a. Thyristor Controlled Reactors (TCR)
b. Thyristor Switched Capacitors (TSC)
c. Switched or Fixed Capacitors
d. Harmonic Filters

2.23.2 **Protection** for the branch circuits that are not part of the **bulk power system** need not be duplicated. **Protection** for these branch circuits should be applied with due consideration for capacitor bank transients, power system voltage unbalance, and system harmonics.

2.23.3 **Protection** against abnormal non-**fault** conditions within the SVC via control of the TSC and TCR valves should be designed so as to not interfere with the proper operation of the SVC.

2.24 Logic System

The design should recognize the effects of contact races, spurious operation due to battery grounds, dc transients, radio frequency interference or other such influences.

It is recognized that timing is often critical in logic schemes. Operating times of different devices vary. Known timing differences should be accounted for in the overall design.

2.25 Microprocessor-Based Equipment and Software

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A **protection system** may incorporate microprocessor-based equipment. Information from this equipment may support other functions such as power system operations. In such cases, the software and the interface should be designed so as to not degrade the **protection system** functions.

2.26 Control Cable, Wiring and Ancillary Control Devices

Control cables and wiring and ancillary control devices should be highly dependable and secure. Due consideration should be given to published codes and standards, fire hazards, current-carrying capacity, voltage drop, insulation level, mechanical strength, routing, shielding, grounding and environment.

2.27 Environment

Means should be employed to maintain environmental conditions that are favorable to the correct performance of **protection systems**.

3.0 Guideline for Application of Remote Access to Protection System

The following guideline is established for the application of remote access to **protection system** Intelligent Electronic Devices (IEDs), such as relays, programmable logic controllers (PLC), and teleprotection equipment that have remote access capabilities, and are designed and configured for remote access applications. It is intended to assist in meeting the requirement stipulated in Section 5.1.3.3 of this Directory, and Section 3.3.1.6 of the *Special Protection System Criteria* (Directory 7).

This guideline assumes that appropriate physical measures are in place, and that they meet all applicable standards.

3.1 Definitions for Use in this Guideline Only

The flowing defined terms are used for illustration of the guideline presented in this Section only. These terms are not defined in Appendix A of this Directory, or any other NPCC documents.

IED - Intelligent Electronic Device, normally computer based, equipped with digital communication abilities, some examples are **protective relays**, RTUs, SERs, DFRs, PLCs, data concentrators, telecommunications equipment, and general monitoring equipment.

PLC - Programmable Logic Controller, used to create and implement logical actions and automation.

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Remote Access - accessing a device from a remote geographical area via a communications link; once accessed, provides similar local device functionality, at a distance.

Authenticate - to prove to be genuine or is an approved user.

Intrusion - An unauthorized electronic entry into an IED. Access normally provides user access to the functionality of the device.

Cryptography – is the study and application of codes and ciphers. Codes or encryption is used to transform data into a form that is not directly usable. Decryption transforms encrypted data using a decryption key back into the original useful form.

VPN – Virtual Private Network. It uses encryption to provide a private channel between private networks using a public network as its carrier i.e., two users using the Internet to provide confidentiality, integrity, and authentication.

3.2 Governing Principles

The industry has become more reliant on computer technology for power **system protection**, control, communications, and automation of its power system. Electromechanical and solid-state technologies are being replaced with microprocessor devices, offering, among other functions, local and remote communications access. **Protection system** IEDs are employed to protect, and or operate power system elements. Unauthorized access to an IED could result in interruption of electric service, damage to the power system equipment, major **disturbances**, or a danger to life and property. **Protection system** IEDs also contain a large amount of information that utility personnel have come to rely on, including telemetry, power system **disturbance** analysis, fault location, preventive maintenance information, as well as asset condition and optimization data. However, this technology has also created vulnerabilities that are similar to those seen in traditional computer networks. Therefore, the following should be the governing principles of any cyber security program:

- Prevent penetration from cyber attacks.
- Prevent local and remote access to critical cyber assets by non-authorized personnel.
- Monitor cyber assets to detect unauthorized access or attempts to access.
- Limit exposure.

3.3 Guideline

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3.3.1 Authentication

One of the foundations of the cyber security program is controlled, or secure, access. This dictates that some form of user authentication be used. Three common means of authenticating a user's identity are:

3.3.1.1 Something the user knows, such as passwords, or IP addresses.

3.3.1.2 Something the user has, such as a key, or cryptographic token.

3.3.1.3 Something the user is, such as fingerprints and voiceprints

At minimum, at least two factors of authentication should be used, e.g., passwords, and a destination – telephone number, or an IP address. The use of more factors such as encryption, etc. will result in providing more secure authentication. However, most present day and legacy **protection system** IEDs do not yet support this technology. Existing equipment often contains some level of security features. At a minimum, they usually provide multi-level passwords. These features should be activated as a first step in security implementation

3.3.2 Substation IED Access Point

A list of all substation IEDs that have remote electronic access configured should be compiled and maintained. This list should also include the access method(s) (e.g., dial-in, WAN, etc), the associated phone numbers and/or IP address, passwords, and other pertinent data.

3.3.3 Approved Remote Access Authorization List

A list of approved users, and the station IEDs they are authorized to access, should be established and maintained. It is vital that all such access information be classified as confidential, and managed as such.

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3.3.4 Remote Access Configuration

Protection system IEDs should be configured to afford remote access only where needed and approved, and then, only when proper authentication is provided.

3.3.5 Password

Most **protection system** IEDs offer multiple access levels, each with separate passwords. Normally, a “view” only level is provided which allows a user to extract and or view information only. An alternate access level is provided to allow trained and authorized users to “make” settings and configuration changes, and initiate breaker operations. It is this level of access that is susceptible to an intrusion which could cause the most damage to the power system. Only limited users should have access to this level by considering the followings:

3.3.5.1 Establish multi-tiered passwords with different privileges for different classes of users.

3.3.5.2 Default passwords should be changed when remote access is configured.

3.3.5.3 Make sure that all IEDs have "strong" passwords, i.e., passwords that are not dictionary words, not easily guessable, not blank, or have no password at all. It is recommended that all passwords contain a combination of letters and numbers, and should be at least six characters long.

3.3.6 Logging/Alarming

When remote connections are used to access the relay beyond “view-only” mode, this should be alarmed and/or logged where possible.

3.3.7 Controlling Authority Approval

For both local and remote communications, excluding viewing, notification and approval of the Controlling Authority should be required to access in-service **protection system** IEDs. Only authorized users, as per Sections 3.3.3 and 3.3.5 above, should have remote access capabilities.

Appendix A

3.3.8 Disable User Function

Often, **protection system** IEDs are put into service with functions that are not used. These functions can create vulnerabilities, and therefore, should be disabled if possible.

3.4 Other Available Higher Level Authentication Factors and Some General Good Practices

As stated in Section 3.3.1, a minimum of two factors of authentication should be used. However, the use of more factors will result in providing more secure authentication. This Section is intended to provide additional factors and practices that could be implemented where warranted, and where the technology allows.

3.4.1 For WAN based access systems, implement Virtual Private Network (VPN) technology. VPN technology is also applicable when using ISDN, DSL, and cable.

3.4.2 Limit, as far as possible, dependence on the public telephone network for substation communications to IEDs. Instead, use secure communications facilities whenever possible.

3.4.3 Call back (where the IED device or modem hangs up on the original caller and calls back on a second line to a preconfigured phone number) may be utilized as a portion of an IED’s security to prevent unauthorized access. This security measure added to other security measures will improve the IEDs security. Security can be further enhanced by using a different telephone line for the return call.

3.4.4 For dial-up modem access, use a hardware lock and key dongle on the analog phone line at each modem and the lock and key combination will act as a gatekeeper. When a call is initiated, the lock at the called modem will verify the existence of a valid key at the calling modem Time.

Appendix A

3.4.5 Isolation from the Business/Corporate Network

Isolation of the substation **protection system** IEDs from the Corporate Network should be provided where possible. Data can be transferred from the substation IEDs to a server connected to a Corporate Network via appropriate firewalls. This practice is warranted because most Corporate Networks are Internet connected and therefore are exposed to external users.

4.0 Procedure for Reporting New and Revised **Protection Systems**

Paragraph 7.1 of this criteria states that **Protection system** owners shall provide the Task Force on System Protection (TFSP) with advance notification of any of their new **bulk power system protection** facilities, or significant changes in their existing **bulk power system protection** facilities. Paragraph 7.2 of this criteria states that **Protection system** owners shall also provide the TFSP with advance notification of non-member **protection** facilities as required per NPCC Bylaws . Notification will be made to the TFSP early in the engineering design stage.

4.1 Additional Requirements for Presentation and Review

4.1.1 A presentation will be made to the TFSP on new facilities or a modification to an existing facility when requested by either a member entity or the TFSP.

4.1.2 A presentation will be made to the TFSP when the design of the **protection** facility deviates from the criteria set forth in this Directory.

4.1.3 A presentation will be made to the TFSP when a member entity is in doubt as to whether a design meets the **protection** criteria set forth in this Directory.

4.2 Data Required for Presentation and Review of Proposed Protection Facilities

4.2.1 The **protection system** owner will advise the TFSP of the basic design of the proposed system. The data will be supplied on the “Protection System Review Forms” (formerly C-22 forms) as listed below, accompanied by a geographical map, a one-line diagram of all affected areas, and the associated **protection** and control function diagrams. A physical layout of **protection** panels and batteries for the purpose of illustrating physical separation will also be included.

Appendix A

Protection System Details
Line Relaying (Phase)
Line Relaying (Ground)
Transformer/Reactor Relaying
Generator Relaying
Bus Relaying
Shunt Capacitors and Filters Relaying
HVdc Converter Relaying
Special Protection Systems
Communication links
Equipment Details
Current Transformers
Voltage Transformers
Station Battery
Physical Separation
Breakers
Disturbance Monitoring Equipment
Transmission Relay Loadability
Exception Request

4.2.2 The proposed **protection system** will be explained with due emphasis on any special conditions or design restrictions existing on the particular power system.

4.3 Procedure for Presentation

4.3.1 The **protection system** owner will arrange to have a technical presentation made to the TFSP

4.3.2 To facilitate scheduling, the chairman of the TFSP will be notified approximately four months prior to the desired date of presentation.

4.3.3 Copies of materials to be presented will be distributed to TFSP members 30 days prior to the date of the presentation.

4.4 TFSP Procedures

4.4.1 The TFSP will review the material presented and develop a position statement concerning the proposed **protection system**. This statement will indicate one of the following:

4.4.1.1 The need for additional information to enable the TFSP to reach a decision.

Appendix A

4.4.1.2 Acceptance of the member statement of conformance to the Protection Criteria.

4.4.1.3 Acceptance of the submitted proposal

4.4.1.4 Conditional acceptance of the submitted proposal*.

4.4.1.5 Rejection of the submitted proposal*.

* Position Statements 4.4.1.4 and 4.4.1.5 will include an indication of areas of departure from the intent of the **protection** criteria and suggestions for modifications to bring the **protection system** into conformance with the NPCC criteria.

4.4.2 The results of the TFSP review will be documented in the following manner:

4.4.2.1 A position statement will be included in the minutes of the meeting at which the proposed **protection system** was reviewed.

4.4.2.2 If necessary, a letter outlining areas of nonconformance with the **protection** criteria stipulated in this Directory and recommendations for correction will be submitted to the **protection system** owner. If necessary, the matter will be brought to the attention of the RCC.

4.4.2.3 The Task Force will maintain a record of all the reviews it has conducted.

Pages 873 - 893 have been removed due to confidentiality.

CI Number: 40287

Title: Substation Recloser Replacement

Start Date: 2011/04

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $3,764,921

DESCRIPTION:

This capital item provides for the costs associated with purchasing and installing 104 substation reclosers for use throughout the province.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Outage Performance

Why do this project?

In 2010, a number of substation recloser failures identified that some substation reclosers are reaching the end of their useful life causing a reliability issue. In 2011 reclosers reaching the end of their useful life will be replaced based on their potential effects on reliability.

Why do this project now?

The average age of substation recloser currently in operation is 32 years, corresponding to 1978 manufacture. Life expectancy is in the range of 30 to 35 years. Recently, failures of substation reclosers have occurred at the following locations: 113H- Dartmouth East, 126H- Porters Lake, 131H-Lucasville and 129H-Kearney Lake Road. The associated reliability implications make it necessary to mitigate the issues with this equipment through removal and replacement.

Why do this project this way?

For those models and vintages of reclosers that have recently failed, removal from service and replacement with new equipment ensures improved reliability of NSPI's system.

CI Number	: 40287	- Substation Recloser Replacement and Contingency Spares	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		204,253	0	204,253
092		092-Vehicle T&D OT Labour AO		17,021	0	17,021
094		094 - Interest Capitalized		96,754	0	96,754
095		095-COPS Overtime Labour AO		25,930	0	25,930
095		095-COPS Regular Labour AO		311,156	0	311,156
095		095-COPS Contracts AO		14,639	0	14,639
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	403,104	0	403,104
002	043	002 - T&D Overtime Labour	043 - TP - Substn Dev.	67,184	0	67,184
011	043	011 - Travel Expense	043 - TP - Substn Dev.	15,000	0	15,000
012	043	012 - Materials	043 - TP - Substn Dev.	2,547,480	0	2,547,480
013	043	013 - COPS Contracts	043 - TP - Substn Dev.	62,400	0	62,400
			Total Cost:	3,764,921	0	3,764,921
			Original Cost:			

CI 40287 - Substation Recloser Replacement

The following is a breakdown of costs associated with the Substation Recloser Replacement Project.

Administrative Overhead and Interest	$669,753
Materials	$2,547,480
Contracts	$62,400
COPS Labour	$470,288
Other	$15,000
Total	$3,764,921

The contracted work associated with this project will completed by NSPI personnel at a rate of approximately $[redacted] per person day. The material cost is based on recloser unit costs of $22,000 per recloser plus associated accessories.

Reclosers planned for replacement include the following:

1. 58H-421	53. 25W-303
2. 58H-431	54. 88W-311
3. 104H-411	55. 88W-321
4. 104H-431	56. 88W-323
5. 92H-331	57. 108H-411
6. 92H-332	58. 108H-412
7. 92H-333	59. 108H-413
8. 92H-334	60. 108H-414
9. 124H-301	61. 101H-412
10. 1N-402	62. 101H-421
11. 1N-404	63. 101H-422
12. 1N-405	64. 101H-423
13. 7N-301	65. 113H-431
14. 7N-302	66. 113H-432
15. 30N-461	67. 113H-433
16. 37N-412	68. 113H-434
17. 37N-413	69. 113H-440
18. 37N-414	70. 113H-441
19. 85S-402	71. 113H-442
20. 85S-403	72. 82V-401
21. 85S-404	73. 82V-402
22. 85S-405	74. 82V-403
23. 104S-311	75. 129H-412
24. 104S-312	76. 129H-413
25. 104S-313	77. 104H-412
26. 100C-421	78. 104H-413

27. 100C-422	79. 104H-430
28. 1C-411	80. 103H-431
29. 1C-412	81. 103H-432
30. 22C-403	82. 103H-433
31. 22C-404	83. 103H-434
32. 82S-302	84. 131H-421
33. 82S-303	85. 131H-424
34. 82S-304	86. 104H-432
35. 22V-312	87. 104H-442
36. 22V-321	88. 131H-423
37. 22V-322	89. 131H-422
38. 22V-323	90. 129H-411
39. 63V-311	91. 104H-441
40. 63V-312	92. 113H-443
41. 63V-313	93. 127H-411
42. 18V-411	94. 2H-412
43. 18V-412	95. 2H-413
44. 18V-413	96. 2H-414
45. 21W-311	97. 62N-414
46. 21W-312	98. 62N-415
47. 70W-321	99. 62N-416
48. 70W-322	100.4C-431
49. 93V-312	101.4C-441
50. 93V-313	102.4C-432
51. 25W-301	103.73W-411
52. 25W-302	104.1V-443

CI Number: 40327

Title: Glen Dhu 138 kV Substation

Start Date: 2011/04

Final Cost Date: 2011/06

Function: Transmission

Forecast Amount: $3,200,000

DESCRIPTION:

This project provides for costs associated with the construction of a 138 kV three breaker ring substation for the purpose of connecting the Glen Dhu wind farm to the NSPI transmission system.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Capacity

Why do this project?

NSPI is required to access Renewable Energy to meet Nova Scotia's Renewable Energy Standards. Pursuant to the May 18, 2010 Nova Scotia Utility and Review Board decision NSUARB-NSPI-P-401.37, NSPI is required to repay to Shear Wind Inc. the costs of the network upgrades associated with the Glen Dhu Wind Farm.

Why do this project now?

Repayment of related costs coincides with the in-service date of the Glen Dhu wind farm.

Why do this project this way?

The Glen Dhu wind farm will be connected to a 138 kV transmission circuit that currently exists between Lochaber Road and Port Hastings. This circuit is an integral part of the NSPI transmission system. The establishment of a 138 kV substation consisting of a three breaker ring will ensure the wind farm can operate during contingencies without causing adverse effects to the NSPI transmission system as well as allowing for greater maintenance flexibility.

CI Number	: 40327	- Glen Dhu 138 kV Substation	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
066	003	066 - Other Goods & Services	003 - TP - Bldg.,Struct.Grnd.	1,000,000	0	1,000,000
066	043	066 - Other Goods & Services	043 - TP - Substn Dev.	1,200,000	0	1,200,000
066	061	066 - Other Goods & Services	061 - TP - Switched Telecomm. Sys	1,000,000	0	1,000,000
			Total Cost:	3,200,000	0	3,200,000
			Original Cost:			

DECISION **NSUARB-NSPI-P-401.37**
2010 NSUARB 103

NOVA SCOTIA UTILITY AND REVIEW BOARD

RA

IN THE MATTER OF THE PUBLIC UTILITIES ACT

- and -

IN THE MATTER OF A REQUEST by **NOVA SCOTIA POWER INCORPORATED** and **SHEAR WIND INC.** to resolve a dispute with respect to the Generator Interconnection Agreement

BEFORE: Peter W. Gurnham, Q.C., Chair
Kulvinder S. Dhillon, P.Eng., Member
Roberta J. Clarke, Q.C., Member

COUNSEL: **NOVA SCOTIA POWER INCORPORATED**
Nicole Godbout, LL.B
Daniel M. Campbell, Q.C.

SHEAR WIND INC.
David MacDougall, LL.B
Matthew Clarke, LL.B
James MacDuff, LL.B.

APPLICATION DATE: December 18, 2009

FINAL SUBMISSIONS: April 30, 2010

DECISION DATE: **May 18, 2010**

DECISION: **Shear Wind Inc. is entitled to fully recover the costs of the BUS in accordance with the GIA.**

Document: 173991

TABLE OF CONTENTS

I INTRODUCTION

[1] Nova Scotia Power Incorporated ("NSPI"), in a letter dated December 18, 2009, requested the Nova Scotia Utility and Review Board ("the Board") to resolve a dispute between NSPI and Shear Wind Inc. ("Shear Wind") with respect to the Generator Interconnection Agreement (the "GIA"). The Board's role in this matter is defined in NSPI's, Board approved, Open Access Transmission Tariff ("OATT"), which states that disputes relating to the GIA can be reviewed by the Board following a process set out in the OATT.

[2] On December 4, 2009, NSPI provided the draft GIA to Shear Wind and on the same day, Shear Wind requested that the unexecuted GIA be filed with the Board pursuant to Sections 11.2 and 11.3 of the Generation Interconnection Procedures ("GIP")

[3] The Board set out directions on procedures as agreed between the parties in a letter dated January 5, 2010.

[4] The Board issued a decision [NSUARB-NSPI-P-401.36] with respect to a dispute between NSPI and Amherst Wind Power LP (the "Amherst Decision") on January 7, 2010. As a result, Shear Wind requested two extensions to the times noted in the directions on procedure which were granted by the Board as follows:

Shear Wind Inc.'s Argument	January 22, 2010
NSPI's Response to Shear Wind Inc.'s Argument	February 5, 2010
IRs issued by Parties and Board	February 12, 2010
Responses to IRs	February 22, 2010
Final Submissions	March 4, 2010

[5] Shear Wind and NSPI executed a Power Purchase Agreement on April 1, 2008 ("PPA"). In their submissions in this proceeding both parties made extensive reference to provisions of the PPA in support of their argument. The PPA in its entirety was filed in confidence pursuant to the Board Regulatory Rules. The Board advised the parties, by letter dated April 1, 2010, that in order to provide a decision which fully explained its reasons, the Board felt it would need to disclose relevant provisions of the PPA and the associated arguments of the parties. In a preliminary hearing on April 30, 2010, Shear Wind and NSPI agreed that for purposes of facilitating this decision, they would waive the confidentiality associated with Sections 5.3(a) and (d) of the PPA and their associated arguments. NSPI's position was that this waiver was for purposes of this decision only and it reserves the right to take a different position in future proceedings involving this or any other PPA.

[6] The following is the summary of the Board's findings in this matter, for reasons which are set out later in this Decision:

a) Shear Wind is entitled to fully recover the costs of the three breaker ring substation ("BUS").

b) Shear Wind is not required to take transmission service to recover the BUS costs.

c) Appendix "A" to the proposed GIA is amended to include the BUS as a Network Upgrade as agreed by the Parties.

II OVERVIEW

[7] Shear Wind is developing a wind farm known as the Glen Dhu Project in Antigonish County, Nova Scotia to supply electric power to NSPI. It entered into negotiations with NSPI to interconnect its wind generating facility with NSPI's 138 kV transmission line (L-6511) between Trenton and Lochaber, Nova Scotia.

[8] After the completion of various required studies, NSPI and Shear Wind proceeded to the negotiation of a GIA, based on the standard form approved by the Board as part of the OATT. NSPI, in its letter dated December 18, 2009, stated that:

> ... Shear Wind and NSPI have completed the required steps of the interconnection process and are at the final stage of negotiating a GIA, the last stage before interconnection.
>
> [Exhibit N-1(C), p. 1]

[9] As of December 18, 2009, the parties reached agreement on all but two points. Shear Wind advised NSPI that it disagreed with:

1. The location of the Point of Interconnection [POI] as identified in Appendix A of the GIA: and

2. The proposal that the 138 kV three breaker ring substation and related equipment should be deemed Transmission Provider's Interconnection Facilities rather than Network Upgrades in Appendix A of the GIA.

[Exhibit N-1(C), p. 4]

[10] When parties are unable to agree to a proposed GIA, ss. 11.2 and 11.3 of the GIP provide that:

> **11.2 Negotiation**
> Notwithstanding Section 11.1, at the request of the Interconnection Customer the Transmission Provider shall begin negotiations with the Interconnection Customer concerning the appendices to the GIA at any time after the Interconnection Customer executes the Interconnection Facilities Study Agreement. The Transmission Provider and the Interconnection Customer shall negotiate concerning any disputed provisions of the

appendices to the draft GIA for not more than 60 Calendar Days after tender of the final Interconnection Facilities Study Report. If the Interconnection Customer determines that negotiations are at an impasse, it may request termination of the negotiations at any time after tender of the GIA pursuant to Section 11.1 and request submission of the unexecuted GIA with the Board or initiate Dispute Resolution procedures pursuant to Section 13.5.

...

11.3 Execution and Filing

...The Interconnection Customer shall either: (i) execute two originals of the tendered GIA and return them to the Transmission Provider; or (ii) request in writing that the Transmission Provider file with the Board an (sic) GIA in unexecuted form. As soon as practicable, but not later than ten Business Days after receiving either the two executed originals of the tendered GIA (if it does not conform with a Board-approved standard form of interconnection agreement) or the request to file an unexecuted [GIA], the Transmission Provider shall file the GIA with the Board, together with its explanation of any matters as to which the Interconnection Customer and the Transmission Provider disagree and support for the costs that the Transmission Provider proposes to charge to the Interconnection Customer under the GIA. An unexecuted GIA should contain terms and conditions deemed appropriate by the Transmission Provider for the Interconnection Request. If the Parties agree to proceed with design, procurement, and construction of facilities and upgrades under the agreed-upon terms of the unexecuted GIA, they may proceed pending Board action.

[2005 NSUARB P-880, Exhibit 2 of Exhibit N-1]

[11] NSPI requested the Board to confirm the unexecuted GIA attached to its letter of December 18, 2009.

[12] Shear Wind requested the Board to modify the GIA by:

1. The location of the POI that is proposed by NSPI be rejected in favour of a location that is on the Shear Wind facility side of the proposed three breaker ring bus. Shear Wind submits that the appropriate location for the POI is at the terminals on the NSPI side of Switch 93N-661. The granting of this relief would require that NSPI be directed to revise Section 1 of Appendix "A" of the unexecuted GIA (titled "Interconnection Facilities") and to revise the One Line Diagram at Schedule A to Appendix "C" of the unexecuted GIA, in order to reflect the revision to the location of the POI;

2. The classification of the 138 kV three-breaker ring bus substation and related equipment as "Transmission Provider's Interconnection Facilities" be rejected and that this infrastructure instead be classified as "Network Upgrades". The granting of this relief would require that NSPI be directed to recategorize the individual items of equipment currently listed under Section 1(b) of Appendix "A" of the unexecuted GIA (titled Transmission Providers' Interconnection Facilities") as "Network Upgrades" by instead listing those items under Section 2 of Appendix "A" of the unexecuted GIA (titled "Network Upgrades"); and

3. The Board provide written confirmation that the effect of the foregoing relief is that Shear Wind shall be entitled to recover all amounts advanced with respect to Network Upgrades in accordance with GIA Section 11.4.1, which provides that full reimbursement of such

> amounts shall occur no later than 20 years following the Commercial Operation Date of the Generating Facility.
>
> [Exhibit N-2, p. 3]

[13] In its February 5, 2010 response to Shear Wind's January 22, 2010 submission NSPI noted, among other items, based on the Amherst Decision, that the BUS is a Network Upgrade and the only unresolved issue is whether Shear Wind is entitled to a refund of the interconnection costs associated with the BUS. NSPI argued that these costs are not refundable:

> There are three key reasons why the Board should reject Shear Wind's approach on this issue:
>
> 1. The Board has already determined that the Shear Wind approach could result in a double recovery from NSPI customers;
> 2. The specific language of the Shear Wind PPA reinforces that Shear Wind was responsible for all interconnection costs; and
> 3. Shear Wind made a separate agreement to be responsible for interconnection costs.
>
> [Exhibit N-16, p. 3]

[14] The Board understands that both parties agree that the BUS is required and is a part of the Network Upgrade as defined in the GIA. The only question for the Board to decide is who pays for the BUS.

[15] The Board is of the opinion that, based on the evidence before it in this case, Shear Wind is entitled to recover the cost of the BUS, which both parties have agreed is a Network Upgrade.

III NETWORK UPGRADE

[16] To transport energy to customers, every power generating facility needs to connect to the transmission system. The type and nature of the interconnection facility

depends upon the size and location of the generating facility and point of interconnection on the transmission line. The GIP/GIA provide the process which the Independent Power Producer (IPP) is required to follow. The costs of the interconnection facilities are to be allocated between NSPI and the IPP.

[17] Generally, the IPP is financially responsible for all interconnecting facilities required by the transmission provider except the Network Upgrades.

[18] The Network Upgrades are defined as the facilities upgrades required beyond the point of interconnection and are designed and built by the transmission provider. In cases where the IPP funds the Network Upgrades, it is entitled to a refund of all amounts advanced for Network Upgrades.

[19] Both NSPI and Shear Wind have submitted that the BUS is required in this case and is a part of the Network Upgrades.

IV AMHERST DECISION

[20] In the Amherst Decision, the Board was required to make findings on the appropriateness of the POI, whether the BUS was required, and if so, whether it was a Network Upgrade, and whether Amherst was entitled to recover the costs, among other issues.

[21] The Board found that the BUS was required, and Amherst was allowed to recover part of the cost of the BUS as a Network Upgrade.

[22] In that proceeding, the Board understood that Amherst had applied to NSPI for interconnection to the L-6535 transmission line, an interprovincial line between Nova Scotia and New Brunswick. The Board also understood that initially, NSPI proposed to connect Amherst's generating facility with a double switch arrangement, and this arrangement was used to prepare NSPI's interconnection cost estimate as provided to Amherst. It was clear that very late in the process (and after input from New Brunswick Power), the interconnection requirements were changed by NSPI to the BUS due to the status of the line and the impact on current customers.

[23] In the Amherst Decision, the Board found the BUS to be a Network Upgrade because of its benefit to both the generating facility and customers in Nova Scotia and New Brunswick. The Board also found that Amherst would not be responsible for the additional costs resulting from the change from the double switch to the BUS.

[24] The Board makes the clarification that, unlike the situation in the Amherst proceeding, in this matter the Board is not required to make a finding on whether the BUS is required or whether it is a Network Upgrade, because the parties have already agreed upon these points.

V IS SHEAR WIND RESPONSIBLE FOR THE THREE RING BUS?

The BUS is a Network Upgrade

[25] In its initial filing (Exhibit N-1), NSPI identified one of the issues of disagreement between the parties as the characterization of the BUS. In Appendix A of

the unexecuted GIA, it appeared as Transmission Provider's Interconnection Facilities, while Shear Wind maintained it is a Network Upgrade. As noted, the Board was advised after the initial filing that NSPI had conceded that the BUS is a Network Upgrade.

[26] Notwithstanding this concession, the Board understands that the following issues raised by NSPI in its initial filing, should the BUS be determined to be a Network Upgrade, remain outstanding:

1. Does Shear Wind remain responsible for the costs associated with the three breaker ring substation?

2. Is Shear Wind eligible for a refund under Section 11.4.1 of the GIA as there are no Transmission Service charges associated with the Generating Facility under the PPA?

3. Do the energy costs in the PPA include Shear Wind's cost of the Interconnection Facilities?

[27] NSPI concludes that if Shear Wind is entitled to a refund of the cost of the Network Upgrades, unless the Energy costs in the PPA are reduced, Shear Wind will enjoy double recovery at the expense of the ratepayers.

[28] As support for its submissions, NSPI relies on the Board's Amherst Decision, on the provisions of the Request for Proposals ("RFP"), and the PPA.

[29] Shear Wind takes the position that as the BUS is agreed to be a Network Upgrade, the provisions of 11.4 of the GIA make it clear that Shear Wind as the Interconnection Customer is not responsible for the costs. Based on *FERC Order 2003-C* (Exhibit N-14), it claims that it is entitled to a refund, whether or not it takes transmission service. Shear Wind says that the special provisions of the PPA reinforce the primacy of

the GIA. Shear Wind argues that NSPI is not legally able to deviate from the Board approved GIA, created under the OATT. Counsel for Shear Wind distinguishes the Amherst Decision.

[30] Shear Wind argues that if it does not receive a refund of the cost of the Network Upgrades, it will in fact experience an "under-recovery" of its costs.

[31] The parties have agreed that the BUS is not a sole use facility; in other words, there are benefits flowing to the transmission system as a whole from the installation of the BUS in the Shear Wind project.

[32] Since the parties have agreed that the BUS is a Network Upgrade, the Board need not make a finding on this issue. The Board accepts, for the purposes of this Decision only, that it is a Network Upgrade. However, this will not bind the Board in future matters where, for example, there may be disagreement on the classification of any component of the interconnection facilities.

Is Shear Wind entitled to recover the cost of the BUS?

[33] For the reasons which follow, the Board finds that Shear Wind is entitled to recover the cost of the BUS.

Provisions of the GIA

[34] The GIA establishes, *inter alia*, the cost responsibilities of the parties. Under Section 11.3 of the GIA, the Interconnection Customer (Shear Wind in this case) is

required to solely fund Network Upgrades, unless the Transmission Provider or Transmission Owner elects to fund them.

[35] Under the terms of Section 11.4.1 the Interconnection Customer is entitled to repayment for the costs of the Network Upgrades. It states:

> **11.4.1 Refund of Amounts Advanced for Network Upgrades**
>
> Interconnection Customer shall be entitled to a cash repayment, equal to the total amount paid to Transmission Provider and Affected System Operator, if any, for the Network Upgrades, to be paid to Interconnection Customer on a dollar-for-dollar basis for the non-usage sensitive portion of transmission charges, as payments are made under Transmission Provider's Tariff and Affected System's Tariff for transmission services with respect to the Generating Facility. Any repayment shall include interest from the date of any payment for Network Upgrades through the date on which the Interconnection Customer receives a repayment of such payment pursuant to this subparagraph. Interconnection Customer may assign such repayment rights to any person.
>
> Notwithstanding the foregoing, Interconnection Customer, Transmission Provider, and Affected System Operator may adopt any alternative payment schedule that is mutually agreeable so long as Transmission Provider and Affected System Operator take one of the following actions no later than five years from the Commercial Operation Date:
>
> (1) return to Interconnection Customer any amounts advanced for Network Upgrades not previously repaid, or
>
> (2) declare in writing that Transmission Provider or Affected System Operator will continue to provide payments to Interconnection Customer on a dollar-for-dollar basis for the non-usage sensitive portion of transmission charges, or develop an alternative schedule that is mutually agreeable and provides return of all amounts advanced for Network Upgrades not previously repaid; however full reimbursement shall not extend beyond (20) years from the Commercial Operation Date.
>
> If the Generating Facility fails to achieve commercial operation, but it or another Generating Facility is later constructed and makes use of the Network Upgrades, Transmission Provider and Affected System Operator shall at that time reimburse Interconnection Customer for the amounts advanced for the Network Upgrades.
>
> . . .
>
> [Exhibit N-1(C), pp. 69-70]

[36] The Board finds that the provisions of the GIA are clear and unambiguous. As a result, the Board considers it unnecessary to look at extrinsic evidence such as the

RFP and Shear Wind's Response to the RFP, the NSPI responses to Clarifying Questions, and correspondence between the parties. The Board will, however, address the provisions of the PPA as they relate to the provisions of the GIA later in this Decision.

[37] The Board finds that under the GIA, the Interconnection Customer is required, unless the Transmission Provider elects otherwise (which NSPI has not done in this instance), to pay the "up front" costs of the Network Upgrades. Once paid, the Interconnection Customer is entitled to recover the costs from the Transmission Provider by either the method set out in 11.4.1 or any other mutually satisfactory method.

Applicability of FERC Order 2003-C

[38] NSPI submitted that Section 11.4.1 of the GIA only permits repayment of the cost of Network Upgrades where the Interconnection Customer takes transmission services. Counsel for NSPI submitted:

> In accordance with the PPA, NSPI will take ownership of energy generated by Shear Wind at the Delivery Point (i.e. at the interface of the wind farm and the NSPI transmission system). Costs advanced for a Network Upgrade are not reimbursed pursuant to section 11.4.1 because these costs are the responsibility of the Seller under the 2007 RFP and PPA. Further, no payments are made for Transmission Service with respect to this Generating Facility. There is no Transmission Tariff Payment, and as such, section 11.4.1 does not apply.
>
> Shear Wind argues that the FERC decision in the Niagara Mohawk case ought to be followed by the UARB. The Niagara Mohawk case determined that in FERC jurisdictions, even if an Interconnection Customer does not take Transmission Service, it is entitled to receive a refund pursuant to section 11.4.1. As stated above, FERC jurisprudence is informative and instructive but does not create a binding precedent in Nova Scotia. As the Board did in the Amherst Decision, FERC decisions should be placed in the context of the circumstances in Nova Scotia. In particular, applying the FERC decision in Niagara Mohawk to the Shear Wind GIA would result in a double recovery for Shear Wind. NSPI customers would pay twice for Shear Wind's interconnection to the system.
>
> [Exhibit N-16, p. 4]

[39] Shear Wind took the position that NSPI mistakenly understood Section 11.4.1 to address when the Interconnection Customer would be entitled to a refund, rather than how the repayment was to be made. Shear Wind's counsel submitted:

> Section 11.4.1 of the GIA clearly provides that an Interconnection Customer is entitled to a cash repayment, equal to the total amount paid to the Transmission Provider for any Network Upgrades that the Interconnection Customer may be required to fund, plus interest from the date of payment until the date of repayment. The right of an Interconnection Customer to receive reimbursement for Network Upgrade advances is further confirmed by Section 12.2.2 of the GIP, which states in the first sentence of its last paragraph that the "Transmission Provider will refund to the Interconnection Customer both the expediting costs and the cost of Network Upgrades, in accordance with Article 11.4 of the GIA".
>
> NSPI is of the mistaken view that an Interconnection Customer must take transmission service from NSPI in order to be eligible to receive reimbursement for the amounts it advances with respect to Network Upgrades. Shear Wind respectfully submits that NSPI's position confuses two separate elements contained in GIA Section 11.4.1. The first of these elements is the mechanics of the reimbursement (i.e., whether the costs advanced by the Interconnection Customer are to be reimbursed in connection with transmission services versus alternative payment arrangements by no later than the end of 20 years) and the second is the actual entitlement to the reimbursement of these costs. As such, with respect to the question of Shear Wind's entitlement to reimbursement for these costs, it is entirely irrelevant whether it will be taking transmission service - this factor affects only the mechanics of the reimbursement.
>
> Section 11.4.1 provides that the Interconnection Customer's advances for Network Upgrades must be fully repaid no later than twenty years following the Generating Facility's Commercial Operation Date, regardless of the extent or manner of any prior repayments it may have received. The requirement for full reimbursement of the Interconnection Customer by this outside date applies regardless of whether or not any repayments have been made with respect to transmission credits arising from the transmission services associated with the Generating Facility...
>
> [Exhibit N-2, pp. 14-15]

[40] NSPI, while recognizing that the Board has in previous decisions noted that FERC jurisprudence is "informative and instructive" but not binding precedent, urged the Board to place "FERC decisions ... in the context of the circumstances in Nova Scotia". (Exhibit N-16, page 4).

[41] The Order of FERC in 2003-C (and not *Niagara Mohawk* as suggested by NSPI) clearly establishes that full reimbursement must be made "even if no transmission service was taken".

[42] Shear Wind submitted that the FERC interpretation should be adopted by the Board, stating:

> The version of GIA Section 11.4.1 that formed the basis of FERC's findings above is the same version that is found in the existing Board-approved GIA. As noted above, as part of the development of the Consensus Proposal, NSPI agreed to adopt the FERC approach to the repayment of Interconnection Customers' capital contributions to Network Upgrades. In doing so, it adopted verbatim the language of Section 11.4.1 of the FERC pro forma GIA. Shear Wind submits that the foregoing FERC interpretation of Section 11.4.1 should be followed by the Board in applying this provision of the GIA in the Nova Scotia context.
>
> [Exhibit N-2, p. 16]

[43] The Board finds FERC jurisprudence instructive on this point. The Board has difficulty in finding anything "in the context of the circumstances in Nova Scotia" which would lead the Board to reach a conclusion contrary to the FERC finding on this issue. As Shear Wind has identified, in the Nova Scotia market, NSPI as Transmission Provider enjoys "near monopoly over generation". Indeed, the Board accepts Shear Wind's position that a primary purpose of the GIA is to ensure that "...transmission facility owners do not discriminate against independent generators...", and that there is "...prevention of undue discrimination by the Transmission Provider". (Exhibit N-2, pp 16-17)

[44] In the circumstances, the Board accepts that as stated by Shear Wind:

> The GIP and GIA must be interpreted and applied in a proper manner if these regulatory instruments are to achieve the goal of creating a predictable, fair and standardized procedure for the interconnection of IPP generation to the Nova Scotia grid...
>
> [Exhibit N-2, p. 17]

[45] The Board, therefore, finds that Shear Wind is entitled to repayment of the costs of Network Upgrades whether or not transmission service is taken.

Effect of PPA

[46] The parties entered into a PPA on April 1, 2008. This was executed after several months of negotiation between the parties on the terms, including Special Provisions. Those Special Provisions modified the standard PPA.

[47] NSPI points to Section 14.9 of the PPA which states that:

14.9 Complete Agreement

> *All previous communications or agreements* between the Parties, whether verbal or written, *with reference to the subject matter of the PPA* are superseded by the PPA and the PPA constitutes the entire agreement between the Parties with respect to such subject matter. The PPA shall not be amended or supplemented except by subsequent written agreement between the Parties.[Emphasis added]
>
> [Exhibit N-18, p. 5]

[48] The Board is of the opinion that the "subject matter" of the PPA is the agreement for Shear Wind to construct the facility, and sell and deliver energy to NSPI, and NSPI's agreement to purchase and take delivery of the Net Output (PPA, Article 4.1).

[49] The Board also notes that Section 14.9 of the PPA refers to previous communications. The draft GIA was not presented to Shear Wind until September 25, 2009, more than a year after the date the PPA was executed. NSPI takes the position that the previous documents (i.e., the RFP, Response of Shear Wind to the RFP, and the Feasibility Study) all contemplate Shear Wind being responsible for all interconnection costs. The Board notes that the term "interconnection costs" is not, however, defined.

NSPI says that the BUS was always included in the facility requirements; therefore its cost is part of the interconnection costs for which Shear Wind is responsible.

[50] Shear Wind says that NSPI is bound "as a matter of regulatory law" to comply with the terms of the GIA, and further that the RFP documentation "expressly provided that interconnections of the successful projects would be conducted in accordance with the GIP/GIA, and specifically indicated that interconnection cost responsibilities would be those established by the GIA". (Exhibit N-19, page 2)

[51] The Board notes that there is no primacy or paramountcy clause in either the PPA or the GIA which would give either of these agreements priority over the other in the event of a discrepancy. A review of the provisions of both documents leads the Board to conclude that they co-exist, each being the final word on their respective subject matters.

[52] However, the parties see the documents differently. NSPI sees the PPA as the final word on the entire interconnection project, the culmination of all of the previous documents, including the RFP and Response, the various Studies, and all other communications. NSPI acknowledges the Special Provisions which were negotiated as modifications to the PPA, but takes the view that they reinforce the position it advances.

[53] Shear Wind takes the position that the additional wording inserted in Paragraph 5.3(a) of the PPA makes the PPA subordinate or subject to the GIA, making the provisions of the GIA the final determinant on this issue. Paragraph 5.3(a) provides:

> **5.3 Interconnection Costs**
>
> (a) Subject to section 5.3(d), the costs of interconnecting the Facility to the System are the responsibility of the Seller. Such costs comprise all costs incurred by NSPI (as computed in accordance with the normal accounting

procedures of NSPI) that are directly related to the interconnection of the Facility to the System consistent with Good Utility Practice and include the costs of any Interconnection Study or Optional Interconnection Study (as defined in the Generator Interconnection Agreement, installation of equipment, metering, and all incremental modifications to the System (to the extent that such modifications are for the sole benefit of the Facility and are necessary to interconnect the Facility to the System).

[Exhibit N-2(C), Tab 4, General Terms and Conditions, p. 17]

[54] It is important to note that Special Provision 36 modifies Section 5.3.(a) by providing:

36. *At the end of the first sentence of section 5.3(a), the following words shall be inserted*:
"in accordance with the Generator Interconnection Agreement." [Emphasis added]

[Exhibit N-2, Tab 4, Special Provisions, p. 6]

[55] NSPI 's position on the insertion of the words from Special Provision 36 is set out in their submission of February 5, 2010, stating:

Contrary to Shear Wind's argument, the additional language reinforces that the parties understood that the Interconnection Customer would be responsible for all interconnection costs. The relevant phrase is "in accordance with" the GIA. The use of the words "in accordance with" shows that the parties intended that the reference to the GIA would be consistent with the preceding words "the costs of interconnecting the Facility to the System are the responsibility of the Seller ..." and the words that follow which state, "Such costs shall comprise all costs incurred by NSPI....".

[Exhibit N-15(C), p. 6]

[56] Shear Wind's position on this point is set out in its January 22, 2010, submission rejecting NSPI's interpretation:

The effect of the foregoing provision, as amended, cannot be clearer: Shear Wind's cost responsibilities for the interconnection of the Glen Dhu Project are those expressly provided for in the GIA. The foregoing provision does not provide, as NSPI apparently believes, that Shear Wind's responsibilities are to be determined in accordance with all those provisions of the GIA other than those that provide for the reimbursement of advances for Network Upgrades. Rather, the Glen Dhu PPA provides that Shear Wind is entitled to recover its advances for Network Upgrades as provided for by the GIA, just as it is responsible to bear all of the interconnection costs that are properly imposed upon it by that document.

> The reference in the second sentence of Section 5.3(a) to Shear Wind being responsible for "all costs incurred by NSPI... that are directly related to the interconnection of the Facility" must necessarily be read in conjunction with the first sentence, which expressly states that Shear Wind's responsibilities are those established by the GIA. *In interpreting this provision, it is important to bear in mind that under the GIA, an Interconnection Customer's responsibilities in relation to Network Upgrades costs involve the up-front payment of these costs, although they are to be later reimbursed to the Interconnection Customer. The Interconnection Customer is therefore "responsible" for the payment of all interconnection costs, subject to its right of subsequent reimbursement for Network Upgrade advances. Its responsibility to pay these upfront costs does not diminish the Interconnection Customer's right to subsequent reimbursement under the GIA.* [Emphasis added]
>
> [Exhibit N-2(C), p. 6]

[57] Further, Shear Wind says:

> Shear Wind submits that Section 5.3(a) of the Glen Dhu PPA is *unambiguous* and makes abundantly clear that Shear Wind's interconnection cost obligations are to be those expressly provided for in the GIA. However, NSPI's argument at the bottom of page 6 of its February 5 submission regarding this point requires comment. In the last paragraph on page 6, NSPI argued that the addition of the underlined and bolded words above somehow "reinforces that the parties understood that the Interconnection Customer would be responsible for all interconnection costs". Shear Wind fails to understand how this conclusion could be reached on *any reasonable reading of those plain and unambiguous words*, but in any event, NSPI's argument is particularly untenable in light of Shear Wind's response to NSPI IR-3(b) and Confidential Exhibits 15 to 23, attached thereto. [Emphasis added]
>
> [Exhibit N-19, p. 4]

[58] The Board is satisfied that the wording of Section 5.3(a) allows it to safely conclude that this provision of the PPA is subject to the provisions of the GIA. Therefore, the Board finds that Section 11.4.1 is the relevant section to determine the entitlement of Shear Wind to repayment for the costs of the Network Upgrade. The Board does not find it necessary to consider whether, absent the terms of Special Provision 36, the same conclusion would apply.

[59] However, it is necessary to consider whether there is anything else in the provisions of the PPA which might lead the Board to find otherwise. This requires the

Board to consider the submissions of NSPI regarding Section 5.3(d) of the PPA. NSPI submitted that:

> It is also significant that sub-clause 5.3(a) starts with the modifier "Subject to section 5.3(d) ... ". The provisions of section 5.3(d) provide a specific approach to how a Seller seeks an alternate means of recovery of its interconnection costs from NSPI Sections 5.3(a) and (d) together recognize that the interconnection costs are to be recovered through the Energy Rate and the PPA. This is clearly the manner in which the parties understood that a recovery of interconnection costs would occur, and not through the 11.4.1 mechanism. *Specifically, if the Shear Wind responsibility for interconnection costs were to be reduced, there would be a corresponding reduction in the Energy price so that customers do not pay twice for interconnection. This is the deal that the Seller negotiated.*
>
> Section 5.3(d) *ensures that all RFP bids competed on the same footing.* Shear Wind suggests that in negotiating the additional words at section 5.3(a), it has somehow obtained the right to receive a refund under section 11.4.1, without a corresponding reduction in Energy Rate. This is contrary to the express wording of section 5.3(d). *To interpret section 5.3(a) as Shear Wind proposes would mean that NSPI's customers will pay significantly more for Shear Wind's energy than what was originally contracted, and that its PPA bid competed on different grounds than the other Independent Power Producers. This is not the case.* [Emphasis added]
>
> [Exhibit N-15(C), p. 7]

[60] In this particular PPA, it is essential to note that Section 5.3(d) is completely different from the standard PPA wording. It is in fact set out in full in the Special Provisions negotiated by the parties and provides:

> 38. *Section 5.3(d) shall be deleted in its entirety and replaced with the following*:
>
> "*The Seller shall have the option*, exercisable in its sole discretion, within thirty (30) days after final determination of its interconnection costs, to provide notification (the "Interconnection Cost Notice") to NSPI that it desires for NSPI to assume such costs. As part of the Interconnection Cost Notice, the Seller will provide the final determination of its interconnection costs and the amount by which it proposes the Energy Rate will be reduced on the assumption that such costs will be assumed by NSPI. NSPI shall have a period of fifteen (15) days in which to advise the Seller if it agrees to assume the interconnection costs and accept the proposed reduced Energy Rate. If NSPI does not advise the Seller within the said (15) day period then NSPI will be deemed to have declined to assume the interconnection costs and the reduced Energy Rate." [Emphasis added]
>
> [Exhibit N-2, Tab 4, Special Provisions, p. 6]

[61] The Board will address these provisions below as they have a direct impact on the issue of whether Shear Wind will enjoy "double recovery" as alleged by NSPI.

Board's Findings in Amherst

[62] Before leaving this issue, the Board finds it necessary to make some additional comments on the relevance of the Amherst Decision to this proceeding. The Amherst matter presented a very different fact situation than the present case. As noted earlier in this Decision, the parties there did not agree that the BUS in that case was a Network Upgrade, and the Board was required to make a finding on that point, in the unique circumstances of the location of the facility and interconnection to a major interprovincial transmission line.

[63] Further, in the Amherst Decision, the Board did not consider the RFP or the PPA in any depth. The Board is not able to comment on whether the PPA in this case and the Amherst PPA contained similar provisions.

Will Shear Wind Enjoy Double Recovery?

Provisions of PPA

[64] NSPI argued that if Shear Wind is allowed to receive a repayment of the costs of the BUS as a Network Upgrade it will have a "double recovery" of those costs. The reason for this is, in NSPI's view, that the costs of the BUS were included in the financial projections provided by Shear Wind, and in its calculation of the energy bid in its

response to the RFP. NSPI says that Shear Wind will recover those costs through the PPA.

[65] As set out in paragraph [59] above, in support of its position, NSPI pointed to the fact that section 5.3(a) of the PPA, as amended by Special Provision 36 is subject to Section 5.3(d) of the PPA.

[66] Shear Wind responded to NSPI by stating:

> In the second paragraph of page 7 of NSPI's February 5 submission, NSPI argues that if Section 5.3(a) of the Glen Dhu PPA is interpreted as Shear Wind proposes ... then:
>
> > "NSPI's customers will pay significantly more for Shear Wind's energy than what was originally contracted, and that its PPA bid competed on different grounds than the other Independent Power Producers".
>
> Shear Wind submits that this characterization is incorrect and illogical. Firstly, provided Section 5.3(a) of the Glen Dhu PPA is properly interpreted (i.e., in accordance with its express, plain language), *NSPI's customers will pay exactly the rate that NSPI contracted for. NSPI negotiated and executed the Glen Dhu PPA with this revised provision and NSPI is contractually obligated to comply with it.*
>
> Secondly, Shear Wind did not "compete on grounds other than the other Independent Power Producers". *Shear Wind responded to the same 2007 RFP as the other IPPs and complied with all of its stated requirements.* One of these was to identify which of the Standard PPA provisions it would seek to revise if its bid was selected. As discussed in detail elsewhere, Shear Wind made clear in its RFP bid that it would require revisions to Section 5.3(a) of the Standard PPA in order to more specifically address the question of the PPA's allocation of costs related to system modifications that "benefit NSPI or other parties" (i.e., Network Upgrades). *Shear Wind's bid was selected by NSPI and the parties subsequently negotiated a change to Section 5.3(a) which addressed Shear Wind's concern in this regard. Shear Wind fails to see how a PPA amendment freely entered into by NSPI several months following the submission of RFP bids amounts to Shear Wind having "competed on different grounds than the other Independent Power Producers". The negotiation process that was undertaken by the parties was fully compliant with the 2007 RFP ...*
>
> . . .
>
> ... while it is not Shear Wind's position that its rights to reimbursement for Network Upgrades under the GIP/GIA are any different than the rights of other IPPs, the foregoing nevertheless makes clear that the PPA negotiation process that it engaged in with NSPI was expressly provided for by the terms of the 2007 RFP.
>
> Moreover, it is Shear Wind's position that ... the GIP/GIA (which applies to all IPPs seeking interconnection in Nova Scotia) clearly requires that all Interconnection Customers be reimbursed for the full amount of any advances they make with respect to Network Upgrades.

Shear Wind also notes that its RFP bid was submitted in response to the 2007 RFP documentation which expressly provided that interconnection cost responsibilities for projects selected in that process would be those established by the GIA ...

... Shear Wind fundamentally disagrees with NSPI that its customers will overpay if Shear Wind recovers its advances for Network Upgrade costs. The very concept of Network Upgrades inherently describes facilities which provide system-wide benefits. The system benefits of the three breaker ring buses required by NSPI for the interconnection of the Amherst and Glen Dhu Projects have been thoroughly canvassed and established in the two respective GIA proceedings. It is entirely appropriate that the costs of these Network Upgrades be borne by rate-payers, as these costs relate to infrastructure that benefits the NSPI transmission system (and thus benefits NSPI rate-payers generally). As previously noted, an underlying purpose of the GIP/GIA regime is to protect individual Interconnection Customers from being forced to bear inappropriate costs (including Network Upgrade costs), and thus to prevent undue discrimination by Transmission Providers such as NSPI. Shear Wind submits that it cannot be correct, as asserted by NSPI, that NSPI customers will over-pay as a result of the Glen Dhu Project being interconnected *in accordance with the approved regulatory regime that governs such interconnections, and in accordance with the commercial arrangements that have been freely entered into by NSPI. In fact, the adoption of NSPI's position would result in Shear Wind bearing 100% of the cost of facilities that are required by NSPI to provide system benefits beyond those required to interconnect the Glen Dhu Project. This is the exact situation that the GIP/GIA concept of Network Upgrades is intended to protect against.* [Emphasis added]

[Exhibit N-19(C), pp. 6-8]

[67] Shear Wind submitted that there would not be any "double recovery", and that there would rather be "under recovery" if it is not permitted to receive the repayment prescribed by Section 11.4.1 of the GIA.

[68] While NSPI submitted that the inclusion of Paragraph 5.3(d) of the PPA demonstrated that Shear Wind and NSPI both understood that the interconnection costs were to be recovered through the Energy Rate under the PPA, Shear Wind dismissed these submissions summarily. Shear Wind argued:

. . .

Shear Wind negotiated specific changes to Section 5.3(d) of the Standard PPA which fundamentally alter its operation. Section 5.3(d) of the Standard PPA provides that NSPI would have the option, after the final determination of the Seller's interconnection costs, to reduce the Energy Rate in proportion to the amount of the Seller's responsibility for interconnection costs. However, the version of Section 5.3(d) negotiated by Shear Wind for the Glen Dhu PPA *provides for the opposite scenario.* That is, Section 5.3(d) of the Glen Dhu

PPA provides that Shear Wind, not NSPI, has the option to give notice that it wishes NSPI to take responsibility for Shear Wind's interconnection costs and to reduce the Glen Dhu PPA Energy Rate by an amount which is to be proposed by Shear Wind. Furthermore, unlike the version of Section 5.3(d) contained in the Standard PPA, the Glen Dhu PPA version of the clause provides that it is Shear Wind that has the right to make the final determination of Shear Wind's interconnection costs.

... Shear Wind successfully negotiated changes to the Glen Dhu PPA which ensured that interconnection costs would be properly allocated between the parties.

NSPI also argued ... that "Section 5.3(d) ensures that all RFP bids competed on the same footing". This latter statement that Section 5.3(d) puts all RFP bidder on the same footing surely cannot be correct given, as NSPI stated ... that "Paragraph 5.3(d) is also not contained in the standard form PPA nor in Amherst's PPA". Further, as noted above, the version of Section 5.3(d) negotiated by the parties in the Glen Dhu PPA is fundamentally different than the version that is contained in the Standard PPA, and therefore it is difficult to see how it can result in "ensuring that all RFP bids competed on the same footing".

NSPI claims ... that it "is significant that subclause 5.3(a) starts with the modifier "Subject to section 5.3(d)...". Shear Wind suggests that this is not particularly significant wording at all, but rather represents common legal drafting practice that is intended to alert the reader to the inter-operative nature of specific provisions in an agreement. Rather, the significant aspects of Sections 5.3(a) and 5.3(d) of the Glen Dhu PPA relate to the fact that Shear Wind obtained specific changes to the Standard PPA that ensured that it would remain protected from any attempt by NSPI to improperly impose system modification/Network Upgrade costs on it.

NSPI also asserts ... that submission that "Sections 5.3(a) and (d) together recognize that the interconnection costs are to be recovered through the Energy Rate and the PPA." This is simply not the case. As noted immediately above, the specific change that Shear Wind negotiated to Sections 5.3(a) clarified its entitlement to reimbursement for eligible interconnection costs pursuant to the GIA, and the change it obtained to Section 5.3(d) ensured that Shear Wind's Energy Rate only be reduced at Shear Wind's option, and only in connection with the assumption by NSPI of the interconnection costs as determined by Shear Wind. NSPI's implied suggestion that Shear Wind might accept a reduction to its Energy Rate pursuant to Section 5.3(d) with respect to interconnection costs for which it was not responsible under Section 5.3(a) is simply not reasonable. [Emphasis added]

[Exhibit N-19(C), pp. 5-6]

[69] The Board notes that Paragraph 5.3(d) which is contained in Special Provision 38 of the PPA is essentially as described by Shear Wind. The Board further notes that the term "interconnection costs" is not a defined term in the PPA. The Board has determined earlier in this decision that Shear Wind is entitled to repayment of the costs

of the Network Upgrades. The Board is not persuaded that there is any other provision in the PPA which would cause the Board to change this finding.

[70] The Board is unable to conclude whether Shear Wind will enjoy any double recovery. There is no evidence before the Board which would indicate how the Shear Wind bid in response to the RFP compared with the bids of other IPP. The Board accepts that NSPI negotiated the Special Provisions of the PPA with Shear Wind. The Board further accepts the argument of Shear Wind that "NSPI's customers will pay exactly the rate that NSPI contracted for" and that "NSPI is contractually obligated to comply with the PPA". The Board cannot rescue NSPI if it has made what it now believes is an improvident bargain with Shear Wind.

VI CONCLUSION

[71] For the reasons set out above, the Board finds that Shear Wind is entitled to fully recover the costs of the BUS in accordance with Section 11.4.1 of the GIA.

[72] The Board further finds, in accordance with FERC Order 2003-C, that it is not necessary for Shear Wind to take transmission in order to be entitled to the repayment.

[73] The parties have already agreed that the Board has the jurisdiction to modify the GIA. Accordingly, Appendix A to the unexecuted GIA should be modified to provide that the BUS and related equipment should be shown as Network Upgrades.

[74] An Order will issue accordingly.

DATED at Halifax, Nova Scotia, this 18th day of May, 2010.

Peter W. Gurnham

Kulvinder S. Dhillon

Roberta J. Clarke

Document: 173991

CI Number: 40322

Title: New Prospect Road Substation

Start Date: 2011/05

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $3,068,581

DESCRIPTION:

This project provides for costs associated with the construction of a 138 - 12 kV, 15/20/25 MVA substation in the Prospect Road area of New Minas. The station will initially terminate 3 x 12 kV existing 22V-New Minas feeders.

Summary of Related CI's +/- 2 years:
2011 – 40321 Install Canaan Road to Prospect Road Transmission Line $2,024,763
2011 – 40323 Canaan Road Line Terminal $738,632
2011 – 38841 New Minas Land Purchase and Rights of Way $593,776
2012 – CI TBD

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Overloaded Equipment

Why do this project?

This project is necessary to accommodate load growth in the New Minas area and was recommended in the attached 2008 distribution planning study, "22V-New Minas, 36V-Hillaton, 50V-Klondike Report No. 261-0608-W66.5". The transformers at the existing New Minas substation are approaching overload and system upgrades are required.

Why do this project now?

This project is required at this time to address growth issues in the New Minas area and to minimize unplanned outages due to protection trips.

Why do this project this way?

