

CI 38724

**TRE 5 Superheater, Reheater and Boiler
Upgrades**

REDACTED

October 15, 2010

RECEIVED
OCT 18 2010

Nova Scotia
Utility and Review Board

NOVA SCOTIA
POWER
An Emera Company

UARB APPROVAL SHEET

Project Title: **TRE5 - Superheater, Reheater and Boiler Upgrades**

CI Number: 38724

☒ Capital Project Authorization

Head Office Use:

☐ ATO

Project Number:

☐ Final Cost

Date: October 5, 2010

Location:			Division:	
Expenditure Profile			Schedule	
YEAR	Budget Estimate	Project Estimate		
2010	1,549,614	796,383	Start Date	2010-08
			Estimated In-Service Date	2010-09
			Estimated Close Date	2010-11
Total	\$1,549,614	\$796,383		

COMMENTS

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Approved on behalf of NOVA SCOTIA UTILITY AND REVIEW BOARD

M/S *S*

Oct 7/2010

Authorized Signatory

DATE

DATE

Mark Savory

VP Technical and Construction

CI Number : 38724

- TRE5 - Superheater, Reheater and Boiler Upgrades

Project Number

Parent CI Number :

-

Cost Centre : 340

- 340-Trenton Unit 5 Capital

Budget Version - 2010 07/05 Forecast

	<u>Forecast</u>
Start :	08/01/2010
Operational :	09/15/2010
Final Cost :	11/15/2010
2010	\$796,382.51
Total :	\$796,382.51
Original Cost :	\$139,000.00

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

CI Number : 38724

- TRE5 - Superheater, Reheater and Boiler Upgrades

Project Number

Parent CI Number :

-

Approved Date

Cost Centre : 340

- 340-Trenton Unit 5 Capital

Budget Version 2010 07/05 Forecast

Capital Item Accounts

Acct	Activ	Account	Activity	Forecast Amount	Amount	Variance
094		094 - Interest Capitalized		8,010	0	8,010
095		095-Thermal & Hydro Contracts AO		28,728	0	28,728
095		095-Thermal Regular Labour AO		18,661	0	18,661
095		095-Thermal Term Labour AO		2,806	0	2,806
001	013	001 - THERMAL Regular Labour	013 - SGP - Boiler	65,500	0	65,500
004	013	004 - THERMAL Term Labour	013 - SGP - Boiler	10,600	0	10,600
012	013	012 - Materials	013 - SGP - Boiler	128,477	0	128,477
013	013	013 - POWER PRODUCTION Contracts	013 - SGP - Boiler	438,600	0	438,600
001	085	001 - THERMAL Regular Labour	085 Design	5,000	0	5,000
011	085	011 - Travel Expense	085 Design	0	0	0
021	085	021 - Telephones	085 Design	0	0	0
028	085	028 - Consulting	085 Design	70,000	0	70,000
041	085	041 - Meals & Entertainment	085 Design	0	0	0
028	087	028 - Consulting	087 Field Super.& Ops.	20,000	0	20,000
Total Cost:				796,383	0	796,383
Original Cost:				139,000		

CI Number : 38724 - TRE5 - Superheater, Reheater and Bo
Parent CI Number : -
Cost Centre : 340 - 340-Trenton Unit 5 Capital

Project Number

Approved Date

Capital Item Justification

Justification Criteria : THERMAL

Sub-Criteria : Heat Rate

Name of Report :

Document Location :

Person Responsible :

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 recent boiler inspections. Past experience on other units indicates that this is the most effective way to approach this project.

This work is currently in progress.

Change in Scope - ACE Version

Please see variance explanation sheet.

CI Number : 38724

- TRE5 - Superheater, Reheater and Bo

Project Number

Parent CI Number :

-

Approved Date

Cost Centre : 340

- 340-Trenton Unit 5 Capital

Reason for Variance / Over Expenditure / Final Costing

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The variance in the project estimate is a result of the following:

Removal of the blowdown tank and drains from the project scope. The replacement of the blowdown tank and drains was projected for 2010 based on inspections completed in 2006. Recent inspections indicate the projected deterioration rates to be lower than anticipated which has resulted in deferring the replacement of these components. This resulted in a reduction of \$300K in the project estimate.

