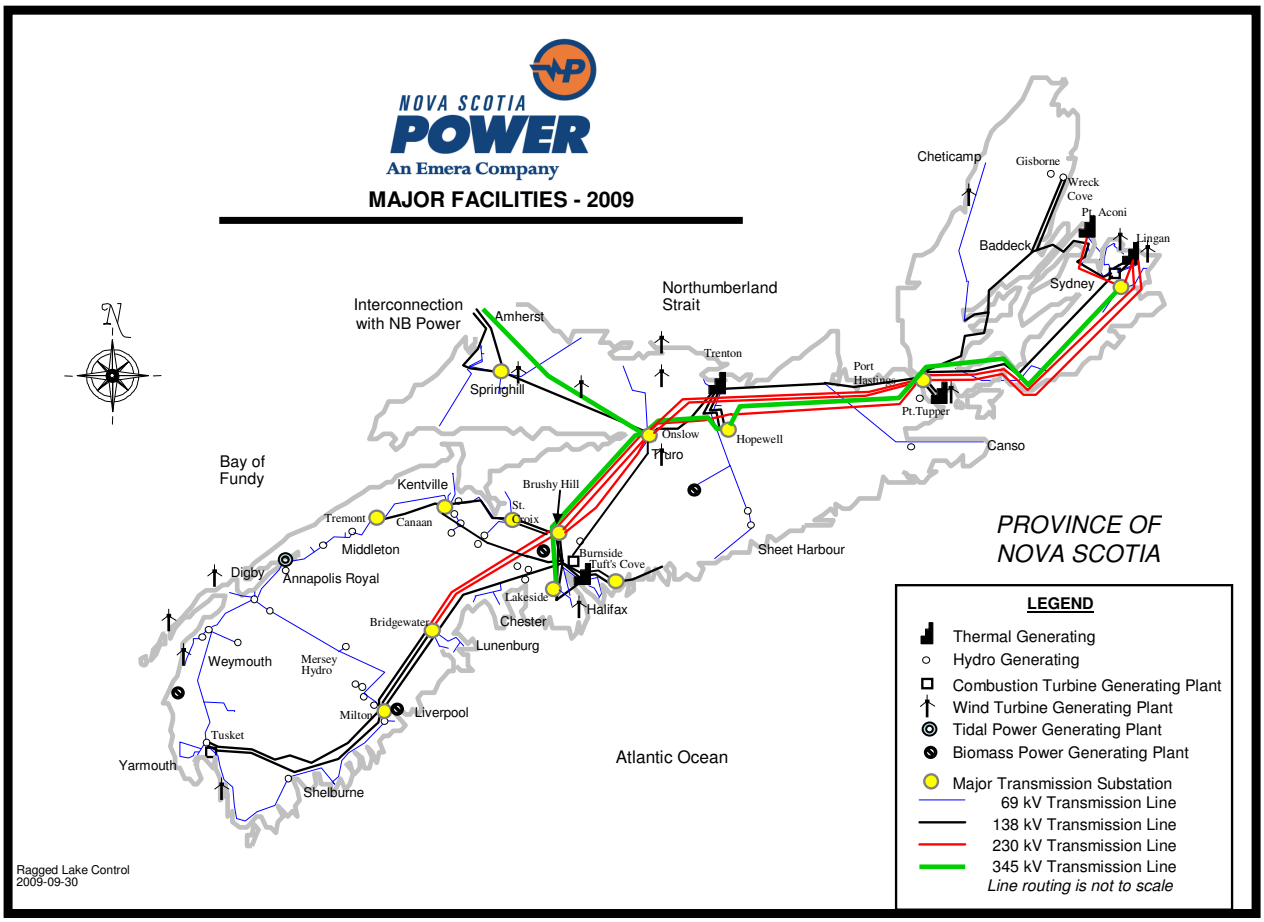
Nova Scotia Power Inc.
2010 Annual Capital Expenditure Plan



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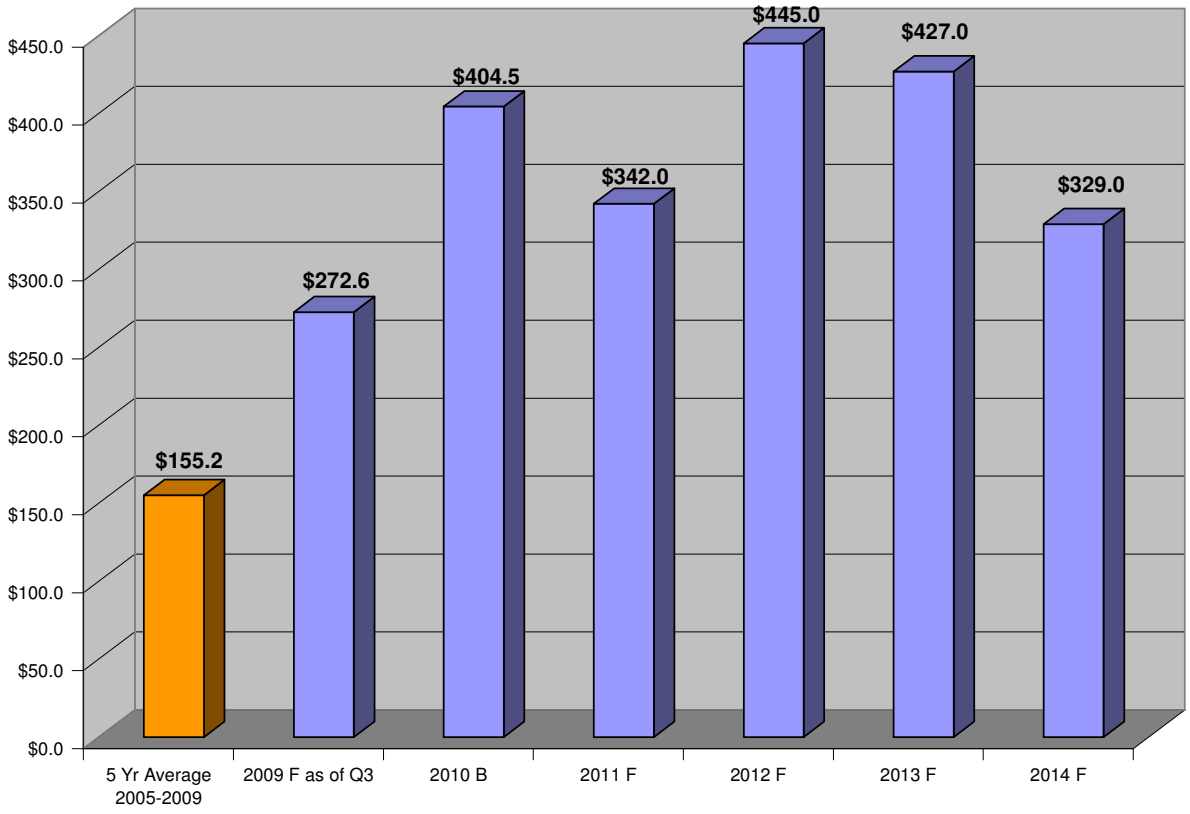
Annual Capital Expenditure Plan for 2010 to 2014

(*Millions of Dollars*)



Highlights of Nova Scotia Power Inc.'s 2010 to 2014 capital plan:

- The proposed capital budget for 2010 is $404.5M.
- New Capital items in 2010 submitted for approval in this ACE Plan total $137.7M. Detailed descriptions and justifications for each new item are included in this document, summarized by capital function. $92.1M of total new spending in 2010 is associated with projects whose total spending is in excess of $1.0M. These projects, though included for the Board's review in this document, will require individual approval by the UARB at the time they are brought forward for activation.
- Carryover projects comprise $203.0M of total spending in 2010. Three large multi year projects which have been approved by the Board constitute $170.2M of the carryover spending: TUC6 Waste Heat Recovery, FAC Space 2011 and the Nuttby Mountain Wind Project Development.
- Routine Capital spending represents $63.8M of total spending in 2010 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.

- 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.

- The 2010-2014 capital program reflects significant new investments in renewable generation, transmission system enhancements and improved service and reliability to meet the requirements of environmental regulation and customer expectations. The Company is investing in its assets to maintain, improve and optimize performance.

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

Projects at or Exceeding $1.0 Million
Requiring Nova Scotia UARB Approval in 2010
(Millions of Dollars)

		2010 Budget	Total Estimate	Page
New Items With Completion in 2010				
1.	28752 LM6000 - Overhaul Tuft's Cove #5 Engine	$1.5	$1.5	22
2.	38859 HYD Big Falls Headgate Replacement	4.3	4.3	24
3	28726 HYD - Carlton Lake Dams Refurbishment	2.7	2.7	25
4.	38834 TRE5 - Turbine Upgrades - LP/IP/HP	4.6	4.6	37
5.	37609 LIN - Unit 1 Rotor Rewind	3.5	3.5	38
6.	34062 TRE5 - Condenser Upgrades	3.0	3.0	39
7.	38942 TUC - Unit # 3 Generator Rotor Rewind	2.0	2.0	40
8.	38724 TRE5 - Superheater, Reheater and Boiler Upgrades	1.5	1.5	41
9.	36902 LIN1- ESP Gas Flow Modification	1.5	1.5	42
10.	38110 2010 Transmission Line Insulator Replacement	3.0	3.0	193
11.	38027 2010 Trans Switch & Breaker Upgrade	2.9	2.9	194
12.	38857 L7004 Deteriorated Replacements	2.2	2.2	195
13.	38266 2010 Protection Upgrades	2.1	2.1	196
14.	11004 Canaan Rd Circuit Breaker Additions	1.7	1.7	197
15.	38856 L7011 Deteriorated Replacements	1.6	1.6	198
16.	38878 2010 Substation Cutout and Insulator Replacements	1.5	1.5	199
17.	33504 Upgrade 69 kV Circuit to Pleasant Street L5536	1.4	1.4	200
18.	38122 2010 PCB Equipment Removal/Destruction	2.0	2.0	211
19.	38024 2010 Distribution Cutout Replacements	2.0	2.0	212
20.	38022 2010 Recloser Additions	1.4	1.4	213
21.	34602 25 kV Feeder Extension Bissett Road	1.0	1.0	214
22.	38062 2010 Off Road to Roadside	1.0	1.0	215
23.	34843 Oracle NLA License	1.0	1.0	239
24.	38852 Work Vehicle Replacement	6.1	6.1	253
	Total New Items With Completion in 2010	**55.6**	**55.6**	

Projects at or Exceeding $1.0 Million
Requiring Nova Scotia UARB Approval in 2010
(Millions of Dollars)

		2010 Budget	Total Estimate	Page
New Items With Subsequent Completion				
25.	38868 HYD Marshall Falls Hydro Station	1.8	13.0	26
26.	30954 LIN3-ESP Gas Flow Modification	0.6	1.5	48
27.	38944 LIN - Unit 2 Rotor Rewind	0.4	2.7	58
28.	33525 Canaan Rd 43V to Tremont 51V Line	14.1	15.0	190
29.	38732 1H Water St Replace 138 kV GIS	6.3	8.7	191
30.	38819 51V Tremont Circuit Breaker & Bus	3.9	7.2	192
31.	34622 Upgrade L-8002	1.2	1.7	201
32.	33624 Spare Generator Transformer	1.1	4.4	202
33.	38182 2010 Backup Control Centre	1.6	2.6	237
34.	34583 Transportation Vehicle Replacements	1.7	3.4	254
35.	34582 Class 3 Light Work Vehicles	1.1	1.2	255
36.	29009 Right of Way Purchase Northern NS	1.3	6.9	256
37.	33562 FAC Land Registration Act	0.3	1.9	259
38.	32304 AMI Hardware & Software Installation	0.1	30.8	261
	Total New Items With Subsequent Completion	**35.4**	**101.0**	
	Total Items Greater than $1 Million	**$90.2**	**$155.8**	

2010 Capital Spending by Justification Criteria

(Millions of Dollars)

Items in the 2010 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	2010 Budget
Distribution System**	$ 53.5
Thermal	97.2
Work Support**	31.7
Hydro	16.6
Health and Safety	6.0
Transmission Plant	59.1
Environmental	101.7
Metering Equipment	2.2
Facilites/Land and Right-of-Way	36.5
Total	$ 404.5

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

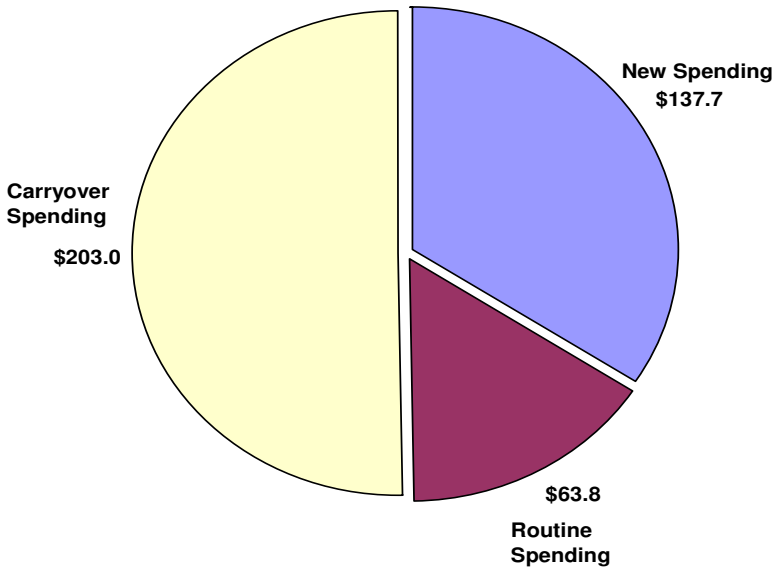
2010 Capital Spending by Justification Sub-Criteria

(Millions of Dollars)

Justification Sub-Criteria	2010 Budget
Distribution System	
Requirement to Serve	$ 34.7
Pole Strength	8.3
Joint Use	0.7
Deteriorated Conductor	0.6
Equipment Replacement	0.5
Outage Performance	0.2
Overloaded Equipment	2.2
System Protection	0.3
Other Distribution System	6.0
Total	**$ 53.5**
Work Support	
Buildings	$ 2.9
Telecommunications	1.8
Computers	12.8
Tools & Equipment	1.6
Vehicles	9.7
Equipment Replacement	1.3
Other	1.5
Total	**$ 31.7**

2010 Capital Spending by Category

(Millions of Dollars)



	Previous Spending	2010 Budget	Subsequent Spending Commitment	Total Estimated Commitment
New Items				
With 2010 Completion	-	$101.4	-	$101.4
With Subsequent Completion	-	36.3	$62.0	98.3
	-	$137.7	$62.0	$199.7
Carryover Items				
With 2010 completion	$134.5	$164.8	-	$299.3
With Subsequent Completion	36.2	38.2	$9.0	83.4
	$170.7	$203.0	$9.0	$382.7
Routine Items	-	$63.8	-	$63.8
Total	$170.7	$404.5	$71.0	$646.2

Please refer to category definitions on the following page.

Category Definitions

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

1. **New Items**

   This category includes new, non-routine items.

   A. New Items with 2010 Completion - This category includes all new, non-routine items scheduled to start and finish in 2010.

   B. New Items with Subsequent Completion - This category includes all new, non-routine items scheduled to start in 2010, but which will be completed beyond fiscal 2010.

2. **Carryover Items**

   This category includes items, which have been previously approved by the UARB, or have been filed and are pending approval by the current year end.

   A. Carryover Items with 2010 Completion - Includes items which will be completed during 2010.

   B. Carryover Items with Subsequent Completion - Includes items which will be completed beyond 2010.

3. **Routine Items**

   This category is for recurring annual 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.

Total Annual Capital Expenditures by Function

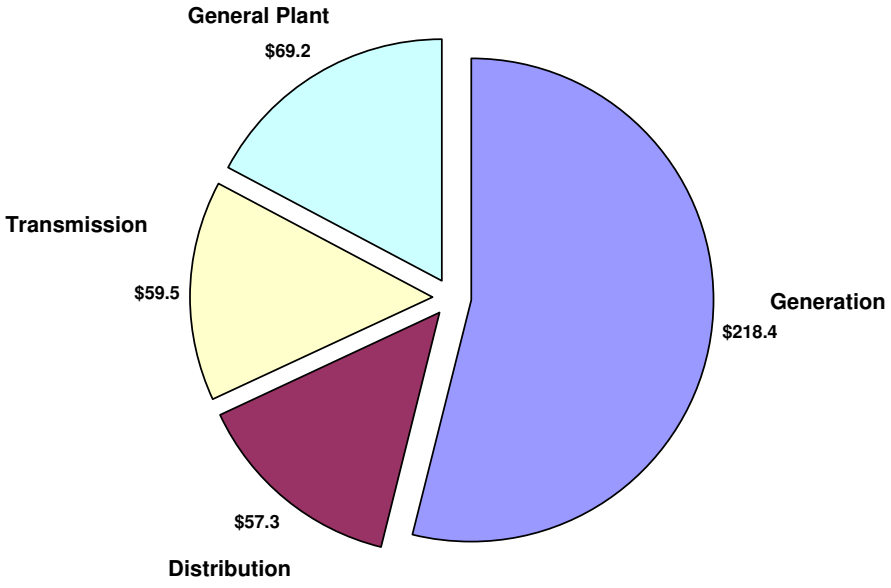
(Millions of Dollars)

	Actuals				Forecast	ACE Plan	Forecast			
	2005	2006	2007	2008	2009 (as of Q3)	2010	2011	2012	2013	2014
Generation	$51.4	$43.2	$47.2	$78.5	$153.6	**$218.4**	$183.0	$240.0	$252.0	$110.0
Transmission	7.2	9.2	19.4	18.0	24.1	**59.5**	61.0	118.0	100.0	144.0
Distribution	31.1	36.5	44.5	47.6	51.8	**57.3**	58.0	59.0	60.0	60.0
General Plant	11.2	20.5	14.5	23.2	43.1	**69.2**	40.0	28.0	15.0	15.0
Total	**$100.9**	**$109.4**	**$125.6**	**$167.3**	**$272.6**	**$404.5**	**$342.0**	**$445.0**	**$427.0**	**$329.0**

Please refer to function definitions on the following page.

2010 Capital Spending by Function

(Millions of Dollars)



Function Definitions

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 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 and the NB/NSPI interconnection throughout the province. Transmission includes energy transmitted at 69 kV level or higher.

Distribution Distribution includes replacement of and additions to equipment for delivering electrical 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, head office facilities and field building facilities.

2010 Routine Capital Spending by Function

This category includes recurring annual 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 2010 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. Please refer to function definitions on page 11.

Generation		
Generation Equipment Replacements	$	3,555,716
Generation Other Hydro		250,000
Generation Other Thermal		518,652
	$	4,324,368
Transmission		
Transmission Substation Replacement, Additions/Modifications	$	2,451,586
Primary Equipment Spares		128,053
Protection Modification & Replacement		712,220
Transmission Line Replacement, Additions/Modifications		5,474,078
	$	8,765,937
Distribution		
Meters	$	2,151,185
Distribution Upgrades and Replacement		17,334,753
New Customers		21,792,479
Joint Use		748,416
Right-of-Way Widening		740,833
	$	42,767,666
General Plant		
Work Vehicles	$	156,626
Tools and Test Equipment		1,772,685
Telecommunications		922,192
Computing Asset Management		2,388,473
Property Improvements and Furniture		1,425,000
Other		1,234,229
	$	7,899,205
Total 2010 Routine Capital Spending	**$**	**63,757,176**

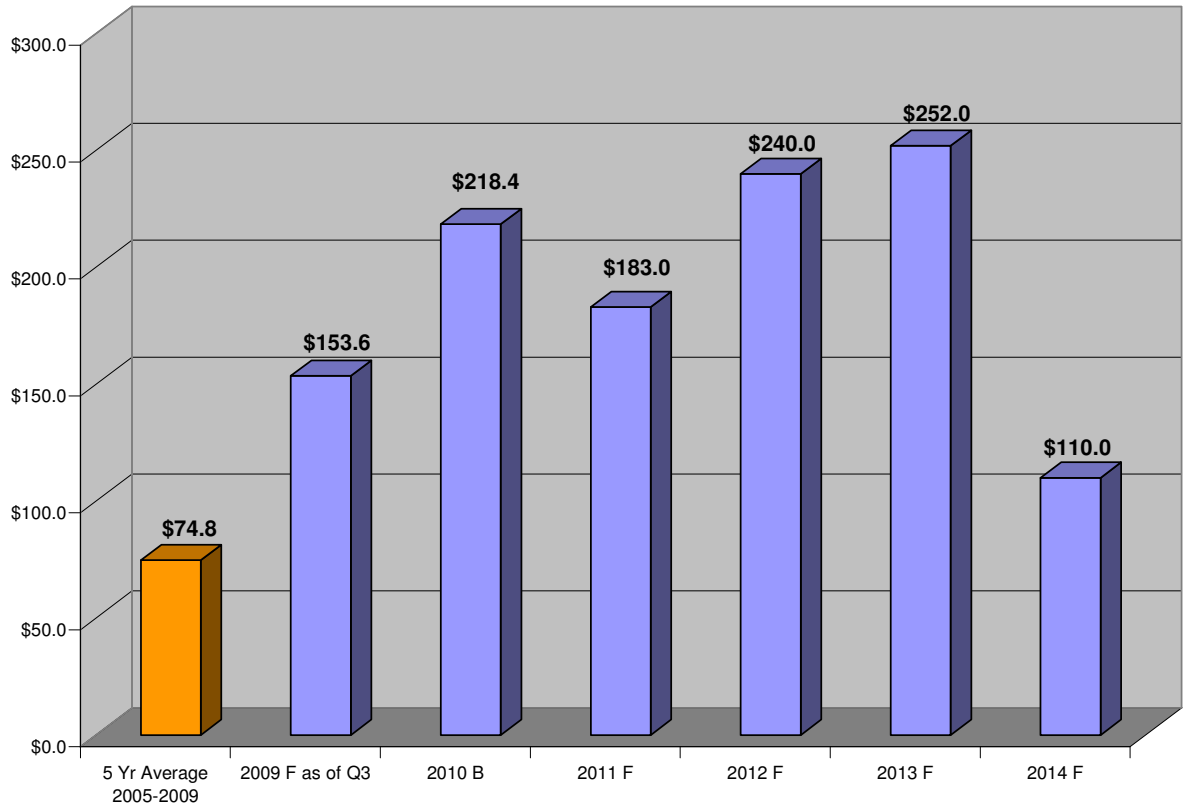
2009 ACE Items – Deferred / Cancelled

CI Number	Project Title	2009 ACE Project Total	
Generation			
28726	HYD Carleton Lake Dam Refurbishment This project has been deferred until 2010 as it is pending environmental permit approval from the Nova Scotia Department of Environment.	$2,270,919	Deferred
34062	TRE5 Condenser Upgrades Further evaluation of the project determined that it could be deferred to 2010.	1,948,668	Deferred
30802	POT Terminal Dust Mitigation Due to a revision to the project scope, this project has been deferred to 2010.	950,598	Deferred
20737	LIN Unit 2 Turbine L1 Dovetail Blade Refurbishment The most recent condition assessment and condition modeling indicates this project can be deferred to 2011 to coincide with the next planned major shutdown.	710,787	Deferred
28393	POT 2A Mill and Feeder Refurbishment Short term repairs have allowed for project deferrel to 2011	408,076	Deferred
33282	LIN - Superheater Header Vestibule. Further evaluation of this project determined that it could be deferred to 2011.	308,240	Deferred
30283	POT Tupper Marine Coal Terminal Vessel Access This project was approved in October 2009 and will be activated in 2010.	294,742	Deferred
30102	POT DCS Replacement Phase 1 Further evaluation of the project determined that it could be deferred to 2010.	921,996	Deferred
28790	POA Ash Cell Capping Cell 3 Stage 1 Further evaluation of the project determined that it could be deferred to 2011.	276,214	Deferred
32483	LIN3 Precipitator Upgrade This project has been cancelled as the scope of the project has been integrated into 2010 ACE Item CI 30954 - LIN3 ESP Gas Flow Modification.	275,174	Cancelled
32482	LIN2 Precipitator Upgrade This project has been cancelled as the scope of the project has been integrated into CI 38442 - Lin U&U Unit #2 ESP Flow Modification.	263,900	Cancelled
26472	TRE6A CW Pump Refurbishment Further evaluation of the project determined that it could be deferred to 2010.	222,765	Deferred
33362	LIN3 Econ. Outlet Duct Exp Joint Upon further inspection of the economizer duct and expansion joint, it was determined that the duct and expansion joint are structurally sound and replacement is not required.	198,054	Cancelled
32825	TUC Motor Refurbishment Program Further evaluation of the project determined that refurbishment of the motors could be deferred until 2010.	143,266	Deferred
30965	LIN Upgrade Precip. Hopper Rooms Upgrade of the hopper rooms will be completed as part of a larger project involving upgrades to the flyash transport system.	131,588	Cancelled
30623	LIN Replace Transport Air Compressor Further evaluation of this project determined it could be deferred until 2011.	131,013	Deferred
32824	TUC Piping Replacement Further evaluation of this project determined it could be deferred until 2010.	104,808	Deferred
30467	TUC 2009 Security Upgrades Security audits completed in 2009 resulted in changes to the project scope. Once the revised project scope has been determined a new project will be created.	99,890	Deferred

CI Number	Project Title	2009 ACE Project Total	
28747	TUC Unit#1 Cooling Water Intake Further evaluation of this project determined it could be deferred until 2011.	$88,173	Deferred
28694	TRE5 Pulverizer Damper Drive Access Further evaluation of the project determined that it could be deferred to 2010.	81,191	Deferred
31444	LIN2-Refurb Generator Hydrogen Oil In the process of completing work under CI 33662 - LIN2 Replace High Voltage Bushings, it was determined that no hydrogen leaks were evident and this project could be cancelled.	77,991	Cancelled
30945	LIN Crusher Chute Refurbishment Upon further examination, thickness of the chute was deemed to be acceptable and non destructive testing will be completed to determine when refurbishment will be required.	77,710	Cancelled
29104	POT Ash Cell Capping Cell B Further evaluation of this project determined it could be deferred until 2011.	65,567	Deferred
32829	TUC HVAC Upgrades Further evaluation of the project determined that it could be deferred to 2011.	56,912	Deferred
32823	TUC Breaker Replacement Further evaluation of this project determined that refurbishment of the breakers could be deferred until 2011.	47,652	Deferred
30465	TUC Unit #1 Closed Cooling Flow Cap Further evaluation of this project determined it could be deferred until 2011.	37,020	Deferred
Transmission			
33624	Spare Generator Transformer The tender specification for the transformer is now being developed. Preliminary leadtimes indicate earliest delivery is 2011. This item was filed with the Board on Nov 3,2009	$4,754,853	Deferred
33504	Upgrade 69 kV Circuit to Pleasant Street Further evaluation of the project determined that it could be deferred to 2010.	1,385,490	Deferred
33582	Canaan Road to Tremont - Right of Way Clearing NSPI determined that the right-of-way clearing could take place just prior to the actual transmission line construction. This work is now included in CI 33525 Canaan Rd 43V to Tremont 51V Line.	901,067	Cancelled
General Plant			
32304	AMI Hardware & Software Installation Further evaluation of this project determined that it needed to be deferred to 2010 due to changes in the smart grid and smart grid thinking.	$33,605,889	Deferred
29009	Right of Way Purchase Northern NS Further evaluation of the project determined that it could be deferred to 2010.	4,733,125	Deferred
33643	2009 Class 3 Light Work Vehicles The work associated with this project will be done under 2010 ACE Item CI 34582 Class 3 Light Work Vehicles.	521,457	Cancelled
33562	FAC Land Registration Act This item was deferred until 2010 due to changes to the project scope. This project is included as a new item in 2010 with a revised 2010 ACE amount	311,440	Deferred
32942	Purchase Spare 8600 Core Network Switch This work has been deferred due to NSPI relocating in 2011.	33,000	Deferred

Generation

(Millions of Dollars)



- The focus for generation capital in 2010 is sustaining the current asset base, air emission control upgrades and incremental generation expansion.

- Year 2010 generation capital is comprised of the following:
  - $ 57.7M New Items
  - $ 156.4M Carryover
  - $ 4.3M Routine spending

- Projects with total spending greater than $1.0M requiring UARB approval in 2010:

  - 38868 HYD Marshall Falls Hydro Station ($13.0M)
  - 38834 TRE5 – Turbine Upgrades – LP/IP/HP ($4.6M)
  - 38859 HYD Big Falls Headgate Replacement ($4.3M)
  - 37609 LIN – Unit 1 Rotor Rewind ($3.5M)
  - 34062 TRE5 – Condenser Upgrades ($3.0M)
  - 28726 HYD – Carlton Lake Dams Refurbishment ($2.7M)
  - 38944 LIN – Unit 2 Rotor Rewind ($2.7M)
  - 38942 TUC – Unit #3 Generator Rotor Rewind ($2.0M)
  - 38724 TRE5 – Superheater, Reheater, and Boiler Upgrades ($1.5M)
  - 36902 LIN1 – ESP Gas Flow Modification ($1.5M)
  - 30954 LIN3-ESP Gas Flow Modification ($1.5)
  - 28752 CT's – Overhaul #5 Engine ($1.3M)

Generation – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2010 Budget	Subsequent Spending	Total Estimate
Combustion Turbine								
G137	22374	CT'S Fuel Controller Replacement	2006/09	2010/07	$336,384	$143,753	$ -	$480,137
		Total Combustion Turbine			**$336,384**	**$143,753**	**$ -**	**$480,137**
Hydro								
	31244	HYD Paradise Wood Stave Pipeline Replacement	2009/10	2011/12	$2,317,014	$3,716,885	$5,128,763	$11,162,662
H555	33942	U&U Coon Pond Pipeline Replacement	2008/10	2010/11	462	2,159,299	-	2,159,761
H530	28570	HYD Hollow Bridge Generator Rewind	2007/10	2010/12	6,037	1,618,486	-	1,624,523
H521	10900	HYD DEB # 10 - Generator Rewind	2007/06	2010/12	458,202	718,674	-	1,176,876
H563	14361	HYD Soldiers Lake Dam Safety Refurbishment	2009/09	2010/08	178,901	552,507	-	731,408
H517	16374	HYD Gaspereau Dam Safety Remedial Works	2007/04	2011/12	3,957,111	485,320	2,456,555	6,898,986
	31225	HYD Weymouth Falls # 1 Runner	2009/12	2010/12	105,294	432,054	-	537,348
H508	28257	HYD Fall River Fish Diversions Screen	2007/03	2010/12	44,106	135,377	-	179,483
H547	28678	HYD Renewable In-Stream Tidal Generation Project	2008/09	2012/02	5,342,755	(484,709)	8,860	4,866,906
		Total Hydro			**$12,409,881**	**$9,333,893**	**$7,594,179**	**$29,337,953**
Steam								
S353	28098	TUC 6 Waste Heat Recovery	2008/07	2010/12	$38,665,304	$45,937,845	$ -	$84,603,150
S430	34223	POT Mercury Abatement Project	2009/05	2010/04	1,826,657	1,306,507	-	3,133,164
S251	28487	LIN Supplemental Water Supply	2007/04	2010/09	919,277	1,240,327	-	2,159,604
S432	34242	TRE Unit #6 Mercury Abatement	2009/05	2010/04	1,636,114	1,046,606	-	2,682,720
S428	34203	LIN Unit #3 Mercury Abatement Project	2009/04	2010/04	3,929,667	1,021,724	-	4,951,391
S429	34222	LIN Unit #4 Mercury Abatement Project	2009/05	2010/04	1,426,558	985,195	-	2,411,753
S431	34224	TRE Unit#5 Mercury Abatement Program	2009/05	2010/04	1,138,334	966,512	-	2,104,846
S427	34202	LIN Unit #2 Mercury Abatement	2009/05	2010/04	1,493,991	961,371	-	2,455,363
S426	34182	LIN Unit #1 Mercury Abatement Project	2009/05	2010/04	1,525,074	887,107	-	2,412,181
	38382	TUC U&U #3 Bus Duct Replacement (Generator) *	2009/09	2010/10	1,697,529	593,570	-	2,291,099
	30283	POT - Tupper Marine Coal Terminal Vessel Access	2009/02	2009/11	-	327,071	-	327,071
S473	25415	LIN1&2 Stack Breech Duct	2009/09	2010/06	104,005	191,317	-	295,322
S445	32582	POT Front Water Wall Panel Replacement	2009/04	2011/10	49,897	154,318	272,510	476,725
S255	25210	TRE5 Bag House Addition	2007/02	2010/02	28,335,320	150,000	-	28,485,320
	38929	POT - U&U E-Crane	2009/11	2010/04	14,186	131,086	-	145,271
S357	28853	TRE Storm Drainage Improvements	2008/11	2010/02	85,976	119,275	-	205,251
	28740	TUC Replacement of CEMS	2009/11	2010/03	114,280	32,257	-	146,537
S110	24743	POT Annunciator Replacement	2006/07	2010/10	59,932	10,000	-	69,932
		Total Steam			**$83,022,101**	**$56,062,088**	**$272,510**	**$139,356,698**
Wind								
	36882	Nuttby Mountain Wind Project Development	2009/12	2011/06	$25,620,278	$90,888,228	$ -	$116,508,507
		Total Wind			**$25,620,278**	**$90,888,228**	**$ -**	**$116,508,507**
		Total Generation Carryover Spending			**$121,388,645**	**$156,427,962**	**$7,866,688**	**$285,683,295**

Note 1: Project Listings are as of November 30, 2009

* Pending UARB Approval

Generation – New Item Spending

CI#	Project Title	2010 Budget	Project Total	Page
Gas Turbine Generation Plant				
28752	LM6000 - Overhaul Tuft's Cove #5 Engine	$1,486,230	$1,486,230	22
37983	CT'S - Replace AVR VJ 1&2	117,982	117,982	23
	Total Combustion New Spending	**$1,604,212**	**$1,604,212**	
Hydro				
38859	HYD Big Falls Headgate Replacement	$4,304,407	$4,304,407	24
28726	HYD - Carlton Lake Dam Refurbishment	2,716,723	2,716,723	25
38868	HYD Marshall Falls Hydro Station	1,801,524	13,000,000	26
16497	HYD Nictaux Electrical Refurbishment	662,935	662,935	27
16495	HYD White Rock Electrical Refurbishment	556,246	556,246	28
36868	HYD Lumsden Runner Replacement	114,580	442,031	29
38873	HYD - Fall Protection - Mersey Hydro System	104,453	104,453	30
38907	HYD Fall Protection - Fundy Hydro System	100,022	100,022	31
16387	HYD- Ruth Falls #3 Runner Replacement	89,221	415,773	32
38906	HYD Fall Protection - St. Margaret's Bay Hydro System	84,416	84,416	33
17853	HYD - STM-Sandy Lake #4 Runner Replacement	64,748	270,826	34
38905	HYD Fall Protection - Eastern Valley Hydro System	52,702	52,702	35
38904	HYD Fall Protection - Wreck Cove	27,016	27,016	36
	Total Hydro New Spending	**$10,678,993**	**$22,737,550**	
Steam				
38834	TRE5 - Turbine Upgrades - LP/IP/HP	$4,621,909	$4,621,909	37
37609	LIN - Unit #1 Rotor Rewind	3,493,019	3,493,019	38
34062	TRE5 - Condenser Upgrades	2,998,281	2,998,281	39
38942	TUC - Unit # 3 Generator Rotor Rewind	2,001,945	2,001,945	40
38724	TRE5 - Superheater, Reheater and Boiler Upgrades	1,549,614	1,549,614	41
36902	LIN1- ESP Gas Flow Modification	1,500,000	1,500,000	42
24509	TUC - Replace Unit #3 Turbine Supervisory	939,507	939,507	43
24722	LIN1-Turbine Supervisory Control Replacement	867,507	867,507	44
34702	LIN - Mill Component Replacement	764,089	764,089	45
30802	POT- Marine Terminal Dust Mitigation	746,743	746,743	46
37743	LIN1 - CW Large Bore Pipe Replacement	651,023	651,023	47
30954	LIN3-ESP Gas Flow Modification	573,642	1,473,990	48
38105	POT - CW Flow Improvements	536,451	536,451	49
34690	LIN - Boiler Feed Pump Rebuild	509,364	509,364	50
37542	TRE - Unit 1-4 Roof Replacement	503,980	503,980	51
38943	LIN1 - Boiler Refurbishment	501,583	501,583	52
38582	TRE6 - Airheater Refurbishment	501,532	501,532	53
37622	TRE - Facilities Improvement Project - Ph 4	499,499	499,499	54
34367	POA - 2010 Refractory Program	484,142	484,142	55
38723	TRE5 - Waterwall Panel Replacements	455,307	455,307	56
34504	TRE6 - Waterwall Panel Replacement	425,086	425,086	57

CI#	Project Title	2010 Budget	Project Total	Page
38944	LIN - Unit 2 Rotor Rewind	$423,521	$2,747,529	58
38603	TRE6 - LP Turbine Gland Replacement	403,980	403,980	59
38602	TRE - Fire System Upgrades	402,653	402,653	60
38728	TRE5 - Hot End Air Heater Basket and Seal Replacement	402,096	402,096	61
37563	TRE6 - Bottom Ash System Refurbishment	401,884	401,884	62
37834	TRE6 - Pulverizer Ductwork & Expansion Joint Replaceme	400,218	400,218	63
38843	TRE5 - FD Fan Refurbishments	399,173	399,173	64
38102	POT - Utilization of Heavy Biofuel Oil	397,966	397,966	65
28315	POA - Water Truck Replacement Project	389,050	389,050	66
38835	TRE5 - Air Register Upgrades	375,098	375,098	67
30082	POT - Develop New Ash Cells at Bearhead Ash Site	374,441	374,441	68
38103	POT - Wastewater Cell Refurbishment	337,350	337,350	69
28645	TRE6 - Turbine Controls Power Supplies Upgrades	331,974	331,974	70
32963	TUC2 Replace Condenser Vacuum Pump	331,764	331,764	71
35083	LIN 2010 Ash Site Sealing and Capping	298,795	298,795	72
38846	LIN1 - Fire Protection / Turbine Hall Sprinkler System	293,207	293,207	73
38945	LIN1 - #8 Nozzle Replacement	290,174	290,174	74
26025	POT - ID Cladding Replacement	281,345	281,345	75
38622	TRE6 - Pulverizer Refurbishment	279,088	279,088	76
30386	POT - West CW Pump Refurbishment	266,816	266,816	77
26472	TRE - 6A CW Pump Refurbishment	262,674	262,674	78
36602	LIN1 - Battery & Charger Replacement	259,217	259,217	80
38895	POT - Plant Improvements	258,694	258,694	81
37744	LIN - CW Screen Refurbishment	255,014	255,014	82
34502	TRE - Asbestos Abatement 2010	253,199	253,199	83
22467	POT - Condenser Waterbox Replacement	250,497	250,497	84
36622	LIN - 4160V and 575V Breakers	248,848	248,848	85
38946	LIN1 - Replace High Voltage Bushings	248,637	248,637	86
38104	POT - Coal Nozzle Standardization	244,471	244,471	87
38729	TRE5 - Replace Demin and Reserve Feedwater Tanks	240,000	240,000	88
38910	LIN - Fall Protection	239,260	239,260	89
36802	LIN1 - ESP Outlet Duct Expansion Joint	237,751	237,751	90
22461	POT - Condenser Outlet Valve Replacement	233,976	233,976	91
37643	TRE5 - Reclaim Feeder Upgrades	227,322	227,322	92
37610	LIN - Common Water Upgrades	205,184	205,184	93
36586	POA - Limestone Piping Replacement	203,730	203,730	94
34484	TUC- Asbestos Abatement 2010	200,672	200,672	95
22954	TRE5 - Bottom Ash / Boiler Seal Replacement	200,583	200,583	96
38844	TRE5 - CW Pump House Structural Steel Upgrades	199,777	199,777	97
33162	POT - Replace HVAC units	197,806	197,806	98
37862	POT-Upgrade Bus Duct	191,622	191,622	99
34505	TRE - 6B Vacuum Pump Overhaul	185,504	185,504	100
37885	POT - Lubrication and Chemical Storage Facility	185,128	185,128	101
32504	LIN - Control Room HVAC Upgrades	180,368	180,368	102
38881	TRE5 - Pulverizer Refurbishment	177,890	177,890	103
31543	LIN - Boiler House Improvements	173,641	173,641	104
36522	POT - Replace Turbine Oil Relay Studs	164,464	164,464	105
38883	TRE - DCMS Upgrade - Phase 2	162,117	162,117	106
28128	LIN - Replace Main BFP Dischare Check Valves	160,092	160,092	107
37562	TRE5 - Bunker C Pump Replacement	160,000	160,000	108
38830	TRE5 - 4kV Motor Refurbishment	159,719	159,719	109
36624	LIN - 4160 Motor Refurbishment	154,517	154,517	110