Constructing a new substation in the Prospect Road area will relieve loading at the existing New Minas substation and will allow for area load growth to be supplied from the new substation.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40322 - New Prospect Road Substation | Project Number

Parent CI Number : - | Approved Date

Cost Centre : 800 - 800-Services - Admin. | Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D OT Labour AO		1,457	0	1,457
092		092-Vehicle T&D Reg. Labour AO		44,652	0	44,652
094		094 - Interest Capitalized		37,420	0	37,420
095		095-COPS Overtime Labour AO		2,220	0	2,220
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		5,115	0	5,115
095		095-COPS Regular Labour AO		68,022	0	68,022
001	003	001 - T&D Regular Labour	003 - TP - Bldg.,Struct.Grnd.	3,187	0	3,187
002	003	002 - T&D Overtime Labour	003 - TP - Bldg.,Struct.Grnd.	0	0	0
012	003	012 - Materials	003 - TP - Bldg.,Struct.Grnd.	247,112	0	247,112
013	003	013 - COPS Contracts	003 - TP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
066	003	066 - Other Goods & Services	003 - TP - Bldg.,Struct.Grnd.	28,756	0	28,756
001	007	001 - T&D Regular Labour	007 - TP - Environmental	1,342	0	1,342
002	007	002 - T&D Overtime Labour	007 - TP - Environmental	0	0	0
012	007	012 - Materials	007 - TP - Environmental	13,455	0	13,455
013	007	013 - COPS Contracts	007 - TP - Environmental	[redacted]	0	[redacted]
001	022	001 - T&D Regular Labour	022 - TP - Elec Contr.Equip.	8,723	0	8,723
002	022	002 - T&D Overtime Labour	022 - TP - Elec Contr.Equip.	0	0	0
011	022	011 - Travel Expense	022 - TP - Elec Contr.Equip.	1,150	0	1,150
012	022	012 - Materials	022 - TP - Elec Contr.Equip.	52,555	0	52,555
013	022	013 - COPS Contracts	022 - TP - Elec Contr.Equip.	[redacted]	0	[redacted]
001	023	001 - T&D Regular Labour	023 - TP - Power Equip.-Station S	3,355	0	3,355
002	023	002 - T&D Overtime Labour	023 - TP - Power Equip.-Station S	0	0	0
012	023	012 - Materials	023 - TP - Power Equip.-Station S	29,325	0	29,325
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	23,150	0	23,150
002	043	002 - T&D Overtime Labour	043 - TP - Substn Dev.	0	0	0
012	043	012 - Materials	043 - TP - Substn Dev.	497,326	0	497,326
001	044	001 - T&D Regular Labour	044 - TP - Substn.Transf.	6,542	0	6,542
002	044	002 - T&D Overtime Labour	044 - TP - Substn.Transf.	5,752	0	5,752
011	044	011 - Travel Expense	044 - TP - Substn.Transf.	1,610	0	1,610
012	044	012 - Materials	044 - TP - Substn.Transf.	1,035,000	0	1,035,000
013	044	013 - COPS Contracts	044 - TP - Substn.Transf.	[redacted]	0	[redacted]
041	044	041 - Meals & Entertainment	044 - TP - Substn.Transf.	805	0	805
066	044	066 - Other Goods & Services	044 - TP - Substn.Transf.	1,150	0	1,150

CI Number	: 40322	- New Prospect Road Substation	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001	061	001 - T&D Regular Labour	061 - TP - Switched Telecomm. Sys	671	0	671
002	061	002 - T&D Overtime Labour	061 - GP - Switched Telecomm. Sys	0	0	0
012	061	012 - Materials	061 - TP - Switched Telecomm. Sys	23,230	0	23,230
001	085	001 - THERMAL Regular Labour	085 Design	21,304	0	21,304
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
011	085	011 - Travel Expense	085 Design	357	0	357
028	085	028 - Consulting	085 Design	54,223	0	54,223
041	085	041 - Meals & Entertainment	085 Design	86	0	86
066	085	066 - Other Goods & Services	085 Design	1,150	0	1,150
001	086	001 - T&D Regular Labour	086 Commissioning	41,153	0	41,153
002	086	002 - T&D Overtime Labour	086 Commissioning	0	0	0
013	087	013 - COPS Contracts	087 Field Super.& Ops.	[redacted]	0	[redacted]
041	087	041 - Meals & Entertainment	087 Field Super.& Ops.	10,350	0	10,350
			Total Cost:	3,068,581	0	3,068,581
			Original Cost:			

CI 40322 New Prospect Road Substation

The following is a breakdown of costs associated with the New Prospect Road Substation Project.

Administrative Overhead and Interest	$[redacted]
Materials	$1,898,003
Contracts	$[redacted]
COPS Labour	$115,179
Consulting	$54,223
Other	$45,414
Total	$3,068,580

This work will be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The COPS labour portion includes supervision and engineering design. The materials cost of this project is based on costs associated with similar substation projects.

Pages 930 - 974 have been removed due to confidentiality.

CI Number: 40281

Title: 2011 Transmission Line Insulator Replacement

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $3,018,100

DESCRIPTION:

This project provides for costs associated with the replacement of insulators on L-6002, a 138 kV line from Gold River to Bridgewater, and two 69 kV lines: L5532 from Big Falls to Gulch, and L5524 from Antigonish to Salmon River Lake. Insulators targeted for replacement have a known failure mechanism resulting from cement growth which leads to unplanned transmission outages. 4433, 1143, and 1091 insulators are planned to be replaced along the three lines, respectively.

Summary of Related CI's +/- 2 years:
2009 – 33464 2009 Transmission Line Insulator Replacement $989,302
2010 – 38110 2010 Transmission Line Insulator Replacement $2,236,168
2012 – CI TBD
2013 – CI TBD

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Outage Performance

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year three of a five year (2009-2013) plan to improve reliability to NSPI's customers. The insulator failure mechanism is well known and previously replaced insulators have been performing well. Each avoided insulator failure on these lines will prevent, on average, 29,700, 3,800, and 7,600 customer hours of interruption from each line, respectively.

Why do this project now?

This project is required because throughout NSPI's system, the type of installed insulator on these circuits has failed due to cement growth.

Why do this project this way?

Replacing the existing defective insulators with a new type of improved insulator is the only option.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40281 - 2011 Transmission Line Insulator Replacement **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 800 - 800-Services - Admin. **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		30,402	0	30,402
094		094 - Interest Capitalized		63,691	0	63,691
095		095-COPS Regular Labour AO		46,314	0	46,314
095		095-COPS Contracts AO		[redacted]	0	[redacted]
001	038	001 - T&D Regular Labour	038 - DP - Insulators	60,000	0	60,000
002	038	002 - Overtime Labour (No AO)	038 - DP - Insulators	0	0	0
011	038	011 - Travel Expense	038 - DP - Insulators	6,708	0	6,708
012	038	012 - Materials	038 - DP - Insulators	[redacted]	0	[redacted]
013	038	013 - COPS Contracts	038 - DP - Insulators	[redacted]	0	[redacted]
014	038	014 - Overtime Meals	038 - DP - Insulators	1,370	0	1,370
041	038	041 - Meals & Entertainment	038 - DP - Insulators	77,064	0	77,064
			Total Cost:	3,018,100	0	3,018,100
			Original Cost:	0		

CI 40281 - 2011 Transmission Line Insulator Replacement

The following is a breakdown of costs associated with the 2011 Transmission Line Insulator Replacement Project.

Administrative Overhead and Interest	$[redacted]
Materials	$[redacted]
Contracts	$[redacted]
COPS Labour	$60,000
Other	$85,142
Total	$3,018,100

The contracted work associated with this project is expected to be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The materials estimate was based on costs associated with similar projects.

CI Number: 40280

Title: 2011 Transmission Switch & Breaker Upgrades

Start Date: 2011/04

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $2,866,718

DESCRIPTION:

This project provides for costs associated with reliability improvements on the NSPI transmission system. Included is the replacement of the following 15 circuit breakers: 17V-503, 43V-502, 43V-505, 99H-501, 99H-502, 58H-500, 58H-501, 58H-502, 58H-503, 58H-505, 58H-506, 89S-551, 91H-608, 91H-515 and 91H-513.

Also included is the replacement of the following 16 switches: 22V-503, 75W-603, 89W-501A, 46W-503, 46W-504, 104H-614, 20V-501, 70V-503, 30W-602A, 30W-602B, 1C-684A, 1C-684B, 1C-688A, 13V-513B, 2S-513A and 2S-513B.

A combination of field-age, condition, and risk of failure was used to identify those circuit breakers and switches that are a priority for replacement.

Summary of Related CI's +/- 2 years
2009 – CI 35862 2009 Transmission Switching Improvements $948,268
2010 – CI 38027 2010 Trans Switch and Breaker Upgrades $2,070,094
2012 – CI TBD
2013 – CI TBD

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Equipment Replacement

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year three of a five year (2009-2013) plan to improve reliability to NSPI's customers. This project will replace circuit breakers that are malfunctioning due to age. In addition, switch modifications/additions will result in improved customer reliability.

Why do this project now?

Doing this project now will result in reliability improvements for customers.

Why do this project this way?

In most instances, circuit breakers are being replaced for which spare parts are no longer available due to the age of the devices. Various switches are being modified or changed out due to either operational issues, or targeted at improving the capability of the switch. These modifications will result in improved customer reliability.

CI Number : 40280 - 2011 Transmission Switch & Breaker Upgrades

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D OT Labour AO		7,887	0	7,887
092		092-Vehicle T&D Reg. Labour AO		161,810	0	161,810
094		094 - Interest Capitalized		66,210	0	66,210
095		095-COPS Overtime Labour AO		12,014	0	12,014
095		095-COPS Contracts AO		35,926	0	35,926
095		095-Thermal Overtime Labour AO		288	0	288
095		095-COPS Regular Labour AO		246,499	0	246,499
095		095-Thermal Regular Labour AO		11,016	0	11,016
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	319,340	0	319,340
002	043	002 - T&D Overtime Labour	043 - TP - Substn Dev.	31,129	0	31,129
011	043	011 - Travel Expense	043 - TP - Substn Dev.	197,736	0	197,736
012	043	012 - Materials	043 - TP - Substn Dev.	1,520,714	0	1,520,714
013	043	013 - COPS Contracts	043 - TP - Substn Dev.	153,138	0	153,138
028	043	028 - Consulting	043 - TP - Substn Dev.	49,736	0	49,736
001	085	001 - THERMAL Regular Labour	085 Design	45,879	0	45,879
002	085	002 - THERMAL Overtime Labour	085 Design	2,397	0	2,397
011	085	011 - Travel Expense	085 Design	5,000	0	5,000
			Total Cost:	2,866,718	0	2,866,718
			Original Cost:	1,721,828		

CI 40280 - 2011 Transmission Switch & Breaker Upgrades

The following is a breakdown of costs associated with the 2011 Transmission Switch and Breaker Upgrades Project.

Administrative Overhead and Interest	$541,650
Materials	$1,520,714
Contracts	$153,138
COPS Labour	$398,745
Other	$252,472
Total	$2,866,718

The work associated with this project is expected to be completed by NSPI personnel at a rate of approximately $[redacted]/ person day. The estimate for this project was developed based on a similar project, CI 38027 2010 Transmission Switch and Breaker Upgrade submitted in the 2010 ACE Plan.

CI Number: 40288

Title: 2011 Substation PCB Equipment Removal

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $2,510,193

DESCRIPTION:

This project provides for the costs associated with the removal of transmission substation devices with 500 mg/kg, or more of PCBs, to be in compliance with recent Federal Environmental PCB Regulations. Included in this item is the replacement of the following PCB containing devices: approximately 4 breakers, 51 instrument transformers and 207 bushings.

Summary of Related CI's +/- 2 years
2010 - CI 38122 2010 PCB Equipment Removal/Destruction - $1,487,135
This is a multi-year initiative that will continue beyond 2011. Future CIs TBD.

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Requirement to Serve

Why do this project?

The removal of transmission substation PCB equipment is a federal regulatory requirement (see attached), with defined timelines.

Why do this project now?

Regulations require that transmission substation equipment that does not meet the federal PCB guidelines, must be removed from service prior to 2015.

Why do this project this way?

The sampling and possible replacement of transmission substation equipment containing greater than 500 mg/kg concentration of PCBs must be planned over a period of several years to ensure necessary outages are scheduled in a timely manner. Present Environment Canada regulations require completion in 2015.

CI Number : 40288 - 2011 PCB Equipment Removals

Parent CI Number : -

Cost Centre : 800 - 800-Services - Admin.

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		278,856	0	278,856
094		094 - Interest Capitalized		51,082	0	51,082
095		095-Thermal Regular Labour AO		7,683	0	7,683
095		095-COPS Contracts AO		39,178	0	39,178
095		095-COPS Regular Labour AO		424,806	0	424,806
013	007	013 - COPS Contracts	007 - TP - Environmental	0	0	0
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	550,338	0	550,338
012	043	012 - Materials	043 - TP - Substn Dev.	926,250	0	926,250
013	043	013 - COPS Contracts	043 - TP - Substn Dev.	167,000	0	167,000
066	043	066 - Other Goods & Services	043 - TP - Substn Dev.	33,000	0	33,000
001	085	001 - THERMAL Regular Labour	085 Design	32,000	0	32,000
			Total Cost:	2,510,193	0	2,510,193
			Original Cost:	396,315		

CI 40288 - 2011 Substation PCB Equipment Removal

The following is a breakdown of costs associated with the 2011 Substation PCB Equipment Removal Project.

Administrative Overhead and Interest	$801,605
Materials	$926,250
Contracts	$167,000
COPS Labour	$582,338
Other	$33,000
Total	$2,510,193

The work associated with this project is expected to be completed by NSPI personnel at a rate of approximately $[redacted]/person day. The material cost is based on a similar project in 2010 to replace PCB contaminated circuit breakers, instrument transformers, and bushings under CI 38122 2010 PCB Equipment Removal/Destruction submitted in the 2010 ACE Plan.

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Canada Gazette Part II

Gazette du Canada Partie II

OTTAWA, WEDNESDAY, SEPTEMBER 17, 2008

OTTAWA, LE MERCREDI 17 SEPTEMBRE 2008

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NOTICE TO READERS

The *Canada Gazette* Part II is published under authority of the *Statutory Instruments Act* on January 9, 2008, and at least every second Wednesday thereafter.

Part II of the *Canada Gazette* contains all "regulations" as defined in the *Statutory Instruments Act* and certain other classes of statutory instruments and documents required to be published therein. However, certain regulations and classes of regulations are exempted from publication by section 15 of the *Statutory Instruments Regulations* made pursuant to section 20 of the *Statutory Instruments Act.*

The *Canada Gazette* Part II is available in most libraries for consultation.

For residents of Canada, the cost of an annual subscription to the *Canada Gazette* Part II is $67.50, and single issues, $3.50. For residents of other countries, the cost of a subscription is US$67.50 and single issues, US$3.50. Orders should be addressed to Government of Canada Publications, Public Works and Government Services Canada, Ottawa, Canada K1A 0S5.

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Copies of Statutory Instruments that have been registered with the Clerk of the Privy Council are available, in both official languages, for inspection and sale at Room 418, Blackburn Building, 85 Sparks Street, Ottawa, Canada.

AVIS AU LECTEUR

La Partie II de la *Gazette du Canada* est publiée en vertu de la *Loi sur les textes réglementaires* le 9 janvier 2008, et au moins tous les deux mercredis par la suite.

La Partie II de la *Gazette du Canada* est le recueil des « règlements » définis comme tels dans la loi précitée et de certaines autres catégories de textes réglementaires et de documents qu'il est prescrit d'y publier. Cependant, certains règlements et catégories de règlements sont soustraits à la publication par l'article 15 du *Règlement sur les textes réglementaires*, établi en vertu de l'article 20 de la *Loi sur les textes réglementaires*.

On peut consulter la Partie II de la *Gazette du Canada* dans la plupart des bibliothèques.

Pour les résidents du Canada, le prix de l'abonnement annuel à la Partie II de la *Gazette du Canada* est de 67,50 $ et le prix d'un exemplaire, de 3,50 $. Pour les résidents d'autres pays, le prix de l'abonnement est de 67,50 $US et le prix d'un exemplaire, de 3,50 $US. Veuillez adresser les commandes à : Publications du gouvernement du Canada, Travaux publics et Services gouvernementaux Canada, Ottawa, Canada K1A 0S5.

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Des exemplaires des textes réglementaires enregistrés par le greffier du Conseil privé sont à la disposition du public, dans les deux langues officielles, pour examen et vente à la Pièce 418, Édifice Blackburn, 85, rue Sparks, Ottawa, Canada.

ISSN 1494-6076

Registration
SOR/2008-273 September 5, 2008

CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999

PCB Regulations

P.C. 2008-1659 September 5, 2008

Whereas, pursuant to subsection 332(1)[a] of the *Canadian Environmental Protection Act, 1999*[b], the Minister of the Environment published in the *Canada Gazette*, Part I, November 4, 2006, a copy of the proposed *PCB Regulations*, substantially in the annexed form, and persons were given an opportunity to file comments with respect to the proposed Regulations or to file a notice of objection requesting that a board of review be established and stating the reasons for the objection;

Whereas, pursuant to subsection 93(3) of that Act, the National Advisory Committee has been given an opportunity to provide its advice under section 6[c] of that Act;

And whereas, in the opinion of the Governor in Council, pursuant to subsection 93(4) of that Act, the proposed Regulations do not regulate an aspect of a substance that is regulated by or under any other Act of Parliament in a manner that provides, in the opinion of the Governor in Council, sufficient protection to the environment and human health;

Therefore, Her Excellency the Governor General in Council, on the recommendation of the Minister of the Environment and the Minister of Health, pursuant to subsection 93(1) and section 97 of the *Canadian Environmental Protection Act, 1999*[b], hereby makes the annexed *PCB Regulations.*

TABLE OF CONTENTS

(*This table is not part of the Regulations.*)

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[a] S.C. 2004, c. 15, s. 31
[b] S.C. 1999, c. 33
[c] S.C. 2002, c. 7, s. 124

Enregistrement
DORS/2008-273 Le 5 septembre 2008

LOI CANADIENNE SUR LA PROTECTION DE L'ENVIRONNEMENT (1999)

Règlement sur les BPC

C.P. 2008-1659 Le 5 septembre 2008

Attendu que, conformément au paragraphe 332(1)[a] de la *Loi canadienne sur la protection de l'environnement (1999)*[b], le ministre de l'Environnement a fait publier dans la *Gazette du Canada* Partie I, le 4 novembre 2006, le projet de règlement intitulé *Règlement sur les BPC*, conforme en substance au texte ci-après, et que les intéressés ont ainsi eu la possibilité de présenter leurs observations à cet égard ou un avis d'opposition motivé demandant la constitution d'une commission de révision;

Attendu que, conformément au paragraphe 93(3) de cette loi, le comité consultatif national s'est vu accorder la possibilité de formuler ses conseils dans le cadre de l'article 6[c] de celle-ci;

Attendu que la gouverneure en conseil est d'avis que, aux termes du paragraphe 93(4) de cette loi, le projet de règlement ne vise pas un point déjà réglementé sous le régime d'une autre loi fédérale de manière à offrir une protection suffisante pour l'environnement et la santé humaine,

À ces causes, sur recommandation du ministre de l'Environnement et du ministre de la Santé et en vertu du paragraphe 93(1) et de l'article 97 de la *Loi canadienne sur la protection de l'environnement (1999)*[b], Son Excellence la Gouverneure générale en conseil prend le *Règlement sur les BPC*, ci-après.

TABLE DES MATIÈRES

(*La présente table ne fait pas partie du Règlement.*)

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[a] L.C. 2004, ch. 15, art. 31
[b] L.C. 1999, ch. 33
[c] L.C. 2002, ch. 7, art. 124

PART 4 — *Continued*

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ABROGATION

ENTRÉE EN VIGUEUR

PCB REGULATIONS

PART 1

GENERAL

Definitions

1. (1) The following definitions apply in these Regulations.

"Act" « *Loi* »

"Act" means the *Canadian Environmental Protection Act, 1999*.

"authorized facility" « *installation agréée* »

"authorized facility" means a facility, including a transfer site, that is authorized by the authorities of the jurisdiction in which it is located to process PCBs or products containing PCBs or to conduct laboratory analysis or research with PCBs or products containing PCBs.

"National Fire Code" « *Code national de prévention des incendies* »

"National Fire Code" means the National Fire Code of Canada 2005, NRCC No. 47667, issued by the Canadian Commission on Building and Fire Codes, National Research Council of Canada, as amended from time to time.

RÈGLEMENT SUR LES BPC

PARTIE 1

GÉNÉRALITÉS

Définitions

1. (1) Les définitions qui suivent s'appliquent au présent règlement.

« BPC » "*PCB*"

« BPC » Tout biphényle chloré visé à l'article 1 de la liste des substances toxiques de l'annexe 1 de la Loi.

« Code national de prévention des incendies » "*National Fire Code*"

« Code national de prévention des incendies » Le *Code national de prévention des incendies — Canada 2005*, CNRC 47667F, avec ses modifications successives, publié par la Commission canadienne des codes du bâtiment et de prévention des incendies du Conseil national de recherches du Canada.

« installation agréée » "*authorized facility*"

« installation agréée » Installation — notamment un centre de transfert — qui est autorisée par les autorités du territoire où elle est située à transformer

"PCB" « *BPC* »

"PCB" means any chlorobiphenyl described in item 1 of the List of Toxic Substances in Schedule 1 to the Act.

"process" « *transformer* »

"process" includes to mix with a product.

"product" « *produit* »

"product" includes equipment.

Concentration — several matrices

(2) For the purposes of these Regulations, if a solid or a liquid containing PCBs is composed of several matrices, the concentration of PCBs is based on the mass of the matrix in which the PCBs are located.

Concentration and quantity

(3) For the purposes of these Regulations, the concentration and quantity of PCBs shall be determined

(*a*) by a laboratory

(i) accredited by the Standards Council of Canada (SCC), the Canadian Association for Environmental Analytical Laboratories Inc. (CAEAL), or any other accreditation body that is a signatory to the *International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement*, and the laboratory shall be accredited in accordance with the International Organization for Standardization standard ISO/IEC 17025:2005 entitled *General Requirements for the Competence of Testing and Calibration Laboratories*, as amended from time to time, and

(ii) for which the scope of accreditation shall include the analytical method used to determine the concentration of PCBs in the matrix in which the PCBs are located; or

(*b*) by a laboratory

(i) accredited in accordance with the *Environmental Quality Act,* R.S.Q., c. Q-2, as amended from time to time, and

(ii) for which the scope of accreditation shall include the analytical method used to determine the concentration of PCBs in the matrix in which the PCBs are located.

Sampling method

(4) For the purposes of these Regulations, other than section 13, the concentration of PCBs in a matrix is determined using a provincially, nationally or internationally recognized sampling method for PCBs in the matrix in which the PCBs are located.

Sampling method — bulk solid products

(5) For the purposes of section 13, the concentration of PCBs is determined using a sampling method for bulk solid products, which is set out in either federal or provincial legislation, as amended from time to time, or approved by the United States Environmental Protection Agency for compliance with the *Resource Conservation and Recovery Act* or with the regulations made under that Act, as amended from time to time.

des BPC ou des produits qui en contiennent, ou à les utiliser pour des analyses de laboratoire ou des recherches.

« Loi » "*Act*"

« Loi » La *Loi canadienne sur la protection de l'environnement (1999)*.

« produit » "*product*"

« produit » S'entend notamment d'une pièce d'équipement.

« transformer » "*process*"

« transformer » S'entend notamment du fait de mélanger avec tout produit.

Concentration — plusieurs matrices

(2) Pour l'application du présent règlement, lorsqu'un solide ou un liquide qui contient des BPC est composé de plusieurs matrices, la concentration de BPC est basée sur la masse de la matrice dans laquelle les BPC se trouvent.

Concentration et quantité

(3) Pour l'application du présent règlement, la concentration et la quantité de BPC sont déterminées :

a) soit par tout laboratoire :

(i) qui est accrédité à la norme de l'Organisation internationale de normalisation intitulée *Exigences générales concernant la compétence des laboratoires d'étalonnages et d'essais* (ISO/IEC 17025:2005), avec ses modifications successives, par le Conseil canadien des normes (CCN), l'Association canadienne des laboratoires d'analyse environnementale (ACLAE) ou tout autre organisme d'accréditation signataire de l'*International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement*,

(ii) dont la portée d'accréditation couvre la méthode d'analyse utilisée pour déterminer la concentration des BPC dans la matrice dans laquelle les BPC se trouvent;

b) soit par tout laboratoire :

(i) qui est accrédité conformément à la *Loi sur la qualité de l'environnement*, L.R.Q., ch. Q-2, avec ses modifications successives,

(ii) dont la portés d'accréditation couvre la méthode d'analyse utilisée pour déterminer la concentration des BPC dans la matrice dans laquelle se trouvent les BPC.

Méthode d'échantillonnage

(4) Pour l'application du présent règlement, sauf l'article 13, la concentration de BPC se trouvant dans une matrice est déterminée au moyen de toute méthode d'échantillonnage pour les BPC dans cette matrice qui est reconnue à l'échelle provinciale, nationale ou internationale.

Méthode d'échantillonnage — produits solides en vrac

(5) Pour l'application de l'article 13, la concentration de BPC est déterminée au moyen de toute méthode d'échantillonnage pour les produits solides en vrac qui est prévue par une loi ou un règlement fédéral ou provincial, avec ses modifications successives, ou qui est approuvée par la United States Environmental Protection Agency pour l'application de la loi des États-Unis intitulée *Resource Conservation and Recovery Act* ou de ses règlements avec leurs modifications successives.

Application

2. (1) These Regulations apply to PCBs and to any products containing PCBs.

Non-application

(2) These Regulations do not apply to the following:

(*a*) the export and import of PCBs that are hazardous waste or hazardous recyclable material within the meaning of the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations* or the export of PCBs that are waste within the meaning of the *PCB Waste Export Regulations, 1996*;

(*b*) the sale, importation or advertising of liquids containing PCBs for use in microscopy, including immersion oils, but not including refractive index oils, which is prohibited under section 4 of the *Hazardous Products Act*; and

(*c*) the offer for sale, sale and use of land contaminated with PCBs or with products containing PCBs.

Sale of property

3. Nothing in these Regulations shall be construed as preventing the sale of

(*a*) personal property or movables that contain PCBs, or real property or immovables that have PCBs or products containing PCBs, and that form part of the sale of the whole or part of a business, including a manufacturing or a processing business;

(*b*) real property or immovables that have products containing PCBs if the products continue to be used after the sale for the same purpose at the same place and are an integral part of the property or immovable; or

(*c*) real property or immovables on which a PCB storage site is located.

Compliance

4. In addition to the persons who must comply with the requirements set out in these Regulations, a person who owns PCBs or products containing PCBs shall ensure that the requirements of these Regulations with respect to those PCBs or products are met.

PART 2

PROHIBITIONS AND PERMITTED ACTIVITIES

PROHIBITIONS

Release into the environment

5. (1) No person shall release PCBs into the environment, other than from the equipment referred to in subsection (2), in a concentration of

(*a*) 2 mg/kg or more for a liquid containing PCBs; or

(*b*) 50 mg/kg or more for a solid containing PCBs.

Release from equipment

(2) No person shall release more than one gram of PCBs into the environment from equipment

Application

2. (1) Le présent règlement s'applique aux BPC et à tout produit qui en contient.

Exclusion

(2) Il ne s'applique toutefois pas aux activités suivantes :

a) l'exportation et l'importation de BPC qui sont des déchets dangereux ou des matières recyclables dangereuses au sens du *Règlement sur l'exportation et l'importation de déchets dangereux et de matières recyclables dangereuses* et l'exportation de déchets contenant des BPC au sens du *Règlement sur l'exportation de déchets contenant des BPC (1996)*;

b) la vente, l'importation ou la publicité des liquides pour usage en microscopie qui contiennent des BPC, y compris les huiles à immersion mais à l'exclusion des huiles à indice de réfraction, interdites par l'article 4 de la *Loi sur les produits dangereux*;

c) la mise en vente, la vente et l'utilisation de terrains contaminés par des BPC ou des produits qui en contiennent.

Vente de biens

3. Le présent règlement n'a pas pour effet d'empêcher la vente des biens suivants :

a) tout bien meuble ou personnel qui contient des BPC ou tout bien immeuble ou réel où se trouvent des BPC ou des produits qui en contiennent, lesquels biens sont compris dans la vente de tout ou partie d'une entreprise, y compris une entreprise de fabrication ou de transformation;

b) tout bien immeuble ou réel dont font partie intégrante les produits qui contiennent des BPC qui s'y trouvent, si les produits continuent d'être utilisés aux mêmes fins et au même endroit après la vente;

c) tout bien immeuble ou réel où se trouve un dépôt de BPC.

Conformité

4. En plus des personnes auxquelles il incombe des obligations en vertu du présent règlement, le propriétaire de BPC ou de produits qui en contiennent veille à ce que les exigences du présent règlement concernant ces BPC ou produits soient remplies.

PARTIE 2

INTERDICTIONS ET ACTIVITÉS PERMISES

INTERDICTIONS

Rejet dans l'environnement

5. (1) Il est interdit de rejeter dans l'environnement, autrement qu'à partir d'une pièce d'équipement visée au paragraphe (2), des BPC de l'une ou l'autre des concentrations suivantes :

a) dans le cas d'un liquide qui contient des BPC, une concentration égale ou supérieure à 2 mg/kg;

b) dans le cas d'un solide qui contient des BPC, une concentration égale ou supérieure à 50 mg/kg.

Rejet à partir d'une pièce d'équipement

(2) Il est interdit de rejeter plus d'un gramme de BPC dans l'environnement à partir d'une pièce

referred to in section 16 that is in use or from equipment in use for which an extension has been granted under section 17.

d'équipement visée à l'article 16 qui est en usage ou d'une pièce d'équipement dont l'usage fait l'objet d'une prolongation en vertu de l'article 17 et qui est en usage.

Prohibited activities

6. Except as provided in these Regulations, no person shall

(*a*) manufacture, export or import PCBs or a product containing PCBs in a concentration of 2 mg/kg or more;

(*b*) offer for sale or sell PCBs or a product containing PCBs in a concentration of 50 mg/kg or more; or

(*c*) process or use PCBs or a product containing PCBs.

6. Sauf dans la mesure prévue par le présent règlement, il est interdit :

a) de fabriquer, d'exporter ou d'importer des BPC ou tout produit qui en contient en une concentration égale ou supérieure à 2 mg/kg;

b) de mettre en vente ou de vendre des BPC ou tout produit qui en contient en une concentration égale ou supérieure à 50 mg/kg;

c) de transformer ou d'utiliser des BPC ou tout produit qui en contient.

Activités interdites

PERMITTED ACTIVITIES

ACTIVITÉS PERMISES

Laboratory analysis

7. A person may manufacture, export, import, offer for sale, sell, process and use PCBs or products containing PCBs for the purpose of laboratory analysis if the analysis is conducted

(*a*) in an authorized facility that is authorized for that purpose; or

(*b*) in a facility that conforms to internationally recognized guidelines on best laboratory practices, if the authorities of the jurisdiction in which the facility is located do not have a mechanism in place to authorize the facility to conduct the analysis.

7. Il est permis de fabriquer, d'exporter, d'importer, de mettre en vente, de vendre, de transformer et d'utiliser des BPC et des produits qui en contiennent pour des analyses de laboratoire, si celles-ci sont effectuées :

a) dans toute installation agréée à cette fin;

b) dans le cas où les autorités du territoire où elle est située ne disposent d'aucun mécanisme l'autorisant à les effectuer, dans toute installation qui est conforme à des lignes directrices, reconnues à l'échelle internationale, sur les pratiques exemplaires en laboratoire.

Analyses de laboratoire

Research

8. (1) A person may offer for sale or sell PCBs or products containing PCBs to be processed or used for the purpose of research to determine the effects of those PCBs or products on human health or on the environment, if the facility in which they are processed or used is

(*a*) an authorized facility that is authorized for that purpose; or

(*b*) a facility that conforms to internationally recognized guidelines on best laboratory practices, if the authorities of the jurisdiction in which the facility is located do not have a mechanism in place to authorize the facility to conduct the research.

8. (1) Il est permis de mettre en vente ou de vendre des BPC ou des produits qui en contiennent pour qu'ils soient utilisés ou transformés à des fins de recherche visant à déterminer les effets des BPC ou des produits sur la santé humaine ou l'environnement, si l'installation où ils sont utilisés ou transformés se conforme à l'une ou l'autre des exigences suivantes :

a) elle est agréée à cette fin;

b) dans le cas où les autorités du territoire où elle est située ne disposent d'aucun mécanisme l'autorisant à effectuer des recherches, elle est conforme à des lignes directrices, reconnues à l'échelle internationale, sur les pratiques exemplaires en laboratoire.

Recherches

Processing and use

(2) A person may process and use the PCBs or products containing PCBs for the purpose of the research referred to in subsection (1) at a facility that meets the requirement set out in paragraph (1)(*a*) or (*b*).

(2) Il est permis de transformer et d'utiliser des BPC et des produits qui en contiennent pour effectuer les recherches visées au paragraphe (1) dans une installation qui se conforme à l'une ou l'autre des exigences prévues à ce paragraphe.

Transformation et utilisation

Electrical capacitor

9. A person may offer for sale, sell and use an electrical capacitor containing PCBs if the electrical capacitor

(*a*) is an integral part of a consumer product;

(*b*) is fusion sealed; and

(*c*) would be rendered inoperable and irreparable if the PCBs were removed from it.

9. Il est permis de mettre en vente, de vendre et d'utiliser tout condensateur électrique qui contient des BPC, si les conditions suivantes sont réunies :

a) il fait partie intégrante d'un produit de consommation;

b) ses joints sont thermoscellés;

c) il ne fonctionnerait plus et serait irréparable si les BPC en étaient extraits.

Condensateurs électriques

Aircraft, ships, trains and other vehicles

10. A person may export, import, offer for sale, sell and use for transportation purposes aircraft, ships, trains and other vehicles that contain PCBs

10. Il est permis d'exporter, d'importer, de mettre en vente, de vendre et d'utiliser pour le transport, tout aéronef, navire, train ou autre véhicule

Aéronefs, navires, trains et autres véhicules only in their communication, navigation or electronic control equipment or cables.

Colouring pigment

11. (1) A person may manufacture, export, import, offer for sale, sell, process and use a colouring pigment containing PCBs produced incidentally if the concentration of the PCBs is less than 50 mg/kg.

Annual average concentration

(2) Despite subsection (1), the annual average concentration of PCBs produced incidentally in colouring pigment that a person may manufacture, export, import, offer for sale, sell, process and use shall not exceed 25 mg/kg.

Destruction

12. A person may process PCBs or products containing PCBs for the purpose of destroying PCBs or recovering PCBs for the purpose of destroying them in an authorized facility that is authorized for that purpose.

Solid products

13. (1) A person may manufacture solid products containing PCBs in a concentration of less than 50 mg/kg using bulk solid products containing PCBs in a concentration of less than 50 mg/kg, and may use those solid products.

Application

(2) Subsection (1) only applies to the manufacture of the types of products that are manufactured before the day on which these Regulations come into force.

Exception

(3) No person shall offer for sale or sell the products manufactured in accordance with subsection (1) unless the products are used in the course of a commercial or industrial activity.

Cables, pipelines, electrical capacitors and other equipment

14. (1) A person may use the following products containing PCBs:

(*a*) cables, if they remain in place on the day on which these Regulations come into force;

(*b*) pipelines that transport natural gas, petroleum or petroleum products and any associated equipment that is in contact with the natural gas, petroleum or petroleum products if the pipelines and the equipment remain in place on the day on which these Regulations come into force;

(*c*) fusion sealed capacitors if they are used in relation to communication equipment or electronic control equipment; and

(*d*) the following equipment containing PCBs in a concentration of less than 50 mg/kg if the equipment is used for the purpose for which it was manufactured:

(i) electrical capacitors, other than light ballasts, and electrical transformers and their auxiliary electrical equipment, other than pole-top electrical transformers and their pole-top auxiliary electrical equipment,

(ii) electromagnets that are not used in the handling of food, feed or any additive to food or feed, and

dont seuls l'équipement de communication, de navigation ou de commande électronique ou les câbles contiennent des BPC.

Pigments pour la coloration

11. (1) Il est permis de fabriquer, d'exporter, d'importer, de mettre en vente, de vendre, de transformer et d'utiliser des pigments pour la coloration qui contiennent des BPC produit par inadvertance en une concentration inférieure à 50 mg/kg.

Moyenne annuelle maximale

(2) Toutefois, la concentration moyenne annuelle de BPC produit par inadvertance dans les pigments pour la coloration fabriqués, exportés, importés, mis en vente, vendus, transformés et utilisés par toute personne ne peut dépasser 25 mg/kg.

Destruction

12. Il est permis, dans une installation agréée à cette fin, de transformer des BPC et des produits qui en contiennent pour les détruire ou pour les récupérer afin de les détruire.

Produits solides

13. (1) Il est permis de fabriquer des produits solides qui contiennent des BPC en une concentration inférieure à 50 mg/kg à partir de produits solides en vrac qui eux-mêmes contiennent des BPC en une concentration inférieure à 50 mg/kg et d'utiliser ces produits solides.

Application

(2) Le paragraphe (1) ne s'applique qu'aux types de produits qui sont fabriqués avant l'entrée en vigueur du présent règlement.

Exception

(3) Il est interdit de mettre en vente ou de vendre des produits fabriqués conformément au paragraphe (1) pour tout usage en dehors d'une activité commerciale ou industrielle.

Câbles, pipelines, condensateurs électriques et pièces d'équipements

14. (1) Il est permis d'utiliser les produits ci-après qui contiennent des BPC :

a) tout câble, s'il demeure à l'endroit où il se trouvait à l'entrée en vigueur du présent règlement;

b) tout pipeline qui transporte du gaz naturel, du pétrole ou des produits pétroliers, ainsi que tout équipement connexe qui est en contact avec le gaz naturel, le pétrole ou les produits pétroliers, si le pipeline et l'équipement demeurent à l'endroit où ils se trouvaient à l'entrée en vigueur du présent règlement;

c) tout condensateur électrique dont les joints sont thermoscellés et qui est utilisé à des fins de communication ou de commande électronique;

d) les pièces d'équipement ci-après qui contiennent des BPC en une concentration inférieure à 50 mg/kg et qui sont utilisées aux fins auxquelles elles étaient destinées lors de leur fabrication :

(i) les condensateurs électriques, autres que les ballasts de lampes, et les transformateurs électriques et tout équipement électrique connexe, à l'exception des transformateurs sur poteaux et de tout équipement électrique connexe sur poteaux,

(iii) heat transfer equipment, hydraulic equipment, vapour diffusion pumps and bridge bearings.

(ii) les électroaimants ne servant pas à la manutention des aliments destinés aux humains ou aux animaux, ou de tout additif à ces aliments,

(iii) l'équipement caloporteur, l'équipement hydraulique, les pompes à diffusion de vapeur et les appareils d'appui de pont.

Electrical capacitors

(2) A person may import fusion sealed capacitors containing PCBs for use in relation to communication tactical equipment or electronic control tactical equipment.

(2) Il est permis d'importer tout condensateur électrique qui contient des BPC et dont les joints sont thermoscellés pour qu'il soit utilisé à des fins de communication tactique ou de commande électronique tactique.

Condensateurs électriques

Liquids for servicing — concentration less than 2 mg/kg

15. (1) A person may use liquids containing PCBs in a concentration of less than 2 mg/kg for the purpose of servicing equipment containing PCBs.

15. (1) Il est permis d'utiliser tout liquide qui contient des BPC en une concentration inférieure à 2 mg/kg pour l'entretien de toute pièce d'équipement qui contient des BPC.

Liquides pour entretien — concentration inférieure à 2 mg/kg

Liquids for servicing — concentration of 500 mg/kg or more

(2) A person may use liquids containing PCBs in a concentration of 500 mg/kg or more for the purpose of servicing equipment containing PCBs in a concentration of 500 mg/kg or more until December 31, 2009.

(2) Il est également permis, jusqu'au 31 décembre 2009, d'utiliser tout liquide qui contient des BPC en une concentration égale ou supérieure à 500 mg/kg pour l'entretien de toute pièce d'équipement qui elle-même contient des BPC en une concentration égale ou supérieure à 500 mg/kg.

Liquide pour entretien — concentration de 500 mg/kg ou plus

END-OF-USE DATES AND EXTENSION

UTILISATION — DATES LIMITES ET PROLONGATION

Equipment referred to in subparagraphs 14(1)(*d*)(i) to (iii)

16. (1) A person may use the equipment referred to in subparagraphs 14(1)(*d*)(i) to (iii) until the following dates if the equipment is in use on the day on which these Regulations come into force:

(*a*) in the case of equipment containing PCBs in a concentration of 500 mg/kg or more, December 31, 2009; and

(*b*) in the case of equipment containing PCBs in a concentration of at least 50 mg/kg but less than 500 mg/kg,

(i) December 31, 2009, if the equipment is located at a drinking water treatment plant or food or feed processing plant, in a child care facility, preschool, primary school, secondary school, hospital or senior citizens' care facility or on the property on which the plant or facility is located and within 100 m of it, and

(ii) December 31, 2025, if the equipment is located at any other place.

16. (1) Il est permis d'utiliser les pièces d'équipement visées aux sous-alinéas 14(1)*d*)(i) à (iii) qui sont en usage à l'entrée en vigueur du présent règlement jusqu'aux dates suivantes :

a) si elles contiennent des BPC en une concentration égale ou supérieure à 500 mg/kg, jusqu'au 31 décembre 2009;

b) si elles contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg mais inférieure à 500 mg/kg :

(i) jusqu'au 31 décembre 2009, si elles se trouvent dans une usine de traitement d'eau potable ou de transformation des aliments destinés aux humains ou aux animaux, dans une garderie, dans une école — de niveau préscolaire, primaire ou secondaire —, dans un hôpital ou dans une résidence pour personnes âgées ou sur le terrain d'un tel établissement, à 100 m ou moins de celui-ci,

(ii) jusqu'au 31 décembre 2025, si elles se trouvent à tout autre endroit.

Pièces d'équipement visées aux sous-alinéas 14(1)*d*)(i) à (iii)

Light ballasts and pole-top electrical transformers

(2) A person may use the following equipment containing PCBs in a concentration of 50 mg/kg or more until December 31, 2025, if the equipment is in use on the day on which these Regulations come into force:

(*a*) light ballasts; and

(*b*) pole-top electrical transformers and their pole-top auxiliary electrical equipment.

(2) Il est permis, jusqu'au 31 décembre 2025, d'utiliser les pièces d'équipement ci-après qui sont en usage à l'entrée en vigueur du présent règlement et qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg :

a) les ballasts de lampes;

b) les transformateurs sur poteaux ainsi que tout équipement électrique connexe sur poteaux.

Ballasts de lampes et transformateurs sur poteaux

Liquid — concentration of 2 mg/kg or more

(3) A person may use a liquid containing 2 mg/kg or more of PCBs that is in equipment until the day on which the liquid is removed from the equipment.

(3) Il est permis d'utiliser tout liquide qui contient des BPC en une concentration égale ou supérieure à 2 mg/kg dans une pièce d'équipement jusqu'à ce qu'il en soit extrait.

Liquides — concentration de 2 mg/kg ou plus

Extension of end-of-use date

17. (1) Despite subsection 15(2), paragraph 16(1)(*a*) and subparagraph 16(1)(*b*)(i), a person may use the equipment and the liquids used for servicing that equipment, referred to in those provisions, until the date set out in an extension granted by the Minister under subsection (2) for that equipment and those liquids.

Application

(2) The Minister shall, on receiving a written application containing the information set out in subsection (3), grant an extension up to the date applied for but no later than December 31, 2014, if either of the following conditions are met:

(*a*) the equipment is being replaced with equipment that is engineered to order, and

(i) it is not technically feasible to replace the equipment on or before December 31, 2009,

(ii) the applicant is taking all necessary measures to minimize or eliminate any harmful effect of the PCBs in the equipment on the environment and on human health,

(iii) a plan has been prepared, along with timelines, to end the use of the equipment by the date applied for,

(iv) a plan has been prepared for inspecting the equipment on a monthly basis for the period of the extension for damage that could lead to the release of PCBs, and

(v) the equipment bears the label required under section 29; or

(*b*) the equipment is located at a facility that is scheduled for permanent closure on or before December 31, 2014, and

(i) the applicant is taking all necessary measures to minimize or eliminate any harmful effect of the PCBs in the equipment on the environment and on human health,

(ii) a plan has been prepared, along with timelines, to end the use of the equipment by the date applied for,

(iii) a plan has been prepared for inspecting the equipment on a monthly basis, for the period of the extension, for damage that could lead to the release of PCBs, and

(iv) the equipment bears the label required under section 29.

Information

(3) The application shall contain the following:

(*a*) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the applicant and of any person authorized to act on the applicant's behalf;

(*b*) a technical description of the equipment which is the subject of the application, including

(i) the type and function of the equipment,

(ii) the quantity of liquid containing PCBs that is in the equipment and the quantity of liquid needed for servicing that equipment, expressed in litres,

Prolongation de la date de fin d'utilisation

17. (1) Malgré le paragraphe 15(2), l'alinéa 16(1)*a*) et le sous-alinéa 16(1)*b*)(i), il est permis d'utiliser les pièces d'équipement et les liquides utilisés pour leur entretien visés à ces dispositions jusqu'à l'expiration de toute prolongation accordée par le ministre en vertu du paragraphe (2) pour ces pièces d'équipement et ces liquides.

Demande

(2) Sur réception d'une demande écrite comportant les renseignements prévus au paragraphe (3), le ministre accorde une prolongation jusqu'à la date prévue dans la demande mais au plus tard jusqu'au 31 décembre 2014, si l'une ou l'autre des conditions suivantes est remplie :

a) la pièce d'équipement doit être remplacée par une pièce d'équipement conçue et fabriquée sur mesure et :

(i) il est techniquement impossible de le faire le 31 décembre 2009 ou avant cette date,

(ii) le demandeur prend les mesures nécessaires pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce sur l'environnement et la santé humaine,

(iii) un plan, incluant un échéancier, a été dressé afin que l'utilisation de la pièce cesse au plus tard à la date prévue dans la demande,

(iv) un plan a été dressé pour l'inspection de la pièce une fois par mois durant la prolongation afin que soit décelé tout dommage pouvant mener au rejet de BPC,

(v) la pièce porte l'étiquette exigée par l'article 29;

b) la pièce d'équipement se trouve dans une installation dont la fermeture permanente est prévue au plus tard pour le 31 décembre 2014 et :

(i) le demandeur prend les mesures nécessaires pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce sur l'environnement et la santé humaine,

(ii) un plan, incluant un échéancier, a été dressé afin que l'utilisation de la pièce cesse au plus tard à la date prévue dans la demande,

(iii) un plan a été dressé pour l'inspection de la pièce une fois par mois durant la prolongation afin que soit décelé tout dommage pouvant mener au rejet de BPC;

(iv) la pièce porte l'étiquette exigée par l'article 29.

Renseignements

(3) La demande comporte :

a) les nom, adresses municipale et postale et numéro de téléphone du demandeur et de toute personne autorisée à agir en son nom et, le cas échéant, leurs numéro de télécopieur et adresse électronique;

b) les caractéristiques techniques de la pièce d'équipement qui fait l'objet de la demande, notamment :

(i) son type et sa fonction,

(ii) la quantité de liquide qui contient des BPC qui s'y trouve et la quantité de liquide nécessaire pour son entretien, exprimées en litres,

(iii) the concentration of PCBs in the liquid, expressed in milligrams of PCBs per kilogram of liquid,

(iv) the quantity of PCBs in the liquid that is in the equipment, expressed in kilograms, and

(v) the name-plate description, if any, and the manufacturer's serial number, if any;

(*c*) the unique identification number that is on the label required under section 29;

(*d*) the name, if any, and civic address of the facility where the equipment is located, or, if there is no civic address, the location using the owner's site identification system, and the function and technical description of the facility;

(*e*) information demonstrating that

(i) it is not technically feasible to replace the equipment on or before December 31, 2009, or

(ii) the facility where the equipment is located is scheduled for permanent closure on or before December 31, 2014;

(*f*) information demonstrating that the applicant is taking all necessary measures to minimize or eliminate any harmful effect of the PCBs that are contained in the equipment on the environment and on human health;

(*g*) the plan, along with timelines, for ending the use of the equipment; and

(*h*) the plan for inspecting the equipment.

Notice of change to information

(4) The applicant shall notify the Minister in writing of any change to the information provided under subsection (3) within 30 days after the day on which the change occurs.

False or misleading information

(5) The Minister shall refuse to grant an extension if the Minister has reasonable grounds to believe that the applicant has provided false or misleading information in support of its application.

Revocation

(6) The Minister shall revoke the extension if

(*a*) the requirements set out in subsection (2) are no longer met during the period of the extension; or

(*b*) the Minister has reasonable grounds to believe that the applicant has provided false or misleading information to the Minister in support of its application.

Reasons for revocation

(7) The Minister shall not revoke the extension unless the Minister provides the applicant with

(*a*) written reasons for the revocation; and

(*b*) an opportunity to be heard, by written representation, in respect of the revocation.

(iii) la concentration de BPC dans le liquide, exprimée en milligrammes de BPC par kilogramme de liquide,

(iv) la quantité de BPC dans le liquide qui s'y trouve, exprimée en kilogrammes,

(v) s'il y a lieu, l'information figurant sur la plaque d'identification et le numéro de série de son fabricant;

c) le numéro d'identification unique figurant sur l'étiquette en application de l'article 29;

d) le nom, s'il y a lieu, et l'adresse municipale de l'installation où se trouve la pièce d'équipement ou, à défaut, l'endroit où elle se trouve d'après le système d'identification de site du propriétaire, et la fonction et les caractéristiques techniques de l'installation;

e) les renseignements qui établissent :

(i) soit qu'il est techniquement impossible de remplacer la pièce d'équipement le 31 décembre 2009 ou avant cette date,

(ii) soit que la fermeture permanente de l'installation dans laquelle se trouve la pièce d'équipement est prévue au plus tard pour le 31 décembre 2014;

f) les renseignements qui établissent que les mesures nécessaires ont été prises par le demandeur pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce d'équipement sur l'environnement et la santé humaine;

g) le plan et l'échéancier qui seront mis en œuvre afin que cesse l'utilisation de la pièce d'équipement;

h) le plan d'inspection de la pièce d'équipement.

Avis de changement des renseignements

(4) Le demandeur est tenu d'aviser le ministre par écrit de tout changement des renseignements fournis en application du paragraphe (3) dans les trente jours suivant la date du changement.

Renseignements faux ou trompeurs

(5) Le ministre refuse d'accorder une prolongation s'il a des motifs raisonnables de croire que le demandeur a fourni des renseignements faux ou trompeurs au soutien de sa demande.

Révocation

(6) Il révoque la prolongation :

a) si, durant la prolongation, les conditions prévues au paragraphe (2), selon le cas, ne sont plus remplies;

b) s'il a des motifs raisonnables de croire que le demandeur lui a fourni des renseignements faux ou trompeurs au soutien de sa demande.

Motifs de révocation

(7) Il ne peut toutefois révoquer la prolongation que si, à la fois :

a) il a avisé le titulaire par écrit des motifs de la révocation;

b) il lui a donné la possibilité de présenter des observations écrites au sujet de celle-ci.

PART 3

STORAGE

Application — concentration of 50 mg/kg or more

18. (1) Subject to subsection (3), this Part applies to a solid or liquid product containing PCBs in a concentration of 50 mg/kg or more

(*a*) that is in an amount equal to or greater than 100 L if the product is a liquid, or in an amount equal to or greater than 100 kg if the product is a solid; or

(*b*) that is in a lesser amount if the product contains 1 kg or more of PCBs.

Determination of amount

(2) For the purposes of subsection (1), the amount of PCBs or products containing PCBs is the aggregate of all amounts of PCBs and products that are located at a particular site.

Non-application

(3) This Part does not apply in respect of the following products containing PCBs:

(*a*) solid or liquid products that are processed daily or used;

(*b*) pipelines that transport natural gas, petroleum or petroleum products, and any associated equipment that is in contact with the natural gas, petroleum or petroleum products, if they remain in place on the day on which these Regulations come into force; and

(*c*) cables, if they remain in place on the day on which these Regulations come into force.

Requirement to store

19. (1) A person who owns, controls or possesses PCBs or products containing PCBs that are not processed daily or used shall, within 30 days after the day on which those PCBs or products are no longer processed or used or within 30 days after the day on which these Regulations come into force, whichever is later, either

(*a*) send them for destruction to an authorized facility that is authorized for that purpose; or

(*b*) store them at a PCB storage site for the period during which they are not processed daily or used.

Remote from or no access to roadway

(2) Despite subsection (1), if the PCBs or products containing PCBs are remote from a roadway system or if there is no access to a roadway system, the person who owns, controls or possesses the PCBs or products may store them at a PCB storage site as soon as feasible but no later than one year after the day on which they are not processed daily or used or one year after the day on which these Regulations come into force, whichever is later. That person shall use best management practices for them from the time that they cease to be processed daily or used until the time that they are stored at a PCB storage site.

Prohibition against storage

20. (1) Effective one year after the day on which these Regulations come into force, no person shall store PCBs or products containing PCBs at the

PARTIE 3

STOCKAGE

Application — Concentration égale ou supérieure à 50 mg/kg

18. (1) Sous réserve du paragraphe (3), la présente partie s'applique aux produits liquides ou solides qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg et :

a) dont la quantité est égale ou supérieure à 100 L, dans le cas d'un produit liquide, ou à 100 kg, dans le cas d'un produit solide;

b) dont la quantité est moindre, si ces produits renferment 1 kg ou plus de BPC.

Détermination des quantités

(2) Pour l'application du paragraphe (1), la quantité de BPC ou de produits qui en contiennent correspond à la somme de toutes les quantités de BPC et de produits qui se trouvent dans un même emplacement.

Exclusion

(3) La présente partie ne s'applique pas aux produits ci-après qui contiennent des BPC :

a) les produits liquides ou solides qui sont transformés quotidiennement ou utilisés;

b) tout pipeline qui transporte du gaz naturel, du pétrole ou des produits pétroliers, ainsi que tout équipement connexe qui est en contact avec le gaz naturel, le pétrole ou les produits pétroliers, si le pipeline et l'équipement demeurent à l'endroit où ils se trouvaient à l'entrée en vigueur du présent règlement;

c) les câbles, s'ils demeurent à l'endroit où ils se trouvaient à l'entrée en vigueur du présent règlement.

Obligation de stocker

19. (1) Le propriétaire de BPC ou de produits qui en contiennent ou la personne qui en a la possession ou le contrôle est tenu, dans les trente jours suivant la date où ceux-ci cessent d'être transformés quotidiennement ou utilisés ou celle de l'entrée en vigueur du présent règlement, selon la plus tardive de ces dates :

a) soit de les expédier pour qu'ils soient détruits dans une installation agréée à cette fin;

b) soit de les stocker dans un dépôt de BPC pendant qu'ils ne sont pas transformés quotidiennement ou utilisés.

Endroit éloigné ou inaccessible

(2) Si les BPC ou les produits qui en contiennent sont éloignés de tout système routier ou se trouvent à un endroit où il n'y a pas d'accès à un tel système, le propriétaire ou la personne peut les stocker dans un dépôt de BPC le plus tôt possible, sans toutefois dépasser un an à compter de la date où ils cessent d'être transformés quotidiennement ou utilisés ou celle de l'entrée en vigueur du présent règlement, selon la plus tardive de ces dates. Ils sont tenus d'appliquer des pratiques exemplaires de gestion pour les BPC et les produits dès qu'ils cessent d'être transformés quotidiennement ou utilisés, et ce, jusqu'à leur stockage dans un dépôt de BPC.

Interdiction de stocker

20. (1) À compter d'un an après la date d'entrée en vigueur du présent règlement, il est interdit de stocker des BPC ou des produits qui en contiennent following plants or facilities or on the land on which those plants or facilities are located and within 100 m of them:

(*a*) a drinking water treatment plant or a food or feed processing plant; or

(*b*) a child care facility, preschool, primary school, secondary school, hospital, or senior citizens' care facility.

Light ballasts

(2) Subsection (1) does not apply to light ballasts.

Maximum storage periods

21. (1) Despite any other provision in these Regulations and subject to section 22, no person shall store PCBs or products containing PCBs, other than those referred to in section 23, beyond the following time limits:

(*a*) one year, beginning on the day on which their use is no longer permitted under these Regulations or the day on which they are no longer processed daily or used, whichever is sooner, if the PCBs or products are stored at a facility that is not referred to in paragraph (1)(*b*) or (*c*);

(*b*) one year, if the PCBs or products are stored at an authorized facility that is a transfer site; and

(*c*) two years, if the PCBs or products are stored at an authorized facility that is authorized to destroy them.

Transfer sites

(2) If the PCBs or products containing PCBs are sent from one transfer site to another, the period referred to in paragraph (1)(*b*) begins when they are received at the first transfer site.

Destruction

(3) The owner or operator of the facility referred to in paragraph (1)(*a*) or (*b*) shall send the PCBs or products containing PCBs for destruction to an authorized facility that is authorized for that purpose within the time limit set out in those paragraphs.

Exceptions to maximum storage periods

22. (1) Section 21 does not apply to the storage of

(*a*) liquids referred to in subsection 15(2) or for which an extension has been granted under subsection 17; or

(*b*) solids and liquids containing PCBs in a concentration of 50 mg/kg or more resulting from environmental restoration work and stored on site for the duration of the work, if the requirements set out in subsections (2) and (3) are complied with.

Information to be provided

(2) The owner of the land where the solids and liquids referred to in paragraph (1)(*b*) are located shall submit to the Minister at least 30 days before the storage of the solids or liquids or within 30 days after the day on which these Regulations come into force, whichever is later, the following information:

(*a*) the civic address of the restoration work site or if there is no civic address, the location using the Global Positioning System;

(*b*) the date of commencement of the restoration work;

(*c*) the anticipated date of completion of the restoration work; and

dans l'un des établissements ci-après ou sur le terrain d'un tel établissement, à 100 m ou moins de celui-ci :

a) une usine de traitement d'eau potable ou de transformation des aliments destinés aux humains ou aux animaux;

b) une garderie, une école — de niveau préscolaire, primaire ou secondaire —, un hôpital ou une résidence pour personnes âgées.

Ballasts de lampes

(2) Le paragraphe (1) ne s'applique pas aux ballasts de lampes.

Périodes maximales de stockage

21. (1) Malgré toute autre disposition du présent règlement mais sous réserve de l'article 22, il est interdit de stocker des BPC et des produits qui en contiennent, autres que ceux visés à l'article 23, au-delà de la période applicable suivante :

a) un an à compter du jour où le présent règlement ne permet plus l'utilisation des BPC et des produits ou de celui, s'il est antérieur, où ils ont cessé d'être transformés quotidiennement ou utilisés, s'ils sont stockés à une installation qui n'est pas visée aux alinéas (1)*b*) ou *c*);

b) un an, s'ils sont stockés dans une installation agréée qui est un centre de transfert;

c) deux ans, s'ils sont stockés dans une installation agréée qui est autorisée à les détruire.

Centres de transfert

(2) Si les BPC et les produits qui en contiennent sont expédiés d'un centre de transfert à un autre, la période prévue à l'alinéa (1)*b*) commence à courir le jour de leur réception au premier centre de transfert.

Destruction

(3) Le propriétaire ou l'exploitant de l'installation visée aux alinéas (1)*a*) ou *b*) est tenu d'expédier, dans le délai prévu à ces alinéas, les BPC ou les produits qui en contiennent pour qu'ils soient détruits dans une installation agréée à cette fin.

Périodes maximales de stockage — exceptions

22. (1) L'article 21 ne s'applique pas au stockage :

a) des liquides visés au paragraphe 15(2) ou pour lesquels une prolongation a été accordée en vertu de l'article 17;

b) des solides et des liquides qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg et qui sont issus de travaux de restauration de l'environnement et stockés sur place pendant la durée des travaux, si les exigences prévues aux paragraphes (2) et (3) sont respectées.

Renseignements à fournir

(2) Le propriétaire du terrain où se trouvent les solides ou les liquides visés à l'alinéa (1)*b*) fournit au ministre, au plus tard trente jours avant la date de leur stockage ou après celle de l'entrée en vigueur du présent règlement, selon la plus tardive de ces dates, les renseignements suivants :

a) l'adresse municipale de l'endroit où sont effectués les travaux de restauration ou, à défaut, sa localisation d'après le système mondial de localisation;

b) la date de début des travaux de restauration;

c) la date prévue pour la fin des travaux de restauration;

(*d*) the anticipated date of the end of storage of the solids or liquids.

Changes to information

(3) The person referred to in subsection (2) shall notify the Minister in writing of the changes to be made at least 30 days before making any changes to the information provided under that subsection.

PCBs or products containing PCBs stored at the coming into force

23. The person who owns PCBs or products containing PCBs, other than liquids for which an extension has been granted under section 17, that are stored on the day on which these Regulations come into force shall send them no later than December 31, 2009 for destruction to an authorized facility that is authorized for that purpose.

PCB storage site

24. PCBs or products containing PCBs shall be stored at a site that is

(*a*) a building, room, shipping container or other enclosed structure; or

(*b*) an area that is enclosed by a woven mesh wire fence or any other fence or wall with similar security characteristics, and the fence or wall shall be at least 1.83 m high.

Storage requirements

25. The owner or operator of a PCB storage site shall

(*a*) store all PCBs or products containing PCBs that are in liquid form in

(i) sealed containers, other than drums, that are made of steel or other metals that provide sufficient durability and strength to prevent those PCBs or products from being affected by the weather or released, or

(ii) drums that are

(A) of a capacity not greater than 205 L,

(B) a closed-head double-bung drum made of steel having a gauge of 16 or heavier, and

(C) painted or treated to prevent rusting;

(*b*) store all PCBs or products containing PCBs that are in solid form in

(i) containers, other than drums, that are made of steel or other materials that provide sufficient durability and strength to prevent those PCBs or products from being affected by the weather or released, or

(ii) drums that are

(A) of a capacity not greater than 205 L,

(B) made of steel having a gauge of 18 or heavier,

(C) equipped with a securely attached, removable steel lid and a gasket made of material that is resistant to the PCBs or the products containing PCBs that are stored in the drums, and

(D) painted or treated to prevent rusting;

(*c*) store equipment containing PCB liquids in

(i) containers, other than drums, that are made of steel or other materials that provide sufficient durability and strength to prevent the equipment from being affected by the weather and

d) la date prévue pour la cessation du stockage des solides ou des liquides.