Reduction in scope for SSH tube replacements and alignment. The scope of work required for SSH tube replacements and alignment is less than originally estimated and resulted in a reduction of \$350K in the project estimate.

Reduction in scope for boiler door replacements. The scope of work for boiler door replacements is less than originally estimated, and resulted in a reduction of \$100K in the project estimate.

38724 - TRE5 Superheater, Reheater and Boiler Upgrades

Account	ACE 2010	Current Submission	Variance
001 - THERMAL Regular Labour	100,000	70,500	(29,500)
004 - THERMAL Term Labour	100,000	10,600	(89,400)
012 - Materials	363,000	128,477	(234,523)
013 - POWER PRODUCTION Contracts	875,000	438,600	(436,400)
028 - Consulting	-	90,000	90,000
094 - Interest Capitalized	1,361	8,010	6,649
095-Thermal & Hydro Contracts AO	57,313	28,728	(28,584)
095-Thermal Regular Labour AO	26,470	18,661	(7,809)
095-Thermal Term Labour AO	26,470	2,806	(23,664)
	1,549,614	796,383	(753,231)

TRENTON GENERATING STATION - PROJECT COST ESTIMATE (2010)

FP# :	38724						
Title :	TRE5 - Superheater, Reheater and Boiler Upgrades						
Item	Description	Acct	Actv	Unit	Quantity	Unit Price	Total
1	Supply of Materials						
1.1	Consumables	012	013	Lot	1		
1.2	Boiler doors- large	012	013	Each	4		
1.3	Boiler doors - small	012	013	Each	2		
1.4	Boiler door misc components	012	013	Lot	1		
1.5	Tubing Cold reheat	012	013	Each	1		
1.6	Shields / clips cold reheat	012	013	Each	77		
1.7	Tubing SSH out	012	013	Each	1		
1.8	Shields/ clips SSH out	012	013	Each	100		
1.9	Platen alignment material	012	013	Lot	1		
1.10	Velocity screens	012	013	Lot	1		
1.11	Ultrasonic leak detection	012	013	Lot	1		
1.12	Misc leak det mat'l	012	013	Lot	1		
						Sub-Total	\$ 128,477.08
2	Equipment Rental & Charges						
2.1	Scaffold	013	013	Lot	1	\$ 53,600.00	\$ 53,600.00
2.2	Trailers	013	013	Each	3	\$ 2,000.00	\$ 6,000.00
2.3	Tooling	013	013	Lot	1	\$ 5,000.00	\$ 5,000.00
						Sub-Total	\$ 64,600.00
3	Plant Labour						
3.1	Manwatch 2*16hr/d*7 wk	004	013	Hour			\$ 5,600.00
3.2	Misc lab- materials handling	001	013	Hour			\$ 12,500.00
3.3	Ultrasonic leak detection	001	013	Hour			\$ 5,000.00
3.4	Reheat line adjust 4m*2*40*3	001	013	Hour			\$ 48,000.00
3.5	Boilermaker support	004	013	Hour			\$ 5,000.00
3.6							\$ -
						Sub-Total	\$ 76,100.00
4	Contractor Labour						
4.1	Inspection (4m*2 sh *40h/w*2 w)	013	013	Hour			
4.2	Install boiler doors (2m*8h/d*5d)	013	013	Hour			
4.3	Cold reheat (4m*2 sh *40h/w*2 w)	013	013	Hour			
4.4	SSHoutlet (4m*2 sh *40h/w*3 w)	013	013	Hour			
4.5	Remove/ reinstall insulation	013	013	Lot			
4.6	Platen alignment (6m*2*80)	013	013	Hour			
4.7	Velocity screen (4m *5*8hr/d	013	013	Hour			
4.8	Ultrasonic leak detection 2 m *10 hr	013	013	Hour			
4.9	Mob/Demob	013	013	Hour			
5.0	Misc Incl Scaffold Clips	013	013	Hour			
5.1							\$ -
5.2							\$ -
5.3							\$ -
5.4							\$ -
5.5							\$ -
						Sub-Total	\$ 374,000.00
5	Engineering & Project Management						
5.1	OST- Piping system analysis-incl reheat piping	028	085	Lot	1	\$ 30,000.00	\$ 30,000.00
5.2	Contract supervision-external	028	087	Lot	1		
5.3	Engineering -internal	001	085	Lot	1	\$ 5,000.00	\$ 5,000.00
5.4	Engineering - external-(B&W)	028	085	Lot	1		
						Sub-Total	\$ 95,000.00
6	Indirect Costs						
6.1	Interest Capitalized	094	N/A	Lot	1	\$ 8,009.96	\$ 8,009.96
6.2	Thermal Regular Labour AO	095	005	Lot	1	\$ 18,661.35	\$ 18,661.35
6.3	Thermal Term Labour AO	095	005	Lot	1	\$ 2,805.82	\$ 2,805.82
6.4	Thermal & Hydro Contracts AO	095	005	Lot	1	\$ 28,728.30	\$ 28,728.30
6.5							\$ -
6.6							\$ -
						Sub-Total	\$ 58,205.43
Project Cost Estimate						Total	\$ 796,382.51
7	Retirement Costs						
7.1	Retirement Cost	097	013	Lot	1	\$ 139,000.00	\$ 139,000.00