CI#	Project Title	2010 Budget	Project Total	Page
28666	TRE - 6B BFP Volute Refurbishment	$153,177	$153,177	111
32824	TUC - Piping Replacement	151,580	151,580	112
38731	TRE - High Pressure Piping Upgrades	151,105	151,105	113
38662	TRE - Plant Lighting Replacement and Upgrades	150,829	150,829	114
38836	TRE5 - 5-1 CW Screen Upgrade	150,304	150,304	115
37582	TRE - HVAC Replacements	145,663	145,663	116
34507	TRE - 5D Belt Replacement	140,677	140,677	117
30387	POT - East CW Pump Bearing Upgrade	137,190	137,190	118
34368	POA - Screw Cooler Rotor Replacement Program	136,618	136,618	119
38725	TRE5 - Refurbish Light Oil Tanks and Lines	134,835	134,835	120
38894	TRE - Fall Protection	132,922	132,922	121
38851	LIN - Coal Belt Sampler	132,053	132,053	122
22426	TRE - 5-2 Air Heater Outlet Expansion Joint Replacement	131,615	131,615	123
28685	TRE5 - Actuator Upgrade	128,117	128,117	125
38937	POT - HFO Dyke Enlargement	127,644	127,644	126
28747	TUC - Refurbish Cooling Water Intake Structures	125,903	125,903	127
32583	POT - Upgrade Oil Guns	123,708	123,708	128
37644	TRE - Coal Conveyor Scraper Upgrade	120,498	120,498	129
28738	TUC - Waste Water Lagoon Enhancement	119,038	119,038	130
37945	TUC - Condensor Tube Sheet Protection	117,005	117,005	131
28300	POT - Actuator Replacement Program	114,485	114,485	132
34506	TRE - Ash Site Management	113,560	113,560	133
38109	POT - Sootblower Upgrades	109,491	109,491	134
28694	TRE5 - Pulverizer PA Damper Drive Upgrades	108,970	108,970	135
37884	POT - Fly Ash Inlet Valve Assembly Replacements	108,947	108,947	136
30462	TUC- Oil Tank Protective Coating	105,939	105,939	137
37886	POT - Coal Site Drainage Modifications	105,608	105,608	138
34545	POT - 2010 Asbestos Abatement	103,470	103,470	139
28818	TRE5 - Pulverizer Reject System Improvements	102,065	102,065	140
38882	TRE - Water Treatment Plant Improvements	101,604	101,604	141
36803	LIN- Fire System Electrical Panel Upgrades	101,520	101,520	142
36742	LIN- Replace F1 Belt	101,406	101,406	143
37943	TUC - Replace High Cycle Valves	100,944	100,944	144
38730	TRE - Transformer Compound Sprinker System Upgrade	100,088	100,088	145
37662	TRE6 - CW Outlet Oil Boom	98,252	98,252	146
38911	TUC - Fall Protection	95,704	95,704	147
30182	POT - SSC Refurbishment	93,826	93,826	148
31362	POA - Station Air Compressor Rebuild	92,406	92,406	149
31722	POA - Coal Receiving Area Re-Paving	92,096	92,096	150
24737	POT - Breaker and Switch Gear Upgrades	89,489	89,489	151
30422	POA - Frontwall Feed Pipe Replacement Program	88,656	88,656	152
38854	TUC - Thermal Fleet Licensing for PRiSM	88,075	88,075	153
28699	TRE6 - Pulveriser Grease Collection System Upgrade	85,842	85,842	155
36763	LIN - Laffin Brook Culvert Upgrade	82,308	82,308	156
37103	LIN - Fire System Valve Replacement	82,252	82,252	157
37612	LIN - Polisher Resin Replacement	80,876	80,876	158
32825	TUC - Motor Refurbishment Program	78,415	78,415	159
37403	POT - Refurbish HP Heater Valves	67,935	67,935	160
24505	TUC - Update 4 Plant Air Compressors	63,565	63,565	161
37882	POT - Install Contractor office, Lunchroom, and Washroom	61,281	61,281	162
37645	TRE - 4kV Breakers	60,398	60,398	163
38877	TRE- Thermal Fleet Licensing for PRiSM	58,717	58,717	164

CI#	Project Title	2010 Budget	Project Total	Page
36564	POA - HVAC Replacement	$56,071	$56,071	166
34543	POT - Reheater	54,167	54,167	167
38912	POA - Fall Protection	53,169	53,169	168
38913	POT- Fall Protection	53,169	53,169	169
34542	POT - Superheater	53,099	53,099	170
37883	TUC - Automate Breaker Closures	52,742	52,742	171
36567	POA - Aux Boiler Controls Upgrade	52,057	52,057	172
38917	POA - C4 Conveyor Belt Replacement	50,232	50,232	173
34384	POA - 4kV Motor Refurbishment Program	48,380	48,380	174
36963	TUC - #3 South Drum Safety Valve Replacement	45,291	45,291	175
37262	POA - Elevator Controls Upgrade	40,955	40,955	176
37422	POA - Bottom Ash Drag Chain Replacement Program	40,779	40,779	177
34369	POA - Polisher Resin Replacement	40,324	40,324	178
37606	LIN - Generator Diesel Fuel Tank	37,769	37,769	179
36563	POA - 4kV Breaker Refurbishment	36,444	36,444	180
37922	POA - NERC CIP Sercurity Upgrades	34,665	34,665	181
36587	POA - Dissolved O2 Analyzer Replacements	30,441	30,441	182
38879	POT - Thermal Fleet Licensing for PRiSM	29,358	29,358	183
38880	LIN -Thermal Fleet Licensing for PRiSM	29,358	29,358	185
	Total Steam New Spending	**$45,414,331**	**$48,638,687**	
	Total Generation New Spending	**$57,697,536**	**$72,980,449**	

Pt. Aconi – New Item Spending

CI #	Project Title	2010 Budget	Project Total	Page
34367	POA - 2010 Refractory Program	$484,142	$484,142	55
28315	POA - Water Truck Replacement Project	389,050	389,050	66
36586	POA - Limestone Piping Replacement	203,730	203,730	94
34368	POA - Screw Cooler Rotor Replacement Program	136,618	136,618	119
31362	POA - Station Air Compressor Rebuild	92,406	92,406	149
31722	POA - Coal Receiving Area Re-Paving	92,096	92,096	150
30422	POA - Frontwall Feed Pipe Replacement Program	88,656	88,656	152
36564	POA - HVAC Replacement	56,071	56,071	166
38912	POA - Fall Protection	53,169	53,169	168
36567	POA - Aux Boiler Controls Upgrade	52,057	52,057	172
38917	POA - C4 Conveyor Belt Replacement	50,232	50,232	173
34384	POA - 4KV Motor Refurbishment Program	48,380	48,380	174
37262	POA - Elevator Controls Upgrade	40,955	40,955	176
37422	POA - Bottom Ash Drag Chain Replacement Program	40,779	40,779	177
34369	POA - Polisher Resin Replacement	40,324	40,324	178
36563	POA - 4kV Breaker Refurbishment	36,444	36,444	180
37922	POA - NERC CIP Sercurity Upgrades	34,665	34,665	181
36587	POA - Dissolved O2 Analyzer Replacements	30,441	30,441	182
	Total Pt. Aconi New Spending	**$1,970,215**	**$1,970,215**	
	Pt. Aconi Carryover Spending	**-**	**-**	
	Pt. Aconi Routine Spending	**$398,591**	**$398,591**	
	Total Pt. Aconi Capital Spending	**$2,368,806**	**$2,368,806**	

CI Number: 28752

Title: LM6000 - Overhaul Tuft's Cove #5 Engine

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $1,486,230

DESCRIPTION:

This project is based on two objectives:

The first is to implement comprehensive service bulletins - safety and design improvements recommended by the Original Equipment Manufacturer (OEM).

The second involves completing a required hot section overhaul (engine refurbishment) in 2010 based on OEM criteria. The most critical service bulletin calls for the replacement of the Inlet Gear Box assembly (IGB) to address an equipment design issue causing the input spline to wear prematurely during start-ups. The hot section overhaul will be performed as recommended for the running hours of the engine and the number of starts.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The service bulletin indicates that several LM6000 Gas Turbine Engines have experienced unscheduled removal and "depot"(off site) repair due to spline wear on the IGB horizontal shaft. This condition can lead to a disengagement of the IGB from the high pressure compressor rotor shaft, resulting in high core speed on start-up, fluctuating core speed at power, and an inability to re-start the gas turbine following a shut-down. By delaying this project the risk of unplanned failure and extensive damage is considered high, as the unit is expected to reach its maximum allowable hours late in 2010.

Why do this project now?

Delaying this project increases the risk of unplanned failure and extensive damage. This project is required to avoid the risk of unplanned failure and extensive damage to this unit. In 2009 a similar engine (TUC#4) was overhauled and the wear on the components relating to SB220 confirmed that the need to perform this work on Unit #5 in 2010.

Why do this project this way?

The need for repair is based on OEM recommendations. These repairs have been successfully completed on similar units. By performing the work in 2010 during the commissioning of TUC#6, replacement energy costs would be minimized.

CI Number: 37983

Title: CT'S - Replace AVR VJ 1&2

Start Date: 2010/05

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $117,982

DESCRIPTION:

This project upgrades and modernizes one of the Automatic Voltage Regulators (AVR) on Units #1 and #2 of the Victoria Junction combustion turbines.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The existing Automatic Voltage Regulation (AVR) systems are over thirty years old and are becoming unreliable. A failure poses risks to power system reliability in that if failure occurs, it could result in a temporary loss of generation capacity (of approximately 30 MW), reserve loss, and a loss in black-start capabilities (the ability to start without an external source of power). Replacement with modern components will reduce the risk of such a turbine outage.

Why do this project now?

The AVR's have now reached the end of their useful life.

Why do this project this way?

The recommended upgrade is the lowest cost alternative based on research and review with various suppliers.

CI Number: 38859

Title: HYD Big Falls Headgate Replacement

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $4,304,407

DESCRIPTION:

The scope of this project includes the replacement of the headgates and intake structure at the Big Falls Generating Station on the Mersey Hydro system.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Equipment Replacement

Why do this project?

The existing headgates in the Big Falls powerhouse are not capable of closing under full flow conditions. The wicket gates in the Big Falls powerhouse, which are the primary means of controlling water flow to the turbines, cannot be reliably closed due to the deteriorated condition of the surrounding concrete in the powerhouse. This could lead to an uncontrolled release of the reservoir.

Why do this project now?

A recent structural inspection shows the concrete in this structure is suffering from the effects of alkali-aggregate reactivity (AAR). AAR causes concrete to swell and prematurely degrade. This causes relative displacements within the concrete structure which affects any mechanical equipment embedded or attached to the concrete. At Big Falls, the concrete displacement is large enough that the cast iron stay vanes have broken and the wicket gates have a history of being difficult to close.

Why do this project this way?

Replacement of the headgates and the intake structure at the Big Falls Generating Station is the only solution to ensure the headgates are capable of automatically closing under full flow conditions.

CI Number: 28726

Title: HYD - Carlton Lake Dam Refurbishment

Start Date: 2010/06

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $2,716,723

DESCRIPTION:

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

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Maintenance

Why do this project?

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

Why do this project now?

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

Why do this project this way?

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

CI Number: 38868

Title: HYD Marshall Falls Hydro Station

Start Date: 2010/05

Final Cost Date: 2012/12

Function: Generation

Forecast Amount: $13,000,000

DESCRIPTION:

This item pertains to a new hydro plant development at the existing Marshall Falls dam. It includes the preparation of the technical specifications for the mechanical equipment and covers the detailed civil, structural design and construction.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Capacity

Why do this project?

This project provides new renewable energy to NSPI in pursuit of compliance with the Renewable Energy Standard (RES).

Why do this project now?

The 2009 Integrated Resource Plan (IRP) update has confirmed this project included in the lowest cost generation plan and is scheduled for completion in 2012.

Why do this project this way?

The existing Marshall Falls dam is used to store water for later release to the existing downstream developments at Malay Falls and Ruth Falls. The addition of a powerhouse at the existing Marshall Falls dam will take advantage of these existing flow releases with minimal impact on the environment as most of the infrastructure required for this development is already in place to support this project.

CI Number: 16497

Title: HYD Nictaux Electrical Refurbishment

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $662,935

DESCRIPTION:

This project consists of replacing the existing 56 year old medium voltage switchgear at the Nictaux powerhouse.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Equipment Replacement

Why do this project?

A condition and risk assessment of the medium voltage switchgear at the Nictaux powerhouse was completed. The assessment revealed the existing oil-filled circuit breakers, power cables, control relays, protective relays, and voltage regulators are obsolete and have reached the end of their useful life.

Why do this project now?

This equipment has reached the end of its useful life. Failure of the switchgear or protective relays under fault conditions could present a risk of damage to the physical plant. This could also expose the hydro turbine generator to potential damage.

Why do this project this way?

Replacing equipment of this vintage with modern electrical equipment is standard industry practice.

CI Number: 16495

Title: HYD White Rock Electrical Refurbishment

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $556,246

DESCRIPTION:

This project consists of replacing the existing 56 year old medium voltage switchgear at the White Rock powerhouse.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Equipment Replacement

Why do this project?

A condition and risk assessment of the medium voltage switchgear at the White Rock powerhouse was completed. The assessment revealed the existing oil-filled circuit breakers, power cables, control relays, protective relays, and voltage regulators are obsolete and have reached the end of their useful life.

Why do this project now?

This equipment has reached the end of its useful life. Failure of the switchgear or protective relays under fault conditions could present a risk of damage to the physical plant. This could also expose the hydro turbine generator to potential damage.

Why do this project this way?

Replacing equipment of this vintage with modern electrical equipment is standard industry practice.

CI Number: 36868

Title: HYD Lumsden Runner Replacement

Start Date: 2010/04

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $442,031

DESCRIPTION:

This project consists of replacing the existing Francis runner at the Lumsden powerhouse.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: System Design

Sub Criteria: Equipment Replacement

Why do this project?

The runner at Lumsden has a history of cavitation. A detailed inspection of the runner in February 2009 revealed the runner is in poor condition; with extensive evidence of cavitation throughout. In some areas, the evidence of cavitation extends more than half way through the thickness of the blades.

Why do this project now?

Industry experience demonstrates that there is potential risk to the unit as a result of cracked runner buckets breaking off and damaging the wicket gates. This results in a loss of control of the water flow through the turbines.

Why do this project this way?

The runner at the Lumsden powerhouse has a history of cavitation. Based on the results of a detailed inspection in February 2009, the runner is past the point of repairing by welding. Replacing the runner with a modern cavitation-resistant design is the most practical solution.

CI Number: 38873

Title: HYD - Fall Protection - Mersey Hydro System

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $104,453

DESCRIPTION:

The work associated with this project will repair "Hazard Class 1" and "Hazard Class 2" locations as identified in the survey completed by a consultant in 2009.

Summary of Related CI's +/- 2 years:
2010 - 38907 HYD Fall Protection - Fundy Hydro System $100,022
2010 - 38906 HYD Fall Protection - St. Margaret's Bay Hydro System $84,416
2010 - 38905 HYD Fall Protection - Eastern Valley Hydro System $52,702
2010 - 38904 HYD Fall Protection - Wreck Cove Hydro System $27,016

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

This project will address Hazard Class 1 and Hazard Class 2 areas with identified potential fall hazards as per the survey completed by a consultant in 2009. The survey was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI conducted a fall protection survey to ensure compliance with applicable fall protection guidelines.

Why do this project now?

The survey included all areas of the facilities that may be considered to have potential for fall issues. This work order includes the materials, labour, and contracts to address the Hazard Class 1 and Hazard Class 2 locations.

Why do this project this way?

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

CI Number: 38907

Title: HYD Fall Protection - Fundy Hydro System

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $100,022

DESCRIPTION:

The work associated with this project will repair "Hazard Class 1" and "Hazard Class 2" locations as identified in the survey completed by a consultant in 2009.

Summary of Related CI's +/- 2 years:
2010 - 38873 HYD Fall Protection - Mersey Hydro System $104,453
2010 - 38906 HYD Fall Protection - St. Margaret's Bay Hydro System $84,416
2010 - 38905 HYD Fall Protection - Eastern Valley Hydro System $52,702
2010 - 38904 HYD Fall Protection - Wreck Cove Hydro System $27,016

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

This project will address Hazard Class 1 and Hazard Class 2 areas with identified potential fall hazards as per the survey completed by a consultant in 2009. The survey was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI conducted a fall protection survey to ensure compliance with applicable fall protection guidelines.

Why do this project now?

The survey included all areas of the facilities that may be considered to have potential for fall issues. This work order includes the materials, labour, and contracts to address the Hazard Class 1 and Hazard Class 2 locations.

Why do this project this way?

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

CI Number: 16387

Title: HYD- Ruth Falls #3 Runner Replacement

Start Date: 2010/05

Final Cost Date: 2011/11

Function: Generation

Forecast Amount: $415,773

DESCRIPTION:

This project consists of replacing the existing Francis runner in the Ruth Falls #3 Unit.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Hydro

Sub Criteria: Equipment Replacement

Why do this project?

Inspection of the runner at the Ruth Falls #3 Unit revealed the runner is showing indications of cracking. Cracks in this runner were last repaired in December 2007, but an inspection in June 2009 revealed new cracks had developed subsequent to these previous repairs.

Why do this project now?

Industry experience has demonstrated that there is risk to the unit resulting from cracked runner buckets breaking off and damaging the wicket gates, resulting in a loss of control of the water flow through the turbines.

Why do this project this way?

The runner at the Ruth Falls #3 Unit has a history of cracking due to its design and age. Replacement of the runner with a modern crack-resistant design is the most practical solution.

CI Number: 38906

Title: HYD Fall Protection - St. Margaret's Bay Hydro System

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $84,416

DESCRIPTION:

The work associated with this project will repair "Hazard Class 1" and "Hazard Class 2" locations as identified in the survey completed by a consultant in 2009.

Summary of Related CI's +/- 2 years:
2010 - 38873 HYD Fall Protection - Mersey Hydro System $104,453
2010 - 38907 HYD Fall Protection - Fundy Hydro System $100,022
2010 - 38905 HYD Fall Protection - Eastern Valley Hydro System $52,702
2010 - 38904 HYD Fall Protection - Wreck Cove Hydro System $27,016

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

This project will address Hazard Class 1 and Hazard Class 2 areas with identified potential fall hazards as per the survey completed by a consultant in 2009. The survey was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI conducted a fall protection survey to ensure compliance with applicable fall protection guidelines.

Why do this project now?

The survey included all areas of the facilities that may be considered to have potential for fall issues. This work order includes the materials, labour, and contracts to address the Hazard Class 1 and Hazard Class 2 locations.

Why do this project this way?

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

CI Number: 17853

Title: HYD - STM-Sandy Lake #4 Runner Replacement

Start Date: 2010/06

Final Cost Date: 2011/11

Function: Generation

Forecast Amount: $270,826

DESCRIPTION:

This project consists of replacing the existing Francis runner in the Sandy Lake #4 Unit.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Hydro

Why do this project?

The runner at the Sandy Lake #4 Unit has a history of cracking problems. Cracks in the runner have been repaired on numerous occasions. This runner continues to develop new cracks.

Why do this project now?

Cracked runner buckets breaking off and damaging the wicket gates results in a loss of control of the water flow through the turbines.

Why do this project this way?

The runner at the Sandy Lake #4 Unit has a history of cracking. Replacement of the runner with a modern crack-resistant design is the only practical solution.

CI Number: 38905

Title: HYD Fall Protection - Eastern Valley Hydro System

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $52,702

DESCRIPTION:

The work associated with this project will repair "Hazard Class 1" and "Hazard Class 2" locations as identified in the survey completed by a consultant in 2009.

Summary of Related CI's +/- 2 years:
2010 - 38873 HYD Fall Protection - Mersey Hydro System $104,453
2010 - 38907 HYD Fall Protection - Fundy Hydro System $100,022
2010 - 38906 HYD Fall Protection - St. Margaret's Bay Hydro System $84,416
2010 - 38904 HYD Fall Protection - Wreck Cove Hydro System $27,016

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

This project will address Hazard Class 1 and Hazard Class 2 areas with identified potential fall hazards as per the survey completed by a consultant in 2009. The survey was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI conducted a fall protection survey to ensure compliance with applicable fall protection guidelines.

Why do this project now?

The Fall Protection Survey was completed by a consultant. The survey included all areas of the facilities that may be considered to have potential for fall issues. This work order includes the materials, labour, and contracts to address the Hazard Class 1 and Hazard Class 2 locations.

Why do this project this way?

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

CI Number: 38904

Title: HYD Fall Protection – Wreck Cove

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $27,016

DESCRIPTION:

The work associated with this project will repair "Hazard Class 1" and "Hazard Class 2" locations as identified in the survey completed by a consultant in 2009.

Summary of Related CI's +/- 2 years:
2010 - 38873 HYD Fall Protection - Mersey Hydro System $104,453
2010 - 38907 HYD Fall Protection - Fundy Hydro System $100,022
2010 - 38906 HYD Fall Protection - St. Margaret's Bay Hydro System $84,416
2010 - 38905 HYD Fall Protection - Eastern Valley Hydro System $52,702

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

This project will address Hazard Class 1 and Hazard Class 2 areas with identified potential fall hazards as per the survey completed by a consultant in 2009. The survey was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI conducted a fall protection survey to ensure compliance with applicable fall protection guidelines.

Why do this project now?

The Fall Protection Survey was completed by a consultant. The survey included all areas of the facilities that may be considered to have potential for fall issues. This work order includes the materials, labour, and contracts to address the Hazard Class 1 and Hazard Class 2 locations.

Why do this project this way?

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

CI Number: 38834

Title: TRE5 - Turbine Upgrades - LP/IP/HP

Start Date: 2010/04

Final Cost Date: 2010/06

Function: Generation

Forecast Amount: $4,621,909

DESCRIPTION:

Trenton #5 turbine consists of high pressure (HP), intermediate pressure (IP) and low pressure (LP) cylinders which transmit the energy from the high pressure/high temperature steam received from #5 boiler to mechanical energy which rotates #5 generator resulting in the production of electrical energy. The HP and IP turbine sections are affected over time by solid particle erosion (due to contaminants in the steam) and creep damage (due to continuous operation at high temperature). Likewise, the LP turbine sections are subjected to water droplet erosion and over time, the turbine components require replacement to restore them to OEM (Original Equipment Manufacturer) specifications. These component replacements will ensure continued reliable operation of the Trenton #5 turbine/generator.

Summary of Related CI's +/- 2 years:
2009 - 21096 IP Turbine Gland & Bolting - $339,397

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

During the 2009 Trenton #5 shutdown, the OEM recommended replacement of the IP rotor impulse row of blades because of wear from solid particle erosion. The blades are configured in packets of five blades with each blade having a tenon at the end which is welded to a shroud that attaches to the five blades in the packet. Because of a delivery time of 28-30 weeks for replacement blades, a temporary weld repair was completed to allow a planned blading replacement in 2010. Because of the outage time required to complete this work, the opportunity will be used to complete other OEM recommended work (HP impulse blading replacement, HP cylinder seal replacement, HP Cylinder fastener replacement, HP Gland replacement, HP Coupling machining for patch plate, IP spring back seal replacements, IP patch plate manufacture and installation, IP Dummy Piston Seal replacements, IP Rotor Remnant Life assessment investigation, IP Row13 closing pocket replacement, IP Row21 Last Stage Blade erosion shield replacements, LP Row 7 LH&RH Last Stage Blade erosion shield replacements, LP Bearing modification and replacement, Reheat Steam Chest fastener replacement and Reheat valve component replacement).

Why do this project now?

Delaying the project beyond 2010 increases the risk of a shroud failure, which could result in an unplanned unit outage of significant duration. The OEM has confirmed that the weld repair completed in 2009 is a short-term repair until replacement blades are received in 2010.

Why do this project this way?

The project should be completed in accordance with OEM recommendations on a planned basis in 2010. An additional year of run-time increases the risk of an in-service impulse blading shroud failure which would result in a lengthy unplanned unit outage. The recommendation is to conduct the work on a planned basis during the 2010 planned maintenance shutdown.

CI Number: 37609

Title: LIN - Unit #1 Rotor Rewind

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $3,493,019

DESCRIPTION:

During the scheduled unit shutdown on October 26, 2008, a ground fault was experienced on the Lingan Unit #1 generator rotor. In order to identify the location of the fault and the root cause behind the event, the generator needed to be disassembled and the rotor removed from the generator. Temporary repairs and an engineering evaluation were completed. Subsequent inspection identified issues with the rotor which necessitate a full rewind during the next planned outage. The next planned outage for this unit is scheduled for April 2010.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

A ground fault was experienced on Lingan Unit #1 rotor during the October 2008 planned shutdown. A temporary repair was carried out involving a partial re-wind of four copper coils. The rotor could not be returned to service without this repair. The Original Equipment Manufacturer (OEM) was contracted to perform measurements to allow for the preparation of alternatives and evaluations in advance of the next planned outage in 2010.

Why do this project now?

The partial rewind in 2008 does not address all coils or other deficiencies identified during the condition assessment, which will be corrected with a full rewind. The generator rotor rewind requires a planned outage on Unit #1. Risk of extending the full rewind to a period beyond 2010 is considered unacceptable based on the evaluation of conditions found during the 2008 temporary repair.

Why do this project this way?

A full generator rewind is the only practical approach to avoid an extended unplanned outage and mitigate equipment damage. Based on the condition assessment completed in 2008.

CI Number: 34062

Title: TRE5 - Condenser Upgrades

Start Date: 2010/01

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $2,998,281

DESCRIPTION:

The Unit #5 condenser is part of the original equipment installed in the late 1960's. It is a double-pass derating type, surface condenser with a total surface area of 79,500 sq. ft. The function of this condenser is to provide the greatest vacuum possible to the turbine exhaust, obtaining the most work from the steam. It employs approximately 8700 tubes (1" outer diameter X 18 gauge X 35 ft long) to condense the exhaust steam and return condensate to the boiler.

The tubes on the Unit #5 condenser at the Trenton Generating Station are nearing the end of serviceable life and need to be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The Unit #5 condenser tubes at the Trenton Generating Station are nearing the end of their serviceable lives. As a result, the frequency of tube failures has recently increased. Condenser tube failures lead to reduced unit load or a unit outage to perform leak repairs. There is a risk of damage to the boiler if a large leak cannot be controlled by condensate polishing and other temporary measures prior to taking the unit off line. The condenser is an integral part of the generation station providing nearly closed loop water supply for power generation. Lower than optimum efficiency is caused by tube fouling and pluggage.

Why do this project now?

The total number and frequency of tubes plugged over the last number of years has increased, resulting in an increased risk to the feed water supply to the boiler. During the outage in 2006, a survey of the entire condenser was performed to determine the total number of tubes requiring replacement. A more detailed analysis of the areas of the tubes most prone to failure, the types of failures occurring, and any other patterns to redesign the condenser has been completed in 2009. The number of plugged tubes and the condition of the remaining tubes warrants replacement of the condenser tubes.

Why do this project this way?

Tube thinning, fouling, and failures have been addressed over the course of the life of Unit #5, but have now reached a point where maintenance alone can no longer provide reliable operation of the condenser. Installation of tube inlet liners is impractical due to the large number of tubes already plugged and the extent of the erosion/corrosion of the tube wall. Replacement of tubes in condensers is typical industry practice to return the equipment to its original condition. This project will provide for the replacement of tubes in the condenser.

CI Number: 38942

Title: TUC - Unit # 3 Generator Rotor Rewind

Start Date: 2010/08

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $2,001,945

DESCRIPTION:

During an unplanned bus duct replacement project (U&U # 38382) in 2009 the Unit #3 generator rotor was inspected and tested. The testing and inspection determined that a rotor rewind is required because of displaced coil insulating barriers. The insulating barriers provide electrical isolation of individual rotor windings. The Original Equipment Manufacturer (OEM) has reported that the insulation in the rotor is at risk of creating a short circuit within the winding, causing an unplanned outage. This project will be used to completely rewind the rotor and reduce the risk of failure in the long term.

Summary of Related CI's +/- 2 years:
2009 - 38382 TUC U&U #3 Bus Duct Replacement $2,291,099

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

An inspection by the OEM in 2009 revealed that the insulating barriers that isolate the windings are in need of replacement. Temporary repairs were made in 2009 to prevent immediate loss and reduce the risk of an internal short. It is recommended to proceed with this project to prevent an extended unplanned outage.

Why do this project now?

During the replacement of the bus ducts in 2009 under CI 38382, the requirement for a full rotor rewind was identified.

Why do this project this way?

A new generator as a replacement is not an alternative due to its substantial cost. A full rotor rewind is required on this unit.

CI Number: 38724

Title: TRE5 - Superheater, Reheater and Boiler Upgrades

Start Date: 2010/04

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $1,549,614

DESCRIPTION:

The focus of this project will be to replace targeted sections of the boiler (tubes, piping, doors and tanks) that have been identified as requiring replacement through detailed inspections, including the Life Assessment Study completed in 2006, and subsequent boiler inspections in 2007 and 2009.

Summary of Related CI's +/- 2 years:
2009 - 28529 TRE5 Secondary Superheater Outlet $1,538,427

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Heat Rate

Why do this project?

Boiler component assessment during the 2006 Life Extension Study identified the requirement that the secondary superheater (SSH), reheat (RH) outlet assembly and boiler drains system, including the blowdown tank and associated drains and vents, be replaced in order for Unit #5 to operate reliably.

Why do this project now?

This project is based on the estimated life of the existing SSH tubes, RH outlet and blowdown tank and drains. It is advantageous to replace the identified components to coincide with the 2010 steam turbine planned outage and minimize subsequent outage durations.

Why do this project this way?

This project is based on an engineering life cycle management report completed in 2006 and validated during boiler inspections in 2009. Past experience on other units indicates that this is the most effective way to approach this project.

CI Number: 36902

Title: LIN1- ESP Gas Flow Modification

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $1,500,000

DESCRIPTION:

The Lingan Unit #1 electrostatic precipitator (ESP) requires upgrading in order to support the combustion of low sulphur compliance coal.

Summary of Related CI's +/- 2 years:
2009 - 38442 LIN U&U Unit#2 ESP Gas Flow Modification $1,719,730
2011 - 30954 Lin 3 ESP Gas Flow Modification $1,473,989

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Heat Rate

Why do this project?

Sulphur Dioxide and Mercury compliance coal has a lower specific energy, higher ash content and a lower sulphur content, resulting in a unit de-rating in order to remain in compliance with opacity limits. An engineering investigation has determined the ESP performance can be improved to support increased unit loading by correcting existing flue gas flow distribution within the ESP.

This project is recommended to proceed to improve Unit #1 ESP performance on compliance low sulphur fuels and avoid replacement energy costs that would otherwise be associated with capacity de-rating of the unit.

Why do this project now?

This project will provide an immediate benefit of improved ESP performance and fuel operating range. Lingan Unit #1 has a four week planned maintenance outage in the spring of 2010 which is long enough for the project to be completed.

Why do this project this way?

NSPI evaluated commercially available alternatives to improve ESP operating performance at Lingan. All of the alternatives start with maximizing the performance capacity and range of the existing ESP. To achieve this, the flue gas flow devices must be upgraded to provide flue gas flow distribution which meets industry guidelines for this equipment. This step is required before additional ESP performance and capacity options can be considered for implementation.

CI Number: 24509

Title: TUC - Replace Unit #3 Turbine Supervisory

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $939,507

DESCRIPTION:

This project is for the replacement of the existing turbine supervisory equipment (TSE) on Unit #3. It includes proximity probes on each turbine and generator bearing to monitor vibration.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The existing equipment is no longer in production and parts necessary to perform repairs are very difficult to find. The component failure rate has been increasing and fans are being used to blow air on some field mounted hardware to prevent them from overheating and failing.

Why do this project now?

Without reliable turbine monitoring, the machine cannot be operated without risk of failure to the equipment. During 2009, a component (circuit board) failed and a replacement was no longer available. The remaining spare part for this component of the system was used increasing the risk that if another failure occurs, the system will be unusable. Without the TSE system the turbine cannot operate.

Why do this project this way?

The proposed system has been installed on other NSPI units and is considered the industry standard. It also includes cylinder expansion monitoring as well as main and re-heat valve position monitoring.

CI Number: 24722

Title: LIN1-Turbine Supervisory Control Replacement

Start Date: 2010/01

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $867,507

DESCRIPTION:

The life of the Lingan Unit #1 turbine control system was extended by utilizing spare parts salvaged from Lingan Units #2, #3 and #4 when the turbine supervisory equipment (TSE) was replaced on these units. Replacing the TSE will ensure the reliability of the turbine and unit availability is maintained.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The TSE for Lingan Unit #1 is based on technology from 1970 and has become obsolete. This existing equipment has exceeded the end of its design life and an increased frequency of TSE component failures is expected. Replacing the TSE on Unit #1 will mitigate the risk of equipment failure and loss of generation.

Why do this project now?

The Original Equipment Manufacturer no longer supports the existing TSE and it must be replaced to maintain turbine reliability and unit availability.

Why do this project this way?

Replacing the existing TSE with similar components as installed on Lingan #2, #3, and #4 is a practical and cost effective solution. It will also provide a common TSE platform for the Lingan Generating Station.

CI Number: 34702

Title: LIN - Mill Component Replacement

Start Date: 2010/01

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $764,089

DESCRIPTION:

The purpose of this project is to replace mill components that have reached the end of their useful life. Based on observed wear characteristics, there is risk that component failures will occur if a replacement plan is not followed. This capital item proposes the replacement of ceramic wear components, worn gear & shaft, vertical shaft and other non-repairable mill components. The scope of this project is to refurbish 4 mills with new ceramic tables and rollers as well as miscellaneous wear items as required.

Summary of Related CI's +/- 2 years:
2008 - 28883 Lin Mill Component Replacement $250,880
2009 - 30916 Lin Mill Component Replacement $598,992

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

As the energy content of many low sulphur coal supplies has been declining, the boilers require a 4 mill operation to maintain full load at the generator. This makes it imperative 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.

Why do this project now?

An evaluation of the mills has identified several areas of concern 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 labour.

CI Number: 30802

Title: POT- Marine Terminal Dust Mitigation

Start Date: 2010/07

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $746,743

DESCRIPTION:

This is further to CI 29822 Relocate Port Malcolm Road Dust Suppression. This project provides for the reconfiguration of the dust suppression system at PTMT. This project includes the addition of water canons and the required pumps, trenching, piping water chambers, heat tracing, electrical and system controls.

Summary of Related CI's +/- 2 years:
2008 - 29822 Pt Tupper Relocate Port Malcolm Rd $2,149,043
2008 - 29842 Move Line Pt. Tupper Mitigate U&U $239,132

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Maintenance

Why do this project?

The most economical solution to control dust from the standing pile is to reconfigure the dust control equipment (sprays and misters) to allow them to be utilized in a more effective manner.

Why do this project now?

The operating permit is contingent on complying with environmental regulations. The Nova Scotia Department of Environment and Labour (NSEL) has expressed concern about dust levels on the road and neighbouring businesses. To address these issues, the sprays must be reconfigured following the road relocation.

Why do this project this way?

Fugitive dust at PTMT has been a challenge since it was commissioned in March 2005. As part of a staged investment approach, NSPI and the terminal operator (Savage) have implemented numerous effective dust control measures (summarized in the CDG Study, RWDI Report). Fugitive dust emissions due to wind erosion of the stockpiles remains a concern. NSPI executed a staged approach that concluded the least cost alternative to mitigate dust and ensure PTMT operating permit compliance is to optimize the configuration of the dust suppression systems following the relocation of a portion of the Port Malcolm Road.

CI Number: 37743

Title: LIN1 - CW Large Bore Pipe Replacement

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $651,023

DESCRIPTION:

This project will refurbish the Cooling Water (CW) piping system supplying the condenser on Unit #1 and replace valves to support efficiency improvements on the unit. Steam discharge from the low pressure section of the turbine is condensed by seawater delivered through a large surface condenser located beneath the turbine. The seawater is delivered from the CW pumphouse via 72" diameter underground concrete pipelines. The concrete pipe connects to steel pipe inside the plant near the condenser. This project focuses on work to the steel pipe and valves directly under the condenser.

The objective of this project is to refurbish Unit #1 large-bore CW piping located at the condenser on Unit #1 and replace eight 48" CW Inlet and Outlet Valves. The planned scope of work includes replacing deteriorated sections of steel pipe to coincide with the Unit #1 planned outage in spring 2010.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The steel piping has been susceptible to leaks resulting in forced outage repairs. Based on non destructive testing, pipe leaks will become more frequent without corrective action. Valve upgrades will enable improved isolation to allow online condenser leak checks, condenser cleaning and support efficiency improvements on the unit.

Why do this project now?

This project needs to be executed during a scheduled outage. An outage is planned on Unit #1 in 2010 that will coincide with the scope of work under this project. Failure to address this issue in 2010 could lead to more extensive and costly repairs in the future.

Why do this project this way?

This project is a cost effective and low-risk approach to extend the life of the piping system. The work plan is to replace the deteriorated pipe with identical sized pipe. The interior of the pipe will be abrasive blasted and a corrosive abrasive resistant epoxy coating will be applied. The upgrades will support efficiency improvements by extending online maintenance capability.