Modification des renseignements

(3) Il avise également le ministre par écrit, au moins trente jours à l’avance, de toute modification apportée aux renseignements fournis.

BPC et produits qui en contiennent stockés à l’entrée en vigueur

23. Le propriétaire de BPC ou de produits qui en contiennent, autres que des liquides pour lesquels une prolongation a été accordée en vertu de l’article 17, qui sont stockés à l’entrée en vigueur du présent règlement est tenu de les expédier, au plus tard le 31 décembre 2009, pour qu’ils soient détruits dans une installation agréée à cette fin.

Dépôt de BPC

24. Les BPC et les produits qui en contiennent doivent être stockés dans un dépôt qui est :

a) soit un bâtiment, une pièce, un conteneur ou tout autre ouvrage fermé;

b) soit un endroit entouré d’une clôture grillagée ou d’un autre genre de clôture ou d’un mur présentant des caractéristiques similaires sur le plan de la sécurité, la clôture ou le mur ayant au moins 1,83 m de haut.

Exigences relatives au stockage

25. Le propriétaire ou l’exploitant d’un dépôt de BPC :

a) stocke les BPC et les produits en contenant qui sont des liquides dans :

(i) soit des contenants étanches, autres que des fûts, faits d’acier ou d’autres métaux offrant une durabilité et une solidité suffisantes pour que ces BPC et ces produits ne soient pas affectés par les conditions climatiques ni rejetés,

(ii) soit des fûts qui, à la fois :

(A) ont une capacité d’au plus 205 L,

(B) sont faits d’acier d’épaisseur minimale 16, ont un dessus non amovible et sont munis de deux bondes,

(C) sont enduits d’une peinture ou d’un revêtement antirouille;

b) stocke les BPC et les produits en contenant qui sont des solides dans :

(i) soit des contenants, autres que des fûts, faits d’acier ou d’autres matériaux offrant une durabilité et une solidité suffisantes pour que ces BPC et ces produits ne soient pas affectés par les conditions climatiques ni rejetés,

(ii) soit des fûts qui, à la fois :

(A) ont une capacité d’au plus 205 L,

(B) sont faits d’acier d’épaisseur minimale 18,

(C) sont dotés d’un couvercle d’acier amovible solidement fixé et d’un joint fait d’un matériau résistant aux BPC et aux produits en contenant qui y sont stockés,

(D) sont enduits d’une peinture ou d’un revêtement antirouille;

c) stocke les pièces d’équipement qui renferment des liquides contenant des BPC dans :

(i) soit des contenants, autres que des fûts, faits d’acier ou d’autres matériaux offrant une to prevent any PCB liquid that leaks from the equipment from being released, or

(ii) drums described in subparagraph (*b*)(ii);

(*d*) store all equipment that is not in a container, other than drained equipment, if that equipment contains PCB liquid, and all containers of PCB liquid, on a floor or surface that is made of steel, concrete or any other similar durable material and that is constructed with curbing or sides that are capable of containing

(i) if one piece of equipment or one container is being stored, 125% of the volume of the PCB liquid in the equipment or container, and

(ii) if more than one piece of equipment or more than one container is being stored, the greater of twice the volume of the PCB liquid in the largest piece of equipment or the largest container and 25% of the volume of all the PCB liquid stored on the floor or surface;

(*e*) if the material of the floor or surface or the curbing or sides referred to in paragraph (*d*) are capable of absorbing any PCB liquid or other product containing PCBs, seal the floor, surface, curbing or sides with an impervious, durable, PCB-resistant coating;

(*f*) ensure that all floor drains, sumps or other openings in the floor or surface referred to in paragraph (*d*) are

(i) closed and sealed to prevent the release of liquids, or

(ii) connected to a drainage system suitable for liquid dangerous goods that terminates at a location where any spilled liquids will be contained and recovered and where the spilled liquids will not create a fire hazard or a risk to public health or safety;

(*g*) place on skids or pallets all equipment containing PCBs and containers of PCBs or products containing PCBs that are not permanently secured to the floor or a surface;

(*h*) stack containers of PCBs and products containing PCBs, other than drums, only if the containers are designed for stacking, and stack containers of PCB liquid not more than two containers high;

(*i*) if drums containing PCBs or products containing PCBs are stacked, separate the drums from each other with pallets and, in the case of drums of PCB liquid, stack the drums not more than two drums high;

(*j*) store equipment containing PCBs, and containers of PCBs or products containing PCBs, in a manner that makes them accessible for inspection;

(*k*) store PCBs or products containing PCBs in a manner that prevents them from catching fire or being released;

(*l*) store PCBs or products containing PCBs together, and separate them from other stored materials;

durabilité et une solidité suffisantes pour que les pièces d'équipement ne soient pas affectées par les conditions climatiques et que les liquides, s'ils fuient des pièces, ne soient pas rejetés,

(ii) soit des fûts visés au sous-alinéa *b*)(ii);

d) stocke les pièces d'équipement — autres que celles contenant des BPC qui ont été vidangées — qui ne sont pas dans un contenant et qui renferment des liquides contenant des BPC, ainsi que tout contenant qui renferme de tels liquides, sur un plancher ou une surface fait d'acier, de béton ou d'un autre matériau durable semblable et entouré d'un rebord ou de côtés capables de retenir :

(i) si une seule pièce d'équipement ou un seul contenant est stocké, 125 % du volume des liquides contenant des BPC que renferme cette pièce d'équipement ou le contenant,

(ii) si plus d'une pièce d'équipement ou plus d'un contenant est stocké, le plus élevé des volumes suivants : le double du volume des liquides contenant des BPC que renferme la plus grosse pièce d'équipement ou le plus grand contenant ou 25 % du volume de l'ensemble des liquides contenant des BPC qui sont stockés sur le plancher ou la surface;

e) scelle, au moyen d'un revêtement étanche, durable et résistant aux BPC, le plancher, la surface, le rebord ou les côtés visés à l'alinéa *d*), lorsqu'ils peuvent absorber des liquides ou d'autres produits qui contiennent des BPC;

f) veille à ce que les drains de sol, puisards et autres ouvertures dans le plancher ou la surface visés à l'alinéa *d*) soient, selon le cas :

(i) obturés et scellés pour empêcher le rejet de liquides,

(ii) reliés à un réseau de drainage convenant aux marchandises dangereuses liquides, qui se jette dans un lieu où les liquides déversés seront confinés et récupérés et où ils ne constitueront pas un risque d'incendie ni un risque pour la santé et la sécurité publiques;

g) place sur des patins ou des palettes les pièces d'équipement contenant des BPC et les contenants renfermant des BPC ou des produits en contenant qui ne sont pas fixés de façon permanente à un plancher ou à une surface;

h) empile les contenants de BPC et de produits qui en contiennent, autres que les fûts, seulement s'ils sont conçus à cette fin et, dans le cas des contenants renfermant des liquides qui contiennent des BPC, ne les empile pas à plus de deux contenants de haut;

i) s'ils sont empilés, sépare les fûts de BPC et de produits qui en contiennent les uns des autres avec des palettes et, dans le cas des fûts renfermant des liquides qui contiennent des BPC, ne les empile pas à plus de deux fûts de haut;

(*m*) if reasonably practicable, equip any indoor PCB storage site having a mechanical exhaust system with heat or smoke sensory controls that stop the fan and close the intake and exhaust dampers in the event of a fire;

(*n*) if equipment or containers of PCB liquid are stored outdoors, cover all PCB equipment that is not in a container, other than drained equipment, if that equipment contains PCB liquid, and all containers of PCB liquid, with a weatherproof roof or barrier that protects the equipment and containers and prevents rain or snow from entering the curbing and the sides of the floor and the surface under them; and

(*o*) ensure that all drained PCB equipment and all containers of any PCB solid or PCB equipment are structurally sound and weatherproof if stored outdoors.

Access to PCB storage site

26. The owner or operator of a PCB storage site shall keep all points of access to the PCB storage site locked or guarded.

Inspection and maintenance of a PCB storage site

27. The owner or operator of a PCB storage site shall

(*a*) inspect all floors, curbing, sides, drains, drainage systems, weatherproof roofs and barriers, fences and walls of the PCB storage site, any fire alarm system, fire extinguishers and fire suppression system and all equipment containing PCBs, containers used for the storage of PCBs or products containing PCBs and materials for clean-up at the PCB storage site

(i) each month,

(ii) at intervals of more than one month, if the Minister, on the written request of the owner or operator, determines that it is not reasonably practicable to inspect the site each month, due to its remote location, or

(iii) at intervals of less than one month, if more frequent inspections are necessary for the safe operation of the site; and

(*b*) keep in good condition and, if damaged, immediately repair or replace the floors, curbing, sides, drains, drainage systems, weatherproof roofs or barriers, fences, walls, fire alarm system, fire extinguishers, fire suppression system, equipment containing PCBs and containers and immediately clean up any contaminated area.

j) stocke les pièces d'équipement qui contiennent des BPC et les contenants renfermant des BPC ou des produits qui en contiennent de manière à ce qu'ils soient accessibles à des fins d'inspection;

k) stocke les BPC et les produits qui en contiennent de façon à empêcher leur inflammation ou leur rejet;

l) stocke les BPC et les produits qui en contiennent ensemble, à l'écart des autres matériaux stockés;

m) dans la mesure du possible, munit tout dépôt de BPC intérieur ayant un dispositif mécanique de ventilation de commandes sensibles à la chaleur ou à la fumée qui, en cas d'incendie, arrêtent le ventilateur et ferment les registres d'admission et d'évacuation d'air;

n) s'ils sont stockés dehors, couvre les pièces d'équipement — autres que celles contenant des BPC qui ont été vidangées — qui ne sont pas dans un contenant et qui renferment des liquides contenant des BPC, ainsi que tout contenant qui renferme de tels liquides, d'une toiture ou d'un écran à l'épreuve des intempéries qui les protège et empêche la pluie et la neige de pénétrer à l'intérieur du rebord et des côtés du plancher et de la surface sur lesquels ils sont posés;

o) s'ils sont stockés dehors, veille à ce que les pièces d'équipement contenant des BPC qui ont été vidangées et tout contenant qui renferme des solides ou des pièces d'équipement contenant des BPC aient une structure en bon état et soient à l'épreuve des intempéries.

Accès au dépôt de BPC

26. Le propriétaire ou l'exploitant d'un dépôt de BPC tient chaque point d'accès au dépôt verrouillé ou veille à ce qu'il soit gardé.

Inspection et entretien des dépôts de BPC

27. Le propriétaire ou l'exploitant d'un dépôt de BPC :

a) en inspecte les planchers, les rebords, les côtés, les drains, les réseaux de drainage, les toitures et écrans à l'épreuve des intempéries, les clôtures, les murs, le système d'alarme-incendie, les extincteurs et le réseau d'extinction automatique, ainsi que les pièces d'équipement qui contiennent des BPC, les contenants servant au stockage des BPC ou des produits qui en contiennent et les agents de nettoyage qui s'y trouvent :

(i) tous les mois,

(ii) à des intervalles de plus d'un mois, si le ministre, à la demande écrite du propriétaire ou de l'exploitant, a déterminé qu'il est en pratique impossible d'inspecter le dépôt tous les mois en raison de son isolement,

(iii) à des intervalles de moins d'un mois, si l'exploitation du dépôt en toute sécurité exige des inspections plus fréquentes;

b) les garde en bon état et, en cas de dommage, les répare ou les remplace immédiatement et nettoie sur-le-champ les aires contaminées.

Fire protection and emergency procedures

28. (1) The owner or operator of a PCB storage site shall

(*a*) develop and implement at the PCB storage site a fire protection and emergency procedures plan and shall

(i) update and test the plan once per year,

(ii) keep a written copy of the latest plan at the PCB storage site and another at their principal place of business, and

(iii) make the latest plan readily available to persons who implement the plan and to the local fire department or to the local officer appointed by the provincial Fire Marshall if there is no local fire department or to any other local authority responsible for fire protection;

(*b*) ensure that all employees who are authorized to enter the PCB storage site are familiar with the contents of the latest plan;

(*c*) equip the indoor PCB storage site with a fully operative fire alarm system that is maintained, inspected and tested in accordance with articles 6.3.1.1 and 6.3.1.2 of the National Fire Code and with

(i) portable fire extinguishers that are selected and installed in accordance with article 2.1.5.1 of the National Fire Code and maintained, inspected and tested in accordance with article 6.2.1.1 of that Code, or

(ii) an automatic fire suppression system that meets the requirements of article 3.2.7.9 of the National Fire Code, if required;

(*d*) keep a copy of the records referred to in sections 43 and 44 at the PCB storage site and make a copy readily available to the local fire department and, if there is no local fire department, to the local officer appointed by the provincial Fire Marshall or to any other local authority responsible for fire protection;

(*e*) ensure that all employees who are authorized to enter the PCB storage site are made aware of the hazards of PCBs and are familiar with the use of protective equipment and clothing and the clean-up procedures referred to in the *Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls (PCBs)*, CCME-TS/WM-TRE008, September 1989, as amended from time to time, issued by the Canadian Council of Ministers of the Environment; and

(*f*) store absorbent materials for clean-up near the PCB storage site.

Shipping containers

(2) Despite paragraph (1)(*c*), if the indoor PCB storage site is a shipping container, the owner or operator of the site does not have to equip that site with a fire alarm system.

Protection contre les incendies et mesures d'urgence

28. (1) Le propriétaire ou l'exploitant d'un dépôt de BPC :

a) élabore et met en œuvre un plan d'intervention d'urgence et de lutte contre les incendies et :

(i) le met à jour et le vérifie annuellement,

(ii) en conserve une copie écrite à jour au dépôt et à son établissement principal,

(iii) en met une copie à jour à la disposition de toute personne qui participe à sa mise en œuvre et au service d'incendie local ou, à défaut, au fonctionnaire local nommé par le commissaire provincial aux incendies ou à toute autre autorité locale chargée de la protection contre les incendies,

b) veille à ce que tous les employés autorisés à entrer dans le dépôt connaissent bien le contenu du plan à jour;

c) s'agissant d'un dépôt intérieur, le munit d'un système d'alarme-incendie en état de fonctionnement qui est entretenu, inspecté et mis à l'essai conformément aux exigences des articles 6.3.1.1 et 6.3.1.2 du Code national de prévention des incendies, ainsi que :

(i) soit d'extincteurs portatifs qui sont choisis et installés conformément à l'article 2.1.5.1 de ce code et qui sont entretenus, inspectés et mis à l'essai conformément aux exigences de l'article 6.2.1.1 de ce code,

(ii) soit d'un réseau d'extinction automatique conforme aux exigences de l'article 3.2.7.9 du même code, si celles-ci s'appliquent;

d) conserve au dépôt une copie des documents et registres visés aux articles 43 et 44 respectivement et en met une à la disposition du service d'incendie local ou, à défaut, au fonctionnaire local nommé par le commissaire provincial aux incendies ou à toute autre autorité locale chargée de la protection contre les incendies;

e) veille à ce que tous les employés autorisés à entrer dans le dépôt soient informés des dangers que présentent les BPC et connaissent bien l'utilisation du matériel et des vêtements de protection et les méthodes de nettoyage mentionnées dans le *Guide pour la gestion des déchets contenant des biphényles polychlorés (BPC)* CCME-TS/WM-TRE008, septembre 1989, avec ses modifications successives, publié par le Conseil canadien des ministres de l'environnement;

f) garde les matériaux absorbants servant au nettoyage près du dépôt.

Conteneur

(2) Malgré l'alinéa (1)*c*), le propriétaire ou l'exploitant d'un dépôt de BPC intérieur qui est un conteneur n'est pas tenu de le munir d'un système d'alarme-incendie.

PART 4

LABELLING, REPORTS AND RECORDS

LABELLING

Equipment and liquids used for their servicing

29. (1) The owner of equipment referred to in section 16, other than equipment for which an extension has been applied for under section 17, or of a liquid used in its servicing referred to in subsection 15(2) shall affix a label in a readily visible location on the equipment or on the container of the liquid, no later than 30 days after the day on which it ceases to be used.

Equipment for which extension applied for

(2) The owner of equipment for which an extension has been applied under section 17 shall affix a label in a readily visible location on the equipment.

Exceptions

(3) Subsection (1) does not apply to

(*a*) equipment or containers of liquids that bear a label on the day on which these Regulations come into force that indicates the presence of PCBs; and

(*b*) equipment that is too small, including light ballasts, to bear the label referred to in subsection (4), until the day on which they cease to be used and are placed in a container that bears the label.

Description

(4) The label must

(*a*) state "ATTENTION — contains 50 mg/kg or more of PCBs / contient 50 mg/kg ou plus de BPC" in black lettering on a white background, in a font size of no less than 36 points;

(*b*) measure at least 150 mm by 150 mm or at least 76 mm by 76 mm in the case of capacitors; and

(*c*) in the case of equipment for which an extension is applied for under section 17, state a unique identification number.

Cables and pipelines

30. (1) The owner of a cable, a pipeline or equipment associated with a pipeline, referred to in paragraphs 14(1)(*a*) and (*b*), containing PCBs in a concentration of 50 mg/kg or more that is in a room, a tunnel or a facility shall either

(*a*) affix the label in the form set out in subsection 29(4) in a readily visible location on a part of the cable, pipeline or associated equipment that is accessible; or

(*b*) place a notice in a readily visible location at the entrance of the room, tunnel or facility that states the information set out in paragraph 29(4)(*a*) and measures at least 150 mm by 150 mm.

If dismantled

(2) If a part of the cable, pipeline or associated equipment is dismantled, the owner of the cable, pipeline or associated equipment shall affix on each dismantled part the label in the form set out in

PARTIE 4

ÉTIQUETAGE, RAPPORTS ET DOSSIERS

ÉTIQUETAGE

Pièces d'équipement et liquides pour leur entretien

29. (1) Le propriétaire d'une pièce d'équipement visée à l'article 16, autre qu'une pièce d'équipement qui fait l'objet d'une demande de prolongation en vertu de l'article 17, ou de tout liquide utilisé pour l'entretien visé au paragraphe 15(2) est tenu d'apposer une étiquette, à un endroit bien en vue sur la pièce d'équipement ou le contenant du liquide, au plus tard trente jours après que la pièce ou le contenant cesse d'être utilisé.

Équipement faisant l'objet d'une demande de prolongation

(2) Le propriétaire d'une pièce d'équipement qui fait l'objet d'une demande de prolongation en vertu de l'article 17 est tenu d'y apposer une étiquette à un endroit bien en vue.

Exceptions

(3) Le paragraphe (1) ne s'applique pas :

a) aux pièces d'équipement et aux contenants de liquide qui portent, à l'entrée en vigueur du présent règlement, une étiquette qui indique la présence de BPC;

b) aux pièces d'équipement qui sont trop petites, y compris les ballasts de lampes, pour que l'étiquette visée au paragraphe (4) y soit apposée, jusqu'à ce qu'elles cessent d'être utilisées et qu'elles soient placées dans un contenant sur lequel l'étiquette est apposée.

Description

(4) L'étiquette doit :

a) porter la mention « ATTENTION — contains 50 mg/kg or more of PCBs / contient 50 mg/kg ou plus de BPC », inscrite en caractères d'au moins 36 points, en noir sur fond blanc;

b) être d'une dimension minimale de 150 mm sur 150 mm ou, dans le cas d'un condensateur, 76 mm sur 76 mm;

c) dans le cas d'une pièce d'équipement qui fait l'objet d'une demande de prolongation en vertu de l'article 17, porter un numéro d'identification unique.

Câbles et pipelines

30. (1) Le propriétaire de câbles, de pipelines ou d'équipement connexe visés aux alinéas 14(1)(*a*) et (*b*) qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg et se trouvent dans une pièce, un tunnel ou une installation est tenu :

a) soit d'apposer une étiquette conforme au paragraphe 29(4) à un endroit bien en vue sur toute partie accessible du câble, pipeline ou équipement connexe;

b) soit de placer à l'entrée de la pièce, du tunnel ou de l'installation à un endroit bien en vue une affiche d'une dimension minimale de 150 mm sur 150 mm portant la mention prévue à l'alinéa 29(4)*a*).

Désassemblage

(2) En cas de désassemblage d'une partie du câble, du pipeline ou de l'équipement connexe, le propriétaire de ceux-ci est tenu, dans les trente jours suivant le désassemblage, d'apposer une étiquette

subsection 29(4), no later than 30 days after the day on which it is dismantled.

A facility other than transfer site or destruction facility

31. (1) The owner or operator of a PCB storage site, other than the PCB storage site of an authorized facility that is a transfer site or that is authorized to destroy PCBs, shall affix a label in a readily visible location on any product containing PCBs in a concentration of 50 mg/kg or more and that are stored at the PCB storage site, which

(*a*) is in the form referred to in subsection 29(4); and

(*b*) states "Date of Commencement of Storage" and the date on which the storage begins.

Transfer site or destruction facility

(2) The owner or operator of the PCB storage site of an authorized facility that is a transfer site or that is authorized to destroy PCBs shall affix a label in the form set out in subsection 29(4) in a readily visible location on any container that is a fixed tank and that is used at the facility for the storage of PCBs or products containing PCBs in a concentration of 50 mg/kg or more.

Notice

(3) The owner or operator of a PCB storage site shall place a notice in a readily visible location at the entrance of the site that states the information set out in paragraph 29(4)(*a*) and that measures at least 150 mm by 150 mm.

Exception

(4) Subsections (1) and (2) do not apply if the product or the container bear a label on the day on which these Regulations come into force that indicates the presence of PCBs and that states "Date of Commencement of Storage" and the date on which the storage begins.

Retention of labels

32. The person who is required to affix a label on a product or container in accordance with sections 29 to 31 shall ensure that it bears that label for the duration that the person possesses the product or container.

REPORTS

End of use of equipment and liquids — 2009

33. (1) The owner of the equipment referred to in paragraph 16(1)(*a*) and subparagraph 16(1)(*b*)(i), other than the equipment for which an extension is granted by the Minister in accordance with section 17, or the liquids referred to in subsection 15(2) shall prepare a report that is current to December 31 of each calendar year in which the person owns the equipment or the liquids and that contains the following information:

(*a*) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the owner and any person authorized to act on the owner's behalf;

(*b*) the civic addresses of the facilities where the equipment and liquids are located or, if there is no civic address, their location using the owner's site identification system;

conforme au paragraphe 29(4) sur chaque partie désassemblée du câble, du pipeline ou de l'équipement connexe.

Installation autre qu'un centre de transfert ou de destruction

31. (1) Le propriétaire ou l'exploitant d'un dépôt de BPC d'une installation autre qu'une installation agréée qui est un centre de transfert ou qui est autorisée à détruire des BPC est tenu d'apposer une étiquette à un endroit bien en vue sur tout produit en contenant qui y sont stockés et qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg; l'étiquette

a) est conforme au paragraphe 29(4);

b) porte la mention « Date de début de stockage » et la date de début de stockage.

Centre de transfert ou de destruction

(2) Le propriétaire ou l'exploitant d'un dépôt de BPC d'une installation agréée qui est un centre de transfert ou qui est autorisée à détruire des BPC est tenu d'apposer une étiquette conforme au paragraphe 29(4) à un endroit bien en vue sur tout contenant qui est un réservoir fixe utilisé pour stocker des BPC à l'installation ou des produits qui en contiennent en une concentration égale ou supérieure à 50 mg/kg.

Affiche

(3) Le propriétaire ou l'exploitant d'un dépôt de BPC place à l'entrée du dépôt à un endroit bien en vue une affiche d'une dimension minimale de 150 mm sur 150 mm portant la mention prévue à l'alinéa 29(4)*a*).

Exception

(4) Les paragraphes (1) et (2) ne s'appliquent pas si le produit ou le contenant porte, à l'entrée en vigueur du présent règlement, une étiquette qui indique la présence de BPC, qui porte la mention « Date de début de stockage » et indique la date de début de stockage.

Conservation des étiquettes

32. La personne qui a l'obligation d'apposer une étiquette sur un produit ou un contenant en application des articles 29 à 31 veille à ce que le produit ou le contenant la porte en tout temps pendant qu'il est en sa possession.

RAPPORTS

Date de fin d'utilisation des pièces d'équipement et des liquides — 2009

33. (1) Le propriétaire des pièces d'équipement visées à l'alinéa 16(1)*a*) ou au sous-alinéa 16(1)*b*)(i), autres que celles pour lesquelles une prolongation a été accordée par le ministre en vertu de l'article 17, ou des liquides visés au paragraphe 15(2) est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il en est propriétaire, comportant les renseignements suivants :

a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;

b) l'adresse municipale des installations où se trouvent les pièces d'équipement et les liquides ou, à défaut, l'endroit où ils se trouvent d'après le système d'identification de site du propriétaire;

(*c*) the quantity of the liquids containing PCBs in the equipment and of the liquids, expressed in litres,

(i) that are in use on December 31,

(ii) that are stored on December 31 at the person's PCB storage site,

(iii) that are sent, in that calendar year, to an authorized facility that is a transfer site,

(iv) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or

(v) that are destroyed in that calendar year; and

(*d*) a certification that the information is accurate and complete and that is dated and signed by the owner or by a person authorized to act on the owner's behalf.

Equipment and liquids for which extension granted

(2) The owner of the equipment referred to in paragraph 16(1)(*a*) and subparagraph 16(1)(*b*)(i) or the liquids referred to in subsection 15(2) for which an extension is granted by the Minister in accordance with section 17 shall prepare a report that is current to December 31 of each calendar year in which the person owns the equipment or the liquids and that contains the following information for each piece of equipment or container of liquid:

(*a*) the information required under paragraphs (1)(*a*) and (*d*);

(*b*) the unique identification number that is on the label referred to in paragraph 29(4)(*c*);

(*c*) the civic address, function and technical description of the facility where the equipment or container of liquid is located or, if there is no civic address, its location using the owner's site identification system;

(*d*) the progress on the plan's implementation and the timelines for ending the use of the equipment;

(*e*) the measures taken to minimize or eliminate any harmful effect of the PCBs in the equipment on the environment and on human health; and

(*f*) the findings of the inspections of the equipment.

End of use of equipment — 2025

(3) The owner of the equipment referred to in subparagraph 16(1)(*b*)(ii) and subsection 16(2) shall prepare a report that is current to December 31 of each calendar year in which the person owns the equipment and that contains the following information:

(*a*) the information required under paragraphs (1)(*a*), (*b*) and (*d*); and

(*b*) the quantity, expressed in litres, of liquids containing PCBs in the equipment, and the concentration, expressed in mg/kg, of the PCBs

(i) that are stored on December 31 at the person's PCB storage site,

c) la quantité, exprimée en litres, de liquides qui contiennent des BPC dans les pièces d'équipement et de liquides :

(i) en usage le 31 décembre,

(ii) stockés à son dépôt le 31 décembre,

(iii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,

(iv) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,

(v) détruits au cours de l'année civile;

d) une attestation, datée et signée par lui ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

Pièces d'équipement et liquides pour lesquels une prolongation a été accordée

(2) Le propriétaire des pièces d'équipement visées à l'alinéa 16(1)*a*) ou au sous-alinéa 16(1)*b*)(i) ou des liquides visés au paragraphe 15(2) pour lesquels une prolongation a été accordée par le ministre en vertu de l'article 17 est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il en est propriétaire, comportant les renseignements suivants pour chaque pièce d'équipement et contenant de liquides :

a) les renseignements prévus aux alinéas (1)*a*) et *d*);

b) le numéro d'identification unique figurant sur l'étiquette conformément à l'alinéa 29(4)*c*);

c) l'adresse municipale, la fonction et les caractéristiques techniques de l'installation où se trouvent la pièce d'équipement ou le contenant des liquides ou, à défaut, l'endroit où il se trouvent d'après le système d'identification de site du propriétaire;

d) le progrès accompli dans la mise en œuvre du plan et de l'échéancier dressé en vue de la cessation de l'utilisation de la pièce d'équipement;

e) les mesures prises pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce d'équipement sur l'environnement et la santé humaine;

f) les résultats des inspections de la pièce d'équipement.

Date de fin d'utilisation des pièces d'équipement — 2025

(3) Le propriétaire des pièces d'équipement visées au sous-alinéa 16(1)*b*)(ii) ou au paragraphe 16(2) est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il en est propriétaire, comportant les renseignements suivants :

a) les renseignements prévus aux alinéas (1)*a*), *b*) et *d*);

b) la quantité de liquides qui contiennent des BPC dans les pièces d'équipement, exprimée en litres, et la concentration de ces BPC dans les liquides, exprimée en mg/kg :

(i) stockés à son dépôt de BPC le 31 décembre,

(ii) that are sent, in that calendar year, to an authorized facility that is a transfer site,

(iii) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or

(iv) that are destroyed in that calendar year.

Research

34. The person who offers for sale, sells, processes or uses PCBs or products containing PCBs for the purpose of research in accordance with section 8 shall prepare a report that is current to December 31 in each calendar year in which the person offers for sale, sells, processes or uses those PCBs or products and that contains the following information:

(*a*) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the person and of any person authorized to act on that person's behalf;

(*b*) an indication of whether the person offers for sale, sells, processes or uses the PCBs or products;

(*c*) the quantity of the PCBs or of the products containing PCBs that are offered for sale, sold, processed or used in that calendar year; and

(*d*) a certification that the information is accurate and complete and that is dated and signed by the person or by a person authorized to act on their behalf.

Colouring pigment

35. The person who manufactures, exports or imports colouring pigment in accordance with section 11 shall prepare a report that is current to December 31 in each calendar year in which the person manufactures, imports or exports the colouring pigment and that contains the following information:

(*a*) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the person and of any person authorized to act on that person's behalf;

(*b*) an indication of whether the person manufactures, exports or imports colouring pigment;

(*c*) the quantity of colouring pigment, expressed in kilograms, the maximum concentration of PCBs in the colouring pigment, expressed in mg/kg, and the average annual concentration of PCBs in the colouring pigment, expressed in mg/kg, that is manufactured, imported or exported in that calendar year;

(*d*) in the case of importing, the name, telephone number and civic and mailing addresses of the person from whom the colouring pigment is imported and, in the case of exporting, the name, telephone number and civic and mailing addresses of the person to whom the colouring pigment is exported; and

(*e*) a certification that the information is accurate and complete and that is dated and signed by the person or by a person authorized to act on their behalf.

(ii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,

(iii) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,

(iv) détruits au cours de l'année civile.

Recherches

34. La personne qui met en vente, vend, transforme ou utilise des BPC ou des produits qui en contiennent en vue d'effectuer des recherches conformément à l'article 8 est tenue de préparer un rapport, au 31 décembre de chaque année civile durant laquelle elle les a mis en vente, vendus, utilisés ou transformés, comportant les renseignements suivants :

a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;

b) une mention indiquant si elle les a mis en vente, vendus, transformés ou utilisés;

c) la quantité de BPC ou de produits qui ont été mis en vente, vendus, transformés ou utilisés durant l'année civile;

d) une attestation, datée et signée par elle ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

Pigments pour la coloration

35. La personne qui fabrique, exporte ou importe, conformément à l'article 11, des pigments pour la coloration est tenue de préparer un rapport, au 31 décembre de chaque année civile durant laquelle elle les fabrique, exporte ou importe, comportant les renseignements suivants :

a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;

b) une mention indiquant si elle les a fabriqués, exportés ou importés;

c) la quantité, exprimée en kilogrammes, de pigments qui ont été fabriqués, exportés ou importés durant l'année civile ainsi que la concentration moyenne annuelle et la concentration maximale en BPC de ces pigments, exprimée en mg/kg;

d) les nom, adresses municipale et postal et numéro de téléphone de la personne de qui proviennent les pigments, dans le cas où ils sont importés, ou à qui ils sont expédiés, dans le cas où ils sont exportés;

e) une attestation, datée et signée par elle ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

Solid products containing PCBs

36. The person who manufactures solid products containing PCBs in accordance with section 13 shall prepare a report that is current to December 31 in each calendar year in which the person manufactures the products and that contains the following information:

(*a*) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the person and of any person authorized to act on that person's behalf;

(*b*) the quantity of solid products manufactured in that calendar year, expressed in kilograms, and the maximum concentration and average concentration of PCBs in the solid products, expressed in mg/kg, for that calendar year;

(*c*) the name, telephone number and civic and mailing addresses of the person to whom the manufacturer sells the products; and

(*d*) a certification that the information is accurate and complete and that is dated and signed by the person or by a person authorized to act on their behalf.

Stored PCBs or products — PCB concentration of 50 mg/kg or more

37. The person who owns and stores PCBs or products containing PCBs in a concentration of 50 mg/kg or more, other than the equipment and liquids referred to in section 33, shall prepare a report that is current to December 31 in each calendar year in which the person stores the PCBs or products at their PCB storage site and that contains the following information:

(*a*) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the owner and of any person authorized to act on the owner's behalf;

(*b*) the civic addresses of the PCB storage sites where the PCBs or products are located, or if there is no civic address, their location using the owner's site identification system;

(*c*) the quantity of liquids containing PCBs in the products, expressed in litres, and the quantity of solids containing PCBs in the products, expressed in kilograms, and the concentration of PCBs in the liquids and the solids, expressed in mg/kg

(i) that are stored on December 31 at the person's PCB storage site,

(ii) that are sent, in that calendar year, to an authorized facility that is a transfer site,

(iii) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or

(iv) that are destroyed in that calendar year; and

(*d*) a certification that the information is accurate and complete and that is dated and signed by the owner of the PCBs or products containing PCBs or by a person authorized to act on the owner's behalf.

Produits solides qui contiennent des BPC

36. La personne qui fabrique, conformément à l'article 13, des produits solides qui contiennent des BPC est tenue de préparer un rapport, au 31 décembre de chaque année civile durant laquelle elle les fabrique, comportant les renseignements suivants :

a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;

b) la quantité, exprimée en kilogrammes, de produits qui ont été fabriqués durant l'année civile ainsi que la concentration moyenne et la concentration maximale en BPC de ces produits, exprimée en mg/kg, pour cette année civile;

c) les nom, adresse municipale et postale et numéro de téléphone de la personne à qui elle a vendu les produits;

d) une attestation, datée et signée par elle ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

BPC ou produits stockés — concentration de BPC de 50 mg/kg ou plus

37. Le propriétaire de BPC ou de produits qui en contiennent en une concentration égale ou supérieure à 50 mg/kg, autres que les pièces d'équipement ou les liquides visés à l'article 33, qui les stocke à son dépôt de BPC est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il les stocke ainsi, comportant les renseignements suivants :

a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;

b) l'adresse municipale des dépôts où sont stockés les BPC et les produits ou, à défaut, l'endroit où ils se trouvent d'après le système d'identification de site du propriétaire;

c) la quantité de liquides qui contiennent des BPC dans les produits, exprimée en litres, la quantité de solides qui contiennent des BPC dans les produits, exprimée en kilogrammes, et la concentration de BPC dans les liquides ou les solides, exprimée en mg/kg :

(i) stockés à son dépôt de BPC le 31 décembre,

(ii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,

(iii) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,

(iv) détruits au cours de l'année civile,

d) une attestation, datée et signée par lui ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

Stored PCBs or products — transfer site or destruction facility

38. The owner of an authorized facility that is a transfer site or that is authorized to destroy PCBs or products containing PCBs and who stores them at their PCB storage site, other than the owner referred to in section 37, shall prepare a report that is current to December 31 in each calendar year and that contains the following information:

(*a*) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the owner and of any person authorized to act on the owner's behalf;

(*b*) the civic addresses of the sites where the PCBs or products containing PCBs are stored, or if there is no civic address, the location of the sites using the owner's site identification system;

(*c*) the quantity of liquids containing PCBs in the products, expressed in litres, or the quantity of solids containing PCBs in the products, expressed in kilograms, and the concentration of the PCBs in the liquids and the solids, expressed in mg/kg

(i) that are stored on December 31 at the owner's PCB storage site,

(ii) that are sent, in that calendar year, to an authorized facility that is a transfer site,

(iii) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or

(iv) that are destroyed in that calendar year; and

(*d*) a certification that the information is accurate and complete and that is dated and signed by the owner of the authorized facility or by a person authorized to act on the owner's behalf.

Date of submission of report

39. (1) The person who is required to prepare a report in accordance with subsection 33(1) or (2) and with any of sections 34 to 38 shall submit it to the Minister on or before March 31 of the year following the calendar year for which the report is made.

Report made under subsection 33(3)

(2) The person who is required to prepare a report in accordance with subsection 33(3) shall submit it to the Minister

(*a*) on or before March 31, 2010 for reports that are current to December 31 of the year that these Regulations come into force up to the year 2009;

(*b*) on or before March 31, 2014 for reports that are current to December 31 of each of the years 2010 to 2013;

(*c*) on or before March 31, 2018 for reports that are current to December 31 of each of the years 2014 to 2017;

(*d*) on or before March 31, 2022 for reports that are current to December 31 of each of the years 2018 to 2021;

(*e*) on or before March 31, 2026 for reports that are current to December 31 of each of the years 2022 to 2025;

BPC ou produits stockés — Centre de transfert ou de destruction

38. Le propriétaire d'une installation agréée qui est un centre de transfert ou qui est autorisée à détruire des BPC et des produits qui en contiennent, autre que le propriétaire visé à l'article 37, et qui les stocke à son dépôt de BPC est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il les transforme ou les détruit, comportant les renseignements suivants :

a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;

b) l'adresse municipale des dépôts où sont stockés les BPC et les produits ou, à défaut, l'endroit où ils se trouvent d'après le système d'identification de site du propriétaire;

c) la quantité de liquides qui contiennent des BPC dans les produits, exprimée en litres, la quantité de solides qui contiennent des BPC dans les produits, exprimée en kilogrammes, et la concentration de BPC dans les liquides ou les solides, exprimée en mg/kg :

(i) stockés à son dépôt de BPC le 31 décembre,

(ii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,

(iii) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,

(iv) détruits au cours de l'année civile,

d) une attestation, datée et signée par lui ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

Date de présentation des rapports

39. (1) La personne qui est tenue de préparer tout rapport visé aux paragraphes 33(1) ou (2) ou à l'un des articles 34 à 38 le présente au ministre au plus tard le 31 mars de l'année civile qui suit celle pour laquelle il est établi.

Rapport visé au paragraphe 33(3)

(2) Celle qui est tenue de préparer le rapport visé au paragraphe 33(3) le présente au ministre :

a) au plus tard le 31 mars 2010, s'il porte sur toute année civile suivant l'entrée en vigueur du présent règlement jusqu'à l'année 2009;

b) au plus tard le 31 mars 2014, s'il porte sur l'une ou l'autre des années 2010 à 2013;

c) au plus tard le 31 mars 2018, s'il porte l'une ou l'autre des années 2014 à 2017;

d) au plus tard le 31 mars 2022, s'il porte sur l'une ou l'autre des années 2018 à 2021;

e) au plus tard le 31 mars 2026, s'il porte sur l'une ou l'autre des années 2022 à 2025;

f) au plus tard le 31 mars 2027, s'il porte sur l'année 2026;

g) au plus tard le 31 mars 2030, s'il porte sur l'une ou l'autre des années 2027 à 2029.

(*f*) on or before March 31, 2027 for reports that are current to December 31 of the year 2026; and

(*g*) on or before March 31, 2030 for reports that are current to December 31 of each of the years 2027 to 2029.

Release into the environment

40. (1) For the purposes of paragraph 95(1)(*a*) of the Act, where there occurs or is a likelihood of a release into the environment of PCBs in contravention of section 5, the person who is designated to be provided with a written report is the Manager of Inspection Program, Environmental Enforcement Division, Enforcement Branch of the Department of the Environment in the region where the release occurs or is likely to occur.

Contents

(2) The report shall include the following information:

(*a*) the name, civic and mailing addresses and telephone number of the person who owns or has the charge, management or control of the PCBs that are released into the environment;

(*b*) the date, time and location of the release;

(*c*) a description of the source of the release; and

(*d*) the quantity of liquids containing PCBs released, expressed in litres, the quantity of solids containing PCBs released, expressed in kilograms, and the concentration of PCBs in the liquids and the solids that are released, expressed in mg/kg.

Retention

41. Any person who is required to submit a report under these Regulations shall keep a copy of the report at their principal place of business in Canada for at least five years after the day on which the report is submitted.

Method of submission

42. Each report referred to in sections 33 to 38 shall be submitted electronically in the format provided by the Department of the Environment, but the report shall be submitted in writing if

(*a*) no such format is provided; or

(*b*) it is, owing to circumstances beyond the control of the person required to submit the report, impracticable to submit the report electronically in the format provided.

RECORDS

Records for permitted activities

43. The following persons shall maintain records that demonstrate that they manufacture, process, use, sell, offer for sale, store, import or export PCBs or products containing PCBs in accordance with the Act and these Regulations:

(*a*) the owner of PCBs or products containing PCBs;

(*b*) the person who is engaged in any of these activities; and

(*c*) the owner or operator of a PCB storage site.

Inspection record

44. (1) The owner or operator of a PCB storage site shall maintain a record of all inspections conducted at the PCB storage site under paragraph 27(*a*)

(*a*) listing all items that are inspected;

(*b*) describing any deficiency found;

Rejets dans l'environnement

40. (1) Pour l'application de l'alinéa 95(1)(*a*) de la Loi, en cas de rejet dans l'environnement — effectif ou probable — de BPC en violation de l'article 5, la personne désignée pour recevoir le rapport écrit est le Gestionnaire du programme d'inspection, Direction de l'application de la loi en environnement, Direction générale de l'application de la loi du ministère de l'Environnement, dans la région où a lieu le rejet — effectif ou probable.

Contenu

(2) Le rapport comporte les renseignements suivants :

a) les nom, adresses municipale et postale et numéro de téléphone de la personne qui a toute autorité sur les BPC qui ont été rejetés dans l'environnement ou qui en est propriétaire;

b) les date, heure et lieu du rejet;

c) une description de la source du rejet;

d) la quantité de liquides qui contiennent des BPC rejetés, exprimée en litres, la quantité de solides qui contiennent des BPC rejetés, exprimée kilogrammes, et la concentration de BPC dans les liquides ou les solides rejetés, exprimée en mg/kg.

Conservation

41. Toute personne qui est tenue de présenter un rapport en application du présent règlement en conserve une copie à son établissement principal au Canada pendant au moins cinq ans après la date de sa présentation.

Méthode de présentation

42. Les rapports visés aux articles 33 à 38 sont présentés sous forme électronique selon le modèle établi par le ministère de l'Environnement. Ils sont toutefois présentés par écrit dans les cas suivants :

a) aucun modèle n'a été établi par le ministère;

b) il est pratiquement impossible, pour des raisons indépendantes de la volonté de la personne tenue de les présenter, de le faire sous forme électronique selon le modèle établi.

DOCUMENTS ET REGISTRES

Documents concernant les activités permises

43. Les personnes ci-après conservent les documents établissant que des BPC ou des produits qui en contiennent ont été fabriqués, transformés, utilisés, mis en vente, vendus, stockés, importés ou exportés conformément à la Loi et au présent règlement :

a) le propriétaire des BPC ou des produits;

b) la personne qui exerce l'activité;

c) le propriétaire ou l'exploitant du dépôt de BPC.

Registres d'inspections

44. (1) Le propriétaire ou l'exploitant d'un dépôt de BPC tient un registre de toutes les inspections effectuées au dépôt de BPC en application de l'alinéa 27*a*), lequel fait état :

a) de tous les points inspectés;

(*c*) setting out the measures taken to remedy the deficiency; and

(*d*) specifying the dates of the inspections and the names of the inspectors.

Owner of equipment — extension

(2) The owner of equipment for which an extension of the end-of-use date is applied under section 17 shall maintain a record of all inspections conducted on the equipment that contains the information set out in paragraphs (1)(*a*) to (*d*).

Retention of records

45. The person who is required to maintain a record under sections 43 and 44 shall retain it at their principal place of business in Canada or at the place where they conduct the activity for at least five years

(*a*) after the destruction of the PCBs or the products containing PCBs that are the subject of the record, in the case of the owner of PCBs or products containing PCBs or the owner or operator of the PCB storage site where the PCBs or products containing PCBs are stored; or

(*b*) after the completion of an activity referred to in section 43, in the case of the person who is engaged in that activity.

PART 5

REPEALS AND COMING INTO FORCE

REPEALS

Repeal

46. The *Chlorobiphenyls Regulations*[1] are repealed.

Repeal

47. The *Storage of PCB Material Regulations*[2] are repealed.

COMING INTO FORCE

Coming into force

48. These Regulations come into force on the day on which they are registered.

[1] SOR/91-152
[2] SOR/92-507; SOR/2000-102, s. 15

b) de toutes les lacunes relevées;

c) des mesures à prendre pour y remédier;

d) de la date de l'inspection et du nom de l'inspecteur.

Propriétaire d'une pièce d'équipement — prolongation

(2) Le propriétaire d'une pièce d'équipement dont l'utilisation fait l'objet d'une prolongation en vertu de l'article 17 tient un registre de toutes les inspections de la pièce d'équipement qui ont été effectuées, lequel fait état des renseignements prévus aux alinéas (1)*a*) à *d*).

Conservation des dossiers

45. Toute personne qui est tenue de conserver des documents ou de tenir un registre en application des articles 43 et 44 respectivement les conserve à son établissement principal au Canada ou à l'établissement où l'activité est exercée pendant au moins cinq ans après :

a) dans le cas du propriétaire de BPC ou de produits qui en contiennent ou du propriétaire ou de l'exploitant d'un dépôt de BPC où sont stockés des BPC ou des produits qui en contiennent, la date de destruction des BPC ou des produits qui en contiennent visés par le document ou le registre;

b) dans le cas de la personne qui exerce une activité visée à l'article 43, la date de la fin de l'activité.

PARTIE 5

ABROGATIONS ET ENTRÉE EN VIGUEUR

ABROGATION

Abrogation

46. Le *Règlement sur les biphényles chlorés*[1] est abrogé.

Abrogation

47. Le *Règlement sur le stockage des matériels contenant des BPC*[2] est abrogé.

Entrée en vigueur

Entrée en vigueur

48. Le présent règlement entre en vigueur à la date de son enregistrement.

[1] DORS/91-152
[2] DORS/92-507; DORS/2000-102, a. 15

CI Number: 40260

Title: L-7012 Beaver Narrows Crossing Replacement

Start Date: 2011/06

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $1,899,224

DESCRIPTION:

This project provides for costs associated with replacing two spliced wood pole structures and two associated wood dead end structures with two double circuit dead end steel towers on the Beaver Narrows crossing of L7012 at St. Peters. The replacement of the poles at the crossing will also require that two wooden dead end structures, one on either side of the crossing, be replaced with steel towers.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Maintenance

Why do this project?

This project is required to replace deteriorated plant due to normal age related issues, at the Beaver Narrows river crossing on a 230 kV circuit between Port Hastings and Lingan. This crossing is considered critical in nature and the need for the upgrading the structure has been identified through the transmission inspection program.

Why do this project now?

This project will replace deteriorated plant that will result in unplanned interruptions on the transmission system if not addressed.

Why do this project this way?

Replacement of these structures is the most cost effective way of maintaining the reliability of the line at this crossing.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40260 - L7012 Deteriorated Plant Upgrades **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 800 - 800-Services - Admin. **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		15,961	0	15,961
094		094 - Interest Capitalized		17,381	0	17,381
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		1,225	0	1,225
095		095-COPS Regular Labour AO		24,315	0	24,315
012	035	012 - Materials	035 - DP - Wood Poles	195,000	0	195,000
013	035	013 - COPS Contracts	035 - TP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - TP - O/H Cond.	105,000	0	105,000
013	039	013 - COPS Contracts	039 - TP - O/H Cond.	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	5,100	0	5,100
001	087	001 - T&D Regular Labour	087 Field Super.& Ops.	31,500	0	31,500
			Total Cost:	1,899,224	0	1,899,224
			Original Cost:	170,000		

CI 40260 L7012 Beaver Narrows Crossing Replacement

The following is a breakdown of costs associated with the L7012 Beaver Narrows Crossing Replacement Project.

Administrative Overhead and Interest	$[redacted]
Materials	$300,000
Contracts	$[redacted]
COPS Labour	$36,600
Total	$1,899,224

The contract portion of this work is planned to be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The COPS labour portion includes supervision and engineering design. The materials amount of this project is based on discussions with steel tower suppliers and estimates from a similar project at Beaver Narrows.

CI Number: 40266

Title: L6002 Deteriorated Plant Replacements

Start Date: 2011/05

Final Cost Date: 2011/11

Function: Transmission

Forecast Amount: $1,340,019

DESCRIPTION:

This project provides for costs associated with work on 80 structures on L6002 including the replacement of 46 structures, and the replacement of 60 spans of overhead sky wire from Gold River to Bridgewater and along the Michelin tap.

Summary of Related CI's +/- 2 years
2009 – 37062 2009 Upgrade L6004 $343,230
2010 - 38858 L6002 Deteriorated Replacements $481,782
2011 – 40281 2011 Transmission Line Insulator Replacement $3,018,100

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Maintenance

Why do this project?

This project is required to increase the ground clearance from energized conductors in locations that do not meet minimum Canadian Standards Association (CSA) standards for ground clearance along with replacing deteriorated plant. Ground Clearance issues exist due to the sag of lines over time, updated CSA requirements or a combination of the two.

Why do this project now?

This project will ensure proper clearances are met and operating ratings can be maintained, and will address deteriorated plant issues.

Why do this project this way?

This project provides for raising the height of spans that do not meet the CSA standard requirement by installing a mid-span structure or changing out existing structures with higher structures.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40266 - L6002 Deteriorated Replacements

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		15,961	0	15,961
094		094 - Interest Capitalized		11,708	0	11,708
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-COPS Regular Labour AO		24,315	0	24,315
095		095-Thermal Regular Labour AO		1,225	0	1,225
012	035	012 - Materials	035 - TP - Wood Poles	92,750	0	92,750
013	035	013 - COPS Contracts	035 - TP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - TP - O/H Cond.	172,250	0	172,250
013	039	013 - COPS Contracts	039 - TP - O/H Cond.	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	5,100	0	5,100
001	087	001 - T&D Regular Labour	087 Field Super.& Ops.	31,500	0	31,500
			Total Cost:	1,340,019	0	1,340,019
			Original Cost:			

CI 40266 - L6002 Deteriorated Replacements

The following is a breakdown of costs associated with the L6002 Deteriorated Replacements Project.

Administrative Overhead and Interest	$[redacted]
Materials	$265,000
Contracts	$[redacted]
COPS Labour	$36,600
Total	$1,340,019

This work will be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The COPS labour portion includes supervision and engineering design.

This 138 kV circuit between Sackville and Bridgewater was constructed between 1962 and 1964 and feeds directly and indirectly 15 substations as well as the Michelin tap and substation. In 2011 the intent is to work on 80 structures and 60 spans of overhead wire from Gold River to Bridgewater including the Michelin Tap. Thirty structures will be replaced for clearance issues and additional work will be carried out to address deteriorated poles, arms and anchors. Replacement of insulators on this section of line will also be carried out in 2011 under CI 40281 2011 Transmission Line Insulator Replacement.

The decision to do this work was based on structure climbing inspections as well as LIDAR surveys. Please refer to Attachment 1 for the most recent inspection reports.

Line #	Str #	Str Type	Pole Lgth L	Pole Lgth C	Pole Lgth R	Date Insp	Directions to Str	GPS Lat	GPS Long	Scoping Req'd	Scheduled	Grd Clr	Min Grd Clr	Work Order	Field priority	Flagged	Comment	Recommendations
L6002	300	I	60	0	60	11/14/2007		44-33-14.70N	64-20-04.60W	No	2011S	6.37	5.26	None	Unassigned	No		replace str with TH-2(0), 70 ft poles remove 60 ft poles, install aerial str numbers on both sides of the str
L6002	302	I	55	0	55	11/14/2007	Logging Rd X's to Xmas Tree Farm	44-32-59.10N	64-20-12.30W	No	2011S	8.01	6.69	None	Unassigned	No	Rt pole = 3 large WP holes 16' 18' 20' ft levels. Pole sounds very hollow GL up as far as I can reach.	replace str with 65 ft poles TH-2 remove 55 ft poles
L6002	305	I	65	0	65	11/14/2007	Boggy Stay to Right of ROW	44-32-34.80N	64-20-24.30W	No	2011S	6.73	5.44	None	Unassigned	No		replace str with 75 ft poles remove 65 ft poles TH-2
L6002	307	I	60	0	60	11/14/2007	Bog Trail to Left of ROW Logging Camp Rd /x's	44-32-18.70N	64-20-32.20W	No	2011S	6.99	5.70	None	Unassigned	No	Left pole has 8 WP holes	replace str with 70 poles remove 65 ft poles TH-2 sky wire dead ends here
L6002	308	I	50	0	50	11/14/2007	Bog	44-32-10.00N	64-20-36.30W	No	2011S	6.83	5.51	None	Unassigned	No	Ants rt pole need to check heigth of poles need to raise this str 10 feet but Lidar and our inspectors pole heigths don't match or does sky wire make a difference, need to see where sky wires are	replace str with 60ft poles, remove 50 ft poles TH-2
L6002	309	I	45	0	45	11/19/2007		44-32-02.60N	64-20-40.40W	No	2011S	7.55	6.55	None	Unassigned	No	Rt pole has ant dust and 4 WP holes 2 very large 6-8"	replace str with 55 ft poles TH-2, remove 45 ft poles
L6002	311	I	55	0	55	11/19/2007		44-31-50.70N	64-20-46.40W	No	2011S	6.55	5.62	None	Unassigned	No		replace str with 65 ft poles TH-2, remove 55 ft poles
L6002	313	I	60	0	60	11/19/2007		44-31-36.70N	64-20-53.00W	No	2011S	6.57	5.57	None	Unassigned	No	Left pole has a hollow sound GL up 1-2"	replace str with 70 ft poles TH-2, remove 60 ft poles
L6002	316	I	60	0	60	11/19/2007	Wood Road in through gravel pitt off hwy 103 behind martins river	44-31-16.80N	64-21-06.80W	No	2011S	8.16	7.23	None	Unassigned	No	4/1/2010	nip .2m between str 316 and str 317 and reinsulate

L6002	319	I	45	0	45	11/10/2007		44-31-04.50N	64-21-24.30W	No	2011S	6.67	5.61	None	Unassigned	No	Left pole has hollow sound one side GL up 3'	replace str with 55 ft poles TH-2, remove 45 ft poles
L6002	320	I	40	0	40	11/10/2007	Trail does to ROW to str 321	44-30-58.60N	64-21-32.00W	No	2011S	7.31	6.31	None	Unassigned	No	Air ID# 320 "0" is no good	replace aerial str Ids
L6002	321	I	60	0	60	11/10/2007	Bog	44-30-53.30N	64-21-39.40W	No	2011S	7.01	6.01	None	Unassigned	No		replace str with 70 ft poles TH-2, remove 60ft poles
L6002	323	I	50	0	50	11/10/2007	Bog 1.0M Stream N44-30-47.80 W64-21-48.90 Port Bridges	44-30-43.30N	64-21-52.80W	No	2011S	9.39	8.20	None	Unassigned	No		replace str with 55 ft poles TH-2, remove 50 ft poles
L6002	324	I	60	0	60	11/10/2007	Bog Note Land owner has blocked ROW Trail with large logs &removed ATV bridges from crossings move around to Dorey Mills Rd off Clearland Rd Mahone Bay to ATV shore club 1st road to left past Western Lake to L6002 Xing	44-30-37.80N	64-21-59.90W	No	2011S	6.78	5.52	None	Unassigned	No		replace str with 70 ft poles TH-2, remove 60 ft poles
L6002	329	I	55	0	55	11/19/2007		44-30-10.50N	64-22-36.90W	No	2011S	10.50	10	None	Unassigned	No		nip .25m between str 329 and str 330, replace insulators
L6002	331	I	60	0	60	11/19/2007	Road X-ing from Dorey Mills ATV Shore Club Road X ing	44-29-59.50N	64-22-51.60W	No	2011S	6.41	5.22	None	Unassigned	No		replace str with 70 ft poles TH-2, remove 60 ft poles
L6002	333	I	60	0	60	11/20/2007		44-29-49.50N	64-23-05.30W	No	2011S	6.52	5.41	None	Unassigned	No		replace str with 65 ft poles TH-2, remove 55 ft poles
L6002	334	I	55	0	55	11/20/2007	4 Wheeler Trail X's	44-29-44.70N	64-23-11.90W	No	2011S	6.90	5.71	None	Unassigned	No		replace str with 70 ft poles TH-2, remove 55 ft poles
L6002	337	I	50	0	50	11/20/2007	2.0M Wide Stream N44-29-33.80 W64-23-29.20 Bog	44-29-29.20N	64-23-33.10W	No	2011S	8.30	7.11	None	Unassigned	No		replace str with 60 ft poles TH-2, remove 50 ft poles

L6002	339	I	50	0	50	11/20/2007	4 Wheel Trail from Dory Mills Rd	44-29-18.80N	64-23-47.20W	No	2011S	6.91	5.65	None	Unassigned	No		replace str with 60 ft poles TH-2, remove 50 ft poles
L6002	340	I	45	0	45	11/20/2007	Bog on ATV Trail	44-29-15.40N	64-23-51.50W	No	2011S	6.89	5.78	None	Unassigned	No	Left pole 2 WP holes Air ID # 340 No good	replace aerial str Ids, fill wood pecker holes, reinsulate
L6002	341	I	50	0	50	11/20/2007	Bog Go Back to Gravel Pit @entrance to Dory Mills Rd	44-29-09.00N	64-24-00.40W	No	2011S	7.12	5.93	None	Unassigned	No		replace str with 60 ft poles TH-2, remove 50 ft poles
L6002	343	I	55	0	55	11/20/2007	1.0M Wide Stream (from Pond under L7009) N44-29-03.20 W64-24-08.70 Port Bridges	44-28-58.60N	64-24-14.80W	No	2011S	8.65	7.33	None	Unassigned	No		replace str with 65 ft poles TH-2, remove 55 ft poles
L6002	344	K	60	60	60	11/20/2007	ATV Trail X's' From Gracel Pit off Dory Mills Rd	44-28-52.20N	64-24-23.50W	No	2011S	6.53	5.29	None	Unassigned	No	Line ID 6002.The zeros are blank Left pole has ants	replace aerial line Ids
L6002	347	K	50	50	50	11/21/2007	150M Wide L6002 X's Round Lake N44-28-30.0 W64-24-57.00 Move @ across from 612 Clearland Rd small dirt rd with 3 houses on it Follow trail Across Bridge 2nd right to ROW	44-28-23.80N	64-25-01.70W	No	2011S	6.09	4.56	None	Unassigned	No	11 guys and anchors ok	replace str with 60 ft poles DT-3, remove 50 ft poles
L6002	348	K	55	55	55	11/21/2007		44-28-21.00N	64-25-05.20W	No	2011S	7.65	6.85	None	Unassigned	No	Center pole has ants. 11 guys and anchors ok	replace str with 65 ft poles DT-3, remove 55 ft poles
L6002	349	K	45	45	45	11/21/2007	10 M Wide Mushamuch River N44-28-13.00 W64-25-16 move around to Ext 11 of Hwy 103 blockhouse turn north till L6002 X'	44-28-10.00N	64-25-20.60W	No	2011S	7.71	6.19	None	Unassigned	No	11 guys and anchors ok	replace str with 60 ft poles DT-3, remove 45 ft poles

L6002	352	I	50	0	50	11/21/2007		44-27-53.20N	64-25-43.10W	No	2011S	7.78	6.52	None	Unassigned	No		replace str with 55 ft poles TH-2, remove 50 ft poles
L6002	356	I	40	0	40	11/20/2007	Park in Driveway under L6002 1/2 way to #356 customer has cultivated blueberry bushes ok to go on trail clearly visible 6' wide (bushes are beside pond)	44-27-31.60N	64-25-55.20W	No	2011S	7.43	6.41	None	6-12 Mo	No	Both poles are rotten from top down 3'.	replace str with 50 ft poles TH-2, remove 40 ft poles
L6002	357	K	40	40	40	11/21/2007	8.0M Wide Stream N44-27-31.60 W64-25-55.10 move around to across from #348 Cornwall Rd for acorss from str #357 #358	44-27-22.10N	64-25-58.10W	No	2011S	6.91	5.62	None	Unassigned	No	13 guys and anchors ok Center pole has ant dust at butt	replace str with 65 ft poles DT-3, remove 40 ft poles
L6002	358	K	65	65	65	11/21/2007	Farmers Road X's Farmers Fence X's	44-27-13.60N	64-26-01.70W	No	2011S	7.72	6.40	None	Unassigned	No	16 guys and anchors ok. Left pole 4" deep locking. WP hole above DE	replace str with 70 ft poles DT-3, remove 65 ft poles
L6002	359	K	70	70	70	11/21/2007	Farmers Fence Crosses	44-26-57.20N	64-26-08.00W	No	2011S	6.71	5.16	None	Unassigned	No	14 guys and anchors ok. Line ID 6002 ok	replace str with 75 ft poles DT-3, remove 70 ft poles
L6002	360	K	70	70	70	11/21/2007	L6002 X's Langle Lake Road 1 Phase Dist Line Large Swamp move around to 141 Langle Lake Road Take trail to left go into ROW	44-26-40.50N	64-26-13.60W	No	2011S	7.64	5.27	None	Unassigned	No	Left pole has ants. Right pole has ants. Air ID no good	replace str with 75 ft poles DT-3, remove 70 ft poles

