



UARB APPROVAL SHEET

Project Title: **51V Tremont Circuit Breaker & Bus**

CI Number: 38819

☒ Capital Project Authorization

Head Office Use:

☐ ATO

Project Number:

☐ Final Cost

Date: June 30, 2010

Location:			Division:	
Expenditure Profile			Schedule	
YEAR	Budget Estimate	Project Estimate		
2010	3,919,209	4,039,168	Estimated Start Date	2010-08
2011	3,289,605	3,413,343	Estimated In-Service Date	2011-12
			Estimated Close Date	2011-12
Total	\$7,208,814	\$7,452,511		

COMMENTS

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Approved on behalf of NOVA SCOTIA UTILITY AND REVIEW BOARD

Authorized Signatory

DATE

DATE

Mark Savory

VP Technical and Construction

Project Number

- 51V Tremont Circuit Breaker & Bus

CI Number : 38819

Parent CI Number : -

Budget Version - 2010 06/06 Forecast

Cost Centre : 800 - 800-Services - Admin.

Forecast

Start :	08/01/2010
Operational :	12/31/2011
Final Cost :	12/31/2011
2010	\$4,039,168.00
2011	\$3,413,343.21
Total :	\$7,452,511.21
Original Cost :	\$0.00

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 \$9,148,573
 2010 - 11004 Canaan Rd Circuit Breaker Additions \$1,990,631

CI Number : 38819

- 51V Tremont Circuit Breaker & Bus

Project Number

Parent CI Number :

Approved Date

Cost Centre : 800

- 800-Services - Admin.

Budget Version 2010 06/06 Forecast

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
092		092-Vehicle T&D OT Labour AO		2,492	0	2,492
092		092-Vehicle T&D Reg. Labour AO		103,975	0	103,975
094		094 - Interest Capitalized		508,287	0	508,287
095		095-COPS Overtime Labour AO		8,603	0	8,603
095		095-COPS Contracts AO		361,570	0	361,570
095		095-COPS Regular Labour AO		359,124	0	359,124
001	003	001 - T&D Regular Labour	003 - TP - Bldg., Struct. Gmd.	14,490	0	14,490
002	003	002 - T&D Overtime Labour	003 - TP - Bldg., Struct. Gmd.	0	0	0
012	003	012 - Materials	003 - TP - Bldg., Struct. Gmd.			
013	003	013 - COPS Contracts	003 - TP - Bldg., Struct. Gmd.			
012	007	012 - Materials	007 - TP - Environmental			
001	022	001 - T&D Regular Labour	022 - TP - Elec Contr. Equip.	185,267	0	185,267
002	022	002 - T&D Overtime Labour	022 - TP - Elec Contr. Equip.	0	0	0
012	022	012 - Materials	022 - TP - Elec Contr. Equip.			
014	022	014 - Overtime Meals	022 - TP - Elec Contr. Equip.	3,300	0	3,300
066	022	066 - Other Goods & Services	022 - TP - Elec Contr. Equip.	155,998	0	155,998
012	023	012 - Materials	023 - TP - Power Equip.-Station S			
001	043	001 - T&D Regular Labour	043 - TP - Substn Dev.	103,415	0	103,415
002	043	002 - T&D Overtime Labour	043 - TP - Substn Dev.	7,420	0	7,420
012	043	012 - Materials	043 - TP - Substn Dev.			
013	043	013 - COPS Contracts	043 - TP - Substn Dev.			
014	043	014 - Overtime Meals	043 - TP - Substn Dev.	1,650	0	1,650
066	043	066 - Other Goods & Services	043 - TP - Substn Dev.	23,996	0	23,996
001	044	001 - T&D Regular Labour	044 - TP - Substn. Transf.	0	0	0
002	044	002 - T&D Overtime Labour	044 - TP - Substn. Transf.	0	0	0
012	044	012 - Materials	044 - TP - Substn. Transf.			
013	044	013 - COPS Contracts	044 - TP - Substn. Transf.	0	0	0
001	061	001 - T&D Regular Labour	061 - TP - Switched Telecomm. Sys	4,336	0	4,336
012	061	012 - Materials	061 - TP - Switched Telecomm. Sys			
001	085	001 - Regular Labour (No AO)	085 Design	79,045	0	79,045
002	085	002 - T&D Overtime Labour	085 Design	0	0	0
011	085	011 - Travel Expense	085 Design	10,395	0	10,395
028	085	028 - Consulting	085 Design	386,500	0	386,500
041	085	041 - Meals & Entertainment	085 Design	1,238	0	1,238

REDACTED

CI Number : 38819 - 51V Tremont Circuit Breaker & Bus Project Number
 Parent CI Number : - Approved Date
 Cost Centre : 800 - 800-Services - Admin. Budget Version 2010 06/06 Forecast

Capital Item Accounts

Acct	Actv	Account	Activity	Forecast Amount	Amount	Variance
001 086		001 - T&D Regular Labour	086 Commissioning	119,234	0	119,234
001 087		001 - T&D Regular Labour	087 Field Super. & Ops.	27,099	0	27,099
002 087		002 - T&D Overtime Labour	087 Field Super. & Ops.	14,326	0	14,326
011 087		011 - Travel Expense	087 Field Super. & Ops.	1,496	0	1,496
041 087		041 - Meals & Entertainment	087 Field Super. & Ops.	3,300	0	3,300
Total Cost:				7,452,511	0	7,452,511
Original Cost:						

CI Number : 38819 - 51V Tremont Circuit Breaker & Bus Project Number
 Parent CI Number : - Approved Date
 Cost Centre : 800 - 800-Services - Admin.

Capital Item Justification

Justification Criteria : TRANSMISSION PLANT

Sub-Criteria : <Select a value>

Name of Report :

Document Location :

Person Responsible :

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 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 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 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.

This work will be completed by NSPI.

CI Number : 38819	- 51V Tremont Circuit Breaker & Bus	Project Number
Parent CI Number :	-	Approved Date
Cost Centre : 800	- 800-Services - Admin.	

Reason for Variance / Over Expenditure / Final Costing

The increased amount of the project from ACE is mostly due to the requirement for a new radio link.

38819 - 51V Tremont Circuit Breaker & Bus

Account	ACE 2010	Current Submission	Variance
001 - Regular Labour (No AO)	-	79,045	79,045
001 - T&D Regular Labour	356,548	453,841	97,293
002 - T&D Overtime Labour	19,476	21,746	2,270
011 - Travel Expense	5,810	11,891	6,081
012 - Materials			
013 - COPS Contracts			
014 - Overtime Meals	4,500	4,950	450
028 - Consulting	40,000	386,500	346,500
041 - Meals & Entertainment	4,125	4,538	413
066 - Other Goods & Services	150,000	179,994	29,994
092-Vehicle T&D OT Labour AO	2,444	2,492	48
092-Vehicle T&D Reg. Labour AO	73,517	103,975	30,458
094 - Interest Capitalized	383,422	508,287	124,865
095-COPS Contracts AO	372,066	361,570	(10,497)
095-COPS Overtime Labour AO	6,935	8,603	1,668
095-COPS Regular Labour AO	253,923	359,124	105,201
	7,208,814	7,452,511	243,697

CI 38819 – 51V Tremont Circuit Breaker & Bus

The following is a breakdown of costs associated with the 51V Tremont Circuit Breaker & Bus.