CI Number: 30954

Title: LIN3-ESP Gas Flow Modification

Start Date: 2010/02

Final Cost Date: 2011/12

Function: Generation

Forecast Amount: $1,473,990

DESCRIPTION:

The Lingan Unit #3 electrostatic precipitator (ESP) requires upgrading in order to support the combustion of low sulphur compliance coal.

Summary of Related CI's +/- 2 years:
2009 - LIN U&U Unit#2 ESP Flow Modification $1,716,730
2010 - 36902 LIN1- ESP Gas Flow Modification $1,500,000

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Heat Rate

Why do this project?

Sulphur Dioxide and Mercury compliance coal has a lower specific energy, higher ash content and a lower sulphur content which results in a unit de-rating in order to remain in compliance with opacity limits. An engineering investigation has determined the ESP performance can be improved to support increased unit loading by correcting existing flue gas flow distribution within the ESP.

This project is recommended to proceed to improve Unit #3 ESP performance on compliance low sulphur fuels and avoid replacement energy costs that would otherwise be associated with capacity de-rating of the unit.

Why do this project now?

This project will provide an immediate benefit of improved ESP performance and fuel operating range. Unit 2 has a four week planned maintenance outage in the Spring of 2010 which is long enough for the project to be completed.

Why do this project this way?

NSPI evaluated commercially available alternatives to improve ESP operating performance at Lingan. All of the alternatives start with maximizing the performance capacity and range of the existing ESP. To achieve this, the flue gas flow devices must be upgraded to provide flue gas flow distribution which meets industry guidelines for this equipment. This step is required before additional ESP performance and capacity options can be considered for implementation.

CI Number: 38105

Title: POT - CW Flow Improvements

Start Date: 2010/07

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $536,451

DESCRIPTION:

Point Tupper Generating Station uses sea water for cooling the condensers, auxiliary cooling of turbine oil, general service cooling water and hydrogen cooling. Sea water is extracted from the Strait of Canso and delivered to the circulating water system through an inlet lagoon and canal. Sea water, by nature, contains organic debris such as kelp, eel grass and sea-weed as well as other animal life such as mollusks, crabs, and smaller micro-organisms. Over time these materials deposit and decay and form a layer of silt on the bottom of the inlet leading to the production of hydrogen sulphide.

The scope of work for this project includes the dredging of the inlet to reduce the rate of hydrogen sulphide formation and addresses the issue of hydrogen sulphide corrosion of the condenser tubes.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Heat Rate

Why do this project?

Rapid corrosion and failure of new condenser tubes in 2008 has been directly linked to hydrogen sulphide. The cooling water inlet was closely examined as part of the failure analysis. It was noted that a large amount of silt had built up in the inlet. Silt contains trapped deposits of hydrogen sulphide which increases as the silt layer thickens. Addition of chemicals to the cooling water is currently protecting the condenser tubes from hydrogen sulphide until the damaged tubes are replaced and accumulation of hydrogen sulphide is controlled through removing the built-up silt.

Why do this project now?

The issue of silt build-up must be addressed at the earliest opportunity to reduce this problem in the future. Completing this project will also reduce the reliance on chemical dosing and associated costs to protect the tubes from hydrogen sulphide.

Why do this project this way?

Dredging the inlet to remove the silt and reduce hydrogen sulphide formation is the most practical and cost effective solution.

CI Number: 34690

Title: LIN - Boiler Feed Pump Rebuild

Start Date: 2010/01

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $509,364

DESCRIPTION:

This project covers the rebuild of one of the boiler feedwater pumps (BFP) for the Lingan Generating Station (LIN). This work will restore all fits and dimensions to Original Equipment Manufacturer (OEM) specifications.

There are 8 pumps at Lingan (2 per unit). Not including this project, 5 of 8 pumps have been rebuilt to OEM specifications. The plan is to rebuild the remaining pumps in 2010 and 2011 and thereafter an annual rebuild of the cartridge only will be required.

Summary of Related CI's +/- 2 years:
2008 - 28913 LIN 2008 Boiler Feed Pump Rebuild $299,900
2009 - 30917 LIN Boiler Feed Pump Rebuild $454,421

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 station needs to be in a position to respond quickly to BFP problems to increase BFP availability in order to mitigate the risk of lost generating capacity or a forced unit outage and the associated replacement energy costs. As part of this recurring capital 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 (restored in 2009) 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?

Lingan boiler feed pumps have been identified as requiring rebuild based on Life Cycle Management data. 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 5 years.

CI Number: 37542

Title: TRE - Unit 1-4 Roof Replacement

Start Date: 2010/05

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $503,980

DESCRIPTION:

Trenton Units #1-4 went in service between 1951 and 1959. The associated boiler and turbine hall roofs have never been replaced since original installation. The three main roofs in the old plant are the 1-4 turbine hall roof, the 1-2 boiler house roof and the 3-4 boiler house roof. All three roofs have been repaired over the years and are now at the point where further repair is not feasible. The 1-4 turbine hall roof insulation is completely saturated and leaks frequently. The leaks impact the main walkway between the administration offices and the plant control room. The metal decking under the east section of 1-4 turbine hall roof is also deteriorating.

The 1-2 boiler house roof also leaks frequently onto an area adjacent to the plant training centre/office area. A portion of 3-4 boiler house roof has been cordoned off for personnel safety reasons because of deterioration of the metal decking below the roof insulation.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

The roofs are 50-60 years old and have been repaired to the point where further maintenance is not feasible. Complete replacement of all three roofs is required.

Why do this project now?

The insulation and metal decking associated with these roofs has been repaired over the years but has now deteriorated to the point where further repairs are not feasible.

Why do this project this way?

The only alternative is to replace the 1-4 turbine hall roof, the 1-2 boiler house roof and the 3-4 boiler house roof.

CI Number: 38943

Title: LIN1 - Boiler Refurbishment

Start Date: 2010/03

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $501,583

DESCRIPTION:

The focus of this project will be to inspect, repair and replace tubes, tube bends and shields on the Unit #1 boiler. Low Temperature Superheater (LTSH): Tube, tube bend and shield replacements - $350K

The quantity of tubes, tube bends and shields to be replaced will be confirmed during the detailed inspections that are completed during the planned Unit 1 outage in 2010. Tubes and tube bends will be replaced in the areas where the thickness readings are below American Society of Mechanical Engineers (ASME) specifications. Replacing the shielding will further protect the tubes from ash erosion.

High Temperature Superheater (HTSH) Selective tube section replacements - $150K

The replacement of High Temperature Super Heater (HTSH) tubes will mitigate risk of tube failures and forced outages. Selective replacement of the HTSH tubes will also minimize unplanned repair costs and replacement energy costs.

Summary of Related CI's +/- 2 years:
2008 - 31502 LIN1 - U&U LTSH Shielding and Bends Replacement $437,390

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

This project is required to maintain the long term reliability of the boiler and mitigate the risk of unplanned outages due to LTSH and HTSH tube leaks.

Why do this project now?

Some of the tubes to be inspected and replaced are difficult to access and require sufficient time 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 1 in 2010 is 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 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 1 boiler will be reduced. Based on boiler life cycle assessments, upgrades are necessary to increase boiler life expectancy.

CI Number: 38582

Title: TRE6 - Airheater Refurbishment

Start Date: 2010/04

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $501,532

DESCRIPTION:

The air heaters on the Unit #6 are tri-sector units which transfer flue gas heat exiting the boiler to both the primary air (that carrying pulverized fuel from the mills to the boiler) and secondary combustion air to the boiler. The sector seals are essential to keep the gas streams from mixing through the air heater and the sector plates essentially act as a barrier between the gas flow from the boiler and air entering the boiler as primary and secondary air for combustion.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

An inspection completed in 2009 identified sector plates that were eroded and sector seals that were worn away. At present there is gas "short-circuiting" and mixing with the primary and secondary air stream. This carries ash back through both gas flows and also reduces the exit gas temperatures to levels that can cause sulphuric acid corrosion in the ducting between the air heater and induced draft fans.

Why do this project now?

This situation must be corrected during a scheduled outage in order to access the affected areas. Operating for extended periods of time under these conditions could permanently damage the air heaters.

Why do this project this way?

The project scope is to refurbish the affected area and replace the seals in accordance with the manufacturer's specifications.

CI Number: 37622

Title: TRE - Facilities Improvement Project - Ph 4

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $499,499

DESCRIPTION:

The Trenton Generating Station was built in stages from 1950 to 1991. In 2007, Phase one of the Facilities Improvement Project was initiated to address issues that were generated from the Facilities Improvement Team (FIT) report. This report, in combination with requests from employees and the insurance company, provided the basis for the initial phase of this improvement project. The focus of 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 will focus on improving the exterior of the plant. The main items included in Phase 4 of this project include replacing exterior plant siding and cladding as well as addressing deficiencies associated with exterior windows and louvers to ensure they are water-tight.

Summary of Related CI's +/- 2 years:
2008 - 28879 Facilities Improvement Phase 2 $80,060
2009 - 30830 Facilities Improvement Phase 3 $102,798

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Phases one, two, and three of the Facilities Improvement Project addressed items in the FIT report (work shops, control room, lunch rooms, locker rooms, shower facilities, wash rooms, offices, etc.). Improvements in these areas were viewed at as favourable actions by all employees. Phase four will focus on the exterior of the plant and strive to improve the appearance by replacing siding and enhancing the grounds around the plant.

Why do this project now?

A delay in Phase four of this project will result in further deterioration to the exterior of the plant. Unit #5 has sections of the north external wall that require re-siding and areas of the grounds need to be repaired (levelled and paved).

Why do this project this way?

A portion of the exterior siding and cladding was upgraded approximately 10 years ago. Replacing the remaining exterior siding and cladding will eliminate the risk of this material detaching during adverse weather conditions as well as enhance the exterior appearance of the Trenton Generating Station. Addressing deficiencies associated with exterior windows and louvers will prevent water damage to the interior of the plant in the affected areas. The plant will be in operation for the foreseeable future, and the benefits of these improvements will be realized going forward.

CI Number: 34367

Title: POA - 2010 Refractory Program

Start Date: 2010/09

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $484,142

DESCRIPTION:

The purpose of this project is to ensure that all refractory components are in acceptable condition to support an operational run of 12 months. The scope of the project will focus on the refurbishment of the lower cyclone refractory, lower combustor repairs and some expansion joint repairs.

Summary of Related CI's +/- 2 years:
2008 - 28785 POA Refractory Program $417,810
2009 - 31728 POA Refractory Program $449,013

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Routine inspection and repair/replacement is critical to maintaining a functional refractory protection program. Improved unit performance with reduced boiler cycling has improved the deterioration rate, but short term repairs will not sustain long-term performance and full replacement is required.

Why do this project now?

This project will be carried out during the 2010 maintenance outage and will concentrate on completing a refractory inspection, routine repair and replacement program to extend the life expectancy of the major refractory systems. The main focus of the 2010 program will be to ensure unit reliability for the upcoming production year and to identify future refractory replacement requirements. The refurbishment of the lower cyclone refractory, lower combustor repairs and some expansion joints are required in 2010.

Why do this project this way?

The selection of repair materials and installation methods used are based on industry and Point Aconi experience.

CI Number: 38723

Title: TRE5 - Waterwall Panel Replacements

Start Date: 2010/03

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $455,307

DESCRIPTION:

This project is the continuation of the waterwall panel replacement program for Trenton Unit #5. It is based on tube survey and wear measurements in the furnace.

Summary of Related CI's +/- 2 years:
2009 - 28692 TRE5 Waterwall Panel Replacement $496,716

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The replacement scope for 2010 was determined through extensive tube wall surveys carried out in 2008 and 2009.

Why do this project now?

Timely replacement of waterwall tubing avoids unplanned repair costs as well as start-up energy costs. The panel replacement program is an integral component of the boiler tube failure reduction program. It serves to maintain target heat rates and the derating adjusted forced outage rate (DAFOR).

Why do this project this way?

A strong waterwall panel replacement program is required to manage DAFOR to levels that provide reliable unit performance.

CI Number: 34504

Title: TRE6 - Waterwall Panel Replacement

Start Date: 2010/03

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $425,086

DESCRIPTION:

This project is the continuation of the waterwall panel replacement program for Trenton Unit 6 based on tube survey and wear measurements in the furnace.

Summary of Related CI's +/- 2 years:
2008 - 28845 TRE6 Waterwall Panel Replacements $298,700

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The replacement scope 2010 was determined through extensive tube wall surveys carried out in 2008 and 2009.

Why do this project now?

Timely replacement of waterwall tubing avoids unplanned repair costs as well as start-up energy costs. The panel replacement program is an integral component of the boiler tube failure reduction program. It serves to maintain target heat rates and the derating adjusted forced outage rate (DAFOR).

Why do this project this way?

A strong waterwall panel replacement program is required to manage DAFOR to levels that provide reliable unit performance.

CI Number: 38944

Title: LIN - Unit 2 Rotor Rewind

Start Date: 2010/02

Final Cost Date: 2011/06

Function: Generation

Forecast Amount: $2,747,529

DESCRIPTION:

During the Unit #1 scheduled shutdown in October 2008, a ground fault was experienced in the generator rotor. The generator rotor was removed from the machine and disassembled to determine the location and extent of the ground fault and to implement corrective measures. The fault was identified and necessitated a temporary partial rewind in order to return the unit to service. Based on inspection results and recommendations from a number of Original Equipment Manufacturers (OEM's) a complete rewind is required. This is based on reduced cooling due to migration of mylar liner insulation into the cooling openings and the presence of copper dusting levels at higher than expected concentrations around the winding turns. It is expected this condition is present on both Unit #1 and Unit #2 generators. Planning is in place for Unit 1 to be re-wound in spring 2010.

This project will cover a planned rewind on Unit 2 in 2011. Lead time for the materials is estimated to be a minimum of four months.

Summary of Related CI's +/- 2 years:
2010 - 37609 LIN1-Rotor Rewind $2,691,747

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The rotor rewind kit will alleviate future copper dust formation and migration of mylar insulation.

Why do this project now?

Ordering a full rewind kit in advance of the planned outage will ensure the kit is onsite for a planned rewind in 2011. In the event of another ground fault occurrence, ordering the full rewind kit in 2010 will mitigate the risk of an extended unplanned downtime.

Why do this project this way?

A full rewind is the most cost effective solution. This project includes advance material order costs in 2010 and rewind in 2011.

CI Number: 38603

Title: TRE6 - LP Turbine Gland Replacement

Start Date: 2010/03

Final Cost Date: 2010/04

Function: Generation

Forecast Amount: $403,980

DESCRIPTION:

The turbine glands provide sealing to prevent steam from escaping the turbine cylinders. The low pressure (LP) glands on Unit #6 are leaking and result in a net loss of efficiency in the LP section of the turbine. It is necessary to replace/refurbish the glands to the manufacturer's specifications to prevent efficiency loss.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The LP glands need to be restored to the manufacturer's specifications to ensure the operational efficiency of the Unit #6 turbine.

Why do this project now?

The leakage is a documented efficiency loss and corrective action is required.

Why do this project this way?

Replacement of the turbine glands is the only alternative and must be performed during a planned annual outage.

CI Number: 38602

Title: TRE - Fire System Upgrades

Start Date: 2010/03

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $402,653

DESCRIPTION:

The 2009 fire system inspection completed by a fire system contractor identified deficiencies in the plant's fire protection systems which, if left in their present state, will result in minimal fire protection in certain areas. Recommendations made by NSPI's insurers will also be addressed within this project. Modifications to the main fire pump to ensure it meets performance requirements as well as modifications to the main fire pump suction line will be completed. Upgrades to the water storage bunker will also be completed.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

Completion of these upgrades will minimize the risk associated with the fire protection / fire fighting systems at the Trenton Generating Station. A significant portion of this project's scope is to ensure adequate water supply to the main fire pump. This incorporates suction line and water bunker upgrades.

Why do this project now?

Addressing the recommendations in timely upgrades will reduce the risk of fire related incidents at the Trenton Generating Station.

Why do this project this way?

The project scope has been defined by NSPI and a NSPI fire system contractor.

CI Number: 38728

Title: TRE5 - Hot End Air Heater Basket and Seal Replacement

Start Date: 2010/03

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $402,096

DESCRIPTION:

The hot end air heater baskets are part of the heat exchange of the combustion process that exchanges hot air energy from the gas stream exiting the boiler with the air stream entering the boiler. The hot end air heater baskets and seals were evaluated during the Unit #5 2009 outage and it was determined replacement is required.

Summary of Related CI's +/- 2 years:
2008 - 28847 TRE5 Air Heater Cold End Basket Replacement $172,990

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The Original Equipment Manufacturer (OEM) was engaged to complete an assessment of the air heater on Unit #5 during 2009's scheduled outage. The hot-end air heater baskets were identified as reaching the end of their useful life. Recommendations are to have these baskets replaced along with the radial, circumferential and post hot end seals.

Why do this project now?

This project is planned for 2010 to coincide with the scheduled outage.

Why do this project this way?

Replacement of the hot end air heater baskets is the only alternative to restore the operational integrity and efficiency of the air heater.

CI Number: 37563

Title: TRE6 - Bottom Ash System Refurbishment

Start Date: 2010/03

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $401,884

DESCRIPTION:

The bottom ash removal system on Trenton Unit #6 was commissioned as part of the original equipment in 1991. The bottom ash removal system is a Submerged Mechanical Drag Conveyor (SMDC), which removes bottom ash via two bar loop style chains fitted with 66 flight bars equally spaced along the chains. The operation of the chains is such that there is always relative motion between the chain and the wear resistant surface at the bottom of the SMDC hopper and the idler wheels. The major components on the SMDC have reached the end of their useful life and replacement is required.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The major components of the SMDC system, such as the bar loop chains, drive sprocket hub and drive sprockets, have worn to a point where they are unable to operate in a reliable manner.

Why do this project now?

The major components on the SMDC have reached the end of their useful life and replacement is necessary. In recent years, there have been multiple component failures, which have required the unit be removed from service.

Why do this project this way?

A "like for like" replacement is a more practical and is a cost effective option. All replacements can be completed during the 2010 shutdown.

CI Number: 37834

Title: TRE6 - Pulverizer Ductwork & Expansion Joint Replacement

Start Date: 2010/04

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $400,218

DESCRIPTION:

Trenton Unit #6 has two mills that pulverize fuel and deliver it to the boiler for combustion. The air supplied to the mills from the air heater picks up the pulverized fuel and transports it to the boiler through a series of duct work and associated expansion joints.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Corrosion and erosion on the interior of the ductwork has resulted in some leakage through the duct. Temporary repairs have been undertaken over the last few years but the duct metal is degraded to the point that sectional replacement is necessary. Two expansion joints have also been identified for replacement.

Why do this project now?

This project must be completed now to maintain the structural integrity of the duct work and preclude forced outages.

Why do this project this way?

Replacement of the identified duct work and expansion joints must be completed during a planned annual outage to avoid unit de-ratings.

CI Number: 38843

Title: TRE5 - FD Fan Refurbishments

Start Date: 2010/05

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $399,173

DESCRIPTION:

The purpose of this project is to improve the reliability of the Forced Draft (FD) Fans on Unit #5 through re-design and replacement of the rotor wheels and inlet vane assemblies.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The existing operating condition of the FD fan assemblies is unreliable, and requires frequent balancing. The balancing is a result of the deteriorated condition of the fan rotor blades, as noted during a fan inspection completed during the 2009 shutdown. Some of the blades were temporarily repaired during the 2009 shutdown.

Why do this project now?

The fans are not reliable and frequently require maintenance in an unplanned manner. Costs continue to be incurred for repeat failures without improving the reliability of the systems. The rotor wheels have been repeatedly repaired, and have reached the point where replacement is necessary to keep the fans operational.

Why do this project this way?

The existing rotor blades have been repeatedly repaired and continue to deteriorate with each failure. Re-design and replacement of the rotor blades will lead to improved reliability of the fans.

CI Number: 38102

Title: POT - Utilization of Heavy Biofuel Oil

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $397,966

DESCRIPTION:

This project is intended to increase utilization of alternative fuels at Point Tupper by co-firing heavy bio-fuel oil to decrease Green House Gas Emissions (GHG's). Over the next several years Nova Scotia Power Inc. (NSPI) will be making modifications to its fleet of thermal generating units to meet a number of federal and provincial regulated emission targets. Using alternative fuels such as heavy bio-fuel oil instead of higher emitting solid fuels in NSPI's thermal fleet is a viable option for reducing NSPI's overall carbon emissions.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Heat Rate

Why do this project?

This project will help reduce green house gas emissions at POT. This project is based on the success of current efforts as presented in the report "Pt. Tupper Heavy Bio-fuel Phase I Co-Firing Test Burn" conducted at POT over the past several months. The NSPI POT Test Burn Team recommends that a permanent and dedicated system can be commercially justified.

Why do this project now?

The opportunity and timing for utilization of this environmentally beneficial product at POT is very short. The fuel supplier will be pursuing other alternatives if NSPI cannot use their product.

Why do this project this way?

Using existing plant equipment and infrastructure is a short-term, low cost modification to enable co-firing capabilities of lower emitting fuels in the solid fuel plants.

CI Number: 28315

Title: POA - Water Truck Replacement Project

Start Date: 2010/03

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $389,050

DESCRIPTION:

The Point Aconi ash removal process requires primary and secondary hydration of the ash before placement in the landfill. The secondary component is completed by the use of a water truck to spray the freshly deposited ash during the rolling / spreading process. This produces a stable product for compaction. The hydration of the ash is an operating permit requirement and controls dust around the site. The water truck provides both services. This project serves to replace the existing water truck.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The need to have a water truck on-site is an operating permit requirement. The water truck provides an essential service for both dust control and secondary hydration of the ash.

Why do this project now?

The current water truck has been in service for 15 years and maintenance costs have increased to a point where replacement is a more economical option.

Why do this project this way?

The options considered for this project were to maintain the existing truck, outsource this service, or purchase a new truck. The most cost effective solution is to purchase a new truck.

CI Number: 38835

Title: TRE5 - Air Register Upgrades

Start Date: 2010/04

Final Cost Date: 2010/06

Function: Generation

Forecast Amount: $375,098

DESCRIPTION:

Trenton Unit #5 is a front-fired boiler that utilizes sixteen coal burners in order to deliver fuel to the boiler. The coal burners are comprised of equipment that is external to the boiler, as well as equipment that is located inside the boiler in a windbox. The focus of this project will be to upgrade the air register assemblies that are located in the windbox.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

During the 2009 shutdown, a full internal inspection of the burner equipment which is located within the windbox was completed. This inspection identified refurbishment work. During the shutdown, temporary work was completed to address the critical issues with the intent that during the 2010 shutdown, a complete refurbishment of the equipment within the windbox would be completed.

Why do this project now?

The 2010 shutdown on Trenton Unit #5 provides the schedule to complete this work. By completing this project in 2010, the reliability of the burners will increase and maintenance associated with this equipment will be reduced in future years.

Why do this project this way?

By completing this project in the manner described above, the frequent maintenance and operational issues with these burners will be minimized.

CI Number: 30082

Title: POT - Develop New Ash Cells at Bearhead Ash Site

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $374,441

DESCRIPTION:

The Ash Management Site at the Point Tupper Generating Station has been operating effectively since the coal conversion of Unit #2 in the late 1980's. The site currently consists of three principal cells. Cell A has been filled with ash and is capped. Cell B has been filled nearly to capacity and currently has coal stored on it. Cell C is currently approaching storage capacity.

This project will allow for the development of additional cells to accommodate ash from Point Tupper.

Summary of Related CI's +/- 2 years:
2011 - 29104 Ash cell capping cell B $65,232
2011 - 30044 Ash cell capping cell C $71,664

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Capacity

Why do this project?

This project is required to ensure adequate area is available for ash disposal for the next several years.

Why do this project now?

Considerable portions of the ash site have reached the allowable elevation for ash storage. The area east of the "C" cell is designated as the zone for ash disposal for the next several years.

Why do this project this way?

The proposed plan is to develop three new cells with the necessary berms at the ash site. The area east of the "C" cell will then be used as the ash lay down zone for the next several years and will be designated as cells D, E, and F. Cell "D" is already developed. Developing cells "E" and "F" concurrently is the most cost effective measure.

CI Number: 38103

Title: POT - Wastewater Cell Refurbishment

Start Date: 2010/04

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $337,350

DESCRIPTION:

The wastewater cells at the Point Tupper Generating Station are part of the plant's operating agreement to ensure that all material leaving the site meets environmental guidelines. The cells were installed in 1986 during the plant's conversion to coal. There are two cells, East and West.

Some leakage between the East and West waste water cells was noted during recent cell cleaning. Investigation has not shown any evidence of water leaving the cells directly into the environment, but the leakage must be addressed to prevent uncontrolled release.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Maintenance

Why do this project?

To ensure that Point Tupper Generating Station remains in compliance with its operating agreement, remedial action is required to ensure the integrity of the cells remains intact. This project will allow for the inspection and necessary repairs to the liner and corner joints in the cells.

Why do this project now?

Completing this project will mitigate the risk of potentially higher costs in the event that external leakage suddenly occurred.

Why do this project this way?

To ensure that the cells will properly contain wastewater, a full assessment of the liner and joints for each cell will be performed. Any materials needed can be ordered in advance of dewatering the cells for maintenance. Each cell will be removed from service individually, so that all plant effluent will not have to be shut off. This approach will ensure the most economical procedure to repair the cells.

CI Number: 28645

Title: TRE6 - Turbine Controls Power Supplies Upgrades

Start Date: 2010/02

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $331,974

DESCRIPTION:

This project is to replace the power supplies in the turbine control panels - Electro-Hydraulic Governing (EHG), Turbine Automatic Start-up System (HITASS) and the Auxiliary Turbine Controls. This system controls the 150 MW turbine on Trenton Unit #6.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Why do this project?

A failure of a power supply will cause the turbine to trip off-line.

Why do this project now?

These components have been in service since 1991 and are beyond the recommended age for replacement. These types of power supplies are known to have failures after 15 years of service life.

Why do this project this way?

The Original Equipment Manufacturer of both the turbine and the turbine control system has recommended replacement of these power supplies during a planned outage.

CI Number: 32963

Title: TUC2 Replace Condenser Vacuum Pump

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $331,764

DESCRIPTION:

Tuft's Cove Unit #2 has operated two single stage air jet injected liquid ring vacuum pumps since it was commissioned in 1968. Original Equipment Manufacture (OEM) performance tests confirm the pumps have deteriorated. They lack the ability to achieve their designed performance. As a result, the pumps have been de-rated to 50% of their design capacity.

The vacuum systems for both Unit #1 and Unit #2 are currently integrated in such a manner that the vacuum created by a single pump can only achieve the vacuum requirements for each unit independently. The exiting pump configuration cannot achieve sufficient vacuum when both units are requiring vacuum simultaneously.

The scope of this project includes the replacement of both obsolete pumps with new pumps. Also, modifications to the existing vacuum piping system is required to optimize the availability and service of each pump.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Replacement of the original vacuum pumps will restore the 2 x 100% pump configuration to provide reliability, reduce auxiliary power consumption and improve unit heat rate.

Why do this project now?

Tuft's Cove Unit #2 has operated two single stage-air jet injected liquid ring vacuum pumps since its commission in 1968. OEM Performance tests confirmed the pumps have deteriorated and are incapable of required performance. As a result the pumps were de-rated to 50% capacity. Unit #1 has 2 obsolete and unreliable vacuum pumps with only 50% available vacuum. These are supplemented currently with a single unit that also acts as a back-up for Unit #2. In the event that a failure occurs on Unit #2 vacuum pumps, the current configuration requires that Unit #1 be removed from service.

Why do this project this way?

Replacement of the vacuum pumps will increase unit reliability, efficiency, as well as reduce auxiliary energy consumption.

CI Number: 35083

Title: LIN 2010 Ash Site Sealing and Capping

Start Date: 2010/04

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $298,795

DESCRIPTION:

The capping and sealing provided for under this project will serve the long-term goal of returning the Lingan Ash Management area to a green site. The work is required to reduce potential dusting problems and improve the water quality of the runoff exiting the site. The intent of the Ash Management Plan is to eventually be able to redirect rainfall on the completed areas of the site, away from the adjacent ash lagoon. This will reduce the amount of ash contacted water on site.

There are two issues addressed through the ash site capping process:

1) Dusting of surrounding areas from the full ash cells will be minimized.
2) The potential of runoff affecting ground water will be mitigated.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

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 and Labour (NSDEL) to the Lingan Generating Plant. This phased capping project serves the long-term goal of returning the area to a green site, which is required to reduce potential dusting problems and improve the quality of surface water exiting the Ash Management area. The intent of the Ash Management Plan is to eventually be able to redirect rainfall on the completed areas of the site, away from the adjacent ash lagoon, reducing the amount of leachate generated by the site.

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. A subsequent engineering study outlined the new capping profile to avoid and mitigate any ground water contamination problems.

Why do this project this way?

Past capping practice is no longer sufficient given new information of the hydrological affects of precipitation permeating through the ash site to groundwater. A new phased capping arrangement is proposed to mitigate the problem. This project applies the recommendation of an engineering consultant's report as well as internal engineering/environmental staff recommendations.

CI Number: 38846

Title: LIN1 - Fire Protection / Turbine Hall Sprinkler System

Start Date: 2010/01

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $293,207

DESCRIPTION:

This project provides the costs for the addition of a fixed fire protection system for the Unit #1 steam turbine generator at the Lingan Generating Station.

Summary of Related CI's +/- 2 years:
2008 - 29039 Lin Fire Protection Turbine Hall $607,020

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Buildings

Why do this project?

A recent gap and risk analysis identified that existing fire protection around the turbine generator units is now below current industry standards. At the time of construction, fire protection requirements were adequate.

In the recent assessment of fire protection systems at all NSPI thermal plants, the highest risk items were associated with the turbine generator area of the plant. 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 at LIN Unit #4 in 2009, and the system design will serve as a model for applying a similar solution for this project.

Why do this project now?

As a result of recent inspections, NSPI's insurance providers have recommended the need to introduce additional fire system risk-control measures. NSPI believes these modifications are important now as the plants age. A staged installation with one unit at a time is appropriate to reduce the risk in the long term.

Why do this project this way?

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

CI Number: 38945

Title: LIN1 - #8 Nozzle Replacement

Start Date: 2010/01

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $290,174

DESCRIPTION:

This project will replace a defective #8 nozzle on the Unit #1 Turbine during the LIN 1 scheduled outage in the Spring of 2010.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

During previous inspections, thermal-induced creep and erosion was observed. This affects optimal delivery of steam to the turbine, reduces output and increases risk of vibration and mechanical degradation. This project includes the installation of a new nozzle shroud to recover lost output and extend the life of the unit. Further repairs to correct the creep deformation are not considered feasible.

Why do this project now?

Nozzle replacement must be completed during a planned outage when the turbine cylinders are opened to allow access.

Why do this project this way?

Replacement is the only solution. Repairing the nozzle is not practical.

CI Number: 26025

Title: POT - ID Cladding Replacement

Start Date: 2010/04

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $281,345

DESCRIPTION:

This project includes replacement of siding, fasteners, and structural components located near the North and South induced draft (ID) fans and ductwork on the Point Tupper Generating Station site.

As part of life cycle management at Point Tupper, the condition of buildings, pipe bridges, walkways, and other structural components are regularly assessed. Several areas of the plant siding have been identified as requiring remediation. Some of the plant siding is original, dating back nearly forty years, with the remainder varying from twenty years to ten years.

The North and South ID fan cladding has also been identified as requiring replacement.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

All siding components require timely attention in order to prevent corroded areas from deteriorating further. Additional equipment damage could occur due to a drop in the flue gas temperature where siding is missing, which causes acids to form in the ductwork causing corrosion.

Why do this project now?

Minor repairs have been ongoing over the past number of years by re-attaching sections to prevent them from completely detaching from the buildings. In several areas, it has been identified that the degree of deterioration of both the siding and some of the support structure itself no longer allow for reattachment and will require replacement of the siding, fasteners, girts, and other supporting members. The siding over the North and South ID fans and surrounding ductwork has degraded. Damage has resulted by allowing corrosion through the ductwork itself.

Why do this project this way?

The most economical method to replace the deteriorated siding is to perform an evaluation of all the plant siding and attachment components, prioritize the condition of each area, and replace sections of siding that can be accessed together. Performing the complete replacement of the siding on the fans and ductwork is best performed during a unit outage, which will occur in 2010.

CI Number: 38622

Title: TRE6 - Pulverizer Refurbishment

Start Date: 2010/04

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $279,088

DESCRIPTION:

Unit #6 at the Trenton Generating Station utilizes two ball mill coal pulverizers to prepare coal for combustion in the boiler. These mills were originally installed and commissioned in 1991 and have been subjected to continuous use. This project focuses on employing optimal maintenance practices in order to improve performance of the main drive assembly and conveyors that transport coal to the mills. In addition to improving performance, the refurbishment will extend the maintenance lifecycle and reliability of mill rotating elements and associated components.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Mill maintenance is a significant cost to the station, and a number of initiatives have been undertaken to extend component life, reduce mill forced outages, maximize mill availability and extend running hours between overhauls. This project focuses on employing optimal maintenance practices in order to improve mill component performance, extend the maintenance lifecycle reliability on mill rotating elements and associated components.

Why do this project now?

The plant requires a high degree of mill efficiency and availability to generate electricity. A phased program is proposed due to the large scope of replacing worn components on the active mills.

Why do this project this way?

Replacement parts are now required due to age and wear on many of the mill components. Re-establishing Original Equipment Manufacturer tolerances and the replacement of worn components will prevent degradation in plant performance.

CI Number: 30386

Title: POT - West CW Pump Refurbishment

Start Date: 2010/04

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $266,816

DESCRIPTION:

The purpose of the Cooling Water (CW) pumps at Point Tupper is to supply cooling water to the condenser. The effectiveness of the CW pumps is measured, in part, by the flow rate of water provided to the condenser. Increasing the flow rate through the condenser has a positive effect on the condenser back pressure and consequently cycle efficiency. Increasing the efficiency contributes to reducing fuel expenses of a power generating station.

The existing west CW pump has a rated flow rate of 40,000 US gpm at 36 feet of head. Given the average cooling water temperature and recent improvements to the turbine, single pump operation is no longer sufficient and both pumps must operate nearly continuously for the unit to achieve full load. This results in increased wear and pump overhaul frequency as well as reduced efficiency using two pumps versus using one pump for parts of the year.

The east CW pump upgrade completed in 2005 successfully reduced the requirement for two-pump operation in the shoulder season. By completing upgrades to the west CW pump, the generating station will be capable of operating at full load for longer periods of time with only one CW pump in operation.

Summary of Related CI's +/- 2 years:
2010 - 30387 East CW Pump Bearings $137,190

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

A complete overhaul of the west CW pump is required in 2010 to ensure the pump's reliability is not compromised. Major pump components have experienced corrosion and erosion and must be replaced. The clearances between the bowls must be restored to restore the pump's efficiency, and upgrading the impeller will improve the pump's performance and capacity. Increasing the pump's capacity will allow the generating station to operate a single CW pump for longer periods of time. This will provide a number of benefits including: reduced wear and overhaul frequency and a reduction of station service.

Why do this project now?

The west CW pump will not continue to function reliably if an overhaul is not completed in 2010.

Why do this project this way?

By completing upgrades to the west CW pump, the generating station will be capable of operating at full load for longer periods of time with only one CW pump in operation. This project will also restore operating reliability of the pump.

CI Number: 26472

Title: TRE - 6A CW Pump Refurbishment

Start Date: 2010/03

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $262,674

DESCRIPTION:

Refurbishment of the 6A cooling water pump at the Trenton Generating Station is required in accordance with the plant's Life Cycle Management Program.

The Trenton Unit #6 circulating water (CW) system supplies cooling water to the steam condenser. Cooling water is drawn from a shoreline intakes through a pair of travelling 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. The pump will be proactively inspected in a planned manner with required component replacements identified. Completing a pump inspection and overhaul 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 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The overhaul and refurbishment of the 6A cooling water pump is required in 2010. The pump was last inspected in the mid 1990's. The shafts, shaft sleeves, impeller and inlet casing will be inspected and upgraded as required. The pump will be disassembled, inspected, and worn components replaced or upgraded. 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 2010. 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 will result in the purchase of replacement energy.

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 All worn components that require replacement or refurbishment will be indentified when the pump is shut down and inspected.

CI Number: 36602

Title: LIN1 - Battery & Charger Replacement

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $259,217

DESCRIPTION:

The primary inverter and chargers are used to charge the control system's emergency batteries in the event of a power outage. The existing inverter and chargers are obsolete and must be replaced. The scope of this project includes the replacement of the existing primary inverter and both chargers on Unit #1.

Summary of Related CI's +/- 2 years:
2008 - 28920 Lin 2 Battery Charger - UPS $188,650

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The existing chargers and inverter are 28 years old and parts are no longer available from the supplier. Reliability of the inverters has been decreasing. Battery and transformer failures have also been experienced.

Why do this project now?

The inverter 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: 38895

Title: POT - Plant Improvements

Start Date: 2010/04

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $258,694

DESCRIPTION:

The Point Tupper Generating Station (POT) was originally constructed in 1969. Although additions and some modifications have been made to the existing buildings over the last forty years, a portion of the original infrastructure requires refurbishment. This project will replace the deteriorated and aging components of the existing building infrastructure at the site.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

This project will improve the appearance and longevity of the buildings at POT.

Why do this project now?

The main entrance is used by all plant employees and visitors. Over time, the tracking of coal dust, ash, and other debris into the building has worn the existing building infrastructure and affected the cleanliness and aesthetics of the building. Although the affected surfaces have been maintained over time, their condition has degraded to the point that these improvements are now necessary.

Why do this project this way?

Refurbishment of some of the buildings at POT is the most viable option and will reduce the likelihood of more costly repairs in the future.

CI Number: 37744

Title: LIN - CW Screen Refurbishment

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $255,014

DESCRIPTION:

This project will address the condition of the circulating 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.

Upgrades to the screen panel seals are required to reduce downstream fouling from eel-grass passing between the sections.

Summary of Related CI's +/- 2 years:
2011 - 20736 LIN, Replace CW Screen Wash/Seal $74,770
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 the traveling screen panels results in downstream fouling, particularly during the late summer and fall. The degree of fouling often results in high mechanical loading on the screens and circulating water pumps. This high loading causes component failure as well as unit outages due to the loss of cooling water.

Why do this project now?

Completing this project will reduce 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 have experienced normal corrosion and wear. The most cost effective solution in this salt-water environment is to replace the deteriorated components with stainless steel components. Sealing between the screen panel sections will further reduce downstream fouling from eel-grass and seaweed.

CI Number: 34502

Title: TRE - Asbestos Abatement 2010

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $253,199

DESCRIPTION:

During the Unit #5 shutdown in 2009, all of the boiler walls from the second floor to the eleventh floor had the insulation (asbestos and mineral wool) removed in order to facilitate the structural upgrades required on the boiler. The only significant area of asbestos insulation remaining on the boiler is on one side of the drum on the eleventh floor.

Encapsulation of affected areas is no longer sustainable to keep the asbestos contained.