L6002	361	K	60	60	60	11/22/2007	RR Tracks X Large Swamp go to L7009 ROW follow trail to RR track go in 500' left to L6002 ROW	44-26-27.60N	64-26-18.40W	No	2011S	6.38	4.93	None	Unassigned	No	Guys and anchors ok. The left phase dead ends are a very dark gray color, almost black	replace all insulators on a DT
L6002	362	I	55	0	55	11/22/2008	4 Wheeler Trail X's	44-26-24.50N	64-26-19.30W	No	2011S	10.10	9.44	None	Unassigned	No	Line ID 6002 2nd O is no good	replace aerial Ids
L6002	364	I	60	0	60	11/22/2007		44-26-13.90N	64-26-23.20W	No	2011S	5.72	4.53	None	Unassigned	No	Both poles sound a bit hollow on one side up 5-6'. Left pole has 1 WP hole. Right pole has 2	replace str with 75ft poles TH-2(0), remove 60 ft poles
L6002	367	I	50	0	50	11/26/2007	Driveway 1136 hwy #3	44-26-03.70N	64-26-40.70W	No	2011S	10.13	9.47	None	Unassigned	No		nip .65m between str 367 and str 368, tuck insulators .2m towards str 366,
L6002	368	I	50	0	50	11/26/2007	Driveway for 1174 Hwy # 3 120/240V service Driveway for 1188 Hwy # 3	44-26-01.30N	64-26-50.30W	No	2011S	6.11	5	None	Unassigned	No		tuck insulators .2m toward str 369
L6002	371	L	65	65	65	11/26/2007	Swamp	44-25-48.10N	64-27-23.30W	No	2011S	8.45	7.34	None	Unassigned	No	1 guy and anchor. Anchor is in water looks ok	install anchor rod extension
L6002	373	I	60	0	60	11/26/2007		44-25-39.60N	64-27-34.80W	No	2011S	10.45	9.43	None	Unassigned	No	Line ID no good	install aerial line Ids
L6002	374	M1	50	50	50	11/26/2007	1 Phase Dist Line Northfield Rd X's	44-25-36.20N	64-27-39.30W	No	2011S	8.67	7.74	None	Unassigned	No	6 guys and anchors ok. Line ID # ok	tuck insulators .15m towards str 375
L6002	378	I	40	0	40	11/21/2007	Bog 3.0M Wide Stream N44-25-23.20 W64-28-10.60 Hard Rock bottom/port Bridges	44-25-21.70N	64-28-18.60W	No	2011S	10.73	9.75	None	Unassigned	No	X arm has a slight bow down at ends	replace str with 50 ft poles 138TH(2), remove 40 ft poles
L6002	379	I	50	0	50	11/24/2007		44-25-17.00N	64-28-28.40W	No	2011S	5.39	4.46	None	Unassigned	No		replace str with 55 ft poles 138TH(2), remove 50 ft poles
L6002	380	M1	50	50	50	11/27/2007		44-25-13.50N	64-28-35.50W	No	2011S	5.83	5.01	None	Unassigned	No	6 guys and anchors ok. ID# 380 is no good	replace str with 60 ft poles 138HA, remove 3 50 ft poles

L6002	381	I	55	0	55			44-25-15.00N	64-28-41.90W	No	2011S	8.67	7.98	None	Unassigned	No		replace str with 60 ft poles 138TH(2), remove 55 ft poles
L6002	382	K	65	65	65	11/27/2007		44-25-17.20N	64-28-51.40W	No	2011S	7.26	6.38	None	Unassigned	No	8 guys and anchors ok. 2 marker balls left phase	replace str with 75 ft poles 138DT-3, remove 65 ft poles, replace anchors
L6002	383	I	90	0	90	11/27/2007	L6002X's Railway bed L6002X's Blymstiener Lake 200M N44-25-17.50 W64-28-52.40 boat requ's for next str	44-25-17.50N	64-28-52.40W	No	2011S	14	13.04	None	Unassigned	No	This structure is on an Island in Blystiner Lake. Preceeding 383 270m Height at waters edge 14m	replace str with 100 ft structure double arms and double X brases ; engineering needs to be done here
L6002	384	K	75	75	75	11/26/2007	Blystiner Lake 200M	44-25-22.80N	64-29-14.90W	No	2011S	13.6	9.9	None	Unassigned	No	1 damper per phase both sides	install 90 ft poles 138DT-3, remove 75 ft poles, replace anchors
L6002	385	K	65	65	65	11/26/2007		44-25-19.00N	64-29-27.40W	No	2011S	14.8	12.1	None	Unassigned	No		replace str with 80 ft poles 138DT-3, remove 65 ft poles
L6002	386	I	60	0	60	11/24/2007		44-25-16.40N	64-29-33.60W	No	2011S	8.44	7.68	None	Unassigned	No		replace str with 70 ft poles 138TH-(2), remove 60 ft poles
L6002	387	I	65	0	65	11/26/2007		44-25-12.80N	64-29-41.10W	No	2011S	7.16	6.34	None	Unassigned	No	Line ID # 1st 0 is no good	replace aerial line Ids
L6002	388	I	50		50	11/26/2007	Naugler Pt Rd X's 1 Phase Dist Line	44-25-09.60N	64-29-49.50W	No	2011S	7.44	6.62	None	Unassigned	No		replace str with 65 ft poles 138TH(2), remove 50 ft poles
L6002	389	I	50		50	11/28/2007	Lake Xing 100M wide	44-25-05.80N	64-29-58.50W	No	2011S	8.10	7.17	None	Unassigned	No		replace str with 65 ft poles 138TH(2), remove 50 ft poles
L6002	390	I	55	0	55	11/28/2007	Bog 4 Wheeler Path X's	44-25-01.20N	64-30-09.30W	No	2011S	6.54	5.58	None	Unassigned	No	Left pole has a pile of ant dust at butt. Air ID no good	replace aerial str Ids
L6002	391	I	40	0	40	11/28/2007	Big bog	42-24-58.00N	64-30-17.90W	No	2011S	6.20	5.38	None	Unassigned	No	Rock cribbed	replace str with 50 ft poles 138 TH(2), remove 40 ft poles
L6002	392	I	65	0	65	4/1/2010	Big Bog	42-24-54.30N	64-30-25.90W	No	2011S	7.98	7.16	None	Unassigned	No	138 TH(1) butts are solid both poles have top rot & mossy ok arms are slightly bowed down	install double arms
L6002	393	I	50	0	50	11/28/2007	4 Wheeler Path X's	44-24-51.10N	64-30-34.70W	No	2011S	6.28	5.40	None	Unassigned	No		replace str with 55 ft poles 138 TH(2), remove 50 ft poles
L6002	396	I	45	0	45	11/28/2007	Charlies Lane X's	44-24-38.30N	64-30-05.50W	No	2011S	9.75	8.56	None	Unassigned	No	Line ID no good	replace aerial line Ids

L6002	398	I	40	0	40	11/28/2007	Fence Field (pasture)	44-24-31.10N	64-31-21.90W	No	2011S	6.57	5.64	None	Unassigned	No		replace str with 45 ft poles 138 TH(2), remove 40 ft poles
L6002	399	I	50	0	50	11/28/2007	Farmers Fence	44-24-28.70N	64-31-26.70W	No	2011S	5.35	4.42	None	Unassigned	No		replace str with 55 ft poles 138 TH(2), remove 50 ft poles
L6002	402	I	65	0	65	11/28/2007	Farmers Fence 3 Phase Dist Line L6002 X's Harold Whynot Rd	44-24-15.50N	64-32-00.80W	No	2011S	4.88	3.82	None	Unassigned	No		nip 1.20m between str 402 and str 403, tuck insulators .5 m towards str 401
L6002	403	I	60	0	60	11/28/2007	L6002 X's Pinegrove Rd	44-24-11.20N	64-32-09.60W	No	2011S	8.31	7.31	None	Unassigned	No		tuck insulators .3m towards str 404
L6002	404	I	60	0	60	11/28/2007		44-24-09.20N	64-32-14.20W	No	2011S	9.58	8.89	None	Unassigned	No		tuck insulators .15m towards str 405
L6002	404A	I	60	0	60	11/28/2007		44-24-06.90N	64-32-19.30W	No	2011S	8.83	8.16	None	Unassigned	No	New structure 2006	nip .2m between str 404A and str 405
L6002	405	I	50	0	50	11/29/2007		44-24-04.90N	64-32-24.60W	No	2011S	9.78	9.11	None	Unassigned	No	Line ID 6002 no good	replace str with 60 ft poles 138 TH(2), remove 50 ft poles
L6002	406	K	55	60	55	11/29/2007	3 Phase Dist Line L6002 X's Hwy #10	44-24-02.60N	64-32-30.70W	No	2011S	7.28	6.50	None	Unassigned	No	Right pole side guy slack. Left pole DE guy 90w side slack	nip .2m between str 406 and str 407
L6002	409	I	65	0	65	11/29/2007		44-23-49.40N	64-32-59.50W	No	2011S	8.44	7.62	None	Unassigned	No		tuck insulators towards str 408, .1m
L6002	410	I	65	0	65	11/29/2007		44-23-46.00N	64-33-05.20W	No	2011S	7.18	6.42	None	Unassigned	No	Air ID no good	replace aerial str Ids, nip .6m between str 410 and str 411, tuck insulators .2m towards str 409
L6002	411	I	50	0	50	11/29/2007		44-23-42.30N	64-33-12.10W	No	2011S	8.30	7.48	None	Unassigned	No		tuck insulators .2m towards str 412
L6002C	001	I	55	0	55	1/9/2008		44-23-33.40N	64-33-15.10W	No	2011S	7.40	6.64	268819	Ground Cl	No	Ground clearance. Pole grounds are cut off 7' off ground. Double arms and x brace	replace pole grounds, replace 24 insulators, nip .8m from between str 1 and str 2, tuck insulators .2m towards tap
L6002C	002	I	60	0	60	1/9/2008		44-23-27.20N	64-33-11.70W	No	2011S	6.97	6.15	268819	Ground Cl	No	Double arms and braces. 2 discs broke on left phase. Pole grounds cut off up 7'. Ground clearance.	replace grounds, replace 24 insulators, tuck insulators .3m towards str 3

L6002C	003	I	55	0	55	1/9/2008	Large bog Path to left of ROW	44-23-19.50N	64-33-08.50W	No	2011S	7.14	6.27	268819	Ground Cl	No	Double arms,single x brace.Pole grounds cut off up 7'. Ground clearance.	replace pole grounds, reinsulate 24 insulators, tuck insulators .15m towards str 4
L6002C	004	I	70	0	70	1/9/2008		44-23-14.60N	64-33-05.90W	No	2011S	8.56	7.87	268819	1-6 Mo	No	Single arm, double brace. Pole grounds cut off 7' up.	replace pole grounds, replace 3 brown insulators
L6002C	005	I	55	0	55	1/9/2008	L6002 X's L5 1.0M Wide Stream N44-23-11.20 W64-33-04.10 Port Bridges	44-23-09.80N	64-33-03.90W	No	2011S	10.48	9.79	268819	1-6 Mo	No	woodpecker holes on both poles at OHGW. Pole grounds cut off 7' up. Single arm and brace.	Lower OHGW framing and replace pole grounds.c replace 24 insulators, nip .7m from between str 5 and str 6, tuck insulators .15 m towards str 4
L6002C	006	M1	65	65	65	11/20/2007	.5M Wide Stream N44-23-05.50 W64-33-01.60 Port Bridges Swamp	44-23-03.90N	64-33-00.50W	No	2011S	6.03	5.21	268819	6-12 Mo	No	Left pole rotten at top.4" wide crack at guy hook. Center pole rotten at top. Bridle guy loose. All downground cut off up 10'.	Install new guy to ohgw 1'-6" below existing and lower ohgw deadends including bridle on right pole. Lower both deadends on bridle guy on center pole.Repair down grounds on all 3 poles.
L6002C	006	M1	65	65	65	1/9/2008	.5M Wide Stream N44-23-05.50 W64-33-01.60 Port Bridges Swamp	44-23-03.90N	64-33-00.50W	No	2011S	6.03	5.21	268819	1-6 Mo	No	Top of right pole rotten. Pole grounds cut off up 12'. Ground clearance.	tuck insulators .15m towards str 7
L6002C	007	I	75	0	75	1/9/2008	Swamp	44-23-02.70N	64-32-54.30W	No	2011S	12.48	11.79	268819	Unassigned	No	Double arm and braces	tuck insulators .1m towards str 8
L6002C	008	I	75	0	75	1/9/2008	L6002 X's Driveway for Gravel Pit L6002 X's Hwy 103	44-23-01.90N	64-32-46.60W	No	2011S	7.12	6.36	268819	Ground Cl	No	Double arms and braces. No Line Id#. Clearance over #103 highway should be re-checked.	install aerial Line IDs, replace 24 insulators

L6002C	009	I	65	0	65	1/9/2008	L6002 X's Logan Rd 3 Phase Dist Line Fence @ Michelin	44-23-01.50N	64-32-37.80W	No	2011S	9.40	8.64	268819	Unassigned	No	Single arm and brace. Ground clearance was taken close to str.8 over small gravel pile in Dexters yard.	reinsulate
L6002C	010	K	55	55	55	1/9/2008	Gravel Parking area on Michelin Plant.	44-23-01.30N	64-32-37.50W	No	2011S	9.40	9.04	268819	6-12 Mo	No	The preforms on the ohgw deadends are very rusty.Not sure of ohgw size.	Replace ohgw preform deadends.Construction of addition to building is going on close to structure. May be able to do with trucks depending on final landscaping. Reinsulate brown insulators

Line #	Str #	Str Type	Pole Lgth L	Pole Lgth C	Pole Lgth R	Date Insp	Directions to Str	GPS Lat	GPS Long	Scoping Req'd	Scheduled	Grd Clr	Min Grd Clr	Work Order	Field priority	Flagged	Comment	Recommendations
L6002C	001	I	55	0	55	1/9/2008		44-23-33.40N	64-33-15.10W	No	2011S	7.40	6.64	268819	Ground Cl	No	Ground clearance. Pole grounds are cut off 7' off ground. Double arms and x brace	replace pole grounds, replace 24 insulators, nip .8m from between str 1 and str 2, tuck insulators .2m towards tap
L6002C	002	I	60	0	60	1/9/2008		44-23-27.20N	64-33-11.70W	No	2011S	6.97	6.15	268819	Ground Cl	No	Double arms and braces. 2 discs broke on left phase. Pole grounds cut off up 7'. Ground clearance.	replace grounds, replace 24 insulators, tuck insulators .3m towards str 3
L6002C	003	I	55	0	55	1/9/2008	Large bog Path to left of ROW	44-23-19.50N	64-33-08.50W	No	2011S	7.14	6.27	268819	Ground Cl	No	Double arms,single x brace.Pole grounds cut off up 7'. Ground clearance.	replace pole grounds, reinsulate 24 insulators, tuck insulators .15m towards str 4
L6002C	004	I	70	0	70	1/9/2008		44-23-14.60N	64-33-05.90W	No	2011S	8.56	7.87	268819	1-6 Mo	No	Single arm, double brace. Pole grounds cut off 7' up.	replace pole grounds, replace 3 brown insulators
L6002C	005	I	55	0	55	1/9/2008	L6002 X's L5 1.0M Wide Stream N44-23-11.20 W64-33-04.10 Port Bridges	44-23-09.80N	64-33-03.90W	No	2011S	10.48	9.79	268819	1-6 Mo	No	woodpecker holes on both poles at OHGW. Pole grounds cut off 7' up. Single arm and brace.	Lower OHGW framing and replace pole grounds.c replace 24 insulators, nip .7m from between str 5 and str 6, tuck insulators .15 m towards str 4

L6002C	006	M1	65	65	65	1/9/2008	.5M Wide Stream N44-23-05.50 W64-33-01.60 Port Bridges Swamp	44-23-03.90N	64-33-00.50W	No	2011S	6.03	5.21	268819	1-6 Mo	No	Top of right pole rotten. Pole grounds cut off up 12'. Ground clearance.	tuck insulators .15m towards str 7
L6002C	006	M1	65	65	65	11/20/2007	.5M Wide Stream N44-23-05.50 W64-33-01.60 Port Bridges Swamp	44-23-03.90N	64-33-00.50W	No	2011S	6.03	5.21	268819	6-12 Mo	No	Left pole rotten at top.4" wide crack at guy hook. Center pole rotten at top. Bridle guy loose. All downground cut off up 10'.	Install new guy to ohgw 1'-6" below existing and lower ohgw deadends including bridle on right pole. Lower both deadends on bridle guy on center pole.Repair down grounds on all 3 poles.
L6002C	007	I	75	0	75	1/9/2008	Swamp	44-23-02.70N	64-32-54.30W	No	2011S	12.48	11.79	268819	Unassigned	No	Double arm and braces	tuck insulators .1m towards str 8
L6002C	008	I	75	0	75	1/9/2008	L6002 X's Driveway for Gravel Pit L6002 X's Hwy 103	44-23-01.90N	64-32-46.60W	No	2011S	7.12	6.36	268819	Ground Cl	No	Double arms and braces. No Line Id#. Clearance over #103 highway should be re-checked.	install aerial Line IDs, replace 24 insulators
L6002C	009	I	65	0	65	1/9/2008	L6002 X's Logan Rd 3 Phase Dist Line Fence @ Michelin	44-23-01.50N	64-32-37.80W	No	2011S	9.40	8.64	268819	Unassigned	No	Single arm and brace. Ground clearance was taken close to str.8 over small gravel pile in Dexters yard.	reinsulate

L6002C	010	K	55	55	55	1/9/2008	Gravel Parking area on Michelin Plant.	44-23-01.30N	64-32-37.50W	No	2011S	9.40	9.04	268819	6-12 Mo	No	The preforms on the ohgw deadends are very rusty.Not sure of ohgw size.	Replace ohgw preform deadends.Construction of addition to building is going on close to structure. May be able to do with trucks depending on final landscaping. Reinsulate brown insulators

CI Number: 40231

Title: 2011 Protection Upgrades LAK

Start Date: 2011/07

Final Cost Date: 2012/03

Function: Transmission

Forecast Amount: $1,609,905

DESCRIPTION:

This project provides for the costs to upgrade the protections system at 103H-Lakeside to comply with Northeast Power Coordination Council (NPCC) criteria for bulk power systems.

Summary of Related CI's +/- 2 years:
2010 – 38266 2010 Protection Upgrades $313,331
2011 – 40233 2011 Protection Upgrades TUC $3,928,932
2012 – 2012 Protection Upgrades Brushy Hill and Onslow

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: System Protection

Why do this project?

In 2008, NPCC approved new criteria (Criteria Document A-10) for determining whether a substation bus is categorized as bulk power. The criterion is used to identify substation busses that, if a fault was not successfully cleared by protection, the situation could result in disturbances outside the local operating area. Stations identified through this criterion are required to have fully redundant protection, control and communication schemes as defined in NPCC Directory #4 – Bulk Power System Protection Criteria. The 103H-Lakeside substation bus has met the criteria for a bulk power element and currently does not have fully redundant protection, control, and communication schemes in place.

Why do this project now?

Implementation of the redundant protection schemes is required to be completed by the end of 2012. Because this work is significant, NSPI has chosen to complete the five stations requiring this upgrade over a three year period. A portion of 79N-Hopewell was completed in 2010 and will be finished in 2011. The 138kV portion of 103H-Lakeside will be completed in 2011 as well as 91H-Tufts Cove, submitted as a separate Capital Item. 1N-Onslow and 120H-Brushy Hill will be submitted in 2012.

Why do this project this way?

To comply with NPCC standards, fully redundant protection, control and communication systems must be in place for all bulk power elements.

CI Number	: 40231	- 2011 Protection Upgrades LAK	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		115,659	0	115,659
094		094 - Interest Capitalized		41,460	0	41,460
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-COPS Regular Labour AO		176,193	0	176,193
095		095-Thermal Regular Labour AO		25,687	0	25,687
013	003	013 - COPS Contracts	003 - TP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
001	022	001 - T&D Regular Labour	022 - TP - Elec Contr.Equip.	62,316	0	62,316
012	022	012 - Materials	022 - TP - Elec Contr.Equip.	343,045	0	343,045
013	022	013 - COPS Contracts	022 - TP - Elec Contr.Equip.	[redacted]	0	[redacted]
066	022	066 - Other Goods & Services	022 - TP - Elec Contr.Equip.	130,000	0	130,000
001	023	001 - T&D Regular Labour	023 - TP - Power Equip.-Station S	7,002	0	7,002
012	023	012 - Materials	023 - TP - Power Equip.-Station S	22,425	0	22,425
013	023	013 - COPS Contracts	023 - TP - Power Equip.-Station S	[redacted]	0	[redacted]
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	37,985	0	37,985
012	043	012 - Materials	043 - TP - Substn Dev.	28,750	0	28,750
001	061	001 - T&D Regular Labour	061 - TP - Switched Telecomm. Sys	4,901	0	4,901
012	061	012 - Materials	061 - TP - Switched Telecomm. Sys	46,460	0	46,460
001	085	001 - THERMAL Regular Labour	085 Design	106,985	0	106,985
001	086	001 - T&D Regular Labour	086 Commissioning	116,055	0	116,055
013	087	013 - COPS Contracts	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	1,609,905	0	1,609,905
			Original Cost:			

CI 40231 – 2011 Protection Upgrades LAK

The following is a breakdown of costs associated with the 2011 Protection Upgrades LAK Project.

Administrative Overhead and Interest	$[redacted]
Materials	$440,680
Contracts	$[redacted]
Other	$130,000
COPS Labour	$335,244
Total	$1,609,905

The contracts cost estimate for this project is based on work being performed in the Lakeside substation by outside contractors and is not expected to be completed by an affiliate. NSPI COPS labour will be carried out by internal technicians, and electricians at a rate of approximately $[redacted]/ person day along with engineering design work. The project estimate is based on a similar project carried out in 2010 at Hopewell substation.

NSPI carried out the A-10 test for Nova Scotia. A list of substations that A-10 test criteria identified as Bulk Power was submitted to Northeast Power Coordinating Counsel (NPCC). Once a bus (a substation at a given voltage level) is identified as Bulk Power as per the A-10 test, the requirement for redundant protection schemes is an absolute requirement. The only possibility of eliminating the redundant protection criteria is to find a solution that allows the substation to be removed from the bulk power designation. In 2010, NSPI reduced the number of substations within the province that were to be classified as bulk power through successful justification for removal of four from the list of nine. Those that were removed were 104H-Kempt Road, 90H-Sackville, 47C-NewPage and 108H-Burnside.

Please refer to CI 40233, Non-confidential Attachments 1-3 and Confidential Attachment 4 for additional justification for this project.

NSPI plans to complete the remainder of the projects as follows:

79N- Hopewell	2010/2011
91H-Tuft's Cove	2011
103H-Lakeside	2011/2012
1N-Onslow	2012
20H-Brushy Hill	2012

CI Number: 40307

Title: L-6033 and L-6035 Water St. Transmission Tower Refurbishment

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $995,497

DESCRIPTION:

This item provides for the costs associated with performing a number of upgrades to 33 steel transmission towers in Halifax peninsula. These steel towers are associated with L6033 and L6035, which form part of a 138kV loop around Metro Halifax.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Maintenance

Why do this project?

In 2010, a study of the 30 year old steel structures associated with L6033 and L6035 was performed by an external consultant. The report indicated that a number of repairs to these structures were necessary to ensure their structural integrity. Items covered by this project include: steel reinforcement for post insulators and overstressed steel members, repair of anchor bolts and a damper study and installation.

Why do this project now?

These steel towers carry significant weight and tension of the transmission lines and need to be structurally sound.

Why do this project this way?

Refurbishment of the existing steel towers is required to ensure their structural integrity and to support transmission supply reliability to the downtown core of Halifax.

CI Number : 40307	- L6033 and L6035 Water St. Transmission Tower Refurbishment	**Project Number**	
Parent CI Number :	-	**Approved Date**	
Cost Centre : 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		80,715	0	80,715
094		094 - Interest Capitalized		28,739	0	28,739
095		095-Thermal Regular Labour AO		14,795	0	14,795
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-COPS Regular Labour AO		122,961	0	122,961
013	002	013 - COPS Contracts	002 - TP - Land Rights	[redacted]	0	[redacted]
001	037	001 - T&D Regular Labour	037 - TP - Steel Towers	159,296	0	159,296
002	037	002 - T&D Overtime Labour	037 - TP - Steel Towers	0	0	0
012	037	012 - Materials	037 - TP - Steel Towers	114,623	0	114,623
013	037	013 - COPS Contracts	037 - TP - Steel Towers	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	61,620	0	61,620
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
			Total Cost:	995,497	0	995,497
			Original Cost:			

CI 40307 – L6033 and L6035 Water St Transmission Tower Refurbishment

The following is a breakdown of costs associated with the L6033 and L6035 Water St Transmission Tower Refurbishment Project.

Administrative Overhead and Interest	$[redacted]
Contracts	$[redacted]
Materials	$114,623
COPS Labour	$220,916
Total	$995,497

This work will be completed by a contractor with NSPI supervision. Estimates were based on discussions with those who perform this type of work. The COPS labour portion includes engineering studies and design and supervision for completion of this work.

Pages 1038 - 1711 have been removed due to confidentiality.

CI Number: 40270

Title: L-5501 Upgrade 69 kV Circuit to Bridge Ave

Start Date: 2011/04

Final Cost Date: 2011/08

Function: Transmission

Forecast Amount: $800,793

DESCRIPTION:

This project provides for costs associated with upgrading conductor on the existing 69 kV circuit between Trenton and Stellarton which is 7.7 km in length. The new conductor will be 336.4 ACSR, designed to a maximum operating temperature of 60 degrees Celsius. This item also provides for the replacement of 35 deteriorated structures along the length of the line.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Requirement to Serve

Why do this project?

This project is required to upgrade the capacity of L5501 so it can accommodate increased load.

Why do this project now?

This project will ensure that reliability to those areas served by L5500 is not affected during line outage situations through the ability to accommodate the increased load on L5501.

Why do this project this way?

This existing conductor on the 69 kV circuit between Trenton and Stellarton is 2/0 ACSR. Upgrading the conductor to 336.4 ACSR will enable the circuit to accommodate the load of L5500 from Trenton to Stellarton when it is taken out of service or experiences an unplanned outage.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40270 - Upgrade 69 kV Circuit to Bridge Ave L5501 **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 800 - 800-Services - Admin. **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		14,188	0	14,188
094		094 - Interest Capitalized		4,611	0	4,611
095		095-Thermal Regular Labour AO		816	0	816
095		095-COPS Regular Labour AO		21,613	0	[redacted]
095		095-COPS Contracts AO		[redacted]	0	[redacted]
012	035	012 - Materials	035 - TP - Wood Poles	55,000	0	55,000
013	035	013 - COPS Contracts	035 - TP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - TP - O/H Cond.	25,000	0	25,000
013	039	013 - COPS Contracts	039 - TP - O/H Cond.	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	3,400	0	3,400
001	087	001 - T&D Regular Labour	087 Field Super.& Ops.	28,000	0	28,000
			Total Cost:	800,793	0	800,793
			Original Cost:	80,000		

CI 40270 - Upgrade 69kV Circuit to Bridge Ave L5501

The following is a breakdown of costs associated with the Upgrade 69kV Circuit to Bridge Ave L5501 Project.

Administrative Overhead and Interest	$[redacted]
Materials	$80,000
Contracts	$[redacted]
COPS Labour	$31,400
Total	$800,793

This work is expected to be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The COPS labour portion includes supervision and engineering design. The materials amount of this project is based on costs associated with similar projects in which deteriorated poles were replaced and conductor upgraded to achieve higher ratings.

From 2006-2010, the combined load on L5500 and 5501 were such that the 51MVA rating of L5501 would be exceeded.

Table 1 – Five Year Load Statistics

Year	Combined Load L5500 & L5501 (MVA)
2006	56.6
2007	61.7
2008	52.6
2009	52.9
2010	52.9

CI Number: 40323

Title: Canaan Road Line Terminal

Start Date: 2011/05

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $738,632

DESCRIPTION:

This project provides for costs associated with the termination of a 138 kV circuit at the Canaan Road Substation consisting of a new 138 kV circuit breaker.

Summary of Related CI’s +/- 2 years:
2011 – 40322 Prospect Road Substation $3,068,581
2011 – 40321 Install Canaan Road to Prospect Road Transmission Line $2,024,763
2011 – 38841 New Minas Land Purchase and Rights of Way $593,776

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Overloaded Equipment

Why do this project?

This project is necessary to terminate a transmission line to accommodate load growth in the New Minas area. In particular the transformers at the existing New Minas substation are approaching overload and projected load increase. This project was recommended in the 2008 distribution planning study, “22V-New Minas, 36V-Hillaton, 50V-Klondike Report No. 261-0608-W66.5”.

Why do this project now?

This project is required at this time to address growth issues in the New Minas area and to minimize unplanned outages due to protection trips.

Why do this project this way?

This circuit breaker is necessary to provide a line termination for a 138 kV transmission line to a proposed new substation in the Prospect Road area of New Minas.

Based on the scope of the work and availability of NSPI’s Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40323 - Canaan Road Line Terminal

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		38,842	0	38,842
094		094 - Interest Capitalized		9,007	0	9,007
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		2,880	0	2,880
095		095-COPS Regular Labour AO		59,171	0	59,171
001	003	001 - T&D Regular Labour	003 - TP - Bldg.,Struct.Grnd.	1,342	0	1,342
002	003	002 - T&D Overtime Labour	003 - TP - Bldg.,Struct.Grnd.	0	0	0
012	003	012 - Materials	003 - TP - Bldg.,Struct.Grnd.	78,821	0	78,821
013	003	013 - COPS Contracts	003 - TP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
066	003	066 - Other Goods & Services	003 - TP - Bldg.,Struct.Grnd.	10,592	0	10,592
001	022	001 - T&D Regular Labour	022 - TP - Elec Contr.Equip.	9,059	0	9,059
002	022	002 - T&D Overtime Labour	022 - TP - Elec Contr.Equip.	0	0	0
012	022	012 - Materials	022 - TP - Elec Contr.Equip.	93,725	0	93,725
013	022	013 - COPS Contracts	022 - TP - Elec Contr.Equip.	[redacted]	0	[redacted]
066	022	066 - Other Goods & Services	022 - TP - Elec Contr.Equip.	23,000	0	23,000
001	023	001 - T&D Regular Labour	023 - TP - Power Equip.-Station S	671	0	671
002	023	002 - T&D Overtime Labour	023 - TP - Power Equip.-Station S	0	0	0
012	023	012 - Materials	023 - TP - Power Equip.-Station S	748	0	748
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	20,256	0	20,256
002	043	002 - T&D Overtime Labour	043 - TP - Substn Dev.	0	0	0
012	043	012 - Materials	043 - TP - Substn Dev.	219,800	0	219,800
001	085	001 - THERMAL Regular Labour	085 Design	11,994	0	11,994
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
066	085	066 - Other Goods & Services	085 Design	1,150	0	1,150
001	086	001 - T&D Regular Labour	086 Commissioning	45,328	0	45,328
002	086	002 - T&D Overtime Labour	086 Commissioning	0	0	0
013	087	013 - COPS Contracts	087 Field Super.& Ops.	[redacted]	0	[redacted]
			Total Cost:	738,632	0	738,632
			Original Cost:			

CI 40323 Canaan Road Line Terminal

The following is a breakdown of costs associated with the Canaan Road Line Terminal Project.

Administrative Overhead and Interest	$[redacted]
Materials	$393,094
Contracts	$[redacted]
COPS Labour	$88,650
Other	$34,742
Total	$738,632

This work is expected to be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The COPS Labour portion includes supervision and engineering design. The materials amount of this project is based on costs associated with similar projects.

The planning study referenced for this project is provided in CI 40322, Confidential Attachment 1.

CI Number: 40296

Title: 2011 Transmission Steel Tower Painting

Start Date: 2011/05

Final Cost Date: 2011/07

Function: Transmission

Forecast Amount: $587,142

DESCRIPTION:

This item provides for the cost to apply anti-corrosive paint to four lattice steel towers that comprise the crossing of the Halifax Harbour at the 'Narrows'. These crossings were constructed in the late 1950's and field inspection has indicated that these towers are beginning to experience surface corrosion.

Summary of Related CI's +/- 2 years
This is a multi-year program that will continue beyond 2011. Future CIs TBD.

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Maintenance

Why do this project?

These towers are exposed to an aggressive marine environment and are experiencing corrosion from the salt laden environment.

Why do this project now?

These four towers require repainting in 2011 to reduce the loss of metal, which will extend the life of the towers. These towers support L-6014 which forms part of the looped transmission service to Peninsular Halifax.

Why do this project this way?

The most cost effective approach is to repaint the steel towers prior to the corrosion penetrating the existing paint and contacting the metal after which painting is no longer an effective mitigation solution.

CI Number : 40296 - 2011 Transmisison Steel Tower Painting

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		12,161	0	12,161
094		094 - Interest Capitalized		1,412	0	1,412
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-Thermal Regular Labour AO		[redacted]	0	[redacted]
095		095-COPS Regular Labour AO		18,526	0	18,526
001	037	001 - T&D Regular Labour	037 - TP - Steel Towers	24,000	0	24,000
013	037	013 - COPS Contracts	037 - TP - Steel Towers	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	[redacted]	0	[redacted]
			Total Cost:	587,142	0	587,142
			Original Cost:			

CI 40296 - 2011 Transmission Steel Tower Painting

The following is a breakdown of costs associated with the 2011 Transmission Steel Tower Painting Project.

Administrative Overhead and Interest	$[redacted]
Contracts	$[redacted]
COPS Labour	$[redacted]
Total	$587,142

This work is expected to be completed by a contractor with NSPI supervision. Estimates were based on discussions with those who perform this type of work. The COPS labour portion includes supervision and engineering design for completion of this work.

CI Number: 40279

Title: 2011 Pole Retreatment

Start Date: 2011/05

Final Cost Date: 2011/10

Function: Transmission

Forecast Amount: $516,341

DESCRIPTION:

This project provides for the cost of re-treatment of approximately 5000 transmission poles.

Summary of Related CI's +/- 2 years
2009 – CI 33563 2009 Pole Retreatment $498,547
2010 – CI 38860 2010 Pole Retreatment $495,505
This is a multi-year program that will continue beyond 2011.Future CIs TBD.

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Maintenance

Why do this project?

Pole re-treatment is a cost effective approach to extend the life of the pole.

Why do this project now?

NSPI re-instated the pole re-treatment program in 2006, a decision supported by the UARB following the November, 2004 Storm Hearing.

Why do this project this way?

Cycle based pole re-treatment is a cost effective way to extend the life of treated wood poles.

CI Number : 40279 - 2011 Pole Retreatment

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		13,174	0	13,174
094		094 - Interest Capitalized		8,368	0	8,368
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-COPS Regular Labour AO		20,069	0	20,069
095		095-Thermal Regular Labour AO		120	0	120
012	035	012 - Materials	035 - TP - Wood Poles	[redacted]	0	[redacted]
013	035	013 - COPS Contracts	035 - TP - Wood Poles	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	500	0	500
001	087	001 - T&D Regular Labour	087 Field Super.& Ops.	26,000	0	26,000
011	087	011 - Travel Expense	087 Field Super.& Ops.	8,000	0	8,000
			Total Cost:	516,341	0	516,341
			Original Cost:			

CI 40279 2011 Pole Retreatment

The following is a breakdown of costs associated with the 2011 Pole Retreatment Project.

Administrative Overhead and Interest	$[redacted]
Contracts	$[redacted]
Materials	$[redacted]
COPS Labour	$26,500
Other	$8,000
Total	$516,341

This work is expected to be completed by an external contractor with NSPI supervision. Estimates of contacts and materials are based on actual costs incurred in this program in previous years. The COPS labour portion includes NSPI supervision for completion of this work. The list of lines to be completed in 2011 is as follows:

LINES	OPERATING SECTION NUMBER AND NAME	APPROX POLES
5017	Five Points 20V to Canaan Road 43V	272
5025	Paradise 11V to Tremont 51V	402
5026	Gulch 13V to Paradise 11V	604
5035	Hells Gate 3V to Canaan Road 43V	10
5042	Farrell Street 99H to Albro Lake 62H	23
5048	East Green Harbour 36W to Lockport 37W	95
5050	Sissiboo 15V to Fourth Lake 91V	198
5057	Tap off L5026 to Cornwallis	30
5500	Trenton 50N to Bridge Ave 62N	160
5530	Milton 50W to Souriquois 30W	960
5538	Sissiboo 15V to Weymouth 16V	92
6516	Port Hastings 2C to Victoria Junction 2S	1017
6521	Port Tupper 1C to Point Tupper Terminal 46C	30
6543	Port Hastings 2C to 3C	5
7011	Port Hastings 2C to Lingan 88S	1214
TOTALS		**5112**

CI Number: 40321

Title: Install Canaan Road to Prospect Road Transmission Line

Start Date: 2011/12

Final Cost Date: 2012/12

Function: Transmission

Forecast Amount: $2,024,763

DESCRIPTION:

This project provides for costs associated with the construction of a 4.3 km, 138 kV transmission line from Canaan Road Substation to a new substation in the Prospect Road area of New Minas.

Summary of Related CI's +/- 2 years:
2011 – 40322 Prospect Road Substation $3,068,581
2011 – 40323 Canaan Road Line Terminal $738,632
2011 – 38841 New Minas Land Purchase and Rights of Way $593,776

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Requirement to Serve

Why do this project?

This project is necessary to accommodate load growth in the New Minas area. The transformers at the existing New Minas substation are approaching overload. This project was recommended in the 2008 distribution planning study, "22V-New Minas, 36V-Hillaton, 50V-Klondike Report No. 261-0608-W66.5".

Why do this project now?

This project is required at this time to address growth issues in the New Minas area and to minimize unplanned outages due to protection trips.

Why do this project this way?

The construction of a 138 kV transmission line from Canaan Road is required to supply a new substation in the Prospect Road area of New Minas.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40321 - Install Canaan Road to Prospect Road Transmission Line

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		73,835	0	73,835
095		095-Thermal Regular Labour AO		12,005	0	12,005
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	035	013 - COPS Contracts	035 - TP - Wood Poles	[redacted]	0	[redacted]
020	035	020 - Royalties, Easements, App	035 - TP - Wood Poles	67,770	0	67,770
012	039	012 - Materials	039 - TP - O/H Cond.	[redacted]	0	[redacted]
020	039	020 - Royalties, Easements, App	039 - TP - O/H Cond.	[redacted]	0	[redacted]
001	085	001 - THERMAL Regular Labour	085 Design	50,000	0	50,000
			Total Cost:	2,024,763	0	2,024,763
			Original Cost:			

CI 40321 Install Canaan Road to Prospect Road Transmission Line

The following is a breakdown of costs associated with the Canaan Road to Prospect Road Transmission Line Project.

Administrative Overhead and Interest	$[redacted]
Contracts	$[redacted]
Materials	$[redacted]
COPS Labour	$50,000
Royalties and Easements	$[redacted]
Total	$2,024,763

The contract portion of this work is expected to be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The COPS labour portion includes supervision and engineering design. There is $[redacted] included in this project for obtaining easements along the proposed route of this new transmission line.

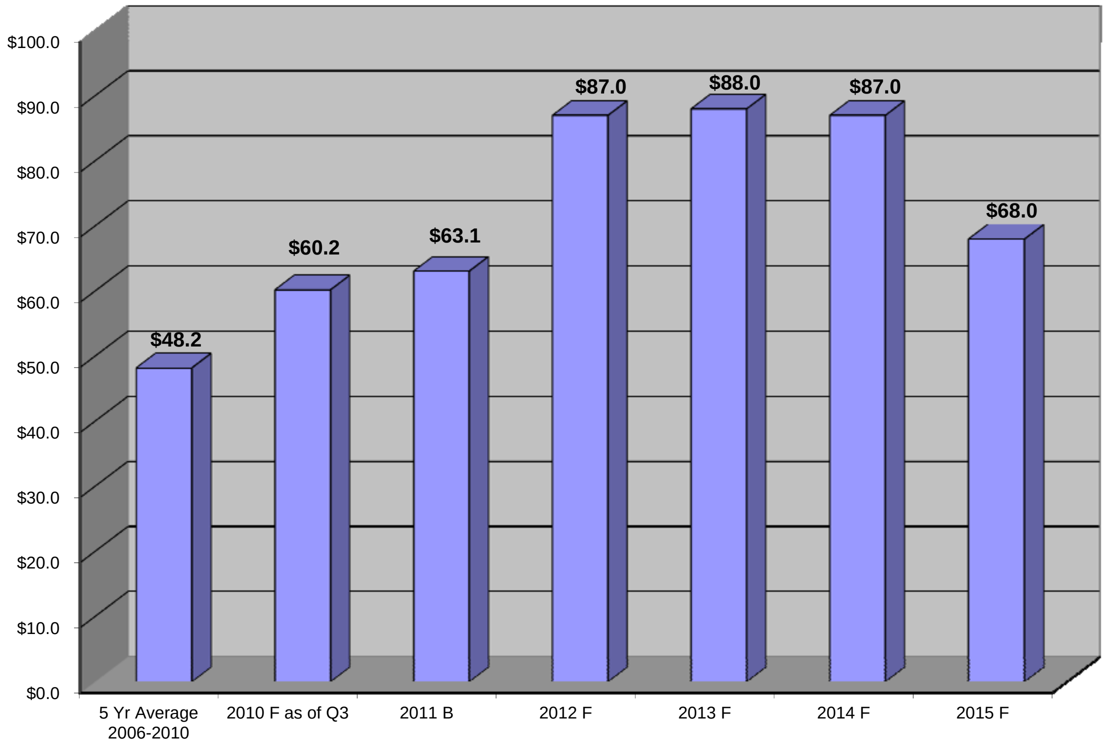
The planning study referenced for this project is provided in CI 40322, Confidential Attachment 1.

Distribution

4 DISTRIBUTION

(Millions of Dollars)

4.1 Five Year Plan and Highlights



- Distribution capital in 2011 focuses on New Customer growth and customer reliability.

- Year 2011 distribution capital is comprised of the following:

  - $8.0M New items with total spend greater than $250K seeking ACE approval
  - $5.8M New items with total spend greater than $250K for individual approval
  - $1.5M New items with total spend less than $250K
  - $0.3M Carryover Spending
  - $47.6M Routine Capital Spending

4.2 Distribution – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2011 Budget	Subsequent Spending	Total Estimate
D321	38867	Replacement of 3H and 6H Reclosers	2010/09	2011/09	2,555	272,190	-	274,745
		Total Distribution			**$2,555**	**$272,190**	**$0**	**$274,745**

4.3 Distribution – New Item Spending

Tab#	CI#	Project Title	2011 Budget	Project Total
D1	25575	Reliability Keltic Drive New Feeder	$1,205,023	$1,205,023
D2	40224	78W-301 Second Peninsula	1,010,713	1,010,713
D3	40226	Sluice Pt 3rd Phase Addition 102W-312	606,307	606,307
D4	40204	70W-322 Starr Street Rebuild	546,821	546,821
D5	40202	39N Maccan Conversion	538,646	538,646
D6	39272	2011 Distribution Feeder Ties	500,000	500,000
D7	40379	Scotch Village Phase 2	458,177	458,177
D8	39269	2011 Recloser Additions	444,765	444,765
D9	40203	103W-311 Gold River Phase 1	434,415	434,415
D10	40220	2011 Halifax Underground Cable Replacement	418,861	418,861
D11	40338	16W-301 Hebron Reconductor	350,000	350,000
D12	40328	Feeder Exit Cable Replacements	317,587	317,587
D13	40211	2011 3H/6H Replacement Program	306,895	306,895
D14	40385	88W-323G Pinkney's Point Part 2	295,351	295,351
D15	40273	101H-411 Targeted Feeder Replacements	273,399	273,399
D16	40265	77V-401 Targeted Feeder Replacements	267,321	267,321
		Total Distribution New Spending	**$7,974,281**	**$7,974,281**

Where NSPI has forecast contract forces to perform Transmission and Distribution work, certain assumptions have been included with regards to the activities and items in the contract price to make the rate essentially all inclusive versus the NSPI labor rate. These same items are accounted for separately and are not reflected in the labour accounts/ person day rate the NSPI cost estimate provides when NSPI is to perform the work activity.

CI Number: 25575

Title: Reliability Keltic Drive New Feeder

Start Date: 2011/04

Final Cost Date: 2011/12

Function: Distribution

Forecast Amount: $1,205,023

DESCRIPTION:

This project is for the distribution work required in constructing a new overhead 25 kV feeder from the Keltic Drive Substation. The source for this feeder will be provided by a second project CI#25391 in 2010 "Add a New 25 kV Bus at the Keltic Drive Substation". This feeder will extend from the Keltic Drive Substation along Route #4 to Howie Center where it will supply a portion of the load off overloaded feeders 11S-303 and 11S-411.

Summary of Related CI's +/- 2 years:
2010 CI 33766 11S-411 Targeted Feeder Replacements $817,950
2010 CI 25391 25 kV Bus Keltic Drive Substation $671,843

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Overloaded Equipment

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year two of a five year (2010-2014) plan to improve reliability to NSPI's customers. This project is required to offload the existing 25 kV feeder.

Why do this project now?

This project will improve reliability to customers by reconfiguring this feeder and will offload the existing feeder. In addition to alleviating the overload conditions, annual reliability savings of approximately 4,200 customer hours of interruption are expected for the Howie Center area once voltage conversion and the new feeder source line is complete.

Why do this project this way?

The completion of this work will reduce outages and improve reliability on this feeder.

CI Number : 25575	- Reliability Keltic Drive New Feeder	**Project Number**	
Parent CI Number :	-	**Approved Date**	
Cost Centre : 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		142,806	0	142,806
094		094 - Interest Capitalized		25,681	0	25,681
095		095-COPS Contracts AO		[redacted]	0	[redacted]
095		095-COPS Regular Labour AO		217,549	0	217,549
001	035	001 - T&D Regular Labour	035 - DP - Wood Poles	87,734	0	87,734
012	035	012 - Materials	035 - DP - Wood Poles	[redacted]	0	[redacted]
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
098	035	098 - Salvage	035 - DP - Wood Poles	(912)	0	(912)
001	039	001 - T&D Regular Labour	039 - DP - O/H Cond.	110,590	0	110,590
012	039	012 - Materials	039 - DP - O/H Cond.	[redacted]	0	[redacted]
098	039	098 - Salvage	039 - DP - O/H Cond.	(1,046)	0	(1,046)
001	040	001 - T&D Regular Labour	040 - DP - O/H Cond.Devices	3,377	0	3,377
012	040	012 - Materials	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
098	040	098 - Salvage	040 - DP - O/H Cond.Devices	(250)	0	(250)
001	041	001 - T&D Regular Labour	041 - DP - O/H Line Transf.	33,215	0	33,215
012	041	012 - Materials	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
098	041	098 - Salvage	041 - DP - O/H Line Transf.	(29,981)	0	(29,981)
001	050	001 - T&D Regular Labour	050 - DP - Street Lights	2,112	0	2,112
012	050	012 - Materials	050 - DP - Street Lights	[redacted]	0	[redacted]
001	052	001 - T&D Regular Labour	052 - DP - Services	9,806	0	9,806
012	052	012 - Materials	052 - DP - Services	[redacted]	0	[redacted]
098	052	098 - Salvage	052 - DP - Services	(88)	0	(88)
001	087	001 - T&D Regular Labour	087 Field Super.& Ops.	35,000	0	35,000
			Total Cost:	1,205,023	0	1,205,023
			Original Cost:	108,897		

CI 25575 – Reliability Keltic Drive New Feeder

The following is a breakdown of costs associated with the Keltic Drive New Feeder Project.

Administrative Overheads and Interest	$[redacted]
Labour	$281,834
Materials	$[redacted]
Contracts	$[redacted]
Salvage	$(32,278)
Total	$1,205,023

The $281,834 internal labour estimate for this project is based on an internal rate of $[redacted] per person day. The materials estimate of $[redacted] is for the cost of electrical equipment including poles, hendrix cable and associated hardware and is based on supplier information and previous projects. The contract estimate of $[redacted] is for land rights and permitting.

CI Number: 40224

Title: 78W-301 Second Peninsula

Start Date: 2011/08

Final Cost Date: 2011/10

Function: Distribution

Forecast Amount: $1,010,713

DESCRIPTION:

This project provides for the rebuild of the existing single phase line on Second Peninsula and the addition of a second phase that will be used to express-feed Heckman's Island. Both of these phases will be constructed using Hendrix Cable, an insulated conductor that uses special brackets to cluster the cable in such a way as to minimize the amount of clearance required from surrounding objects (trees, other electrical circuits etc.). Hendrix cable is used in areas where contact from trees is common to minimize outages.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Outage Performance

Why do this project?

This project is required to improve the reliability of 78W-301G through the addition of a new phase, and the use of Hendrix Cable**.**

Why do this project now?

This project will improve the reliability of the power supply to Second Peninsula and Heckman's Island.

Why do this project this way?

This project will implement a newer technology in an area that is prone to outages caused by tree contact.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number	: 40224	- 78W-301 Second Peninsula		**Project Number**	
Parent CI Number	:	-		**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		9,783	0	9,783
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	36,068	0	36,068
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - DP - O/H Cond.	120,330	0	120,330
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
012	040	012 - Materials	040 - DP - O/H Cond.Devices	3,684	0	3,684
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
098	040	098 - Salvage	040 - DP - O/H Cond.Devices	(344)	0	(344)
012	041	012 - Materials	041 - DP - O/H Line Transf.	7,299	0	7,299
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
013	050	013 - COPS Contracts	050 - DP - Street Lights	[redacted]	0	[redacted]
012	052	012 - Materials	052 - DP - Services	2,433	0	2,433
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
			Total Cost:	1,010,713	0	1,010,713
			Original Cost:	91,733		

CI 40224 - 78W-301 Second Peninsula

The following is a breakdown of costs associated with the 78W-301 Second Peninsula Project.

Administrative Overhead and Interest	$[redacted]
Materials	$169,814
Contracts	$[redacted]
Other	$(344)
Total	$1,010,713

The contracted work associated with this project is proposed to be completed by a contractor at a budgeted rate of $[redacted] per standard work unit hour. The cost of Hendrix cable, included in the materials cost of $169,814 was obtained from a supplier while all other material costs are based on previous projects of a similar nature.

CI Number: 40226

Title: Sluice Pt 3rd Phase Addition 102W-312

Start Date: 2011/04

Final Cost Date: 2011/09

Function: Distribution

Forecast Amount: $606,307

DESCRIPTION:

This project will add a third phase to the feeder 102W-312 along Highway 308, to balance the load on the existing two phases. The third phase will extend from Highway #3 to Chemin des Bouleaux, approximately 7 kms. This will aid in balancing the load, as well as coordinating protection. Removal of the old conductor will be required, as well as the upgrading of some insulators and cross arms.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Currently, the two existing phases are unbalanced and the coordination of protection devices is difficult.

Why do this project now?

The current unbalanced condition affects the reliability in the area. Adding a third phase will balance the load and improve the ability to coordinate protective devices.

Why do this project this way?

This is the only reasonable option to balance the existing load.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40226 - Sluice Pt PH 3 Addition 102W-312 **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 800 - 800-Services - Admin. **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		6,386	0	6,386
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	15,004	0	15,004
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - DP - O/H Cond.	36,975	0	36,975
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
012	040	012 - Materials	040 - DP - O/H Cond.Devices	3,175	0	3,175
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
012	041	012 - Materials	041 - DP - O/H Line Transf.	7,228	0	7,228
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
			Total Cost:	606,307	0	606,307
			Original Cost:	37,461		

CI 40226 - Sluice Pt PH 3 Addition 102W-312

The following is a breakdown of costs associated with the 102W-312 Sluice Pt Phase 3 Addition Project.

Administrative Overhead and Interest	$[redacted]
Materials	$62,382
Contracts	$[redacted]
Total	$606,307

The contracted work associated with this project is proposed to be completed by a contractor at a budgeted rate of $[redacted] per standard work unit hour. There is $[redacted] included as contracts for land rights. The material cost of this project is based on similar projects in the past.

CI Number: 40204

Title: 70W-322 Starr Street Rebuild

Start Date: 2011/01

Final Cost Date: 2011/07

Function: Distribution

Forecast Amount: $546,821

DESCRIPTION:

This project results from the 2007 Planning Study, 244-11 06-W65 "Bridgewater East (89W)". This study outlined the need for the reconductoring of 70W-322 to enable the transfer schemes, between 89W-304 and 89W-301. The circuit will be reconductored with 336ACSR, as the current conductor is overloaded. Poles will be replaced on Starr St. to provide adequate spacing between existing equipment and the new conductors.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Overloaded Equipment

Why do this project?

The current conductor is overloaded and has limited capacity for contingency loads.

Why do this project now?

This project is required to relieve overloaded equipment and will improve the reliability to customers, through the increased capacity for load transfers, as recommended in the planning study.

Why do this project this way?

This project was recommended in the attached 2007 Planning Study, 244-11 06-W65 "Bridgewater East (89W)", to be the most cost effective solution to serve the area, in a reliable manner.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40204	- 70W-322 Starr Street Rebuild	**Project Number**	
Parent CI Number :	-	**Approved Date**	
Cost Centre : 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		4,459	0	4,459
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	35,437	0	35,437
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
098	035	098 - Salvage	035 - DP - Wood Poles	(5,442)	0	(5,442)
012	039	012 - Materials	039 - DP - O/H Cond.	20,391	0	20,391
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
098	039	098 - Salvage	039 - DP - O/H Cond.	(295)	0	(295)
012	040	012 - Materials	040 - DP - O/H Cond.Devices	579	0	579
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
012	041	012 - Materials	041 - DP - O/H Line Transf.	7,617	0	7,617
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
098	041	098 - Salvage	041 - DP - O/H Line Transf.	(1,130)	0	(1,130)
012	042	012 - Materials	042 - DP - O/H Ln.Transf.Dev.	1,822	0	1,822
013	042	013 - COPS Contracts	042 - DP - O/H Ln.Transf.Dev.	[redacted]	0	[redacted]
098	042	098 - Salvage	042 - DP - O/H Ln.Transf.Dev.	(1,368)	0	(1,368)
012	050	012 - Materials	050 - DP - Street Lights	74	0	74
013	050	013 - COPS Contracts	050 - DP - Street Lights	[redacted]	0	[redacted]
012	052	012 - Materials	052 - DP - Services	1,393	0	1,393
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
098	052	098 - Salvage	052 - DP - Services	(54)	0	(54)
			Total Cost:	546,821	0	546,821
			Original Cost:	36,011		

CI 40204 70W-322 Starr Street Rebuild

The following is a breakdown of costs associated with the 70W-322 Starr Street Rebuild Project.

Administrative Overhead and Interest	$[redacted]
Materials	$67,313
Contracts	$[redacted]
Salvage	($8,289)
Total	$546,821

The contracted work associated with this project is proposed to be completed by a contractor at a budgeted rate of $[redacted] per standard work unit hour. There is $[redacted] included as contracts for land rights. The material cost of this project is based on similar projects in the past.

Pages 1743 - 1768 have been removed due to confidentiality.

CI Number: 40202

Title: 39N Maccan Conversion

Start Date:	2011/01
Final Cost Date:	2011/06
Function:	Distribution
Forecast Amount:	$538,646

DESCRIPTION:

This project is for the work required for the retirement of the 25 kV to 4 kV Maccan Stepdown Transformer, 39N-201. The current stepdown is an oil filled device which is rusting. The transformer is more than 50 years old and is nearing the end of its useful life. This project will also upgrade the current feeder, 39N-201, towards Maccan East, from 4 kV to 25 kV distribution, for improved reliability. This load will continue to be serviced by the 30N-411 feeder. The project will include the removal of the current stepdown transformer, as well as upgrading of the down line equipment.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Equipment Replacement

Why do this project?

This project is required to remove the 39N Maccan Stepdown from service, as the equipment is oil filled and rusting.

Why do this project now?

The 39N Maccan Stepdown is more than 50 years old and is approaching the end of its useful life. Retirement reduces the potential for a lengthy unplanned outage, due to transformer failure and the potential environmental risk is mitigated.

Why do this project this way?

Replacement of the deteriorated equipment in this manner is the most cost effective option.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40202 - 39N Maccan Conversion **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 800 - 800-Services - Admin. **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		4,516	0	4,516
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	22,339	0	22,339
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
098	035	098 - Salvage	035 - DP - Wood Poles	(7,122)	0	(7,122)
012	039	012 - Materials	039 - DP - O/H Cond.	18,623	0	18,623
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
098	039	098 - Salvage	039 - DP - O/H Cond.	(12,660)	0	(12,660)
012	040	012 - Materials	040 - DP - O/H Cond.Devices	4,914	0	4,914
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
098	040	098 - Salvage	040 - DP - O/H Cond.Devices	0	0	0
012	041	012 - Materials	041 - DP - O/H Line Transf.	65,480	0	65,480
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
098	041	098 - Salvage	041 - DP - O/H Line Transf.	(22,890)	0	(22,890)
012	050	012 - Materials	050 - DP - Street Lights	1,000	0	1,000
013	050	013 - COPS Contracts	050 - DP - Street Lights	[redacted]	0	[redacted]
098	050	098 - Salvage	050 - DP - Street Lights	(5)	0	(5)
012	052	012 - Materials	052 - DP - Services	862	0	862
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
098	052	098 - Salvage	052 - DP - Services	(119)	0	(119)
			Total Cost:	538,646	0	538,646
			Original Cost:	31,769		

CI 40202 39N Maccan Conversion

The following is a breakdown of costs associated with the 39N Maccan Conversion Project.

Administrative Overhead and Interest	$[redacted]
Materials	$113,218
Contracts	$[redacted]
Salvage	($42,796)
Total	$538,646

The contracted work associated with this project is proposed to be completed by a contractor at a budgeted rate of $[redacted] per standard work unit hour. There is $[redacted] included as contracts for land rights. The material cost of this project is based on similar projects in the past.

CI Number: 39272

Title: 2011 Distribution Feeder Ties

Start Date: 2011/05

Final Cost Date: 2011/10

Function: Distribution

Forecast Amount: $500,000

DESCRIPTION:

This item provides for the costs associated with reconductoring sections of lines to enable them to be interconnected. This allows for the transfer of customers to an adjacent feeder during an outage. This process will reduce the length of the outage to customers on the affected circuit. Targeted feeder interconnections are 79V- 403 / 1V- 443.

Summary of Related CI's +/- 2 years
2010 - 38847 2010 Distribution Feeder Ties - $496,042
2012- CIs TBD
2013- CIs TBD

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Outage Performance

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year two of a five year (2010-2014) plan to improve reliability to NSPI's customers. This project is required in order to improve reliability by enabling the transfer of customers between feeders during outages.

Why do this project now?

This project will improve system reliability, with an expected annual savings of 3,200 customer hours of interruption

Why do this project this way?

This is the most cost effective and efficient way to create feeder interconnections between these circuits.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 39272 - 2011 Distribution Feeder Ties

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		5,688	0	5,688
095		095-COPS Contracts AO		[redacted]	0	[redacted]
001	035	001 - T&D Regular Labour	035 - DP - Wood Poles	0	0	0
002	035	002 - T&D Overtime Labour	035 - DP - Wood Poles	0	0	0
012	035	012 - Materials	035 - DP - Wood Poles	30,056	0	30,056
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
001	039	001 - T&D Regular Labour	039 - DP - O/H Cond.	0	0	0
002	039	002 - T&D Overtime Labour	039 - DP - O/H Cond.	0	0	0
012	039	012 - Materials	039 - DP - O/H Cond.	31,700	0	31,700
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
001	040	001 - T&D Regular Labour	040 - DP - O/H Cond.Devices	0	0	0
002	040	002 - T&D Overtime Labour	040 - DP - O/H Cond.Devices	0	0	0
012	040	012 - Materials	040 - DP - O/H Cond.Devices	50,426	0	50,426
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
			Total Cost:	500,000	0	500,000
			Original Cost:	337,807		

CI 39272 2011 Distribution Feeder Ties

The following is a breakdown of costs associated with the 2011 Distribution Feeder Ties Project.

Administrative Overhead and Interest	$[redacted]
Materials	$112,182
Contracts	$[redacted]
Total	$500,000

The contracted work associated with this project is proposed to be completed by a contractor at a budgeted rate of $[redacted] per standard work unit hour. The material cost of this project is based on a similar project, CI 38847 Distribution Feeder Ties, which was submitted in the 2010 Annual Capital Expenditure Plan.

CI Number: 40379

Title: Scotch Village Phase 2

Start Date: 2011/05

Final Cost Date: 2011/12

Function: Distribution

Forecast Amount: $458,177

DESCRIPTION:

This project is the second phase of a three year program to replace deteriorated plant along Highway 236 from Scotch Village toward Stanley & Clarksville. This will involve the replacement of deteriorated poles, conductor, and devices as required to improve the reliability of the line. A portion of this project was completed in 2010 under the Deteriorated Plant Routine.

Summary of Related CI's +/- 2 years:
2010 CI 23158 – Unplanned Replace Deteriorated Plant Routine $6,487,745

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Equipment Replacement

Why do this project?