• Administrative Overheads and Interest	\$1,344,050
• Labour	\$ 554,632
• Materials	██████████
• Contracts	██████████
• Consulting	\$ 386,500
• Other	\$ 201,373
• Total	\$7,452,511

Materials – Electric Control Equipment \$604,905

This estimate includes all control cabling and protection panels.

Materials – Substation Development \$991,883

This estimate includes;

- █ 138 kV circuit breakers at █ for a total of \$208,400, (Attachment 1, Note 1)
- █ 69 kV circuit breakers at █ for a total of \$213,500, (Attachment 1, Note 2)
- █ 138 kV switches at █ (█ plus additional materials not quoted) per switch, for a total of \$93,500. (Attachment 2, Note 1)
- █ 69 kV switches, █ at █ and 1 at █ for a total of approximately \$60,000, (Attachment 2, Note 2)
- █ 138 kV lightning arrestors at █ for a total of \$9,150, (Attachment 3, Note 1)
- █ 138 kV potential transformers at █ each for a total of \$57,400, (Attachment 4, Note 1)
- █ 69 kV potential transformers at █ for a total of \$37,050. (Attachment 4, Note 2)
- █ 69 kV lightning arrestors at █ each for a total of \$9,936, (Attachment 3, Note 2)

The remaining \$302,947 in this account includes all of the material required to connect this equipment to the substation, connectors, insulation, etc.

Materials – Substation Transformer [REDACTED]

This estimate includes the cost of the transformer along with assembly and off loading at the site. [REDACTED] is for the base price, off-load to pad, assembly and oil, recommended spare parts. (Attachment 5, Note 1). [REDACTED] The remaining [REDACTED] consists of additional materials and contingency.

Materials – Switched Telecommunications Equipment \$262,500

This material is for a new radio link.

Contracts – Substation Development [REDACTED]

This estimate includes the contracts to install the substation equipment. This work will not be completed by an affiliate.

Contracts – Building, Structures, Ground [REDACTED]

This estimate is for the civil work including foundations and bus installation for both the 138 kV and 69 kV portions of the substation. This work will not be completed by an affiliate.

Consulting – Design \$386,500

This estimate includes costs for protection and control design, substation design, and witnessing of tests.

Circuit Breakers - 69 kV & Above

Schedule of Prices & Delivery									
Inquiry Item no.	QTY	Pricing per Each Unit							
1									
	Delivery	18-22 wks + 1-2 wks transit	24-28 wks ARO	18-22 wks ARO	10-12 wks ARO	10-12 wks ARO		18-21 wks ARO	July 9, 2010
2A									
	Delivery	18-22 wks + 1-2 wks transit	24-28 wks ARO	18-22 wks ARO	10-12 wks ARO	10-12 wks ARO		18-21 wks ARO	July 9, 2010
2B									
	Delivery	18-22 wks + 1-2 wks transit	24-28 wks ARO	18-22 wks ARO	10-12 wks ARO	10-12 wks ARO		18-21 wks ARO	July 9, 2010
3A									
	Delivery	18-22 wks + 1-2 wks transit	24-28 wks ARO	18-22 wks ARO	10-12 wks ARO	10-12 wks ARO		18-21 wks ARO	July 9, 2010
3B									
	Delivery	17-18 wks + 4 wks transit	No Bid	16-20 wks ARO	No Bid	No Bid		18-21 wks ARO	July 9, 2010
4									
	Delivery	17-18 wks + 4 wks transit	No Bid	16-20 wks ARO	No Bid	No Bid		18-21 wks ARO	July 9, 2010
5A									
	Delivery		No Bid		No Bid	No Bid		No Bid	July 9, 2010
Alternatives		Pricing per Each Unit							
1									
2A									
2B									
3A									
	Delivery	20-24 wks + 1-2 wks transit							
Shipping Terms		DDP Site	plus duty estimated at \$2900	DDP Site	not price competitive	not price competitive	not price competitive	DDP Site	not price competitive
Comments		5A includes gas density monitor @ \$3,226 & s/s housing (no charge)	Gas density monitor for each unit (\$3800) has been added into above prices as it is included in all other bids.	Offers 4% discount for quantities of 4 & 10% for quantities of 14					
Spare Parts		Spare Parts - \$1317 (spring charge motor & closing coil)	not price competitive					Spare parts interchangeable between all units quoted - \$11,240 (interrupter, trip/close coil, spring charge motor)	
Warranty		18mos from shipment or 12mos from first use		1 yr limited warranty				18mos from shipment or 12mos from installation	
Payment Terms		85% of supply price of each shipment 30 days after receipt at site; 15% of supply price 60 days after receipt at site		20% net 30 days from acceptance of PO; 10% net 30 days from submission of engineering drawings; 70% net 60 days after delivery to site				80% 30 days receipt at site, 15% 60 days after receipt at site, 5% 12 months after initial energization.	
Quality Assurance		ISO 9001, 14001 and OHSAS 18001 certified		ISO 9001 Registered				PAB utilizes its own Quality Program created and adapted for the size and goals specific to Pennsylvania Breaker.	

Schedule of Drawings									
Drawings for Approval	Production Schedule	4-7 wks ARO	2 wks	N/A	1 wk ARO	1 wk ARO		2 wks ARO	In OA
	Outline	4-7 wks ARO	4 wks	6 wks ARO	4 wks ARO	4 wks ARO		2 wks ARO	6-8 wks
	Foundation Plan	4-7 wks ARO	4 wks	6 wks ARO	4 wks ARO	4 wks ARO		2 wks ARO	6-8 wks
	AC, DC Schematics	4-7 wks ARO	8 wks	6 wks ARO	6 wks ARO	6 wks ARO		2 wks ARO	6-8 wks
	Assembly Drawings	4-7 wks ARO	N/A	6 wks ARO	6 wks ARO	6 wks ARO		18 wks ARO	n/a
	Hydraulic/Pneumatic Schematic	4-7 wks ARO	8 wks	N/A	6 wks ARO	6 wks ARO		2 wks ARO	n/a
	SF6 Gas System	4-7 wks ARO	8 wks	N/A	4 wks ARO	4 wks ARO		2 wks ARO	6-8 wks
	Nameplates	4-7 wks ARO	8 wks	6 wks ARO	6 wks ARO	6 wks ARO		2 wks ARO	6-8 wks
	Bushings	4-7 wks ARO	8 wks	6 wks ARO	6 wks ARO	6 wks ARO		2 wks ARO	6-8 wks
	Bill of Material	4-7 wks ARO	N/A	6 wks ARO	10 wks ARO	10 wks ARO		18 wks ARO	not provided
	Instruction Manual		4 wks	with units	14 wks ARO	14 wks ARO		18 wks ARO	1 wk prior to shipment if order place by Mar 24, 2010