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**Superheater, Reheater, and Boiler Upgrades
Reference Notes**

Budget Year	2010
Division	Power Production
Department	Trenton Generating Station

Date	July 20th
CI number	38724

Note 1 & 2	Boiler doors	As per the estimate received from B&W the material cost for boiler doors, large and small, are [REDACTED] and [REDACTED] respectively. Note that NSPI will only purchase 4 large and 2 small doors.
Note 3	Tubing	Alstom has estimated the cost for the cold reheat tubing at [REDACTED]
Note 4	Tubing SSH out (200)	Alstom has also estimated the cost of 200ft of Secondary super heater tubing at [REDACTED]
Note 5	Platen Alignment Material	As per the estimate received from B&W the platen alignment material cost is [REDACTED]. An additional \$1,500 has been added as contingency.
Note 6	Ultrasonic Leak Detection	As estimated by Bastobell AquaTronix, ultrasonic leak detection will cost [REDACTED]. This value is based on a per day charge of [REDACTED] for 10 days and an additional [REDACTED] and [REDACTED] for equipment and \$125 contingency.
Note 7	Scaffold	Safeway has estimated the cost of scaffolding for this project to be \$53,600
Note 8	Alstom contract labour	Contract labour costs were estimated using Alstom's hourly rates for the time period of May 1st 2010 - Dec 31st 2010. The quantity of hours required to complete the work is based on NSPI engineering staff experience on similar projects.
Note 9	Piping System Analysis	OST has estimated the cost of performing piping, pipe support and restraint inspection at [REDACTED]. An additional \$4,500 was added to this estimate as contingency.
Note 10	External Engineering	As quoted by B&W, the cost of engineering design review is [REDACTED] with \$1,000 added as contingency.



TRE5 - Superheater, Reheater, and Boiler Upgrades Summary of Alternatives

Budget Year : 2010
Division : Power Production
Department : Trenton Generating Station
Originator :

Date : 23-Jul-10
CI Number: 38724
Project No. :

Alternative	After Tax WACC	PV of EVA / NPV	Rank	IRR	Disc Pay
A Complete Boiler Upgrade	6.55%	1,445,427	1	25.84%	5.7 years
B Test 2	6.55%	0	2	#NUM!	0.0 years
C Test 3	6.55%	0	2	#NUM!	0.0 years
D Test 4	6.55%	0	2	#NUM!	0.0 years

Recommendation :

It is recommended to perform upgrades to TRE5 boiler based on recommendations from inspections conducted during the 2006 Life Extension Study. This economic analysis supports these recommendations. The upgrade costs versus the replacement energy costs if the boiler causes an unplanned outage makes this project justifiable. The project is predicted to provide a favorable NPV of \$1.4M and an IRR of 25.8%.

Notes/Comments :

Complete Boiler Upgrade
The cumulative benefit of all the planned work within the scope of this project will result in improved reliability of the boiler. The benefit will be reduced risk of future unplanned unit outages. It is estimated that this work will prevent an average of two 48-hour outages annually (Total of 96h/yr). Avoided Replacement energy costs for 2010 and 2011 are \$74,995 and \$240,461 respectively.