This project is required to replace deteriorated equipment that is affecting the reliability of 624V-311.

Why do this project now?

Due to the age of the plant on this feeder, deterioration is negatively affecting reliability.

Why do this project this way?

The completion of this work will reduce outages and improve reliability on this feeder.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number	: 40379	- Scotch Village Phase 2	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		8,294	0	8,294
095		095-COPS Contracts AO		[redacted]	0	[redacted]
098		098 - Salvage		(6,067)	0	(6,067)
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	20,886	0	20,886
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - DP - O/H Cond.	18,041	0	18,041
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
012	040	012 - Materials	040 - DP - O/H Cond.Devices	1,158	0	1,158
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
012	041	012 - Materials	041 - DP - O/H Line Transf.	21,796	0	21,796
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
013	050	013 - COPS Contracts	050 - DP - Street Lights	[redacted]	0	[redacted]
012	052	012 - Materials	052 - DP - Services	489	0	489
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
			Total Cost:	458,177	0	458,177
			Original Cost:	39,279		

CI 40379 - Scotch Village Phase 2

The following is a breakdown of costs associated with the Scotch Village Phase 2 Project.

Administrative Overhead and Interest	$[redacted]
Materials	$62,370
Contracts	$[redacted]
Salvage	($6,067)
Total	$458,177

The contracted work associated with this project is proposed to be completed by a contractor at a budgeted rate of $[redacted] per standard work unit hour. There is $[redacted] of contracts associated with land rights. The material cost of this project is based on similar projects in the past.

CI Number: 39269

Title: 2011 Recloser Additions

Start Date: 2011/02

Final Cost Date: 2011/12

Function: Distribution

Forecast Amount: $444,765

DESCRIPTION:

This item provides for the installation of additional reclosers to provide sectionalizing points on specified feeders. In 2011 it is proposed to add or change out reclosers associated with 9 distribution circuits. Feeder selection is based on Customer Interruptions (CI) x Customer Hours (CH) weighting for full feeder outages that were not caused by loss of transmission. The feeders involved in this project are 1N-405 (25 kV feeder out of Onslow toward Bible Hill), 79V-401 (25 kV feeder out of Three Mile Plains toward Newport Corner), 64V-301 (12 kV feeder out of Greenwood Village toward Torbrook Mines), 55V-314 (12 kV feeder out of Waterville toward Aylesford), 1N-421 (25 kV feeder out of Onslow toward Walker St.), 65V-303 (12 kV feeder out of Middleton toward Lower Middleton), 82S-304 (12 kV feeder out of Whitney Pier toward South Bar), 137H-412 (25 kV feeder out of Hammonds Plains), 18V-413 (25 kV feeder out of Upper Burlington toward Scotch Village).

Summary of Related CI's +/- 2 years:
2009 - 35642 2009 Recloser Additions $1,512,766
2010 - 38022 2010 Recloser Additions $1,400,271
2012- CIs TBD
2013- CIs TBD

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Outage Performance

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year two of a five year (2010-2014) plan to improve reliability to NSPI's customers. This project is required to improve distribution reliability on feeders. An estimated 5,445 customer interruptions and 9,950 customer hours of interruption will be avoided each year through improved feeder sectionalizing and automatic restoration of unfaulted feeder segments.

Why do this project now?

This project will provide improved reliability through avoided customer interruptions.

Why do this project this way?

This project will provide improved reliability through avoided customer interruptions. Appropriate sectionalizing of a feeder will improve outage statistics. For instance, installing a recloser at 50% of the length of a feeder with 50% of the customer count before and after the recloser will result in a 25% (on average) improvement in both the System Average Interruption Frequency Index (SAIFI) and the System Average Interruption Duration Index (SAIDI) statistics. The reduction in customer outages will improve customer service.

CI Number	: 39269	- 2011 Recloser Additions	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		25,542	0	25,542
094		094 - Interest Capitalized		7,319	0	7,319
095		095-COPS Contracts AO		2,346	0	2,346
095		095-COPS Regular Labour AO		38,910	0	38,910
001	035	001 - T&D Regular Labour	035 - DP - Wood Poles	15,408	0	15,408
002	035	002 - T&D Overtime Labour	035 - DP - Wood Poles	0	0	0
012	035	012 - Materials	035 - DP - Wood Poles	85,000	0	85,000
013	035	013 - COPS Contracts	035 - DP - Wood Poles	5,000	0	5,000
066	035	066 - Other Goods & Services	035 - DP - Wood Poles	10,240	0	10,240
001	039	001 - T&D Regular Labour	039 - DP - O/H Cond.	10,000	0	10,000
002	039	002 - T&D Overtime Labour	039 - DP - O/H Cond.	0	0	0
012	039	012 - Materials	039 - DP - O/H Cond.	85,000	0	85,000
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	0	0	0
001	040	001 - T&D Regular Labour	040 - DP - O/H Cond.Devices	25,000	0	25,000
002	040	002 - T&D Overtime Labour	040 - DP - O/H Cond.Devices	0	0	0
012	040	012 - Materials	040 - DP - O/H Cond.Devices	130,000	0	130,000
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	5,000	0	5,000
066	040	066 - Other Goods & Services	040 - DP - O/H Cond.Devices	0	0	0
			Total Cost:	444,765	0	444,765
			Original Cost:	30,000		

CI 39269 2011 Recloser Additions

The following is a breakdown of costs associated with the 2011 Recloser Additions project:

Administrative Overhead and Interest	$74,117
Materials	$300,000
Contracts	$10,000
COPS Labour	$50,408
Other	$10,240
Total	$444,765

This project will be completed by NSPI personnel at a rate of approximately [redacted] per person day. The contract portion refers to traffic control. The material portion of the project is based on similar projects over the past two years.

CI Number: 40203

Title: 103W-311 Gold River Phase 1

Start Date: 2011/03

Final Cost Date: 2011/06

Function: Distribution

Forecast Amount: $434,415

DESCRIPTION:

This project entails the reconductoring of approximately seven kilometres of feeder. This project has multiple phases that will be carried out over multiple years. The first phase of this project will begin south of Delbury Road, on Highway #3, in the Western Shore area and heading south, for approximately 175 spans. The current conductor size will be increased to enable a contingency for load transferring.

Summary of Related CI's +/- 2 years:
2012 – CI TBD 103W-311 Gold River Phase 2 $TBD
2013 – CI TBD 103W-311 Gold River Phase 3 $TBD

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

The existing conductor is a combination of #6 Cu and #4 Al. This small wire is old and has limited capacity for loading.

Why do this project now?

Reconductoring with a larger wire will improve reliability and provide loading contingency, at all times of the year.

Why do this project this way?

This is the most efficient and effective method for increasing the contingency in this area. Reconductoring the small wire closest to the existing source, provides the capacity for load transfers.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40203 - 103W-311 Gold River Phase 1

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		2,437	0	2,437
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	7,280	0	7,280
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
098	035	098 - Salvage	035 - DP - Wood Poles	(9)	0	(9)
012	039	012 - Materials	039 - DP - O/H Cond.	25,989	0	25,989
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
098	039	098 - Salvage	039 - DP - O/H Cond.	(2,810)	0	(2,810)
012	040	012 - Materials	040 - DP - O/H Cond.Devices	5,429	0	5,429
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
098	040	098 - Salvage	040 - DP - O/H Cond.Devices	(101)	0	(101)
012	041	012 - Materials	041 - DP - O/H Line Transf.	8,016	0	8,016
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
098	041	098 - Salvage	041 - DP - O/H Line Transf.	(42)	0	(42)
013	050	013 - COPS Contracts	050 - DP - Street Lights	[redacted]	0	[redacted]
012	052	012 - Materials	052 - DP - Services	2,586	0	2,586
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
			Total Cost:	434,415	0	434,415
			Original Cost:	22,545		

CI 40203 103W-311 Gold River Phase 1

The following is a breakdown of costs associated with the 103W-311 Gold River Phase 1 Project.

Administrative Overhead and Interest	$[redacted]
Materials	$49,300
Contracts	$[redacted]
Salvage	($2,962)
Total	$434,415

The contracted work associated with this project is proposed to be completed by a contractor at a budgeted rate of $[redacted] per standard work unit hour. There is $[redacted] of contracts associated with land rights. The material cost of this project is based on similar projects in the past.

CI Number: 40220

Title: 2011 Halifax Underground Cable Replacement

Start Date: 2011/04

Final Cost Date: 2011/09

Function: Distribution

Forecast Amount: $418,861

DESCRIPTION:

This project is required to replace 2.8 km of 3 phase, 25kV underground cable between1H Water Street Substation and Proctor Street, as well as a section to the Art Gallery Vault.

Summary of Related CI's +/- 2 years:
2010 - 38903 Halifax UG Cable Replacement 1H-403 & 405 $456,405
2012 – CI TBD Halifax UG Cable Replacement
2013 - CI TBD Halifax UG Cable Replacement

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Deteriorated Conductor

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year two of a five year (2010-2014) plan to improve reliability to NSPI's customers. This project is required to replace deteriorated underground 25 kV cables and accessories in downtown Halifax.

Why do this project now?

This project is part of a plan to begin replacing cables installed 35 years ago, which have now reached the end of their useful life. The 1H-419 feeder provides power to approximately 80 large commercial and residential customers in the downtown core area of Halifax.

Why do this project this way?

Due to the age of the underground cables, a five year (2010-2014) replacement plan (Attachment 1) was developed and is being implemented. This is the most cost effective option to replace these assets.

CI Number	: 40220	- 2011 Halifax Underground Cable Replacement	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		17,447	0	17,447
092		092-Vehicle T&D OT Labour AO		7,990	0	7,990
094		094 - Interest Capitalized		6,159	0	6,159
095		095-COPS Overtime Labour AO		12,171	0	12,171
095		095-COPS Regular Labour AO		26,579	0	26,579
095		095-COPS Contracts AO		2,346	0	2,346
095		095-Thermal Regular Labour AO		1,200	0	1,200
001	046	001 - T&D Regular Labour	046 - DP - U/G Conductor	34,433	0	34,433
002	046	002 - T&D Overtime Labour	046 - DP - U/G Conductor	31,536	0	31,536
011	046	011 - Travel Expense	046 - DP - U/G Conductor	2,000	0	2,000
012	046	012 - Materials	046 - DP - U/G Conductor	259,000	0	259,000
013	046	013 - COPS Contracts	046 - DP - U/G Conductor	10,000	0	10,000
041	046	041 - Meals & Entertainment	046 - DP - U/G Conductor	2,000	0	2,000
001	085	001 - THERMAL Regular Labour	085 Design	5,000	0	5,000
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
011	085	011 - Travel Expense	085 Design	500	0	500
041	085	041 - Meals & Entertainment	085 Design	500	0	500
			Total Cost:	418,861	0	418,861
			Original Cost:	105,000		

CI 40220 - 2011 Halifax Underground Cable Replacement

The following is a breakdown of costs associated with the 2011 Halifax Underground Cable Replacement Project.

Administrative Overhead and Interest	$73,892
Materials	$259,000
Contracts	$10,000
COPS Labour	$70,969
Other	$5,000
Total	$418,861

This project will be completed by NSPI personnel at a rate of approximately [redacted] per person day. The material portion of the project is based the costs of the 2010 Halifax Underground Cable Replacement Program, CI 38903 filed in the 2010 Annual Capital Expenditure Plan.

DISTRIBUTION CAPITAL INVESTMENT REPORT
HALIFAX 25 kV UNDERGROUND SYSTEM

Draft

October 05, 2009

TABLE OF CONTENTS

1.0 SUMMARY

Objective
The purpose of this report is to identify the requirements necessary to perform the cable replacement program in Downtown Halifax.

Scope
The scope of the report is limited to 25 kV feeders interconnected around the pole-free area of Downtown Halifax. The main components of the report are: overview of the present system configuration, review of the historic load check, cable inventory and categorization, review of manhole configurations and availability of spare ducts, basic feeder contingency assessment, system improvement proposals, budgeting and timelines. The existing 4 kV underground distribution system, substation contingencies and justifications for new feeder(s) are not covered in the report.

Recommendations
This report recommends that the replacement project be carried out over the next 5 years. The required expenditures have been prioritized. This report has considered the age of plant, the loading of the system from PI data and the reliability to customers connected to the underground system. Consideration has been given to prolonging cable life by injection of chemicals into existing cables.

Also, the report recommends two system improvement options that are necessary to improve the existing switching flexibility by establishing two new tie links. These changes should be made prior to the cable replacement program.

2.0 PRESENT SYSTEM CONFIGURATION

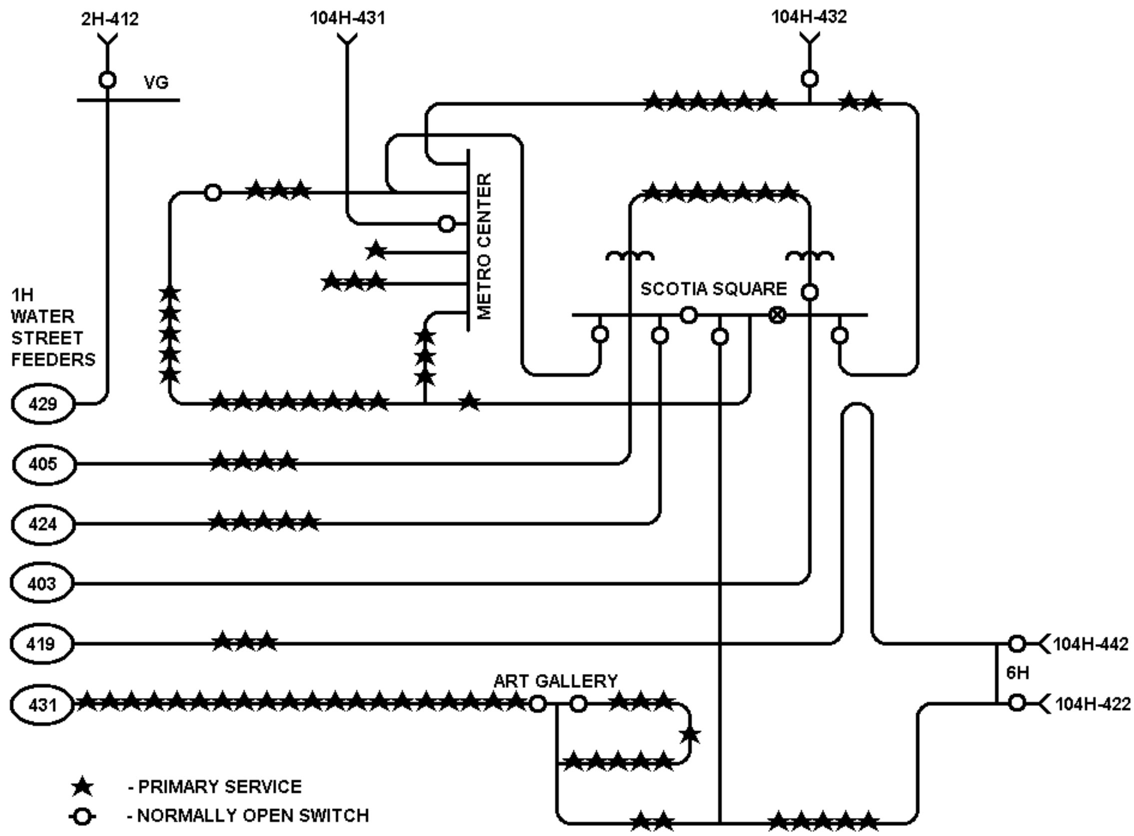


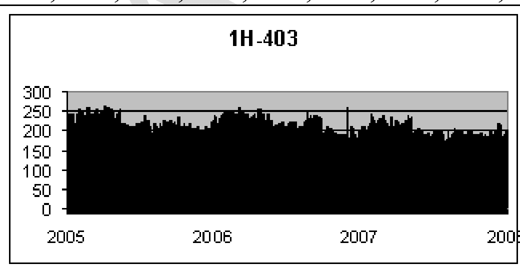
Fig. 2.1 Simplified Feeder Diagram

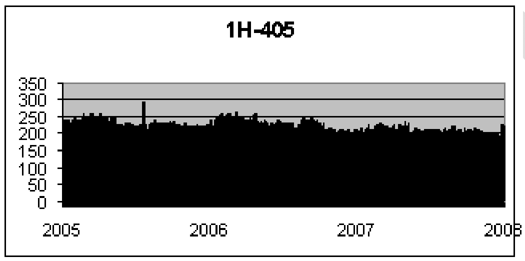
The diagram on Fig. 2.1 is a simplified combination of an electrical single line diagram and a geographical layout of the Halifax UD system. For simplicity, only open points are shown (except for the one at Scotia Square).

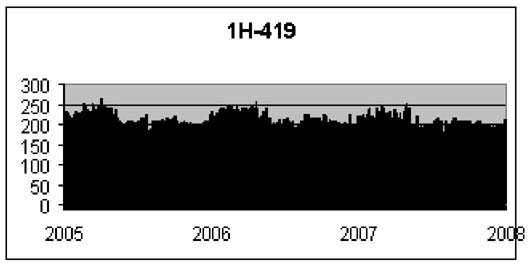
2.1 UNDERGROUND FEEDER PROFILES

The feeder profiles below describe each of the six underground feeders in a uniform format that will allow for easy comparison and quick reference further in the report. The underground feeders are: 1H-403, 1H-405, 1H-419, 1H-424, 1H-429 and 1H-431

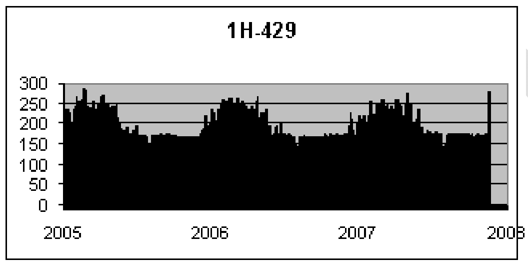
1 of 6

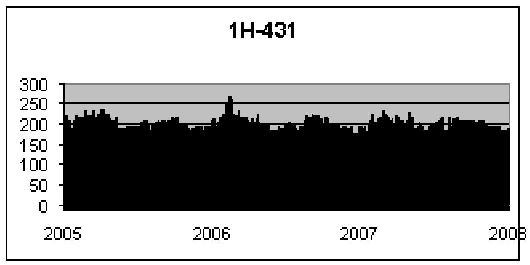
1H-403 FEEDER PROFILE			
Scotia Square / Metro Center			
Total feeder length (including services)	7.8 km		
Built	1970's		
Route	Water, Sackville, Granville, Duke, 28H, Barrington, Agryle, Grafton, Market, Brunswick, Cogswell.		
Installed MVA	23		
Interties with feeders	1H-405, 1H-419, 104H-432, 104H-431		
Loops	Two		
Stepdowns	689H		
Primary services	CS431-048, 170, 139, 197, 184, 185, 198, 487, 510, 428, 036, 429, 637, 531, 430, 150, 227, 211, 162, 154, 001, 182, 270, 426, 046, 144, 143, 265, 216, 244, 573, 402		
Load profile for the last 3 years ending June 1, 2008.			
Underground Cable	Part of feeder	Conductor size [kcmil],[AWG]	Length, 3ph [m]
	Main radial	750	1780
	Loops	750	2240
		500	180
		350	1550
	Ties	750	230
		500	180
	Primary services	750	90
		350	100
		3/0	1110
		1/0	470
		#1	100

<table>
<tr><th colspan="4">1H-405 FEEDER PROFILE</th></tr>
<tr><th colspan="4">Scotia Square</th></tr>
<tr><td>Total feeder length (including services)</td><td colspan="3">3.8 km</td></tr>
<tr><td>Built</td><td colspan="3">1970’s</td></tr>
<tr><td>Route</td><td colspan="3">Water, Sackville, Granville, Duke, Scotia Square, Market, Cogswell</td></tr>
<tr><td>Installed MVA</td><td colspan="3">14 (approx.)</td></tr>
<tr><td>Interties with feeders</td><td colspan="3">1H-403, 1H-424</td></tr>
<tr><td>Loops</td><td colspan="3">One</td></tr>
<tr><td>Stepdowns</td><td colspan="3">28H-T26</td></tr>
<tr><td>Primary services</td><td colspan="3">CS431-007, 427, 005, 012, 507, 508, 481, 506</td></tr>
<tr><td>Load profile for the last 3 years ending June 1, 2008.</td><td colspan="3">
</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td rowspan="8">Underground Cable</td><td>Part of feeder</td><td>Conductor size [kcmil],[AWG]</td><td>Length, 3ph [m]</td></tr>
<tr><td>Main radial</td><td>750</td><td>1470</td></tr>
<tr><td rowspan="4">23 kV loop</td><td>750</td><td>160</td></tr>
<tr><td>350</td><td>1380</td></tr>
<tr><td>4/0</td><td>180</td></tr>
<tr><td>#1</td><td>340</td></tr>
<tr><td rowspan="2">Primary services</td><td>3/0</td><td>170</td></tr>
<tr><td>#1</td><td>10</td></tr>
</table>

1H-419 FEEDER PROFILE			
Joseph Howe Bldg./ Proctor Street			
Total feeder length (including services)	5.4 km		
Built	1970's		
Route	Water, Sackville, Granville, Duke, 28H, Hollis, 6H, Upper Water		
Installed MVA	14		
Interties with feeders	1H-403, 1H-431, 104H-422, 104H-442		
Loops	One		
Stepdowns	622H		
Primary services	CS431-351, 138, 196, 053, 268, 183, 272, 140, 004, 142, 047, 279, 011, 141, 169		
Load profile for the last 3 years ending June 1, 2008.			
Underground Cable	Part of feeder	Conductor size [kcmil],[AWG]	Length, 3ph [m]
	Main radial	750	2140
	Loop	750	1290
		4/0	490
		3/0	640
	Tie	750	240
	Primary services	750	30
		3/0	100
		#1	50

1H-424 FEEDER PROFILE			
Water Street/Scotia Square			
Total feeder length (including services)	2.0 km		
Built	2003		
Route	Water, Granville, Duke, 28H		
Installed MVA	3.9		
Interties with feeders	1H-405		
Loops	N/A		
Stepdowns	N/A		
Primary services	CS431-516, 493, 247, 485, 566, 567		
Load profile	No Load Profile Available		
Underground Cable	Part of feeder	Conductor size [kcmil],[AWG]	Length, 3ph [m]
	Main radial	750	1600
	Primary services	350	270
		3/0	350
		#1	150

1H-429 FEEDER PROFILE			
V.G. Hospital			
Total feeder length (including services)	2.2 km		
Built	1990's		
Route	Water, Morris, 10H		
Installed MVA	11.2		
Interties with feeders	2H-412		
Loops	N/A		
Stepdowns	10H-T1 VG - North Bus		
Primary services	N/A		
Load profile for the last 3 years ending June 1, 2008.			
Underground Cable	Part of feeder	Conductor size [kcmil],[AWG]	Length, 3ph [m]
	Main radial	750	2200

<table>
<tr><th colspan="4">1H-431 FEEDER PROFILE</th></tr>
<tr><th colspan="4">Downtown U/G</th></tr>
<tr><td>Total feeder length (including services)</td><td colspan="3">3.9 km</td></tr>
<tr><td>Built</td><td colspan="3">1970's</td></tr>
<tr><td>Route</td><td colspan="3">Morris, Hollis, Salter, Water, Bedford Row, Prince</td></tr>
<tr><td>Installed MVA</td><td colspan="3">17.5</td></tr>
<tr><td>Interties with feeders</td><td colspan="3">1H-419, 1H-415(o/h), 1H-427(o/h)</td></tr>
<tr><td>Loops</td><td colspan="3">N/A</td></tr>
<tr><td>Stepdowns</td><td colspan="3">610H Bedford Row</td></tr>
<tr><td>Primary services</td><td colspan="3">CS431-205, 345, 554, 002, 497, 498, 148, 580, 674, 165, 049, 261, 217, 220, 271, 401, 608, 450, 054</td></tr>
<tr><td>Load profile for the last 3 years ending June 1, 2008.</td><td colspan="3">
</td></tr>
<tr><td></td><td colspan="3"></td></tr>
<tr><td rowspan="4">Underground Cable</td><td>Part of feeder</td><td>Conductor size [kcmil],[AWG]</td><td>Length, 3ph [m]</td></tr>
<tr><td>Main radial</td><td>750</td><td>2130</td></tr>
<tr><td rowspan="2">Primary services</td><td>3/0</td><td>280</td></tr>
<tr><td>350</td><td>270</td></tr>
</table>

2.2 LOAD CHECK SUMMARY

FEEDER PEAK LOAD HISTORY 2004 - 2008

Halifax peninsular feeders of interest		2008*		2007		2006		2005		2004	
		PI	Load Check	PI	Load Check	PI	Load Check	PI	Load Check	PI	Load Check
Underground	1H- 431	230	213	250	223	270	298	240	286	240	303
feeders	1H-419	220	-	250	196	260	230	260	240	290	258
	1H-403	220	203	240	222	260	273	270	227	270	250
	1H-405	220	210	250	220	270	275	270	283	255	230
	1H-424**	-	60	-	70	-	70	-	70	-	80
	1H-429	180	-	270	184	270	257	280	261	260	247
Overhead	1H-415	360	-	375	283	340	326	390	320	350	240
Feeders	1H-427	230	230	260	238	260	267	260	220	250	220
intertied with	104H-413	250	253	250	330	280	330	250	360	340	350
u/g feeders	104H-431	350	350	260	243	270	271	280	250	340	330
	104H-432	280	343	275	365	280	288	350	351	160	271
	104H-422	230	206	300	253	275	277	275	280	230	267
	104-442	280	284	290	309	240	287	270	253	310	309
	2H-412	350	331	350	345	350	334	350	357	330	332
	2H-413	300	295	300	336	290	242	260	379	300	255

* - Period ending June 1, 2008
** - Evaluated based on installed kVA

3.0 FEEDER CONTINGENCIES

The purpose of this contingency categorization is to help identify feeders with switching limitations and to help draw the line between “Possible” and “Practical” as applied to a planned power outage to a part of the system. In other words even if the power can be restored after a system failure, the same technique may not always be justifiable for a planned outage.

3.1 CONTINGENCY DEFINITIONS

Contingency A – Transferring open point(s) in the loop of the same feeder. This is the preferred way of managing planned and unplanned outages.

Contingency B – Simple switching by transferring open point between two adjacent feeders of the same source (substation). Backup feeder loading is a possible limiting factor.

Contingency C – Transferring open point between two feeders from two independent substations. Limiting factors: feeder loading, substation capacity, temporary abnormal configuration of the backup feeder, possible issues with paralleling, more complicated switching procedures.

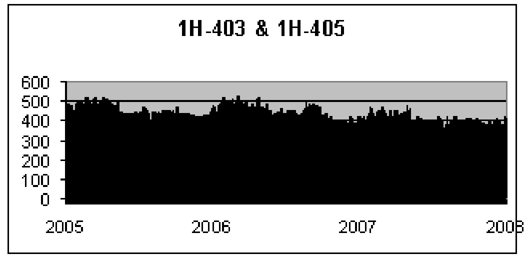
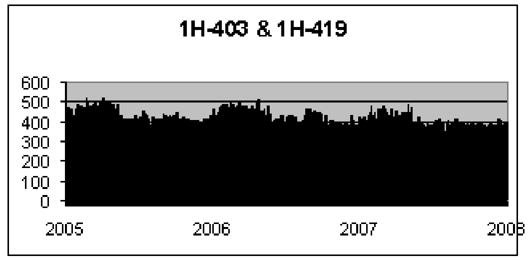
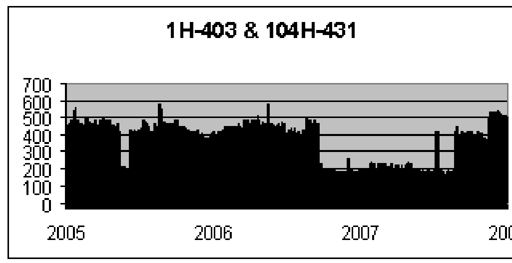
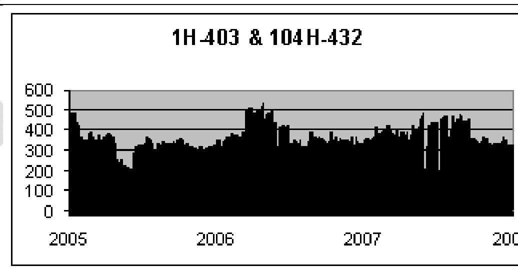
Contingency D – Cascade offloading. (a) Same as Contingency B or C but the backup feeder needs to be offloaded first to a third feeder. (b) Splitting load between two adjacent feeders.

3.2 CONTINGENCY OPTIONS

The following summaries are to give an overview of the available switching options. Contingency A options are only available for feeders with loops and only for the loop part of the feeder. This option is not shown in the summaries.

Contingency D options are only shown for the feeders with limited switching options B and C.

Not all of the D- options can be shown due to a high number of open/closed switch combinations.

1H-403 CONTINGENCY OPTIONS		
Backup feeder	**1H-405**	
Total load [A]	490/440	
Switching device	L431-412	
Contingency type	B	
Comment	This option can be marginal during summer peaks	
Backup feeder	**1H-419**	
Total load [A]	490/420	
Switching device	28H-413	
Contingency type	B	
Comment	Very similar to 1H-405	
Backup feeder	**104H-431**	
Total load [A]	500/465	
Switching device	L431-233 Metro Center	
Contingency type	C	
Comment	Combined load can be close to 500 A -load check is recommended	
Backup feeder	**104H-432**	
Total load [A]	575/570	
Switching device	D4A15364	
Contingency type	C	
Comment	Available but load check is recommended	
Backup feeder	**1H-419** offloaded to 1H-431 sw# L431-177	No Profile Available
Total load [A]	310/350 estimated	
Switching device	28H-413	
Contingency type	D	
Comment	Limiting factor: 1H-431 peaks at 430/380	
Backup feeder	Split between **104H-431 & 104H-432**	No Profile Available
Total load [A]	TBD as required	
Switching device	TBD as required	
Contingency type	D	
Comment	Available	

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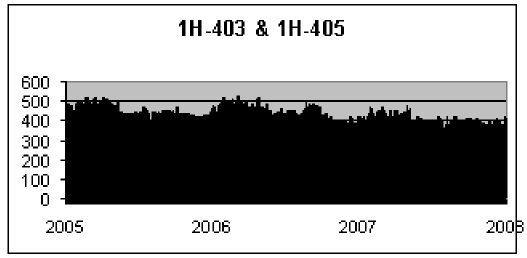
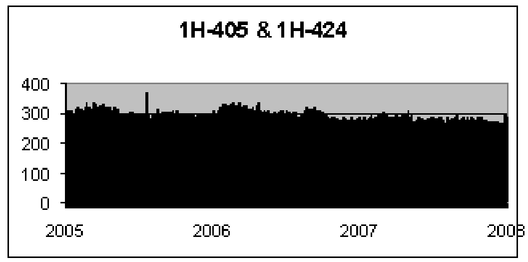
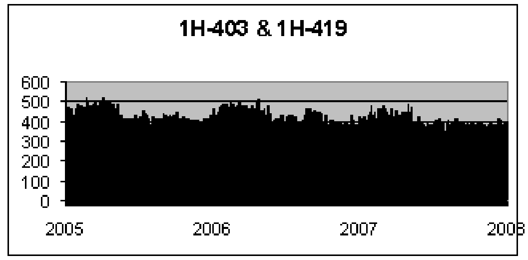
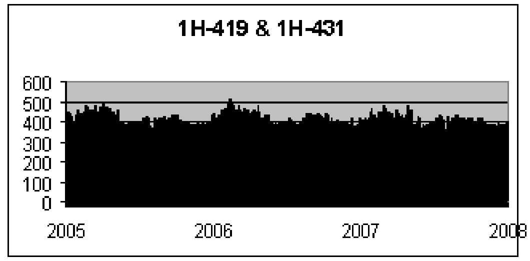
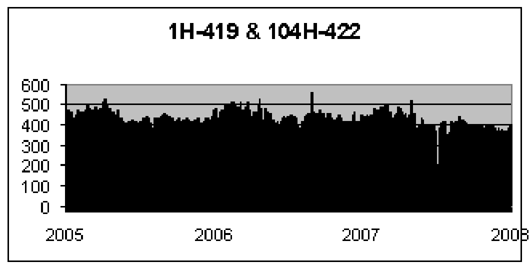
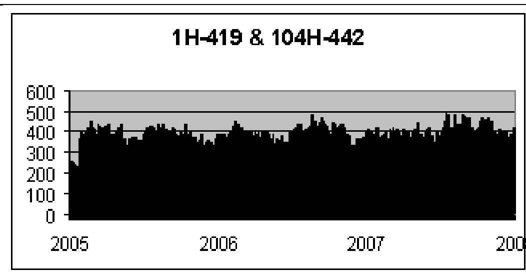
1H-405 CONTINGENCY OPTIONS		
Backup feeder	**1H-403**	
Total load [A]	490/440	
Switching device	L431-412	
Contingency type	B	
Comment	This option can be marginal during summer time	
Backup feeder	**1H-424**	
Total load [A]	290/320	
Switching device	28H-447	
Contingency type	B	
Comment	Available. 1H-424 load is estimated to be 70 A.	

1H-419 CONTINGENCY OPTIONS		
Backup feeder	**1H-403**	
Total load [A]	490/320	
Switching device	28H-413	
Contingency type	B	
Comment	Possible but load check is recommended before switching	
Backup feeder	**1H-431**	
Total load [A]	510/440	
Switching device	L431-210 Art Gallery	
Contingency type	B	
Comment	Load check is recommended before switching	
Backup feeder	**104H-422**	
Total load [A]	600/500	
Switching device	6H-410	
Contingency type	C	
Comment	Most of the time >400 A. Marginal	
Backup feeder	**104H-442**	
Total load [A]	560/490	
Switching device	6H-430	
Contingency type	C	
Comment	Available, but load check is recommended before switching	
Backup feeder	Split between 1H-431 & one the above	No Profile Available
Total load [A]	TBD as required	
Switching device	TBD as required	
Contingency type	D	
Comment	Available	

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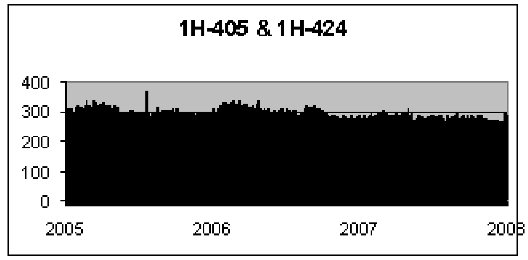
1H-424 CONTINGENCY OPTIONS		
Backup feeder	**1H-405**	
Total load [A]	290/320	
Switching device	28H-447	
Contingency type	B	
Comment	1H-424 load is estimated to be 70 A.	

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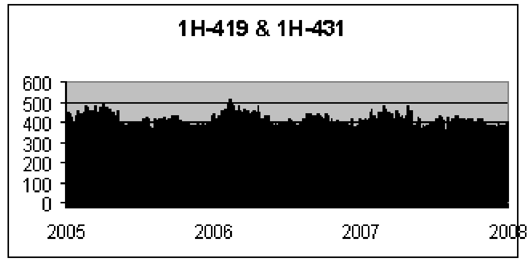
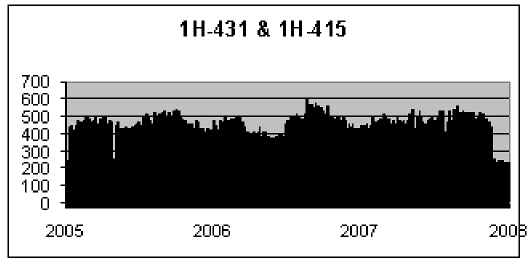
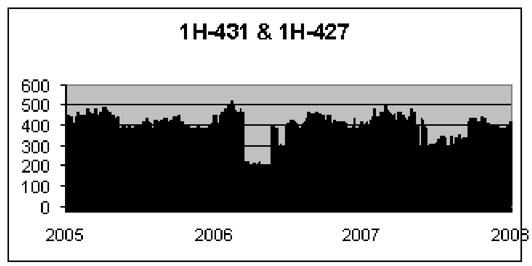
1H-429 CONTINGENCY OPTIONS		
Backup feeder	Split between 2H-412 and 104H-413	1H-429 is an express feeder to the stepdown 10H-T1 North Bus of VG Hospital. At full capacity the load is 260A.
Total load [A]	TBD as required	
Switching device	TBD as required	
Contingency type	D	
Comment	This backup option can be marginal during summer peaks.	

1H-431 CONTINGENCY OPTIONS		
Backup feeder	**1H-419**	
Total load [A]	510/440	
Switching device	L431-210 Art Gallery	
Contingency type	B	
Comment	Load check is recommended before switching	
Backup feeder	**1H-415**	
Total load [A]		
Switching device	D431-184 Hollis/Morris	
Contingency type	B	
Comment	The intertie switch is close to the substation. Very limited backup options for 1H-431	
Backup feeder	**1H-427**	
Total load [A]		
Switching device	D431-266 Hollis/Morris	
Contingency type	B	
Comment	The intertie switch is close to the substation. Very limited backup options for 1H-431	

3.3 OBSERVATIONS

1H-403
There are several switching options but none of them are straightforward. All of the options can be marginal during summer peaks.

1H-405
Feeder 1H-424 is a reliable backup for 1H-405.

1H-419
There are several options. During summer time the simple options become questionable. Splitting the load between 1H-431 and 1H-403 or 104H-422 would be the next option.

1H-424
Feeder 1H-405 is a reliable backup for 1H-424. New feeder.

1H-429
Complicated switching to offload the 10H-T1 transformer between 2H-412 and 104H-413. The load situation at 4 kV is expected to improve and therefore the above offloading should become more reliable. There is a suspicion of a collapsed ductbank on Morris St. The work to clarify on this issue is in progress (Summer 2008). This feeder is relatively new.

1H-431
The only simple backup option for this feeder is 1H-419. This option becomes questionable during summer months. For improved switching flexibility this feeder may require additional intertie. See 4.1 for details. This may be especially important considering the overhead section of the feeder that is exposed at the intersection of Hollis and Morris St.

To summarize the above:
- Feeders 1H-405 and 1H-424 have reliable backup.
- Feeders 1H-403, 1H-419 and 1H-429 have conditional backup options. An effort should be made to improve it.
- Feeder 1H-431 has a questionable backup option. There is a risk of extended outage. Additional backup alternative(s) need to be developed.

4.0 SYSTEM IMPROVEMENTS

4.1 ART GALLERY TIE

To improve the backup options for feeders 1H-431 and 1H-419 a new tie connection is recommended between the Art Gallery vault and feeder 1H-424 in manhole #13 on Lower Water Street. This will create a simple and reliable contingency option for the above two feeders which can also be used for a cable replacement/injection or cable treatment program.

The new feeder configuration will require extending nine 100 mm ducts (3-in, 3-out, 3-spare) from MH56 to the Art Gallery vault. See Fig. 4.2 and Appendix 4 for more details. There are ducts available in the existing ductbank between MH13 and MH56 to install six 750 kcmil cables. The total length of the new cable extension is approximately 60 meters.

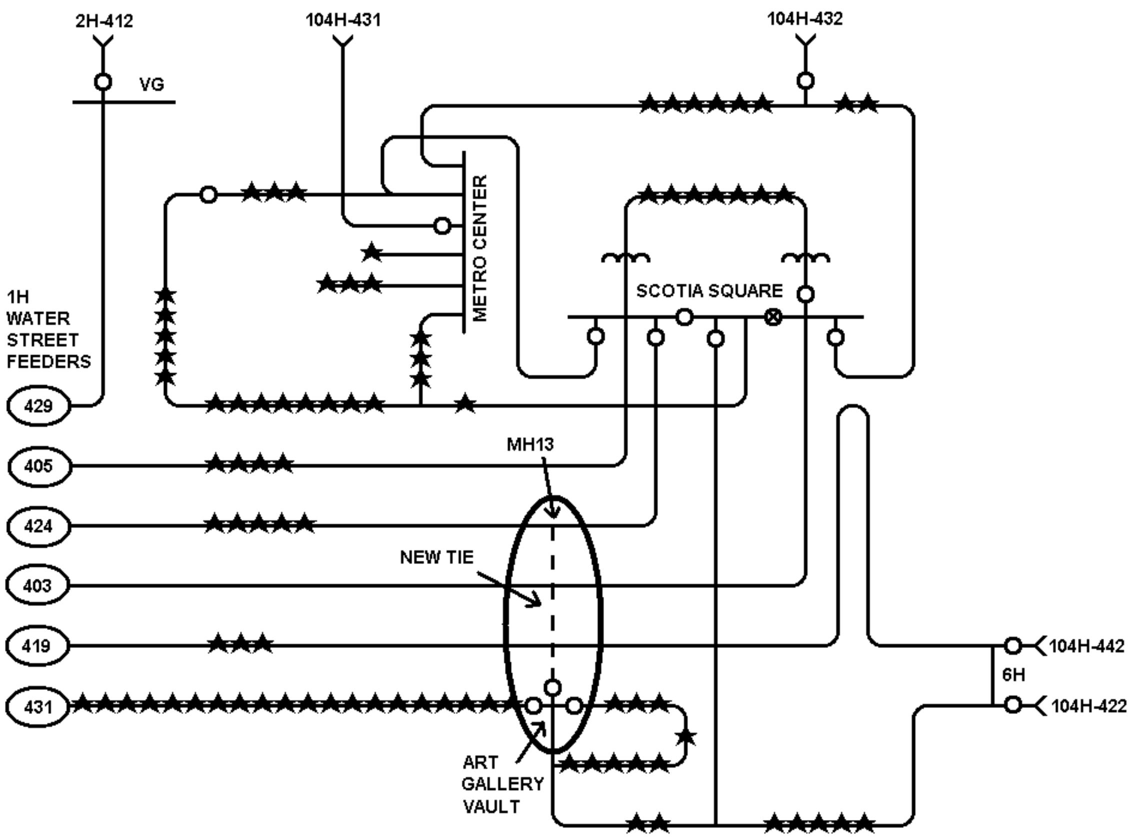


Fig. 4.1 New intertie between Art Gallery vault and MH13

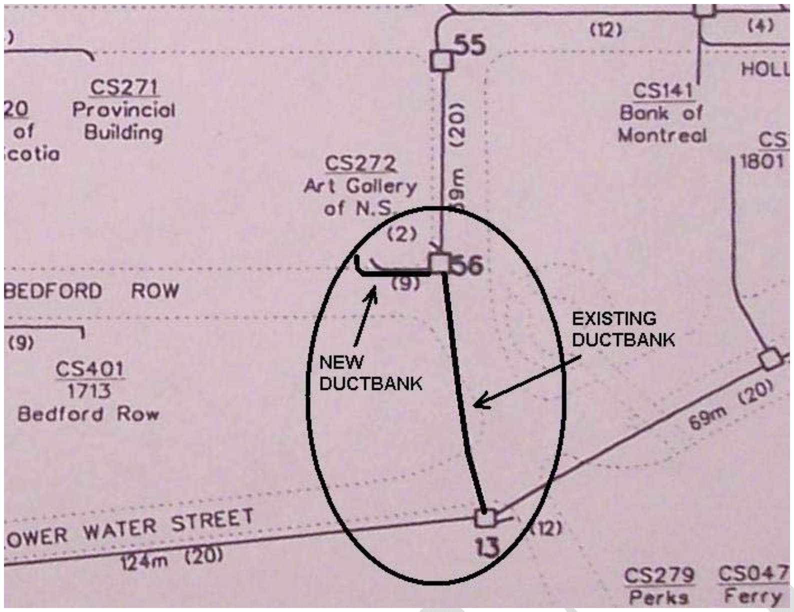


Fig. 4.2 Ductbank Layout

4.2 SCOTIA SQUARE TIE

The main purpose of this proposal is to improve the backup options of the feeder 1H-403. The idea is to use the existing 3-way Vista switch at the Scotia Square vault as a universal tie for 1H-403, 1H-405 and 1H-424 feeders that will allow paralleling them in any combination. At the moment the switch is underutilized and is serving as a connection point between 1H-405 and 1H-424.

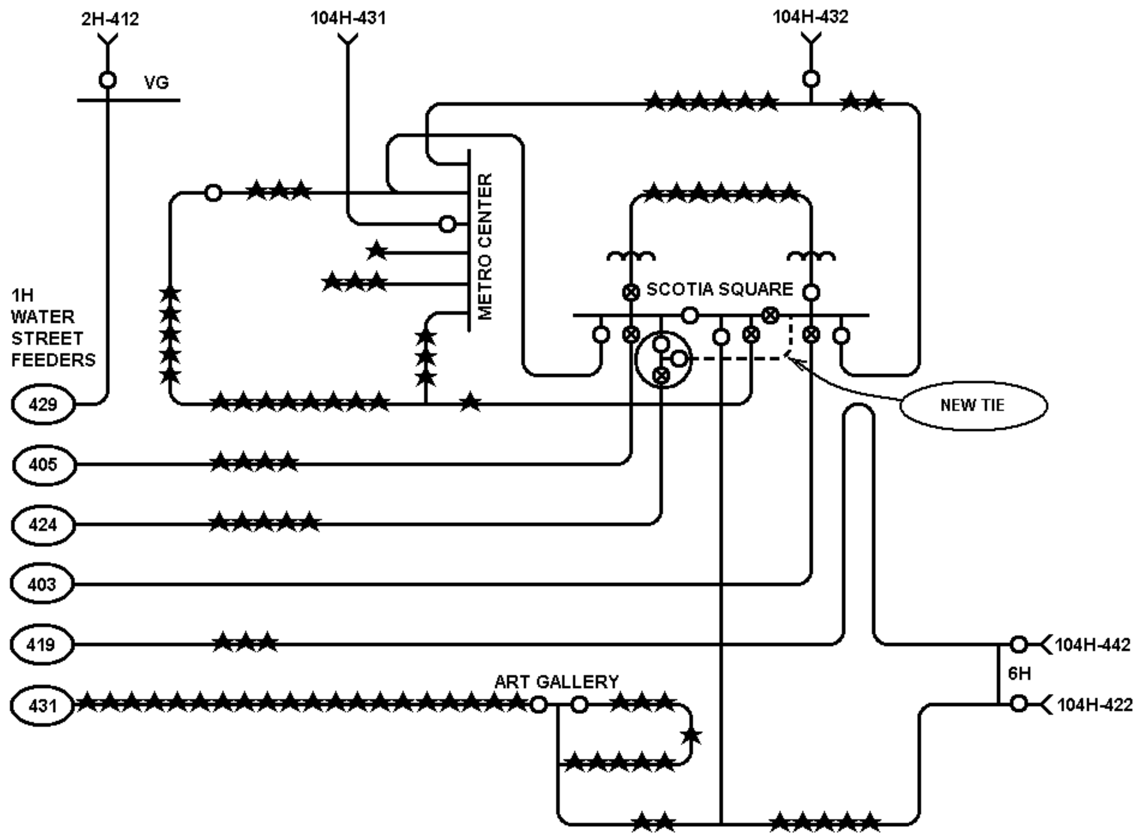


Fig. 4.7 New Connection in the Scotia Square vault

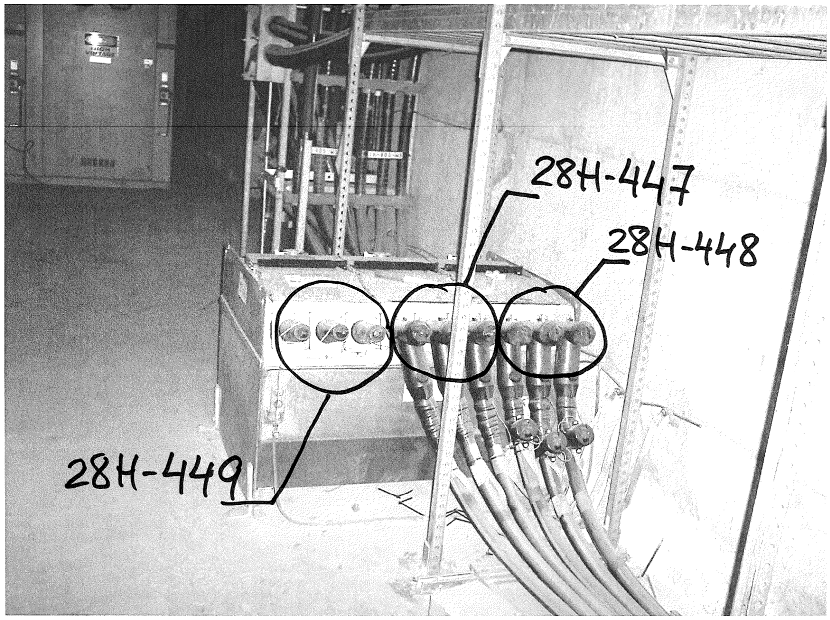


Fig. 4.8

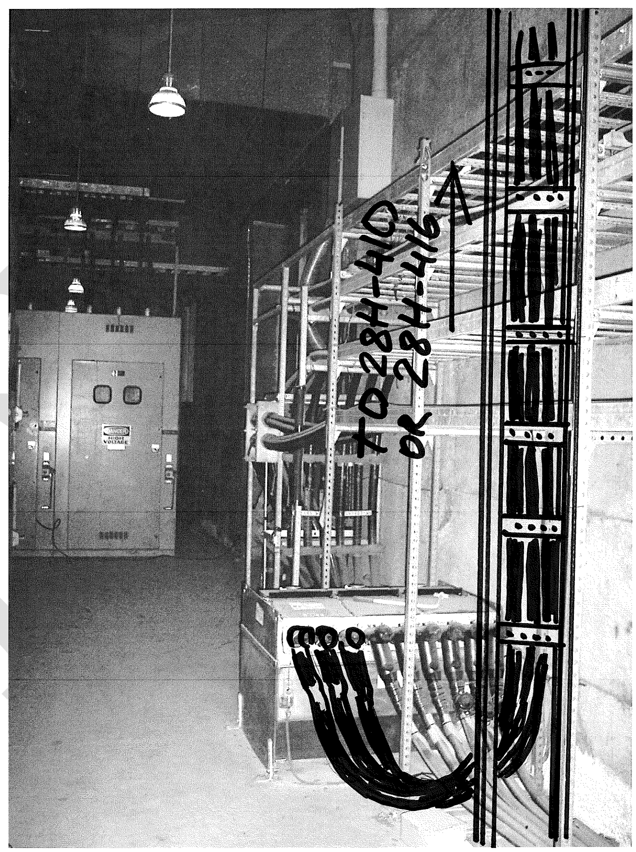


Fig. 4.9

The switch 28H-449 can be connected to one of the following devices that are on the same bus of the 28H substation: 28H-410, 28H-416, 28H-414 or 28H-445
The exact point of connection needs to be determined.

4.3 OTHER SYSTEM IMPROVEMENT OPTIONS

4.3.1 Configuration Improvements of 1H-431

Converting the o/h portion of the feeder 1H-431 would benefit the reliability of the Halifax underground system. There are six riser poles around the intersection of Hollis and Morris Streets that are exposed to traffic and weather. Also, there is a number of flying taps (two sets), quick sleeves, inline switches, communication loops and 4 kV lines sharing the same poles. The top circuits on each of the three poles on Fig. 4.10 are the feeder 1H-431.

Fig. 4.10 Intersection of Hollis and Morris St.

This project would mostly involve extending the ductbank on Hollis Street from manhole #59 (Bushop/Hollis) to #60 (Morris/Hollis) which are approximately 120 meters apart and a new manhole in the middle of the block with a submersible switch in it. The switch is required for two primary services: Waterford Apartments CS431-554 and Prince Matthew's Apartments CS431-480 and also to replace the functionality of the existing set of inline switches D431-394. Two or three overhead services would have to be converted as well.

This part of the feeder is situated within the boundaries of the existing pole-free area. This conversion would have to be supported by the HRM as a continued commitment of the current cost sharing agreement with NSPI. A new development in the area may help to trigger this process.

4.3.2 Cable Upgrades

There are two potential bottlenecks in the existing system that may be considered for an upgrade. The purpose is to increase the conductor size to the full size feeder (750 kcmil) between the Metro Center and Scotia Square and between the riser pole on Cogswell St (feeder 104H-432) and Scotia Square.

See paragraphs 5.3.1 (B) and 5.3.1 (E) further in the text for details. With the existing ductbank configuration only one of the two can be implemented.

5.0 CABLE REPLACEMENT

5.1 Cable Lengths

Table 5.1

Total Feeder Section Lengths [m]							
Part of Feeder	Cable Size	1H Underground Feeders					
		403	405	419	424	429	431
Radial	750	1780	1440	3430	1600	2200	2130
	500	-	-	-	-	-	-
Loop	750	2240	160	-	-	-	-
	500	180	-	-	-	-	-
	350	1550	1380	-	-	-	-
	4/0	-	180	490	-	-	-
	3/0	-	-	640	-	-	-
	#1	-	170	-	-	-	-
Tie	750	230	-	240	-	-	-
	500	-	180	-	-	-	-
Primary Service	350	100	-	-	-	-	-
	3/0	1260	130	100	350	-	270
	#1	-	10	50	-	-	280
Total without/with services		5980/ 7340	3510/ 3650	4800/ 4950	1600/ 1950	2200	2130/ 2680

Note:
1. The above numbers are 3 phase lines, not individual conductors
2. For detailed summary on feeder sections see Appendix A
3. For detailed summary on primary service cables see Appendix B

Summary:
The total length underground feeders including primary services (6 feeders): 22770 m
Same for the feeders over 30 years old (4 feeders) – 18620 m
This includes the feeder sections:
a) Radial – 8780 m
b) Loops – 6990 m
c) Ties – 650 m
d) Primary services – 2200 m

5.2 Cable Accessories

The following cable accessories will be referenced to in tables 5.2, 5.3 and Appendix C:
S – Splice, general.
T – 600 A deadbreak termination
LF – Life front termination
L – 200 A loadbreak elbow
SA – Support arm, 14" multi-mount, Underground Devices Inc, MM14,

Table 5.2

Accessories per Feeder								
Cable Accessory	1H-403		1H-405		1H-419		1H-431	
	Feeder	Service	Feeder	Service	Feeder	Service	Feeder	Service
S	9	-	9	-	9	-	2	-
T	31	27	24	9	20	13	21	14
LF	31	7	36	-	15	4	2	4
L	0	33	-	9	-	11	-	14
SA*	60	-	34	-	60	-	26	-

* - the number of support arms is estimated based on the approximate number of passes through manholes for feeder cables only.

Table 5.3

Total Accessories		
Cable Accessory	Feeder	Service
S	25	-
T	96	67
LF	84	15
L	0	67
SA	180	-
Total	385	149

Note that the accessories are shown here as three phase devices, therefore for the actual number of single phase units needs to be tripled.

5.3 Feeder Sections

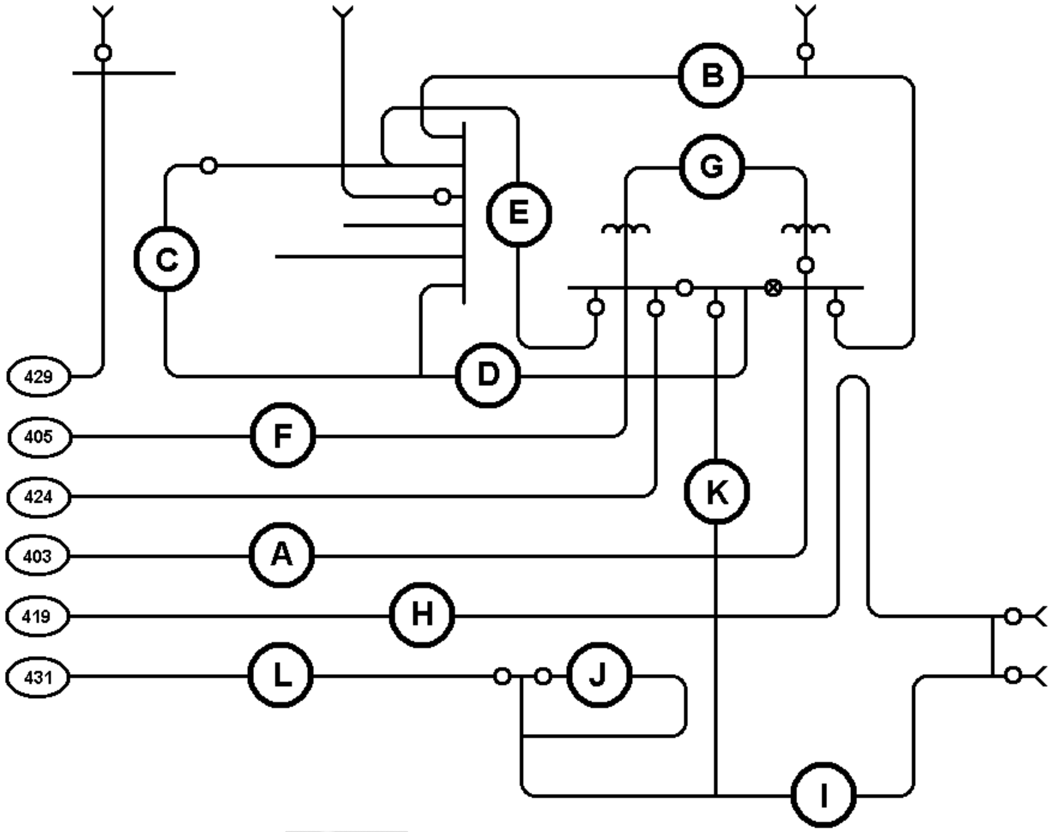


Fig. 5.3 Feeder Sections for Replacement

5.3.1 FEEDER 1H-403 (A, B, C, D, E)

(A) 1H-403 – Main Radial from 1H to 28H-416

The replacement of this part of the feeder can be approached in two ways:

Option 1
Use an alternative supply for 1H-403 (See 3.2 Contingency Options). Deenergize the radial part of the feeder between 1H and 28H-416 (approx. 1.4 km) and replace it.

Option 2
Remove the old 4 kV cables 1H-243, 1H-246 and 1H-247 (#500, 3 phase PILC) along the Lower Water, Sackville and Granville Streets between 1H and MH46 (1 km). Install new cables in the freed-up ducts while the existing feeder cables are still in service. Then extend the new cables from MH46 to MH47 and further to MH125 and MH26. This is approximately 90 % of the radial section of the feeder. The remaining short run from MH26 – MH28 – MH32 to 28H does not have enough free ducts. Therefore, one of the alternative supplies will be used for the duration of the cable replacement.

Advantages of this option: a) minimizes the use of alternative supply b) one kilometer of ducts becomes available for cascade replacement of two more feeders c) old equipment is removed and salvaged.

This cable may contain PCB. Federal and provincial legislation and regulations regulate the management of PCBs. Refer to the Environmental Management Strategy for Oil-Filled Equipment ENV-2.05 (Environmental Binder) for proper procedures.

(B) 1H-403 – North Loop from 28H-410 to L431-229 Metro Center
There are three sizes of conductors in the loop: 350, 500 and 750 kcmil. It may be beneficial to upgrade a part of the loop between MH102 on Cogswell St and 28H to 750 kcmil to create a full size tie between feeder 104H-422 (SW# D4A15363) and 28H-410 in Scotia Square. There are two conditions for this upgrade:
1) Some cables would have to be swapped in MH43 to make this tie “service free”. This will transfer the cs431-265 service to another shoulder of the same loop that has multiple primary services and will remain 350 kcmil.
2) There are only two free ducts available between 28H and MH32. The upgrade is still possible but this option needs to be further investigated.

(C) 1H-403 –Metro Center Loop from L431-230 to L431-232
This part of the feeder has enough spare ducts to pre-install the new switch-to-switch sections while the old cable remains in service. The switching between the old and new cable can be done without taking outages to the customers.

(D) 1H-403 – 28H-415 to Grand Parade Vault
This is a normal feed for the Metro Center loop. There are not enough spare ducts to install the replacement cable ahead of time. One of the two available backup options has to be used for the duration of the cable replacement or injection.

(E) 1H-403 – 28H-411 to L431-230 Metro Center – Tie with 1H-405
There are two sizes of conductors (500 and 750 kcmil) used in this tie. The 500 kcmil section should be upgraded to the standard 750 kcmil size. There are only two free ducts available between 28H and MH32 to exit the Scotia Square vault. The cable upgrade is possible but this option needs to be further investigated.

With the existing ductbank configuration, the two cable upgrades (B) and (E) are mutually exclusive therefore:
a) Only one of the two may be selected
b) Possibility of adding more ducts between 28H vault and MH32 to be explored

5.3.2 FEEDER 1H-405 (F, G)

(F) 1H-405 – Main Radial from 1H to 28H-417
This part of the feeder is very similar to 1H-403 (A) and can be approached in the same way. See section (A) options for details. The removal of the old 4 kV feeder cables will also benefit the 1H-405 feeder replacement.

(G) 1H-405 – 23 kV Loop
The old multi-loop configuration was recently changed. The exact configuration of the present system may need to be updated on the single line diagrams. The upcoming cable replacement may also be used as an opportunity to further optimize the existing 23 kV loop system.

5.3.3 FEEDER 1H-419 (H, I, J)

(H) 1H-419 – to L431-401 Proctor Street
The replacement of this section can be combined with the removal of the old 4 kV cables (See 5.1 Option 2). This section can be backfeed from 104H-422 or 104H-442.