Primary Equipment RFP Evaluation - Air Switches

Inquiry Item#	LOCATION	Original Quantity	Voltage (kV)	Current (A)	Function												
1 of 12	Tremont		138	1200	L-6015 Isol. + Grd.												
2 of 12	Tremont		138	1200	XFMR Isolation												
3 of 12	Tremont		138	1200	L-6013 Isol. + Grd.												
4 of 12	Tremont		138	2000	Ring Isolation -High												
5 of 12	Tremont		138	2000	Ring Isolation -Low												
6 of 12	Tremont		69	1200	Line Bypass												
7 of 12	Tremont		69	1200	Bkr. Isolation												
8 of 12	Tremont		69	1200	Xfmr. & B52												
9 of 12	Tremont		69	1200	B51												
10 of 12	Canaan Rd.		138	2000	Bus Tie - low												
11 of 12	Canaan Rd.		138	1200	L-6515 Isol. + Grd.												
12 of 12	Canaan Rd.		138	1200	Line (bus side)												
1 of 3	Glen Dhu	138	2000	Line Isol.	DDP					DDP	Includes preassembly @ \$400/switch 145kV only, Insulators SUZHOU, includes 2% discount for complete purchase						
2 of 3	Glen Dhu	138	2000	Isol. + Grd. + Inter								Preassembly included, Insulators LAPP or equiv					
3 of 3	Glen Dhu	138	2000	Isol. + Inter													
					Shipping Terms												
					Comments												
					Spare Parts												
					Warranty												
					Payment Terms												
					Quality Assurance												
					Site Supervision		??		??								
					Delivery		16-18 weeks		10-12 weeks		12-14 weeks						
					Kirk Keys supplied		YES		YES		YES						

Surge Arresters - Station Class

Schedule of Prices & Delivery							
Inquiry Item no.	QTY	Pricing per Unit					
1	Duty	Included	Included	Included	Included	Does not meet technical specifications - Basic Impulse Level (BIL) does not meet spec	Included
	Freight	Included	Included	Included	Included		Included
	Total Delivery	5-7 wks + 1-2 wks transit	14 wks ARO	6-8 wks	7-9 wks		July 1, 2010
2 (increased from 9 to 12)	Duty	Included	Included	Included	Included	Does not meet technical specifications - Basic Impulse Level (BIL) does not meet spec	Included
	Freight	Included	Included	Included	Included		Included
	Total Delivery	4-6 wks + 1-2 wks transit	14 wks ARO	6-8 wks	7-9 wks		July 1, 2010
3	Duty	Included	Included	Included	Included	Does not meet technical specifications - Basic Impulse Level (BIL) does not meet spec	Included
	Freight	Included	Included	Included	Included		Included
	Total Delivery	4-6 wks + 1-2 wks transit	14 wks ARO	6-8 wks	7-9 wks		July 1, 2010
4A	Duty	Included	Included	Included	Does not meet technical specifications - Creepage distance too short - Alternative 4A does meet spec	Included	Included
	Freight	Included	Included	Included		Included	Included
	Total Delivery	4-6 wks + 1-2 wks transit	14 wks ARO	15 wks ARO		17 wks ARO	July 1, 2010
4B	Duty	Included	Included	Included	Does not meet technical specifications - Creepage distance too short	Included	Included
	Freight	Included	Included	Included		Included	Included
	Total Delivery	4-6 wks + 1-2 wks transit	14 wks ARO	15 wks ARO		17 wks ARO	July 1, 2010
	Shipping Terms	Not competitive Price wise	FOB Washington				DDP
	Comments						
	Spare Parts						
	Warranty		12 mos after energization, not to exceed 18 mos from delivery				12 mos after being placed in service or 18 mos after shipment
	Payment Terms		Net 30 days				80% upon delivery to site, 15% after 30 days on site, 5% after installation
	Quality Assurance						ISO 9001 & ISO 14000 Certified

Instrument Voltage Transformers

Schedule of Prices & Delivery				
Inquiry Item no.	QTY	Pricing		
1A	Duty	Included	\$0.00	
	Freight	Included	Included	Included
	Total			
	Delivery	Stock - 3-4 wks transit	33 wk EX works +1 wk transi	16-18 wks ARO
1B	Duty	Included	\$0.00	
	Freight	Included	Included	Included
	Total			
	Delivery	Stock - 3-4 wks transit	33 wk EX works +1 wk transi	16-18 wks ARO
2	Duty	Included	\$0.00	
	Freight	Included	Included	Included
	Total			
	Delivery	Stock - 3-4 wks transit	33 wk EX works +1 wk transi	16-18 wks ARO
3A	Duty	Included	\$0.00	
	Freight	Included	Included	Included
	Total			
	Delivery	Stock - 3-4 wks transit	33 wk EX works +1 wk transi	16-18 wks ARO
3B	Duty			
	Freight	Included	Included	Included
	Total			
	Delivery	16-18 wks ARO + 2 wks transit	7-8 months	16-18 wks ARO
3C	Delivery Alternatives			
	Delivery	20-24 wks + 3-4 wks transit		
	Duty	Included	\$0.00	
	Freight	Included	Included	Included
4	Total			
	Delivery Alternatives			
	Delivery	16-18 wks ARO + 2 wks transit	7-8 months	16-18 wks ARO
	Delivery	20-24 wks + 3-4 wks transit		
Item no longer required as it has already been purchased from ABB in 2009	Duty	Included	\$0.00	
	Freight	Included	Included	Included
	Total			
	Delivery Alternatives			
	Delivery	16-18 wks ARO + 2 wks transit	7-8 months	16-18 wks ARO
	Delivery	20-24 wks + 3-4 wks transit		
Shipping Terms		DDP Site	DDP Site	DDP Site
Comments			Offers 4% discount for quantities of 4 & 10% for quantities of 14	Offers 5% discount if all items are awarded (includes IVT, CVT & CT's)
Spare Parts				
Warranty		18mos from shipment or 12mos from first use	18 mos limited warranty	12 mos in service, maximum 18 mos after delivery.
Payment Terms		85% of supply price of each shipment 30 days after receipt at site; 15% of supply price 60 days after receipt at site	100% - 30 days from delivery	100% net 30 days after delivery
Quality Assurance		ISO 9001, 14001 and OHSAS 18001 certified	ISO 9001 Registered	ISO 9001 Registered