Test 2

Test 3

Test 4

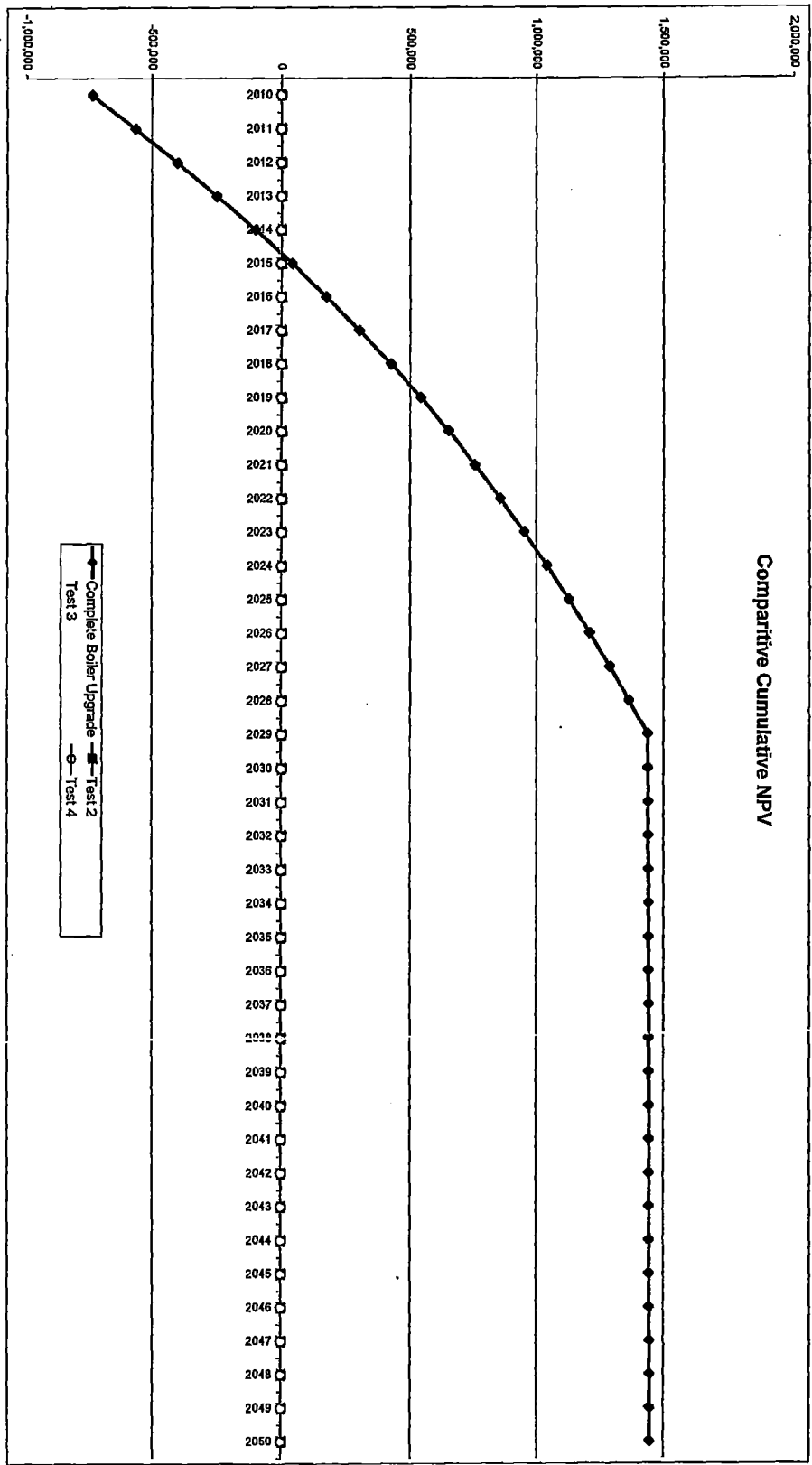
TRE5 - Superheater, Reheater, and Boiler Upgrades
Complete Boiler Upgrade