(I) 1H-419 – L431-404 Proctor Street to L431-211 Art Gallery Vault
The layouts of manholes MH90, MH91 and MH92 need to be verified and completed.

(J) 1H-419 Loop from L431-211 to L431-209 Art Gallery Vault
This is a normal underground loop. There is no foreseeable reason for cable size upgrades or configuration change.

(K) 1H-419 MH22 to 28H-413
This is a normally open tie with the feeder 1H-403. There are no primary services on this feeder section. The replacement should be straightforward.

5.3.4 FEEDER 1H-431 (L)
(L) 1H-431 to Art Gallery Vault
The records on the available spare ducts are inconsistent. A detailed scoping is required. The system improvement option 4.1 is recommended for better contingency arrangements.

5.4 Budgeting for Cable Replacement

5.4.1 Estimates and Assumptions

Labour:
- One underground crew includes 3 technicians.
- A basic length of 3 phase cable would normally consist of 1, 2 or 3 runs between two electrically adjacent cable accessories. The cable runs can be: manhole-to-manhole, manhole-to-vault, vault-to-vault and in some cases riser pole to manhole.
- One crew can install in one normal day:
  a) one basic length of three 750 kcmil cables, no terminations.
  b) 2 basic lengths of triplexed cable, no terminations.
  c) 1 basic length of triplexed cable and terminate one end.
  d) 6 cable terminations
  e) one primary service loop (one basic length), terminate both ends reconnect.
- One crew can remove in one normal day:
  a) three old PILC cables from three manhole-to-manhole lengths. Four manholes to be entered. This is mostly applicable to the three old feeders between 1H and MH46.
  b) switch from old to new pre-installed and pre-terminated length of cable, remove the old cable. Phase the cable.
- For simplicity the above installation steps can be further combined into mandays per basic length of cable (installation + termination + switching + removal):
  a) 750 kcmil three 1 phase cables: [redacted]
  b) <750 kcmil 3 phase cable installation: [redacted]

- One eight hour manday (2010) with overhead is calculated as follows:
  [redacted]

- One eight hour overtime manday is calculated:
  [redacted]

- Unless specified, no overtime rates have been used for calculations.

Materials:

- Primary cable:	750 kcmil Al, 28 kV	- $25/m
	350 kcmil Al, 28 kV, 3 phase	- $40/m
	3/0 Al, 28 kV, 3 phase	- $35/m
	#1 Al, 28 kV, 3 phase	- $30/m
- Splice	750/750	- $200 each
- T-Connector 600 A	(See Appendix E for details)	- $239 each
- Loadbreak elbow 200 A		- $55 each
- Synthetic terminator	-	$170 each
- Support arm 14” complete with masonry fasteners and tie wraps for cable		- $50 each

5.4.2 Feeder Replacement Estimates

Table 5.4

Materials and Labour for Cable Replacement Option Excluding Primary Services			
Feeder	Cable (refer to feeder profiles 2.2)	Accessories (refer to 5.2)	Labour (refer to 5.4.1)
1H-403	750 kcmil: 4250 x 1.1* x 25 x 3 = $325,625 350 kcmil: 1550 x 1.1 x 40 = $68,200 Other sizes: 360 x 1.1 x 35 = $13,860 **Total: $407,685**	S: 9 x 6**x 239 = $12,906 T: 31 x 3 x 239 = $22,227 LF: 31 x 3 x 170 = $15,810 SA: 60 x 50 = $3,000 **Total: $53,943**	750 kcmil: [redacted] <750 kcmil***: [redacted] [redacted]
1H-405	750 kcmil: 1630 x 1.1 x 25 x 3 = $134,475 350 kcmil: 1380 x 1.1 x 40 = $60,720 Other sizes: 520 x 1.1 x 35 = $20,020 **Total: $215,215**	S: 9 x 6 x 239 = $12,906 T: 24 x 3 x 239 = $17,208 LF: 36 x 3 x 170 = $18,360 SA: 34 x 50 = $1,700 **Total: $50,174**	750 kcmil: 7 runs = [redacted] <750 kcmil: 6 runs = [redacted] [redacted]
1H-419	750 kcmil: 3430 x 1.1 x 25 x 3 = $302,775 Other sizes: 1130 x 1.1 x 35 = $43,505 **Total: $346,280**	S: 9 x 6 x 239 = $12,906 T: 20 x 3 x 239 = $14,340 LF: 15 x 3 x 170 = $7,650 SA: 60 x 50 = $3,000 **Total: $37,896**	750 kcmil: 17 runs = [redacted] <750 kcmil: 8 runs = [redacted] [redacted]
1H-431	750 kcmil: 2130 x 1.1 x 25 x 3 = $175,725 **Total : $175,725**	S: 2 x 6 x 239 = $2,868 T: 21 x 3 x 239 = $15,057 LF: 2 x 3 x 170 = $1,020 SA: 26 x 50 = $1,300 **Total: $20,245**	750 kcmil cable: 14 runs = [redacted] [redacted]

* - 10% of length is added for splicing loops and waste.
** - 600 A deadbreak elbows are used for splicing cables.
*** - In this context: 3 phase cable size between #1 and 350 kcmil

Total: [redacted]

Note that the system improvement items (4.0), old 4 kV cable removals (5.3.1 A) and proposed conductor upgrades for 1H-403 (5.3.1 B, E) are not included in the above estimate.

5.4.3 Service Replacement Estimates

Table 5.5

Materials and Labour for Replacing Primary Service Cables			
Feeder	Cable (refer to feeder profiles 2.2)	Accessories (refer to 5.2)	Labour (refer to 5.4.1)
1H-403	750 kcmil: 100 x 1.1* x 25 x 3 = $8,250 350 kcmil: 100 x 1.1 x 40 = $4,400 Other sizes: 1680 x 1.1 x 35 = $64,680 **Total: 72,930**	T: 27 x 3 x 239 = $19,359 LF: 7 x 3 x 170 = $3,570 L: 33 x 3 x 55 = $5,445 **Total: $28,374**	32 services = [redacted] [redacted]
1H-405	3/0: 170 x 1.1 x 35 = **$6,545**	T: 9 x 3 x 239 = $6,453 L: 9 x 3 x 55 = $1,485 **Total: $7,938**	8 services = [redacted] [redacted]
1H-419	750 kcmil: 30 x 1.1 x 25 x 3 = $2,475 3/0 & #1: 140 x 1.1 x 35 = $5,390 **Total: $7,865**	T: 13 x 3 x 239 = $9,321 LF: 4 x 3 x 170 = $2,040 L: 11 x 3 x 55 = $1,815 **Total: $13,176**	15 services = [redacted] [redacted]
1H-431	350 kcmil: 270 x 1.1 x 40 = $11,880 3/0 & #1: 480 x 1.1 x 35 = $18,480 **Total: $30,360**	T: 14 x 3 x 239 = $10,038 LF: 4 x 3 x 170 = $2,040 L: 14 x 3 x 55 = $2,310 **Total: $14,388**	19 services = [redacted] [redacted]

* - 10% of length is added for splicing loops and waste.

[redacted]

Table 5.6

Materials and Labour for Replacing Primary Service Cables 50% Overtime			
Feeder	Cable (refer to feeder profiles 2.2)	Accessories (refer to 5.2)	Labour (refer to 5.4.1)
1H-403	750 kcmil: 100 x 1.1* x 25 x 3 = $8,250 350 kcmil: 100 x 1.1 x 40 = $4,400 Other sizes: 1680 x 1.1 x 35 = $64,680 **Total: 72,930**	T: 27 x 3 x 239 = $19,359 LF: 7 x 3 x 170 = $3,570 L: 33 x 3 x 55 = $5,445 **Total: $28,374**	32 services = [redacted] [redacted]
1H-405	3/0: 170 x 1.1 x 35 = **$6,545**	T: 9 x 3 x 239 = $6,453 L: 9 x 3 x 55 = $1,485 **Total: $7,938**	8 services = [redacted] [redacted]
1H-419	750 kcmil: 30 x 1.1 x 25 x 3 = $2,475 3/0 & #1: 140 x 1.1 x 35 = $5,390 **Total: $7,865**	T: 13 x 3 x 239 = $9,321 LF: 4 x 3 x 170 = $2,040 L: 11 x 3 x 55 = $1,815 **Total: $13,176**	15 services = [redacted] [redacted]
1H-431	350 kcmil: 270 x 1.1 x 40 = $11,880 3/0 & #1: 480 x 1.1 x 35 = $18,480 **Total: $30,360**	T: 14 x 3 x 239 = $10,038 LF: 4 x 3 x 170 = $2,040 L: 14 x 3 x 55 = $2,310 **Total: $14,388**	19 services = [redacted] [redacted]

* - 10% of length is added for splicing loops and waste.

[redacted]

5.5 Salvage

Aluminum

Table 5.7

Theoretical Weight of Aluminum Wire			
Wire size	Diameter [mm]	Cross-section [mm2]	Weight [kg/km]
750	22	380	1026
500	18	253	683
350	15	177	478
4/0	11.7	107	289
3/0	10.4	85	230
#1	7.4	42	113

Table 5.8

Aluminum Salvage Weight by Feeder [kg]					
	Cable Size	1H-403	1H-405	1H-419	1H-431
Feeder	750	13,080	4,926	11,295	6,555
	500	369	369	-	-
	350	2,223	1,977	-	-
	4/0	-	156	426	-
	3/0	-	-	441	-
	#1	-	57	-	-
Service	350	144	-	-	-
	3/0	849	90	69	186
	#1	-	-	18	96

Note: concentric neutral material is not accounted for

Salvage value of aluminum: $1.5/kg:

a) Feeder cables 750 kcmil = $54,000
b) Feeder cables <750 kcmil = $9,000
c) Services, all sizes = $2,200

Copper

The salvage value of copper: $5.00/kg. The removal of 3 km of 3 ph 500 kcmil PILC cable (5.3.1 Option 2) should produce 10 tons of salvageable copper, which is approximately $50,000.

The total salvage value of the cables proposed for removal under this project is expected to be $110,000.

6.0 CABLE INJECTION

6.1 Description

The cable injection option will be calculated for 750 kcmil cable only. The smaller conductor sizes for both feeder and services are considered for replacement. See Table 6.1 for summaries.

Table 6.1

Three phase line to be injected/replaced [m]			
	Feeder Injection 750 kcmil	Feeder Replacement <750 kcmil	Service Cable Replacement
1H-403	4,250	1,730	1,360
1H-405	1,680	1,910	140
1H-419	3,650	1,130	150
1H-431	2,130	0	550
Total	**11,710**	**4,770**	**2,200**

For feeder cables the injection will have to be done with de-energized cables. The injection and material installation crew would normally include 3 technicians. Time to inject will be dependent on the characteristics of the cable and type of conductors. The first draft work schedule implies up to 10 hours/day and 7 days/week. Labour fees for cable testing (TDR and pressure test) and cable injection are included in the injection price. The actual cable length is to be confirmed with TDR. Once injected the cables are protected by a 20 year warranty.

6.2 Scope

Following is a planned scope of injection work grouped by feeder# and section# (see Fig. 5.3). The sections will be (a) terminated at switching devices using livefront or deadfront terminations and (b) spliced using 600A deadbreak T-body, therefore each section will require 6 terminations. All terminations are in manholes and vaults. Some of the basic section lengths below are assumed to be equal for simplicity, but the total lengths should be fairly accurate.

Feeder 1H-403 (4250 m)
Section A: 230+230+230+230+230+230=1400 m
Section B: 160+150+230=540 m
Section C: 210+220+160+220+140+80+280+120+120+150=1700 m
Section D: 190+190=380 m
Section E: 230 m
Three phase cable sections: **22**
Terminations: 22 x 6 = **132**

Feeder 1H-405 (1680 m)
Section F: 230+230+230+230+230+270=1440
Section G: 240

Three phase cable sections: **7**
Terminations: **42**

Feeder 1H-419 (3670 m)
Section H: 228+228+228+228+228+200+200+200+200+200=1140 m
Section I: 156+156+156+110+190+240+190=1290 m
Section K: 240 m
Three phase cable sections: **18**
Terminations: **108**

Feeder 1H-431 (2130 m)
Section L: 190+190+150+90+100+160+170+170+190+110+100+180+160+160=2130 m
Three phase cable sections: **14**
Terminations: **84**

Summary:
Three phase cable sections: **61** (183 1ph 750 kcmil cables)
Total 3 ph. length: **11,710 m**
Terminations: **366** (306 T-bodies + 60 misc. live front terminations)

6.3 Cable Replacement Part of the Cable Injection Option

The cables other than 750 kcmil will be replaced as follows

Table 6.2

Materials and Labour for Cable Replacement Excluding 750 kcmil Feeder Cables and Primary Services			
Feeder	Cable (refer to feeder profiles 2.2)	Accessories (refer to 5.2)	Labour (refer to 5.4.1)
1H-403	350 kcmil: 1550 x 1.1* x 40 = $68,200 Other sizes: 360 x 1.1 x 35 = $13,860 **Total: $82,060**	T: 13 x 3 x 239 = $9,321 LF: 23 x 3 x 170 = $11,730 SA: 60 x 50 = $3,000 **Total: $24,051**	<750 kcmil**: 13 runs = [redacted] [redacted]
1H-405	350 kcmil: 1380 x 1.1 x 40 = $60,720 Other sizes: 520 x 1.1 x 35 = $20,020 **Total: $80,740**	T: 32 x 3 x 239 = $22,944 LF: 32 x 3 x 170 = $16,320 SA: 34 x 50 = $1,700 **Total: $40,964**	<750 kcmil: 6 runs = [redacted] [redacted]
1H-419	Other than 750 kcmil sizes: 1130 x 1.1 x 35 = **$43,505**	T: 7 x 3 x 239 = $5,019 LF: 10 x 3 x 170 = $5,100 SA: 60 x 50 = $3,000 **Total: $13,119**	<750 kcmil: 8 runs = [redacted] [redacted]
1H-431	N/A	N/A	N/A

* - 10% of length is added for splicing loops and waste.

** - In this context: 3 phase cable size from #1 to 350 kcmil

[redacted]

6.4 Injection Estimates

[redacted]

The Total price with 24.46% of contractor’s overhead: [redacted]

One of the NSPI underground crews will be involved with the contractor for the duration of the project which is estimated to be 8 weeks.

[redacted]

The Total contractor's price: [redacted]
Same with 24.42% of contractor's overhead: [redacted]

7.0 Cable Replacement vs. Cable Injection

Table 7.1

Replacement of 750 kcmil Cable Only			
Feeder	Cable (Table 5.4)	Accessoties	Labour
1H-403	**$325,625**	Splices:19x1,432=$27,208 Brackets:19x50=$950 Total: **$28,158**	[redacted]
1H-405	**$130,475**	Splices:7x1,432=$10,024 Brackets: 7x50=$350 Total: **$10,374**	[redacted]
1H-419	**$302,775**	Splices: 17x1,432=$24,344 Brackets: 17x50=$850 Total: **$25,194**	[redacted]
1H-431	**$175,725**	Splices: 14x1,432=$20,048 Brackets: 14x50=$700 Total: **$20,748**	[redacted]
Total:	**$934,600**	**$84,474**	**$325,242**

Table 7.2

Cable Replacement vs. Cable Injection Budget Summaries 750 kcmil only						
	Cable Replacement (Table 7.1)		CableCure [redacted]		Cable Injection [redacted]	
	$	Comment	$	Comment	$	Comment
NSPI Labour	325,242	replace radial feeder cables	114,120	working with [redacted]	114,120*	working with [redacted]
Materials	1,019,074	750 kcmil cables	N/A	N/A	N/A	N/A
Cable Injection with OH 25%	N/A	N/A	927,582	Injecting cables, 3x12km	709,194	Injecting cables, 3x12km
Salvage	+60,000	Al	N/A		N/A	
	+50,000	Cu	N/A		N/A	
Total:	**$1,234,316**		**$1,041,702**		**$823,314**	

* -3 technicians, [redacted] regular time [redacted]

Calculating net present values for projects with different life spans can lead to incorrect decisions unless adjustments are made. One of the accepted techniques for dealing with this problem is the Replacement Chain Method which transforms the decision variable (NPV) into a common metric for projects of different life spans. NPV in itself does not accomplish this.

Table 7.3

Cable Replacement vs. Cable Injection – Compare the Options of Different Life 750 kcmil only			
	Cable Replacement	CableCure [redacted]	Cable Injection [redacted]
Expected Life, years	40	20	40**
NPV	$1,238,000	$1,041,702	$823,314
Replacement Chain Method * (i = 8%)	$1,238,000	$1,265,197	$823,314

* Method: Determine the lowest common denominator of all the "project lives". Calculate the Net Present Value for the project repeated "n" times. Compare the projects; choose that project with highest NPV or less negative in our case.
** [redacted]

Risks associated with cable injection:

a. A variety of first generation polyethylene insulation cable will remain in service.
b. After removing of the old terminations and splices some of the cables may be too short for a quality splice.
c. Some of the cable sections may not be injectable due to physical (loss of pressure) or electrical parameters and therefore will have to be replaced.
d. Need to trace another parameter of the injected cable section and having to manage the cable injection records for warranty purposes.
e. The cable injection warranty will only cover the cost of injection for the affected section. The cost of associated NSPI labour and cost of restoration will not be covered.
f. Introduction of non-standard hardware to the system. All of the new terminations have features for cable injection (e.g. reticular flash preventer)
g. Working with contractor will require additional coordination effort.
h. Unforeseeable cost plus items

[redacted]

The cost of cable injection per basic length of three phase section (typ. Switch-to-switch) today is:
$823,314 / 57 (Table 7.2) = $14,444

When one of the three cables of the injected section fails in 20 years, NSPI will be reimbursed with:
$570,000 / (57x3) = $3,333

The present value of the future warranty payment is:
PV=3,333(P/F,8%,20)= $715

8.0 BUDGETARY TIMELINES

Year 1, 2 and 3 – replace radial sections of the feeders 1H-403, 405, 419 and 431
Year 4 and 5 – replace loops and ties of the feeders 1H-403, 405 and 419

2010: a) 1H-403 – radial section between 1H and 28H-416 Scotia Square (1,400m)
b) 1H-405 – radial section between 1H and 28H-417 Scotia Square (1,440m)
c) PILC cable removal between 1H and MH46 on Granville St (1,000m)

2011: a) 1H-419 – radial section between 1H and L431-401 Proctor Street (2,140m)
b) 1H-419 – half of the radial section between L431-404 and L431-211 Art Gallery Vault (645m)

2012: a) 1H-431 – radial section between 1H and Art Gallery Vault (2,230m)
b) 1H-419 – second half of the radial section between L431-404 and L431-211 Art Gallery Vault (645m)

2013: a) 1H-403 – North Loop from 28H-410 to L431-229 Metro Center (2,240m)
b) 1H-403 – Metro Center Loop from L431-230 to L431-232 (1,700m)

2014: a) 1H-403 – Scotia Square 28H-415 to Grand Parade Vault (380m)
b) 1H-403 – Scotia Square 28H-411 to Metro Center L431-230 (410m)
c) 1H-405 – 23kV loop (1,900m)
d) 1H-419 – Tie to Scotia Square (240m)

Budgetary Item for 2010

The underground work units and cost of materials are described in Section 5.4.1 of the Report. The RT labour is calculated as: [redacted]

1. Cable NSPI# 6548-0400
   (1400 + 1440) x 1.1 x $25 x 3 = **$234,300**
2. Accessories
   Separable cable connectors as per Appendix E: 28 x $1,432 = **$40,095**
   Support arms – 28 x $50 = **$1,400**
3. Labour
   Cable installation (28 basic runs) 28 x 9 = [redacted]: **$161,532**
   PILC cable removal [redacted]: **$9,615**
4. Contracting
   Traffic control - [redacted]/day: 28 x 500 x 1.2442 = **$17,419**
5. Salvage
   3 x 3 x 1 km of copper PILC 500 kcmil cable = 10,000 kg of salvageable copper
   Assume salvage value is $5.00/kg, the total value is **$50,000**
   3 x 2.84 km of 750 kcmil al cable = 8,740 kg of salvageable aluminum
   Assume the salvage value is $1.5/kg the total value is **$13,000**

Total: $401,419

APPENDIX A – Cable Lengths and Available Ducts

(A) 1H-403 – Main Radial 1H to 28H-416 – 1400 m of 750 kcmil		
From	To	Available Ducts
1H Substation	MH2	9A (A- available), Remove: 243, 246, 247
MH2	MH4	1A* Removals: 243, 246, 247
MH4	MH5	
MH5	MH6	
MH6	MH9	
MH9	MH10	2A* Removals: 243, 246, 247
MH10	MH48	
MH48	MH46	
MH46	MH26	0A, 1 cemented over,
MH26	MH28	0A
MH28	MH32	3A
MH32	28H-416 Scotia Square	2A*

(B) 1H-403 – North Loop from 28H-410 to L431-229 Metro Center			
From	To	Cable	Available Ducts
28H-410	MH32	500, 180 m	2A
MH32	MH39		5A
MH39	MH41	350, 530 m	4A*
MH41	MH42		4A*
MH42	MH43		5A
MH43	MH126		2A
	MH102	350, 400 m	3A*
MH102	MH103		0A
MH103	Police Station Vault		0A
Police Station Vault	Citadel Inn Vault	350, 70 m	0A
Citadel Inn Vault	MH103	350, 550 m	0A
MH103	MH102		0A
MH102	MH43		3A*
MH43	MH42		5A
MH42	MH41		4A*
MH41	MH39		4A*
MH39	MH38	750, 160 m	3A*
MH38	MH40		5A
MH40	MH38	750, 150 m	5A
MH38	MH116		5A
MH116	MH38	750, 230 m	5A
MH38	MH37		9A
MH37	MH36		9A
MH36	L431-229 MetroCtr		8A

(C) 1H-403 –Metro Center Loop from L431-230 to L431-232			
From	To	Cable	Available Ducts
Metro Venter Vault	MH36	750, 210 m	11A
MH36	MH110		4A
MH110	MH114		
MH114	Prince George Vault		
Prince George Vault	MH114	750, 220 m	
MH114	MH124		
MH124	Cambridge Vault		
Cambridge Vault	MH124	750, 160 m	
MH124	MH87		
MH87	MH131		
MH131	MH132	750, 220 m	
MH132	MH117	750, 140 m	
MH117	MH115	750, 80 m	
MH115	MH109	750, 280 m	
MH109	Grand Parade Vault		
Grand Parade Vault	MH33	750, 120 m	
MH33	MH34		
MH34	MH35	750, 120 m	
MH35	MH123		
MH123	MH35	750, 150 m	
MH35	MH36		
MH36	L431-232 Metro Ctr		

(D) 1H-403 – 28H-415 to Grand Parade Vault			
From	To	Cable	Available Ducts
28H-415	MH30	750, 190 m	2A
MH30	MH31		2A
MH31	L431-187 Barrington Place		0A
L431-186	MH31	750, 190 m	0A
MH31	MH30		2A
MH30	MH33		12A
MH33	L431-227 Grand Parade Vault		9A

(E) 1H-403 – 28H-411 to L431-230 Metro Center – Tie with 1H-405			
From	To	Cable	Available Ducts
28H-411	MH32	500, 180 m	A2, Upgrade?
MH32	MH39		A5, Upgrade?
MH39	MH38	750, 230 m	A3*
MH38	MH37		A9
MH37	MH36		A9

MH36	L431-230 Metro Center		A11

(F) 1H-405 – Main Radial 1H to 28H-417			
From	To	Cable	Available Ducts
1H-405	MH2	750, 1050 m	9A
MH2	MH4		1A
MH4	MH5		1A
MH5	NH6		1A
MH6	MH9		1A
MH9	MH10		2A
MH10	MH48		2A
MH48	MH46		2A
MH46	MH47		3A
MH47	MH133		13A
MH133	MH47	750, 390 m	13A
MH47	MH46		3A
MH46	MH26		0A
MH26	MH28		1A
MH28	MH32		3A
MH32	28H-417		2A, may be used for 1H-403 upgrades

(G) 1H-405 – 23 kV Loop			
From	To	Cable	Available Ducts
28H-408	MH32	350, 390 m	2A
MH32	MH39		5A
MH39	MH41		4A
28H-409	MH32	350, 390 m	2A
MH32	MH39		5A
MH39	MH41		4A
28H-408	28H-424 Center Pad	350, 110 m	
28H-409	28H-423 Center Pad	350, 110 m	
MH41	28H-419 Scotia Tower	350, 20 m	
MH41	28H-418 Scotia Tower	350, 20 m	
MH41	MH42	350, 120 m	4A
MH41	MH42	350, 120 m	4A
MH42	28H-427 North Pad	4/0, 90 m	1A
MH42	28H-428 North Pad	4/0, 90 m	1A
MH42	28H-433 MacKeen Tower	350, 50 m	0A
MH42	28H-432 MacKeen Tower	350, 50 m	0A

28H-433	MH43	#1, 170 m	
MH43	28H-442		
28H-432	MH43	#1, 170 m	
MH43	28H-441		

(H) 1H-419 – to L431-401 Proctor Street			
From	To	Cable	Available Ducts
1H-405	MH2	750, 1140 m	9A
MH2	MH4		1A
MH4	MH5		1A
MH5	MH6		1A
MH6	MH9		1A
MH9	MH10		2A
MH10	MH48		2A
MH48	MH46		2A
MH46	MH47		3A
MH47	MH125		3A
MH125	MH26	750, 1000 m	1A
MH26	MH28		1A
MH28	MH32		3A
MH32	28H		2A*
28H	MH30		2A
MH30	MH23		6A
MH23	MH22		7A
MH22	MH21		9A
MH21	MH90		0A
MH90	MH91		0A
MH91	MH92		
MH92	6H-401 Proctor St		

(I) 1H-419 – L431-404 Proctor Street to L431-211 Art Gallery Vault			
From	To	Cable	Available Ducts
L431-404	MH92	750, 560 m	
MH92	MH91		
MH91	MH90		0A
MH90	MH21		0A
MH21	MH20		5A
MH20	MH19		7A
MH19	L431-257 Xerox Building		4A
L431-256	MH19	750, 110 m	4A
MH19	L431-259 Sheraton Vault		5A
L431-258 Sheraton Vault	MH19	750, 190 m	5A

MH19	MH18		15A
MH18	MH22		9A
MH22	MH18	750, 240 m	9A
MH18	MH16		14A
MH16	MH14		14A
MH14	1801 Hollis St		4A
1801 Hollis St	MH14	750, 190 m	4A
MH14	MH13		14A
MJH13	MH56		12A
MH56	L431-211 Art Gallery Vault		0A

(J) 1H-419 Loop from L431-211 to L431-209 Art Gallery Vault			
From	To	Cable	Available Ducts
L431-211 Art Gallery Vault	MH56	3/0, 140 m	0A
MH56	MH55		13A
NH55	MH25		1A
MH25	L431-236 Royal Bank Vault		4A
L431-237 Royal Bank Vault	MH25	3/0, 210 m	4A
MH25	MH24		4A
MH24	MH15		
MH15	MH17		2A
MH17	L431-238 Historic Properties Vault		0A
L431-239 Historic Properties Vault	MH7	4/0, 160 m	
MH7	MH15		
MH15	L431-240 Law Courts Vault		
Law Courts Vault	MH111	3/0, 50 m, NB radial	
MH111	Ferry Term. Vault		
Ferry Term. Vault	MH13		
MH13	Riser Pole		
L431-241 Law Courts Vault	MH15	4/0, 140 m	
MH15	MH24		4A
MH24	L431-242 Hist. Prop. Prom. Vault		
L431-243 Hist. Prop. Prom. Vault	MH24	4/0, 190 m	
MH24	MH25		4A
MH25	Royal Bank Vault		4A

Royal Bank Vault	MH25		4A
MH25	L431-244 Bank of Montreal		2A
L431-245 Bank of Montreal	MH25	3/0, 70 m	2A
MH25	MH105		0A
MH105	MH25	3/0, 170 m	0A
MH25	MH55		1A
MH55	MH56		12A
MH56	L431-209 Art Gallery Vault		0A

(K) 1H-419 MH22 to 28H-413			
From	To	Cable	Available Ducts
L431-176 MH22	MH23	750, 240 m	
MH23	MH30		6A
MH30	28H-413 Scotia Square		2A

(L) 1H-431 to Art Gallery Vault			
From	To	Cable	Available Ducts
1H-431	MH2	750, 380 m	12A
MH2	MH3		2A
MH3	MH60		2A
MH60	Riser D431-001		0A
Riser D431-354	MH59	750, 150 m	0A
MH59	MH58		9A
MH58	MH57	750, 90 m	9A
MH57	MH148		
MH148	Ralston Vault	750, 100 m	
Ralston Vault	MH57	750, 160 m	
MH57	MH7		8A
MH7	Keith's Brewery Vault		1A
Keith's Brewery	MH7	750, 170 m	1A
MH7	Harbour Walk Vault		5A
Harbour Walk Vault	MH7	750, 180 m	5A
MH7	MH8		15A
MH8	Summit Place Vault		
Summit Place Vault	MH89	750, 190 m	
MH89	MH49		5A
MH49	MH51		9A
MH51	Founder's Square Vault		0A
Founder's Square	MH51	750, 110 m	0A

Vault			
MH51	MH52		5A
MH52	Bedford Row Vault		
Bedford Row Vault	MH52	750, 100 m	3A
MH52	MH53		12A
MH53	Public Works Vault		
Public Works Vault	MH53	750, 180 m	
MH53	MH12		
MH12	MH88		
MH88	Maritime Museum Vault		
Maritime Museum Vault	MH88	750, 320 m	
MH88	MH12		
MH12	MH13		
MH13	MH56		
MH56	Art Gallery Vault		

APPENDIX B – Primary Service Cables

Note: Due to short cable length, the primary services located in the same with the switch vault or manhole may not be shown in the list.

1 of 4

1H-403 Primary Service Cables		
CS Number	Cable Size [AWG], [kcmil]	Cable Length [m]
CS431-139	3/0	70
CS431-170-T2	#1	160
CS431-150	750	10
CS431-221	3/0	10
CS431-227	3/0	40
CS431-265	350	60
CS431-426	350	40
CS431-046	3/0	50
CS431-182	3/0	150
CS431-270	750	80
CS431-001	3/0	50
CS431-211	3/0	80
CS431-162	3/0	100
CS431-154	3/0	40
CS431-402	3/0	50
CS431-430	3/0	150
CS431- 531	#1	100
CS431-036	3/0	50
CS231-012	1/0	200
CS231-038	1/0	270
CS431-428	3/0	10
CS431-197	3/0	130
CS431-137	3/0	100
CS431-185	3/0	20
CS431-184	3/0	10

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1H-405 Primary Service Cables		
CS Number	Cable Size [AWG], [kcmil]	Cable Length [m]
CS431-007	3/0	50
CS431-012	3/0	70
CS431-005	3/0	50
CS431-504	-	-
CS431-505	-	-
CS431-506	-	-
CS431-507	-	-
CS431-508	-	-

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1H-419 Primary Service Cables		
CS Number	Cable Size [AWG], [kcmil]	Cable Length [m]
CS431-351	3/0	10
CS431-138	3/0	70
CS431-196-T2	750	30
CS431-268	#1	50
CS431-279	3/0	10

4 of 4

1H-431 Primary Service Cables		
CS Number	Cable Size [AWG], [kcmil]	Cable Length [m]
CS431-205	#1	55
CS431-002	3/0	50
CS431-345	#1	50
CS431-247	#1	30
CS431-049	#1	10
CS431-217	3/0	10
CS431-220	3/0	220
CS431-271	3/0	50
CS431-450	350	270

APPENDIX C – Splices and Terminations

The allocation of the cable accessories below is assumed based on single line diagrams and may not be an exact representation of the actual type or quantity. For accessory legend see 5.2.

Splices and Terminations									
MH# /Vault	Equip. in MH	1H-403		1H-405		1H-419		1H-431	
		Feeder	Service	Feeder	Service	Feeder	Service	Feeder	Service
001									
002									
003								s	
004		s		s		s			
005									
006		s		s		s			
007									
008									
009									
010		s		s		s			
011									
012								s	
013									
014									
015									
016									
017									
018									
019									
020						s			
021									
022	TX+SW					3T	2T+2L		
023						s			
024									
025									
026				s					
027									
028		s							
029									
030									
031									
032						s			
033									
034	SW	2T	T+L						
035									
036		T							
037									
038									
039		2s							
040	SW	2T	T+L						
041				2s					
042		s		2s					
043		s							

044									
045									
046		s				s			
047				s					
048									
049									
050									
051									
052	TX+SW								
053									
054									
055									
056									
057									
058								T	
059									
060									
061									
062									
063									
064									
065									
066									
067									
068									
069									
070									
071									
072									
073									
074									
075									
076									
077									
078									
079									
080									
081									
082									
083									
084									
085									
086									
087									
088									
089									
090						2s			
091A									
091B									
092									
093									
094									
095									

096									
097									
098									
099									
100									
101									
102		s							
103									
104									
105	TX+SW					2T	T+L		
106									
107									
108	TX		L						
109									
110									
111									
112									
113									
114									
115	TX+SW	2T	4T+4L						
116		2T	2T+2L						
117	TX+SW	2T	T+L						
118									
119									
120	SW								
121									
122	TX								
123	TX+SW	2T	2T+2L						
124	TX								
125	TX+SW					2T	2T+2L		
126	Adj Sw	2LF	2LF+2 L						
127									
128									
129									
130									
131	TX+SW	5T	5T+5L						
132	TX+SW	2T	2T+L						
133	TX+SW			4T	4T+4L				
134									
135									
136									
137									
138									
139									
140									
141									
142									
143									
144									
145									
146									
147									
148	TX+SW							2T	2T+2L

149									
150									
151									
152									
153									
154	SW								
155									
156									
157									
158									
159	TX	2T	2T+2L						
160									
161									
162									
163									
164									
165									
166									
167									
168									
169									
170									
171									
200									
B01	TX+SW								
B02	TX+SW								
D01									
D02	TX								
D03	SW								
D04									
D05									
D06									
D07									
D08									
D09									
D10	SW								
D11	SW								
D12									
D13	TX+SW								
D14	TX+SW								
D15									
D16	TX+SW								
D17									
D18	TX+SW								
D19									
D2	TX								
D20	TX								
D21	TX+SW								
D22									
D23	TX+SW								
D24									
D25									
D26									

D27									
D28									
D29									
D30									
D31									
D32									
D33									
D34									
D35									
D36A									
D36B									
D37									
D38									
D39									
D40									
D41									
D42									
D43									
D44A									
D44B									
D44C									
D44D									
D44E									
D44F									
D44G									
D44H									
D44I									
D44J									
D6									
Police Station		4LF	LF						
Citadel Hotel		4LF	LF						
Plaza 1881									
Blue Cross									
Metro Center		11LF	3LF						
Prince George		2T	T+L						
Cambrid ge Suites		2T	2T+2L						
Canada Trust									
City Hall									
Grand Parade		3T	3T+3L						
Proctor Street									
Xerox Bldg						2T	2T+2L		
Sherato						2T	T+L		

n									
Hollis 1801						2T	T+L		
Art Gallery						3T	T+L	T	
Royal Bank						2LF	LF		
Historic Prop. Warerfront						2LF	LF		
Ferry Terminal						2LF			
Law Courts						2T	2T+3LF		
Hist Prop. Promenade						2T	T+L		
Bank of Montreal						2LF	LF		
Ralston Building								2T	T+L
Summit Place								2T	T+L
Founder's Square								3T	T+L
Bedford Row								2T	2T+2L
Public Works Canada								2T	2T+2L
Barrington Place		2T	T+L						
Market St 1770			4L						
6H Proctor Street						6LF			
O/H section								2LF	4LF
Keith's Brewery								2T	2T+2L
Harbour Walk								2T	T+L
Maritime Museum								2T	2T+2L
28H South Pad Vault		10LF		36LF+2T		LF			
Center Pad Vault				4T	T+L				

Scotia Tower Vault				4T	T+L				
North Pad Vault				4T	T+L				
MacKeen Pad Vault				4T	T+L				
Trade Mart Vault				2T	T+L				

APPENDIX D – Art Gallery Tie (Details)

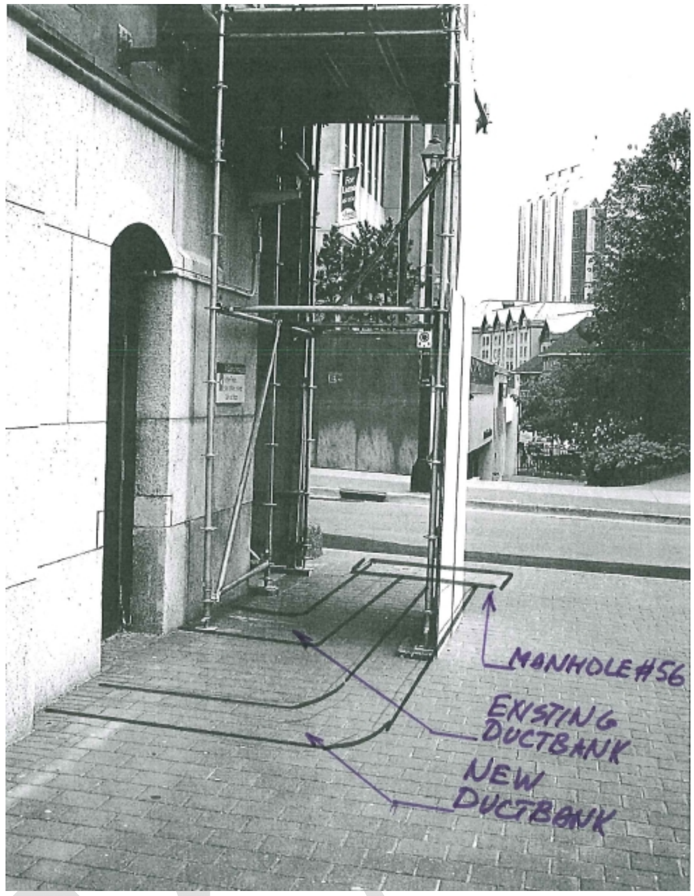


Fig. 4.3 Art Gallery Ductbank Extension

The inlaid brick manhole cover should be replaced with a different type of cover that can be quickly removed and reinstalled as required.


Fig. 4.4 Manhole MH56

The electrical connections in the vault will have to be modified to allow for a new switch. One of the options would be to install a new two-way 200 A VacPac switch and relocate the CS431-272 primary service from the existing four-way VacPac switch to the new switch. The source side of the new switch will be piggybacked at L431-209. See Fig. 4.5 and 4.6 for details. This will free up one of the 600 A switches on the existing VacPac which will be used to tie-in the feeder 1H-424.

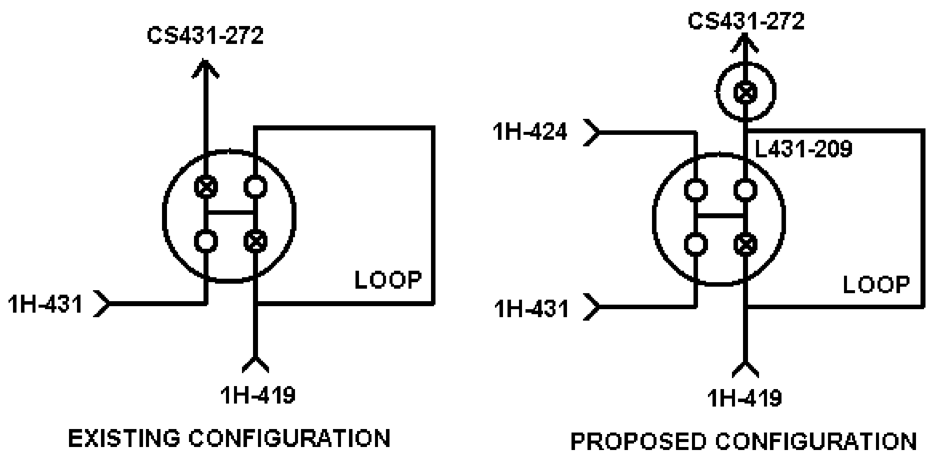


Fig. 4.5 Electrical Connections Before and After

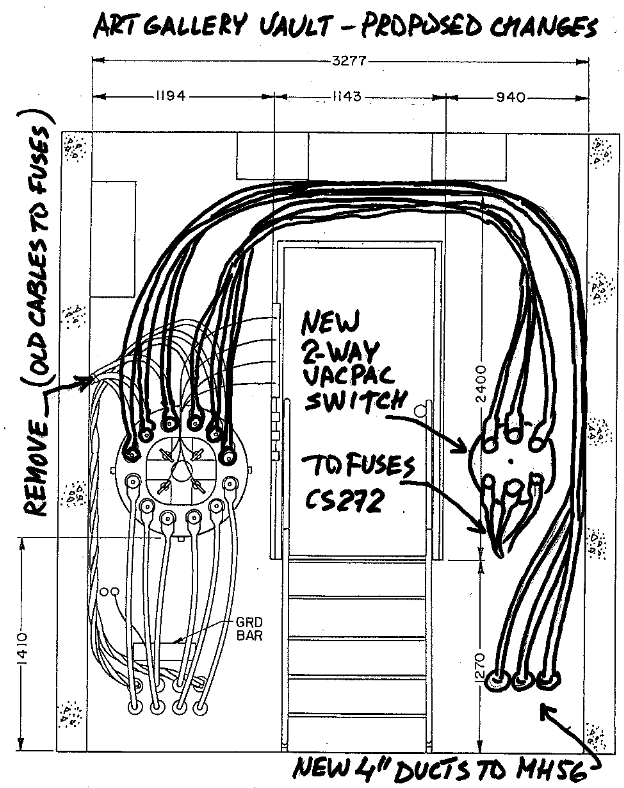


Fig. 4.6 New Two-Way Switch in the Vault

The following is the list of basic jobs for the project:

1. Install nine 100 mm ducts (3 spare) between the Art Gallery vault and MH56 (approx. 8 m).
2. Repair or replace manhole cover MH56
3. Install six 750 kcmil Al cables from MH13 through MH56 to Art Gallery vault (60 – 70 m)
4. Install new 2-way 200 A VacPac switch in the vault. Cooper model # 21VP125-22. The SMD-20 fuse mounts in the vault may need to be slightly moved to allow for proper clearance.
5. Transfer cs431-272 from four-way to two-way VacPac switch. The source side of the new switch connects to L431-209.
6. Terminate and connect the new cables to L431-212 -the freed-up switch.
7. Splice-in the other end of the cable to the feeder 1H-424 in MH13 using 600A deadbreak terminations.
8. Consider installing barriers in front of the fuses in the vault.

APPENDIX E – Deadfront Splice Specifications for 750 kcmil Cable

One three phase separable deadfront splice on the full size feeder cable will require the following materials:

#	Description	NSPI Code	QTY	Price
1	Basic Shielded Elbow 25 kV	5465-2370	6	$76.87/ea
2	Cable Adapter #750, Compact	5465-0189	6	$15.84/ea
3	Connecting Plug 25 kV	5465-7400	3	$79.26/ea
4	Basic Insulating Plug	5465-7350	6	$46.29/ea
5	Conductor Contact, #750 Compact	5465-1320	6	$33.17/ea
6	Constant Force Spring	5465-0655	6	$13.56/ea
7	Braid Flexible Tinned	5465-0650	3 m	$7.98 per ft

CI Number: 40338

Title: 16W-301 Hebron Reconductor

Start Date: 2011/04

Final Cost Date: 2011/10

Function: Distribution

Forecast Amount: $350,000

DESCRIPTION:

This project provides for the costs associated with upgrading conductor on the 16W-301 feeder, out of Hebron toward Port Maitland, to a larger conductor to accommodate load increases in the area. The feeder conductor will be replaced from the 16W Hebron Substation, to the first set of reclosers.

Summary of Related CI's +/- 2 years:
No other projects in 2009,2010,2011,2012 and 2013

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Overloaded Equipment

Why do this project?

Completion of this project will ensure that the system is able to meet the growing load requirements in the area.

Why do this project now?

Load increases in the area dictate that this project must be completed to accommodate the increase in customers in this area.

Why do this project this way?

Upgrading the 16W-301 feeder to a larger size conductor accommodates load increases on the existing feeder.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40338	- 16W-301 Hebron Reconductor		**Project Number**	
Parent CI Number :	-		**Approved Date**	
Cost Centre : 800	- 800-Services - Admin.		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		1,488	0	1,488
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	21,654	0	21,654
012	035	012 - Materials	035 - DP - Wood Poles	13,444	0	13,444
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - DP - O/H Cond.	51,558	0	51,558
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
012	040	012 - Materials	040 - DP - O/H Cond.Devices	2,592	0	2,592
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
			Total Cost:	350,000	0	350,000
			Original Cost:	23,067		

CI 40338 - 16W-301 Hebron Reconductor

The following is a breakdown of costs associated with the 16W-301 Hebron Reconductor Project.

Administrative Overhead and Interest	$[redacted]
Materials	$67,594
Contracts	$[redacted]
Total	$350,000

This project will be complete[redacted] contractor at an estimated rate of $[redacted] per standard work unit hour. Included is $[redacted] of contracts for land rights. The material cost is based on estimates from similar projects.

CI Number: 40328

Title: Feeder Exit Cable Replacements

Start Date: 2011/04

Final Cost Date: 2011/12

Function: Distribution

Forecast Amount: $317,587

DESCRIPTION:

This project provides for the costs associated with replacing deteriorated feeder exit cables at the 48H Penhorn Substation, and the 101H Cobequid Substation.

Summary of Related CI's +/- 2 years:
This is a multi-year project that will continue beyond 2011. Future CIs TBD

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Deteriorated Conductor

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year two of a five year (2010-2014) plan to improve reliability to NSPI's customers. Deteriorated feeder exit cables have the potential to affect the reliability of their associated feeder through failure generally leading to lengthy customer outages. The purpose of this project is to replace such cables prior to their failure. It is predicted that replacing 48H and 101H feeder exit cables will prevent feeder exit cable failure outages, which would result in approximately 165,000 customer hours of interruption.

Why do this project now?

This project is part of an annual replacement program in which all feeder exit cables at two substations will be replaced.

Why do this project this way?

The planned replacement of feeder exit cables allows for the controlled upgrade of deteriorated plant, focusing on those that are the greatest risk to reliability, based on feeder inspection data.

CI Number : 40328 - Feeder Exit Cable Replacements

Parent CI Number : -

Cost Centre : 800 - 800-Services - Admin.

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D OT Labour AO		6,587	0	6,587
092		092-Vehicle T&D Reg. Labour AO		13,174	0	13,174
094		094 - Interest Capitalized		6,953	0	6,953
095		095-COPS Overtime Labour AO		10,035	0	10,035
095		095-COPS Contracts AO		18,768	0	18,768
095		095-COPS Regular Labour AO		20,069	0	20,069
001	046	001 - T&D Regular Labour	046 - DP - U/G Conductor	26,000	0	26,000
002	046	002 - T&D Overtime Labour	046 - DP - U/G Conductor	26,000	0	26,000
012	046	012 - Materials	046 - DP - U/G Conductor	110,000	0	110,000
013	046	013 - COPS Contracts	046 - DP - U/G Conductor	80,000	0	80,000
			Total Cost:	317,587	0	317,587
			Original Cost:	50,000		

CI 40328 - Feeder Exit Cable Replacements

The following is a breakdown of costs associated with the Feeder Exit Cable Replacements Project.

Administrative Overhead and Interest	$75,587
Materials	$110,000
Contracts	$80,000
Labour	$52,000
Total	$317,587

This project, for the most part, will be completed by NSPI personnel at a rate of approximately $[redacted] per person day. The contract portion would be civil work and cable laying which would not be completed by an affiliate. The materials portion of the project is based on similar feeder exit cable replacement projects in the past.

CI Number: 40211

Title: 2011 3H/6H Replacement Program

Start Date: 2011/03

Final Cost Date: 2011/12

Function: Distribution

Forecast Amount: $306,895

DESCRIPTION:

This project provides for the replacement of 10 model 3H and 6H hydraulic reclosers. There are approximately 20 of these reclosers remaining in the Nova Scotia Power Inc. distribution system. It is anticipated all of these reclosers will be replaced over a 3 year period (2010-2012). The replacements will start with the oldest reclosers first. Devices targeted for 2011 replacement include 509V-302, R318-001, R318-003, R312-008, R316-018, R315-010, 624V-311, R312-004, R356-025, 545N-301, R323-006, 704H-311.

Summary of Related CI's +/- 2 years:
2010 CI 38867 Replacement of 3H and 6H Reclosers $272,568
2012 CI TBD Replacement of 3H and 6H Reclosers

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: System Production

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is part of the five year (2010-2014) plan to improve reliability to NSPI's customers. This project is required to replace deteriorated equipment, which is having a negative effect on distribution system reliability.

Why do this project now?

These reclosers are approximately 40 years old and are at the end of their expected product life. Deterioration of these reclosers has a negative impact on customer service reliability. Replacement of these devices in 2011 will prevent failures, thereby averting over 9,000 customer hours of interruption.

Why do this project this way?

Replacing approximately 10 reclosers per year will provide the opportunity to manage this work in a cost effective manner.

CI Number : 40211 - 2011 3H/6H Replacement Program **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 800 - 800-Services - Admin. **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		22,098	0	22,098
094		094 - Interest Capitalized		4,406	0	4,406
095		095-COPS Contracts AO		117	0	117
095		095-COPS Regular Labour AO		33,663	0	33,663
001	040	001 - T&D Regular Labour	040 - DP - O/H Cond.Devices	35,611	0	35,611
002	040	002 - T&D Overtime Labour	040 - DP - O/H Cond.Devices	0	0	0
011	040	011 - Travel Expense	040 - DP - O/H Cond.Devices	1,000	0	1,000
012	040	012 - Materials	040 - DP - O/H Cond.Devices	200,000	0	200,000
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	500	0	500
041	040	041 - Meals & Entertainment	040 - DP - O/H Cond.Devices	500	0	500
001	043	001 - T&D Regular Labour	043 - DP - Substn Dev.	5,000	0	5,000
002	043	002 - T&D Overtime Labour	043 - DP - Substn Dev.	0	0	0
001	085	001 - THERMAL Regular Labour	085 Design	0	0	0
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
011	085	011 - Travel Expense	085 Design	1,000	0	1,000
041	085	041 - Meals & Entertainment	085 Design	0	0	0
001	087	001 - T&D Regular Labour	087 Field Super.& Ops.	3,000	0	3,000
002	087	002 - T&D Overtime Labour	087 Field Super.& Ops.	0	0	0
			Total Cost:	306,895	0	306,895
			Original Cost:	44,531		

CI 40211 - 2011 3H/6H Replacement Program

The following is a breakdown of costs associated with the 2011 3H/6H Replacement Project.

Administrative Overhead and Interest	$60,284
Materials	$200,000
Contracts	$500
Labour	$43,611
Other	$2,500
Total	$306,895

This project will be completed by NSPI personnel at a rate of approximately $[redacted] per person day. The materials portion of the project, approximately $20,000 per recloser, is based on a similar project, CI 38867 Replacement of 3H and 6H Reclosers, submitted in the 2010 Annual Capital Expenditure Plan.

CI Number: 40385

Title: 88W-323G Pinkney's Point Part 2

Start Date: 2011/06

Final Cost Date: 2011/12

Function: Distribution

Forecast Amount: $295,351

DESCRIPTION:

The purpose of this project is to replace deteriorated plant. In total this job is to replace 51 poles, add 4 poles, reconductor 59 spans of primary single phase line to 2/0, add two new cutouts and replace two transformers.

Summary of Related CI's +/- 2 years:
2010 – CI 39576 Pinkney's Point Deteriorated Plant $233,739

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Deteriorated Conductor

Why do this project?

The plant referenced above is at the end of its useful life.

Why do this project now?

Replacement of this plant is necessary to minimize outages and improve reliability.

Why do this project this way?

Reuse of existing alignment minimizes environmental impact and eliminates the need to obtain new easements.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40385 - 88W-323G Pinkney's Point Part 2 **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 800 - 800-Services - Admin. **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		6,942	0	6,942
095		095-COPS Contracts AO		[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	8,884	0	8,884
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - DP - O/H Cond.	5,590	0	5,590
013	039	013 - COPS Contracts	039 - DP - O/H Cond.	[redacted]	0	[redacted]
098	039	098 - Salvage	039 - DP - O/H Cond.	(209)	0	(209)
012	040	012 - Materials	040 - DP - O/H Cond.Devices	617	0	617
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
012	041	012 - Materials	041 - DP - O/H Line Transf.	4,300	0	4,300
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
098	041	098 - Salvage	041 - DP - O/H Line Transf.	(28)	0	(28)
013	042	013 - COPS Contracts	042 - DP - O/H Ln.Transf.Dev.	[redacted]	0	[redacted]
098	042	098 - Salvage	042 - DP - O/H Ln.Transf.Dev.	(65)	0	(65)
012	050	012 - Materials	050 - DP - Street Lights	198	0	198
013	050	013 - COPS Contracts	050 - DP - Street Lights	[redacted]	0	[redacted]
012	052	012 - Materials	052 - DP - Services	765	0	765
013	052	013 - COPS Contracts	052 - DP - Services	[redacted]	0	[redacted]
098	052	098 - Salvage	052 - DP - Services	(105)	0	(105)
			Total Cost:	295,351	0	295,351
			Original Cost:	16,269		

CI 40385 - 88W-323G Pinkney's Point Part 2

The following is a breakdown of costs associated with the 88W-323G Pinkney's Point Part 2 Project.

Administrative Overhead and Interest	$[redacted]
Materials	$20,355
Contracts	$[redacted]
Salvage	($407)
Total	$295,351

This project is proposed to be completed by a contractor at a rate of $[redacted] per standard work unit hour. The material cost is based on past similar projects.

CI Number: 40273

Title: 101H-411 Targeted Feeder Replacements

Start Date: 2011/01

Final Cost Date: 2011/12

Function: Distribution

Forecast Amount: $273,399

DESCRIPTION:

This project is part of a program to improve customer service and reliability, as measured by System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) performance on select feeders throughout the Province. Specifically, deteriorated poles and conductor, porcelain arrestors, cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013.

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Outage Performance

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year two of a five year (2010-2014) plan to improve reliability to NSPI's customers. Distribution equipment (e.g. poles, conductor, cutouts, and transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 101H-411, out of the Cobequid Road Substation. This feeder, which is 30.2km in length, was selected due to past performance, customer density and feeder length.

Why do this project now?

This feeder is included in the 2011 Reliability Investment Plan based on past performance, customer density and feeder length. It is expected that targeted replacements on 101H-411 will result in annual savings of over 9,300 customer hours of interruption.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number	: 40273	- 101H-411 Targeted Feeder Replacements	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 800	- 800-Services - Admin.	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		9,497	0	9,497
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	1,757	0	1,757
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
012	040	012 - Materials	040 - DP - O/H Cond.Devices	2,185	0	2,185
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
			Total Cost:	273,399	0	273,399
			Original Cost:	7,851		

CI 40273 101H-411 Targeted Feeder Replacements

The following is a breakdown of costs associated with the 101H-411 Targeted Feeder Replacements Project.

Administrative Overhead and Interest	$[redacted]
Materials	$3,942
Contracts	$[redacted]
Total	$273,399

This project is proposed to be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. The material cost is based on estimates of similar projects.

CI Number: 40265

Title: 77V-401 Targeted Feeder Replacements

Start Date:	2011/05
Final Cost Date:	2011/12
Function:	Distribution
Forecast Amount:	$267,321

DESCRIPTION:

This project is part of a program to improve customer service and reliability, as measured by System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) performance on select feeders throughout the Province. Specifically, deteriorated poles and conductor, porcelain arrestors, cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Outage Performance

Why do this project?

This work is being done as part of the overall customer reliability improvement investment. This is year two of a five year (2010-2014) plan to improve reliability to NSPI's customers. Distribution equipment (e.g. poles, conductor, cutouts, and transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 77V-401, out of the Conway Substation. This feeder, which is 61.7km in length, was selected due to past performance, customer density and feeder length.

Why do this project now?

This feeder is included in the 2011 Reliability Investment Plan based on past performance, customer density and feeder length. It is expected that targeted replacements on 77V-401 will result in annual savings of around 3,200 customer hours of interruption.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

Based on the scope of the work and availability of NSPI's Power Line Technician workforce, the Company plans to engage a contractor to perform this work.

CI Number : 40265 - 77V-401 Targeted Feeder Replacements

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 800 - 800-Services - Admin.

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		7,477	0	7,477
095		095-COPS Contracts AO		[redacted]	0	[redacted]
013	002	013 - COPS Contracts	002 - DP - Land Rights	[redacted]	0	[redacted]
012	035	012 - Materials	035 - DP - Wood Poles	4,687	0	4,687
013	035	013 - COPS Contracts	035 - DP - Wood Poles	[redacted]	0	[redacted]
012	039	012 - Materials	039 - DP - O/H Cond.	150	0	150
012	040	012 - Materials	040 - DP - O/H Cond.Devices	23,039	0	23,039
013	040	013 - COPS Contracts	040 - DP - O/H Cond.Devices	[redacted]	0	[redacted]
012	041	012 - Materials	041 - DP - O/H Line Transf.	4,913	0	4,913
013	041	013 - COPS Contracts	041 - DP - O/H Line Transf.	[redacted]	0	[redacted]
			Total Cost:	267,321	0	267,321
			Original Cost:	21,504		

CI 40265 77V-401 Targeted Feeder Replacements

The following is a breakdown of costs associated with the 77V-401 Targeted Feeder Replacements Project.

Administrative Overhead and Interest	$[redacted]
Materials	$32,789
Contracts	$[redacted]
Total	$267,321

This project is proposed to be completed by a contractor at an estimated rate of $[redacted] per standard work unit hour. Included is $[redacted] in contracts associated with land rights. The material cost is based on estimates of similar projects.

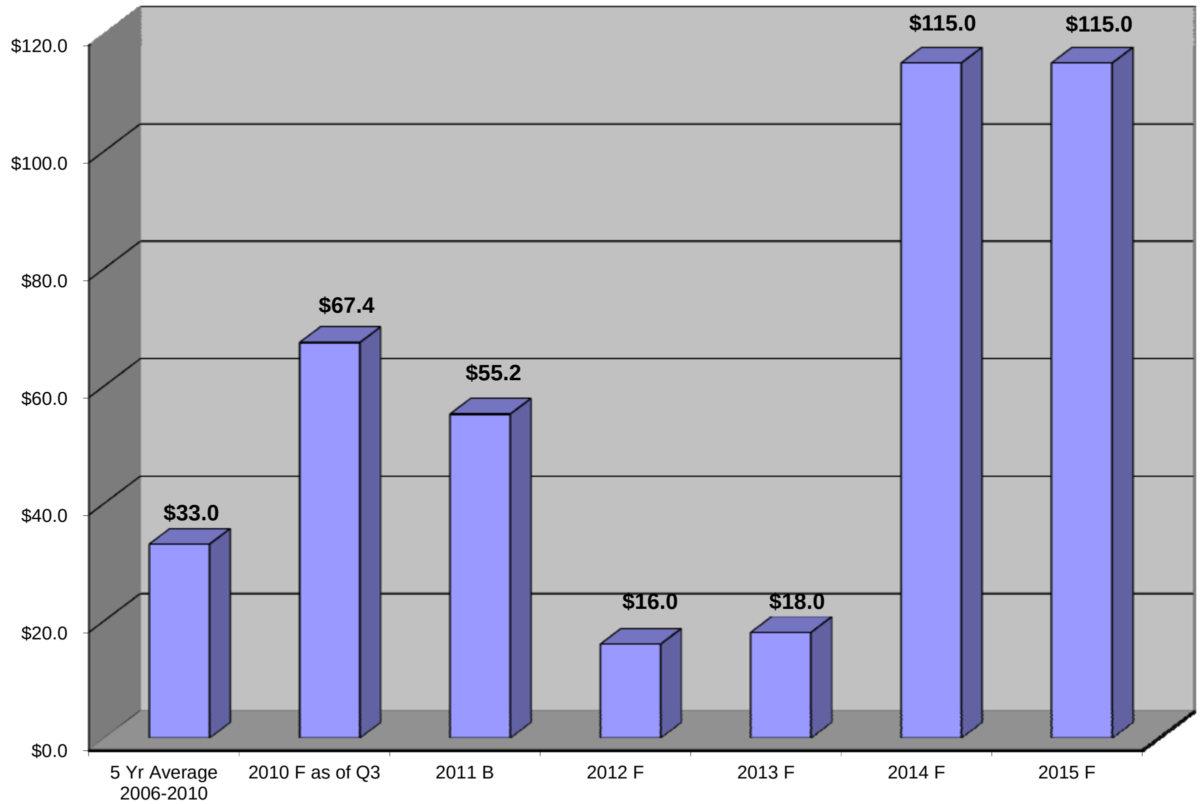
2011 Reliability Investment Plan

CI #	Proj #	Title	Functional Class	Year	Total
38867	D321	Replacement of 3H and 6H Reclosers	Distribution Plant	2011	272,568
25575		Reliability Keltic Drive New Feeder	Distribution Plant	2011	1,205,023
39269		2011 Recloser Additions	Distribution Plant	2011	444,765
39270		2011 Dist. Cutout Replacements	Distribution Plant	2011	2,953,283
39272		2011 Distribution Feeder Ties	Distribution Plant	2011	500,000
40211		2011 3H/6H Replacement Program	Distribution Plant	2011	306,895
40219		2011 Recloser Control Replacements	Distribution Plant	2011	216,786
40220		2011 Halifax U/G Cable Replacement	Distribution Plant	2011	418,861
40227		2011 Off Road to Roadside	Distribution Plant	2011	2,500,000
40263		24C-442 Targeted Replacements	Distribution Plant	2011	143,254
40264		37N-411 Targeted Replacements	Distribution Plant	2011	54,361
40265		77V-401 Targeted Replacements	Distribution Plant	2011	267,321
40267		37N-413 Targeted Replacements	Distribution Plant	2011	37,618
40268		22N-401 Targeted Replacements	Distribution Plant	2011	214,217
40273		101H-411 Targeted Replacements	Distribution Plant	2011	273,399
40284		82V-423 Targeted Replacements	Distribution Plant	2011	67,135
40291		2C-402 Targeted Replacements	Distribution Plant	2011	89,209
40300		104H-432 Targeted Replacements	Distribution Plant	2011	124,108
40328		Feeder Exit Cable Replacements	Distribution Plant	2011	317,587
40545		2011 New Reliability Technologies	Distribution Plant	2011	110,769
35742	P789	GIS Connectivity Project	General Property	2011	1,443,434
25391		25 kV Bus Keltic Dr	Transmission Plant	2011	375,445
40280		2011 Trans Switch & Breaker Upgrade	Transmission Plant	2011	2,866,718
40281		2011 Tx Line Insulator Replacement	Transmission Plant	2011	3,018,100
40285		2011 Trans Subst Insulator & Cutout	Transmission Plant	2011	1,500,000
40274		New RTU Deployment	General Property	2011	509,706
					20,230,564

General Plant

5 GENERAL PLANT
(Millions of Dollars)

5.1 Five Year Plan and Highlights



- General Plant capital in 2011 focuses largely on Information Technology system replacements and vehicles.