Summary of Related CI's +/- 2 years:
2008 - 28690 TRE5 Asbestos Program $98,330
2009 - 30826 TRE5 Asbestos Program $115,248

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

Encapsulation has provided adequate long-term protection for high pressure piping, storage tanks, feed water heaters and other affected areas of the plant. However, due to the constant movement and vibration as well as frequent maintenance activities in the area of the boiler, replacement of existing insulation on the drum of the boiler, de-aerator, and adjacent ductwork and piping is required.

Why do this project now?

The Unit #5 shutdown in 2010 will have six to eight weeks of scheduled outage time. This is sufficient to remove the asbestos insulation in a planned manner using the required air enclosures under negative pressure in areas such as the side drum and deaerator.

Why do this project this way?

Removal of the asbestos on Unit #5 must be completed while the unit is shut down. Removal in selected portions is the most cost effective solution as it allows the work to be completed within planned shutdowns and minimizes the down time on the unit. The asbestos abatement program is planned to continue in future years until all of the asbestos is removed from the boiler and associated piping.

CI Number: 22467

Title: POT - Condenser Waterbox Replacement

Start Date: 2010/05

Final Cost Date: 2011/03

Function: Generation

Forecast Amount: $250,497

DESCRIPTION:

This project includes the replacement of the inlet/outlet water nozzle section (the nest) of the south waterbox side of the Unit #2 condenser.

The condenser on Point Tupper Unit #2 is original equipment that was installed in 1972. The condenser is a two-pass, double waterbox surface design with 80,000 sq. ft. of surface area. The condenser's unique design allows the flow of the inlet and outlet cooling water to be reversed with the use of sliding sluice gates that results in instant backwashing. The force of flow from the return side is causing a washing out of the material on the water nozzle sections of the front waterbox, commonly referred to as the nests.

Severe material loss from sections around the inlet and outlet cooling water nozzles was witnessed during previous visual inspections. The visual inspections also revealed that small holes have developed in the transition areas from the nest to the outlet pipe. The water nozzle sections of the front waterbox contain a right hand and left hand section and both require replacement at the next available opportunity.

Summary of Related CI's +/- 2 years:
2010 - 22461 Condenser Outlet Valve Replacement $233,976

JUSTIFICATION:

Justification Criteria: Thermal

Why do this project?

An inspection of the Point Tupper Unit #2 (POT) condenser during the 2002 and 2008 shutdowns revealed several sections of the inlet and outlet water nozzle had substantial material loss from water washouts. The inspection revealed washed out sections on the 42" inlet and outlet sections and the formation of holes in the transition areas around the nozzle areas at the outlet nozzles. Due to material loss on wall thickness of the piping, weld repair to patch the holes is no longer feasible and replacement of the water nozzle sections of the front waterbox is required. Evaluations show the remaining sections of the upper waterbox lining to be in sound condition.

Why do this project now?

The integrity of the condenser inlet/outlet waterbox hull will be compromised if repairs at not completed within the next two years. The most cost-effective approach is to complete this work during a scheduled outage when the unit is out of service. The next opportunity to complete this work while the unit is shut down is during the planned outage in 2010.

Why do this project this way?

Replacement of the waterbox inlet/outlet nozzle with a nozzle of similar design is required to ensure the long-term integrity of Unit #2 condenser. Replacement is the most practical and cost-effective long term solution. It is expected that replacing the nozzle will reduce rising maintenance costs for repairs and application of protective coatings.

CI Number: 36622

Title: LIN - 4160V and 575V Breakers

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $248,848

DESCRIPTION:

This project provides the costs to continue with the refurbishment of Lingan 4 kV and 0.6KV breakers. The breakers are an integral component of the power supply to the plant's main auxiliary motors; including the boiler feed pump, forced draft fan, induced draft fan, cooling water and extraction pump motors. They also power the main 4 kV bus and auxiliary transformers. The breakers have critical adjustment components and electrical isolations that have deteriorated over time, as well as worn mechanical components.

Breakers are delivered back to the Original Equipment Manufacturer (OEM) for refurbishment while spare breaks are substituted.

There are 72 4160V breakers (60 - 1200 Amp and 12 3000 Amp). 68 of the 72 breakers will be completed by the end of 2009. Four (4) 4160V 3000A breakers remain to be refurbished.

There are 120 - 600 V breakers. 15 of the 120 will be completed as of 2009. NSPI plans to complete the remaining breakers between 2010 and 2012 (approx. 20 per year) during planned outages.

Summary of Related CI's +/- 2 years:
2008 - CI 28916 LIN- 4160V and 600V Breaker Replace $227,680
2009 - CI 30918 LIN - 600V Breaker Refurbish / Replace $242,234
2011 - CI TBD LIN - 4160Vand 600V Breaker Refurbish / Replace $250,000
2012 - CI TBD LIN - 600V Breaker Refurbish / Replace $225,000

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The breakers at Lingan are approximately 25 years old. Complete overhauls and refurbishment started in 2005 when the refurbishment program was first initiated. Failure of the 4kV breakers could result in an unplanned outage and significant damage to the 4kV bus. Refurbishment of the 4kV breakers is required to mitigate the risk of damage to the bus and unplanned outages.

Why do this project now?

The recommended refurbishment interval for these breakers is every 15 to 20 years, depending on the breaker design and duty cycle. NSPI's life cycle management plan identifies the required breaker refurbishments in 2010 - 2012. (Lingan maintains spare breakers to allow swap out and delivery back to the OEM for refurbishment.)

Why do this project this way?

Refurbishment is the most cost effective option. The cost to refurbish the breakers is approximately 25% less than to replace these breakers with new ones. The breakers will be refurbished to the same condition as new breakers to assure long-term reliability of the breakers is achieved. It is expected that refurbishment will extend the serviceable life of these breakers for an additional 15 to 20 years.

CI Number: 38946

Title: LIN1 - Replace High Voltage Bushings

Start Date: 2010/01

Final Cost Date: 2010/06

Function: Generation

Forecast Amount: $248,637

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. Hydrogen leakage has been observed around the bushings on Unit #1 and #2. Unit #2 bushings have been addressed in 2009 under CI 33662. The scope of this project is to refurbish the bushings on Unit 1 to reduce the risk of an unplanned failure and the associated replacement energy costs.

Summary of Related CI's +/- 2 years:
2009 - 33662 Lin 2 Replace HV Bushings $314,340

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Due to hydrogen leaks occurring around the generator bushings and with Original Equipment Manufacturer (OEM) recommendations, replacement of the generator bushings and o-ring gaskets is required.

Why do this project now?

The planned Unit #1 outage in 2010 is the next available opportunity to complete this work. Completing this project in 2010 will mitigate the risk of unplanned generator failures.

Why do this project this way?

Replacing the original generator bushings and o-ring gaskets is the most cost effective approach of ensuring long-term reliability of the generator.

CI Number: 38104

Title: POT - Coal Nozzle Standardization

Start Date: 2010/07

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $244,471

DESCRIPTION:

The Unit # 2 boiler was retrofitted to burn coal in 1986. The conversion included the installation of new coal nozzles designed to deliver the pulverized coal to the boiler. The original design of the nozzles included seal plates to prevent coal from entering the windbox. These seal plates would sometimes cause the nozzles to bind and limit their ability to tilt and operate as intended. Several designs were considered and tested over time, resulting in improved performance and extended life of these boiler components. As these nozzle designs evolved over time, the configurations of replacement nozzles also varied. This project will allow for the coal nozzles to be standardized to the most reliable nozzle design.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Due to evolution of coal nozzle design, a number of different nozzles are currently in service on the Unit # 2 boiler. Replacing the existing nozzles with those of a common design will ensure that the low NOx coal buckets fit the nozzles properly, preventing leakage between the two components.

Why do this project now?

Following the low NOx conversion project, the frequency of coal bucket repairs has increased. The cause of the failures is attributed to coal bypassing the nozzle and causing small fires in the windbox. This results in damage to the buckets and adjacent areas. Replacing the coal nozzles at the next available opportunity will address the issue of coal bypassing the nozzles and reduce the frequency of coal bucket repairs going forward.

Why do this project this way?

Replacing the existing nozzles with standardized nozzles of current design will minimize unit down-time during nozzle replacements and maintenance of the coal buckets. The new nozzles will have expandable tips and improved sealing surfaces.

CI Number: 38729

Title: TRE5 - Replace Demin and Reserve Feedwater Tanks

Start Date: 2010/06

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $240,000

DESCRIPTION:

The demineralized (demin) water tank and reserve feedwater tanks are integral components of the feed-water system for Unit #5. The demin tank is a heated storage vessel that contains boiler fed-water. The hot water in the demin tank is connected into the reserve feedwater tank and the condenser hot-well where make-up water is introduced through an automated water surplus valve. The surplus valve regulates the level in the hot-well to ensure sufficient water supply to the boiler. Demineralized make-up water supply is required during the normal course of operation to compensate for lower volumes of boiler feed-water during boiler operations such as blowdown, evaporation, attemperation, and regeneration. This project will include the replacement of the demin tank and reserve feedwater tanks.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The demin and reserve feedwater tanks were identified as requiring replacement during the Trenton Unit #5 Life Extension Study and must be replaced due to internal corrosion.

Why do this project now?

This project is planned for 2010 in accordance with the Trenton Unit #5 Life Extension Study recommendations. This project could not be completed during the planned outage in 2009 due to the location of these tanks relative to the Baghouse construction activities.

Why do this project this way?

This project will be completed in accordance with the recommendations in the Trenton Unit #5 Life Extension Study.

CI Number: 38910

Title: LIN - Fall Protection

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $239,260

DESCRIPTION:

The work associated with this project will repair "Hazard Class 2" 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:
2010 - 38910 TRE-Fall Protection $132,922
2010 - 38911 TUC-Fall Protection $95,704
2010 - 38912 POA-Fall Protection $53,169
2010 - 38913 POT-Fall Protection $53,169
2009 - 36262 TUC-U&U Fall Protection $100,493
2009 - 36242 TRE-U&U Fall Protection $66,152
2009 - 36244 POT-U&U Fall Protection $58,943
2009 - 36243 LIN-U&U Fall Protection $38,663
2009 - 36245 POA-U&U Fall Protection $35,521

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Buildings

Why do this project?

This project will address Hazard Class 2 areas with identified potential fall hazards as per the CJ MacLellan Fall Protection Survey Report dated February 20, 2009. The report was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI represented to the Court that it would conduct a fall protection survey to ensure compliance with applicable fall protection guidelines.

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 2 locations.

Why do this project this way?

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

CI Number: 36802

Title: LIN1 - ESP Outlet Duct Expansion Joint

Start Date: 2010/03

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $237,751

DESCRIPTION:

The purpose of this project is to refurbish deteriorated Unit # 1 precipitator outlet ductwork and cladding to stop the ingress of atmospheric air into the ductwork. Each generating unit uses two induced draft (ID) fans to draw combustion gases from the boiler and discharge these gases through the stack. Refurbishment of cladding and ductwork will prevent ingress of air and preclude more extensive long-term corrosive damage to the ID fans, ductwork and stack internals.

Summary of Related CI's +/- 2 years:
2009 - CI25415 Lin 1 & 2 Stack Breech Duct $268,904

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Heat Rate

Why do this project?

The induced draft (ID) fans on each generating unit discharge the combustion gases from the boiler. The combustion gases pass through the electrostatic precipitators (ESP) prior to being released to the atmosphere through the stack. The precipitator outlet ductwork and cladding are deteriorated as a result of sulphuric acid corrosion. The ID fans create negative pressure in the ductwork, which allows atmospheric air to enter the stream of hot flue gas that is being drawn into the fans. This cool air can bring the temperature of the gas flow below its dew point, causing sulphuric acid to form on the system components. The sulphuric acid rapidly corrodes the fan and ductwork components. It also adversely affects sections of the stack. Refurbishment of the ductwork and cladding is required to prevent further sulphuric acid corrosion.

Why do this project now?

The ductwork must be refurbished in 2010 to mitigate the risk of further corrosion to system components and more costly repairs in the future. The work is planned for the scheduled outage in 2010.

Why do this project this way?

Replacing the existing ductwork and expansion joints is the most practical and cost effective solution. The service life of the existing ductwork and expansion joints cannot be extended any further through repairs. Replacement is required to restore long-term integrity.

CI Number: 22461

Title: POT - Condenser Outlet Valve Replacement

Start Date: 2010/04

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $233,976

DESCRIPTION:

The condenser is vital to efficient turbine operation in a thermal generating station. The primary purpose of the condenser is to maximize energy value of the steam and convert the steam to water for re-injection into the boiler. To accomplish the conversion of steam to water, untreated cooling water is drawn from the cooling water source and pumped through a system of tubes that pass through the exhaust steam from the turbine. The cooling water reduces the temperature of the steam to the point where it condenses. The spent cooling water is discharged back to the environment through two outlet chambers.

The valves on the outlet piping of the condenser at Point Tupper are original equipment and they are difficult to close due to wear of the valve stems. A sufficient seal can no longer be obtained due to the condition of the valves and the condenser cannot be isolated.

Summary of Related CI's +/- 2 years:
2010 - 22467 Condenser Waterbox replacement $250,497

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The valves on both outlet chambers of the condenser no longer function as designed. The deteriorated valve stems allow water to leak past the valves when the valves are closed. Routine maintenance and repair work for unexpected condenser tube leaks require that these valves operate effectively and achieve complete isolation of the condenser.

In the last two years, plugs have been welded into condenser tubes during eight different outages. The unit was on-line for six of these partial outages. The cost of completing repairs during a partial condenser outage (unit on line at reduced load) is more cost effective than having the unit run continuously with the condenser in its current condition or taking the unit off line to complete repairs. Dependable isolation allows repair work on one drained chamber while the other is in operation. With valves operating as designed and providing complete isolation of the condenser, the unit could remain on-line and maintain up to 110MW (80 MW in the summer) while repairs are completed.

Why do this project now?

Replacing the valves at the earliest opportunity will ensure the condenser can be isolated effectively and eliminate the risk of having to shut down the unit to complete tube repairs.

Why do this project this way?

Replacing the valves is the most cost effective solution, as it will allow for complete isolation and only partial unit outages to complete maintenance activities in the future. The new valves will be equipped with the existing actuators, which have recently been refurbished.

CI Number: 37643

Title: TRE5 - Reclaim Feeder Upgrades

Start Date: 2010/08

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $227,322

DESCRIPTION:

Unit #5 utilizes four separate reclaim hoppers that are located below the plant's coal pile to store various types of coal. The coal is transferred from the pile to the conveyor system by four vibrating feeders that were designed to control coal flow and allow for proper blending.

The purpose of this project is to establish a reliable system that will allow coal to be transferred from the Unit #5 coal pile to the reclaim belt (5D) by upgrading the vibrating reclaim feeders and associated equipment. This will include replacing the vibrating feeders, attached chutes, and gates.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The existing vibrating reclaim feeders and associated equipment no longer transfers coal reliably from the Unit # 5 coal pile to the reclaim belt.

Why do this project now?

The current reclaim feeders are in excess of twenty years old, and are subject to challenging operating conditions, including coal dust, moisture and vibration. All four feeders have deteriorated and require replacement. Availability of spare parts has become an issue, at a time when maintenance activities have become more frequent. The earliest opportunity to replace the feeders is during the 2010 planned shutdown.

Why do this project this way?

In order to enhance the overall reliability of the Unit #5 coal handling system, this is the most cost effective and practical option.

CI Number: 37610

Title: LIN - Common Water Upgrades

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $205,184

DESCRIPTION:

This project will see the continued replacement of deteriorated sections of the original common water pipe throughout the plant. Leaking and deteriorated piping in various locations will be replaced. The piping will be systemically replaced throughout the station based on priority.

Summary of Related CI's +/- 2 years:
2009 - 33322 LIN Common Water Piping Replacement $149,546

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Sections of the common water pipe have corroded and are leaking. This project includes replacement of deteriorated sections to mitigate the risk of further deterioration or failure of the existing pipe.

Why do this project now?

A number of pipes in the common water system pass through areas of sensitivity, such as Motor Control Centers (MCC), turbine halls and control room areas. Some sections of the common water pipe are leaking in these areas and must be replaced.

Why do this project this way?

Patching is no longer effective for these sections of pipe due to the amount of corrosion. Replacement in sections is the most cost effective option to ensure continued use of the system.

CI Number: 36586

Title: POA - Limestone Piping Replacement

Start Date: 2010/09

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $203,730

DESCRIPTION:

Limestone is used in the combustion process at Point Aconi and is an essential part of the reaction in a circulating fluidized bed boiler. The limestone is delivered to the site in the form of crushed rock where it is then milled down to dust before it is added to the boiler. The movement of limestone through the transportation piping in the mill is very abrasive. This causes wear to both the piping and the mill. The purpose of this project is to replace piping and mill components that have experienced excessive wear. The material of the replacement piping components will be more resistant to erosion than the existing components.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Replacing limestone piping and mill components that have experienced excessive wear will reduce rising maintenance costs associated with completing temporary repairs.

Why do this project now?

In a number of areas, temporary repairs can no longer sustain the reliability of the limestone piping and mill components. Replacement is required at the earliest opportunity.

Why do this project this way?

Replacement of high-wear areas in the piping with upgraded materials is the most cost effective option.

CI Number: 34484

Title: TUC- Asbestos Abatement 2010

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $200,672

DESCRIPTION:

Asbestos insulation is being removed from Tuft's Cove 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 and boiler wall insulation).

Summary of Related CI's +/- 2 years:
2008 - 28746 TUC Asbestos Abatement 2008 $175,190
2009 - 30464 TUC Asbestos Abatement 2009 $198,691

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

Removing asbestos insulation reduces the risk of asbestos particles becoming air-borne where encapsulating 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 2010 are in accordance with the plant's asbestos work plan and inventory.

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 running plant.

CI Number: 22954

Title: TRE5 - Bottom Ash / Boiler Seal Replacement

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $200,583

DESCRIPTION:

The seal skirt and sacrificial protection on the Unit #5 bottom ash system form part of the boiler seal for the unit. This system was installed in the summer of 1999 during the conversion from a wet submerged bottom ash collection process to the current enclosed dry type. The skirt is a metal fabric style that is attached to the boiler and extends down into the bottom ash conveyor. The fabric material of the seal skirt moves up and down in the hopper to accommodate thermal expansion of the boiler while providing an airtight seal between the boiler / bottom ash conveyor. To protect this skirt from the heat from the boiler, a radiant screen was originally positioned between the fireball and the skirt. Evaluation of this design has resulted in the requirement for additional sacrificial protection in the form of hanging metal plates. The results of the evaluation indicated that the skirt deteriorated faster than expected.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Why do this project?

Deterioration of the bottom ash seal and screening has been identified as the root cause of two tube failures that occurred in the throat area of the furnace. Investigations from both failures identified design issues that contributed to premature failure of the boiler tubes. The development of further tube leaks due to material deterioration of the skirt could compromise the boiler seal. This would result in a reduction in unit efficiency and potential safety issues, depending on the size and nature of the tube leak. A unit outage would be required to repair the damage.

Why do this project now?

The proximity of the pressure boundary to the skirt and the location of the weld seams with respect to the pressure boundary increases the risk of more failures. To mitigate the risk of future failures, a plan to reinforce all welded seams identified as being the root cause of tube failures has been undertaken. This reinforces the welded seams but does not address material thickness issues, orientation and metallurgy of the sealing plates. A new seal skirt designed to provide added protection to the pressure boundary would prevent future tube leaks and subsequent generation losses from forced outages.

Why do this project this way?

The options of replacing the existing seal skirt with a re-designed seal skirt and reinforcing the deteriorated areas of the existing seal skirt and liner were considered. Repair and reinforcement of existing components is not the best option due to the significant amount of modifications that would be required to ensure an effective seal was achieved.

Analysis of repair and replacement options has concluded that replacement of the skirt and sacrificial protection with an upgraded design will result in extended life of these components and reduce the frequency of maintenance.

CI Number: 38844

Title: TRE5 - CW Pump House Structural Steel Upgrades

Start Date: 2010/01

Final Cost Date: 2010/04

Function: Generation

Forecast Amount: $199,777

DESCRIPTION:

The Unit #5 circulating water (CW) pump house at the Trenton Generating Station is part of the original plant that was constructed in the late 1960's. The CW pumps, CW screens, CW screen-wash pumps, and auxiliary equipment are located in the pump house.

The circulating water used at the Trenton plant is brackish water. Over the last forty years, the corrosive nature of the brackish circulating water has resulted in the corrosion of the structural steel in the pump house to the point where replacement is required.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

This project includes the replacement of all floor plates and handrails, as well as the reinforcement of major structural columns within the pump house to ensure the structural integrity of the building is maintained. Proactive replacement of the floor plates and handrails will ensure safe accessibility to the areas within the pump house is maintained.

Why do this project now?

A number of structural components require reinforcement at the earliest opportunity to ensure the structural integrity of the pump house is maintained.

Why do this project this way?

Maintaining the structural integrity of the pump house will also mitigate the risk of damage to the equipment located in the building. Planned replacement and reinforcement of the existing structural components is a more cost effective approach than replacing the complete structure.

CI Number: 33162

Title: POT - Replace HVAC units

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $197,806

DESCRIPTION:

A heating and ventilating consultant performed a condition assessment of all air conditioning units at Point Tupper. This project will implement the recommendation to replace the 600V MCC unit and the rack room unit. Both of these units are critical to the reliable operation of the plant.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Due to the age and condition of the rack room and 600V MCC heating ventilating and air conditioning (HVAC) units, maintenance is no longer cost effective and replacement is required. These units are critical to plant operation as they prevent electrical equipment from overheating and failing.

Why do this project now?

In accordance with the recommendations in the condition assessment, the rack room and 600V MCC HVAC units have reached the end of their service life and replacement is required. The plant must be off line during the replacement of these HVAC units as they provide cooling to critical electrical components required for normal plant operations. The planned outage in 2010 is the next available opportunity to replace these units.

Why do this project this way?

Replacement of the HVAC units is more cost-effective than continuing to repair the units. Failure of either of these two units would cause a unit outage and impact unit efficiency.

CI Number: 37862

Title: POT-Upgrade Bus Duct

Start Date: 2010/08

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $191,622

DESCRIPTION:

The bus duct at the Point Tupper Generating Station consists of sections of aluminum duct that are isolated from the ground with insulators and connected with flexible connections. The scope of this project includes replacement of the insulators, the purchase of flexible straps, installation of infrared viewing windows and replacement of duct cover seals.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The condition of the bus duct was assessed after the failure of flexible leads in 2009. It was determined that the insulators must be replaced. Completing this project will improve the plant's reliability.

Why do this project now?

An outage is required to perform this work and the next available opportunity is the planned outage in 2010.

Why do this project this way?

The insulators, flexible straps and duct cover seals are the components of this system that are most affected by usage over time and must be replaced.

CI Number: 34505

Title: TRE - 6B Vacuum Pump Overhaul

Start Date: 2010/04

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $185,504

DESCRIPTION:

The Trenton Unit #6 air extraction system (condenser vacuum) was constructed utilizing two liquid ring vacuum pumps. The vacuum pumps remove air and non-condensable gases from the Unit #6 condenser.

In 2003, 6A vacuum pump experienced a failure, and was overhauled in an unplanned manner. Subsequent to the rebuild of 6A pump, both 6A and 6B pumps have been monitored on a routine basis. Proactive refurbishment of the 6B vacuum pump is required in 2010 to mitigate the risk of another unplanned failure.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The current operating mode of Unit #6 has one vacuum pump in operation, while the other pump is on stand-by, or periodically supplying a vacuum to the Unit #5 condenser. In order to maintain the availability and reliability of Unit #6 at Trenton, the air extraction system needs to be restored to a reliable service condition by overhauling the 6B vacuum pump during the 2010 shutdown.

Why do this project now?

A proactive refurbishment of the 6B vacuum pump is required in 2010 to mitigate the risk of an unplanned failure of this pump and ensure unit reliability is maintained.

Why do this project this way?

Refurbishing the 6B vacuum pump in a planned manner during the 2010 shutdown is the most cost effective option.

CI Number: 37885

Title: POT - Lubrication and Chemical Storage Facility

Start Date: 2010/04

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $185,128

DESCRIPTION:

The original Unit #2 oil storage area is undersized for the requirements of the plant. Ensuring there is adequate storage for lubricating oil and non-hazardous chemicals is an important component of environmental management. This project includes the construction of a storage building for lubricating oils, chemicals, salt for winter usage and auxiliary equipment such as hoses and storage containers.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

Proper storage of lubricating oil is required to maintain environmental management practices and fire safety policies. The old petroleum storage area for Unit 2 is undersized and a new location is required. The new storage area will also include storage for other nonhazardous chemicals; salt and sand. The existing storage area is considered to be temporary and a permanent storage area is required.

Why do this project now?

The lubricating oil and chemicals are currently stored in a temporary storage area that is not located close to plant operations. Completing this project in 2010 will provide the benefits of a permanent storage area that is located close to plant operations.

Why do this project this way?

The area on the south side of Unit #2 is the most cost effective location to construct a lubricating and chemical storage building. It is also the most optimal area to locate this building as it has supply truck access.

CI Number: 32504

Title: LIN - Control Room HVAC Upgrades

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $180,368

DESCRIPTION:

A condition assessment performed by a heating and ventilation consultant indicated that replacing several heating ventilation and air conditioning (HVAC) units at the plant is required. This project includes replacement of HVAC units for the control room, relay 3-4 breaker room and lunch room. Replacing these HVAC units will ensure cooling is provided to the electrical equipment and provide a more comfortable working environment for plant personnel.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The condition assessment indicated that continuing to repair these HVAC units is no longer the most cost effective option.

Why do this project now?

The existing units have reached the end of their service life and replacing these HVAC units is required in 2010 to ensure the reliability of the plant is maintained. Replacing the control room and 3-4 breaker room HVAC units must be coordinated with unit outages that are planned in 2010.

Why do this project this way?

Replacing the existing units is the most practical and cost effective option.

CI Number: 38881

Title: TRE5 - Pulverizer Refurbishment

Start Date: 2010/04

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $177,890

DESCRIPTION:

Unit #5 at the Trenton Generating Station utilizes four coal pulverizers to prepare the coal for combustion in the boiler. These pulverizers were originally installed and commissioned in 1969 and have been subjected to continuous use. This project will improve pulverizer component performance, extend the maintenance lifecycle, improve the reliability of pulverizer rotating elements and associated components.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

A number of initiatives have been undertaken to extend component life, reduce forced outages, maximize availability and extend running hours between overhauls. This project focuses on improving pulverizer component performance, extending the maintenance lifecycle, improving the reliability on pulverizer rotating elements and associated components. This will result in avoiding increasing maintenance costs and improve unit efficiency.

Why do this project now?

High pulverizer efficiency and availability are required to ensure unit reliability is not compromised. A phased program is being initiated due to the large scope of replacing worn components on the four active pulverizers. Replacement parts are now required due to the age and wear of many of the pulverizer components.

Why do this project this way?

Re-establishing Original Equipment Manufacturer tolerances and the replacement of worn components will prevent degradation in unit performance and sustain high capacity factors.

CI Number: 31543

Title: LIN - Boiler House Improvements

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $173,641

DESCRIPTION:

This project includes the replacement of deteriorated floor grating and floor plate. This project is a continuation of the 2009 grating replacement project (CI 30942).

Summary of Related CI's +/- 2 years:
2009 - 30942 Floor Grating and Structural Upgrade $359,956

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

A large portion of the grating and floor plating around the mills and trench covers between the boiler feed pumps and the condenser pits are nearing the end of their useful life. Due to normal wear and corrosion, the existing carbon steel floor grating must be replaced.

Why do this project now?

Replacement of the existing grating and floor plating is based on the life cycle asset management assessment. The existing grating is corroded and must be replaced to maintain a safe working environment for plant personnel.

Why do this project this way?

Replacing the grating in corrosive areas with galvanized grating will ensure the life of the grating in these areas is maximized. Galvanized grating is the most cost effective option. The engineered floor plating is designed for higher loads than the existing floor plating. This will provide improved access for mobile equipment.

CI Number: 36522

Title: POT - Replace Turbine Oil Relay Studs

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $164,464

DESCRIPTION:

Replacing the oil relay studs on the turbine at Point Tupper is consistent with proactive work completed at Tuft's Cove and other NSPI generating stations in 2009.

Summary of Related CI's +/- 2 years:
2011 - 28289 POT Turbine Electro-Hydraulic Governor $580,150
2011 - 34544 POT Turbine Major Rebuild $1,270,572
2011 - 28288 POT Turbine Supervisory Equipment $841,870

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Replacing the oil relay studs on the Point Tupper turbine will mitigate the risk of potential failure and damage to the turbine.

Why do this project now?

The age of the studs is a key factor in determining the risk of failure. They are approximately 36 years old and are estimated to be original turbine parts installed in 1973. Due to the age of the oil relay studs, they must be replaced during the next planned outage to mitigate the risk of failure.

Why do this project this way?

Replacing the oil relay studs will mitigate the risk of failure and potential damage to the turbine. This is the only option to ensure the integrity of the connection of the turbine relay to the steam chest is maintained.

CI Number: 38883

Title: TRE - DCMS Upgrade - Phase 2

Start Date: 2010/05

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $162,117

DESCRIPTION:

The Distributed Control and Management System (DCMS) is a vital system that allows personnel to control and monitor the operation of the plant via graphical displays and operator interfaces. The Original Equipment Manufacturer (OEM) has discontinued regular product support of several DCMS components. Replacement parts are becoming increasingly difficult to source and will no longer be available by 2012. Upgrades to DCMS components must be completed to mitigate the risk of unit de-ration and reduced reliability in the event of a DCMS failure.

Summary of Related CI's +/- 2 years:
2009 - 28669 TRE5 DCMS Upgrade / Migration $151,195

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Most of the DCMS hardware components are now obsolete and must be replaced. Technical and hardware support is becoming increasingly difficult to obtain. The upgraded DCMS will be supported by the OEM for a minimum of 15 years. The upgrade to the DCMS is being completing using a phased approach. This project is the second phase of the three-phase DCMS upgrade.

Why do this project now?

Given the time and cost required to upgrade the existing DCMS, it is necessary to continue with phase 2 of the upgrade in 2010.

Why do this project this way?

Continuing with phase 2 of the DCMS upgrade will mitigate the risk of unit outages and de-rating the units in the event of a DCMS component failure.

CI Number: 28128

Title: LIN - Replace Main BFP Discharge Check Valves

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $160,092

DESCRIPTION:

The purpose of this project is to replace the existing discharge check valves on Unit #1 boiler feed pumps at the Lingan Generating Station. Replacement of these valves will improve the reliability and performance of the boiler feed pump (BFP) discharge check valve isolation.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The existing BFP discharge check valves are approximately 25 years old and have reached the end of their useful life. It is becoming increasingly difficult to source replacement parts and maintain the valves in acceptable working condition. The existing valves also contain an automatic recirculation feature which is no longer used. There are several parts associated with this automatic recirculation feature that can not be removed from the valves. These parts have begun to cause performance and maintenance issues. Hot feed-water leaking past a discharge check valve from the unit's common BFP discharge line promotes uneven thermal flow within the standby pump. This uneven flow distorts critical tolerances and clearances. This also increases the risk of damaging the pump when it is started.

Why do this project now?

Replacing the BFP discharge check valves will mitigate the risk of an unplanned unit outage and associated replacement energy costs in the event of BFP check valve failure.

Why do this project this way?

The existing valves have reached the end of their useful life and replacement is the only option.

CI Number: 37562

Title: TRE5 - Bunker C Pump Replacement

Start Date: 2010/08

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $160,000

DESCRIPTION:

Coal is the primary source of fuel for the boilers at Trenton, and bunker C oil is used as an alternative fuel. The bunker C system is supported by three bunker C pumps; one of which was installed when Unit #6 was built in 1991, and two installed when Unit #5 was commissioned in 1969.

Each pump has the nominal capacity to support either unit. Redundancy is incorporated into the design of the bunker C system such that only two pumps must operate simultaneously to support both generating units when bunker C oil is required. The purpose of this project is to increase the reliability of the two generating units by upgrading the bunker C pumps. The scope of the project includes replacing the two Unit #5 pumps, upgrading the control system and replacing the bunker C piping system to support the installation of new pumps.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The two unit #5 bunker C pumps are at the end of their service life. They have been rebuilt several times and have become unreliable. As the pumps continue to age, spare parts become increasingly difficult and costly to source. The control system components that are used in the automatic change-over between pumps are no longer functional and need to be replaced. Replacement of two bunker C pumps and the associated control system components will increase the reliability of both Units #5 and #6.

Why do this project now?

The existing condition of the pumps and control system components increases the risk of Units #5 and #6 being unavailable should firing the boilers with bunker C be required for an extended period of time. Completing this project will mitigate the risk of generating unit downtime in the event of bunker C pump failure.

Why do this project this way?

Replacement of the pumps is the most cost effective option to increase the reliability of the bunker C system.

CI Number: 38830

Title: TRE5 - 4kV Motor Refurbishment

Start Date: 2010/06

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $159,719

DESCRIPTION:

Some of the critical equipment at the Trenton Generating Station is driven by 4160 volt motors. These include forced draft (FD) fans, induced draft (ID) fans, pulverizers, crushers, boiler feed pumps, condensate extraction pumps, and circulating water pumps. Many of these motors have been in service for over 25 years and some of them require refurbishment. Unplanned failure of these motors could cause a unit trip or result in reduced generating capacity. These motors require refurbishment in 2010. Refurbishment activities include dismantling, cleaning, "meggering", internal inspection, bearing overhaul or replacement, wedging of loose coils, dipping and reassembly. Refurbishing the 4160 volt motors will maximize motor availability and reliability.

The 5-1 CW Pump, 5-1 Condensate Extraction, 5-2 Condensate Extraction, 5-1 Pulverizer and 5-2 Pulverizer motors will be refurbished in 2010. To date, 15 of the 28 4kV motors included in the motor refurbishment program have been refurbished.

Summary of Related CI's +/- 2 years:
2008 - 28686 TRE 4kV Motor Program $126,410
2009 - 30822 TRE 4kV Motor Program $152,223

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

On-going monitoring and inspections indicate that a number of the plant's critical 4160V motors must be refurbished. Proactively refurbishing these critical motors will mitigate the risk of more costly motor repairs in the event of unplanned failure.

Why do this project now?

Refurbishment of these motors is required now due to the risk of unplanned motor failure, forced outages and the higher repair or replacement costs that could be associated with unplanned failures.

Why do this project this way?

Refurbishing the existing motors is the most practical solution and is more cost effective than replacing the motors with new motors.

CI Number: 36624

Title: LIN - 4160 Motor Refurbishment

Start Date: 2010/02

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $154,517

DESCRIPTION:

Some of the critical equipment at the Lingan Generating Station is driven by 4160 volt motors. These include forced draft (FD) fans, induced draft (ID) fans, pulverizers, crushers, boiler feed pumps, condensate extraction pumps, and circulating water pumps. Many of these motors have been in service for over 25 years and some of them require refurbishment. Unplanned failure of these motors could cause a unit trip or result in reduced generating capacity. These motors require refurbishment in 2010. Refurbishment activities include dismantling, cleaning, "meggering", internal inspection, bearing overhaul or replacement, wedging of loose coils, dipping and reassembly. Refurbishing the 4160 volt motors will maximize motor availability and reliability.

6 motors will be refurbished in 2010. To date, 47 of the 56 4kV motors at the Lingan Generating Station have been refurbished.

Summary of Related CI's +/- 2 years:
2009 - 30922 LIN 4160V and 600 V Motor Refurbish $149,560

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

On-going monitoring and inspections indicate that a number of the plant's critical 4160V motors must be refurbished. Proactively refurbishing these critical motors will mitigate the risk of more costly motor repairs in the event of unplanned failure.

Why do this project now?

Refurbishment of these motors is required now due to the risk of unplanned motor failure, forced outages and the higher repair or replacement costs that could be associated with unplanned failures.

Why do this project this way?

Refurbishing the existing motors is the most practical solution and is more cost effective than replacing the motors with new motors.

CI Number: 28666

Title: TRE - 6B BFP Volute Refurbishment

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $153,177

DESCRIPTION:

The feed water system at the Trenton Generating Station supplies boiler feed water to the Unit # 6 boiler. The 6B boiler feed pump (BFP) requires refurbishment in 2010. This refurbishment will include the replacement of the existing volute with a volute that is currently in stock as a spare part at the plant.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Why do this project?

The inspection and overhaul of 6B BFP is required in 2010. This refurbishment will ensure the long-term reliability of the pump and minimize the risk of unplanned failures and more costly repairs in the future.

Why do this project now?

Refurbishing the 6B BFP will ensure sufficient feed water supply to the boiler and mitigate the risk of de-rating the unit in the event of a pump failure. An unplanned BFP failure would result in Unit #6 operating without a backup pump and increase the risk of an unplanned unit outage The plant's Life Cycle Management Program has indentified that the 6B BFP must be refurbished in 2010.

Why do this project this way?

The first option considered was the refurbishment of the existing volute during a planned pump outage. The second option considered was replacement of the volute with a new volute purchased from the original equipment manufacturer (OEM). The most cost effective option is to refurbish the existing volute. A spare pump volute is stocked at the plant and will be used to complete the pump refurbishment. The pump volute currently in operation will be inspected, refurbished and returned to the plant's inventory of spare parts for future refurbishments.

CI Number: 32824

Title: TUC - Piping Replacement

Start Date: 2010/04

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $151,580

DESCRIPTION:

This project is for proactive replacement of several piping systems at Tuft's Cove. Condition monitoring, inspection and assessment of historic failure data has identified a number of areas as being at risk of impacting unit performance, heat rate or unit availability. The majority of the project scope includes work to the following piping systems; turbine vents and drains, circulating water, boiler vents, drains and blowdowns, chemical feed, station fuel oil and unit fuel oil.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Several piping systems at Tuft's Cove have degraded to the point of requiring replacement due to exposure to a harsh operating environment over the life of the systems. Some of the piping systems are in excess of 30 years old and have never been replaced. Repairs have been successful in the past for thinning sections of pipe. However, for some piping systems the piping has reached the point where repair is no longer the most practical and cost effective solution.

Why do this project now?

The piping sections identified for replacement have deteriorated to the point where replacement is required in 2010.

Why do this project this way?

The alternative to replacing the identified sections of piping would be to continue with piping repairs. Repairs are no longer a practical or cost effective approach.

CI Number: 38731

Title: TRE - High Pressure Piping Upgrades

Start Date: 2010/06

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $151,105

DESCRIPTION:

Inspection of the low load feed water lines, the de-aerator (DA) cascade lines and feed water system identified some areas requiring replacement due to accelerated flow erosion and corrosion. The areas that did not meet American Society of Mechanical Engineers (ASME) B31.1 standards were replaced in 2009, and the remaining areas must be replaced during the Unit # 5 outage planned for 2010.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Accelerated flow erosion and corrosion is prevalent in the areas of the piping where flow is constricted or changes direction. Replacing the piping will mitigate the risk of failure due to accelerated flow erosion and corrosion.

Why do this project now?

The affected areas of pipe have reached a wall thickness where replacement is the only option. Replacing the piping in 2010 will mitigate the risk of unplanned failures.

Why do this project this way?

Many of the affected areas are 40 years old and replacement is the most cost effective solution.