Schedule of Drawings		ABB	Areva	Trench
Drawings for Approval	Outline		2-3 wks	2 wks ARO
	Rating Plate		2-3 wks	2 wks ARO
	Excitation Curves		2-3 wks	After test
	Production Schedule	2 wks or less		2 wks ARO
	Transformer Outline	2 wks or less		2 wks ARO
	Nameplate	2 wks or less		2 wks ARO
	Diagram of Connections	2 wks or less		2 wks ARO
	Schematics	2 wks or less		2 wks ARO
	Shipping Drawing	2 wks or less		2 wks ARO
	Instruction Manuals	with units	2 wks	2 wks ARO

Power Transformers - Transmission, 138kV and Above

Schedule of Prices & Delivery								
Quantity - 1								
Unit Quoted	30/40/50//56	33.6/44.8/56 @65C	30/40/50//56	30/40/56//62.72 ??	30/40/50//56	30/40/50 MVA @65C	30/40/50 @65C	30/40/50//56
Duty	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Freight	Included (not offloaded to pad)					Included	Included	Included
Cost of Oil	Included (shipped separately to site)		n/a	Included	Included	Included	Included	Included
Total - Base Price								
Off Load to Pad								
Assemble & Oil								
Standard Warranty	12/18 mos	36 mos	36/42 mos	12/18 mos	12/18 mos	12/18 mos	60/60 mos warranty (core & coils only after 12/18mos)	5 yrs from delivery to site, includes costs of yearly visits by HICO engineer
Extended Warranty								
Field Supervisor								
No Load Losses	14.9	18.0	15.5	12.0	17.0	14.0	12.3	20.0
Load Losses at ONAN	55.0	63.0	49.5	68.0	51.0	42.0	76.0	45.0
Load Losses @ Peak		175.0	172.5	189.0	142.0	56.0	211.0	123.0
Aux. Losses	2.5	3.7	10.0	??	3.0	1.5	2.5	2.0
Recommended Spare Parts								
Cost of Iron Losses @								
Cost of Cu Loss (ONAN) @								
TOTAL EVALUATED COST								
Unit price to purchase radiators potentially removed after the Temp. Rise Test.	Radiators Included	n/a	included	n/a	Included	not provided		
Delivery	29-32 wks ARO - subject to confirmation at time of order	32 wks ARO	10 months	10 month ARO	36 wks ARO	28-30 wks	by dec 31 -if order June 8	40-44 wks ARO
Shipping Terms	DDP	DDP Site	DDP Greenwood, NS	DDP Site/Pad	DDP Site	DDP Site (not unloaded)	DDP Site (not unloaded)	DDP Site (not unloaded)
Location of Manufacture	Mexico	Taiwan	Mexico	Winnipeg	Canada	USA	USA	Korea
Comments	Extended Warranty is 5 years	Extended Warranty is 5 years		Freight cost, Off load to pad and Assemble & Oil are estimated & are subject to change; Extended Warranty is 3 years (in/out); No switching implulse test	Oil Specialist for 2 days + oil treatment facility for 2 days; NSPI assemble XFMR; more info required on tap position impedances for paralleling; No switching impulse test; 8 fans/stage		No switching impulse test; concern over transformer overall rating at 65C; concern over master-follower understanding; M-F by Tapcon 250; Alternate pricing @ net 35 days is \$938,375	No switching impulse test; tapchanger supply voltage; warranty includes yearly visit from factory engineer
Spare Parts Listing								
Payment Terms	80% upon delivery to site; 15% after 30 days on site; 5% after insallation	Net 35	Progress payments to be defined (each net 30days)	Net 30 days	10% initial submission of documents; 30% core steel received in plant; 20% all windings completed; 20% successful completion of tests in plant; 20% shipment from plant	10% at drawing approval; 40% at winding materials received; 20% at windings completed; 10% as testing completed; 20% upon receipt & inspection	20% with acknowledgement of order; 30% with approval drawings submittal; 50% invoiced with shipment	Net 35
Quality Assurance	ISO 9001 & 14001 registered	ISO 9001 Registered	ISO 9001 Registered			ISO 9001, ISO 14001 and OSHAS	Some discussion provided	No discussion
Master - Follower	new xfmr only	No discussion	ABBAlamo UZFRT 550/600	UZERT 550kv/300 (3ph 208/360)	Some discussion provided	Not ABB responsibility		
Tap Changer	UZER (200/600 or 550/600)	UZFRT 650kV/300A (500,000 operations at FL	500,000 operations)		UZ-FRT 380/300	UZ-F 550/650	UZERT 650/600	MR-VRCIII 400Y-123/C14273W
Weights (kgs):								
Core & Coils	25000	26700	28500	9537	28000	29030	24272	37500
Tank & Fittings	19000	21300	15000	18373	25000	20185	26282	17400
Oil	24000	22400	21500	16801	24000	39917	31927	22900
Total Wt.	68000	70400	65000	54712	77000	89131	82481	77800
Heaviest piece	37000	39000	43000	32225	48000	47401	43636	50300
Regulation	3.19%	3.5% @ rated voltage	5.13% at rated voltage	5.18%	5.12%	3.06%	3.31%	6.39%
AC required for fans, T/C	1ph,240	3ph, 208V	3ph, 208	TBD	fans-3ph, 208,t/c-1ph120	??	3ph, 208V	Fans-3Ph-208,t/c-3ph-400
Sound Level -ONAN/ Max.	67/69/70 dB	68dB/72dB	66/68/69	67/70/78	65/68	69/72	76/78	69//72
Flux density @ 1pu voltage (Gauss)	1.664 T	16900	1.6T	??	1.51T	??	1.6T	1.7T
Dimensions (in):								
Ht. overall	204	232.3	228.3	196	?	239	245	224.41
Length	190	303.1	212.6	287	?	278	255	316.93
Width	348	212.6	181.1	201	?	200	185	196.85
Shipping (H,W,L)	?	161.4,169.3, 279.5	169.3/118.1/252	135/103/235	?	155/114/254	165/110/255	143.7,108.27,267.72

Schedule of Drawings								
Production Schedule	30 days ARO	4 wks	6 wks	See Submission	2 wks ARO	4 wks	8 wks ARO	10 wks ARO
Transformer Outline & BOM	7-9 wks ARO	8 wks	6 wks		8 wks ARO	16wks	4 wks ARO	12 wks ARO
Nameplate	7-9 wks ARO	8 wks	6 wks		8 wks ARO	16wks		12 wks ARO
Schematics	7-9 wks ARO	8 wks	6 wks		8 wks ARO	16wks		12 wks ARO
Diagram of Connections	7-9 wks ARO	8 wks	6 wks		8 wks ARO	16wks		12 wks ARO
Wiring Diagrams & Panel Layout	7-9 wks ARO	8 wks	6 wks		8 wks ARO	16wks		12 wks ARO
Shipping Drawing	7-9 wks ARO	8 wks	6 wks		8 wks ARO	16wks	10-12 wks ARO	14 wks ARO
Instruction Manuals	at time of shipment	2 wks before shipment	6 wks		4 wks before delivery	at shipment	with transformer	with transformer