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	74,995.2	-	(796,382.0)	31,855.3	764,526.7	(721,386.8)	(15,298.3)	(736,685.1)	1.000	(736,685.1)	(736,685.1)
2011	240,460.8	-	-	81,162.1	703,364.6	240,460.8	(58,628.1)	181,832.7	0.939	170,654.8	(566,030.3)
2012	245,270.0	-	-	56,269.2	647,095.4	245,270.0	(58,701.9)	186,568.1	0.881	164,335.2	(401,695.2)
2013	250,175.4	-	-	51,767.6	595,327.8	250,175.4	(61,506.4)	188,669.0	0.827	155,969.7	(245,725.5)
2014	255,178.9	-	-	47,626.2	547,701.6	255,178.9	(64,435.8)	190,743.1	0.776	147,990.9	(97,734.6)
2015	260,282.5	-	-	43,816.1	503,885.4	260,282.5	(67,104.6)	193,177.9	0.728	140,666.4	42,931.8
2016	265,488.2	-	-	40,310.8	463,574.6	265,488.2	(69,805.0)	195,683.2	0.683	133,731.2	176,663.0
2017	270,797.9	-	-	37,086.0	426,488.6	270,797.9	(72,450.7)	198,347.2	0.641	127,219.0	303,882.0
2018	276,213.9	-	-	34,119.1	392,369.5	276,213.9	(75,049.4)	201,164.5	0.602	121,094.3	424,976.3
2019	281,738.2	-	-	31,389.6	360,980.0	281,738.2	(77,608.1)	204,130.1	0.565	115,325.7	540,301.9
2020	287,372.9	-	-	28,878.4	332,101.6	287,372.9	(80,133.3)	207,239.6	0.530	109,885.0	650,186.9
2021	293,120.4	-	-	26,568.1	305,533.5	293,120.4	(82,631.2)	210,489.2	0.498	104,747.0	754,933.9
2022	298,982.8	-	-	24,442.7	281,090.8	298,982.8	(85,107.4)	213,875.3	0.467	99,889.4	854,823.3
2023	304,962.4	-	-	22,487.3	258,603.5	304,962.4	(87,567.3)	217,395.1	0.438	95,291.7	950,115.0
2024	311,061.7	-	-	20,688.3	237,915.2	311,061.7	(90,015.8)	221,045.9	0.411	90,935.6	1,041,050.6
2025	317,282.9	-	-	19,033.2	218,882.0	317,282.9	(92,457.4)	224,825.5	0.386	86,804.8	1,127,855.4
2026	323,628.6	-	-	17,510.6	201,371.5	323,628.6	(94,896.6)	228,732.0	0.362	82,884.2	1,210,739.6
2027	330,101.1	-	-	16,109.7	185,261.7	330,101.1	(97,337.3)	232,763.8	0.340	79,160.2	1,289,899.8
2028	336,703.2	-	-	14,820.9	170,440.8	336,703.2	(99,783.5)	236,919.7	0.319	75,620.4	1,365,520.2
2029	343,437.2	-	-	13,635.3	156,805.5	343,437.2	(102,238.6)	241,198.6	0.300	72,253.6	1,437,773.7
2030	-	-	-	12,544.4	144,261.1	-	3,388.8	3,888.8	0.281	1,093.3	1,438,867.0
2031	-	-	-	11,540.9	132,720.2	-	3,577.7	3,577.7	0.264	944.0	1,439,811.1
2032	-	-	-	10,617.6	122,102.6	-	3,291.5	3,291.5	0.248	815.1	1,440,626.2
2033	-	-	-	9,768.2	112,334.4	-	3,028.1	3,028.1	0.232	703.8	1,441,330.0
2034	-	-	-	8,986.8	103,347.6	-	2,785.9	2,785.9	0.218	607.7	1,441,937.7
2035	-	-	-	8,267.8	95,079.8	-	2,563.0	2,563.0	0.205	524.7	1,442,462.4
2036	-	-	-	7,606.4	87,473.4	-	2,358.0	2,358.0	0.192	453.1	1,442,915.4
2037	-	-	-	6,997.9	80,475.6	-	2,169.3	2,169.3	0.180	391.2	1,443,306.6
2038	-	-	-	6,438.0	74,037.5	-	1,995.8	1,995.8	0.169	337.8	1,443,644.4
2039	-	-	-	5,923.0	68,114.5	-	1,836.1	1,836.1	0.159	291.6	1,443,936.0
2040	-	-	-	5,449.2	62,665.4	-	1,689.2	1,689.2	0.149	251.8	1,444,187.8
2041	-	-	-	5,013.2	57,652.1	-	1,554.1	1,554.1	0.140	217.4	1,444,405.3
2042	-	-	-	4,612.2	53,040.0	-	1,429.8	1,429.8	0.131	187.7	1,444,593.0
2043	-	-	-	4,243.2	48,796.8	-	1,315.4	1,315.4	0.123	162.1	1,444,755.1
2044	-	-	-	3,903.7	44,893.0	-	1,210.2	1,210.2	0.116	140.0	1,444,895.1
2045	-	-	-	3,591.4	41,301.6	-	1,113.3	1,113.3	0.109	120.9	1,445,015.9
2046	-	-	-	3,304.1	37,997.5	-	1,024.3	1,024.3	0.102	104.4	1,445,120.3
2047	-	-	-	3,039.8	34,957.7	-	942.3	942.3	0.096	90.1	1,445,210.4
2048	-	-	-	2,796.6	32,161.0	-	866.9	866.9	0.090	77.8	1,445,288.2
2049	-	-	-	2,572.9	29,588.2	-	797.6	797.6	0.084	67.2	1,445,355.3
2050	-	-	-	2,367.1	27,221.1	-	902.3	902.3	0.079	71.3	1,445,426.7
Total	5,567,254.12	-	(796,382.0)	769,160.19	4,771,894.93	4,770,872.12	(7,492,417.0)	3,278,455.12	15,106.22	1,445,426.7	40,436,872.5