CI Number: 38662

Title: TRE - Plant Lighting Replacement and Upgrades

Start Date: 2010/10

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $150,829

DESCRIPTION:

Trenton #5 was originally commissioned in 1969. As part of the original design, a lighting layout and standard for minimum luminance was defined. Over the years, there have been a number of modifications and upgrades to the plant and facilities. In some areas of the plant, changes to the configuration of plant equipment and deterioration of the original lighting have resulted in the need for lighting replacements and upgrades. The two areas in need of lighting upgrades are the ground and steam drum floors of the #5 boiler house.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Buildings

Why do this project?

A lighting survey was completed in 2002 to test the luminance (brightness) in the areas around Unit #5. Readings were taken with a digital light meter to test the illumination levels of the lighting. All readings were expressed in foot-candle units. The readings were taken just above waist level (3'-6"), where most of the work would be conducted. The results were compared to the minimum allowable luminance as suggested in the original lighting layout drawings for Unit # 5. The results indicated that only 20% of the readings exceeded the illumination level of 20 ft-candles.

Why do this project now?

With the installation of new lighting in 2010, as well as the work completed in 2006 and 2007, this project would mitigate the risk associated with traversing in poorly lit areas.

Why do this project this way?

Increasing the illumination levels in these areas by installing new lights is the most effective solution.

CI Number: 38836

Title: TRE5 - 5-1 CW Screen Upgrade

Start Date: 2010/06

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $150,304

DESCRIPTION:

The Unit # 5 traveling water screens are an integral part of the intake circulating water (CW) system for the Trenton plant. The screen system consists of two separate units, each of which has numerous framed screens that rotate through the circulating water (CW) intake system. The primary purpose of these is to filter out the foreign material from the water as it is being extracted from the river. A failure of these screens would allow foreign matter into the CW system, or result in the screen system plugging. A plugged screen system could lead to a drive train failure and reduce the water flow to the CW pumps. In each case, the circulating water system performance would be affected. Reduced unit efficiency due to fouling, de-rating of the unit, or an unplanned unit outage could also occur.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The screen units are original equipment from the commissioning of the plant in 1969. Due to the effects of salt water corrosion, the screen components do not typically have a long life. Inspections on this system in 2009 indicated that that there are a number of components that need to be replaced and rebuilt on the 5-1 CW Screen in 2010.

Why do this project now?

The Unit #5 traveling water screen components have reached a point where evidence of corrosion and wear indicate the components are approaching the end of their service life. These components require refurbishment in 2010 to ensure long term reliability and integrity of the Unit 5 CW system. The most effective approach is to complete the repairs at the next available opportunity to avoid more costly repairs and system disruptions.

Why do this project this way?

Due to the wear across the entirety of the screens, partial replacement is not an option. Replacement of these screens can only be accomplished during a planned unit outage when the equipment can be dewatered. The next available opportunity to complete this work is during the planned outage in 2010.

CI Number: 37582

Title: TRE - HVAC Replacements

Start Date: 2010/03

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $145,663

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 HVAC to offices, control rooms, and critical plant equipment. The focus of this HVAC replacement project will be to replace the HVAC units for the inverter room and control room.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

In recent years, the frequency of failure of the HVAC units in the inverter room and control room has increased. Refrigerant leaks have also been experienced in recent years and must be addressed. Replacing the HVAC units will ensure reliable cooling is available for both the inverter room and control room's electrical components.

Why do this project now?

The frequency of repairs of the HVAC units in the inverter room and control room has recently increased. These units have undergone frequent repairs. The risk of not being able to obtain replacement parts now exists, as some parts have been discontinued. Replacement of these two units in 2010 will mitigate the risk of equipment failures.

Why do this project this way?

The most practical and cost effective solution to address the HVAC reliability issues in the control room and the inverter room is to replace the existing HVAC units.

CI Number: 34507

Title: TRE - 5D Belt Replacement

Start Date: 2010/05

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $140,677

DESCRIPTION:

The 5D conveyor is part of the Unit # 5 coal reclaim system at the Trenton Generating Station. Conveyor D is the first belt in the system and recovers coal from the underground reclaim hoppers located under the Unit # 5 coal pile. Conveyor D also delivers the reclaimed coal to the frozen coal crusher and on to conveyor 5E. The conveyor was originally installed in 1969 and was most recently replaced in 2003. A conveyor belt for this system would typically be replaced after five years of service.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

During an inspection in 2008, the belt was found to be approaching the end of its useful life. It was recommended this belt be replaced during the 2010 shutdown.

Why do this project now?

The conveyor has a rated capacity of 600 tons per hour. Should the belt be taken off line for service, Unit # 5 would have a coal supply for approximately 16 hours. This belt requires replacement in a planned manner during an extended outage. The next available opportunity is the planned shutdown in 2010.

Why do this project this way?

Due to the wear along the entirety of the belt, partial replacement is not an option. Replacement of this belt can only be completed during an extended shutdown, which is scheduled in 2010.

CI Number: 30387

Title: POT - East CW Pump Bearing Upgrade

Start Date: 2010/04

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $137,190

DESCRIPTION:

The east cooling water (CW) pump requires a planned overhaul and bearing replacement. The new bearings for the east CW pump will be of the same type and design used in the west CW pump.

Summary of Related CI's +/- 2 years:
2010 - 30386 Waste CW Pump Bearings $266,816

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The east CW pump must be overhauled. When the east CW pump was last upgraded, the intent was to replace the bearings with bearings that were the same type and design of the west CW pump. Due to issues experienced with the bearing manufacturer, the original bearing design was maintained.

Why do this project now?

The next opportunity to complete the upcoming overhaul of the east CW pump and bearing replacement is during the planned outage in 2010.

Why do this project this way?

The pump has been very reliable since installation, but requires regular overhauls. One of the parts of the pump that dictates the time between overhauls is the cutlass rubber bearings. Typically, failures of the cutlass rubber bearings have occurred after five years of operation. Replacing the cutlass rubber bearings with a new design similar to the west CW pump will increase the life of the bearings. This project also supports additional operating benefits including, a reduction in the use of common water and the optimization of spare parts inventory.

CI Number: 34368

Title: POA - Screw Cooler Rotor Replacement Program

Start Date: 2010/05

Final Cost Date: 2010/06

Function: Generation

Forecast Amount: $136,618

DESCRIPTION:

The Screw Cooler Rotor Replacement Program will return the existing screw cooler rotors to 'like new' condition, through a planned replacement approach.

Erosion of the screw cooler flights has resulted in increased cooler leaks. This will be addressed by replacing the rotor flights. The delivery lead-time is significant and rotor hard-surfacing is required before a rotor can be replaced. The scope of this project includes the purchase of a new rotor to replace the existing worn rotor.

Summary of Related CI's +/- 2 years:
2008 - 28786 POA-Screw Cooler Rotor Program $193,090

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The Screw Cooler Rotor Replacement Program will return the existing screw cooler rotors to like new condition, through a planned replacement approach. Erosion of the rotor flights has resulted in increased cooler leaks which will be addressed by replacing the rotor flights.

Why do this project now?

Through routine annual inspection and life cycle management, it has been determined that the screw cooler rotors have deteriorated to a point that a staged replacement approach is required. The current ash loading on the boiler requires that all four coolers be available to mitigate the risk of de-rating the unit by 30 MW. Recent cooler leaks have resulted in loss of generation and the frequency of this occurrence has recently increased. The 2010 maintenance shutdown will provide sufficient time to continue the replacement process.

Why do this project this way?

This project addresses the fourth of four rotors to complete the Screw Cooler Rotor Replacement Program in the short-term.

CI Number: 38725

Title: TRE5 - Refurbish Light Oil Tanks and Lines

Start Date: 2010/02

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $134,835

DESCRIPTION:

Light oil is required for ignition start-up of the boilers in conjunction with bunker C oil in some cases. The tanks are contained in a concrete reinforced dyke that is approved by the Nova Scotia Department of Environment and Labour. The exterior of the tanks must be recoated.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Rusting on the exterior of the light oil tanks and associated piping prompted an ultrasonic thickness survey under the plant's Life Cycle Management (LCM) program. The objective was to identify weak areas on the tank shell. Although no indications of weakness were found on the tank, significant rusting was discovered. This condition will accelerate corrosion, unless the surface coating is renewed. The tanks are located outside within an approved containment dyke. The tanks are over 30 years old and the coating has deteriorated due to a combination of exposure to the elements and age.

Why do this project now?

Evidence of corrosion is present on the exterior shell of the tank and associated piping. Corrosion will continue if the tank exterior surface and associated piping are not recoated. Being proactive and completing this project in 2010 will mitigate the risk of a future oil leak.

Why do this project this way?

This project must be completed to maintain the structural integrity of Trenton Unit # 5 oil tanks and associated piping.

CI Number: 38894

Title: TRE - Fall Protection

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $132,922

DESCRIPTION:

The work associated with this project will repair "Hazard Class 2" 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:
2010 - 38910 LIN-Fall Protection $239,260
2010 - 38911 TUC-Fall Protection $95,704
2010 - 38912 POA-Fall Protection $53,169
2010 - 38913 POT-Fall Protection $53,169
2009 - 36262 TUC-U&U Fall Protection $100,493
2009 - 36242 TRE-U&U Fall Protection $66,152
2009 - 36244 POT-U&U Fall Protection $58,943
2009 - 36243 LIN-U&U Fall Protection $38,663
2009 - 36245 POA-U&U Fall Protection $35,521

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Buildings

Why do this project?

This project will address Hazard Class 2 areas with identified potential fall hazards as per CJ MacLellan Fall Protection Survey Report dated February 20, 2009. The Report was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI represented to the Court that it would conduct a fall protection survey to ensure compliance with applicable fall protection guidelines.

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 2 locations.

Why do this project this way?

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

CI Number: 38851

Title: LIN - Coal Belt Sampler

Start Date: 2010/01

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $132,053

DESCRIPTION:

The coal mix at Lingan is a critical element in the overall management of environmental, ash and heat rate parameters. Maintaining the desired coal mix and trending variations over the short and long term is critical to environmental regulation compliance and managing generating station efficiency.

Coal is presently extracted manually from feed conveyers and prepared for lab analysis. This project includes the design specification and installation of a coal sampling system that will automatically extract a sample of coal and prepare the sample for the laboratory testing.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Heat Rate

Why do this project?

Using coal sampling equipment that is already established in the industry will improve the coal sampling process and support compliance with the American Society for Testing and Materials testing methods.

Why do this project now?

Managing the coal blend at Lingan is becoming increasingly important to meet environmental and efficiency requirements. Existing coal blending controls and its correlation to environmental and efficiency parameters can be improved by automating the data collection process.

Why do this project this way?

Coal sample extraction is established in the industry as an effective way to manage coal blending operations.

CI Number: 22426

Title: TRE - 5-2 Air Heater Outlet Expansion Joint Replacement

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $131,615

DESCRIPTION:

The flue gas ducts on Trenton Unit #5 between the air heaters and precipitator are part of the original unit equipment and date back to 1969. During the 2005 shutdown, several leaks were discovered in the bellows style inlet expansion joint on the east side of the precipitator. This resulted in air ingress to the precipitator which can effect precipitator performance. This expansion joint was part of the original plant equipment and was a corrugated steel bellows style joint. Ash had compacted in the flutes of the joint and cracked the steel in some of the flutes.

The bellows style joint will be replaced with a fabric joint. Air ingress can lower flue gas temperatures, resulting in precipitation of sulphur dioxide and subsequent corrosion of the ductwork and expansion joint in the area of the leak. Spot repairs were conducted during the 2005 shutdown, but these repairs only addressed the issue on a short term basis. The expansion joint requires replacement to ensure the long term integrity and reliability of the unit.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Temporary repairs were completed in 2005 to address leaks in the expansion joint on Trenton Unit # 5 (east precipitator inlet). Replacement of the damaged expansion joint will ensure the long term integrity and reliability of the unit. The sulphuric acid precipitated would result in corrosion damage to the ductwork and precipitator.

The flue gas in the area of the expansion joint is typically under negative pressure. In the event that holes develop in the expansion joint and a boiler tube leak occurs, there is a risk that flue gas could leak into the boiler house.

Why do this project now?

This project serves to maximize long term unit performance as well as minimize the risk of safety issues. Replacement of the joint will require a unit shutdown to accommodate the time required for this work. The next opportunity to complete this work is during the scheduled shutdown for the unit in 2010.

Why do this project this way?

Options considered include the following:

1. Plating over the joint
2. Replacement of the joint with a steel expansion joint that is similar in design to the current expansion joint
3. Replacement with a fabric joint.

Plating over the joint would be an extremely short term solution. The amount of movement between the air heater and the precipitator, combined with the rigidity of the components, does not make this style of repair the best choice. Replacement with a similar design expansion joint would be costly, as access to the joint is very restricted. During construction of the unit, the joints would have been installed early, before much of the surrounding equipment was in place. The cost to install a one-piece joint would be far less cost effective than an alternative fabric joint.

Replacement with a fabric joint would require removal of insulation in the area around the joint, cut out of the existing joint and installation of attachment plates for the fabric. When these activities are complete the installation of the fabric itself will follow. Re-insulation would not be required. This is the most efficient and cost effective option. Fabric joints have been installed successfully in two locations down stream of the air heaters on Unit # 5 (induced fan inlet and the stack breaching).

CI Number: 28685

Title: TRE5 - Actuator Upgrade

Start Date: 2010/04

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $128,117

DESCRIPTION:

The high pressure feed water valve actuators at the Trenton Generating Station are approximately 30 years old and are nearing the end of their useful life. Replacement parts are difficult to source and many of these actuators have become unreliable and difficult to maintain.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Why do this project?

Accurate and reliable control of high pressure feed water valve actuators is critical to plant operation. The existing actuators have become unreliable and difficult to maintain. They need to be replaced to mitigate the risk of lost generation.

Why do this project now?

The existing feed water actuators at Trenton are at the end of their useful life. They have become difficult to maintain and replacement parts are no longer available. Many of the actuators on Unit # 5 are 40 years old. Recent issues with these actuators have delayed bringing the unit online and occasionally resulted in lost generation.

Why do this project this way?

It is no longer feasible to continue maintaining the existing actuators. Replacement of these actuators with new actuators is the most cost effective option. This project will be executed using a phased approach over several years.

CI Number: 38937

Title: POT - HFO Dyke Enlargement

Start Date: 2010/06

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $127,644

DESCRIPTION:

The heavy fuel oil (HFO) tank dyke no longer complies with environmental regulations for storage capacity and must be enlarged.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Capacity

Why do this project?

The heavy oil tank dyke does not meet environmental regulations for storage capacity and must be enlarged. The practice that was in place to maintain a lower level in the tank is no longer accepted by the Department of Environment.

Why do this project now?

The practice of maintaining a lower level in the dyke tank will no longer be accepted by the Department of Environment. The dyke must be enlarged.

Why do this project this way?

The dyke will be enlarged by excavating within the existing dyke and raising the overall height of the dyke. This is the most cost-effective approach to completing this project.

CI Number: 28747

Title: TUC - Refurbish Cooling Water Intake Structures

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $125,903

DESCRIPTION:

This project includes the repair and replacement of the concrete and structural steel components of the Unit #1 cooling water intake structures at Tuft's Cove.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

The structural concrete and steel at the intake area of the Unit #1 cooling water intake structures has been identified by an engineering consultant as requiring refurbishment. The concrete and structural steel components will be refurbished at the next opportunity in order to reduce the risk of failure.

Why do this project now?

The concrete and steel components are over 30 years old and are located in turbulent, salt-water environment. These conditions have caused deterioration. Based on an independent study from a civil engineering firm refurbishment is required.

Why do this project this way?

The alternatives are refurbishing the affected structures or replacing the entire structure. The most practical and cost effective option is refurbishment.

CI Number: 32583

Title: POT - Upgrade Oil Guns

Start Date: 2010/07

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $123,708

DESCRIPTION:

Technological improvements to oil igniter guns have addressed many of the maintenance issues that have occurred in the older mechanical retraction units. The most common issue has been the cost of refurbishing the retractable mechanism. A boiler engineering and construction firm has identified the problem and developed a new type of oil gun that has been used successfully in the industry. This new "Evercool technology" eliminates the need to retract the igniter guns from the boiler after firing. They are cooled externally and have very few moving parts. Based on industry experience it is expected that these units will have significantly less maintenance requirements than the existing antiquated technology.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

This project will reduce rising maintenance levels on the existing oil guns. Additionally it serves to reduce unit start-up durations (currently attributed to faulty guns) and limit switches in the moving mechanisms.

Why do this project now?

This is new technology that has been proven effective and efficient in the power generation industry. Implementing this technology at the earliest opportunity will allow for the benefits of lower maintenance costs and reducing start-up durations to be realized.

Why do this project this way?

These upgrades will significantly shorten unit start-ups and reduce maintenance requirements.

CI Number: 37644

Title: TRE - Coal Conveyor Scraper Upgrade

Start Date: 2010/03

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $120,498

DESCRIPTION:

The Trenton Generating Station operates two 150MW Units (#5 & #6) that burn coal as the main fuel source. In order to effectively manage the coal handling process, the plant has a total of twelve separate coal conveyors; all of which are required to operate both units.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

In November 2008, an inspection was performed on the coal conveyor systems. The inspection indicated that the condition and cleanliness of the belt scrapers presented reliability concerns.

Why do this project now?

The implementation of an effective belt cleaning mechanism is critical to proper operation of the coal conveyors. The Unit #5 conveyor system was initially installed in 1969, and has undergone many scraper modifications over the years; with limited success. Unit #6 coal scrapers were installed with the original equipment in 1991 and are becoming problematic as they approach the end of their useful life. There is an opportunity to complete this project in 2010 as planned outages are scheduled for both units.

Why do this project this way?

By implementing standardized coal belt cleaning equipment on both Unit #5 and Unit #6, long-term reliability of the belt scrapers and coal conveyors will be restored.

CI Number: 28738

Title: TUC - Waste Water Lagoon Enhancement

Start Date: 2010/02

Final Cost Date: 2010/06

Function: Generation

Forecast Amount: $119,038

DESCRIPTION:

This project will expand the waste water lagoon at Tuft's Cove to provide increased storage capacity.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The storage capacity of the lagoon has not been increased since the installation of Units #1, #2 and #3. The capacity of the lagoon can be limited by elevated levels of precipitation, addition of plant equipment and water treatment requirements. Current studies indicate the volume of water currently being processed has increased the risk of a leak into the environment in the event of a severe storm, or an equipment failure downstream of the lagoon.

Why do this project now?

Study results indicate that enhancements of the waste water lagoon are required in the short-term to mitigate the risk of an environmental incident.

Why do this project this way?

Alternatives include installing a completely new lagoon, increasing the capacity of the existing lagoon or renting tanks during periods of highest risk (such as equipment failure and heavy storms). Increasing the capacity of the existing lagoon is the most cost effective and practical approach.

CI Number: 37945

Title: TUC - Condenser Tube Sheet Protection

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $117,005

DESCRIPTION:

This project includes the addition of a new impressed current cathodic protection system for the Unit #3 condenser waterbox internals.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Inspection of the existing condenser tubes, tubesheets and waterboxes by a metallurgical consulting group revealed that installation of an impressed current cathodic protection system in each of the six waterbox enclosures would reduce the effects of corrosion.

Why do this project now?

Testing and evaluations in 2008 and 2009 suggest that the active rates of corrosion are fast enough that a protective system must be installed in the near future to avoid major repairs and replacements. Installing an impressed protection system will reduce future costs for major repairs and equipment replacements.

Why do this project this way?

Impressed current cathodic protection systems provide corrosion protection at a reasonable cost. Additionally, this project will serve to reduce the risk of having to replace tubes, tubesheets and waterbox components due to accelerated corrosion.

CI Number: 28300

Title: POT - Actuator Replacement Program

Start Date: 2010/06

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $114,485

DESCRIPTION:

This project includes the replacement of the actuators on all high pressure (HP) heaters. These existing actuators are 35 years old and have reached the end of their useful life.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The actuators for the HP heaters are original equipment and have reached the end of their service life. Repairs have maintained the actuators in operation, but spare parts are no longer available. Internal limit switches have been problematic and a complete failure of the actuators could occur.

Why do this project now?

These actuators are now a discontinued product and spare parts are no longer available. The actuators must be replaced to maintain reliable operation of the plant.

Why do this project this way?

Proactively replacing the actuators before they fail is the most cost effective option.

CI Number: 34506

Title: TRE - Ash Site Management

Start Date: 2010/01

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $113,560

DESCRIPTION:

The ash site for the Trenton Generating Station has been operating since Unit # 6 went into service in 1991. The ash site has received ash from Unit #6 from 1991 until 1999. The site was not used between 1999 and 2007, when all of the ash from Unit #5 and Unit #6 was placed in the ash lagoon adjacent to the plant. Since May 2007, all ash from both units has been placed at the ash site because the ash lagoon is now at full capacity.

Summary of Related CI's +/- 2 years:
2008 - 28693 TRE Ash Site Covering $136,070
2009 - 30827 TRE Ash Site Covering Project $120,517

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Maintenance

Why do this project?

The capping of the completed areas of the active ash cells within the ash site is a requirement stipulated in the plant operating permit issued by the Nova Scotia Department of Environment and Labour. The capping minimizes the risk of the ash dust becoming airborne and controls erosion of the ash material within the remaining cell areas. This project includes covering and capping the active ash cell as it reaches final grade in 2010.

Why do this project now?

The operating permit issued to the Trenton Generating Station requires that all completed cells of the ash management site be capped with a soil cover within a reasonable period of time. Completing this project in 2010 will minimize the exposed area of ash at any given time and control erosion and run-off.

Why do this project this way?

The method of capping the completed cells at the ash management site will be similar to the method used between 1991 and 1999. This method meets the operating permit requirements. After the cell has reached its final grade, native till material from the surrounding areas will be transported to the site, levelled to an approximate depth of 300 mm and then rolled to a uniform thickness. The area will then be mulched to promote the establishment of a vegetative protection cover, which will contribute to the long term protection of the soil cap. The application of this thickness of material has proven to be sufficient to achieve and maintain the required protective covering.

CI Number: 38109

Title: POT - Sootblower Upgrades

Start Date: 2010/04

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $109,491

DESCRIPTION:

Sootblowers maintain the proper operation of a boiler by cleaning soot and ash from the boiler tubes. One sootblower design currently in operation is positioned along the boiler walls to clean tube platens. One issue with this type of sootblower is that impingement of sootblower spray on the tubes leads to premature failure of boiler tubes. This project includes the modification of wall sootblowers to ensure that repetitive blowing or condensate spraying is mitigated in order to reduce erosion of tubes and premature tube failures.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Forced Outage Rate

Why do this project?

This project will reduce tube failures caused by sootblower impingement. This will be achieved through changing the repetitive impingement of sootblower paths and eliminating the spraying of condensate on the boiler tubes.

Why do this project now?

The impingement of sootblower spray has caused premature thinning of boiler tube walls resulting in rupture of the tube. To reduce the frequency of failures, upgrading the wall sootblowers by installing sootblowers with indexing or one-way blowing capability will be completed.

Why do this project this way?

Sootblowers are necessary to minimize slag and ensure proper operation of the boiler. Historically, the drawback of sootblowers has been premature tube failures due to repeated impingement of high pressure steam, ash particles or condensate. Modification of existing sootblowers to reduce this effect without reducing the cleaning capabilities of the sootblower is the most practical and cost effective solution.

CI Number: 28694

Title: TRE5 - Pulverizer PA Damper Drive Upgrades

Start Date: 2010/03

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $108,970

DESCRIPTION:

Four pulverizers are utilized in the operation of Trenton Unit # 5. Each of these pulverizers has three separate damper drive mechanisms to control air flow and temperature. The existing pneumatic damper drives are unreliable and replacement of these drives is required. Installation of electric damper drives would improve the reliability of the pulverizers.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

There are pneumatic dampers for hot air tempering, cold air tempering, and capacity control on each pulverizer. The capacity control damper is adjacent to each pulverizer, and controls the amount of primary air entering each pulverizer. The location of the eight tempering dampers and related drive assemblies is approximately fifteen feet above floor level. As a result, the tempering dampers and drive assemblies are not easily accessible and improved maintenance access is required.

Why do this project now?

Replacing the existing pneumatic drives with upgraded electric drives will improve the reliability of the pulverizers and mitigate the risk of de-rating the unit. The existing dampers and drive assemblies are not easily accessible and maintenance access to the dampers and drives must also be improved. The planned outage for Unit # 5 in 2010 is the next available opportunity to complete this project.

Why do this project this way?

In 2009, electric damper drives were installed on all of the fan assemblies. This resulted in improved reliability and less maintenance. In light of this experience, replacing the existing pulverizer pneumatic drives with electric drives during the 2010 shutdown will further improve unit reliability and reduce increasing maintenance requirements.

CI Number: 37884

Title: POT - Fly Ash Inlet Valve Assembly Replacements

Start Date: 2010/05

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $108,947

DESCRIPTION:

Depac Transporters are critical equipment used to transport flyash to the ash silo for storage. The ash inlet valve assemblies are original components installed in 1986 and must be replaced to ensure reliable operation of the transporters.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The ash inlet valve assemblies connect the transporters to the bottom of the precipitator hoppers. The pneumatic valve assembly is nearing the end of its design life and must be replaced. All six transporter inlet valve assemblies must be replaced.

Why do this project now?

The ash inlet valve assemblies must be replaced before unplanned failure occurs. The planned outage in 2010 is the next opportunity to complete this replacement, as the ash transporters and generating unit will be shut down for an extended period of time.

Why do this project this way?

The replacement of the inlet valve assemblies is the most cost effective option and will improve the long-term reliability of the transporters.

CI Number: 30462

Title: TUC - Oil Tank Protective Coating

Start Date: 2010/06

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $105,939

DESCRIPTION:

The scope of this project is to repair and re-coat the bottom skirt on the external surface of the #1 heavy fuel oil tank at Tuft's Cove.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Maintenance

Why do this project?

Visual inspection indicated that there is evidence of corrosion on the external surface and the bottom ring of the fuel oil tank. Applying a protective coating to the exterior surface of the tank will mitigate the risk of further corrosion.

Why do this project now?

This project must be completed in 2010 to ensure the tank remains code-compliant.

Why do this project this way?

External surface repairs of the affected areas and recoating the external surface of the tank is the most cost effective option.

CI Number: 37886

Title: POT - Coal Site Drainage Modifications

Start Date: 2010/05

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $105,608

DESCRIPTION:

Surface water near the coal pile must be collected and diverted before being released to the environment. Blockage and collapse of existing underground drainage pipes has caused water to pool and flow in undesirable areas. One of these undesirable areas is the coal pile, where surface water contact with the coal pile causes issues with processing and burning the coal. The drainage piping must be modified to ensure water is effectively collected, diverted from the coal pile and redirected for release.

Also, the former railcar unloading building has ground water seeping into its basement. This project also includes the installation of a sump near the railcar unloading building and underground drainage piping to direct the water to a collection weir for release.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The existing drainage infrastructure is damaged and cannot handle the volume of groundwater near the coal pile. To ensure the groundwater is properly collected and diverted, the drainage system must be modified. Diverting the surface water will ensure the water does not come into contact with the coal pile and improves unit performance during wet weather conditions.

Why do this project now?

The surface water is not able to flow through the existing drainage system. Temporary measures, which include a pump and temporary piping system have been put in place for the coal pile and the railcar unloading building, but installation of a new drainage system is required in 2010.

Why do this project this way?

Installation of a new drainage system is the most cost effective option. Replacing sections of the existing drainage piping is the only other option. This would be more expensive and very difficult to perform. The coal pile is located above the pipes and would need to be relocated as each section of the piping is replaced. The proximity of the new drainage discharge would be closer to the coal pile and railcar unloading building, which also makes the option of a new drainage system more cost effective than replacing existing piping.

CI Number: 34545

Title: POT - 2010 Asbestos Abatement

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $103,470

DESCRIPTION:

Asbestos insulation is being removed from the Point Tupper 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, maintenance activities and equipment vibration (e.g. pipe and boiler wall insulation).

Summary of Related CI's +/- 2 years:
2008 - 28396 POT Asbestos Abatement Project 2008 $197,740
2011 - CI TBD POT Asbestos Abatement project 2011

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

Removing asbestos insulation reduces the risk of asbestos particles becoming airborne. The condition of the existing asbestos insulation continues to deteriorate in some areas of the plant due to maintenance activities and equipment vibration. Encapsulation of affected areas has required considerable maintenance to prevent asbestos fibres from becoming airborne.

This project will replace asbestos insulation in areas of priority where it is more practical than re-encapsulation, or where encapsulation has proven to be ineffective.

Why do this project now?

In 2002 the turbine piping directly underneath the turbine was addressed, however, there is still a large quantity of asbestos insulation on Unit #2. The next planned unit outage is in 2010, and asbestos will be removed from the areas that will be accessible during the outage.

Why do this project this way?

Removing the asbestos from Unit #2 must be completed while the unit is shut down. Removal in smaller portions is the most cost effective solution as it allows the work to be completed within planned shutdowns and minimizes the down time on the unit while ensuring asbestos is contained.

CI Number: 28818

Title: TRE5 - Pulverizer Reject System Improvements

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $102,065

DESCRIPTION:

Four pulverizers are utilized in the operation of Trenton Unit # 5. Each of these pulverizers incorporates a water-based flushing system to remove rejected coal lumps and debris from the grinding zone. The scope of this project includes the installation of a re-designed reject removal system on each of the four pulverizers.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Why do this project?

Currently, each of these systems experiences significant maintenance each year as a result of plugged lines and poor flushing system performance. In most cases, the affected pulverizer is taken out-of-service in order to correct the issue.

Why do this project now?

The 2010 shutdown on Trenton Unit #5 provides sufficient time to install the modified components. Completing this project in 2010 will increase the reliability of the pulverizers and reduce the maintenance costs associated with this equipment.

Why do this project this way?

The frequent maintenance and operational issues with the pulverizers that are directly related to the reject removal system will be minimized once this project is completed. The most cost effective method is to install the re-designed reject removal system on each of the four pulverizers.

CI Number: 38882

Title: TRE - Water Treatment Plant Improvements

Start Date: 2010/03

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $101,604

DESCRIPTION:

The scope of this project includes the replacement of degraded equipment in the Water Treatment Plant. Degrading enclosure curtains, valves and piping have presented safety risks. These have been mitigated by increasing awareness of the items identified in the hazard assessment and implementing temporary solutions. Although regular maintenance has addressed these risks, permanent solutions are now required.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

The temporary solutions to mitigate the risks associated with these items are no longer sustainable and permanent solutions are required. The items to be addressed include replacement of backwash valves on the 5-2 polisher, replacement of polisher pump system enclosure curtains, replacement of degraded acid piping, installation of new low pressure dosing tanks, pumps and level indication, and improvements to lab ventilation.

Why do this project now?

The temporary solutions to mitigate the risks associated with these items are no longer sustainable and permanent solutions are required.

Why do this project this way?

Completing these equipment replacements, installations and improvements will mitigate the risks associated with these items.

CI Number: 36803

Title: LIN- Fire System Electrical Panel Upgrades

Start Date: 2010/03

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $101,520

DESCRIPTION:

This project includes installation of new fire system electrical panels in the control rooms. The existing panels are obsolete and are no longer supported by the Original Equipment Manufacturer (OEM). The existing fire system electrical panels are no longer compatible with inputs from the new fire protection system and must be replaced.

Summary of Related CI's +/- 2 years:
2008 - 29039 LIN4 Fire Protection/Turbine Hall $607,020
2009 - 33683 NERC CIPs $41,833
2010 - 38846 LIN - Unit #1 Fire Suppression Turbine & Generator $293,207

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Maintenance

Why do this project?

The existing fire system panels do not have the capacity and are not designed to integrate with the new fire protection systems that will be installed at the plant. The obsolete fire system panels must be replaced to support the ongoing improvements and additional fire protection systems.

Why do this project now?

Fire system upgrades to Unit #1 will be completed in 2010 and upgrades to remaining units are planned for future years. Upgrading the fire panels in 2010 will eliminate the need for separate add-on panels for the Unit #1 fire system upgrade and each new system installed in future years.

Why do this project this way?

Upgrading the panels will ensure there is a common interface between the existing and new fire protection systems. This option is more cost effective than individual add-on panels for fire systems upgrades completed in 2010 and in subsequent years. Completing this project will address the issue of not being able to source spare parts for the existing panels.

CI Number: 36742

Title: LIN- Replace F1 Belt

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $101,406

DESCRIPTION:

Solid fuel at the Lingan Generating Station is transferred to the 16 coal bunkers that supply the four boilers by a series of belt conveyors. The condition of the conveyor belts is monitored yearly. The most recent evaluation indicates that the F1 belt must be replaced due to wear and deterioration at the splices. The technical assessment has concluded that the belt has reached the end of its useful life. This project is part of the plant's ongoing Life Cycle Management plan.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Maintenance records and the most recent technical evaluation indicate the belt has reached the end of its useful life. In the event of a belt failure, a reduction in station load would be experienced while the belt was replaced due to a reduction in solid fuel transfer to the coal bunkers.

Why do this project now?

The "F1" belt has reached the end of its useful life and replacement is required. Delivery for a new belt is estimated to be between 12 and 16 weeks.

Why do this project this way?

Replacement is the only practical solution. Given the condition of the belt, splicing the belt and completing a temporary repair is not possible.

CI Number: 37943

Title: TUC - Replace High Cycle Valves

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $100,944

DESCRIPTION:

This project includes the replacement of high cycle isolation valves, drain valves and associated components. The frequency of failures for these existing valves is increasing and the valves are now obsolete. The condition of the existing valves and frequency of failures is impacting the plant's heat rate and the ability of the units to return to service in a time effective manner after a two-shift operation. The following valves will be replaced; west sootblower drain valve, main sootblower isolator, primary superheater motorized drain (north side), main stop bypass, main stop, condenser surplus valve, auxiliary steam system, and turbine & auxiliaries.

Summary of Related CI's +/- 2 years:
2008 - 27148 TUC Replace Specific Isolator Valves-All Units $65,770

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Tuft's Cove Units #2 & #3 have a high duty cycle because of the need to two-shift the units. Two-shifting the units requires frequent cycling for many of these valves. This causes a reduction in reliability and the useful life of the valves. This selective replacement program will ensure that the plant's critical valves function as designed.

Why do this project now?

A number of the high cycle valves and associated components are experiencing chronic failures. Due to their age, condition and service history, these valves should be replaced with upgraded valves designed for high duty cycles.

Why do this project this way?

A systematic approach to replacing the high cycle valves, drain valves and associated components is the most cost effective alternative in preventing valve failures and unplanned outages.

CI Number: 38730

Title: TRE - Transformer Compound Sprinkler System Upgrade

Start Date: 2010/09

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $100,088

DESCRIPTION:

The generator, excitation, unit and service transformers for Units #5 and #6 are located in the transformer compounds. During the 2009 review by the plant's insurers, it was found that the transformer compound fire suppression system must be upgraded.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Why do this project?

The fire system sprinklers in the transformer compound are currently directed towards the high voltage bushings. The orientation of the sprinklers must be re-adjusted to comply with current fire protection standards. Also, the windows adjacent to the transformer compound require fire protection to prevent them from failing during a fire.

Why do this project now?

This project must be completed in 2010 to comply with the insurer's recommendations.

Why do this project this way?

The transformer compound fire suppression system must be upgraded to comply with current industry fire protection standards.

CI Number: 37662

Title: TRE6 - CW Outlet Oil Boom

Start Date: 2010/08

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $98,252

DESCRIPTION:

Unit #5 and #6 at the Trenton Generating Station utilize a common discharge canal for the circulating water (CW) used in the steam condensing and cooling processes. This water exits the CW canal and then enters a water stream that discharges into the East River adjacent to the plant. In certain areas, there is a risk of oil leaking from equipment into the water stream.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Maintenance

Why do this project?

Currently, an oil absorbent sock is strung across the CW outlet in order to absorb any oil residue that may be present. Although the presence of oil is rare, a more effective means of absorbing the oil is required. The existing boom is not as effective as an engineered oil absorbing system. The modifications will incorporate anchors on each side of the outlet, and include an oil absorbing mechanism that will provide a positive isolation from the adjacent river.

Why do this project now?

The installation of an engineered oil absorbing system will provide for a permanent solution in line with industry practices.

Why do this project this way?

The design and installation of the proposed solution is a cost effective approach to providing oil release protection.

CI Number: 38911

Title: TUC – Fall Protection

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $95,704

DESCRIPTION:

The work associated with this project will repair "Hazard Class 2" 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:;
2010 - 38910 LIN-Fall Protection $239,260
2010 - 38894 TRE-Fall Protection $132,922
2010 - 38912 POA-Fall Protection $53,169
2010 - 38913 POT-Fall Protection $53,169
2009 - 36262 TUC-U&U Fall Protection $100,493
2009 - 36242 TRE-U&U Fall Protection $66,152
2009 - 36244 POT-U&U Fall Protection $58,943
2009 - 36243 LIN-U&U Fall Protection $38,663
2009 - 36245 POA-U&U Fall Protection $35,521

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Buildings

Why do this project?

This project will address Hazard Class 2 areas with identified potential fall hazards as per CJ MacLellan Fall Protection Survey Report dated February 20, 2009. The Report was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI represented to the Court that it would conduct a fall protection survey to ensure compliance with applicable fall protection guidelines.

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 2 locations.

Why do this project this way?

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

CI Number: 30182

Title: POT - SSC Refurbishment

Start Date: 2010/04

Final Cost Date: 2011/03

Function: Generation

Forecast Amount: $93,826

DESCRIPTION:

The submerged scraper conveyor (SSC), removes the heavy bottom ash from the boiler for disposal. It was originally installed during the coal conversion in 1986 to handle the ash that falls out of the boiler during the combustion process. After over twenty years of operation, work has been performed to maintain operation of the conveyor, but no mechanical work has been preformed. This project includes the replacement of the conveyor chain, flights, chain guide rolls, chain shields, bearings and other necessary components to rebuild the conveyor.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The SSC is a necessary piece of equipment in operating a coal-fired boiler. The frequency of equipment failures and maintenance has increased. These failures were directly related to the advanced age of the equipment. This project is related to work previously completed on the wear surfaces of the SSC in the last few years to restore the moving parts of the conveyor to original specifications and prevent failures.

Why do this project now?

The SSC is nearing the end of its original design life. To ensure continued reliable operation, the moving mechanical components must be replaced to restore it to the original equipment manufacturer specifications. Recent issues with the conveyors have been addressed on a temporary basis, but replacement of the major mechanical components is required to ensure long-term reliability of the conveyor.

Why do this project this way?

The most cost-effective means to restore reliable long-term operation is to replace the major mechanical moving components of the conveyor. Most of the SSC infrastructure is in acceptable condition and complete replacement is not required.

CI Number: 31362

Title: POA - Station Air Compressor Rebuild

Start Date: 2010/09

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $92,406

DESCRIPTION:

The station air compressors provide service and instrument air to all pneumatic operated equipment in the plant. A minimum of two compressors are required to supply the plant's minimum requirements and a third compressor must be available for back-up during planned and unplanned maintenance activities. All three compressors are required during unit start-up. This project will provide for the complete rebuild of one air compressor.