REDACTED

Transmission Responses

Request IR-T2:

With respect to:

Page 190, CI# 33525 - Canaan Rd 43V to Tremont 51V Line,

Page 192, CI# 38819 - 51V Tremont Circuit Breaker and Bus, and

Page 197, CI# 11004 - Cannan Rd Circuit Breaker Additions,

a) Please provide the planning studies and other relevant documents that justify the construction of these three related projects.

b) Since these three projects, totaling approximately \$24 million, are not only related but appear to be essential to make a complete infrastructure addition to the system, what is the reason to split the projects into three separate submissions?

c) i) Are the design and engineering phases of these projects complete? If not, when will these phases be completed?

ii) Has the work in c-i) above been completed by NSPI staff or has it been contracted out? If contracted out, please clarify the aspects that were contracted, the contractor or consulting firm, and the cost for that service.

iii) Have tender documents been prepared for construction? Please provide a list of enders that will be issued, the issue and closing date, and estimated cost for that aspect of the works.

d) Please provide the Gantt charts for the projects.

REDACTED

Request IR-T2: (cont'd)

e) Please provide a cost breakdown for each of the three projects indicating the amount to be spent each year until completion of the works. Provide the breakdown showing at a minimum the amount budgeted for NSPI labour contracted labour consultants, material interest, and overhead charges.

f) Will NSPI be completing any portion of the works utilizing its own forces? If so, please specify those portions of the works that will be assigned to NSPI staff.

Response IR-T2:

a) Please refer to Confidential Attachment 1.

b) The three projects are directly related. The reason for separating these projects is to facilitate project cost management.

c) i) The preliminary design and engineering for this project has been completed. Early phases of the line and substation design have begun. Please refer to Attachment 2 for a detailed schedule.

ii) The work referenced in response to IR- c-i) has been predominantly completed by NSPI. To assist with this project, two consultants have been hired on a per hour basis. These two consultants are retired NSPI employees.

iii) Tender documents have been issued as outlined in the table below. Construction has not begun on the three major components of this project, with the exception of the right-of-way clearing.

REDACTED

Response IR-T2: (cont'd)

Table 1 – Time Table Outlining Tender Documents for the Canaan Road to Tremont Project

Tender Document	Tender Amount	Issue Date	Close Date	Comments
Right-of-Way Clearing	\$500 K	March 2010	March 2010	Tender awarded
Site Development and Foundations – Canaan Rd.	\$350 K	May 2010	July 2010	This tender has been issued, but not awarded. The close date and dollar value are estimated.
Site Development and Foundations – Tremont	\$800 K - \$1.0 M	May 2010	July 2010	This tender has been issued, but not awarded. The close date and dollar values are estimated.
Electrical Construction - Tremont	\$750 K	July 2010	July 2010	This tender has not been issued. The dollar value and dates are estimated.

Transmission line construction labour for CI# 33525 is being sourced through NSPI's existing Power Line Technician (PLT) Service Agreement with Emera Utility Services (EUS). This is aligned with NSPI's workforce planning model, which is designed to optimize the allocation and execution of PLT resources among work requirements.

d) Please refer to Attachment 2.

e) Please refer to the tables below, which show the ACE 2010 version totals of each capital item.

REDACTED

Response IR-T2: (cont'd)

Table 1 Cost Breakdown of CI#33525 Canaan Rd. 43kV to Tremont 51V Line

Account	2010 Total	2011 Total	Project Total
Labour	105,431	5,549	110,980
Materials			
Contracts			
Other	20,561	2286	22,847
Interest	347,681	191,332	539,012
AO	2,333,838	122,833	2,456,672
Total	14,058,941	929,823	14,988,764

Table 2 Cost Breakdown of CI#38819 51V Tremont Circuit Breaker & Bus

Account	2010 Total	2011 Total	Project Total
Labour	178,274	178,274	356,548
Overtime Labour	9,738	9,738	19,476
Materials			
Contracts			
Consulting	16,000	24,000	40,000
Other	82,218	82,218	164,436
Interest	104,597	278,825	383,422
AO	352,483	356,401	708,884
Total	3,919,209	3,289,605	7,208,814

Table 3 Breakdown of CI#11004 Canaan Rd. Circuit Breaker Additions

Account	2010 Total	2011 Total	Project Total
Labour	161,831	0	161,831
Overtime Labour	7,420	0	7,420
Materials			
Contracts			
Other	24,893	0	24,893
Interest	29,521	0	29,521
AO	269,425	0	269,425
Total	1,705,311	0	1,705,311

REDACTED

1 Response IR-T2: (cont'd)

2
3 f) NSPI plans to complete the majority of the design and electrical work at both the Canaan
4 Road and Tremont Substations. NSPI will also be completing all of the commissioning and
5 switching functions associated with all three projects. EUS will be completing the
6 transmission line construction work with NSPI providing field supervision.

7
8 The study for the reinforcement of the Canaan Road to Tremont electrical system is
9 confidential due to system security concerns. Protection of the power system preserves
10 reliability and reduces the risks associated with external threats.

11
12 The material and contract information presented in the tables above is considered
13 confidential.

14
15 NSPI strives to keep the terms and conditions of suppliers' pricing proposals and
16 arrangements confidential from their other customers or potential competitors. This prevents
17 competitors from using their information to gain a competitive advantage. This is equally
18 true for NSPI, which desires to protect its ability to acquire capital services and equipment on
19 the most competitive terms. Those "best" terms may not be available if there is a risk that
20 they will be disclosed to the customers or competitors of the supplier.

21
22 Since NSPI customer rates are cost-based, the maintenance of confidentiality for this item is
23 to the direct benefit of customers.



Canaan Road - Tremont Transmission Reinforcement Summary of Alternatives

Budget Year :	2010	Date :	27-Jul-10
Division :		CI Number:	
Department :		Project No. :	
Originator :			

	Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A	Transmission Line on Existing Easement	6.55%	-13,512,462	3	#DIV/0!	0.0 years
B	Transmission Line on Alternate Easement	6.55%	-18,004,006	4	#DIV/0!	0.0 years
C	Test 3	6.55%	0	1	#NUM!	0.0 years
D	Test 4	6.55%	0	1	#NUM!	0.0 years

Recommendation :**Notes/Comments :**
Transmission Line on Existing Easement

NSPI currently has an easement parall to the existing 138 kV circuit between Canaan Road and Tremont.