TRE5 - Superheater, Reheater, and Boiler Upgrades

Test 2

Year	Total Revenue	Operating Costs	Capital	CCA	UCC	CFBT	Applicable Taxes	CFAT	Discount Factor	PV of CF	CNPV
2010	-	-	-	-	-	-	-	-	1.000	-	-
2011	-	-	-	-	-	-	-	-	0.939	-	-
2012	-	-	-	-	-	-	-	-	0.881	-	-
2013	-	-	-	-	-	-	-	-	0.827	-	-
2014	-	-	-	-	-	-	-	-	0.776	-	-
2015	-	-	-	-	-	-	-	-	0.728	-	-
2016	-	-	-	-	-	-	-	-	0.683	-	-
2017	-	-	-	-	-	-	-	-	0.641	-	-
2018	-	-	-	-	-	-	-	-	0.602	-	-
2019	-	-	-	-	-	-	-	-	0.565	-	-
2020	-	-	-	-	-	-	-	-	0.530	-	-
2021	-	-	-	-	-	-	-	-	0.498	-	-
2022	-	-	-	-	-	-	-	-	0.467	-	-
2023	-	-	-	-	-	-	-	-	0.438	-	-
2024	-	-	-	-	-	-	-	-	0.411	-	-
2025	-	-	-	-	-	-	-	-	0.386	-	-
2026	-	-	-	-	-	-	-	-	0.362	-	-
2027	-	-	-	-	-	-	-	-	0.340	-	-
2028	-	-	-	-	-	-	-	-	0.319	-	-
2029	-	-	-	-	-	-	-	-	0.300	-	-
2030	-	-	-	-	-	-	-	-	0.281	-	-
2031	-	-	-	-	-	-	-	-	0.264	-	-
2032	-	-	-	-	-	-	-	-	0.248	-	-
2033	-	-	-	-	-	-	-	-	0.232	-	-
2034	-	-	-	-	-	-	-	-	0.218	-	-
2035	-	-	-	-	-	-	-	-	0.205	-	-
2036	-	-	-	-	-	-	-	-	0.192	-	-
2037	-	-	-	-	-	-	-	-	0.180	-	-
2038	-	-	-	-	-	-	-	-	0.169	-	-
2039	-	-	-	-	-	-	-	-	0.159	-	-
2040	-	-	-	-	-	-	-	-	0.149	-	-
2041	-	-	-	-	-	-	-	-	0.140	-	-
2042	-	-	-	-	-	-	-	-	0.131	-	-
2043	-	-	-	-	-	-	-	-	0.123	-	-
2044	-	-	-	-	-	-	-	-	0.116	-	-
2045	-	-	-	-	-	-	-	-	0.109	-	-
2046	-	-	-	-	-	-	-	-	0.102	-	-
2047	-	-	-	-	-	-	-	-	0.096	-	-
2048	-	-	-	-	-	-	-	-	0.090	-	-
2049	-	-	-	-	-	-	-	-	0.084	-	-
2050	-	-	-	-	-	-	-	-	0.079	-	-
Total									151		