Summary of Related CI's +/- 2 years:
2008 - 29130 POA U&U "B" Station Air Compressor $100,663

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The failure of a station air compressor will result in the plant relying on the remaining two compressors to supply the plant's compressed air requirements. To mitigate the risk of unplanned failure and not having sufficient compressed air supply, the Station Air Compressor that most requires service will be rebuilt to avoid unplanned failure.

Why do this project now?

An unplanned failure of one of the compressors occurred in 2008, indicating that a similar event on other compressors is becoming more likely. Rebuilding one compressor in 2010 will mitigate the risk of unplanned failure, and ensure the plant avoids a situation of not having a back-up compressor available.

Why do this project this way?

In the event of unplanned failure, a portable unit would be required to reduce the risk of a unit trip until the failed compressor was rebuilt. A portable unit of this capacity is not readily available. In the event that a portable unit was rented on a temporary basis, it would likely prevent the unit from tripping but would not be capable of providing sufficient capacity for prolonged full-load operation.

CI Number: 31722

Title: POA - Coal Receiving Area Re-Paving

Start Date: 2010/03

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $92,096

DESCRIPTION:

The paved road on the east side of the plant is used for limestone and coal deliveries to the plant. This road as well as the pavement in the truck scale coal pile areas has deteriorated over the years and frequent patching has been required to maintain the road in satisfactory condition. This project includes repaving approximately 10% of the coal receiving area to return it to a satisfactory condition.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Patching the road where limestone and coal is delivered to the plant is no longer effective. This section of the road requires repairing.

Why do this project now?

The condition of the pavement in this area has deteriorated to the point that re-paving is required to reduce wear on vehicles using the road.

Why do this project this way?

Patching the road is no longer practical and re-paving is the best option.

CI Number: 24737

Title: POT - Breaker and Switch Gear Upgrades

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $89,489

DESCRIPTION:

This project includes the refurbishment or replacement of existing electrical breakers and switchgear. 4160 volt and 600 volt breakers and switchgear are used for the switching of various electrical loads; including large motors.

The electrical breakers and switchgear are over 30 years old and must be refurbished or replaced. Approximately 50 breakers have been identified as requiring refurbishment or replacement of components to meet Original Equipment Manufacturer (OEM) standards.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Due to the age of the existing breakers and switchgear, upgrading the 4160 volt and 600 volt breakers and switchgear is required. It is becoming increasingly difficult and costly to maintain the older equipment. Modern-day equipment provides increased protection for the equipment powered through the breakers.

Why do this project now?

The existing breakers and switchgear must be upgraded at the earliest opportunity to mitigate the risk of unplanned equipment failures. The 4160 volt and 600 volt breakers and switchgear will be upgraded using a phased approach and prioritized based on the condition of the exiting equipment. The equipment that is most in need of upgrade will be completed under this project and additional upgrades will be required in subsequent years.

Why do this project this way?

Upgrading the 4160 volt and 600 volt breakers and switchgear is required. Completing the project in a phased approach is the most practical option.

CI Number: 30422

Title: POA - Frontwall Feed Pipe Replacement Program

Start Date: 2010/09

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $88,656

DESCRIPTION:

This project includes replacement of the 1-B-3 frontwall feed pipe on the coal system, which consists of four feed pipes. The feed pipe consists of an inner and outer pipe. The inner pipe transports the coal and the outer pipe is injected with air to cool the inner pipe. One of the front well feed pipes must be replaced to mitigate the risk of premature failure.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Proactively replacing this pipe before it fails will mitigate the risk of de-rating the unit due to restricting the amount of coal that can be supplied to the combustor.

Why do this project now?

The pipe is nearing the end of its service life and must be replaced. Not addressing this issue in 2010 will likely result in more costly repairs.

Why do this project this way?

Replacement of the pipe is the only option, as repairs are no longer feasible.

CI Number: 38854

Title: TUC - Thermal Fleet Licensing for PRiSM

Start Date: 2010/04

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $88,075

DESCRIPTION:

The project will expand the existing licensing of InStep PRiSM to the thermal units at Tuft's Cove.

PRiSM provides early indications to problems occurring in real time. PRiSM also provides a quantitative comparison between current and historical data, alerting users to anomalies that are outside of normal operating regimes. The benefits of PRisM include:

- Improved asset availability
- Reduced forced outages
- Improved predictive maintenance
- Improved operational support to plant staff
- Capturing retiring work force asset expertise and knowledge

NSPI has licensed and installed PRiSM for four thermal units and has tested the software on major equipment in both real time and in historical play back mode. The software has demonstrated its ability to detect issues earlier than other traditional methods and has provided insight into the asset operational issues.

Summary of Related CI's +/- 2 years:
2010 - 38877 TRE Thermal Fleet Licensing for PRiSM $58,717
2010 - 38879 POT Thermal Fleet Licensing for PRiSM $29,358
2010 - 38880 LIN Thermal Fleet Licensing for PRiSM $29,358

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

NSPI faces growing business challenges from increasing fuel costs, regulations and aging generation equipment. NSPI has piloted PRiSM on four thermal units. In a very short time the software has demonstrated its anomaly detection capabilities. Based on the pilot program results, expanding the licensing of InStep PRiSM will allow the entire thermal generating fleet to realize the benefits of improved anomaly detection and analysis of critical operation processes.

Why do this project now?

The results of the limited licensing of PRiSM demonstrate the value of the software. This project will help advance NSPI goals and meet business challenges associated with aging generation equipment. This project should be completed at the earliest opportunity to leverage the benefits of PRiSM in managing NSPI's thermal generating assets.

Why do this project this way?

The decision to move forward and license the thermal fleet is based on operating experience with this product. Increasing licensing and implementation of the software in this manner ensures the benefits will be realized in a timely manner.

CI Number: 28699

Title: TRE6 - Pulveriser Grease Collection System Upgrade

Start Date: 2010/04

Final Cost Date: 2011/02

Function: Generation

Forecast Amount: $85,842

DESCRIPTION:

The scope of this project is to implement a grease collection system for the Unit #6 pulverizer. This project will eliminate the spillage of grease currently being experienced. Frequent cleaning is currently the only option to mitigate risk associated with this spillage.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

Unit #6 at the Trenton Generating Station utilizes two pulverizers to supply pulverized coal to its boiler. These pulverizers are original equipment commissioned in 1991. Large ball mills incorporate a pinion/bull gear assembly in order to rotate the large drum of steel balls that pulverize the coal. In order to maintain reliability of the pulverizers, each gear set is lubricated with an independent lubrication system that sprays lubricant onto the bull gear.

When the pulverizers were initially installed, the lubricant was a more viscous product and was collected by utilizing a wheeled tray. When the tray was approaching its full capacity, utility personal would wheel the tray out and slide in a new one. The removed tray would be cleaned for re-use. Since that time, numerous pinion gear failures have been experienced, which resulted in maintenance outages and unit de-rating of the generating unit. One corrective action to minimize pinion failures was to switch lubricants to an asphalt-based lubricant. The original collection system functions inadequately with the asphalt-based grease, and the grease collects under the pulverizers. The grease cannot be removed while the equipment is operating.

Implementing a grease collection system for the Unit #6 pulverizers will eliminate the spillage of grease currently being experienced.

Why do this project now?

Implementing this project in 2010 will eliminate the collection of grease under the pulverizers between shutdowns. The installed system will provide adequate collection of the asphalt-based lubricant.

Why do this project this way?

Currently, the grease collects under the pulverizers between planned shutdowns (one or two years). During a shutdown, utility crews go under the mill and remove the grease using jack hammers. By installing an adequate collection system, the cleaning work will be minimized, and the grease will be eliminated.

CI Number: 36763

Title: LIN - Laffin Brook Culvert Upgrade

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $82,308

DESCRIPTION:

Laffin Brook is a watercourse that runs through the Lingan Generating Station property. This project will ensure the Laffin Brook is properly isolated from the Lingan site to ensure surface water from Laffin Brook is properly diverted from the site. It will ensure coal pile debris does not enter the water course through a manhole location near the coal pile.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Maintenance

Why do this project?

The brook is isolated from the Lingan site with appropriate culverts. A raised diversion culvert that is designed to draw water from the brook in the event of primary water supply problems is required. Isolation valves to allow the culvert to continue to be a source of emergency water supply while not allowing overflow to the Lingan site.

There is also a culvert that passes under the coal pile that can be accessed via a manhole at the coal pile. The diversion culvert, in times of heavy rain, can allow unwanted brook water to enter the Lingan site and impact the waste water system. The manhole cover under the coal pile must be secured to ensure it will not be damaged and dislodged during coal moving operations.

Why do this project now?

Completing this project will reduce the potential of overflow and mitigate the risk of unplanned wastewater discharge. This will relieve the excessive demands on the waste water system. Isolating the diversion culvert with isolation valves will allow the culvert to continue to be a source of emergency water supply while not allowing overflow to the Lingan site.

Why do this project this way?

In periods of heavy rain, isolating the diversion design and securing the manhole cover under the coal pile is the most practical solution.

CI Number: 37103

Title: LIN - Fire System Valve Replacement

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $82,252

DESCRIPTION:

The fire system valve for the dumper building is located below the dumper floor and is not readily accessible for inspections while the dumper is operational. The valve is also difficult to access after system tripping or testing. This project includes the upgrade and relocation of the valve to a sheltered location outside of the dumper building so it can be easily accessed, maintained and operated when required.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Why do this project?

Relocating the valve has been identified as a fire safety improvement item.

Why do this project now?

Completing this project now will mitigate the risk of not being able to obtain easy access to the valve when required.

Why do this project this way?

Relocating the valve to a sheltered location outside of the dumper building is the most practical option.

CI Number: 37612

Title: LIN - Polisher Resin Replacement

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $80,876

DESCRIPTION:

Resin removes positive (cation) and negative (anion) charged particles in the feed water and is regenerated with chemicals to maintain ion exchange. The frequency in which the resin is regenerated is a function of resin performance. Anion resin has a much lower life cycle than cation resin and lasts approximately five years. The anion demineralizers have reached the point that the resin must be replaced.

Summary of Related CI's +/- 2 years:
2008 - 28882 LIN - Anion/Cation Resin $71,460

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Water delivered to the boiler must be of high quality to prevent precipitation and corrosion of chemical compounds on the turbine blades, boiler tubes and associated system piping. The regenerative resins in the demineralizers ensure contaminant elements and compounds are removed to meet boiler water chemistry standards.

Anion exchange resin is concentrated with sodium hydroxide (caustic soda) and removes silica, chloride and sulphates. Cation exchange resin is concentrated with sulphuric acid and removes sodium, calcium, and magnesium. As the resin ages, the interval between regenerations (re-concentrating the resin with chemical) increases.

The resin in the demineralizers must be replaced to ensure the quality of boiler feed water is maintained at the required industry standards.

Why do this project now?

The increasing number of re-generations required as well as instances of resin leaks are indications of resin deterioration. The anion/cation resins in the demineralizers have reached the point where replacement is cost effective. Replacing the resin in the demineralizers will ensure water chemistry is maintained to industry standards.

Why do this project this way?

Replacing the resins in the demineralizers is the only option to effectively treat the supply water and manage the frequency of regenerations required.

CI Number: 32825

Title: TUC - Motor Refurbishment Program

Start Date: 2010/03

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $78,415

DESCRIPTION:

The availability and reliability of the plant's critical motors and associated equipment are essential to the performance and reliability of the units. Reduced unit load and forced unit outages are the potential impacts of critical motors being out of service.

Ongoing monitoring and inspections of these motors prioritizes which motors will be refurbished. The Unit #1 South BFP, South FD fan and North FD fan motors (4160V) will be refurbished in 2010. The refurbishments include dismantling, cleaning, meggering, internal inspection, bearing overhaul or replacement, wedging of loose coils, dipping and reassembly.

Summary of Related CI's +/- 2 years:
2008 - 29121 TUC U&U Repair Unit #3 North FD Fan Motor $53,245
2008 - 33122 TUC U&U Unit #3 North Boiler Feed Pump Motor $71,801
2009 - 37182 TUC U&U Unit #1 Gas Recirculating Gas Fan Motor $73,470

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

This project will reduce the overall cost of maintaining critical motors through improved equipment reliability and reduction of reactive maintenance and unscheduled maintenance. The condition assessments, historical data, Life Cycle Management and the relative criticality of the motors form the basis for selecting which motors will be refurbished in 2010.

The majority of the critical motors at Tufts Cove are approaching the end of their useful life. Motors are subject to the most stress during start and stop events where current loads, heat and vibration are highest. Most of the motors at Tuft's Cove were installed when the plant was built and they are currently subjected to high frequencies of starts and stops when two-shifting the units.

Why do this project now?

Based on condition assessments, historical data and Life Cycle Management, five (5) of the plant's critical motors must be refurbished in 2010. NSPI's experience with the condition based monitoring is that risks can be mitigated and further damage can be avoided if the motors are proactively refurbished.

Why do this project this way?

The most cost effective option is to refurbish these motors.

CI Number: 37403

Title: POT - Refurbish HP Heater Valves

Start Date: 2010/07

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $67,935

DESCRIPTION:

The plant has numerous parallel slide isolation valves on feedwater and steam-side isolation lines connected to the high pressure (HP) heaters. The HP heaters transfer heat to the feedwater prior to delivery to the boiler. The increasing frequency of tube leak repairs on the aging HP heaters requires that the heater's isolation valves be in acceptable condition.

The isolation valves are of similar age as the HP heaters and no longer provide complete isolation when the valves are closed. Without proper isolation, the heater cannot be accessed to complete repairs. In the event of a tube leak, the unit must be forced off-line for a minimum of 24 hours and in some cases several days, to complete repairs. This risk is currently being mitigated by completing in-situ valve disc and seat rebuilds on identified valves during scheduled unit outages. Repairing the valves is no longer an option and reliable isolation valves are required to mitigate the risk of forced outages due to HP heater repairs.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The existing valves must be refurbished to ensure the HP heaters can be individually isolated for repairs. This will mitigate the risk of forced unit outages while the heater repairs are completed.

Why do this project now?

The valves do not provide complete and reliable isolation due to their condition. Refurbishing the valves will mitigate the risk of lost generation caused by a forced outage.

Why do this project this way?

Refurbishing the isolation valves is the most cost-effective solution.

CI Number: 24505

Title: TUC - Update 4 Plant Air Compressors

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $63,565

DESCRIPTION:

The existing instrument air compressors were commissioned in 2001 and have reached the end of their useful life. The light industrial compressors have proven to be unreliable and require frequent maintenance.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

This project will reduce maintenance costs and will improve unit reliability.

Why do this project now?

The existing compressors continue to deteriorate and have reached the end of their useful life.

Why do this project this way?

Replacement of these compressors is the most cost effective option and this project will improve unit reliability.

CI Number: 37882

Title: POT - Install Contractor office, Lunchroom, and Washroom Facilities

Start Date: 2010/04

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $61,281

DESCRIPTION:

There are currently no designated office, lunchroom, and washroom facilities for contractors at the Point Tupper Generating Station. There are typically major planned outages on Unit # 2 every two years, as well as ongoing contracts during normal plant operations. During the planned outages, the boilermaker contractor currently transports and rents a trailer equipped with a lunch room and a wash-up area. Contractors working on site while the plant is operating also rent facilities. These costs are covered by NSPI.

The scope of this project includes the purchase of a pre-fabricated building equipped with a lunch room, washroom, wash-up area, change area and a small office. This facility will be completely serviced, including heating, and plumbing. It will be located behind the mill bay.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Buildings

Why do this project?

The supply of a contractor facility that includes a lunch room, wash-up facilities, change area and office is required to support ongoing and shutdown activities. NSPI has policies in place which require anyone working in areas contaminated with boiler ash to wash their hands and face at break time and eat in areas that are separated from the plant's work areas.

Why do this project now?

Point Tupper has a planned outage approximately every two years. The total contractor work crew can exceed 45 personnel. Benefits can be maximized from this project if the facilities are available for planned outages, as well as during the rest of the operating cycle when contractors are performing work on site.

Why do this project this way?

The most cost-effective and practical long-term option is the installation of a new facility.

CI Number: 37645

Title: TRE - 4kv Breakers

Start Date: 2010/03

Final Cost Date: 2010/09

Function: Generation

Forecast Amount: $60,398

DESCRIPTION:

The purpose of this capital item is to continue with the refurbishment of the Trenton Unit #6 4kV breakers. The 4kV breakers are an integral component of the power supply to the plant's main auxiliary motors; including the boiler feed pump, forced draft fan, induced draft fan, cooling water and extraction pump motors. They also power the main 4 kV bus and auxiliary transformers. The 4 kV breakers have critical adjustment components and electrical isolations that have deteriorated over time, as well as worn mechanical components.

Summary of Related CI's +/- 2 years:
2008 - 28691 TRE 4kV Breakers & Switchgear $50,471

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Capacity

Why do this project?

The breakers at Trenton are approximately 25 years old. Complete overhauls and refurbishment commenced in 2005 when the refurbishment program was first initiated. Failure of the 4kV breakers could result in an unplanned outage and significant damage to the 4kV bus. Refurbishment of the 4kV breakers is required to mitigate the risk of damage to the bus and unplanned outages.

Why do this project now?

The recommended refurbishment interval for these breakers is every 15 to 20 years; depending on the breaker design and duty cycle. NSPI's life cycle management plan identifies the required breaker refurbishments in 2010.

Why do this project this way?

Refurbishment is the most cost effective option, as the cost to refurbish the breakers is approximately 25% less costly than purchasing new breakers. The breakers will be refurbished to the same condition as new breakers to assure long-term reliability of the breakers is achieved. It is expected that refurbishment will extend the serviceable life of these breakers for an additional 15 to 20 years.

CI Number: 38877

Title: TRE- Thermal Fleet Licensing for PRiSM

Start Date: 2010/04

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $58,717

DESCRIPTION:

The project will expand the existing licensing of InStep PRiSM to the thermal units at Trenton.

PRiSM provides early indications to problems occurring in real time. PRiSM also provides a quantitative comparison between current and historical data, alerting users to anomalies that are outside of normal operating regimes. The benefits of PRisM include:

- Improved asset availability
- Reduced forced outages
- Improved predictive maintenance
- Improved operational support to plant staff
- Capturing retiring work force asset expertise and knowledge

NSPI has licensed and installed PRiSM for four thermal units and has tested the software on major equipment in both real time and in historical play back mode. The software has demonstrated its ability to detect issues earlier than other traditional methods and has provided insight into the asset operational issues.

Summary of Related CI's +/- 2 years:
2010 - 38854 TUC Thermal Fleet Licensing for PRiSM $88,075
2010 - 38879 POT Thermal Fleet Licensing for PRiSM $29,358
2010 - 38880 LIN Thermal Fleet Licensing for PRiSM $29,358

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

NSPI faces growing business challenges from increasing fuel costs, regulations and aging generation equipment. NSPI has piloted PRiSM on four thermal units. In a very short time the software has demonstrated its anomaly detection capabilities. Based on the pilot program results, expanding the licensing of InStep PRiSM will allow the entire thermal generating fleet to realize the benefits of improved anomaly detection and analysis of critical operation processes.

Why do this project now?

The results of the limited licensing of PRiSM demonstrate the value of the software. This project will help advance NSPI goals and meet business challenges associated with aging generation equipment. This project should be completed at the earliest opportunity to leverage the benefits of PRiSM in managing NSPI's thermal generating assets.

Why do this project this way?

The decision to move forward and license the thermal fleet is based on operating experience of this product. Increasing licensing and implementation of the software in this manner ensures the benefits will be realized in a timely manner.

CI Number: 36564

Title: POA - HVAC Replacement

Start Date: 2010/05

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $56,071

DESCRIPTION:

This project will serve to replace heating, ventilating, and air conditioning (HVAC) equipment throughout the plant that has reached the end of its useful life. This project includes the replacement of the units in 2010 with the highest risk of failure.

Summary of Related CI's +/- 2 years:
2009 - 28783 POA - HVAC Refurbishment Program $87,221

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Recently, there have been failures of the HVAC equipment in the switch gear rooms, which require backup HVAC capacity to prevent un-planned tripping of the electrical components. Replacing HVAC equipment that has reached the end of its useful life will reduce the risk of un-planned equipment failure.

Why do this project now?

The equipment identified in this project has high potential to fail and has reached the end of its useful life.

Why do this project this way?

It is more cost-effective to replace this high risk equipment proactively as opposed to awaiting for an un-planned failure.

CI Number: 34543

Title: POT - Reheater

Start Date: 2010/01

Final Cost Date: 2010/06

Function: Generation

Forecast Amount: $54,167

DESCRIPTION:

The pendant style reheater at the Point Tupper Generating Station (POT) was first installed in the #2 boiler as part of the coal conversion in 1987. Not long after the conversion, plant personal discovered that premature coal ash corrosion was taking place in certain platens of the reheater.

This ongoing project identifies and replaces tubes that are less than 0.115". This will ensure all tubing in the reheater is at, or above the NSPI established standard of 70% minimum wall thickness.

Summary of Related CI's +/- 2 years:
2008 - 28397 Selective Reheater Replacement $225,900
2011 - CI TBD Selective Reheater Replacement

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

During boiler operation, ongoing erosion and corrosion can reduce several reheater tubes to a wall thickness of about 0.100". Further corrosion or sootblowing may cause tube failures and the result is an unplanned unit outage.

Why do this project now?

POT has scheduled a three-week outage in the summer of 2010. If the tubes are not replaced during this outage, it raises the risk of unplanned reheater tube failures. When a reheater tube fails, the unit is forced off-line and repair must be undertaken.

Why do this project this way?

NSPI has demonstrated the most cost effective approach is to complete extensive non-destructive testing, project tube wastage rates and target selective tube sections for replacement rather than replace large sections of boiler heat transfer surface.

CI Number: 38912

Title: POA – Fall Protection

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $53,169

DESCRIPTION:

The work associated with this project will repair "Hazard Class 2" 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:;
2010 - 38910 LIN-Fall Protection $239,260
2010 - 38894 TRE-Fall Protection $132,922
2010 - 38911 TUC-Fall Protection $95,704
2010 - 38913 POT-Fall Protection $53,169
2009 - 36262 TUC-U&U Fall Protection $100,493
2009 - 36242 TRE-U&U Fall Protection $66,152
2009 - 36244 POT-U&U Fall Protection $58,943
2009 - 36243 LIN-U&U Fall Protection $38,663
2009 - 36245 POA-U&U Fall Protection $35,521

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Buildings

Why do this project?

This project will address Hazard Class 2 areas with identified potential fall hazards as per CJ MacLellan Fall Protection Survey Report dated February 20, 2009. The Report was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI represented to the Court that it would conduct a fall protection survey to ensure compliance with applicable fall protection guidelines.

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 2 locations.

Why do this project this way?

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

CI Number: 38913

Title: POT – Fall Protection

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $53,169

DESCRIPTION:

The work associated with this project will repair "Hazard Class 2" 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:
2010 - 38910 LIN-Fall Protection $239,260
2010 - 38894 TRE-Fall Protection $132,922
2010 - 38911 TUC-Fall Protection $95,704
2010 - 38912 POA-Fall Protection $53,169
2009 - 36262 TUC-U&U Fall Protection $100,493
2009 - 36242 TRE-U&U Fall Protection $66,152
2009 - 36244 POT-U&U Fall Protection $58,943
2009 - 36243 LIN-U&U Fall Protection $38,663
2009 - 36245 POA-U&U Fall Protection $35,521

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Buildings

Why do this project?

This project will address Hazard Class 2 areas with identified potential fall hazards as per CJ MacLellan Fall Protection Survey Report dated February 20, 2009. The Report was commissioned by NSPI following an incident involving the fatality of a worker at the Lingan Plant in December 2004, and subsequent charges brought against NSPI under the Fall Protection Regulations of the Occupational Health and Safety Act. NSPI represented to the Court that it would conduct a fall protection survey to ensure compliance with applicable fall protection guidelines.

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 2 locations.

Why do this project this way?

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

CI Number: 34542

Title: POT - Superheater

Start Date: 2010/01

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $53,099

DESCRIPTION:

The pendant style high temperature superheater was first installed in the #2 boiler as part of the coal conversion in 1987. Annual inspection and selective replacement of thinning tubes has been ongoing.

The scope of this project includes inspection of the high temperature superheater and selective replacement of 6 or 7 tube bends or straight tubes. Quantity will depend on inspection results.

The Point Tupper Generating Station has recognized that even with the replacement and upgrade, extensive life cycle inspections would have to be undertaken. These surveys predict when the various sections or bends will have to be replaced. This avoids the major cost of a forced outage due to a tube leak. The inspections have been based on visual means with ultrasonic examination.

The Point Tupper Generating Station is planning a three-week outage in the summer of 2010. This opportunity will be used to maintain the reliability of the boiler including replacements as needed in the high temperature superheater.

Summary of Related CI's +/- 2 years:
2008 - 28398 Selective Superheater Replacement $146,630
2011 - CI TBD Selective Superheater Replacement

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

This project is part of ongoing asset management at the Point Tupper Generating Station and is required to mitigate the risk of tube failures due to tube erosion and corrosion.

Why do this project now?

When a superheater tube fails, the unit is forced off-line and repairs must be undertaken. This down time results in replacement energy costs and associated repair costs. Doing this project in 2010 will mitigate the risk of increasing these costs.

Why do this project this way?

There are only two options for this project. The most costly option is to replace the entire affected platens. This option is costly because replacing many sections which are not experiencing the corrosion or cracking would also be required.

The most cost effective approach is to replace only the tubes that are experiencing the higher temperature and the higher corrosion rate.

CI Number: 37883

Title: TUC - Automate Breaker Closures

Start Date: 2010/03

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $52,742

DESCRIPTION:

The scope of this project is to replace manual breakers on Tuft's Cove's units with an automated system that can be operated remotely. During two-shifting operations a manual disconnect and re-connect is required on each unit to isolate the generator and transformer. This project will provide for the equipment to be installed to automate this process.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

This project will automate the disconnect and re-connect on each unit to isolate the generator and transformer during two-shift operations.

Why do this project now?

Automation of the two-shift operation procedure will improve staff safety when performing this task.

Why do this project this way?

By automating the system, the need for extra personnel during two shifting is reduced and safety is increased.

CI Number: 36567

Title: POA - Aux Boiler Controls Upgrade

Start Date: 2010/09

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $52,057

DESCRIPTION:

The auxiliary boiler supplies steam to the plant heating systems and is needed during the winter months to ensure critical equipment in the plant does not freeze. The auxiliary boiler is also required during a shutdown/unit trip as it is the only supply of steam to the plant. This project replaces selected control equipment on the auxiliary boiler, which has become obsolete and no longer functions as designed.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The auxiliary boiler is approximately 30 years old and the control equipment on the auxiliary boiler has become obsolete. The auxiliary boiler and controls must function properly to ensure unit availability during the winter months.

Why do this project now?

The control equipment no longer functions as designed and must be replaced.

Why do this project this way?

Replacement of the control equipment on the auxiliary boiler requires replacement as the existing equipment is obsolete.

CI Number: 38917

Title: POA - C4 Conveyor Belt Replacement

Start Date: 2010/02

Final Cost Date: 2010/05

Function: Generation

Forecast Amount: $50,232

DESCRIPTION:

The C-4 conveyor belt transports limestone from the crusher building to the limestone mill building. This belt is an essential part of the material handling process in the limestone system. An independent inspection completed in January 2009 identified the C-4 conveyor as requiring replacement over next 12 to 24 months.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Forced Outage Rate

Why do this project?

The C-4 belt is worn and requires replacement. The C-4 belt is an integral part of the limestone system and is required to maintain plant operations.

Why do this project now?

The belt is at the end of its service life and requires replacement.

Why do this project this way?

Replacement of the belt is the only option.

CI Number: 34384

Title: POA - 4KV Motor Refurbishment Program

Start Date: 2010/09

Final Cost Date: 2010/10

Function: Generation

Forecast Amount: $48,380

DESCRIPTION:

Some of the critical equipment at the Pt. Aconi generating station is driven by 4160 volt motors. These include forced draft (FD) fans, induced draft (ID) fans, pulverizers, crushers, boiler feed pumps, condensate extraction pumps, and circulating water pumps. Many of these motors have been in service for over 25 years and some of them require refurbishment. Unplanned failure of these motors could cause a unit trip or result in reduced generating capacity. These motors require refurbishment in 2010. Refurbishment activities include dismantling, cleaning, "meggering", internal inspection, bearing overhaul or replacement, wedging of loose coils, dipping and reassembly. Refurbishing the 4160 volt motors will maximize motor availability and reliability.

Summary of Related CI's +/- 2 years:
2008 - 28784 POA - 4KV Motor Refurbishment Program $61,800
2012 - CI TBD POA - 4KV Motor Refurbishment Program $52,547

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

On-going monitoring and inspections indicate that a number of the plant's critical 4160V motors must be refurbished. Proactively refurbishing these critical motors will mitigate the risk of more costly motor repairs in the event of unplanned failure.

Why do this project now?

Refurbishment of these motors is required now due to the risk of unplanned motor failure, forced outages and the higher repair or replacement costs that could be associated with unplanned failures.

Why do this project this way?

Refurbishing the existing motors is the most practical solution and is more cost effective than replacing the motors with new motors.

CI Number: 36963

Title: TUC - #3 South Drum Safety Valve Replacement

Start Date: 2010/02

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $45,291

DESCRIPTION:

This project includes the purchase and installation of a new safety valve on Unit #3's south drum.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Health & Safety

Sub Criteria: Equipment Replacement

Why do this project?

This valve requires replacement in 2010. This valve provides for relief in the event of over pressurization and must be functional as per provincial pressure vessel regulations.

Why do this project now?

The valve is in need of replacement as it has reached the end of its useful life.

Why do this project this way?

Replacement is the most economical approach, as this valve has reached the end of its useful life.

CI Number: 37262

Title: POA - Elevator Controls Upgrade

Start Date: 2010/05

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $40,955

DESCRIPTION:

Pont Aconi Plant (POA) has only one elevator, which is outfitted with original controls. These controls are approximately 15 years old. The elevator is crucial during shutdowns for transporting materials and staff to upper floors. This project will provide for the replacement the elevator controls.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Without use of this elevator, staff must transport materials to the upper levels using the stairs.

Why do this project now?

Having the elevator out of service decreases employee productivity because stairs must be used to get the materials to the upper levels on the plant.

Why do this project this way?

Replacing the controls will return the elevator to a reliable working condition and avoid lost productivity.

CI Number: 37422

Title: POA - Bottom Ash Drag Chain Replacement Program

Start Date: 2010/09

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $40,779

DESCRIPTION:

At the Point Aconi Generating Station (POA), there are two bottom ash drag chain systems that remove bottom ash from the boiler. The drag chain conveyors must be in working order for the boiler to function. If one chain fails, the Unit is at risk of coming off-line if the second chain fails. The chains wear over time due to the abrasive nature of the bottom ash. This project will include the purchase of a spare chain, which can be used to replace a worn chain. In addition to the spare drag chain being replaced, the worn side and bottom plates will be replaced on the conveyor system.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

Purchasing a spare drag chain and replacing the worn side and bottom plates will mitigate the potential of the Unit coming off line, due to bottom ash drag chain conveyor break downs.

Why do this project now?

This project will improve unit availability by purchasing a spare chain and replacing the side and bottom plates of the conveyor.

Why do this project this way?

Having a spare chain and replacing worn side and bottom plates is the most cost effective way of mitigating an unplanned outage associated with the bottom ash drag chain conveyor system.

CI Number: 34369

Title: POA - Polisher Resin Replacement

Start Date: 2010/06

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $40,324

DESCRIPTION:

There are three polisher vessels at Point Aconi Generating Station (POA). These polishers are used to remove contaminants from the boiler water. The POA boiler water treatment system was designed to use a volatile treatment where only hydrazine and ammonia are used to treat the water before it is passed through the polisher. This creates the need for constant regeneration of the polishers. Because all the boiler water on each cycle is passed through the polisher, the resin deteriorates over time.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Maintenance

Why do this project?

The plant requires three working polishers in order to process the boiler water. The resin in the C polisher has been in service since 1997 and requires replacement. The resin has deteriorated from the abrasion of being in service for over 12 years.

Why do this project now?

The resin in the C polisher is at the end of its life and requires replacement.

Why do this project this way?

Replacing the resin in the C polisher is the only option to maintain operation of this polisher.

CI Number: 37606

Title: LIN - Generator Diesel Fuel Tank

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Generation

Forecast Amount: $37,769

DESCRIPTION:

This project includes the installation of a new fuel tank for the emergency diesel generator. Presently, the generator uses common plant light oil as its fuel source. Automotive grade diesel fuel should be used to maintain integrity of the system. This project includes installation of a dedicated fuel tank for this generator.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Using automotive grade diesel will provide the best performance and reduce the risk of failed fuel and ignition systems, which is critical for this emergency back up equipment.

Why do this project now?

Completion of this project will reduce the risk of failure of this back-up equipment.

Why do this project this way?

Supplying this unit with the Original Equipment Manufacturer's recommended fuel source is proper practice and reduces risk of failure of this system.

CI Number: 36563

Title: POA - 4kV Breaker Refurbishment

Start Date: 2010/08

Final Cost Date: 2010/11

Function: Generation

Forecast Amount: $36,444

DESCRIPTION:

The purpose of this capital item is to continue with the refurbishment of Pt. Aconi 4 kV breakers. This project will allow for the refurbishment of 5 breakers in 2010. The 4 kV breakers are an integral component of the power supply to the plant's main auxiliary motors; including the boiler feed pump, forced draft fan, induced draft fan, cooling water and extraction pump motors. They also power the main 4 kV bus and auxiliary transformers. The 4 kV breakers have critical adjustment components and electrical isolations that have deteriorated over time, as well as worn mechanical components.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

The breakers at Pt. Aconi are approximately 25 years old. Complete overhauls and refurbishment commenced in 2005. Failure of the 4kV breakers could result in an unplanned outage and significant damage to the 4kV bus. Refurbishment of the 4kV breakers is required to mitigate the risk of damage to the bus and unplanned outages.

Why do this project now?

The recommended refurbishment interval for these breakers is every 15 to 20 years, depending on the breaker design and duty cycle. NSPI's Life Cycle management plan identifies the required breaker refurbishments in 2010.

Why do this project this way?

Refurbishment is the most cost effective option, as the cost to refurbish the breakers is approximately 25% less costly than new breakers. The breakers will be refurbished to the same condition as new breakers to assure long-term reliability of the breakers is achieved. It is expected that refurbishment will extend the serviceable life of these breakers for an additional 15 to 20 years.

CI Number: 37922

Title: POA - NERC CIP Security Upgrades

Start Date: 2010/03

Final Cost Date: 2010/06

Function: Generation

Forecast Amount: $34,665

DESCRIPTION:

The project covers the installation of several doors at the Point Aconi Generating Station (POA).

The scope of this project also includes installing a work station to manage personnel access control for these doors.

The security software and server purchased in 2009 to manage door security at Tufts Cove and Lingan will also be used to manage the access control of these doors.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

As a result of changes in the NERC Critical Infrastructure Protection (CIP) criteria POA will be considered a critical generation asset in 2010. POA is required to manage a physical perimeter around critical cyber assets identified under the NERC CIP requirements.

Why do this project now?

By doing this project now, NSPI will standardize security across all plants and meet NERC compliance requirements for POA.

Why do this project this way?

Point Aconi will be required to be compliant to all NERC CIP's by Jan 1, 2011. Door security for identified critical cyber assets will need to be completed in 2010.

CI Number: 36587

Title: POA - Dissolved O2 Analyzer Replacements

Start Date: 2010/05

Final Cost Date: 2010/08

Function: Generation

Forecast Amount: $30,441

DESCRIPTION:

At the Point Aconi Generating Station (POA), there are two dissolved oxygen analyzers in the low pressure boiler water line. The oxygen analyzers monitor the oxygen level in the boiler water. High oxygen levels cause increased corrosion in the boiler. The analyzers allow the plant to react to high oxygen levels through the use of hydrazine and determine the effectiveness of the deaerator tank. Due to the age of the existing analyzers, replacement is required.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

Without effective oxygen analyzers the plant cannot monitor the oxygen levels in the boiler water. Increased dissolved oxygen levels in the water can increase the internal corrosion rate in the boiler. The existing analyzers no longer function as designed and must be replaced.

Why do this project now?

The dissolved oxygen analyzers have reached the end of their useful life.

Why do this project this way?

Due to their age, replacement of these analyzers is the only option.

CI Number: 38879

Title: POT - Thermal Fleet Licensing for PRiSM

Start Date: 2010/04

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $29,358

DESCRIPTION:

The project will expand the existing licensing of InStep PRiSM to the thermal units at Pt. Tupper

PRiSM provides early indications to problems occurring in real time. PRiSM also provides a quantitative comparison between current and historical data, alerting users to anomalies that are outside of normal operating regimes. The benefits of PRisM include:

- Improved asset availability
- Reduced forced outages
- Improved predictive maintenance
- Improved operational support to plant staff
- Capturing retiring work force asset expertise and knowledge

NSPI has licensed and installed PRiSM for four thermal units and has tested the software on major equipment in both real time and in historical play back mode. The software has demonstrated its ability to detect issues earlier than other traditional methods and has provided insight into the asset operational issues.

Summary of Related CI's +/- 2 years:
2010 - 38877 TRE Thermal Fleet Licensing for PRiSM $58,717
2010 - 38854 TUC Thermal Fleet Licensing for PRiSM $88,075
2010 - 38880 LIN Thermal Fleet Licensing for PRiSM $29,358

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

NSPI faces growing business challenges from increasing fuel costs, regulations and aging generation equipment. NSPI has piloted PRiSM on four thermal units, and in a very short time the software has demonstrated its anomaly detection capabilities. Based on the pilot program results, expanding the licensing of InStep PRiSM will allow the entire thermal generating fleet to realize the benefits of improved anomaly detection and analysis of critical operation processes.

Why do this project now?

The results of the limited licensing of PRiSM demonstrate the value of the software. This project will help advance NSPI goals and meet business challenges associated with aging generation equipment. This project should be completed at the earliest opportunity to leverage the benefits of PRiSM in managing NSPI's thermal generating assets.

Why do this project this way?

The decision to move forward and license the thermal fleet is based on operating experience of the product. Increasing licensing and implementation of the software in this manner ensures the benefits will be realized in a timely manner.

CI Number: 38880

Title: LIN -Thermal Fleet Licensing for PRiSM

Start Date: 2010/04

Final Cost Date: 2010/07

Function: Generation

Forecast Amount: $29,358

DESCRIPTION:

The project will expand the existing licensing of InStep PRiSM to the thermal units at Lingan.

PRiSM provides early indications to problems occurring in real time. PRiSM also provides a quantitative comparison between current and historical data, alerting users to anomalies that are outside of normal operating regimes. The benefits of PRisM include:

- Improved asset availability
- Reduced forced outages
- Improved predictive maintenance
- Improved operational support to plant staff
- Capturing retiring work force asset expertise and knowledge

NSPI has licensed and installed PRiSM for four thermal units and has tested the software on major equipment in both real time and in historical play back mode. The software has demonstrated its ability to detect issues earlier than other traditional methods and has provided insight into the asset operational issues.