Transmission Line on Alternate Easement

An alternate easement and route would be required between Bridgewater and Tremont.

Test 3**Test 4**

Canaan Road - Tremont Transmission Reinforcement
Transmission Line on Existing Easement

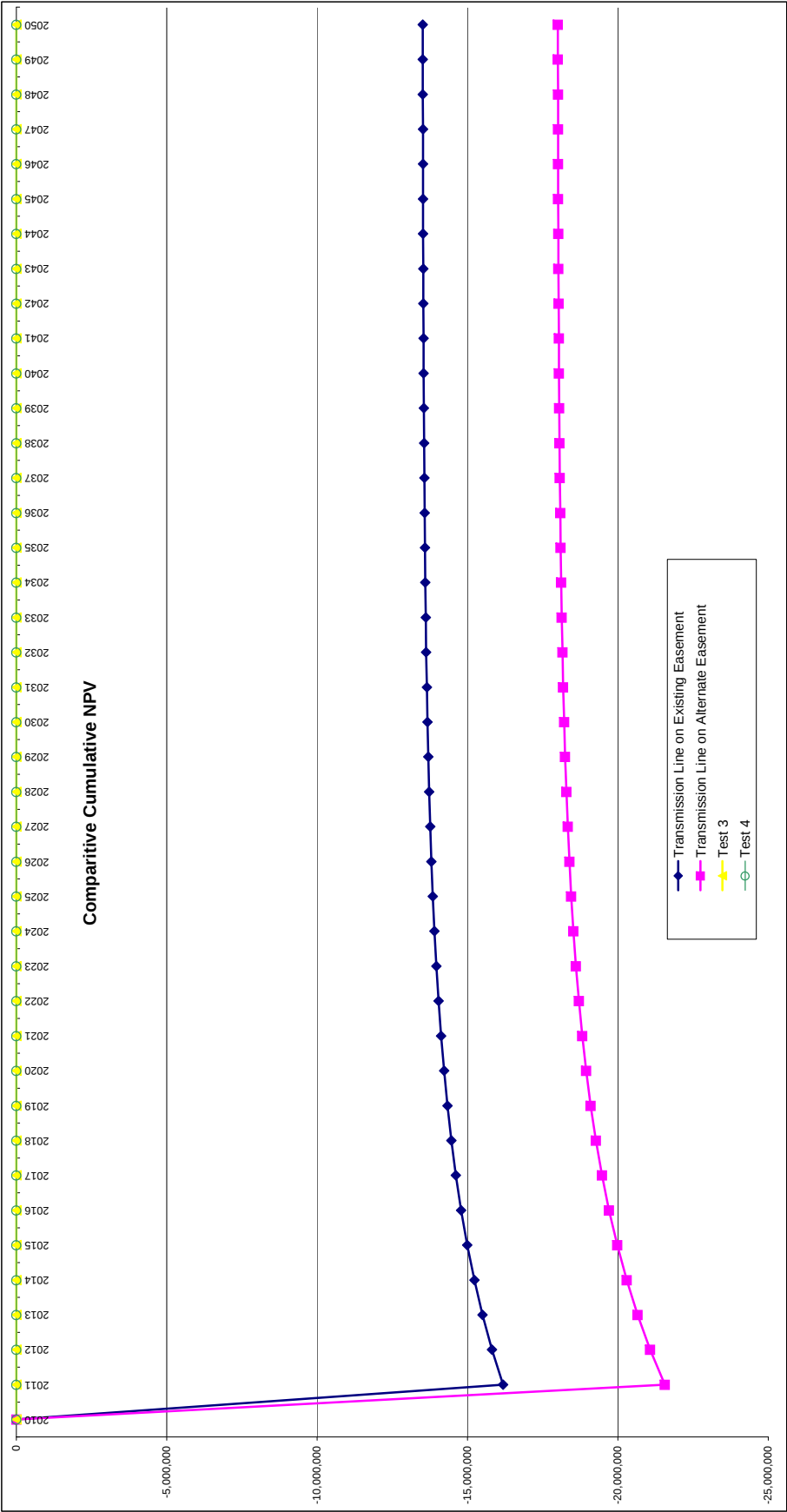
Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	GNPV
2010	-	-	(17,459,577.0)	-	-	(17,459,577.0)	-	-	1.000	-	-
2011	-	-	-	698,383.1	16,761,193.9	-	218,489.1	(17,241,087.9)	0.939	(16,181,218.1)	(16,181,218.1)
2012	-	-	-	1,340,895.5	15,420,298.4	-	413,017.6	413,017.6	0.881	363,798.1	(15,817,418.9)
2013	-	-	-	1,233,623.9	14,186,674.5	-	382,423.4	382,423.4	0.827	316,143.4	(15,501,275.6)
2014	-	-	-	1,134,934.0	13,051,740.6	-	349,578.1	349,578.1	0.776	271,225.4	(15,230,050.1)
2015	-	-	-	1,044,139.2	12,007,601.3	-	323,683.2	323,683.2	0.728	235,696.3	(14,994,353.8)
2016	-	-	-	960,608.1	11,046,993.2	-	297,788.5	297,788.5	0.683	203,510.7	(14,790,843.1)
2017	-	-	-	883,759.5	10,163,233.8	-	273,965.4	273,965.4	0.641	175,720.2	(14,615,122.9)
2018	-	-	-	813,058.7	9,350,175.1	-	252,048.2	252,048.2	0.602	151,724.6	(14,463,398.4)
2019	-	-	-	748,014.0	8,602,161.1	-	231,884.3	231,884.3	0.565	131,005.7	(14,332,392.6)
2020	-	-	-	688,172.9	7,913,988.2	-	213,333.6	213,333.6	0.530	113,116.2	(14,219,276.4)
2021	-	-	-	633,119.1	7,280,869.1	-	196,266.9	196,266.9	0.498	97,669.5	(14,121,606.9)
2022	-	-	-	582,469.5	6,698,399.6	-	180,565.6	180,565.6	0.467	84,332.2	(14,037,274.7)
2023	-	-	-	535,872.0	6,162,527.6	-	166,120.3	166,120.3	0.438	72,816.2	(13,964,458.5)
2024	-	-	-	493,002.2	5,669,525.4	-	152,830.7	152,830.7	0.411	62,872.7	(13,901,585.8)
2025	-	-	-	453,562.0	5,215,963.4	-	140,604.2	140,604.2	0.386	54,287.1	(13,847,298.7)
2026	-	-	-	417,277.1	4,798,686.3	-	129,355.9	129,355.9	0.362	46,873.9	(13,800,424.8)
2027	-	-	-	383,894.9	4,414,791.4	-	119,007.4	119,007.4	0.340	40,473.0	(13,759,951.8)
2028	-	-	-	353,183.3	4,061,608.1	-	109,486.8	109,486.8	0.319	34,946.2	(13,725,005.7)
2029	-	-	-	324,928.6	3,736,679.4	-	100,727.9	100,727.9	0.300	30,174.1	(13,694,831.6)
2030	-	-	-	298,934.4	3,437,745.1	-	92,669.7	92,669.7	0.281	26,053.6	(13,668,777.9)
2031	-	-	-	275,019.6	3,162,725.5	-	85,256.1	85,256.1	0.264	22,495.9	(13,646,282.1)
2032	-	-	-	253,018.0	2,909,707.4	-	78,435.6	78,435.6	0.248	19,423.9	(13,626,858.1)
2033	-	-	-	232,776.6	2,676,930.8	-	72,160.7	72,160.7	0.232	16,771.5	(13,610,086.7)
2034	-	-	-	214,154.5	2,462,776.4	-	66,387.9	66,387.9	0.218	14,481.2	(13,595,605.4)
2035	-	-	-	197,022.1	2,265,754.3	-	61,076.9	61,076.9	0.205	12,503.8	(13,583,101.7)
2036	-	-	-	181,260.3	2,084,493.9	-	56,190.7	56,190.7	0.192	10,796.3	(13,572,305.4)
2037	-	-	-	166,759.5	1,917,734.4	-	51,695.4	51,695.4	0.180	9,322.0	(13,562,983.4)
2038	-	-	-	153,418.8	1,764,315.7	-	47,559.8	47,559.8	0.169	8,049.0	(13,554,934.3)
2039	-	-	-	141,145.3	1,623,170.4	-	43,755.0	43,755.0	0.159	6,949.9	(13,547,984.4)
2040	-	-	-	129,853.6	1,493,316.8	-	40,254.6	40,254.6	0.149	6,000.8	(13,541,983.6)
2041	-	-	-	119,465.3	1,373,851.4	-	37,034.3	37,034.3	0.140	5,181.4	(13,536,802.2)
2042	-	-	-	109,908.1	1,263,943.3	-	34,071.5	34,071.5	0.131	4,473.8	(13,532,328.4)
2043	-	-	-	101,115.5	1,162,827.9	-	31,345.8	31,345.8	0.123	3,862.9	(13,528,465.5)
2044	-	-	-	93,026.2	1,069,801.6	-	28,838.1	28,838.1	0.116	3,335.4	(13,525,130.0)
2045	-	-	-	85,584.1	984,217.5	-	26,531.1	26,531.1	0.109	2,879.9	(13,522,250.1)
2046	-	-	-	78,737.4	905,480.1	-	24,408.6	24,408.6	0.102	2,486.7	(13,519,763.4)
2047	-	-	-	72,438.4	833,041.7	-	22,455.9	22,455.9	0.096	2,147.1	(13,517,616.3)
2048	-	-	-	66,643.3	766,398.4	-	20,659.4	20,659.4	0.090	1,853.9	(13,515,762.4)
2049	-	-	-	61,311.9	705,086.5	-	19,006.7	19,006.7	0.084	1,600.7	(13,514,161.7)
2050	-	-	-	56,406.9	648,679.6	-	21,502.3	21,502.3	0.079	1,699.6	(13,512,462.1)
Total	-	-	(17,459,577.0)	16,810,897.4	202,055,109.0	(17,459,577.0)	5,212,473.3	(12,247,103.7)	15.1	(13,512,462.1)	(559,733,433.6)