ALSTOM

EXECUTIVE SUMMARY REPORT

**Nova Scotia Power Incorporated
Trenton Generating Station
Unit # 5
August/September 2009 – Shutdown**

Summary

The utility boiler for Unit # 5 at Trenton Generating Station was shut down as part of the Planned Annual Maintenance in July 2009.

The major scope of work for the boiler was removal of all asbestos (Gulid), strengthening all buck-stays (B & W), replacement of Economizer Inlet Header (B & W), new generator (Mitsubishi), new bag-house (Sunny-Corner) replacement of four (4) water-wall panels on the East Wall, two (2) water-wall panels on the South wall, one (1) water-wall panel on the West water-wall. There were eleven (11) SSH tubes replaced.

Introduction

During the August/September 2009 shutdown, the boiler was inspected internally to determine the condition and assessment. Sections of the boiler were repaired to ensure the Unit's integrity could be maintained.

Alstom under the Supervision of Mr. [REDACTED] carried out the repairs on days and [REDACTED] on nights. Alstom under the Supervision of Mr. [REDACTED] carried out the Non-Destructive Testing. Mr. [REDACTED] carried out Quality Assurance and Mr. [REDACTED] carried out Safety Officer functions.

Lower Furnace

A visual and UT survey was carried out on the waterwalls with the following.

The South Waterwall (Rear) was surveyed with no pad welds required. There were two (2) water-wall panels replaced. One water-wall panel (1-S-1) was replaced from Tube 8-11 at elevation 65'-0" to 82'-0". The second water-wall panel (1-S-2) was replaced from Tube 70-85 at elevation 65'-0" to 82'-0". Panel 1-S-1 is four (4) tubes wide and seventeen (17') in length. Panel 1-S-2 is sixteen (16) tubes wide and seventeen (17') in length.

The East Waterwall (Left) was surveyed with no pad welds required. There were four (4) water-wall panels replaced. One water-wall panel (1-E-1) was replaced from Tube 27-37 at elevation 68'-6" to 91'-6". The second water-wall panel (1-E-2a) was replaced from Tube 38-50 at elevation 79'-0" to 99'-0". The third water-wall panel (1-E-2b) was replaced from Tube 51-63 at elevation 79'-0" to 99'-0". The fourth water-wall panel (1-E-2c) was replaced from Tube 64-76 at elevation 67'-0" to 87'-0". Panel 1-E-1 is eleven (11) wide and twenty-three (23') in length. Panels 1-E-2a, 1-E-2b, and 1-E-2c are thirteen (13) tubes wide and twenty (20') in length. In addition to the panels, the offset tube for IR-2 was replaced.

The West Water-wall (Right) was surveyed with three (3) areas for a total of forty-eight (48") overlayed with pad welding. Also, one water-wall panel (1-W-1) was replaced from Tube 54-68 at elevation 86'-0" to 105'-0". The

panel is fifteen (15) tubes and nineteen (19') in length. In addition to the panels, the offset tubes for IR-8 and IR-17 were replaced.

All pad welds were MT Inspected and accepted. All butt welds were radiographed.

Due to time constraints, four water-wall panels were not replaced. The following depict the locations for scheduled panels:

- 1-W-2 was scheduled for replacement from Tube 83-97 at elevation 86'-0 to 103'-0".
- 1-W-3 was scheduled for replacement from Tube 98-111 at elevation 86'-0" to 105'-0".
- 1-S-3 was scheduled for replacement from Tube 56-65 at elevation 82'-0" to 106'-0".
- 1-S-4 was scheduled for replacement from Tube 66-76 at elevation 82'-0" to 106'-0".