Summary of Related CI's +/- 2 years:
2010 - 38877 TRE Thermal Fleet Licensing for PRiSM $58,717
2010 - 38879 POT Thermal Fleet Licensing for PRiSM $29,358
2010 - 38854 TUC Thermal Fleet Licensing for PRiSM $88,075

JUSTIFICATION:

Justification Criteria: Thermal

Sub Criteria: Equipment Replacement

Why do this project?

NSPI faces growing business challenges from increasing fuel costs, regulations and aging generation equipment. NSPI has piloted PRiSM on four thermal units, and in a very short time the software has demonstrated its anomaly detection capabilities. Based on the pilot program results, expanding the licensing of InStep PRiSM will allow the entire thermal generating fleet to realize the benefits of improved anomaly detection and analysis of critical operation processes.

Why do this project now?

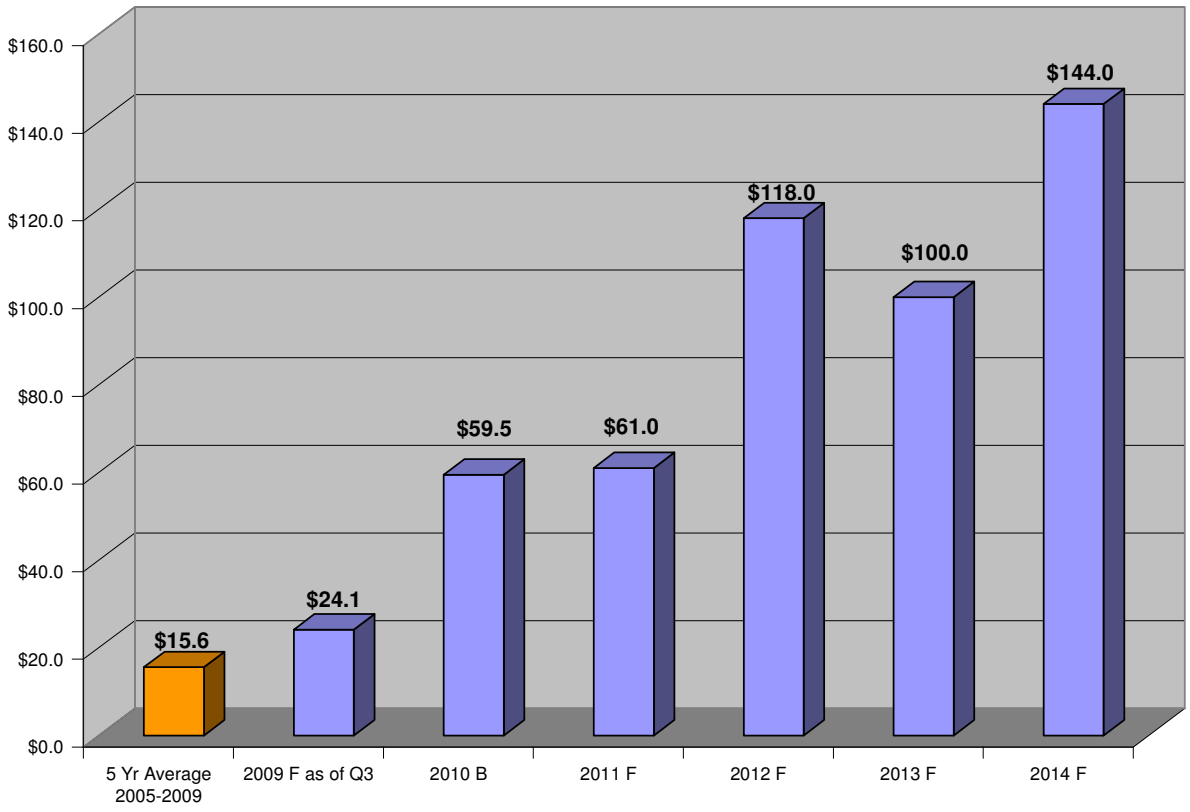
The results of the limited licensing of PRiSM demonstrate the value of the software. This project will help advance NSPI goals and meet business challenges associated with aging generation equipment. This project should be completed at the earliest opportunity to leverage the benefits of PRiSM in managing NSPI's thermal generating assets.

Why do this project this way?

The decision to move forward and license the thermal fleet is based on operating experience of the product. Increasing licensing and implementation of the software in this manner ensures the benefits will be realized in a timely manner.

Transmission

(Millions of Dollars)



- The focus for Transmission capital in 2010 is growth in customer base and reliability.
- Year 2010 transmission capital is comprised of the following:
    - $45.5M New Items
    - $ 5.2M Carryover
    - $ 8.8M Routine spending
- Projects with total spending greater than $1.0M requiring UARB approval in 2010:
    - 33525 Canaan Rd 43V to Tremont 51V Line ($15.0M)
    - 38732 1H Water St Replace 138 kV GIS ($8.7M)
    - 38819 51V Tremont Circuit Breaker & Bus ($7.2M)
    - 33624 Spare Generator Transformer ($4.4M)
    - 38110 2010 Transmission Line Insulator Replacement ($3.0M)
    - 38027 2010 Trans Switch & Breaker Upgrade ($2.9M)
    - 38857 L7004 Deteriorated Replacements ($2.2M)
    - 38266 2010 Protection Upgrades ($2.1M)
    - 11004 Canaan Rd Circuit Breaker Additions ($1.7M)
    - 34622 Upgrade L-8002 ($1.7M)
    - 38856 L7011 Deteriorated Replacements ($1.6M)
    - 38878 2010 Substation Cutout and Insulator Replacements ($1.5M)
    - 33504 Upgrade 69 kV Circuit to Pleasant Street L5536 ($1.4M)

Transmission – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2010 Budget	Subsequent Spending	Total Estimate
	37942	Nuttby Mountain Wind Project Substation	2010/01	2010/06	$ -	$2,895,574	$ -	$2,895,574
T602	29008	Construct 139H Dartmouth Crossing Substn	2008/08	2010/03	3,994,954	637,565	-	4,632,519
T595	29012	UPGRADE L6537	2008/04	2010/04	1,721,090	605,433	-	2,326,523
	37944	Nuttby Mountain Wind Project Transmission	2010/01	2010/06	-	563,173	-	563,173
T596	29010	Install 138-25KV Transformer At 22C Cleveland Sub	2008/07	2010/03	1,762,917	194,610	-	1,957,527
T549	28478	L6033 & L6035 Tower Footing Restoration	2007/03	2010/12	11,234	187,969	-	199,202
T592	29013	82V Elmsdale Transformer Addition	2008/06	2010/06	2,242,600	90,111	-	2,332,711
	35862	2009 Transmission Switching Improvements	2009/07	2010/02	882,854	65,414	-	948,268
		Total Transmission			**$10,615,649**	**$5,239,849**	**$ -**	**$15,855,498**

Note 1: Project Listings are as of November 30, 2009

* Pending UARB Approval

Transmission – New Item Spending

CI#	Project Title	2010 Budget	Project Total	Page
33525	Canaan Rd 43V to Tremont 51V Line	14,058,941	14,988,764	190
38732	1H Water St Replace 138 kV GIS	6,283,630	8,734,155	191
38819	51V Tremont Circuit Breaker & Bus	3,919,209	7,208,814	192
38110	2010 Transmission Line Insulator Replacement	2,962,648	2,962,648	193
38027	2010 Transmission Switch & Breaker Upgrade	2,852,047	2,852,047	194
38857	L7004 Deteriorated Replacements	2,240,074	2,240,074	195
38266	2010 Protection Upgrades	2,071,661	2,071,661	196
11004	Canaan Rd Circuit Breaker Additions	1,705,311	1,705,311	197
38856	L7011 Deteriorated Replacements	1,604,403	1,604,403	198
38878	2010 Substation Cutout and Insulator Replacements	1,500,961	1,500,961	199
33504	Upgrade 69 kV Circuit to Pleasant Street L5536	1,449,970	1,449,970	200
34622	Upgrade L-8002	1,201,706	1,658,189	201
33624	Spare Generator Transformer *Pending UARB Approval	1,051,660	4,351,660	202
38893	2010 Steel Tower Life Extension	800,379	800,379	203
38860	2010 Pole Retreatment	500,227	500,227	204
25391	25kV Bus Keltic Drive Substation	487,804	487,804	205
38858	L6002 Deteriorated Replacements	481,782	481,782	206
38818	Valley Protection Upgrades	288,332	288,332	207
	Total Transmission New Spending	**$ 45,460,745**	**$ 55,887,181**	

* Pending UARB Approval

CI Number: 33525

Title: Canaan Rd 43V to Tremont 51V Line

Start Date: 2010/01

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $14,988,764

DESCRIPTION:

This project provides for costs associated with the construction of a new 138kV transmission line approximately 43 kms in length between the Canaan Road and Tremont Substations.

Summary of Related CI's +/- 2 years:
2010 - 38819 51V Tremont Circuit Breaker & Bus $7,208,814
2010 - 11004 Canaan Rd Circuit Breaker Additions $1,705,311

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Voltage Unbalance

Why do this project?

The load on the 69kV system in the Annapolis Valley has increased to a level where a loss of selected elements (138kV line or 138-69kV transformer) in the area, under peak load conditions, causes the voltage on the 69kV system to drop below acceptable levels. An additional 138kV supply from 43V-Canaan Road to 51V-Tremont is required to maintain reliability on the 69kV system for contingency failures during peak load periods.

This project provides for the interconnection of the new 138kV line at the 51V-Tremont Substation and the addition of a new 138kV-69kV autotransformer.

Why do this project now?

The 2010/11 peak load on the 69kV system in the Annapolis Valley is forecasted to reach levels such that failure of selected elements (138kV line or 138-69kV transformer) during peak load conditions causes the voltage on the 69kV system to drop below acceptable levels, which could result in outages.

Why do this project this way?

The new line terminal and second transformer addition at 51V-Tremont is required to terminate the new 138kV line and provide the additional source point on the 69kV system.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38732

Title: 1H Water St Replace 138 kV GIS

Start Date: 2010/01

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $8,734,155

DESCRIPTION:

The 138kV Gas Insulated Substation (GIS) at 1H-Water Street is 32 years old and at the end of its useful life. The 138kV breakers and associated buswork are experiencing failures that pose potential reliability risks to the downtown area of Halifax.

This project provides for the costs associated with replacing the 138kV GIS and relocating the 138kV substation within the property boundaries on the south side of the Water Street office complex.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

The 138kV GIS is at the end of its useful life and is experiencing reliability issues. A bus failure on B61 is the most recent example. The Water St. substation serves approximately 80MVA of load in the downtown Halifax area.

Why do this project now?

The 138kV GIS is 32 years old. Life expectancy for this type of switchgear is approximately 30 to 35 years. Over the last several years problems have been experienced with the 138kV circuit breakers and most recently a 138kV bus failure.

Why do this project this way?

The existing 138kV GIS needs to be replaced. This project provides an opportunity to relocate the switchgear to an existing indoor location and modify the station one-line to a more reliable ring-bus configuration. This will further allow for future load growth in the downtown core.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38819

Title: 51V Tremont Circuit Breaker & Bus

Start Date: 2010/01

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $7,208,814

DESCRIPTION:

This project provides for the costs to add a second 138kV-69kV autotransformer, the addition of 138kV and 69kV busses, and the associated protection and control additions and modifications.

Summary of Related CI's +/- 2 years:
2010 - 33525 Canaan Rd 43V to Tremont 51V Line $14,988,764
2010 - 11004 Canaan Rd Circuit Breaker Additions $1,705,311

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

The load on the 69kV system in the Annapolis Valley has increased to a level where a loss of selected elements (138kV line or 138-69kV transformer) in the area, under peak load conditions, causes the voltage on the 69kV system to drop below acceptable levels. An additional 138kV supply from 43V-Canaan Road to 51V-Tremont is required to maintain reliability on the 69kV system for first contingency failures during peak load periods.

This project provides for the interconnection of the new 138kV line at the 51V-Tremont Substation and the addition of a new 1 38kV-69kV autotransformer.

Why do this project now?

The 2010/11 peak load on the 69kV system in the Annapolis Valley is forecasted to reach levels such that failure of some source elements (138kV line or 138-69kV transformer) during peak load conditions causes the voltage on the 69kV system to drop below acceptable levels, which could result in outages.

Why do this project this way?

The new line terminal and second transformer addition at 51V-Tremont is required to terminate the new 138kV line and provide the additional source point on the 69kV system.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38110

Title: 2010 Transmission Line Insulator Replacement

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $2,962,648

DESCRIPTION:

This project provides for the costs associated with the replacement of insulators on six 69kV circuits in 2010, three 138kV circuits in 2011, one 138kV circuit, one 230 kV circuit in 2012, one 69kV circuit and one 138kV circuit in 2013. These insulators have failed from cement growth.

Summary of Related CI's +/- 2 years:
2009 - 33464 2009 Transmission Line Insulator Replacement $977,146
2008 - 28621 2008 L5027 Insulator Replacement $1,049,592

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

The failure mechanism is known and previously replaced insulators have been performing well.

Why do this project now?

This project is required because the type of 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.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38027

Title: 2010 Transmission Switch & Breaker Upgrade

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $2,852,047

DESCRIPTION:

This project provides for costs associated with reliability improvements on the NSPI transmission system. Included is the replacement of 17 circuit breakers rated 69kV and one circuit breaker rated 138kV. Also included is the replacement of 15 switches, rated 138kV and 69kV. In addition, road access will be upgraded to provide access for the mobile circuit switcher in remote areas.

Summary of Related CI's +/- 2 years:
2009 - 35862 2009 Transmission Switching Improvements $948,268

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

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 to customers.

Why do this project this way?

The circuit breakers that are being replaced are old and in most instances spare parts are no longer available. 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.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38857

Title: L7004 Deteriorated Replacements

Start Date: 2010/06

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $2,240,074

DESCRIPTION:

This project provides for costs associated with increasing ground clearances of certain spans along with the replacement of deteriorated poles, insulators, and cross arms on approximately 335 structures on the transmission L-7004.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

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.

Why do this project now?

This project will ensure proper clearances are met and operating ratings can be maintained as well as addressing 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.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38266

Title: 2010 Protection Upgrades

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $2,071,661

DESCRIPTION:

This project provides for the costs to upgrade the protection systems at 79N-Hopewell, 91H-Tuft's Cove, and 108H-Burnside Substations to comply with Northeast Power Coordination Council (NPCC) criteria for bulk power systems. This is the first phase of a 3 phase requirement to upgrade the identified substations protection systems to comply with the NPCC A-1O criteria.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

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 criteria is used to identify substation busses if a fault was not successfully cleared by protection. This situation results in disturbances outside the local operating area. Those stations identified through this criterion are required to have fully redundant protection, control and communication schemes. Therefore, stations listed in the description of the project met the criteria and currently do not have fully redundant protection, control, and communication schemes.

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 nine stations requiring this upgrade over a three year period; three stations each year.

Current plans would have 79N-Hopewell, 91H-Tuft's Cove, and 108H-Burnside completed in 2010; 103H-Lakeside, 120H-Brushy Hill, and 1N-Onslow completed in 2011; and 104H-Kempt Road, 90H-Sackville, and 47C-NewPage completed 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.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 11004

Title: Canaan Rd Circuit Breaker Additions

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $1,705,311

DESCRIPTION:

This project provides for the costs to add a new 138kV line terminal as well as the associated protection and bus modifications at 43V-Canaan Road.

Summary of Related CI's +/- 2 years:
2010 - 33525 Canaan Rd 43V to Tremont 51V Line $14,988,764
2010 - 38819 51V Tremont Circuit Breaker & Bus $7,208,814

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

The load on the 69kV system in the Annapolis Valley has increased to a level where a loss of some source elements (138kV line or 138-69kV transformer) in the area, under peak load conditions, causes the voltage on the 69kV system to drop below acceptable levels. An additional 138kV supply from 43V-Canaan Road to 51V-Tremont is required to maintain reliability on the 69kV system for first contingency failures during peak load periods.

This project provides for the interconnection of the new 138kV line from 43V-Canaan Road to 51V-Tremont at the 43V-Canaan Road Substation.

Why do this project now?

The 2010/11 peak load on the 69kV system in the Annapolis Valley is forecasted to meet levels during peak load conditions which cause the voltage on the 69kV system to drop below acceptable levels which could result in outages.

Why do this project this way?

The new line terminal addition at 43V-Canaan Road is required to terminate the new 138kV line.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38856

Title: L7011 Deteriorated Replacements

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $1,604,403

DESCRIPTION:

This project provides for costs associated with changing out deteriorated poles, arms and insulators on approximately 160 structures on transmission L-7011.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Maintenance

Why do this project?

This project is required to replace deteriorated poles, crossarms, and insulators on a 230kV circuit between Lingan and Port Hastings. This circuit is an integral part of NSPI's transmission system.

Why do this project now?

This project will replace deteriorated plant that may result in unplanned interruptions on the transmission system.

Why do this project this way?

Replacement in kind is the most effective method of addressing this deteriorated plant.

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CI Number: 38878

Title: 2010 Substation Cutout and Insulator Replacements

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $1,500,961

DESCRIPTION:

This capital item is to replace porcelain cutouts on select equipment in 28 transmission substations.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Outage Performance

Why do this project?

Porcelain cutouts have been failing because they develop hairline cracks as a result of moisture. This can cause these cutouts to explode and may cause a fire. These failures are resulting in customer outages. Outages affect a large number of customers as failures involve more than one feeder.

Why do this project now?

Program cutout replacement on a prioritized substation basis is required to improve customer reliability. Cutout failures contribute to customer outages.

Why do this project this way?

The best approach to reduce outages caused by cutout failures is to focus on specific substations and replace the cutouts in kind.

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CI Number: 33504

Title: Upgrade 69 kV Circuit to Pleasant Street L5536

Start Date: 2010/07

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $1,449,970

DESCRIPTION:

This project provides for costs associated with upgrading conductors on the existing 69 kV circuit between Tusket and Pleasant Street, Yarmouth, which is 12.2km in length. The new conductor will be 336.4 ACSR designed to a maximum operating temperature of 60 degrees Celsius.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Overloaded Equipment

Why do this project?

The area load has increased to a level where additional transmission capacity is required.

Why do this project now?

Load projections indicate the 69 kV line rating will be exceeded in late 2010.

Why do this project this way?

The existing conductor on the 69 kV circuit between Tusket and Pleasant Street is 2/0 ACSR. Upgrading the conductor to 336.4 ACSR will enable the circuit to accommodate load growth on the 69 kV circuit for the next planning period.

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CI Number: 34622

Title: Upgrade L-8002

Start Date: 2010/05

Final Cost Date: 2011/12

Function: Transmission

Forecast Amount: $1,658,189

DESCRIPTION:

This project provides for costs associated with upgrading L-8002 (Onslow - Lakeside) to an operating temperature of 60 degrees Celsius. There will be 28 structures replaced on L-8002.

Summary of Related CI's +/- 2 years:
2009 - 33542 Upgrade L-8002 $1,601,290

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

This project is required to increase the clearance from the energized conductors to the ground on L-8002, which in some locations, does not meet the minimum Canadian Standards Association (CSA) standard for ground clearance on a 345 kV circuit.

Why do this project now?

This project will ensure proper clearances are met and operating ratings can be maintained.

Why do this project this way?

This project will raise the height spans on this circuit that do not meet the CSA standard requirement. This will be achieved by installing some new structures at the mid span and raising other structures.

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CI Number: 33624

Title: Spare Generator Transformer

Start Date: 2010/06

Final Cost Date: 2011/05

Function: Transmission

Forecast Amount: $4,351,660

DESCRIPTION:

This project involves the purchase and commissioning of a spare generator transformer configured to backup and of the four units at Lingan. In addition to being portable, the unit's size makes it a suitable backup for the unit at Point Aconi, Point Tupper, two units at Trenton and one unit at Tuft's Cove.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

This project is required to provide the most cost effective long term solution ensuring NSPI can maintain or quickly restore the power delivery system after experiencing a failure of a generator transformer. This generator will serve to support Lingan (units 1 to 4), Point Tupper Unit 2, Point Aconi Unit 1, Trenton Units 5 and 6, and Tuft's Cove Unit 3. The acquisition of a spare generator transformer allows for a reduction in replacement energy costs associated with an extended outage.

Why do this project now?

The loss of a generator transformer at any of NSPI's base load units will result in an extended outage.

Why do this project this way?

The options after a critical transformer failure include purchasing replacement energy, searching the market for a compatible used transformer, or purchasing a spare generator transformer. Planned acquisition of a new spare generator transformer is the most cost effective approach.

CI Number: 38893

Title: 2010 Steel Tower Life Extension

Start Date: 2010/06

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $800,379

DESCRIPTION:

This item provides for the cost to apply anti-corrosive paint to selected lattice steel towers on various transmission lines around the province.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Maintenance

Why do this project?

These towers are exposed to the sea coast environment and have experienced accelerated corrosion due to salt contamination.

Why do this project now?

These towers need repainting in 2010 to slow down the loss of metal and extend the life of the towers.

Why do this project this way?

It is necessary to paint the towers now because after rust has penetrated the metal, painting would no longer be an effective solution.

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CI Number: 38860

Title: 2010 Pole Retreatment

Start Date: 2010/04

Final Cost Date: 2010/10

Function: Transmission

Forecast Amount: $500,227

DESCRIPTION:

This project provides for the cost of pole re-treatment of approximately 5000 transmission poles.

Summary of Related CI's +/- 2 years:
2008 - 29001 T582 2008 Pole Retreatment Program $689,510
2009 - 33563 T604 2009 Pole Retreatment $507,058

JUSTIFICATION:

Justification Criteria: Transmission Plant

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.

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CI Number: 25391

Title: 25kV Bus Keltic Drive Substation

Start Date: 2010/04

Final Cost Date: 2010/08

Function: Transmission

Forecast Amount: $487,804

DESCRIPTION:

This item provides for the termination of a second 25kV feeder circuit at the Keltic Drive Substation. A distribution line work order associated with this project has also been scheduled for 2010. It is included under CI 25575.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Sub Criteria: Overloaded Equipment

Why do this project?

It is necessary to create a 25 kV bus to accommodate a new 25kV feeder out of Keltic Drive to offload feeder circuit 11S-411.

Why do this project now?

The project is required to coincide with the construction of a second 25 kV feeder out of Keltic Drive substation.

Why do this project this way?

Currently there is a single termination point for the existing 25 kV circuit at the Keltic Drive Substation. The termination of a second 25 kV circuit requires the establishment of a standard 25 kV bus.

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CI Number: 38858

Title: L6002 Deteriorated Replacements

Start Date: 2010/06

Final Cost Date: 2010/10

Function: Transmission

Forecast Amount: $481,782

DESCRIPTION:

This project provides for costs associated with changing ground clearances on certain spans along with the replacement of deteriorated poles, insulators, and cross arms on approximately 56 structures on transmission L-6002.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

This project is required to increase the ground clearance of energized conductors in some locations that do not meet minimum Canadian Standards Association (CSA) standards for ground clearance along with replacing deteriorated plant.

Why do this project now?

This project will ensure proper clearances are met and operating ratings can be maintained. It also addresses 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 mid-span structure or changing out existing structures with higher structures.

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CI Number: 38818

Title: Valley Protection Upgrades

Start Date: 2010/01

Final Cost Date: 2010/12

Function: Transmission

Forecast Amount: $288,332

DESCRIPTION:

This project provides for the costs to improve the fault clearing times for the existing protection on the 69kV system in the Western Annapolis Valley area. This includes faster operating times for distance protection at 11V- Paradise, 13V-Gulch, 15V-Sissaboo, 3W-Big Falls and 9W-Tusket as well as breaker fail protection at 13V-Gulch.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Transmission Plant

Why do this project?

A review of the system protection in the Western Annapolis Valley identified some areas where modifications should be made to improve system reliability by improving fault clearing times. Clearing local line faults faster will reduce the number of stations involved in isolating the fault.

Why do this project now?

This project will reduce the number of customers potentially affected by 69kV transmission line faults in the Western Valley area. New generation load flow changes, increase the probability of extended protection operation for slow clearing faults. The modifications are required now to minimize the potential reliability impacts.

Why do this project this way?

The modifications included in this project are the least cost alternative to improve fault clearing times.

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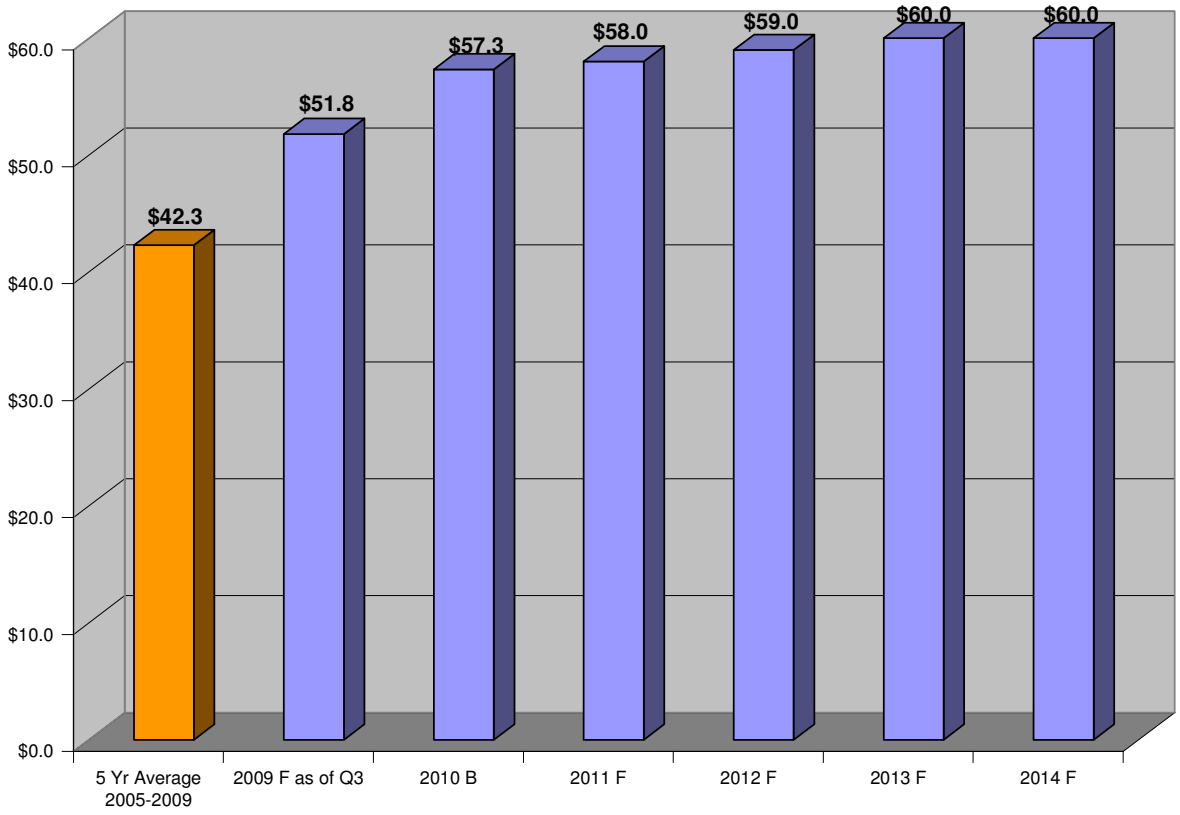
Distribution

(Millions of Dollars)



- Distribution capital in 2010 focuses on New Customer growth and reliability.

- Year 2010 distribution capital is comprised of the following:

    - $ 14.3M New Items
    - $ 0.2M Carryover
    - $ 42.8M Routine spending.

- Projects with total spending greater than $1.0M requiring UARB approval in 2010:

    - 38122 2010 PCB Equipment Removal / Destruction ($2.0M)
    - 38024 2010 Distribution Cutout Replacements ($2.0M)
    - 38022 2010 Recloser Additions ($1.4M)
    - 38062 2010 Off Road to Roadside ($1.0M)
    - 34602 25 kV Feeder Extension Bisset Road ($1.0M)

Distribution – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2010 Budget	Subsequent Spending	Total Estimate
D249	35642	2009 Recloser Additions	2009/09	2010/03	$1,336,758	$133,128	$0	$1,469,886
D202	34962	Stirling Load Transfer	2009/02	2010/08	135,778	96,435	-	232,212
		Total Distribution			**$1,472,536**	**$229,563**	**$0**	**$1,702,099**

Distribution – New Item Spending

CI#	Project Title	2010 Budget	Project Total	Page
38122	2010 PCB Equipment Removal/Destruction	$2,001,844	$2,001,844	211
38024	2010 Distribution Cutout Replacements	2,000,971	2,000,971	212
38022	2010 Recloser Additions	1,400,271	1,400,271	213
34602	25 kV Feeder Extension Bissett Road	1,036,178	1,036,178	214
38062	2010 Off Road to Roadside	1,001,045	1,001,045	215
38888	50N-412 Targeted Feeder Replacements	872,257	872,257	216
33766	11S-411 Targeted Feeder Replacements	817,950	817,950	217
25575	Reliability Keltic Drive New Feeder	708,813	708,813	218
38890	57C-426 Targeted Feeder Replacements	640,251	640,251	219
38903	Halifax UG Cable Replacement 1H-403 & 405	592,567	592,567	220
38847	Distribution Feeder Ties	496,042	496,042	221
38886	131H-423 Targeted Feeder Replacements	422,762	422,762	222
38025	131H-422 Targeted Feeder Replacements	402,868	402,868	223
38083	Recloser Control Replacements	285,612	285,612	224
38892	50W-412 Targeted Feeder Replacements	280,731	280,731	225
38867	Replacement of 3H and 6H Reclosers	267,556	267,556	226
38885	19C Canso Distribution Supply	248,744	248,744	227
38901	23H-303 Targeted Feeder Replacements	216,357	216,357	228
38889	137H-414 Targeted Feeder Replacements	146,904	146,904	229
38887	22N-402 Targeted Feeder Replacements	142,205	142,205	230
38891	127H-411 Targeted Feeder Replacements	132,877	132,877	231
38915	Martins Brook Regulation Additions	120,337	120,337	232
38914	2010 Animal Guard Installations	100,038	100,038	233
	Total Distribution New Spending	**$14,335,180**	**$14,335,180**	

CI Number: 38122

Title: 2010 PCB Equipment Removal/Destruction

Start Date: 2010/03

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $2,001,844

DESCRIPTION:

This project provides for the costs associated with the removal of equipment with 500 mg/kg, or more of PCBs, to be in compliance with recently published Federal Environmental PCB Regulations.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Environment

Sub Criteria: Requirement to Serve

Why do this project?

The removal of PCB equipment is a regulatory requirement.

Why do this project now?

Regulations require that this equipment must be removed.

Why do this project this way?

The sampling and possible replacement of equipment containing greater than 500 mg/kg concentration of PCBs must be planned over a period of a few years to ensure outages are scheduled in a timely manner. Present draft regulations will aim for this completion in 5 years (2014).

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CI Number: 38024

Title: 2010 Distribution Cutout Replacements

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $2,000,971

DESCRIPTION:

Porcelain cutouts are failing due to hairline cracks and as a result of moisture. This may cause the cutouts to fail and could cause a fire. These failures are resulting in customer outages. In 2010 the porcelain cutout program will target 35 feeders. The following four years will see a similiar program of distribution cutout replacements on a prioritized basis.

Summary of Related CI's +/- 2 years:
2009 - 35882 2009 Cutout Replacements $1,510,053

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Program cutout replacement on a prioritized substation basis is required to improve customer reliability.

Why do this project now?

It has been determined that the best approach to reduce outages caused by cutout failures is to focus on specific substations.

Why do this project this way?

It has been determined that the best approach to reduce outages caused by cutout failures is to prioritize feeders, as opposed to targeting specific cutout replacements across a number of feeders.

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CI Number: 38022

Title: 2010 Recloser Additions

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $1,400,271

DESCRIPTION:

This item provides for the installation of additional reclosers to provide sectionalizing points on specified feeders. In 2010 it is proposed to add or change out reclosers associated with 32 distribution circuits. Feeder selection is based on a Customer Interruptions (CI) x Customer Hours (CH) weighting for full feeder outages that were not caused by a loss of transmission.

Summary of Related CI's +/- 2 years:
2009 - 35642 2009 Recloser Additions $1,512,766

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

This project is required to improve distribution reliability on feeders. An estimated 24,860 customer interruptions and 37,292 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?

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% 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. If the new downline feeder section can be transferred automatically to an alternate feeder when its normal source feeder has tripped, then the improvement in predicted reliability becomes 50%. Given the predicted improvement in CI and CH, the $/ACI (Avoided Customer Interruptions) was evaluated to be $40.22/ACI and the $/ACHI (Avoided Customer Hour Interruptions) was evaluated to be $60.34/ACHI.

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CI Number: 34602

Title: 25 kV Feeder Extension Bissett Road

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $1,036,178

DESCRIPTION:

This project will serve to construct a 25kV circuit from East Dartmouth to Eastern Passage via Bisset Road. Work will include construction of a new 3 phase 25kV 336Al line, upgrade the existing single phase lines as well as voltage conversion in the Cow Bay area from 12.5kV to 25kV.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Overloaded Equipment

Why do this project?

This capital expenditure is required to relieve overloaded equipment. The East Dartmouth 25kV feeder circuit 113H-442 supplying Caldwell Road, Cow Bay and the Eastern Passage areas of Dartmouth exceeds overload criteria. Load on this feeder at the 2008-09 peak was recorded at 432 amps. The overload criteria is a maximum of 325 amps.

Why do this project now?

This project is required to restore overload criteria and provide for further development in this area.

Why do this project this way?

Alternatives to extending this feeder include building a 138kV transmission line and a new substation in Eastern Passage. This item was investigated in the Distribution Planning Study "Dartmouth 25kV System Report #232-1105-H38". This report was originally filed with the Board on May 30, 2008 in response to IR-4 pertaining to CI #28520. Two extra copies of this report were filed with the Board on August 14, 2009. The approach outlined in this work order is the most cost effective.

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CI Number: 38062

Title: 2010 Off Road to Roadside

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $1,001,045

DESCRIPTION:

This project will relocate approximately 18kms of distribution line from off road to the roadside in various locations throughout the Province.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

This project will reduce outage duration(s) by relocating distribution circuits to the roadside. Relocating to the roadside will target difficult access areas. These are areas where reliability issues persist due to off right of way (ROW) problems, or those with vegetation challenges.

Why do this project now?

Moving lines to the roadside will increase the reliability of the system.

Why do this project this way?

Relocating small off road sections to the road side improves access and reduces outage restoration time.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38888

Title: 50N-412 Targeted Feeder Replacements

Start Date: 2010/03

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $872,257

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on 50N-412 out of the Trenton Substation. This feeder, which is 9.4km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

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CI Number: 33766

Title: 11S-411 Targeted Feeder Replacements

Start Date: 2010/04

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $817,950

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
2010 – 25575 Reliability Keltic Drive New Feeder $708,813

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on 11S-411, out of the Keltic Drive Substation. This feeder, which is 91.7km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

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CI Number: 25575

Title: Reliability Keltic Drive New Feeder

Start Date: 2010/04

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $708,813

DESCRIPTION:

This project is for the distribution work required in constructing a new overhead 25kV feeder from the Keltic Drive Substation. The source for this feeder will be provided by the transmission project CI#25391 in 2010 "Add a New 25kV 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 feeder 11S-411.

Summary of Related CI's +/- 2 years:
2010 - 33766 11S-411 Targeted Feeder Replacements $817,950

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Overloaded Equipment

Why do this project?

This project is required to offload the existing 25kV feeder.

Why do this project now?

This project will improve reliability to customers by reconfiguring this feeder and will offload the existing feeder.

Why do this project this way?

The completion of this work will reduce outages and improve reliability on this feeder.

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CI Number: 38890

Title: 57C-426 Targeted Feeder Replacements

Start Date: 2010/03

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $640,251

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 57C-426, out of the Salmon River Lake Substation. This feeder, which is 33.6km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

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CI Number: 38903

Title: Halifax UG Cable Replacement 1H-403 & 405

Start Date: 2010/08

Final Cost Date: 2010/10

Function: Distribution

Forecast Amount: $592,567

DESCRIPTION:

This project is required to replace 2.8 km of 3 phase 25kV underground cable between the Water Street Substation and Scotia Square on circuits 1 H-403 and 1 H-405.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Deteriorated Conductor

Why do this project?

This project is required to replace deteriorated underground 25kV cables and accessories in the Halifax Underground System.

Why do this project now?

This project is part of a plan to begin replacing cables that have reached the end of their useful life. Cables installed in the early 1970's have now reached the end of their useful life; estimated at 35 years.

Why do this project this way?

Due to the age of the underground cables, a planned replacement program is scheduled to take place over the next several years.

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CI Number: 38847

Title: Distribution Feeder Ties

Start Date: 2010/03

Final Cost Date: 2010/08

Function: Distribution

Forecast Amount: $496,042

DESCRIPTION:

This item provides for the reconductoring of two sections of distribution line in the Windsor and Dartmouth areas. This will enable these lines to be tied to adjacent feeders, allowing the transfer of customers and minimizing outages.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Equipment Replacement

Why do this project?

This project is required in order to improve reliability by enabling the transfer of customers between feeders during outage periods in the event of outages.

Why do this project now?

This project will improve system reliability.

Why do this project this way?

This is the most cost effective and efficient way to create feeder ties between these circuits.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38886

Title: 131H-423 Targeted Feeder Replacements

Start Date: 2010/05

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $422,762

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 131H-423, out of the Lucasville Substation. This feeder, which is 80.4km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38025

Title: 131H-422 Targeted Feeder Replacements

Start Date: 2010/04

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $402,868

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 131H-422, out of the Lucasville Substation. This feeder, which is 64.2km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38083

Title: Recloser Control Replacements

Start Date: 2010/02

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $285,612

DESCRIPTION:

This project provides for the replacement of thirty (30) Form 3 and 3A recloser controls with new microprocessor based controls on both downline reclosers and substation reclosers.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

This project is required to replace deteriorated equipment that is having a negative effect on distribution reliability.

Why do this project now?

Microprocessor-based recloser controls provide the opportunity for additional reliability improvements by providing information about fault characteristics and fault location.

Why do this project this way?

Due to the age of the recloser controls, failures are becoming more frequent. The failure rate will increase unless replacements are not forthcoming. Controls can be replaced without changing the whole recloser unit.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38892

Title: 50W-412 Targeted Feeder Replacements

Start Date: 2010/03

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $280,731

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 50W-412, out of the Milton Substation. This feeder, which is 26.4km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

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CI Number: 38867

Title: Replacement of 3H and 6H Reclosers

Start Date: 2010/06

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $267,556

DESCRIPTION:

This project provides for the replacement of 10 model 3H and 6H hydraulic reclosers. There are approximately 30 of these reclosers in the Nova Scotia Power Inc. distribution system. It is anticipated all of these reclosers will be replaced over a 3 year period. The replacements will start with the oldest reclosures first.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: System Protection

Why do this project?