- Year 2011 general plant capital is comprised of the following:

    - $9.3M New items with total spend greater than $250K seeking ACE approval
    - $9.1M New items with total spend greater than $250K for individual approval
    - $1.9M New items with total spend less than $250K
    - $18.3M Carryover Spending
    - $16.5M Routine Capital Spending

5.2 General Plant – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2011 Budget	Subsequent Spending	Total Estimate
P772	29131	FAC Space 2011	2008/10	2011/06	$50,458,657	$7,756,889	$0	$58,215,546
*	38182	2010 Backup Control Centre	2010/11	2012/01	$116,063	$3,106,003	$0	$3,222,066
		Total Buildings			**$50,574,720**	**$10,862,892**	**$0**	**$61,437,612**
P789	35742	Connectivity Upgrade	2009/05	2012/03	$1,721,234	$1,443,434	$0	$3,164,667
*	34843	Oracle NLA License	2011/01	2011/03	$0	$1,016,000	$0	$1,016,000
P819	34782	Oracle Financials Upgrade	2010/05	2011/12	$286,403	$455,942	$0	$742,344
P797	32163	Treasury Management System Upgrade	2009/12	2011/03	$306,524	$373,963	$0	$680,487
		Total Computers			**$2,314,161**	**$3,289,339**	**$0**	**$5,603,498**
P833	29009	Right of Way Purchase Northern NS	2010/09	2013/05	$918,491	$2,582,498	$961,504	$4,462,493
P834	40103	U&U Load Control Demo	2010/10	2014/03	$109,517	$957,082	$3,227,194	$4,293,793
*	33562	FAC Land Registration Act	2010/09	2014/12	$323,120	$349,658	$1,226,384	$1,899,162
**	38849	Harbour East Land Purchase and Right of Way	2011/03	2011/12	$0	$257,157	$0	$257,157
P813	38900	Opsym	2010/05	2011/04	$734,718	$48,000	$0	$782,718
		Total Other General Plant			**$2,085,846**	**$4,194,395**	**$5,415,082**	**$11,695,323**
		Total General Plant			**$54,974,727**	**$18,346,626**	**$5,415,082**	**$78,736,433**

Note 1: Project Listings are as of December 2010

Note 2: * Pending UARB Approval

Note 3: ** Name change from Eastern Passage to Harbour East Land Purchase and Right of Way. UARB Approved, pending activation.

5.3 General Plant – New Item Spending

Tab#	CI#	Project Title	2011 Budget	Project Total	Page
GP1	40298	SAN and Backup Replacement	$947,305	$947,305	
GP2	40365	MS Sharepoint Platform Upgrade	703,711	908,174	
GP3	40290	Enterprise Geographic Information System (GIS)	320,381	320,381	
GP4	40275	Eastlink Outage Information Interface	296,460	296,460	
		Total Computers New Spending	**$2,267,857**	**$2,472,320**	
GP5	40229	Protective Equipment Test Center Upgrade	$875,542	$875,542	
GP6	40274	New RTU Deployment	509,706	509,706	
GP7	40245	2011 RTU Replacement Program	459,517	459,517	
		Total Equipment Replacement New Spending	**$1,844,765**	**$1,844,765**	
GP8	40278	OMS Upgrade 2011	$2,050,951	$2,050,951	
GP9	40299	Field Office Phone System Replacement	833,557	833,557	
GP10	40249	New Chester Microwave Radio Link	407,925	407,925	
GP11	40261	Newtonville SR500 Multipoint Radio System Replacement	351,681	351,681	
GP12	40252	2011 Replace Microwave Radio System	351,658	351,658	
GP13	40247	2011 Radio Tower Upgrades	324,686	324,686	
		Total Telecommunication New Spending	**$4,320,458**	**$4,320,458**	
GP14	40105	Boiler Condition and Data Tracking Software	$570,643	$570,643	
GP15	40293	People Soft Workflow	276,578	276,578	
		Total Other General Plant	**$847,221**	**$847,221**	
		Total General Plant New Spending	**$9,280,301**	**$9,484,764**	

CI Number: 40298

Title: SAN and Backup Replacement

Start Date:	2011/01
Final Cost Date:	2011/04
Function:	General Plant
Forecast Amount:	$947,305

DESCRIPTION:

This project will update and replace the current SAN (Storage Area Network) and Backup system. The current systems are approximately seven years old and are no longer supported by the vendor. Updating the system will keep technologies, systems and hardware current with industry practice and support, allowing for continued operation.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

The current SAN and Backup system is now seven years old and is no longer supported by the vendor.

Why do this project now?

This system is no longer supported by the vendor and replacement is now required.

Why do this project this way?

Replacement of the system is the most cost effective option.

CI Number : 40298 - SAN and Backup Replacement

Parent CI Number : -

Cost Centre : 027 - 027-Administration

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001		001 - IT Regular Labour		24,000	0	24,000
028		028 - Consulting		[redacted]	0	[redacted]
035		035 - Comp.Hrdwr & Op.Sftwr		[redacted]	0	[redacted]
094		094 - Interest Capitalized		10,508	0	10,508
095		095-IT Regular Labour AO		12,797	0	12,797
			Total Cost:	947,305	0	947,305
			Original Cost:			

NOVA SCOTIA POWER
An Emera Company

SAN and Backup Replacement
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**20-Dec-10**
Division :	Integrated Customer Service	**CI Number:**	40298
Department :	Information Technology	**Project No. :**	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	SAN Backup Scenario 1	6.68%	123,835	3	9.77%	9.2 years
B	SAN Backup Scenario 2	6.68%	1,416,814	2	30.03%	6.4 years
C	SAN Backup Scenario 3	6.68%	6,176,468	1	63.59%	5.1 years
D	SAN Backup Scenario 4	6.68%	0	4	#NUM!	0.0 years

Recommendation :

Justification of this project is based upon the opportunity cost of avoided maintenance and productivity loss. In the event that the Storage Area Network (SAN) and Backup system became unavailable a significant portion of the Company's employees would be unable to continue working. This system operates many of the Company's key critical applications such as Oracle Financials, Maximo and PeopleSoft.

Notes/Comments :

SAN Backup Scenario 1

This scenario is based upon a 15% probability that the SAN and Backup system would become unavailable (increasing 3% annually), with a service interruption lasting 1 day and affecting approx. 525 employees; the length of outage is expected to increase from 1 day to 10 days in duration over the life of 7 years.

SAN Backup Scenario 2

This scenario is based upon increasing probabilities of failure (starting at 15% and increasing exponentially) and impacting a greater portion of employees directly (50%).

SAN Backup Scenario 3

This scenario is based upon increasing probabilities of failure (starting at 25% and increasing exponentially) and impacting greater portion of employees directly (60%).

SAN Backup Scenario 4

SAN and Backup Replacement
SAN Backup Scenario 1

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(947,305.0)	260,508.9	686,796.1	(947,305.0)	84,317.7	(862,987.3)	0.937	(808,949.5)	(808,949.5)
2012	-	14,081.3	-	377,737.9	309,058.3	14,081.3	112,680.2	126,761.5	0.879	111,383.6	(697,565.9)
2013	-	34,618.1	-	169,982.0	139,076.2	34,618.1	41,962.8	76,580.9	0.824	63,077.0	(634,488.8)
2014	-	83,186.1	-	76,491.9	62,584.3	83,186.1	(2,086.0)	81,100.1	0.772	62,616.6	(571,872.2)
2015	-	195,335.1	-	34,421.4	28,162.9	195,335.1	(49,883.3)	145,451.8	0.724	105,269.9	(466,602.3)
2016	-	283,045.4	-	15,489.6	12,673.3	283,045.4	(82,942.3)	200,103.1	0.678	135,755.0	(330,847.3)
2017	-	323,902.7	-	6,970.3	5,703.0	323,902.7	(98,249.0)	225,653.7	0.636	143,503.1	(187,344.2)
2018	-	367,282.1	-	3,136.6	2,566.3	367,282.1	(112,885.1)	254,397.0	0.596	151,651.9	(35,692.3)
2019	-	412,648.3	-	1,411.5	1,154.9	412,648.3	(127,483.4)	285,164.9	0.559	159,348.9	123,656.6
2020	-	-	-	635.2	519.7	-	196.9	196.9	0.524	103.1	123,759.7
2021	-	-	-	285.8	233.9	-	88.6	88.6	0.491	43.5	123,803.2
2022	-	-	-	128.6	105.2	-	39.9	39.9	0.460	18.4	123,821.6
2023	-	-	-	57.9	47.4	-	17.9	17.9	0.431	7.7	123,829.3
2024	-	-	-	26.0	21.3	-	8.1	8.1	0.404	3.3	123,832.6
2025	-	-	-	11.7	9.6	-	3.6	3.6	0.379	1.4	123,834.0
2026	-	-	-	5.3	4.3	-	1.6	1.6	0.355	0.6	123,834.6
2027	-	-	-	2.4	1.9	-	0.7	0.7	0.333	0.2	123,834.8
2028	-	-	-	1.1	0.9	-	0.3	0.3	0.312	0.1	123,834.9
2029	-	-	-	0.5	0.4	-	0.1	0.1	0.293	0.0	123,835.0
2030	-	-	-	0.2	0.2	-	0.1	0.1	0.274	0.0	123,835.0
2031	-	-	-	0.1	0.1	-	0.0	0.0	0.257	0.0	123,835.0
2032	-	-	-	0.0	0.0	-	0.0	0.0	0.241	0.0	123,835.0
2033	-	-	-	0.0	0.0	-	0.0	0.0	0.226	0.0	123,835.0
2034	-	-	-	0.0	0.0	-	0.0	0.0	0.212	0.0	123,835.0
2035	-	-	-	0.0	0.0	-	0.0	0.0	0.199	0.0	123,835.0
2036	-	-	-	0.0	0.0	-	0.0	0.0	0.186	0.0	123,835.0
2037	-	-	-	0.0	0.0	-	0.0	0.0	0.174	0.0	123,835.0
2038	-	-	-	0.0	0.0	-	0.0	0.0	0.164	0.0	123,835.0
2039	-	-	-	0.0	0.0	-	0.0	0.0	0.153	0.0	123,835.0
2040	-	-	-	0.0	0.0	-	0.0	0.0	0.144	0.0	123,835.0
2041	-	-	-	0.0	0.0	-	0.0	0.0	0.135	0.0	123,835.0
2042	-	-	-	0.0	0.0	-	0.0	0.0	0.126	0.0	123,835.0
2043	-	-	-	0.0	0.0	-	0.0	0.0	0.118	0.0	123,835.0
2044	-	-	-	0.0	0.0	-	0.0	0.0	0.111	0.0	123,835.0
2045	-	-	-	0.0	0.0	-	0.0	0.0	0.104	0.0	123,835.0
2046	-	-	-	0.0	0.0	-	0.0	0.0	0.098	0.0	123,835.0
2047	-	-	-	0.0	0.0	-	0.0	0.0	0.091	0.0	123,835.0
2048	-	-	-	0.0	0.0	-	0.0	0.0	0.086	0.0	123,835.0
2049	-	-	-	0.0	0.0	-	0.0	0.0	0.080	0.0	123,835.0
2050	-	-	-	0.0	0.0	-	0.0	0.0	0.075	0.0	123,835.0
Total	-	1,714,099.1	(947,305.0)	947,305.0	1,248,720.2	766,794.1	(234,210.3)	532,583.7	14.8	123,835.0	229,048.6

SAN and Backup Replacement
SAN Backup Scenario 2

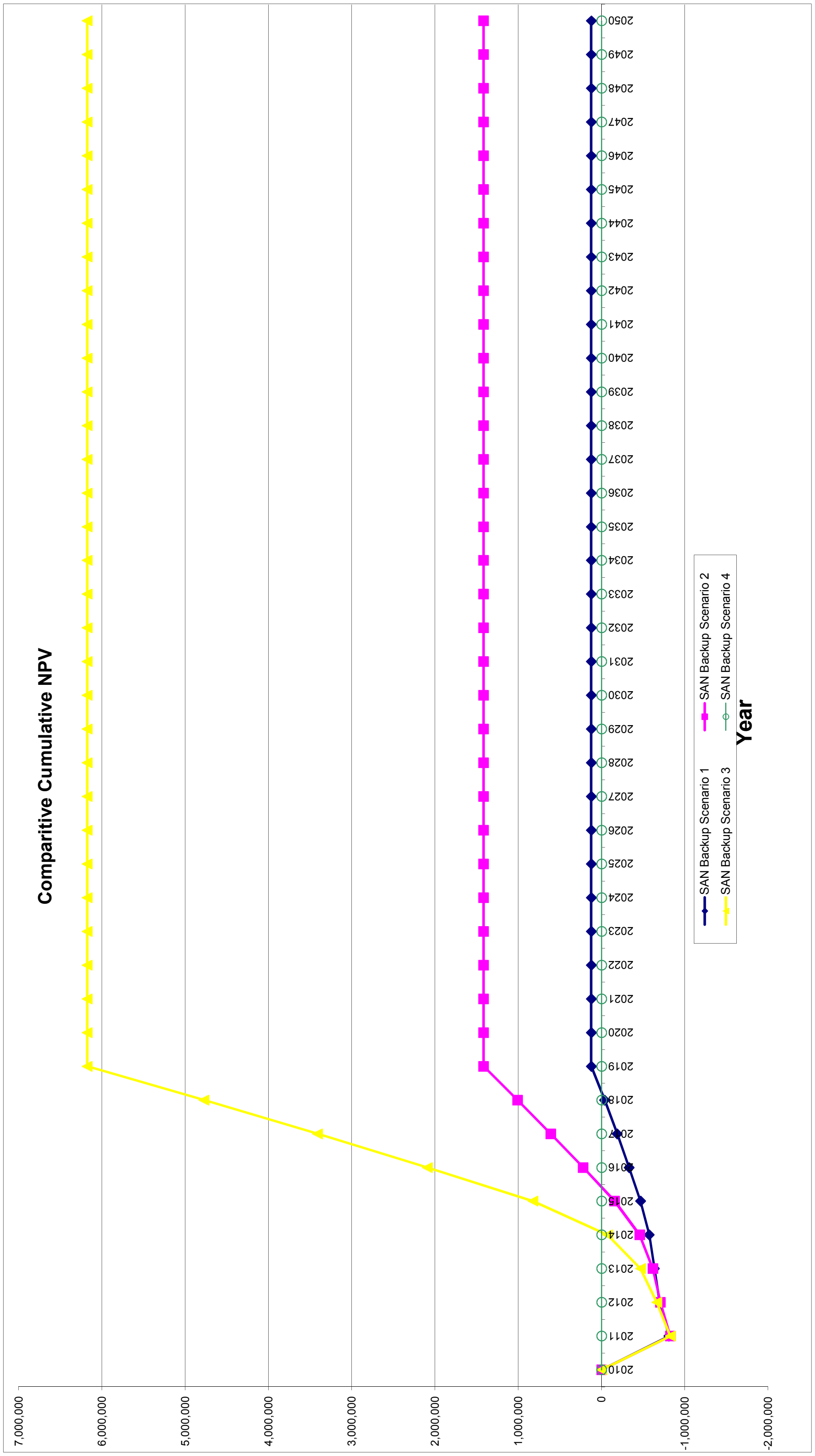
Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(966,251.1)	265,719.1	700,532.0	(966,251.1)	86,004.0	(880,247.1)	0.937	(825,128.5)	(825,128.5)
2012	-	23,868.8	-	385,292.6	315,239.4	23,868.8	111,987.0	135,855.8	0.879	119,374.6	(705,753.8)
2013	-	80,624.4	-	173,381.7	141,857.7	80,624.4	28,754.8	109,379.1	0.824	90,091.8	(615,662.0)
2014	-	263,617.9	-	78,021.8	63,836.0	263,617.9	(57,545.8)	206,072.1	0.772	159,106.2	(456,555.7)
2015	-	583,652.9	-	35,109.8	28,726.2	583,652.9	(170,048.4)	413,604.6	0.724	299,343.8	(157,211.9)
2016	-	802,557.6	-	15,799.4	12,926.8	802,557.6	(243,895.0)	558,662.6	0.678	379,010.8	221,798.8
2017	-	885,298.3	-	7,109.7	5,817.1	885,298.3	(272,238.4)	613,059.8	0.636	389,871.8	611,670.6
2018	-	967,373.2	-	3,199.4	2,617.7	967,373.2	(298,893.9)	668,479.3	0.596	398,496.0	1,010,166.6
2019	-	1,053,548.7	-	1,439.7	1,178.0	1,053,548.7	(326,153.8)	727,394.9	0.559	406,465.0	1,416,631.6
2020	-	-	-	647.9	530.1	-	200.8	200.8	0.524	105.2	1,416,736.8
2021	-	-	-	291.5	238.5	-	90.4	90.4	0.491	44.4	1,416,781.2
2022	-	-	-	131.2	107.3	-	40.7	40.7	0.460	18.7	1,416,799.9
2023	-	-	-	59.0	48.3	-	18.3	18.3	0.431	7.9	1,416,807.8
2024	-	-	-	26.6	21.7	-	8.2	8.2	0.404	3.3	1,416,811.1
2025	-	-	-	12.0	9.8	-	3.7	3.7	0.379	1.4	1,416,812.5
2026	-	-	-	5.4	4.4	-	1.7	1.7	0.355	0.6	1,416,813.1
2027	-	-	-	2.4	2.0	-	0.8	0.8	0.333	0.2	1,416,813.4
2028	-	-	-	1.1	0.9	-	0.3	0.3	0.312	0.1	1,416,813.5
2029	-	-	-	0.5	0.4	-	0.2	0.2	0.293	0.0	1,416,813.5
2030	-	-	-	0.2	0.2	-	0.1	0.1	0.274	0.0	1,416,813.5
2031	-	-	-	0.1	0.1	-	0.0	0.0	0.257	0.0	1,416,813.5
2032	-	-	-	0.0	0.0	-	0.0	0.0	0.241	0.0	1,416,813.5
2033	-	-	-	0.0	0.0	-	0.0	0.0	0.226	0.0	1,416,813.5
2034	-	-	-	0.0	0.0	-	0.0	0.0	0.212	0.0	1,416,813.6
2035	-	-	-	0.0	0.0	-	0.0	0.0	0.199	0.0	1,416,813.6
2036	-	-	-	0.0	0.0	-	0.0	0.0	0.186	0.0	1,416,813.6
2037	-	-	-	0.0	0.0	-	0.0	0.0	0.174	0.0	1,416,813.6
2038	-	-	-	0.0	0.0	-	0.0	0.0	0.164	0.0	1,416,813.6
2039	-	-	-	0.0	0.0	-	0.0	0.0	0.153	0.0	1,416,813.6
2040	-	-	-	0.0	0.0	-	0.0	0.0	0.144	0.0	1,416,813.6
2041	-	-	-	0.0	0.0	-	0.0	0.0	0.135	0.0	1,416,813.6
2042	-	-	-	0.0	0.0	-	0.0	0.0	0.126	0.0	1,416,813.6
2043	-	-	-	0.0	0.0	-	0.0	0.0	0.118	0.0	1,416,813.6
2044	-	-	-	0.0	0.0	-	0.0	0.0	0.111	0.0	1,416,813.6
2045	-	-	-	0.0	0.0	-	0.0	0.0	0.104	0.0	1,416,813.6
2046	-	-	-	0.0	0.0	-	0.0	0.0	0.098	0.0	1,416,813.6
2047	-	-	-	0.0	0.0	-	0.0	0.0	0.091	0.0	1,416,813.6
2048	-	-	-	0.0	0.0	-	0.0	0.0	0.086	0.0	1,416,813.6
2049	-	-	-	0.0	0.0	-	0.0	0.0	0.080	0.0	1,416,813.6
2050	-	-	-	0.0	0.0	-	0.0	0.0	0.075	0.0	1,416,813.6
Total	-	4,660,541.8	(966,251.1)	966,251.1	1,273,694.6	3,694,290.7	(1,141,664.4)	2,552,626.3	14.8	1,416,813.6	44,421,042.9

SAN and Backup Replacement
SAN Backup Scenario 3

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(966,251.1)	265,719.1	700,532.0	(966,251.1)	86,004.0	(880,247.1)	0.937	(825,128.5)	(825,128.5)
2012	-	92,625.0	-	385,292.6	315,239.4	92,625.0	90,672.6	183,297.6	0.879	161,061.1	(664,067.3)
2013	-	266,759.5	-	173,381.7	141,857.7	266,759.5	(28,947.1)	237,812.4	0.824	195,877.9	(468,189.4)
2014	-	706,504.6	-	78,021.8	63,836.0	706,504.6	(194,840.7)	511,663.9	0.772	395,050.6	(73,138.8)
2015	-	1,777,655.6	-	35,109.8	28,726.2	1,777,655.6	(540,189.2)	1,237,466.4	0.724	895,608.8	822,470.0
2016	-	2,705,140.8	-	15,799.4	12,926.8	2,705,140.8	(833,695.8)	1,871,445.0	0.678	1,269,635.4	2,092,105.4
2017	-	3,000,562.4	-	7,109.7	5,817.1	3,000,562.4	(927,970.3)	2,072,592.1	0.636	1,318,052.7	3,410,158.1
2018	-	3,312,017.4	-	3,199.4	2,617.7	3,312,017.4	(1,025,733.6)	2,286,283.8	0.596	1,362,906.6	4,773,064.7
2019	-	3,638,707.1	-	1,439.7	1,178.0	3,638,707.1	(1,127,552.9)	2,511,154.2	0.559	1,403,221.8	6,176,286.5
2020	-	-	-	647.9	530.1	-	200.8	200.8	0.524	105.2	6,176,391.7
2021	-	-	-	291.5	238.5	-	90.4	90.4	0.491	44.4	6,176,436.1
2022	-	-	-	131.2	107.3	-	40.7	40.7	0.460	18.7	6,176,454.8
2023	-	-	-	59.0	48.3	-	18.3	18.3	0.431	7.9	6,176,462.7
2024	-	-	-	26.6	21.7	-	8.2	8.2	0.404	3.3	6,176,466.0
2025	-	-	-	12.0	9.8	-	3.7	3.7	0.379	1.4	6,176,467.4
2026	-	-	-	5.4	4.4	-	1.7	1.7	0.355	0.6	6,176,468.0
2027	-	-	-	2.4	2.0	-	0.8	0.8	0.333	0.2	6,176,468.3
2028	-	-	-	1.1	0.9	-	0.3	0.3	0.312	0.1	6,176,468.4
2029	-	-	-	0.5	0.4	-	0.2	0.2	0.293	0.0	6,176,468.4
2030	-	-	-	0.2	0.2	-	0.1	0.1	0.274	0.0	6,176,468.4
2031	-	-	-	0.1	0.1	-	0.0	0.0	0.257	0.0	6,176,468.5
2032	-	-	-	0.0	0.0	-	0.0	0.0	0.241	0.0	6,176,468.5
2033	-	-	-	0.0	0.0	-	0.0	0.0	0.226	0.0	6,176,468.5
2034	-	-	-	0.0	0.0	-	0.0	0.0	0.212	0.0	6,176,468.5
2035	-	-	-	0.0	0.0	-	0.0	0.0	0.199	0.0	6,176,468.5
2036	-	-	-	0.0	0.0	-	0.0	0.0	0.186	0.0	6,176,468.5
2037	-	-	-	0.0	0.0	-	0.0	0.0	0.174	0.0	6,176,468.5
2038	-	-	-	0.0	0.0	-	0.0	0.0	0.164	0.0	6,176,468.5
2039	-	-	-	0.0	0.0	-	0.0	0.0	0.153	0.0	6,176,468.5
2040	-	-	-	0.0	0.0	-	0.0	0.0	0.144	0.0	6,176,468.5
2041	-	-	-	0.0	0.0	-	0.0	0.0	0.135	0.0	6,176,468.5
2042	-	-	-	0.0	0.0	-	0.0	0.0	0.126	0.0	6,176,468.5
2043	-	-	-	0.0	0.0	-	0.0	0.0	0.118	0.0	6,176,468.5
2044	-	-	-	0.0	0.0	-	0.0	0.0	0.111	0.0	6,176,468.5
2045	-	-	-	0.0	0.0	-	0.0	0.0	0.104	0.0	6,176,468.5
2046	-	-	-	0.0	0.0	-	0.0	0.0	0.098	0.0	6,176,468.5
2047	-	-	-	0.0	0.0	-	0.0	0.0	0.091	0.0	6,176,468.5
2048	-	-	-	0.0	0.0	-	0.0	0.0	0.086	0.0	6,176,468.5
2049	-	-	-	0.0	0.0	-	0.0	0.0	0.080	0.0	6,176,468.5
2050	-	-	-	0.0	0.0	-	0.0	0.0	0.075	0.0	6,176,468.5
Total	-	15,499,972.4	(966,251.1)	966,251.1	1,273,694.6	14,533,721.3	(4,501,887.9)	10,031,833.4	14.8	6,176,468.5	206,713,950.1

SAN and Backup Replacement
SAN Backup Scenario 4

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-


Comparitive Cumulative NPV
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SAN Backup Scenario 1
SAN Backup Scenario 2
SAN Backup Scenario 3
SAN Backup Scenario 4

CI Number: 40365

Title: MS Sharepoint Platform Upgrade

Start Date: 2011/03

Final Cost Date: 2012/09

Function: General Plant

Forecast Amount: $908,174

DESCRIPTION:

The current version of the NSPI SharePoint platform is the minimum feature version called Windows SharePoint Services 3.0. This version does not require user licensing as it only provides a limited amount of functionality in the areas of collaboration, document management, business data services, portal functions, and administration.

Upgrading to the licensed, full feature platform will ensure system stability, system scalability and enable a suite of features.

This project includes the implementation of the licensed version of SharePoint, an upgrade of the SharePoint platform to Microsoft's latest offering and implementation of new features available from this platform.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

Licensing the full product offering will enable NSPI to more fully leverage the features and functions SharePoint has to offer. These features include enhanced interoperability with the MS Office Suite (Word, Excel, etc), enhanced search capabilities, better permissions management, enhanced workflow, specialized services for Excel and other applications and the ability to create a portal style experience for users.

A more robust platform will be used to support other significant initiatives including NSPI Intranet, Customer Service process documentation, and DirectLine document management.

The licensed version of SharePoint provides improved redundancy and recovery mechanisms that will reduce system downtime in the event of hardware, software, or planned maintenance activities.

Why do this project now?

The new SharePoint platform provides better management features, which improves the ability of technology support resources to manage the significant growth with internal use that is currently happening and forecast to continue.

Why do this project this way?

This project will be executed with a combination of internal and external expert resources. This approach also ensures that knowledge and skills are grown in-house and sustained beyond the life of the project.

The project will use industry standard approaches, processes, and tools that have been proven successful by SharePoint contractors and endorsed by Microsoft (the SharePoint vendor).

CI Number : 40365 - MS Sharepoint Platform Upgrade | **Project Number**

Parent CI Number : - | **Approved Date**

Cost Centre : 027 - 027-Administration | **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		63,727	0	63,727
095		095-IT Regular Labour AO		134,046	0	134,046
001	072	001 - IT Regular Labour	072 - GP - Computer Equipment	251,400	0	251,400
011	072	011 - Travel Expense	072 - GP - Computer Equipment	17,000	0	17,000
028	072	028 - Consulting	072 - GP - Computer Equipment	[redacted]	0	[redacted]
034	072	034 - Appl. Software	072 - GP - Computer Equipment	[redacted]	0	[redacted]
035	072	035 - Comp.Hrdwr & Op.Sftwr	072 - GP - Computer Equipment	[redacted]	0	[redacted]
041	072	041 - Meals & Entertainment	072 - GP - Computer Equipment	3,000	0	3,000
056	072	056 - Training & Development	072 - GP - Computer Equipment	21,000	0	21,000
			Total Cost:	908,174	0	908,174
			Original Cost:			

CI 40365 MS Sharepoint Platform Upgrade
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**20-Dec-10**
Division :	Integrated Customer Service	**CI Number:**	40365
Department :	Information Technology	**Project No. :**	N/A
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	MS Sharepoint Scenario 1	6.68%	246,087	1	14.24%	8.1 years
B	MS Sharepoint Scenario 2	6.68%	83,478	2	9.39%	9.8 years
C	MS Sharepoint Scenario 3	6.68%	-264,970	4	-3.62%	0.0 years
D	MS Sharepoint Scenario 4	6.68%	0	3	#NUM!	0.0 years

Recommendation :

Justification of this project is based upon estimates for corporate wide efficiency gains multiplied by the probability of acheivement. This project is expected to drive search, document management, workflow and community benefits to all SharePoint users which should reduce time spent performing each of those tasks.

Notes/Comments :

MS Sharepoint Scenario 1

Scenario 1 provides a conversative probability of achieving efficiency gains and benefits with a 3% increase in wage rates annually. Gains are projected estimating that SharePoint users will acheive on average a minute reduction in time to complete a process.

MS Sharepoint Scenario 2

Scenario 2 assumes increased efficiency gains, but with a lower probability of acheivement.

MS Sharepoint Scenario 3

Scenario 3 assumes the highest efficiency gains, but with the lowest probability of acheivement. Wages assume a 3% annual increase. While this scenario displays a negative present value, it is preceded by scenarios 1 and 2.

MS Sharepoint Scenario 4

CI 40365 MS Sharepoint Platform Upgrade
MS Sharepoint Scenario 1

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(908,174.0)	249,747.9	658,426.2	(908,174.0)	80,834.7	(827,339.3)	0.937	(775,533.6)	(775,533.6)
2012	-	178,746.3	-	362,134.4	296,291.8	178,746.3	56,799.2	235,545.5	0.879	206,970.7	(568,563.0)
2013	-	184,108.7	-	162,960.5	133,331.3	184,108.7	(6,555.9)	177,552.7	0.824	146,244.1	(422,318.9)
2014	-	189,631.9	-	73,332.2	59,999.1	189,631.9	(36,063.3)	153,568.7	0.772	118,568.9	(303,750.0)
2015	-	195,320.9	-	32,999.5	26,999.6	195,320.9	(50,319.6)	145,001.3	0.724	104,943.8	(198,806.2)
2016	-	201,180.5	-	14,849.8	12,149.8	201,180.5	(57,762.5)	143,418.0	0.678	97,298.4	(101,507.8)
2017	-	207,216.0	-	6,682.4	5,467.4	207,216.0	(62,165.4)	145,050.5	0.636	92,244.0	(9,263.8)
2018	-	213,432.4	-	3,007.1	2,460.3	213,432.4	(65,231.9)	148,200.6	0.596	88,345.8	79,082.0
2019	-	219,835.4	-	1,353.2	1,107.2	219,835.4	(67,729.5)	152,105.9	0.559	84,996.1	164,078.1
2020	-	226,430.5	-	608.9	498.2	226,430.5	(70,004.7)	156,425.8	0.524	81,936.7	246,014.8
2021	-	-	-	274.0	224.2	-	84.9	84.9	0.491	41.7	246,056.5
2022	-	-	-	123.3	100.9	-	38.2	38.2	0.460	17.6	246,074.1
2023	-	-	-	55.5	45.4	-	17.2	17.2	0.431	7.4	246,081.5
2024	-	-	-	25.0	20.4	-	7.7	7.7	0.404	3.1	246,084.6
2025	-	-	-	11.2	9.2	-	3.5	3.5	0.379	1.3	246,085.9
2026	-	-	-	5.1	4.1	-	1.6	1.6	0.355	0.6	246,086.5
2027	-	-	-	2.3	1.9	-	0.7	0.7	0.333	0.2	246,086.7
2028	-	-	-	1.0	0.8	-	0.3	0.3	0.312	0.1	246,086.8
2029	-	-	-	0.5	0.4	-	0.1	0.1	0.293	0.0	246,086.9
2030	-	-	-	0.2	0.2	-	0.1	0.1	0.274	0.0	246,086.9
2031	-	-	-	0.1	0.1	-	0.0	0.0	0.257	0.0	246,086.9
2032	-	-	-	0.0	0.0	-	0.0	0.0	0.241	0.0	246,086.9
2033	-	-	-	0.0	0.0	-	0.0	0.0	0.226	0.0	246,086.9
2034	-	-	-	0.0	0.0	-	0.0	0.0	0.212	0.0	246,086.9
2035	-	-	-	0.0	0.0	-	0.0	0.0	0.199	0.0	246,086.9
2036	-	-	-	0.0	0.0	-	0.0	0.0	0.186	0.0	246,086.9
2037	-	-	-	0.0	0.0	-	0.0	0.0	0.174	0.0	246,086.9
2038	-	-	-	0.0	0.0	-	0.0	0.0	0.164	0.0	246,086.9
2039	-	-	-	0.0	0.0	-	0.0	0.0	0.153	0.0	246,086.9
2040	-	-	-	0.0	0.0	-	0.0	0.0	0.144	0.0	246,086.9
2041	-	-	-	0.0	0.0	-	0.0	0.0	0.135	0.0	246,086.9
2042	-	-	-	0.0	0.0	-	0.0	0.0	0.126	0.0	246,086.9
2043	-	-	-	0.0	0.0	-	0.0	0.0	0.118	0.0	246,086.9
2044	-	-	-	0.0	0.0	-	0.0	0.0	0.111	0.0	246,086.9
2045	-	-	-	0.0	0.0	-	0.0	0.0	0.104	0.0	246,086.9
2046	-	-	-	0.0	0.0	-	0.0	0.0	0.098	0.0	246,086.9
2047	-	-	-	0.0	0.0	-	0.0	0.0	0.091	0.0	246,086.9
2048	-	-	-	0.0	0.0	-	0.0	0.0	0.086	0.0	246,086.9
2049	-	-	-	0.0	0.0	-	0.0	0.0	0.080	0.0	246,086.9
2050	-	-	-	0.0	0.0	-	0.0	0.0	0.075	0.0	246,086.9
Total	-	1,815,902.6	(908,174.0)	908,174.0	1,197,138.5	907,728.6	(278,044.4)	629,684.2	14.8	246,086.9	5,491,986.1

CI 40365 MS Sharepoint Platform Upgrade
MS Sharepoint Scenario 2

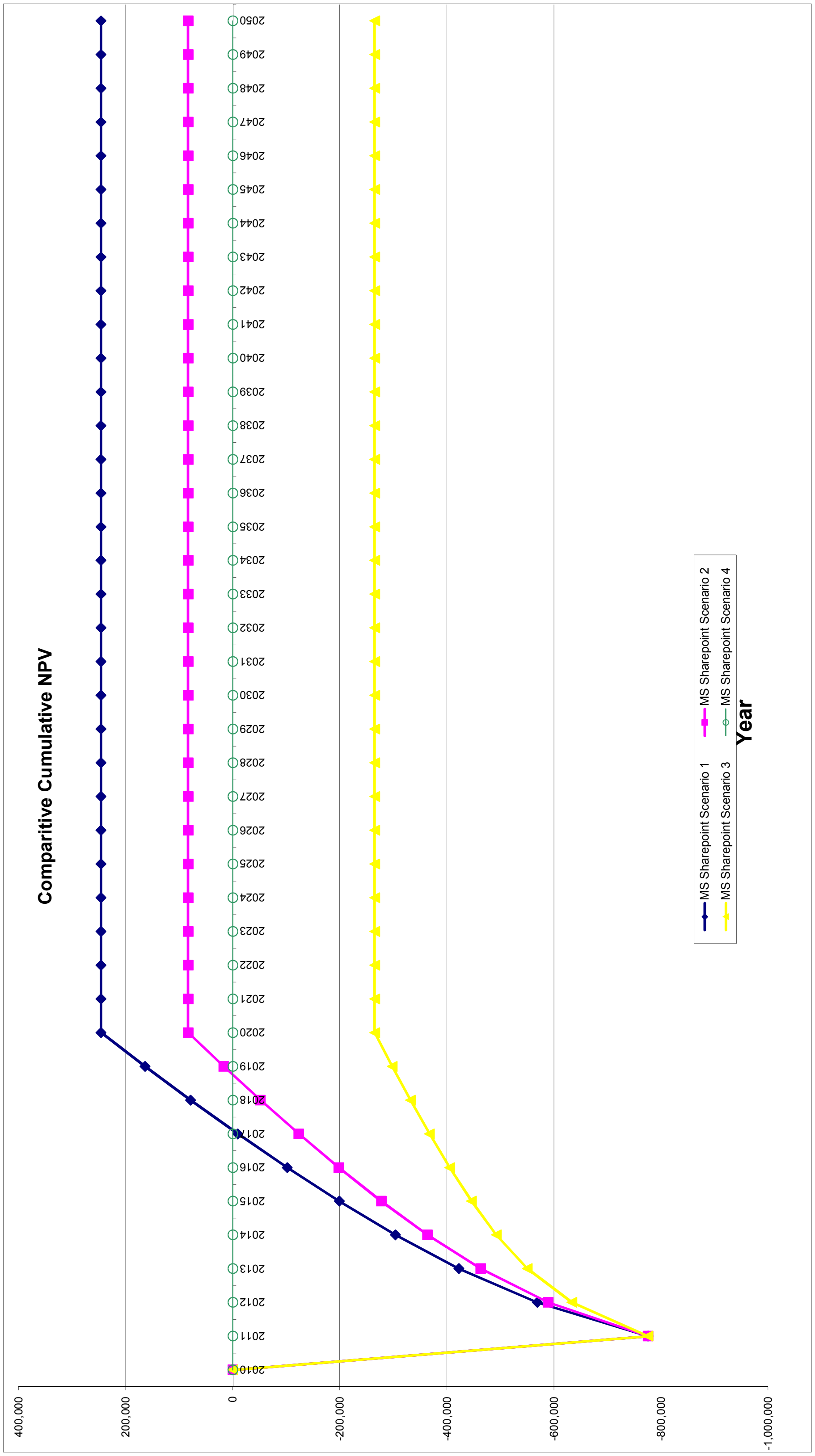
Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(908,174.0)	249,747.9	658,426.2	(908,174.0)	80,834.7	(827,339.3)	0.937	(775,533.6)	(775,533.6)
2012	-	144,594.0	-	362,134.4	296,291.8	144,594.0	67,386.4	211,980.4	0.879	186,264.3	(589,269.3)
2013	-	148,931.8	-	162,960.5	133,331.3	148,931.8	4,348.9	153,280.7	0.824	126,252.1	(463,017.2)
2014	-	153,399.8	-	73,332.2	59,999.1	153,399.8	(24,831.3)	128,568.5	0.772	99,266.4	(363,750.8)
2015	-	158,001.8	-	32,999.5	26,999.6	158,001.8	(38,750.7)	119,251.1	0.724	86,307.2	(277,443.5)
2016	-	162,741.8	-	14,849.8	12,149.8	162,741.8	(45,846.5)	116,895.3	0.678	79,304.7	(198,138.8)
2017	-	167,624.1	-	6,682.4	5,467.4	167,624.1	(49,891.9)	117,732.2	0.636	74,871.1	(123,267.8)
2018	-	172,652.8	-	3,007.1	2,460.3	172,652.8	(52,590.2)	120,062.6	0.596	71,572.1	(51,695.7)
2019	-	177,832.4	-	1,353.2	1,107.2	177,832.4	(54,708.6)	123,123.8	0.559	68,801.0	17,105.4
2020	-	183,167.4	-	608.9	498.2	183,167.4	(56,593.1)	126,574.2	0.524	66,300.3	83,405.6
2021	-	-	-	274.0	224.2	-	84.9	84.9	0.491	41.7	83,447.4
2022	-	-	-	123.3	100.9	-	38.2	38.2	0.460	17.6	83,464.9
2023	-	-	-	55.5	45.4	-	17.2	17.2	0.431	7.4	83,472.4
2024	-	-	-	25.0	20.4	-	7.7	7.7	0.404	3.1	83,475.5
2025	-	-	-	11.2	9.2	-	3.5	3.5	0.379	1.3	83,476.8
2026	-	-	-	5.1	4.1	-	1.6	1.6	0.355	0.6	83,477.4
2027	-	-	-	2.3	1.9	-	0.7	0.7	0.333	0.2	83,477.6
2028	-	-	-	1.0	0.8	-	0.3	0.3	0.312	0.1	83,477.7
2029	-	-	-	0.5	0.4	-	0.1	0.1	0.293	0.0	83,477.8
2030	-	-	-	0.2	0.2	-	0.1	0.1	0.274	0.0	83,477.8
2031	-	-	-	0.1	0.1	-	0.0	0.0	0.257	0.0	83,477.8
2032	-	-	-	0.0	0.0	-	0.0	0.0	0.241	0.0	83,477.8
2033	-	-	-	0.0	0.0	-	0.0	0.0	0.226	0.0	83,477.8
2034	-	-	-	0.0	0.0	-	0.0	0.0	0.212	0.0	83,477.8
2035	-	-	-	0.0	0.0	-	0.0	0.0	0.199	0.0	83,477.8
2036	-	-	-	0.0	0.0	-	0.0	0.0	0.186	0.0	83,477.8
2037	-	-	-	0.0	0.0	-	0.0	0.0	0.174	0.0	83,477.8
2038	-	-	-	0.0	0.0	-	0.0	0.0	0.164	0.0	83,477.8
2039	-	-	-	0.0	0.0	-	0.0	0.0	0.153	0.0	83,477.8
2040	-	-	-	0.0	0.0	-	0.0	0.0	0.144	0.0	83,477.8
2041	-	-	-	0.0	0.0	-	0.0	0.0	0.135	0.0	83,477.8
2042	-	-	-	0.0	0.0	-	0.0	0.0	0.126	0.0	83,477.8
2043	-	-	-	0.0	0.0	-	0.0	0.0	0.118	0.0	83,477.8
2044	-	-	-	0.0	0.0	-	0.0	0.0	0.111	0.0	83,477.8
2045	-	-	-	0.0	0.0	-	0.0	0.0	0.104	0.0	83,477.8
2046	-	-	-	0.0	0.0	-	0.0	0.0	0.098	0.0	83,477.8
2047	-	-	-	0.0	0.0	-	0.0	0.0	0.091	0.0	83,477.8
2048	-	-	-	0.0	0.0	-	0.0	0.0	0.086	0.0	83,477.8
2049	-	-	-	0.0	0.0	-	0.0	0.0	0.080	0.0	83,477.8
2050	-	-	-	0.0	0.0	-	0.0	0.0	0.075	0.0	83,477.8
Total	-	1,468,945.8	(908,174.0)	908,174.0	1,197,138.5	560,771.8	(170,487.8)	390,284.0	14.8	83,477.8	(237,324.9)

CI 40365 MS Sharepoint Platform Upgrade
MS Sharepoint Scenario 3

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(908,174.0)	249,747.9	658,426.2	(908,174.0)	80,834.7	(827,339.3)	0.937	(775,533.6)	(775,533.6)
2012	-	71,410.5	-	362,134.4	296,291.8	71,410.5	90,073.3	161,483.8	0.879	141,893.6	(633,640.0)
2013	-	73,552.8	-	162,960.5	133,331.3	73,552.8	27,716.4	101,269.2	0.824	83,412.0	(550,228.0)
2014	-	75,759.4	-	73,332.2	59,999.1	75,759.4	(762.8)	74,996.6	0.772	57,904.1	(492,323.9)
2015	-	78,032.2	-	32,999.5	26,999.6	78,032.2	(13,960.1)	64,072.0	0.724	46,371.8	(445,952.1)
2016	-	80,373.1	-	14,849.8	12,149.8	80,373.1	(20,312.2)	60,060.9	0.678	40,746.8	(405,205.3)
2017	-	82,784.3	-	6,682.4	5,467.4	82,784.3	(23,591.6)	59,192.7	0.636	37,643.3	(367,562.0)
2018	-	85,267.9	-	3,007.1	2,460.3	85,267.9	(25,500.8)	59,767.0	0.596	35,628.5	(331,933.5)
2019	-	87,825.9	-	1,353.2	1,107.2	87,825.9	(26,806.5)	61,019.4	0.559	34,097.3	(297,836.2)
2020	-	90,460.7	-	608.9	498.2	90,460.7	(27,854.0)	62,606.6	0.524	32,793.7	(265,042.5)
2021	-	-	-	274.0	224.2	-	84.9	84.9	0.491	41.7	(265,000.8)
2022	-	-	-	123.3	100.9	-	38.2	38.2	0.460	17.6	(264,983.2)
2023	-	-	-	55.5	45.4	-	17.2	17.2	0.431	7.4	(264,975.8)
2024	-	-	-	25.0	20.4	-	7.7	7.7	0.404	3.1	(264,972.6)
2025	-	-	-	11.2	9.2	-	3.5	3.5	0.379	1.3	(264,971.3)
2026	-	-	-	5.1	4.1	-	1.6	1.6	0.355	0.6	(264,970.7)
2027	-	-	-	2.3	1.9	-	0.7	0.7	0.333	0.2	(264,970.5)
2028	-	-	-	1.0	0.8	-	0.3	0.3	0.312	0.1	(264,970.4)
2029	-	-	-	0.5	0.4	-	0.1	0.1	0.293	0.0	(264,970.4)
2030	-	-	-	0.2	0.2	-	0.1	0.1	0.274	0.0	(264,970.4)
2031	-	-	-	0.1	0.1	-	0.0	0.0	0.257	0.0	(264,970.3)
2032	-	-	-	0.0	0.0	-	0.0	0.0	0.241	0.0	(264,970.3)
2033	-	-	-	0.0	0.0	-	0.0	0.0	0.226	0.0	(264,970.3)
2034	-	-	-	0.0	0.0	-	0.0	0.0	0.212	0.0	(264,970.3)
2035	-	-	-	0.0	0.0	-	0.0	0.0	0.199	0.0	(264,970.3)
2036	-	-	-	0.0	0.0	-	0.0	0.0	0.186	0.0	(264,970.3)
2037	-	-	-	0.0	0.0	-	0.0	0.0	0.174	0.0	(264,970.3)
2038	-	-	-	0.0	0.0	-	0.0	0.0	0.164	0.0	(264,970.3)
2039	-	-	-	0.0	0.0	-	0.0	0.0	0.153	0.0	(264,970.3)
2040	-	-	-	0.0	0.0	-	0.0	0.0	0.144	0.0	(264,970.3)
2041	-	-	-	0.0	0.0	-	0.0	0.0	0.135	0.0	(264,970.3)
2042	-	-	-	0.0	0.0	-	0.0	0.0	0.126	0.0	(264,970.3)
2043	-	-	-	0.0	0.0	-	0.0	0.0	0.118	0.0	(264,970.3)
2044	-	-	-	0.0	0.0	-	0.0	0.0	0.111	0.0	(264,970.3)
2045	-	-	-	0.0	0.0	-	0.0	0.0	0.104	0.0	(264,970.3)
2046	-	-	-	0.0	0.0	-	0.0	0.0	0.098	0.0	(264,970.3)
2047	-	-	-	0.0	0.0	-	0.0	0.0	0.091	0.0	(264,970.3)
2048	-	-	-	0.0	0.0	-	0.0	0.0	0.086	0.0	(264,970.3)
2049	-	-	-	0.0	0.0	-	0.0	0.0	0.080	0.0	(264,970.3)
2050	-	-	-	0.0	0.0	-	0.0	0.0	0.075	0.0	(264,970.3)
Total	-	725,466.8	(908,174.0)	908,174.0	1,197,138.5	(182,707.2)	59,990.6	(122,716.5)	14.8	(264,970.3)	(12,514,420.0)

CI 40365 MS Sharepoint Platform Upgrade
MS Sharepoint Scenario 4

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-


Comparitive Cumulative NPV
Year
MS Sharepoint Scenario 1
MS Sharepoint Scenario 2
MS Sharepoint Scenario 3
MS Sharepoint Scenario 4

CI Number: 40290

Title: Enterprise Geographic Information System (GIS)

Start Date: 2011/01

Final Cost Date: 2011/12

Function: General Plant

Forecast Amount: $320,381

DESCRIPTION:

This item provides for the costs associated with the implementation of an Enterprise Geographic Information System (GIS). The GIS captures, stores, analyzes, manages and presents data that are linked to specific geographic locations through merging cartography and database technology. NSPI's existing GIS was first introduced in 2001 and is primarily used in conjunction with the Outage Management System (OMS) to support the management of customer outages; particularly during storm-response events. Over the last number of years, stand-alone databases have been created to support specific business needs, but integration of these databases into an Enterprise GIS is now required. This enterprise system will enable a means for layering environmental and vegetation data over a distribution and transmission model, implement a website for storing and updating fusing and transformer specifications identified through engineering studies and allow for the incorporation of aerial inspection data into the GIS.

The increasing importance of geospatial data and the demand for both data storage and access has expanded significantly. This growth has generated the need for an Enterprise GIS with available capacity and an upgraded system structure (including coordination of system hardware).

The scope of this project includes an enterprise license agreement, a performance upgrade to a new front-end CITRIX server and an expansion of the GIS hardware in a way that will ensure performance for both the expanded user base as well as GIS editors.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

The GIS has been primarily used in conjunction with the Outage Management System (OMS) to effectively manage customer outage events. In the past year, the requirements for geospatial data have increased and the demand for a place to store and access the data has expanded significantly. This growth has generated the need for upgrading the existing GIS to an Enterprise GIS.

Why do this project now?

The GIS operational environment is expanding at a rapid pace. To ensure that further development of NSPI's GIS occurs at the enterprise level, this project must be completed in 2011.

Why do this project this way?

Consultation with GIS industry professionals and a review of technical proceedings has indicated that an Enterprise GIS is considered to be best practice.

CI Number : 40290 - Enterprise GIS

Parent CI Number : -

Cost Centre : 800 - 800-Services - Admin.

Project Number

Approved Date

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		16,214	0	16,214
094		094 - Interest Capitalized		16,466	0	16,466
095		095-COPS Regular Labour AO		24,701	0	24,701
001	078	001 - T&D Regular Labour	078 - GP - Comp. Appl. Software	32,000	0	32,000
002	078	002 - T&D Overtime Labour	078 - GP - Comp. Appl. Software	0	0	0
011	078	011 - Travel Expense	078 - GP - Comp. Appl. Software	10,000	0	10,000
012	078	012 - Materials	078 - GP - Comp. Appl. Software	13,000	0	13,000
028	078	028 - Consulting	078 - GP - Comp. Appl. Software	[redacted]	0	[redacted]
034	078	034 - Appl. Software	078 - GP - Comp. Appl. Software	[redacted]	0	[redacted]
035	078	035 - Comp.Hrdwr & Op.Sftwr	078 - GP - Comp. Appl. Software	[redacted]	0	[redacted]
041	078	041 - Meals & Entertainment	078 - GP - Comp. Appl. Software	3,000	0	3,000
056	078	056 - Training & Development	078 - GP - Comp. Appl. Software	0	0	0
066	078	066 - Other Goods & Services	078 - GP - Comp. Appl. Software	0	0	0
			Total Cost:	320,381	0	320,381
			Original Cost:			

CI 40290 – Enterprise GIS

The following is a breakdown of costs associated with the Enterprise GIS Project.

Administrative Overhead and Interest	$57,381
Materials	$13,000
COPS Labour	$32,000
Consulting	$[redacted]
Software	$[redacted]
Other	$13,000
Total	$320,381

The $[redacted] in software costs for this project includes the cost for obtaining license agreements and web server upgrades for a common operating picture. The $[redacted] in hardware costs are associated with a new front-end CITRIX server and expansion of the GIS hardware. The $[redacted] in consulting costs is associated with engaging a consultant to assist with framing an enterprise strategy. Labour costs are associated with NSPI engineering and design support.

CI Number: 40275

Title: Eastlink Outage Information Interface

Start Date: 2011/03

Final Cost Date: 2011/08

Function: General Plant

Forecast Amount: $296,460

DESCRIPTION:

This item provides for the installation of a new interface from existing Telco equipment both at the pole and individual premises to the Outage Management System (OMS). This interface is expected to reduce the customer hours of interruption (CHs) by making the OMS aware of outages in a more timely manner and reduce the dependence on customer reporting of outages.

Completing this project will also replace the existing Sentry system, which is becoming obsolete.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

Less than one third of the original 1800 Sentrys deployed across the system continue to operate. These autonomous communication units provide a valuable source of outage information during both regular operation and storm situations. Expanding the number of devices that are linked to the OMS system can be achieved through the use of Telephone Service Provider pole top devices. Outage reporting devices like Sentrys or the use of Telco Outage devices greatly improve the outage prediction performance of the OMS by providing data to supplement customer calls.

Why do this project now?

The Sentry devices have been deployed by NSPI on the distribution system to enhance monitoring of power outages beyond Supervisory Control and Data Acquisition (SCADA) monitored devices and customer reports. The Sentry devices are no longer manufactured and while they remain operational and reliable, they are no longer supported and cannot be replaced as they become damaged. Expanding the number of automated monitoring sites throughout the system indicating customer outages will help reduce the number of customer hour interruptions and subsequently improve the reliability of the system.

Why do this project this way?

Utilizing existing Telco assets makes this a cost effective method to enhance monitoring of distribution circuits for outages and relaying this information back to the OMS for improved outage prediction.

CI Number : 40275 - Eastlink Outage Information Interface

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 620 - 620-Control Centre Operations

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		20,268	0	20,268
094		094 - Interest Capitalized		6,816	0	6,816
095		095-COPS Regular Labour AO		30,876	0	30,876
001	072	001 - T&D Regular Labour	072 - GP - Computer Equipment	40,000	0	40,000
002	072	002 - T&D Overtime Labour	072 - GP - Computer Equipment	0	0	0
011	072	011 - Travel Expense	072 - GP - Computer Equipment	5,000	0	5,000
012	072	012 - Materials	072 - GP - Computer Equipment	[redacted]	0	[redacted]
028	072	028 - Consulting	072 - GP - Computer Equipment	[redacted]	0	[redacted]
041	072	041 - Meals & Entertainment	072 - GP - Computer Equipment	2,000	0	2,000
066	072	066 - Other Goods & Services	072 - GP - Computer Equipment	4,000	0	4,000
			Total Cost:	296,460	0	296,460
			Original Cost:			

CI 40275 – Eastlink Outage Information Interface

The following is a breakdown of costs associated with the Eastlink Outage Information Interface Project.

Administrative Overhead and Interest	$57,960
Materials	$[redacted]
COPS Labour	$40,000
Consulting	$[redacted]
Other	$11,000
Total	$296,460

The $[redacted] in material costs associated with this project is for the hardware to support this secure link to Eastlink. Consulting costs associated with this project are for utilizing Oracle, the OMS vendor, to build an interface to process the incoming data and is based on the costs of similar interfaces that have been built in 2010. Labour costs are associated with NSPI engineering and design support.

CI Number: 40229

Title: Protective Equipment Test Center Upgrade

Start Date: 2011/04

Final Cost Date: 2011/12

Function: General Plant

Forecast Amount: $875,542

DESCRIPTION:

This project provides for the upgrade of the Protective Equipment Test Centre (PETC) and the replacement of aging equipment used in the regular inspection and maintenance of live line tools and rubber protective equipment, an integral element of NSPI's safe work practices.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Equipment Replacement

Why do this project?

The use of live line tools and rubber protective equipment forms an integral part of Nova Scotia Power Inc.'s safe work practices. The performance of this equipment is assured through regular testing and maintenance to national and international standards and specifications at the PETC.

The replacement of aging test equipment and an upgrade of the facility is necessary to ensure that the PETC continues to provide electrical workers with tools, that through regular inspection and maintenance, comply with industry standards and specifications.

Why do this project now?

The PETC was last upgraded approximately twenty years ago to meet industry requirements. The test equipment installed at this time has reached the end of its useful life. An increase in the time required to maintain this equipment will impact the execution of field work in cases where tested and certified rubber protective equipment and live line tools are unavailable due to equipment issues within the PETC.

Why do this project this way?

Repairing or replacing test equipment and an upgrade to the PETC is the most cost effective option to ensure the continuous supply of tested and safe electrical tools are available for the safe operation and maintenance of the electric power system.

CI Number	: 40229	- Protective Equipment Test Center Upgrade	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 032	- 032-Facilities	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle Cust. Serv. Reg. Labour		1,696	0	1,696
094		094 - Interest Capitalized		21,858	0	21,858
095		095-COPS Regular Labour AO		2,584	0	2,584
013	003	013 - OTHER Contracts	003 - GP - Bldg.,Struct.Grnd.	[redacted]	0	[redacted]
001	070	001 - CUST. SERV. Regular Labour	070 - GP - Shop Equipment	3,347	0	3,347
012	070	012 - Materials	070 - GP - Shop Equipment	[redacted]	0	[redacted]
013	070	013 - OTHER Contracts	070 - GP - Shop Equipment	[redacted]	0	[redacted]
028	085	028 - Consulting	085 Design	[redacted]	0	[redacted]
			Total Cost:	875,542	0	875,542
			Original Cost:	571,949		

CI 40229 - Protective Equipment Test Center Upgrade

The following is a breakdown of costs associated with the Protective Equipment Test Center Upgrade Project.

Administrative Overhead and Interest	$26,138
Materials	$[redacted]
Contracts	$[redacted]
Consulting	$[redacted]
COPS Labour	$3,347
Total	$875,542

The materials portion of this project includes $[redacted] US for a glove tester, $[redacted] US for a blanket/hose tester, $[redacted] US for a bucket liner test set, $[redacted] US for rubber washing and drying equipment, and the remainder for some ground set test equipment.

The contract portion includes physical changes to the building that are required to accommodate the equipment that is to be purchased. These modifications will also allow for process improvements in the PETC. This will include the relocation/addition and removal of walls, interior partition fencing for storage areas.

CI Number: 40274

Title: New RTU Deployment

Start Date: 2011/01

Final Cost Date: 2011/12

Function: General Plant

Forecast Amount: $509,706

DESCRIPTION:

This item provides for Remote Terminal Units (RTUs) at four substations (Spryfield, Rockingham, Willow Lane and New Minas) that are not currently equipped with this equipment. In addition this project would also allow for the upgrade of some existing RTUs to further enhance their communication capabilities.

Summary of Related CI's +/- 2 years:
2010 - 38142 RTU Replacement Program $780,137

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Equipment Replacement

Why do this project?

Completion of these new RTU installations and communication upgrades will provide remote monitoring and control capability to System Operators at the Energy Control Centre which will improve power outage prediction, and improve reliability through reduction of power outage duration. A total of 38,061 customers are served by these three substations.

Why do this project now?

Increasing operational visibility of distribution substations by adding RTUs and enhancing the ability to perform remote switching will provide a subsequent reduction in customer interruption hours.

Why do this project this way?

The technology that will be used in this project aligns with the communication methodology employed in over 120 other RTUs across the province.

CI Number : 40274 - New RTU Deployment

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 620 - 620-Control Centre Operations

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		27,869	0	27,869
094		094 - Interest Capitalized		25,633	0	25,633
095		095-COPS Regular Labour AO		42,455	0	42,455
001	064	001 - T&D Regular Labour	064 - DP - Sup. Control and DA	55,000	0	55,000
002	064	002 - T&D Overtime Labour	064 - DP - Sup. Control and DA	0	0	0
011	064	011 - Travel Expense	064 - DP - Sup. Control and DA	13,750	0	13,750
012	064	012 - Materials	064 - DP - Sup. Control and DA	320,000	0	320,000
028	064	028 - Consulting	064 - DP - Sup. Control and DA	10,000	0	10,000
041	064	041 - Meals & Entertainment	064 - DP - Sup. Control and DA	10,000	0	10,000
066	064	066 - Other Goods & Services	064 - DP - Sup. Control and DA	5,000	0	5,000
			Total Cost:	509,706	0	509,706
			Original Cost:			

CI 40274 – New RTU Deployment

The following is a breakdown of costs associated with the New RTU Deployment Project.