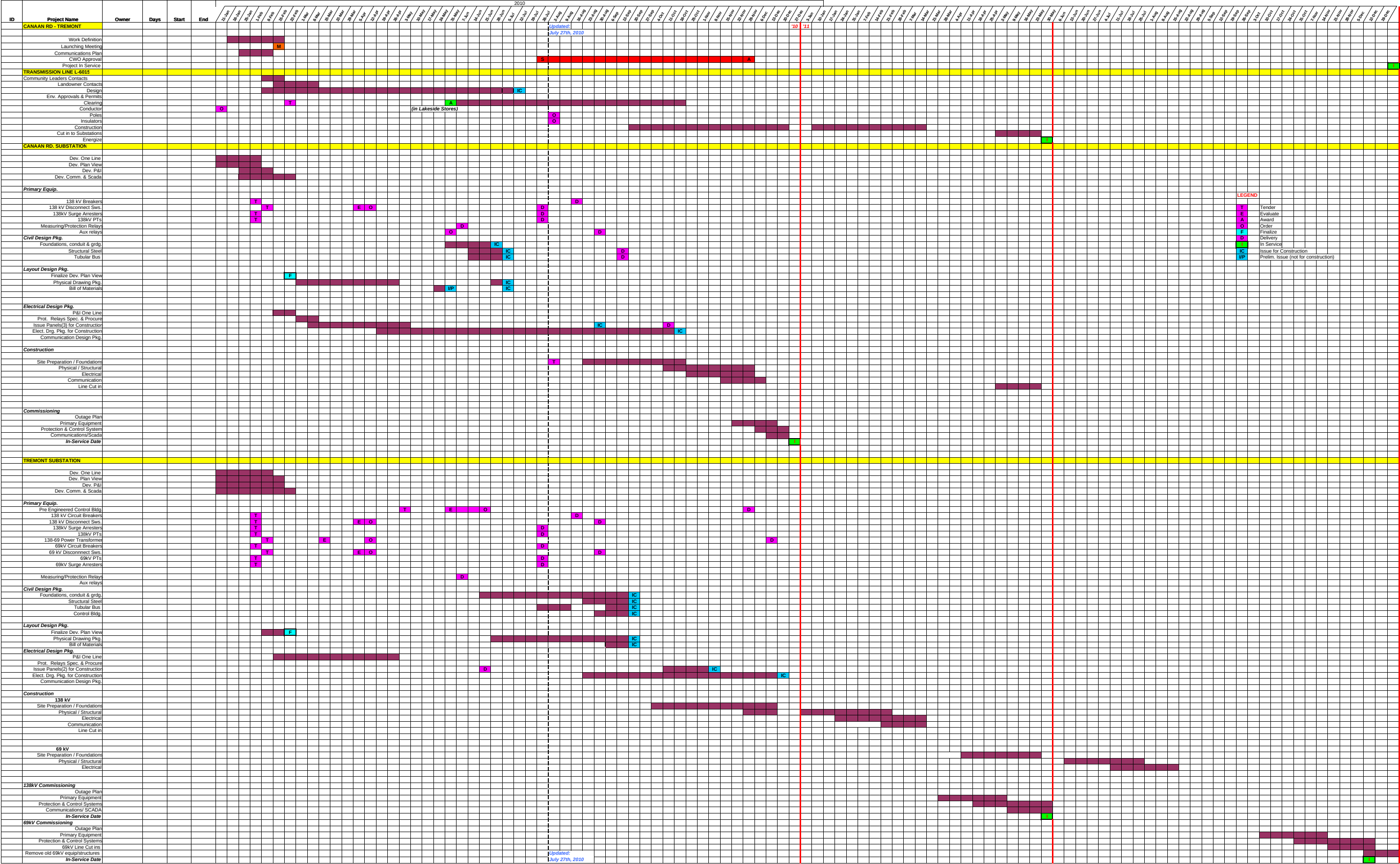
Canaan Road - Tremont Transmission Reinforcement
Transmission Line on Alternate Easement