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. They are deteriorating and this is resulting in a negative impact on customer service reliability.

Why do this project this way?

Replacing 10 reclosers per year will provide the opportunity to manage this work in a cost effective manner.

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CI Number: 38885

Title: 19C Canso Distribution Supply

Start Date: 2010/07

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $248,744

DESCRIPTION:

This project will provide for the costs associated with a distribution supply to the Town of Canso. This project will include the extension of the closest 3-phase line into the community of Canso and provide for the interconnection with the 19C Substation.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Outage Performance

Why do this project?

This project will improve the reliability of the power supply to the town of Canso.

Why do this project now?

Due to the remote routing of the transmission line, extended line outages are taking place when the 69kV circuit experiences an unplanned outage.

Why do this project this way?

This is the least cost option to supply the community of Canso with an alternate source of supply.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38901

Title: 23H-303 Targeted Feeder Replacements

Start Date: 2010/05

Final Cost Date: 2010/12

Function: Distribution

Forecast Amount: $216,357

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 23H-303, out of the Rockingham Substation. This feeder, which is 22.8km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

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CI Number: 38889

Title: 137H-414 Targeted Feeder Replacements

Start Date: 2010/05

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $146,904

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 137H-414, out of the Hammonds Plains Substation. This feeder, which is 37.6km in length, was selected based on past performance, customer numbers and feeder length

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38887

Title: 22N-402 Targeted Feeder Replacements

Start Date: 2010/04

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $142,205

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 22N-402, out of the Church Street Substation. This feeder, which is 56km in length, was selected based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38891

Title: 127H-411 Targeted Feeder Replacements

Start Date: 2010/07

Final Cost Date: 2011/02

Function: Distribution

Forecast Amount: $132,877

DESCRIPTION:

This project is part of a program to improve customer service 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 wire, porcelain arrestors and cutouts, rusty transformers and guys will be replaced.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Distribution equipment (e.g. poles, wire, cutouts, transformers) failures are a primary driver of customer outages. This project will address distribution equipment issues on feeder 127H-411, out of the Aerotech Substation. This feeder, which is 95.6km in length, is targeted based on past performance, customer numbers and feeder length.

Why do this project now?

This feeder is included in the 2010 Reliability Investment Plan based on past performance, customer numbers and feeder length.

Why do this project this way?

This project will address the distribution equipment weaknesses on this feeder.

Pursuant to the master PLT services agreement, NSPI engages an affiliate to conduct PLT work at rates established in the contract. The work assigned to the affiliate is determined prior to project activation based on the nature of the work to be undertaken, the availability of NSPI's PLT work force, the scope of the project and project location.

CI Number: 38915

Title: Martins Brook Regulation Additions

Start Date: 2010/05

Final Cost Date: 2010/08

Function: Distribution

Forecast Amount: $120,337

DESCRIPTION:

This project involves adding three 12kV single-phase 219 amp voltage regulators within the Martins Brook Substation to regulate both distribution circuits 78W-301 and 302.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

Voltage is below Canadian Standards Association (CSA) Standard C235 which limits the number of customers on this feeder. The transformer at Martins Brook 78W-T1 has an old type Reinhausen tapchanger which has failed and spare parts are no longer available. The transformer will not operate automatically from the controller, and it can only operate in one direction by manually changing the taps. There is no regulation on transmission line L-5547 out of Westhavers Elbow substation. Poor voltage profiles were found on both 78W-301 and 78W-302 during peak load conditions.

Why do this project now?

Voltage at the 2010 peak will be below CSA Standard C235 which limits the number of customers on this feeder.

Why do this project this way?

Alternative solutions were evaluated to address the voltage issues. The installation of the regulators within the substation was found to be the most economical alternative.

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CI Number: 38914

Title: 2010 Animal Guard Installations

Start Date: 2010/04

Final Cost Date: 2010/08

Function: Distribution

Forecast Amount: $100,038

DESCRIPTION:

This project provides for the installation of a variety of bird and animal guards on a sample set of feeder sections.

These animal guards will be installed on a selection of feeders representing those with the highest number of bird and animal related outages. Each style of guard will be installed on a separate feeder, with a number of guards being installed per feeder section.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve

Why do this project?

This project will reduce the number of animal contacts thereby improving the reliability of the distribution system.

Why do this project now?

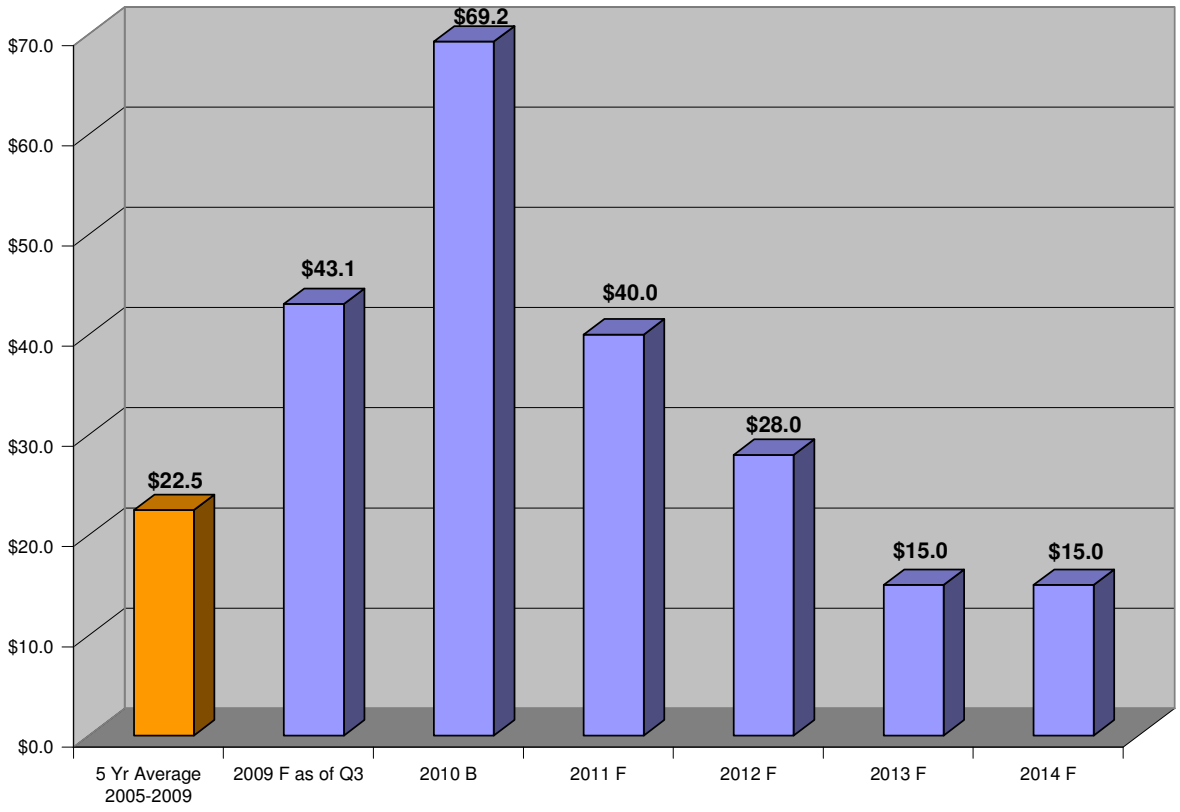
The variety of bird and animal guards that result in the most improved reliability performance will result in standard changes to the distribution system.

Why do this project this way?

Bird and animal guards help prevent outages resulting from foreign interference. Installing different styles of bird and animal guards on multiple feeders will provide the opportunity to assess which styles work best.

General Plant

(Millions of Dollars)



- General Plant capital in 2010 focuses largely on IT system replacements and vehicles.

- Year 2010 general Plant capital is comprised of the following:
  - $ 20.3M New Items
  - $ 41.1M Carry Over
  - $ 7.9M Routine spending

- Projects with total spending greater than $1.0M requiring UARB approval in 2010:
  - 32304 AMI Hardware & Software Installation ($30.8M)
  - 29009 Right of Way Purchase Northern NS ($6.9M)
  - 38852 Work Vehicle Replacement ($6.1M)
  - 34583 Transportation Vehicle Replacements ($3.4M)
  - 38182 2010 Backup Control Centre ($2.6M)
  - 33562 FAC Land Registration Act ($1.9M)
  - 34582 Class 3 Light Work Vehicles ($1.2M)
  - 34843 Oracle NLA License ($1.0M)

General Plant – Carryover Spending

Project Number	CI Number	Project Title	Start Date	Final Date	Previous Expenditure	2010 Budget	Subsequent Spending	Total Estimate
P773	28413	Work Management System Replacement	2008/03	2010/06	$11,230,005	$5,059,701	$ -	$16,289,706
P789	35742	Connectivity Upgrade	2009/05	2011/12	424,154	960,334	966,133	2,350,620
	32163	Treasury Management System Upgrade	2009/12	2010/05	46,410	622,121	-	668,531
		Total Computers			**$11,700,569**	**$6,642,156**	**$966,133**	**$19,308,858**
	33642	2009 Transportation Vehicle Replacement *	2009/09	2010/12	$596,221	$663,747	$ -	$1,259,968
		Total Vehicles			**$596,221**	**$663,747**	**$ -**	**$1,259,968**
P772	29131	FAC Space 2011	2008/10	2011/05	$24,104,517	$33,376,546	$263,800	$57,744,863
P761	28416	Replacement of Toughbook Laptop Computers	2008/06	2010/12	166,054	187,000	-	353,054
P782	32242	GS Upgrade of Ambient Air Shelters and Meteorological Equip	2009/06	2010/10	100,256	162,702	-	262,958
P787	35842	Nuttby Mountain Wind Project U&U Land Rights	2009/07	2010/12	584,295	60,000	-	644,295
		Total Other General Plant			**$24,955,123**	**$33,786,248**	**$263,800**	**$59,005,171**
		Total General Plant			**$37,251,913**	**$41,092,151**	**$1,229,933**	**$79,573,996**

Note 1: Project Listings are as of November 30, 2009

* Pending UARB Approval

General Plant – New Item Spending

CI#	Project Title	2010 Budget	Project Total	Page
38182	2010 Backup Control Centre	$1,615,035	$2,613,495	237
38871	Site Uninterruptible Power Supply (UPS) Upgrades	54,160	54,160	238
	Total Buildings New Spending	**$1,669,195**	**$2,667,655**	
34843	Oracle NLA License	$1,010,430	$1,010,430	239
34748	Upgrade Microsoft Office Pro	885,400	885,400	240
37722	PeopleSoft Upgrade	585,072	585,072	241
38162	2010 SCADA Upgrade	415,920	415,920	242
34782	Oracle Financials Upgrade	399,363	399,363	243
37829	SQL Server Consolidation	144,216	144,216	244
37742	Installation of Microsoft Network Policy Servers	98,662	98,662	245
37833	Plant Information (PI) Gateway and Portal Hardware Procurement	50,635	50,635	246
37835	Sharepoint Load Balancing Hardware	41,222	41,222	247
	Total Computers New Spending	**$3,630,920**	**$3,630,920**	
38142	RTU Replacement Program	780,137	780,137	248
38082	Phone Replacement System Operations	108,349	108,349	249
	Total Equipment Replacement New Spending	**$888,486**	**$888,486**	
37822	Barrington Tower Telephone System Replacement	814,450	814,450	250
38244	Replace Microwave Radio Systems	384,389	384,389	251
37842	Telecom Management System	50,332	50,332	252
	Total Telecommunication New Spending	**$1,249,171**	**$1,249,171**	
38852	Work Vehicle Replacement	6,101,516	6,101,516	253
34583	Transportation Vehicle Replacements	1,723,031	3,446,332	254
34582	Class 3 Light Work Vehicles	1,063,981	1,151,049	255
	Total Vehicles New Spending	**$8,888,528**	**$10,698,897**	
29009	Right of Way Purchase Northern NS	1,922,657	3,107,528	256
38900	Opsym-Incumbent Generation Dispatch Modeling Tool	988,123	988,123	257
38841	New Minas Land Purchase and Rights of Way	362,963	362,963	258
33562	FAC Land Registration Act	323,868	1,892,331	259
38849	Eastern Passage Land Purchase and Right of Way	259,216	259,216	260
32304	AMI Hardware & Software Installation	72,644	30,848,745	261
	Total Other General Plant	**$3,929,471**	**$37,458,906**	
	Total General Plant New Spending	**$20,255,771**	**$56,594,035**	

CI Number: 38182

Title: 2010 Backup Control Centre

Start Date: 2010/01

Final Cost Date: 2011/07

Function: General Plant

Forecast Amount: $2,613,495

DESCRIPTION:

North American Electric Reliability Corporation (NERC) requires all Transmission Operators and Balancing Authorities have a back-up control strategy in place by Q1 of 2012; pending the approval of the NERC EOP-008-1 standard in Q4 of 2009.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Buildings

Why do this project?

Nova Scotia Power Inc.'s (NSPI) requirement for a Back-up Control Centre (BCC) originates from a business need to provide constant monitoring of the bulk power system and the emerging NERC standard (EOP-008-1). This standard requires a back-up plan that "includes monitoring, control, logging, and alarming sufficient for maintaining compliance with all reliability standards". Today NSPI has a single point of failure (no redundancy) at the Ragged Lake Control Centre (RAL). All communications and control for the bulk power system is through RAL. An industrial or natural disaster could limit or curtail NSPI in such a way where the only visibility on the grid would be individuals stationed at major sub-stations and plants. NSPI currently has a simple BCC in the Scotia Square basement, it is dependent on the infrastructure at RAL. The NERC requirements state that "backup capabilities should not depend on the primary control center for any functionality required to maintain compliance with Reliability Standards that depend on the primary control functionality".

Why do this project now?

With the NERC EOP-008 standard expected to be approved in Q4 of 2009 and its requirement that a back-up plan be in place by Q1 of 2012, starting now would provide the necessary time to execute the project.

Why do this project this way?

A separate control building would comply with the new NERC CIP standards. This building would also serve as a training facility for operator apprentices. It would also provide space for annual operator certification requirements and the SCADA-Energy Management System operator training simulator.

CI Number: 38871

Title: Site Uninterruptible Power Supply (UPS) Upgrades

Start Date: 2010/03

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $54,160

DESCRIPTION:

This project is intended to upgrade the Uninterruptible Power Supplies (UPS) that are used to protect Nova Scotia Power Inc.(NSPI) sites against power interruptions & fluctuations.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Buildings

Why do this project?

This project provides for the replacement, addition and upgrading of NSPI's UPS devices to ensure that they continue to operate to manufacturer's specifications and protect the production data and telephone networks from unplanned outages.

Why do this project now?

A review of the UPS devices has shown that in many cases they are operating beyond the recommended replacement period. They may fail to perform as required during a power fluctuation, causing a loss in network connectivity and potential loss of hardware. NSPI's Information Technology infrastructure service provider has advised that most network outages in remote locations could be reduced or prevented with the installation of UPS systems that have alerting capability.

Why do this project this way?

Upgrades and additional UPS installations will reduce production outages to the IT data network and telecommunications equipment.

CI Number: 34843

Title: Oracle NLA License

Start Date: 2010/04

Final Cost Date: 2010/11

Function: General Plant

Forecast Amount: $1,010,430

DESCRIPTION:

This project provides for the purchase of Oracle processor based licensing for Nova Scotia Power Inc's (NSPI) Outage Management System (OMS) database. The current Oracle Database Network License Agreement (NLA) is limited to 200 concurrent users. NSPI's OMS database has been increasingly interfaced with a number of systems and devices.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

The NSPI OMS database must be relicensed to a processor-based model to mitigate the risk of non-compliance to the Oracle Database Network License Agreement. Oracle reserves the right to audit NSPI Oracle databases for license compliance. A finding of non-compliance by Oracle would result in financial implications to NSPI, in the form of penalties, or re-licensing charges.

Why do this project now?

The OMS database is considered mission-critical to NSPI and should leverage the optional database management packs that are not currently available under the existing NLA. These packs help ensure optimal application performance by providing proactive warning of database concerns and allowing for quicker resolution to database issues. The appropriate licensing model for the OMS database is the processor-based license agreement model.

Why do this project this way?

The OMS databases have numerous, complicated interfaces with many applications and data sources. These interfaces and connections allow the status of large numbers of devices and customers to be maintained in the OMS database. This unmanaged pool of potential connections is not suited to a shared license agreement with a constrained number (200) of allowable concurrent connections.

CI Number: 34748

Title: Upgrade Microsoft Office Pro

Start Date: 2010/05

Final Cost Date: 2010/11

Function: General Plant

Forecast Amount: $885,400

DESCRIPTION:

This project provides for the purchase of 1,300 Microsoft Office Professional 2007 user licenses. Nova Scotia Power Inc. (NSPI) currently utilizes Microsoft Office 2003 Pro as the primary desktop suite providing a uniform platform for email, word processing, spreadsheet calculation and small database interface. This project covers the cost of upgrading the desktop suite to version 2007.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

The existing version of the desktop office suite needs to be upgraded to align with NSPI's Information Technology (IT) maintenance guidelines. These state that software will be no more than one major release behind. This upgrade will also respond to the increasing demands from user groups for access to functions and integration opportunities that may only be available in an updated release.

Why do this project now?

The upgrade will ensure we maintain a vendor supported environment that can be integrated with other applications which support new business innovation (e.g. Internet, SharePoint, Work Management, etc). This upgrade will also align with ongoing desktop standardization activity; aligning the deployment of a new office suite environment with new computer deployments.

Why do this project this way?

This project complies with the objective of a standardization of desktop supported software. Employees will have access to current technology to perform their jobs.

CI Number: 37722

Title: PeopleSoft Upgrade

Start Date: 2010/05

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $585,072

DESCRIPTION:

This project provides for the upgrade of the PeopleSoft Enterprise Human Capital Management (HCM) software to version 9.1.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

The upgrade is required to maintain vendor support for software upgrades and patches. The existing software release will not be supported beyond Q2 2011.

Why do this project now?

Year end processing requirements for human resource services combined with project effort and timeline considerations provide constraints that support a 2010 upgrade plan.

Why do this project this way?

PeopleSoft supports payroll, employee benefits, time entry and employee data repository services. An upgrade is significantly less expensive than a replacement and offers ongoing vendor support for critical tax upgrades and patches.

CI Number: 38162

Title: 2010 SCADA Upgrade

Start Date: 2010/02

Final Cost Date: 2011/01

Function: General Plant

Forecast Amount: $415,920

DESCRIPTION:

The SCADA-Energy Management System (EMS) upgrade will provide upgraded versions of all NSPI licensed products, including a new interface for NSPI's operators and enhanced alarm handling.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

With the progressive and changing demands of North American Electric Reliability Corporation's Critical Infrastructure Protection standards and the Provincial renewable energy targets, the SCADA-EMS is becoming more pivotal to daily operations.

Why do this project now?

The SCADA-EMS upgrade in 2010 is required as the underlying architecture is undergoing major alterations.

Why do this project this way?

The project is being completed as prescribed by OSI as it is a major change to the architecture.

CI Number: 34782

Title: Oracle Financials Upgrade

Start Date: 2010/05

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $399,363

DESCRIPTION:

This project provides for the upgrade of the Oracle Financials application to version 12.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

The upgrade is required to maintain vendor support for the Oracle Financials application and to provide enhancements to support the transition to International Financial Reporting Standards (IFRS).

Why do this project now?

Vendor support for the current Oracle Financials application will end in 2010. Ongoing vendor support is required to ensure production issues can be corrected and that new accounting standards can be adequately supported.

Why do this project this way?

A software upgrade to the existing system is the most cost effective and efficient method for maintaining product support, and enhancing IFRS functionality.

CI Number: 37829

Title: SQL Server Consolidation

Start Date: 2010/07

Final Cost Date: 2011/06

Function: General Plant

Forecast Amount: $144,216

DESCRIPTION:

This project provides for the movement of applications that use a Microsoft SQL Server into a consolidated server environment.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

This project is required to realize the benefits of managing a single consolidated database environment rather than managing many stand-alone database environments.

Why do this project now?

The number of NSPI applications that use Microsoft SQL Servers as database engines has increased in the last few years. This consolidation will reduce the number of servers required to manage stand-alone database environments and the costs of ongoing management and administration.

Why do this project this way?

The most effective solution is to move NSPI's applications to a consolidated server environment.

CI Number: 37742

Title: Installation of Microsoft Network Policy Servers

Start Date: 2010/06

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $98,662

DESCRIPTION:

This project provides for the purchase and implementation of a Microsoft Windows 2008 Network Policy Server (NPS) for device authentication for NSPI's production network. NPS performs centralized connection authentication, authorization, and accounts for many types of network access, including wireless, authenticating switch, dial-up & virtual private network (VPN) remote access, and router-to-router connections. Each device that has a media access control address will authenticate to the production network.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

There is an increasing number of external parties (consultants, etc) that have access to the NSPI business network. This has proven to be a necessary and effective way to support various consulting and contract assignments. Some external access requests are denied because of their risk profile. Access control technology will prevent any unauthorized personal computers from plugging into NSPI's production network; offering the level of security required to manage associated risks.

Why do this project now?

An increasing number of employees and contractors have their own laptops, routers and printers. The connection of unapproved network devices like printers, PCs, routers and switches is on the increase and network outages have been associated with unapproved configurations. A policy against unapproved devices being connected to our network is in place, but policy alone is not a sufficient control given the impact of a potential incident. The implementation of proactive protection against foreign devices will reduce the risk of network outages.

Why do this project this way?

Network authentication is an industry best practice and is considered a prudent security measure that is employed by companies with critical network availability requirements.

CI Number: 37833

Title: Plant Information (PI) Gateway and Portal Hardware Procurement

Start Date: 2010/04

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $50,635

DESCRIPTION:

This project will standardize the gateway server fleet with a standard gateway server profile that will rebuild the integrity of the hardware and software redundancy. The integrity of the hardware and software redundancy minimizes the potential downtime of the Plant Information (PI) gateway and aids in the technical support of the gateway and related issues.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

The Plant Information (PI) System (i.e. plant distributed control systems, the PI gateway servers, the PI application server and the PI Portal) is used for generation management, monitoring and alerting of plant operating conditions, and monitoring and alerting of related environmental conditions. Components of the system are supported on hardware that is at the end of its useful life. It needs to be replaced to maintain the reliability and performance of the system. Each thermal plant has two PI data gateway servers that manage the delivery of plant control system information to the PI management server. The dual gateways per plant deliver redundancy with the ability to provide a near real-time failover to a second gateway upon an issue with the primary gateway.

Why do this project now?

The PI gateways are supported on hardware that is at the end of its useful life. It needs to be replaced to ensure the required service levels of the PI environment can be maintained. Requirements for gateway maintenance have increased in the last year and this trend will continue if the condition of the gateway servers is not addressed.

Why do this project this way?

The procurement, deployment, and support of gateway servers is a routine task for NSPI's Information Technology group.

CI Number: 37835

Title: Sharepoint Load Balancing Hardware

Start Date: 2010/04

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $41,222

DESCRIPTION:

This project will increase the capacity for external collaboration using SharePoint with external users (e.g. consultants, vendors, external contractors). The current installation of the external SharePoint solution has outgrown its environment.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Computers

Why do this project?

This project is required to meet the demand of NSPI users for extended collaboration with external business partners. The current SharePoint environment does not meet the architecture and capacity requirements of the current demand.

Why do this project now?

NSPI requires increased capacity for Sharepoint due to collaborations with external users. NSPI is leveraging the current environment, but will soon reach a point where reliability or accessibility may be compromised due to use beyond the capacity of the current installation.

Why do this project this way?

The addition of a new server within a sustainable architecture is a proven method for improving service reliability.

CI Number: 38142

Title: RTU Replacement Program

Start Date: 2010/01

Final Cost Date: 2011/01

Function: General Plant

Forecast Amount: $780,137

DESCRIPTION:

The Remote Terminal Unit (RTU) Capital replacement program will replace selected RTUs, enabling NSPI to free up 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:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Equipment Replacement

Why do this project?

Due to changing standards, technology, and product lifespan, approximately 90 of the RTUs that are in service have been determined to be obsolete by their manufacturers. The commercial availability of spare parts is becoming difficult to manage effectively.

Why do this project now?

The inventory for spare parts has become sparce. RTU installations require extensive time and effort to complete. It is important to have a plan is in place for the replacement of the RTUs to minimize the impact on other operations.

Why do this project this way?

Half 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: 38082

Title: Phone Replacement System Operations

Start Date: 2010/04

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $108,349

DESCRIPTION:

This item provides for the replacement of the existing system operations voice telephone system at the Ragged Lake Energy Control Center (ECC), at various transmission substations, generating stations, and at the NB Power Control Center.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Equipment Replacement

Why do this project?

This project is required because NSPI requires primary and backup voice communications from the ECC to critical transmission substations, generating stations and the New Brunswick Power Control Center as per the North American Electric Reliability Corporation (NERC) Reliability Standard COM-001 -1 Telecommunications.

The existing system operation's phone system, associated power line carrier and the tone protection equipment is approximately 20-30 years old. It is in need of replacement due to very few, or no working spares being available.

Why do this project now?

This project is required now because the existing system operation's phone system is not working in many locations and needs to be replaced. This replacement is necessary to ensure NSPI continues to meet the requirements of voice communications for the NERC Reliability Standards.

Why do this project this way?

Current technology will replace the existing "hard wired" technology that is currently in use. The new technology will provide more flexibility to add new sites and for communications between the various sites.

CI Number: 37822

Title: Barrington Tower Telephone System Replacement

Start Date: 2010/01

Final Cost Date: 2011/03

Function: General Plant

Forecast Amount: $814,450

DESCRIPTION:

This project includes replacing the PBX telephone system at Scotia Square with a new voice communications system.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunications

Why do this project?

The current phone system (Nortel Option 61C PBX) which supports NSPI's corporate offices in Barrington Tower has reached the end of its useful life. The replacement of this technology will also provide access to new system capabilities and simplify phone management and administration.

Why do this project now?

The current telecom infrastructure hardware is rated "manufacture discontinued" and the parts required to sustain the system are increasingly difficult to obtain. While this environment is generally reliable in the current state, any changes to, or relocation of this asset would cause significant failures. The transition of existing telecom infrastructure to the new office location is not practical or recommended. Replacement is required regardless of the future relocation.

Why do this project this way?

New telecom infrastructure will be provisioned at the new building on Water Street, reducing the risk and complexity associated with moving the existing system while enabling the operation of both facilities during employee transition.

CI Number: 38244

Title: Replace Microwave Radio Systems

Start Date: 2010/03

Final Cost Date: 2010/09

Function: General Plant

Forecast Amount: $384,389

DESCRIPTION:

This item provides for the replacement of existing microwave radio equipment on the radio hops from Ragged Lake to Aspotogan and Aspotogan to Bridgewater. This also includes the replacement of the existing system from Wreck Cove to Pt. Aconi. These microwave radio hops are a critical part of NSPI's Telecommunication Infrastructure. The existing equipment was installed in the 1980s.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunications

Why do this project?

This project is required because the existing microwave radio equipment is reaching the end of its useful life.

Why do this project now?

This project is required now because the existing equipment is reaching the end of its useful life.

Why do this project this way?

This project will replace old microwave radio equipment with the newer generation equipment. NSPI has standardized a new microwave radio for high capacity and high reliability radio links. Furthering this project will allow for maintenance practices and training for all the new radio links.

CI Number: 37842

Title: Telecom Management System

Start Date: 2010/04

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $50,332

DESCRIPTION:

A Telecom Expense Management (TEM) system will track mobility assets and format billing to enable analysis of the billing data. It will also allow for better expenditure decisions based on usage patterns and trends. This information can potentially provide support for negotiating better contracts and asset tracking.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Telecommunications

Why do this project?

Telecom billing is known to be complex, with numerous inaccuracies due to the number and cost variances associated with the various call transactions. A TEM system will allow for the identification of issues and will provide the accuracy that is needed to make informed business decisions. Industry analysts indicate that wireless costs typically decrease by 3-15% by utilizing a TEM system. A TEM system will also offer full visibility into NSPI's wireless infrastructure, including inventory management (ownership, location, etc) and cost control (e.g. best plan alignment, deactivate retired devices, etc), enabling more analytical and less administrative tasks (e.g. automates the manual tasks of invoice processing, cost allocation and dispute management).

Why do this project now?

The demand for wireless devices is increasing and becoming more complex. The associated costs continue to rise rapidly without a centralized mechanism for cost management. A management system is required to help control inventory. The new system will allow NSPI to transition from paying individual bills via a procurement card to a centralized bill payment method.

Why do this project this way?

Automation is the only practical alternative to ensure phones are properly allocated and that bills are accurate. Previous manual methods have not been sustainable.

CI Number: 38852

Title: Work Vehicle Replacement

Start Date: 2010/01

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $6,101,516

DESCRIPTION:

This capital project provides for costs associated with the purchase of work vehicles. These costs include commissioning, accessories, and the salvage value of the retired trucks.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Vehicles

Why do this project?

This project is required to maintain NSPI's service levels. The vehicles being replaced exceed NSPI's capital justification criteria as it pertains to vehicle replacement.

Why do this project now?

These trucks will provide the required equipment for Power Line Technicians to perform their daily duties.

Why do this project this way?

The life cycle costing model concludes that these vehicles should be replaced rather than carry out extensive repairs to keep them operational.

CI Number: 34583

Title: Transportation Vehicle Replacements

Start Date: 2010/01

Final Cost Date: 2011/12

Function: General Plant

Forecast Amount: $3,446,332

DESCRIPTION:

This project provides for costs associated with the purchase of transportation vehicles. Included in the cost is commissioning, accessories, and the salvage value of retired vehicles.

Summary of Related CI's +/- 2 years:
2008 - 28490 2007 & 2008 Transportation Vehicle Replacement $3,096,483
2009 - 33642 2009 Transportation Vehicle Replacement $1,259,968

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Vehicles

Why do this project?

This project is required to maintain NSPI's service level commitments.

Why do this project now?

Without these vehicles, NSPI will not have the required equipment for employees (meter readers, wiring inspectors, etc.) to perform their daily duties.

Why do this project this way?

The life cycle costing model concludes that it is beneficial to replace these vehicles before major maintenance is required.

CI Number: 34582

Title: Class 3 Light Work Vehicles

Start Date: 2010/01

Final Cost Date: 2011/01

Function: General Plant

Forecast Amount: $1,151,049

DESCRIPTION:

This project provides for costs associated with the purchase of light work vehicles. Included in the cost is commissioning, accessories and the salvage value of retired vehicles.

Summary of Related CI's +/- 2 years:
2008 - 28493 2007 & 2008 Class 3 Light Work Vehicle Replacement $814,580
2009 - 33643 2009 Class 3 Light Work Vehicle Replacement $521,457

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Sub Criteria: Vehicles

Why do this project?

This project is required to maintain NSPI's service level commitments.

Why do this project now?

Without these vehicles, NSPI will not have the required equipment for employees to perform their daily duties.

Why do this project this way?

The life cycle costing model concludes that it is beneficial to replace these vehicles before major maintenance is required.

CI Number: 29009

Title: Right of Way Purchase Northern NS

Start Date: 2010/01

Final Cost Date: 2016/05

Function: General Plant

Forecast Amount: $3,107,528

DESCRIPTION:

This project provides for costs associated with acquiring a right-of-way to the New Brunswick border for the purpose of future transmission expansion, to provide for a second NS / NB intertie.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Land and Right-of-Way

Why do this project?

A new right-of-way is required to facilitate future 345kV transmission developments from Nova Scotia to New Brunswick.

Why do this project now?

Nova Scotia Power Inc. is committed to adding significant amounts of renewable resources (e.g. wind, tidal, biomass) to the current generation mix. These new resources could be located within Nova Scotia or imported into the Province. The expansion of renewable resources will result in a need for additional transmission facilities to support these new sources of energy and ensure bulk power system reliability is maintained. Additional transmission will be required to strengthen interconnections with New Brunswick. NSPI uses the existing interconnection for the import of energy where economical and exports energy to reduce the cost of electricity for our customers.

Why do this project this way?

Right-of-way acquisition must take place prior to the design and construction of the transmission facilities.

CI Number: 38900

Title: Opsym-Incumbent Generation Dispatch Modeling Tool

Start Date: 2010/03

Final Cost Date: 2010/06

Function: General Plant

Forecast Amount: $988,123

DESCRIPTION:

This project is required to address the functional and technical limitations of the incumbent generation dispatch modeling tool (Opsym/Prosym) used by the NSPI 24/7 Power Desk. The project consists of the procurement, planning, installation, configuration, and deployment of the generation optimization solution.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Work Support Facilities

Why do this project?

This project is required to address the functional and technical concerns of the incumbent generation dispatch modeling tool. The 2008 Technical Asset Review identified Opsym as an overall high risk due to underlying business risks. These risks are being mitigated with manual intervention using currently available personnel. This has reduced the overall risk exposure, but is not sustainable. A loss of the Opsym application could result in inaccurate real time pricing valuations, or non-optimal fleet dispatch scenarios. A loss of the Opsym application would result in commercial operations being unable to produce the daily Northeast Power Coordinating Council adequacy report for the regional control authority. This is a North American Electric Reliability Corporation requirement.

The risk rating is 'high' because the application functionality and scalability does not meet current and anticipated requirements (renewables accountability, Fuel Adjustment Mechanism constraints, etc).

Why do this project now?

NSPI is subject to an ever- changing set of requirements relating to how it manages power inputs and outputs relating to energy. This includes renewable energy legislation, the Fuel Adjustment Mechanism, new fuel sources, power market conditions. NSPI needs a robust solution to meet the analytical, management, reporting, and transparency requirements of this critical part of the business.

Why do this project this way?

A generation dispatch modeling solution is delivered through software deployed at the generation manager's site (NSPI). The proposed solution is aligned with vendor experience best practices.

CI Number: 38841

Title: New Minas Land Purchase and Rights of Way

Start Date: 2010/01

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $362,963

DESCRIPTION:

This project provides for costs associated with a land purchase in New Minas and acquiring right-of-ways for future infrastructure development.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Land and Right-of-Way

Why do this project?

Reliability and capacity of service to New Minas, Kentville and Wolfville are constrained by existing infrastructure. A second line is required.

Why do this project now?

Future reliability targets cannot be met and forecasted demand shows the system nearing capacity.

Why do this project this way?

Land and right-of-ways must be acquired to support the future development of required infrastructure.

CI Number: 33562

Title: FAC Land Registration Act

Start Date: 2010/01

Final Cost Date: 2014/12

Function: General Plant

Forecast Amount: $1,892,331

DESCRIPTION:

This item provides for costs associated with migrating NSPI property titles to a new system, enabling the Provincial Government to guarantee title to the property. CI 25262 was used to migrate NSPI hydro lands and rights to the new title system. This capital item will be used to migrate NSPI's remaining lands to the new title system.

Summary of Related CI's +/- 2 years:
2008 – 25262 Land Registration Act $867,387

JUSTIFICATION:

Justification Criteria: Land and Right-of-Way

Why do this project?

The Land Registration Act (LRA) is the first major change to the land registration system since 1759. The LRA establishes a process to migrate the title of properties from the old system to the new system. Once title to a property is migrated to the new system, the Provincial Government guarantees the title to this property.

Why do this project now?

NSPI needs to migrate its remaining non-LRA registered properties now to protect its title under the LRA System. The remaining properties relate to land acquired for transmission, distribution, power production, and corporate services.

Why do this project this way?

NSPI will use external legal resources to complete this project using the same procedure developed in CI 25262.

CI Number: 38849

Title: Eastern Passage Land Purchase and Right of Way

Start Date: 2010/01

Final Cost Date: 2010/12

Function: General Plant

Forecast Amount: $259,216

DESCRIPTION:

This project provides for costs associated with a land purchase in Eastern Passage and acquiring right-of-ways for future infrastructure development.

Summary of Related CI's +/- 2 years:
No projects in 2008, 2009, 2010, 2011 and 2012

JUSTIFICATION:

Justification Criteria: Land and Right-of-Way

Why do this project?

Reliability and capacity of service to Eastern Passage and South Dartmouth are constrained by existing infrastructure.

Why do this project now?

Future reliability targets cannot be met and forecasted demand shows the system nearing capacity.

Why do this project this way?

Land and right of ways have to be acquired to support future development of required infrastructure.

CI Number: 32304

Title: AMI Hardware & Software Installation

Start Date: 2010/11

Final Cost Date: 2012/12

Function: General Plant

Forecast Amount: $30,848,745

DESCRIPTION:

The purpose of this project is to install Advanced Metering Infrastructure (AMI) at all NSPI substations and to install AMI meters for 5,000 residential and 13,000 commercial and industrial customers. System software and hardware will be purchased and installed along with AMI business application software for Outage Management, Meter Data Management, Revenue Protection and a Contact Centre Customer Application. Installation labour and contracts are also included within the scope of this capital item.

Summary of Related CI's +/- 2 years:
2009 - 32622 Automated Metering Infrastructure (AMI) to Production $157,956

JUSTIFICATION:

Justification Criteria: Metering Equipment

Why do this project?

This project will install AMI technology at all NSPI substations in the province and equip commercial and industrial customers with energy management tools for improved load management. The project has a seven year economic payback when considering the avoided costs of additional generation. This project will also enable NSPI to further develop AMI technology for improved system performance and additional customer benefits.

Why do this project now?

This project has an economic payback of seven years when considering the avoided costs of additional generation.

Why do this project this way?

A project team has evaluated AMI technologies and vendors for Nova Scotia Power. What emerged from this analysis was that there are two proven AMI communication technologies available in the market today. (1) Radio frequency (RF) where the meter reading is transmitted via radio signal for the meter to a collection device 500 to 1000 feet away; and (2) Power Line Carrier (PLC) where the meter reading is transmitted via an ultra low frequency carrier on the power lines from the meter to a receiver located at the distribution substation.

Both RF and PLC AMI technologies have an initial benefit of cost saving through reduction of meter reading workforce, costs and risks. Additional benefits in the areas of Customer Service, Outage Management, Load Control and Theft Detection could help offset the additional costs of a more extensive deployment of AMI technology in the Province. A review of NSPI requirements resulted in recommendation of PLC technology for the Province. In 2006, 400 AMI meters were installed within the NSPI system using this technology. The pilot project demonstrated that this technology is compatible with NSPI's systems and will achieve the desired benefits.

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 aluminium 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 kW·h is a measure of energy equal to 1000 watts, over a period of one hour.

A MW·h is a measure of energy equal to 1000 kilowatt hours.

A GW·h 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 kW·h. 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.

NSPI 2010 Quick Reference Sheet

2010 AFUDC Rate 7.96%

2010 O/H Rates

Power Production		**Customer Operations**		**Shared Services**	
PP Regular	26.5%	Regular	79.1%	Regular	42.4%
Hydro	19.5%	Contract	24.5%	Meter Services	
Contractor	6.5%	Vehicle	22.9%	Vehicle	27.9%

ACE Plan	**2010**
(in millions)	
Generation	$218.4
Transmission	$ 59.5
Distribution	$ 57.3
General Plant	$ 69.2
Total	$404.5

2010 Depreciation Rates (Year 3 of the Phase-In)

	2010
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%

	2010
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%

	2010
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%**