Administrative Overhead and Interest	$95,957
Materials	$320,000
COPS Labour	$55,000
Consulting	$10,000
Other	$28,750
Total	$509,706

The material costs associated with this item are for the purchase of RTUs and associated accessories and are based on similar units purchased in 2010. The labour costs associated with this project are for engineering design, as well as for the installation of the RTUs.

CI Number: 40245

Title: 2011 RTU Replacement Program

Start Date: 2011/01

Final Cost Date: 2012/01

Function: General Plant

Forecast Amount: $459,517

DESCRIPTION:

The Remote Terminal Unit (RTU) capital replacement program will replace selected RTUs, enabling NSPI to re-deploy spare parts for other RTUs. This will add newer RTUs to the system and remove RTUs that are close to the end of their useful life.

Summary of Related CI's +/- 2 years
2010 - 38142 RTU Replacement Program $780,137
This is a multi-year project that will continue beyond 2011. Future CIs TBD

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Equipment Replacement

Why do this project?

Due to changing standards, technology, and product lifespan, about 90 of the RTU's that are in service have been marked obsolete by their manufacturers. These unreliable RTU operations will have impacts on both generation and customer reliability. The commercial availability of spare parts is becoming difficult to manage effectively. Replacement of part of the operating inventory creates spares for use as necessary.

Why do this project now?

The inventory of RTU spare parts has become sparse. Most of the existing RTUs have reached the end of their useful life. RTU installations require extensive time and effort to complete. It is important to have an ongoing plan in place for the orderly replacement of units that are performing poorly and to gradually modernize the fleet.

Why do this project this way?

Most of NSPI's RTUs have reached the end of their useful life. It would be costly and time-consuming to replace all of those at once. By identifying enough RTUs to supplement the spares in inventory NSPI can find a balance between installing and retiring RTUs.

CI Number	: 40245	- 2011 RTU Replacement Program	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 620	- 620-Control Centre Operations	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		63,337	0	63,337
094		094 - Interest Capitalized		16,222	0	16,222
095		095-COPS Regular Labour AO		96,488	0	96,488
001	064	001 - T&D Regular Labour	064 - GP - Sup. Control and DA	125,000	0	125,000
002	064	002 - T&D Overtime Labour	064 - GP - Sup. Control and DA	0	0	0
011	064	011 - Travel Expense	064 - GP - Sup. Control and DA	50,000	0	50,000
012	064	012 - Materials	064 - GP - Sup. Control and DA	85,970	0	85,970
034	064	034 - Appl. Software	064 - GP - Sup. Control and DA	0	0	0
041	064	041 - Meals & Entertainment	064 - GP - Sup. Control and DA	15,000	0	15,000
066	064	066 - Other Goods & Services	064 - GP - Sup. Control and DA	7,500	0	7,500
			Total Cost:	459,517	0	459,517
			Original Cost:	309,500		

CI 40245 – 2011 RTU Replacement Program

The following is a breakdown of costs associated with the 2011 RTU Replacement Program.

Administrative Overhead and Interest	$176,047
Materials	$85,970
COPS Labour	$125,000
Other	$72,500
Total	$459,517

The materials cost associated with this item is for the purchase of five RTU's for installation at the following substations: Kempt Road (104H), Onslow (57N), Henry St (691H), Townsend St (4S) and Keltic Drive (11S). The RTU's range in cost from $8,800 to $16,720 based on the requirements of the specific substation. This pricing is based on similar units purchased in 2010. The labour cost associated with this project is for engineering design, as well as for the installation of the RTU's.

CI Number: 40278

Title: OMS Upgrade 2011

Start Date:	2011/01
Final Cost Date:	2011/07
Function	General Plant
Forecast Amount	$2,050,951

DESCRIPTION:

This project provides for the costs associated with upgrading the Outage Management System (OMS) to a version that is fully supported by the manufacturer. The OMS is a critical system in the prediction, tracking and restoration of customer power outages.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunication

Why do this project?

The upgrade is required to maintain full vendor support for the OMS application. Ongoing vendor support is required to ensure stable and reliable operation of this critical customer service application.

Why do this project now?

The OMS vendor has advised NSPI that in 2011 it will begin to reduce the level of support offered to 1.7x releases of the product (NSPI presently operates 1.7.1.1). Given the critical nature of the OMS to power restoration efforts, NSPI plans to proceed with an upgrade to sustain the priority vendor support which is necessary for this essential operational tool.

Why do this project this way?

A software upgrade to the existing system is the most cost effective and efficient method for maintaining full product support.

CI Number	: 40278	- OMS Upgrade 2011	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 620	- 620-Control Centre Operations	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		45,603	0	45,603
094		094 - Interest Capitalized		19,877	0	19,877
095		095-COPS Regular Labour AO		69,471	0	69,471
001	072	001 - T&D Regular Labour	072 - GP - Computer Equipment	90,000	0	90,000
002	072	002 - T&D Overtime Labour	072 - GP - Computer Equipment	0	0	0
011	072	011 - Travel Expense	072 - GP - Computer Equipment	12,500	0	12,500
012	072	012 - Materials	072 - GP - Computer Equipment	[redacted]	0	[redacted]
028	072	028 - Consulting	072 - GP - Computer Equipment	[redacted]	0	[redacted]
034	072	034 - Appl. Software	072 - GP - Computer Equipment	[redacted]	0	[redacted]
035	072	035 - Comp.Hrdwr & Op.Sftwr	072 - GP - Computer Equipment	[redacted]	0	[redacted]
041	072	041 - Meals & Entertainment	072 - GP - Computer Equipment	8,500	0	8,500
066	072	066 - Other Goods & Services	072 - GP - Computer Equipment	5,000	0	5,000
			Total Cost:	2,050,951	0	2,050,951
			Original Cost:	1,610,364		

CI 40278 – OMS Upgrade 2011

The following is a breakdown of costs associated with the OMS Upgrade 2011 Project.

Administrative Overhead and Interest	$134,951
Materials	$[redacted]
COPS Labour	$90,000
Consulting	$[redacted]
Software	$[redacted]
Other	$26,000
Total	$2,050,951

The $[redacted] in consulting costs and $[redacted] in software costs are associated with the necessary interface and service upgrades to OMS to allow NSPI to run on the most current version of the software. Labour costs are associated with NSPI engineering and design support.

CI Number: 40299

Title: Field Office Phone System Replacement

Start Date: 2011/04

Final Cost Date: 2011/11

Function: General Plant

Forecast Amount: $833,557

DESCRIPTION:

This project provides for the replacement and consolidation of regional phone systems that have reached their end of life and are no longer supported. The project will give priority to equipment replacement and consolidation at sites that have the highest risk of service disruption.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunications

Why do this project?

The telephone systems in various areas of the province have reached capacity (i.e., no additional users can be added) and are no longer vendor supported. The replacement and consolidation of existing systems with the ongoing expansion of the enterprise Voice Over Internet Protocol (VoIP) system will support the expansion of new users and enable vendor support arrangements.

Why do this project now?

The current systems are at the end of their life (most are over 15 years old and are no longer supported by the vendor) and do not have the capacity to support new user demands. Access to parts is no longer being offered and parts have become increasingly difficult to source. Systems that experience failures can be costly to repair and may result in a telephone service outage during a critical event.

Why do this project this way?

The proposed enterprise replacement and consolidation model is the most cost effective option.

CI Number	: 40299	- Field Office Phone System Replacement		**Project Number**	
Parent CI Number	:	-		**Approved Date**	
Cost Centre	: 027	- 027-Administration		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001		001 - IT Regular Labour		205,000	0	205,000
094		094 - Interest Capitalized		19,251	0	19,251
095		095-IT Regular Labour AO		109,306	0	109,306
021	072	021 - Telephones	072 - GP - Computer Equipment	500,000	0	500,000
			Total Cost:	833,557	0	833,557
			Original Cost:			

NOVA SCOTIA POWER
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Regional Phone System Replacements
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**20-Dec-10**
Division :	Integrated Customer Service	**CI Number:**	40299
Department :	Information Technology	**Project No. :**	N/A
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Regional Phone System Replacement Scenario 1	6.68%	21,284	1	7.30%	15.0 years
B	Regional Phone System Replacement Scenario 2	6.68%	0	2	#NUM!	0.0 years
C	Regional Phone System Replacement Scenario 3	6.68%	0	2	#NUM!	0.0 years
D	Regional Phone System Replacement Scenario 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Justification for this project is based on reduced maintenance costs for the current telephony environment. The project also supports benefits associated with the continued operations and safety of the company by providing stable and supported telephone systems (911, fire and health safety calls are routed through these systems).

Notes/Comments :

Regional Phone System Replacement Scenario 1

This scenario is based upon the replacement of 450 Centrex phones, and the replacement of PBX systems allowing us to avoid operating fees for Centrex, as well as ongoing maintenance costs incurred to maintain PBX.

Regional Phone System Replacement Scenario 2

Regional Phone System Replacement Scenario 3

Regional Phone System Replacement Scenario 4

Regional Phone System Replacements
Regional Phone System Replacement Scenario 1

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(833,557.0)	20,838.9	812,718.1	(833,557.0)	6,361.2	(827,195.8)	0.937	(775,399.1)	(775,399.1)
2012	-	178,200.0	-	40,635.9	772,082.2	178,200.0	(42,778.1)	135,421.9	0.879	118,993.4	(656,405.7)
2013	-	178,200.0	-	38,604.1	733,478.1	178,200.0	(43,274.7)	134,925.3	0.824	111,133.3	(545,272.4)
2014	-	178,200.0	-	36,673.9	696,804.2	178,200.0	(43,993.3)	134,206.7	0.772	103,619.7	(441,652.7)
2015	-	178,200.0	-	34,840.2	661,964.0	178,200.0	(44,441.5)	133,758.5	0.724	96,806.9	(344,845.8)
2016	-	178,200.0	-	33,098.2	628,865.8	178,200.0	(44,981.6)	133,218.4	0.678	90,378.7	(254,467.1)
2017	-	178,200.0	-	31,443.3	597,422.5	178,200.0	(45,494.6)	132,705.4	0.636	84,393.2	(170,073.8)
2018	-	178,200.0	-	29,871.1	567,551.3	178,200.0	(45,982.0)	132,218.0	0.596	78,818.2	(91,255.6)
2019	-	178,200.0	-	28,377.6	539,173.8	178,200.0	(46,445.0)	131,755.0	0.559	73,624.1	(17,631.5)
2020	-	-	-	26,958.7	512,215.1	-	8,357.2	8,357.2	0.524	4,377.5	(13,253.9)
2021	-	-	-	25,610.8	486,604.3	-	7,939.3	7,939.3	0.491	3,898.3	(9,355.7)
2022	-	-	-	24,330.2	462,274.1	-	7,542.4	7,542.4	0.460	3,471.5	(5,884.2)
2023	-	-	-	23,113.7	439,160.4	-	7,165.2	7,165.2	0.431	3,091.4	(2,792.8)
2024	-	-	-	21,958.0	417,202.4	-	6,807.0	6,807.0	0.404	2,752.9	(39.9)
2025	-	-	-	20,860.1	396,342.3	-	6,466.6	6,466.6	0.379	2,451.5	2,411.6
2026	-	-	-	19,817.1	376,525.2	-	6,143.3	6,143.3	0.355	2,183.1	4,594.7
2027	-	-	-	18,826.3	357,698.9	-	5,836.1	5,836.1	0.333	1,944.1	6,538.8
2028	-	-	-	17,884.9	339,814.0	-	5,544.3	5,544.3	0.312	1,731.2	8,270.0
2029	-	-	-	16,990.7	322,823.3	-	5,267.1	5,267.1	0.293	1,541.7	9,811.7
2030	-	-	-	16,141.2	306,682.1	-	5,003.8	5,003.8	0.274	1,372.9	11,184.6
2031	-	-	-	15,334.1	291,348.0	-	4,753.6	4,753.6	0.257	1,222.6	12,407.2
2032	-	-	-	14,567.4	276,780.6	-	4,515.9	4,515.9	0.241	1,088.7	13,495.9
2033	-	-	-	13,839.0	262,941.6	-	4,290.1	4,290.1	0.226	969.5	14,465.4
2034	-	-	-	13,147.1	249,794.5	-	4,075.6	4,075.6	0.212	863.4	15,328.8
2035	-	-	-	12,489.7	237,304.8	-	3,871.8	3,871.8	0.199	768.8	16,097.6
2036	-	-	-	11,865.2	225,439.5	-	3,678.2	3,678.2	0.186	684.7	16,782.3
2037	-	-	-	11,272.0	214,167.5	-	3,494.3	3,494.3	0.174	609.7	17,392.0
2038	-	-	-	10,708.4	203,459.2	-	3,319.6	3,319.6	0.164	543.0	17,935.0
2039	-	-	-	10,173.0	193,286.2	-	3,153.6	3,153.6	0.153	483.5	18,418.5
2040	-	-	-	9,664.3	183,621.9	-	2,995.9	2,995.9	0.144	430.6	18,849.0
2041	-	-	-	9,181.1	174,440.8	-	2,846.1	2,846.1	0.135	383.4	19,232.5
2042	-	-	-	8,722.0	165,718.8	-	2,703.8	2,703.8	0.126	341.4	19,573.9
2043	-	-	-	8,285.9	157,432.8	-	2,568.6	2,568.6	0.118	304.1	19,878.0
2044	-	-	-	7,871.6	149,561.2	-	2,440.2	2,440.2	0.111	270.8	20,148.7
2045	-	-	-	7,478.1	142,083.1	-	2,318.2	2,318.2	0.104	241.1	20,389.9
2046	-	-	-	7,104.2	134,979.0	-	2,202.3	2,202.3	0.098	214.7	20,604.6
2047	-	-	-	6,748.9	128,230.0	-	2,092.2	2,092.2	0.091	191.2	20,795.8
2048	-	-	-	6,411.5	121,818.5	-	1,987.6	1,987.6	0.086	170.3	20,966.1
2049	-	-	-	6,090.9	115,727.6	-	1,888.2	1,888.2	0.080	151.6	21,117.7
2050	-	-	-	5,786.4	109,941.2	-	2,205.8	2,205.8	0.075	166.1	21,283.8
Total	-	1,425,600.0	(833,557.0)	723,615.8	14,165,478.5	592,043.0	(217,555.4)	374,487.6	14.8	21,283.8	(2,920,356.3)

Regional Phone System Replacements
Regional Phone System Replacement Scenario 2

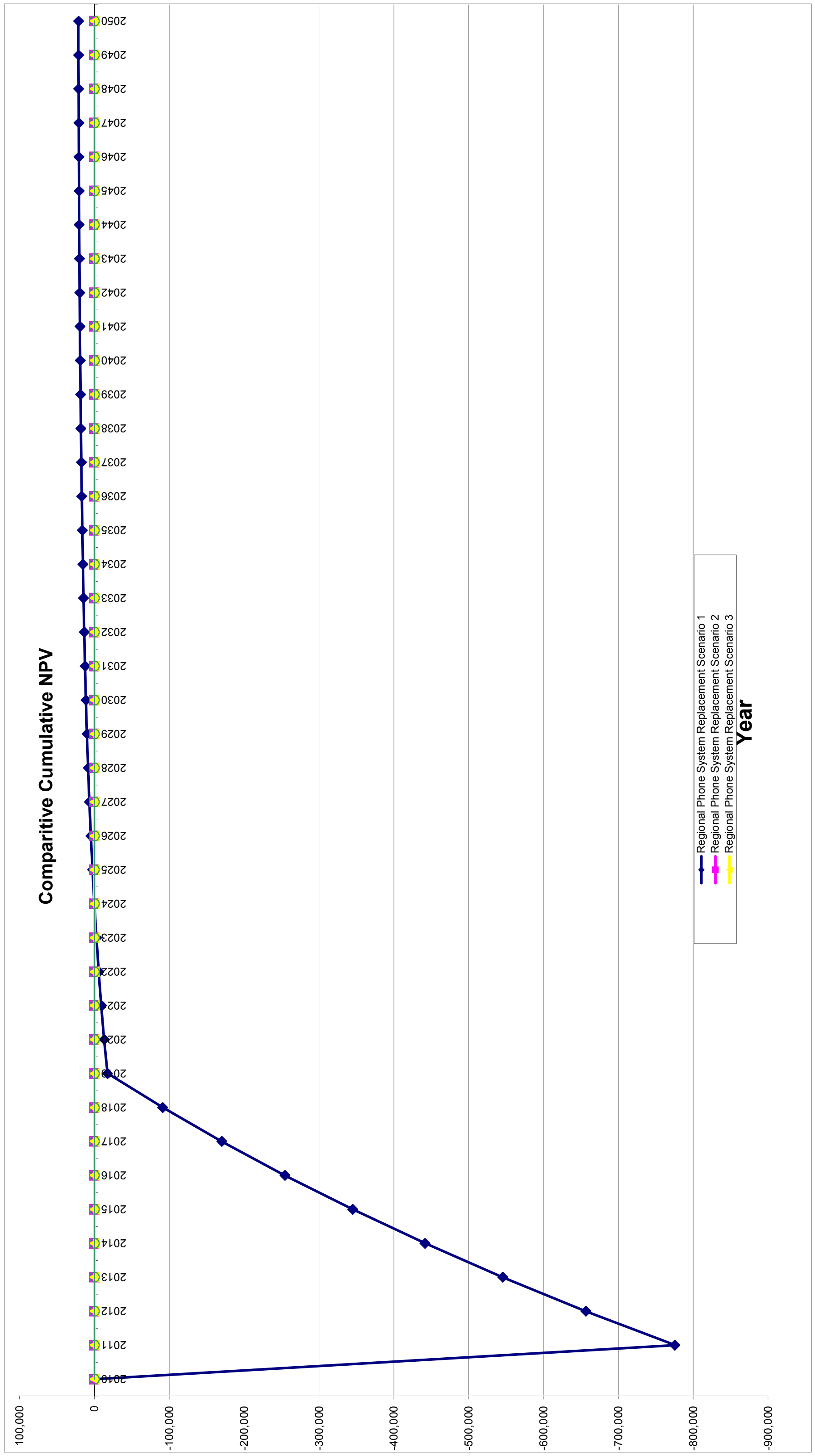
Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-

Regional Phone System Replacements
Regional Phone System Replacement Scenario 3

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-

Regional Phone System Replacements
Regional Phone System Replacement Scenario 4

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-


Comparitive Cumulative NPV
Year
Regional Phone System Replacement Scenario 1
Regional Phone System Replacement Scenario 2
Regional Phone System Replacement Scenario 3
100,000
0
-100,000
-200,000
-300,000
-400,000
-500,000
-600,000
-700,000
-800,000
-900,000
2010
2011
2012
2013
2014
2015
2016
2017
2018
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2049
2050

CI Number: 40249

Title: New Chester Microwave Radio Link

Start Date: 2011/02

Final Cost Date: 2011/12

Function: General Plant

Forecast Amount: $407,925

DESCRIPTION:

This project provides for the installation of new microwave radio links at the New Chester radio site on the Eastern Shore of Nova Scotia. The addition of this site will complete the backbone radio system from the Ragged Lake Energy Control Center to the 101S-Woodbine substation in Cape Breton.

The project will include the installation of two new radios at New Chester and one new radio at each of the Marinette and Cochrane Hill radio sites. This project will include the purchase of the radios, antennas and associated equipment as well as the design, installation and commissioning of the equipment at these sites.

Summary of Related CI’s +/- 2 years
2010 - 38244 Replace Microwave Radio Systems $410,068
2011 – 40252 2011 Replace Microwave Radio System $351,658

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunication

Why do this project?

Microwave radio equipment provides for the transport of critical Supervisory Control and Data Acquisition (SCADA), teleprotection, voice and data traffic on NSPI's telecom network infrastructure. The current system configuration is such that communications to some radio sites can be disrupted when there are issues at other communication sites. This project will introduce a redundant path for traffic and a more robust network. It will ensure there are more reliable and diverse communication paths to alleviate the loss of communications.

Why do this project now?

Installation of the new node at New Chester will immediately improve the reliability of the system, reduce the possibility of long communication outages and provide communications infrastructure for the incorporation of new and additional technology in the future.

Why do this project this way?

The New Chester site was chosen as an intermediate site as it allows for the connection of two radio link systems to form a complete microwave radio link system from Ragged Lake to 101S-Woodbine. There is currently an existing radio tower and building at the New Chester site. The tower has been designed to be able to accommodate the new antennas. In combination with the existing SONET-based fibre system, which also extends to 101S-Woodbine, two alternate paths for critical circuits will be in place.

CI Number	: 40249	- New Chester Microwave Radio Link		**Project Number**	
Parent CI Number	:	-		**Approved Date**	
Cost Centre	: 620	- 620-Control Centre Operations		**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		3,770	0	3,770
094		094 - Interest Capitalized		12,747	0	12,747
095		095-COPS Regular Labour AO		5,743	0	5,743
095		095-Thermal Regular Labour AO		1,203	0	1,203
095		095-COPS Contracts AO		[redacted]	0	[redacted]
001	055	001 - T&D Regular Labour	055 - GP - Teleprotection	7,440	0	7,440
002	055	002 - T&D Overtime Labour	055 - GP - Teleprotection	0	0	0
011	055	011 - Travel Expense	055 - GP - Teleprotection	500	0	500
012	055	012 - Materials	055 - GP - Teleprotection	[redacted]	0	[redacted]
013	055	013 - COPS Contracts	055 - GP - Teleprotection	[redacted]	0	[redacted]
028	055	028 - Consulting	055 - GP - Teleprotection	[redacted]	0	[redacted]
041	055	041 - Meals & Entertainment	055 - GP - Teleprotection	500	0	500
066	055	066 - Other Goods & Services	055 - GP - Teleprotection	0	0	0
001	085	001 - THERMAL Regular Labour	085 Design	5,010	0	5,010
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
011	085	011 - Travel Expense	085 Design	250	0	250
041	085	041 - Meals & Entertainment	085 Design	250	0	250
066	085	066 - Other Goods & Services	085 Design	0	0	0
			Total Cost:	407,925	0	407,925
			Original Cost:			

CI 40249 – New Chester Microwave Radio Link

The following is a breakdown of costs associated with the New Chester Microwave Radio Link Project.

Administrative Overhead and Interest	$[redacted]
Materials	$[redacted]
COPS Labour	$12,450
Contracts	$[redacted]
Consulting	$[redacted]
Other	$1,500
Total	$407,925

The material costs associated with this item are based on previous projects that have utilized similar radio equipment. The contract costs of this project are associated with antenna installation by a contractor. The labour costs are associated with engineering design and field installation of the radios based on an internal rate of approximately $[redacted] per person day.

CI Number: 40261

Title: Newtonville SR500 Multipoint Radio System Replacement

Start Date: 2011/02

Final Cost Date: 2011/11

Function: General Plant

Forecast Amount: $351,681

DESCRIPTION:

This project will replace the obsolete SR Telecom SR500 radio system, which provides Supervisory Control and Data Acquisition (SCADA) communications to six hydro sites with a modern licensed multipoint radio system. This project will provide for one master station and six remote stations at the six hydro sites as well as a new fiber link at the White Rock outstation to provide network access.

Summary of Related CI's +/- 2 years:
2010 - 33524 Replace Microwave Radio - Brushy Hill $127,199
2011 - 29043 Replace Metro SR500 Radio System $125,470

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunication

Why do this project?

The existing equipment has reached the end of its useful life and because it has been discontinued by the manufacturer, spare parts for the system are no longer available. A failure of the radio system would result in an extended loss of communications to the six hydro sites, and the inability to remotely control these stations via SCADA.

Why do this project now?

The existing SR500 radio system is obsolete and cannot be effectively maintained. Replacement of this system in 2011 will ensure reliable communication and control to these sites.

Why do this project this way?

The multipoint radio system replacement option is a cost effective, proven technology suitable for this application. It has been deployed in other areas of the telecommunications network which will allow for common maintenance practices, sparing and training.

CI Number : 40261 - Newtonville SR500 Multipoint Radio System Replacement

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 620 - 620-Control Centre Operations

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		11,548	0	11,548
094		094 - Interest Capitalized		9,473	0	9,473
095		095-COPS Regular Labour AO		17,592	0	17,592
095		095-Thermal Regular Labour AO		1,976	0	1,976
095		095-COPS Contracts AO		[redacted]	0	[redacted]
001	055	001 - T&D Regular Labour	055 - GP - Teleprotection	22,790	0	22,790
002	055	002 - T&D Overtime Labour	055 - GP - Teleprotection	0	0	0
011	055	011 - Travel Expense	055 - GP - Teleprotection	1,500	0	1,500
012	055	012 - Materials	055 - GP - Teleprotection	[redacted]	0	[redacted]
013	055	013 - COPS Contracts	055 - GP - Teleprotection	[redacted]	0	[redacted]
028	055	028 - Consulting	055 - GP - Teleprotection	[redacted]	0	[redacted]
041	055	041 - Meals & Entertainment	055 - GP - Teleprotection	1,500	0	1,500
066	055	066 - Other Goods & Services	055 - GP - Teleprotection	0	0	0
001	085	001 - THERMAL Regular Labour	085 Design	8,230	0	8,230
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
011	085	011 - Travel Expense	085 Design	1,500	0	1,500
041	085	041 - Meals & Entertainment	085 Design	1,500	0	1,500
066	085	066 - Other Goods & Services	085 Design	0	0	0
			Total Cost:	351,681	0	351,681
			Original Cost:	236,865		

CI 40261 – Newtonville SR500 Multipoint Radio System Replacement

The following is a breakdown of costs associated with the Newtonville SR500 Multipoint Radio System Replacement Project.

Administrative Overhead and Interest	$[redacted]
Materials	$[redacted]
Contracts	$[redacted]
COPS Labour	$31,020
Consulting	$[redacted]
Other	$6,000
Total	$351,681

The material costs associated with this project are for radios and peripherals with estimates based on previous projects. The contract costs of this project are associated with antenna installation by a contractor. The labour costs are associated with engineering design and field installation of the radios based on an internal rate of approximately $[redacted] per person day.

CI Number: 40252

Title: 2011 Replace Microwave Radio System

Start Date: 2011/02

Final Cost Date: 2011/12

Function: General Plant

Forecast Amount: $351,658

DESCRIPTION:

This project provides for the replacement of existing microwave radio equipment on three critical radio hops across the province: Bridgewater to Greathill, Newtonville to Stronach and Lingan to Point Aconi. This equipment and systems allow for transport of critical Supervisory Control and Data Acquisition (SCADA), teleprotection, voice and data traffic on NSPI telecom network infrastructure.

Summary of Related CI's +/- 2 years
2010 - 38244 Replace Microwave Radio Systems $410,068
2011 - 40249 New Chester Microwave Radio Link $407,925

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunication

Why do this project?

Replacement of the equipment for three radio hops is required to ensure reliability and provide the required system capacity of the telecom network infrastructure.

Why do this project now?

The existing equipment has reached the end of its useful life and because it has been discontinued by the manufacturer, spare parts for the system are no longer available. Replacing the systems in 2011 will reduce the risk of losing protected communications to key facilities and areas of the province. Attachment 1 provides the manufacturer's discontinuation notice.

Why do this project this way?

The existing microwave radio equipment will be replaced with standard equipment used throughout the Company. This will allow for common sparing, maintenance practices and training for all the links.

CI Number : 40252 - 2011 Replace Microwave Radio System **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 620 - 620-Control Centre Operations **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D Reg. Labour AO		7,540	0	7,540
094		094 - Interest Capitalized		10,936	0	10,936
095		095-COPS Regular Labour AO		11,486	0	11,486
095		095-Thermal Regular Labour AO		2,924	0	2,924
001	060	001 - T&D Regular Labour	060 - GP - Broadband Radio	14,880	0	14,880
002	060	002 - T&D Overtime Labour	060 - GP - Broadband Radio	0	0	0
011	060	011 - Travel Expense	060 - TP - Broadband Radio	250	0	250
012	060	012 - Materials	060 - GP - Broadband Radio	290,712	0	290,712
041	060	041 - Meals & Entertainment	060 - GP - Broadband Radio	250	0	250
066	060	066 - Other Goods & Services	060 - GP - Broadband Radio	0	0	0
001	085	001 - THERMAL Regular Labour	085 Design	12,180	0	12,180
002	085	002 - THERMAL Overtime Labour	085 Design	0	0	0
011	085	011 - Travel Expense	085 Design	250	0	250
041	085	041 - Meals & Entertainment	085 Design	250	0	250
066	085	066 - Other Goods & Services	085 Design	0	0	0
			Total Cost:	351,658	0	351,658
			Original Cost:	134,697		

CI 40252 – 2011 Replace Microwave Radio System

The following is a breakdown of costs associated with the 2011 Replace Microwave Radio System Project.

Administrative Overhead and Interest	$32,886
Materials	$290,712
COPS Labour	$27,060
Other	$1,000
Total	$351,658

The material costs associated with this item are based on previous projects that have utilized similar radio equipment. The labour costs are associated with engineering design and field installation of the radios based on an internal rate of approximately [redacted] per person day.

PRODUCT CHANGE NOTICE (PCN)

Supplier Information
Alcatel USA
1000 Coit Road
Plano, TX 75075
TAC 1-888-252-2832
ALCL

PCN 01-381
Class D
Issue 01

Issue Date of Change
07/13/2001

System and Product Description
TNRADS
DVR-4X07e
MDR-4X06e
MDR-4XU6e
MDR-4X07e
MDR-4X08e
MDR-4X11e
MDR-6X08/i

New Product Code(s)
N/A

Old Product Code(s)
See Description of Change Section below

New CLEI Code(s)
N/A

Old CLEI Code(s)
N/A

Associated Products of Changes Affected
Any system that relies on these products should be evaluated.

Drawing Number
N/A

Product Change Classification
D

Classification Substantiation
This PCN is classified as D because it announces the A&M (Additions and Maintenance) and MD (Manufacturing Discontinued) of various products.

Reason for Change
This PCN announces the A&M (Additions and Maintenance) and MD (Manufacturing Discontinued) of various products as listed.

Description of Change
Product Classifications Description
Consistent with the policy to provide optimum support for the longest practical time to its customers, Alcatel USA regularly monitors market acceptance of its current products to provide a maximum sustained term in this classification.

Current Product Line:
Current high volume manufactured products including standard rack (bay) configurations, subsystems, plug-in modules and major replaceable components. Primary Marketing and Sales efforts are devoted to these products and purchasing, production planning, inventory management and other activities are focused to meet large-scale market requirements.

As new telecommunications technologies become available, market demands change and/or more efficient design and manufacturing processes are introduced, a transition to new superseding products will begin to take place. Under conditions of diminishing demand levels, Alcatel USA provides for continuing support of customer-owned systems by reclassification of the product from **Current Product Line** to **Additions & Maintenance**.

Additions & Maintenance (A&M):
Equipment in the form of plug-in modules and selective sub-assemblies to expand previously delivered hard-wired but only partially equipped systems and to support module replacement requirements. Normally, six-month advance notice is given to the identified customer base before the ***A&M*** *classification becomes effective. These products will involve periodic rather than continuous production activity with stocking levels reflecting best available judgment of reduced market demands. As a result, prices are higher for these products and delivery intervals usually will be longer than for Current Product Line equipment.*

The third and final phase in the life of a product is classified as **Manufacturing Discontinued (MD)**. Reclassification of an **A&M** status to **MD** status occurs when demands become sporadic, components are no longer available, or superseding products are available.

Manufacturing Discontinued (MD):
A product which is no longer available for purchase. Continuing support will be available by means of (1) equipment repair or replacement utilizing components and materials from sources that can be found through reasonable efforts and (2) remote technical assistance. Technical assistance over the telephone is billable at then current charges for such services annual contracts are available for such support. Please call 1-888-ALCATEC for more information. A product may become ***MD*** *no sooner than six (6) months following classification to* ***A&M****. As is customary, a minimum of six months advance notification is given to the identified customer base.*

Product Classification Changes
The following list details classification changes for Alcatel USA Wireless Access products.

Orders for products classified A&M (Additions and Maintenance) will be considered at current pricing.
Orders for products classified MD (Manufacturing Discontinued) will only be accepted subject to stock availability.

Existing contracts that spell out notice requirements will be executed as detailed in those contracts.

Product	New Status	Effective Date	Replacement Product
DVR-4107e	A&M	January 15, 2002	MDR-8607-45
DVR-4107e	MD	July 15, 2002	MDR-8607-45
DVR-4207e	A&M	January 15, 2002	MDR-8607-90
DVR-4207e	MD	July 15, 2002	MDR-8607-90
MDR-4X06e	A&M	January 15, 2002	MDR-8606
MDR-4X06e	MD	July 15, 2002	MDR-8606
MDR-4XU6e	A&M	January 15, 2002	MDR-8606
MDR-4XU6e	MD	July 15, 2002	MDR-8606
MDR-4X07e	A&M	January 15, 2002	MDR-8607
MDR-4X07e	MD	July 15, 2002	MDR-8607
MDR-4X08e	A&M	January 15, 2002	MDR-8608
MDR-4X08e	MD	July 15, 2002	MDR-8608

MDR-4X11e	A&M	January 15, 2002	MDR-8611
MDR-4X11e	MD	July 15, 2002	MDR-8611
MDR-6X08/i (All versions including CommPak)	A&M	January 15, 2002	MDR-8X08/i
MDR-6X08/i (All versions including CommPak)	MD	July 15, 2002	MDR-8X08/i

For additional information on these products, please contact the following Wireless Access Product Management personnel:

DVR-4000e	Scott Nelson	Product Manager	972/996-5890
MDR-4000e/i	Scott Nelson	Product Manager	972/996-5890
MDR-6000/i & CommPak	Pat Picquet	Product Manager	972-996-6073
MDR-8000	Pat Picquet	Product Manager	972-996-6073

For information on other Alcatel USA products, please call Alcatel USA at 1-888-252-2832 or 1-972-519-4141. In Canada, call your local network support specialist or the Technical Assistance Center.

The following provides additional information concerning the above product classification changes:

DVR-4X07e Microwave Digital Radio Family
The MDR-4X07e supports 1xDS3 or 2xDS3 radio operating in the 7 GHz band designated for Studio-to-Transmitter Link (STL) applications where bandwidths are restricted to 25 MHz. This product line is replaced by the MDR-8000-DS3

MDR-4X06e, -4XU6e, -4X07e, -4X08e, -4X11e Microwave Digital Radio Family
The MDR-4000e family supports 1xDS3, 2xDS3 and 3xDS3 applications in the L6, U6, 7, 8, and 11 GHz frequency bands. This product line is replaced by the MDR-8000-DS3.

MDR-6000 Microwave Digital Radio Family
The MDR-6000 product line in the L6, U6, 7, 8, 10.5 and 11 GHz frequency bands supports capacities of 2x, 4x, 8x, 12x and 16xDS1 or CEPT 2x, 4x, 8x, 12x and 16xE1 (2 Mb/s) versions for international applications. This product line is replaced by the MDR-8000-DS1 and MDR-8000-E1.

Effect of Change
N/A

Material Affected
Products listed in the Description of Change section above.

Documentation Affected
N/A

Implementation Date
01/15/2002

Modification Completion Date
N/A

Modification Location
N/A

Modification Cost
N/A

Location and Quantity of Equipment
N/A

Attachments
N/A

Comments
A&M and MD information are announced via Class D Product Change Notices (PCNs) in compliance with the requirements of Telcordia GR-209-CORE.

General Information
For general assistance call the Alcatel Technical Assistance Center (TAC) at 1-888-252-2832 or 1-972-519-4141. In Canada, call 1-905-873-6300.

To be removed from this mailing list or for administrative assistance, call the PCN Administrator at 1-972-477-2529.

For Alcatel products and services information or for general company information, visit our web site at www.usa.alcatel.com.

CI Number: 40247

Title: 2011 Radio Tower Upgrades

Start Date: 2011/02

Final Cost Date: 2011/12

Function: General Plant

Forecast Amount: $324,686

DESCRIPTION:

This project provides for NSPI's portion of the costs to construct a new radio tower at the Willow Hill radio site and to replace the existing tower at the Granite Village radio site. The total cost of the towers will be shared with the Province of Nova Scotia through a current cost sharing agreement.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunication

Why do this project?

A new radio tower at the Willow Hill site will allow for the installation of a radio link into the St. Croix Substation. Current communication with the substation is over leased circuits which have failed several times since installation. The power line carrier equipment is over 35 years old and requires replacement.

At the Granite Village radio site, the installation of a new heavy duty tower will allow NSPI to proceed with a planned upgrade to microwave radio equipment.

Why do this project now?

The Province of Nova Scotia is planning to proceed with the replacement of radio towers at Willow Hill and Granite Village in 2011. With input and cost sharing from NSPI under the Master License Agreement, the towers will be designed and constructed to accommodate the needs of both NSPI and the Province.

Why do this project this way?

Cost sharing with the Province of Nova Scotia is a very cost effective option for NSPI to have access to upgraded radio tower infrastructure, without having to build its own tower sites.

CI Number	: 40247	- 2011 Radio Tower Upgrades	**Project Number**	
Parent CI Number	:	-	**Approved Date**	
Cost Centre	: 620	- 620-Control Centre Operations	**Budget Version**	2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		10,281	0	10,281
095		095-Thermal Regular Labour AO		1,203	0	1,203
095		095-COPS Contracts AO		[redacted]	0	[redacted]
011	055	011 - Travel Expense	055 - GP - Teleprotection	600	0	600
012	055	012 - Materials	055 - GP - Teleprotection	[redacted]	0	[redacted]
013	055	013 - COPS Contracts	055 - GP - Teleprotection	[redacted]	0	[redacted]
028	055	028 - Consulting	055 - GP - Teleprotection	[redacted]	0	[redacted]
041	055	041 - Meals & Entertainment	055 - GP - Teleprotection	400	0	400
066	055	066 - Other Goods & Services	055 - GP - Teleprotection	0	0	0
001	085	001 - THERMAL Regular Labour	085 Design	5,010	0	5,010
011	085	011 - Travel Expense	085 Design	250	0	250
041	085	041 - Meals & Entertainment	085 Design	250	0	250
066	085	066 - Other Goods & Services	085 Design	0	0	0
			Total Cost:	324,686	0	324,686
			Original Cost:	82,076		

CI 40247 – 2011 Radio Tower Upgrades

The following is a breakdown of costs associated with the 2011 Radio Tower Upgrades Project.

Administrative Overhead and Interest	$[redacted]
Materials	$[redacted]
Contracts	$[redacted]
COPS Labour	$5,010
Consulting	$[redacted]
Other	$1,500
Total	$324,686

The materials cost associated with this item is for NSPI's costs associated with the radio towers and associated components. Contract costs are for the antenna installation by contractors. Labour and consulting costs are related to the engineering design of the towers.

Pages 1933 - 1963 have been removed due to confidentiality.

CI Number: 40105

Title: Boiler Condition and Data Tracking Software

Start Date:	2011/02
Final Cost Date:	2011/09
Function:	General Plant
Forecast Amount:	$570,643

DESCRIPTION:

This project includes the installation and implementation of a boiler asset condition management tool that is designed to improve data collection and storage as well as analyze data related to NSPI's fleet of boiler assets.

Summary of Related CI's +/- 2 years:
No projects in 2009, 2010, 2011, 2012 and 2013

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Why do this project?

Enhancing current capabilities of collecting, analyzing and storing boiler-related inspection data through the implementation of this software will assist in ensuring reliability of the boiler assets, minimize forced outages, support investment decisions and contribute to outage planning.

Why do this project now?

Executing this project now will ensure the knowledge base of an aging workforce with many years of experience operating and managing boiler assets is captured and maintained.

Why do this project this way?

Doing the project this way will ensure that a standardized approach in determining and monitoring boiler component condition is achieved. Implementing the boiler condition and data tracking software is a practical and cost-effective solution to ensuring the reliability of boiler assets are maintained.

CI Number : 40105 - Boiler Condition and Data Tracking Software

Project Number

Parent CI Number : -

Approved Date

Cost Centre : 013 - 013-Advanced Technologies

Budget Version 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		14,649	0	14,649
095		095-IT Regular Labour AO		23,994	0	23,994
001	078	001 - IT Regular Labour	078 - GP - Comp. Appl. Software	45,000	0	45,000
013	078	013 - OTHER Contracts	078 - GP - Comp. Appl. Software	[redacted]	0	[redacted]
034	078	034 - Appl. Software	078 - GP - Comp. Appl. Software	[redacted]	0	[redacted]
			Total Cost:	570,643	0	570,643
			Original Cost:			

Pages 1966 - 2345 have been removed due to confidentiality.

CI Number: 40293

Title: People Soft Workflow

Start Date:	2011/06
Final Cost Date:	2011/09
Function:	General Plant
Forecast Amount:	$276,578

DESCRIPTION:

NSPI currently utilizes PeopleSoft to manage Human Resources management information, benefits administration, time & labor, payroll, training, and pension services. This project will introduce a PeopleSoft automation tool called Workflow that will enable NSPI to efficiently automate the flow of HR related information throughout the Company.

Summary of Related CI's +/- 2 years:
2010 – 37722 PeopleSoft Upgrade $585,072

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Why do this project?

This project will reduce time consuming business processes (new hire, time entry, pension and safety training) that are currently run manually and can be automated and setup to deliver the right information to the right people at the right time.

Why do this project now?

Completing this project will ensure accurate and timely information is available to NSPI employees by automating manual tasks and processes.

Why do this project this way?

This project will ensure NSPI staff is able to effectively enable Workflow automation on additional processes not identified on the initial list. This is the most practical and cost effective option because the proposed solution is compatible with the existing PeopleSoft software.

CI Number : 40293 - People Soft Workflow. **Project Number**

Parent CI Number : - **Approved Date**

Cost Centre : 022 - 022-Application Support **Budget Version** 2011 ACE Plan

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001		001 - IT Regular Labour		29,070	0	29,070
001		001 - Regular Labour (No AO)		17,750	0	17,750
028		028 - Consulting		[redacted]	0	[redacted]
035		035 - Comp.Hrdwr & Op.Sftwr		[redacted]	0	[redacted]
041		041 - Meals & Entertainment		900	0	900
056		056 - Training & Development		10,000	0	10,000
094		094 - Interest Capitalized		3,338	0	3,338
095		095-IT Regular Labour AO		15,500	0	15,500
			Total Cost:	276,578	0	276,578
			Original Cost:			

Peoplesoft Workflow
Summary of Alternatives

Budget Year :	**2011**	**Date :**	**20-Dec-10**
Division :	Integrated Customer Service	**CI Number:**	40293
Department :	Information Technology	**Project No. :**	N/A
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Peoplesoft Scenario 1	6.68%	75,805	1	14.32%	8.1 years
B	Peoplesoft Scenario 2	6.68%	0	2	#NUM!	0.0 years
C	Peoplesoft Scenario 3	6.68%	0	2	#NUM!	0.0 years
D	Peoplesoft Scenario 4	6.68%	0	2	#NUM!	0.0 years

Recommendation :

Justification of this project is based upon the expected benefits of workflow management. This project is expected to provide corporate benefits that would be equal to one Full Time Equivalent (FTE).

Notes/Comments :

Peoplesoft Scenario 1

By using workflow management, many time intensive Human Resource processes will be streamlined such as:
- the new hire process
- employee coordination for plant shutdown
- coordination of safety training
- pension reviews and set ups

Peoplesoft Scenario 2

Peoplesoft Scenario 3

Peoplesoft Scenario 4

Peoplesoft Workflow
Peoplesoft Scenario 1

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	(276,578.0)	76,059.0	200,519.1	(276,578.0)	24,617.6	(251,960.4)	0.937	(236,183.3)	(236,183.3)
2012	-	54,616.7	-	110,285.5	90,233.6	54,616.7	17,241.8	71,858.4	0.879	63,141.0	(173,042.3)
2013	-	56,255.2	-	49,628.5	40,605.1	56,255.2	(2,054.3)	54,200.9	0.824	44,643.4	(128,398.9)
2014	-	57,942.8	-	22,332.8	18,272.3	57,942.8	(11,042.3)	46,900.6	0.772	36,211.5	(92,187.4)
2015	-	59,681.1	-	10,049.8	8,222.5	59,681.1	(15,385.7)	44,295.4	0.724	32,058.5	(60,128.9)
2016	-	61,471.5	-	4,522.4	3,700.1	61,471.5	(17,654.2)	43,817.3	0.678	29,726.8	(30,402.1)
2017	-	63,315.7	-	2,035.1	1,665.1	63,315.7	(18,997.0)	44,318.7	0.636	28,184.2	(2,217.9)
2018	-	65,215.2	-	915.8	749.3	65,215.2	(19,932.8)	45,282.4	0.596	26,993.9	24,776.0
2019	-	67,171.6	-	412.1	337.2	67,171.6	(20,695.4)	46,476.2	0.559	25,970.7	50,746.6
2020	-	69,186.8	-	185.4	151.7	69,186.8	(21,390.4)	47,796.4	0.524	25,036.0	75,782.6
2021	-	-	-	83.5	68.3	-	25.9	25.9	0.491	12.7	75,795.3
2022	-	-	-	37.6	30.7	-	11.6	11.6	0.460	5.4	75,800.7
2023	-	-	-	16.9	13.8	-	5.2	5.2	0.431	2.3	75,802.9
2024	-	-	-	7.6	6.2	-	2.4	2.4	0.404	1.0	75,803.9
2025	-	-	-	3.4	2.8	-	1.1	1.1	0.379	0.4	75,804.3
2026	-	-	-	1.5	1.3	-	0.5	0.5	0.355	0.2	75,804.5
2027	-	-	-	0.7	0.6	-	0.2	0.2	0.333	0.1	75,804.5
2028	-	-	-	0.3	0.3	-	0.1	0.1	0.312	0.0	75,804.6
2029	-	-	-	0.1	0.1	-	0.0	0.0	0.293	0.0	75,804.6
2030	-	-	-	0.1	0.1	-	0.0	0.0	0.274	0.0	75,804.6
2031	-	-	-	0.0	0.0	-	0.0	0.0	0.257	0.0	75,804.6
2032	-	-	-	0.0	0.0	-	0.0	0.0	0.241	0.0	75,804.6
2033	-	-	-	0.0	0.0	-	0.0	0.0	0.226	0.0	75,804.6
2034	-	-	-	0.0	0.0	-	0.0	0.0	0.212	0.0	75,804.6
2035	-	-	-	0.0	0.0	-	0.0	0.0	0.199	0.0	75,804.6
2036	-	-	-	0.0	0.0	-	0.0	0.0	0.186	0.0	75,804.6
2037	-	-	-	0.0	0.0	-	0.0	0.0	0.174	0.0	75,804.6
2038	-	-	-	0.0	0.0	-	0.0	0.0	0.164	0.0	75,804.6
2039	-	-	-	0.0	0.0	-	0.0	0.0	0.153	0.0	75,804.6
2040	-	-	-	0.0	0.0	-	0.0	0.0	0.144	0.0	75,804.6
2041	-	-	-	0.0	0.0	-	0.0	0.0	0.135	0.0	75,804.6
2042	-	-	-	0.0	0.0	-	0.0	0.0	0.126	0.0	75,804.6
2043	-	-	-	0.0	0.0	-	0.0	0.0	0.118	0.0	75,804.6
2044	-	-	-	0.0	0.0	-	0.0	0.0	0.111	0.0	75,804.6
2045	-	-	-	0.0	0.0	-	0.0	0.0	0.104	0.0	75,804.6
2046	-	-	-	0.0	0.0	-	0.0	0.0	0.098	0.0	75,804.6
2047	-	-	-	0.0	0.0	-	0.0	0.0	0.091	0.0	75,804.6
2048	-	-	-	0.0	0.0	-	0.0	0.0	0.086	0.0	75,804.6
2049	-	-	-	0.0	0.0	-	0.0	0.0	0.080	0.0	75,804.6
2050	-	-	-	0.0	0.0	-	0.0	0.0	0.075	0.0	75,804.6
Total	-	554,856.5	(276,578.0)	276,578.0	364,580.1	278,278.5	(85,245.7)	193,032.8	14.8	75,804.6	1,702,866.1

Peoplesoft Workflow
Peoplesoft Scenario 2

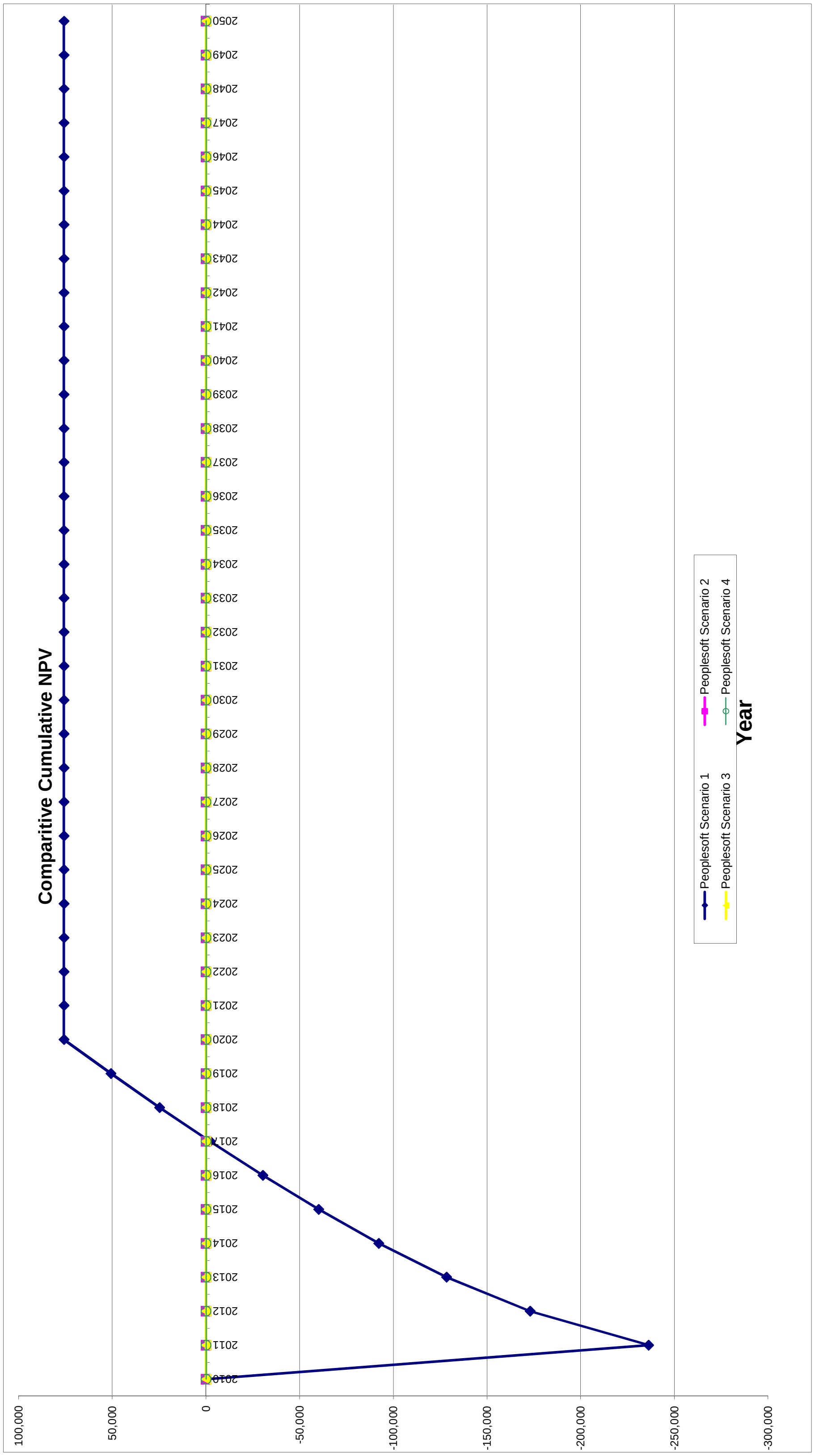
Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-

Peoplesoft Workflow
Peoplesoft Scenario 3

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-

Peoplesoft Workflow
Peoplesoft Scenario 4

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.937	-	-
2012	-	-	-	-	-	-	-	-	0.879	-	-
2013	-	-	-	-	-	-	-	-	0.824	-	-
2014	-	-	-	-	-	-	-	-	0.772	-	-
2015	-	-	-	-	-	-	-	-	0.724	-	-
2016	-	-	-	-	-	-	-	-	0.678	-	-
2017	-	-	-	-	-	-	-	-	0.636	-	-
2018	-	-	-	-	-	-	-	-	0.596	-	-
2019	-	-	-	-	-	-	-	-	0.559	-	-
2020	-	-	-	-	-	-	-	-	0.524	-	-
2021	-	-	-	-	-	-	-	-	0.491	-	-
2022	-	-	-	-	-	-	-	-	0.460	-	-
2023	-	-	-	-	-	-	-	-	0.431	-	-
2024	-	-	-	-	-	-	-	-	0.404	-	-
2025	-	-	-	-	-	-	-	-	0.379	-	-
2026	-	-	-	-	-	-	-	-	0.355	-	-
2027	-	-	-	-	-	-	-	-	0.333	-	-
2028	-	-	-	-	-	-	-	-	0.312	-	-
2029	-	-	-	-	-	-	-	-	0.293	-	-
2030	-	-	-	-	-	-	-	-	0.274	-	-
2031	-	-	-	-	-	-	-	-	0.257	-	-
2032	-	-	-	-	-	-	-	-	0.241	-	-
2033	-	-	-	-	-	-	-	-	0.226	-	-
2034	-	-	-	-	-	-	-	-	0.212	-	-
2035	-	-	-	-	-	-	-	-	0.199	-	-
2036	-	-	-	-	-	-	-	-	0.186	-	-
2037	-	-	-	-	-	-	-	-	0.174	-	-
2038	-	-	-	-	-	-	-	-	0.164	-	-
2039	-	-	-	-	-	-	-	-	0.153	-	-
2040	-	-	-	-	-	-	-	-	0.144	-	-
2041	-	-	-	-	-	-	-	-	0.135	-	-
2042	-	-	-	-	-	-	-	-	0.126	-	-
2043	-	-	-	-	-	-	-	-	0.118	-	-
2044	-	-	-	-	-	-	-	-	0.111	-	-
2045	-	-	-	-	-	-	-	-	0.104	-	-
2046	-	-	-	-	-	-	-	-	0.098	-	-
2047	-	-	-	-	-	-	-	-	0.091	-	-
2048	-	-	-	-	-	-	-	-	0.086	-	-
2049	-	-	-	-	-	-	-	-	0.080	-	-
2050	-	-	-	-	-	-	-	-	0.075	-	-
Total	-	-	-	-	-	-	-	-	14.8	-	-


Comparitive Cumulative NPV
100,000
50,000
0
-50,000
-100,000
-150,000
-200,000
-250,000
-300,000
2010
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2048
2049
2050
Year
Peoplesoft Scenario 1
Peoplesoft Scenario 2
Peoplesoft Scenario 3
Peoplesoft Scenario 4

6 GLOSSARY OF TERMS

Capacitor	A device used by electrical utilities to maintain voltage on a distribution or a transmission line.
Capacity	The load for which a generating unit, generating station, or other electrical apparatus is rated. Several capacity values may be identified as follows:
Maximum:	the maximum output that can be achieved.
Nameplate:	the maximum output specified by the manufacturer.
Dependable:	the maximum output that can be reliably supplied during peak load months (December, January, and February).
Firm:	based on dependable capacity, unit availability and system characteristics.
Cogeneration	The generation of electricity in conjunction with the production of useful heat, usually steam.
Conductor	One or more wires, usually aluminum or copper, connected together and designed to carry an electrical current. These wires may be bare or insulated.
Demand	The rate at which electric energy is delivered at a given instant or averaged over some designated period of time, expressed in kilowatts, megawatts, and other larger units. Also called “load” or “power.”
Distribution System	The facilities (i.e. lines, transformers, switches and sub-stations) used to distribute electricity over short distances from the transmission system to the customer, generally at voltages below 69 kV.
Energy Terms	A kWh is a measure of energy equal to 1000 watts, over a period of one hour.
	A MWh is a measure of energy equal to 1000 kilowatt hours.
	A GWh is a measure of energy equal to 1000 megawatt hours.
Electrical Generation	The process of transforming other forms of energy into electrical energy. At Nova Scotia Power, this means using coal, oil, natural gas, diesel fuel, water or wind as fuel for the process to create electrical energy.
Feeder	An electric line for supplying electrical energy within an electric service area or subarea.

Heat Rate	A measure of the thermal efficiency of a generation station, generally expressed as Btu per net kWh. The lower the heat rate (the fewer Btu's required to produce a kilowatt hour of electricity), the more efficient the generating unit.
Line	A term used to describe a section of either distribution or transmission conductor, and its supporting hardware towers and insulators.
Load	See Demand.
Load Factor	The ratio of energy supplied during a given period to the maximum that could have been supplied had the peak load in that period been maintained in all hours.
Recloser	A heavy duty power switch capable of detecting abnormal power flows, then automatically opening and closing according to preset instructions.
Relay	A piece of equipment used to monitor quantities such as current, pressure, liquid levels, voltage or temperature and take action when these quantities are outside prescribed limits.
Substation	A facility for switching circuits and/or transforming electrical energy from one voltage to another.
Three Phase	Three separate conductors, each at the same nominal voltage, used to supply power primarily to large customers.
Transformer	An electromagnetic device for changing voltage from one level to another.
Transmission System	The facilities (i.e. lines, transformers, switches and substations) used to transmit electrical energy from the generating stations throughout the province and NB Power/NSPI interconnection to various parts of the transmission system, generally at voltages of 69 kV and higher.

7 NSPI 2011 QUICK REFERENCE SHEET

2011 AFUDC Rate 7.87%

2011 O/H Rates

Power Production		Customer Operations		Shared Services	
PP Regular	24.0%	Regular	77.2%	Regular	53.3%
Hydro	18.5%	Contract	23.5%		
Contractor	5.0%	Vehicle	50.7%		

8 2011 DEPRECIATION RATES (YEAR 3 of the PHASE-IN)

	2011
Steam Production Plant	
Lingan	
Lingan 1-2	2.14%
Lingan 3-4	2.18%
Lingan - Common	2.93%
Total Lingan	2.22%
Point Aconi 1	2.50%
Point Tupper	
Point Tupper 1	1.62%
Point Tupper 2	2.46%
Total Point Tupper	2.43%
Trenton	
Trenton 1-4	1.23%
Trenton 5	3.68%
Trenton 6	2.43%
Trenton - Common	2.64%
Total Trenton	2.62%
Tufts Cove	
Tufts Cove 1	2.78%
Tufts Cove 2	3.05%
Tufts Cove 3	2.80%
Tufts Cove - Common	3.73%
Total Tufts Cove	3.12%
General	3.49%
Total Steam Production Plant	2.50%

	2011
Hydraulic Production Plant	
Avon	1.89%
Bear River	1.35%
Black River	1.41%
Dickie Brook	2.09%
Fall River	1.54%
Harmony	2.49%
Lequille System	1.75%
Roseway	1.83%
St. Margaret's	2.00%
Sheet Harbor	2.13%
Tusket	1.75%
Wreck Cove System	1.31%
Annapolis Tidal	1.81%
General	1.94%
Total Hydraulic Production	**1.51%**
Other Production - Gas Turbines	
Burnside	1.84%
Tusket	5.50%
Victoria Junction	2.27%
Total Other Production - Gas Turbines	**2.47%**
LM6000	**3.33%**
Wind Turbines	**5.00%**
Transmission Plant	
Land Rights - Easements	1.21%
Station Equipment	2.51%
Towers & Fixtures	1.16%
Poles & Fixtures	3.31%
Overhead Conductors & Devices	2.18%
Underground Conduit	1.59%
Underground Conductors & Devices	2.64%
Roads, Trails & Bridges	1.47%
Transmission- Indirect Costs	2.71%
Transmission Net Salvage Allowance	$1,827,004
Total Transmission Plant	2.63%

	2011
Distribution Plant	
Land Rights - Easements, Surveys & Clearing	1.57%
Structures & Improvements	2.99%
Station Equipment	2.26%
Poles, Towers & Fixtures	3.07%
Overhead Conductors & Devices	3.26%
Underground Conduit	1.32%
Underground Conductors & Devices	2.32%
Line Transformers	4.69%
Services	2.78%
Meters	5.18%
Street Lighting & Signal Systems	4.55%
Distribution- Indirect Costs	4.18%
Distribution Net Salvage Allowance	$7,092,193
Total Distribution Plant	**4.11%**
General Plant	
Land Rights - General Plant	1.94%
Structures & improvements	2.60%
Office Furniture & Equipment	5.79%
Office Furniture & Equip - Comp Hardware	12.62%
Reserve Variance Amort - Comp Hardware	44,703
Office Furniture & Equip - Comp Software	12.98%
Transportation Equipment	14.45%
Stores Equipment	5.17%
Tools, Shop and Garage Equipment	4.78%
Laboratory Equipment	10.83%
Communication Equipment	4.62%
Communication Equipment - SCADA Eq	5.08%
Miscellaneous Equipment	5.42%
Roads, Bridges & Traps (Kelly Rock)	2.96%
Mining Equipment (Kelly Rock)	3.60%
General - Indirect Costs	8.48%
General Net Salvage Allowance	$(859,451)
Total General Plant	**8.04%**