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	GNPV
2010	-	-	(23,263,142.0)	-	-	(23,263,142.0)	291,115.0	(22,972,027.0)	1.000	-	-
2011	-	-	-	930,525.7	22,332,616.3	-	550,304.7	550,304.7	0.939	(21,559,856.4)	(21,559,856.4)
2012	-	-	-	1,786,609.3	20,546,007.0	-	509,541.0	509,541.0	0.881	484,726.0	(21,075,130.4)
2013	-	-	-	1,643,680.6	18,902,326.5	-	465,777.9	509,541.0	0.827	421,229.5	(20,653,901.0)
2014	-	-	-	1,512,186.1	17,390,140.3	-	431,275.5	465,777.9	0.776	361,380.8	(20,292,520.2)
2015	-	-	-	1,391,211.2	15,998,929.1	-	396,773.4	431,275.5	0.728	314,041.8	(19,978,478.4)
2016	-	-	-	1,279,914.3	14,719,014.8	-	365,031.6	396,773.4	0.683	271,157.7	(19,707,320.7)
2017	-	-	-	1,177,521.2	13,541,493.6	-	335,829.0	365,031.6	0.641	234,129.6	(19,473,191.1)
2018	-	-	-	1,083,319.5	12,458,174.1	-	308,962.7	335,829.0	0.602	202,157.9	(19,271,033.3)
2019	-	-	-	996,653.9	11,461,520.2	-	284,245.7	308,962.7	0.565	174,552.1	(19,096,481.2)
2020	-	-	-	916,921.6	10,544,598.6	-	261,506.0	284,245.7	0.530	150,716.0	(18,945,765.2)
2021	-	-	-	843,567.9	9,701,030.7	-	240,585.6	261,506.0	0.498	130,134.9	(18,815,630.3)
2022	-	-	-	776,082.5	8,924,948.2	-	221,338.7	240,585.6	0.467	112,364.2	(18,703,266.1)
2023	-	-	-	713,995.9	8,210,952.4	-	203,631.6	221,338.7	0.438	97,020.3	(18,606,245.8)
2024	-	-	-	656,876.2	7,554,076.2	-	187,341.1	203,631.6	0.411	83,771.6	(18,522,474.2)
2025	-	-	-	604,326.1	6,949,750.1	-	172,353.8	187,341.1	0.386	72,332.1	(18,450,142.1)
2026	-	-	-	555,980.0	6,393,770.1	-	158,565.5	172,353.8	0.362	62,454.8	(18,387,687.3)
2027	-	-	-	511,501.6	5,882,268.5	-	145,880.3	158,565.5	0.340	53,926.2	(18,333,761.1)
2028	-	-	-	470,581.5	5,411,687.0	-	134,209.8	145,880.3	0.319	46,562.3	(18,287,198.8)
2029	-	-	-	432,935.0	4,978,752.0	-	123,473.1	134,209.8	0.300	40,203.9	(18,246,994.9)
2030	-	-	-	398,300.2	4,580,451.9	-	113,595.2	123,473.1	0.281	34,713.9	(18,212,281.0)
2031	-	-	-	366,436.1	4,214,015.7	-	104,507.6	113,595.2	0.264	29,973.5	(18,182,307.5)
2032	-	-	-	337,121.3	3,876,894.5	-	96,147.0	104,507.6	0.248	25,880.5	(18,156,427.0)
2033	-	-	-	310,151.6	3,566,742.9	-	88,455.2	96,147.0	0.232	22,346.3	(18,134,080.7)
2034	-	-	-	285,339.4	3,281,403.5	-	81,378.8	88,455.2	0.218	19,294.8	(18,114,785.9)
2035	-	-	-	262,512.3	3,018,891.2	-	74,868.5	81,378.8	0.205	16,660.0	(18,098,125.9)
2036	-	-	-	241,511.3	2,777,379.9	-	68,879.0	74,868.5	0.192	14,385.0	(18,083,740.9)
2037	-	-	-	222,190.4	2,555,189.5	-	63,368.7	68,879.0	0.180	12,420.6	(18,071,320.3)
2038	-	-	-	204,415.2	2,350,774.3	-	58,299.2	63,368.7	0.169	10,724.5	(18,060,595.8)
2039	-	-	-	188,061.9	2,162,712.4	-	53,635.3	58,299.2	0.159	9,260.0	(18,051,335.7)
2040	-	-	-	173,017.0	1,989,695.4	-	49,344.4	53,635.3	0.149	7,995.5	(18,043,340.2)
2041	-	-	-	159,175.6	1,830,519.8	-	45,396.9	49,344.4	0.140	6,903.7	(18,036,436.5)
2042	-	-	-	146,441.6	1,684,078.2	-	41,765.1	45,396.9	0.131	5,961.0	(18,030,475.6)
2043	-	-	-	134,726.3	1,549,351.9	-	38,423.9	41,765.1	0.123	5,147.0	(18,025,328.6)
2044	-	-	-	123,948.2	1,425,403.8	-	35,350.0	38,423.9	0.116	4,444.1	(18,020,884.5)
2045	-	-	-	114,032.3	1,311,371.5	-	32,522.0	35,350.0	0.109	3,837.2	(18,017,047.3)
2046	-	-	-	104,909.7	1,206,461.8	-	29,920.3	32,522.0	0.102	3,313.2	(18,013,734.0)
2047	-	-	-	96,516.9	1,109,944.8	-	27,526.6	29,920.3	0.096	2,860.8	(18,010,873.2)
2048	-	-	-	88,795.6	1,021,149.2	-	25,324.5	27,526.6	0.090	2,470.1	(18,008,403.1)
2049	-	-	-	81,691.9	939,457.3	-	28,649.7	25,324.5	0.084	2,132.8	(18,006,270.3)
2050	-	-	-	75,156.6	864,300.7	-	28,649.7	28,649.7	0.079	2,264.5	(18,004,005.7)
Total	-	-	(23,263,142.0)	22,398,841.3	289,218,245.8	(23,263,142.0)	6,945,100.0	(16,318,042.0)	15.1	(18,004,005.7)	(745,788,878.4)

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43V- Canaan Rd. - 51V- Tremont 138kV System Expansion Project