Cold Re-Heat - Up Pass # 6 - Tubes 1-20 - 8th Floor

This section was surveyed via swing stages. Thirty-five (35) locations for a total of one hundred fifty-seven (159") inches were found to be below minimum wall. These areas were repaired by pad weld overlay, re-inspected and found acceptable.

Secondary SH Inlet - Up Pass 5 - 6 - Tubes 1-24 - 8-8 1/2 Floor

The survey of this section revealed thirty-eight (38) areas for a total of one hundred sixteen (116") identified for pad weld overlay. These areas were repaired, inspected and found acceptable. In addition, five (5) shields were identified for replacement. These shields were not replaced.

Secondary SH Intermediate - Up Pass 4-5 - Tubes 25-56 - 8 1/2 - 9th Floor

The survey of this section revealed no mechanical work required.

Sec SH Outlet / RH-2 - Up Pass 3-4 - Tubes 57-68; 1-10; 9-9 1/2 Floor

An extensive survey was carried out in this section. There were eleven (11) Secondary SH Outlet tubes with wall thickness less than 0.200". These tubes were replaced with approximately 8' sections of new tube. There were one hundred and nine (109) tubes with thickness between 0.201 and 0.252". These tubes required in total two hundred eighty-four (284) shields to protect tubes. These tubes were shielded??

Re-Heat 2 Intermediate - Up Pass 2 - 3 - Tubes 11-30; 9 1/2 - 10th Floor

The survey of this section revealed no mechanical work required.

ReHeat Finish - Pri SH Finish - Up Pass 1-2 - Tubes 31-40; Tubes 1-4 - 10 - 10 1/2 Floor

The survey of this section revealed thirty-three (33) areas for a total of one hundred twenty-three (123) inches identified for pad weld overlay. These areas were repaired and found acceptable. Also, there were six tubes identified for shields.

Crossover Tubes - Up Pass 1 - 10 1/2 Floor

The survey of this section revealed one (1) area for a total of eight (8) identified for pad weld overlay. This area was repaired and found acceptable. There were eighteen shields identified for replacement.

Primary SH 3 - Down Pass # 1-2 - Tubes 5-20 - 10 1/2 - 10th Floor

The survey of this section revealed two (2) areas for a total of ten inches (10") identified for pad weld overlay. These areas were repaired and found acceptable.

Primary SH 2 - Down Pass # 2-3 - Tubes 21-44 - 10-9 1/2 Floor

The survey of this section revealed twenty-nine (29) areas for a total of one hundred seventy-six (176") inches identified for pad weld overlay. These areas were repaired and found acceptable. Also there were two (2) shields identified for replacement.

Primary SH 1 - Down Pass # 3-4 - Tubes 45-66 - 9 1/2 - 9th Floor

The survey of this section revealed six (6) areas for a total of thirty-four (34") identified for pad weld overlay. These areas were repaired and found acceptable.

Primary SH 1 - Down Pass # 4-5 - Tubes 67-70 - 9th - 8th Floor

The survey of this section revealed no mechanical work required.

West, Center and East Economizer - 8th Floor

There was one (1) location for a total of three (3") identified for pad weld overlay. This area was repaired and found acceptable.

Headers

The following headers were inspected with a borescope:

Rear - lower water-wall header and East lower water-wall header. No indications were noted; however a 14" long X 3/8" piece of steel was removed from the Rear lower water-wall header. Two hand hole caps were installed, inspected and found acceptable.

Steam Drum

The circumferential welds on the heads and the circumferential to longitudinal weld "T"s on the East and West Heads were inspected with Wet Fluorescent Magnetic Particle Inspection. The down-comers and all attachment welds on the heads were also inspected with MPI. No defects were noted. There were a few cans with minor linear indications noted. These areas were not attached to the pressure parts and not repaired at this time.

Blow-down Tank

A visual inspection was carried out internally with no defects noted.

Deaerator Heater and Storage Tanks

A visual and magnetic particle inspection was carried out in the Deaerator Storage and Deaerator Heater vessels. All circumferential, longitudinal and attachment welds in the storage vessel were inspected with no defects noted. All attachment welds in the heater section were inspected with no defects noted. However, the box structure for the heater trays was found to be deteriorated. These areas were repaired with new plates.

HP Heaters 5-4 and 5-6

Division Plates - The HP Heaters 5-4 and 5-6 were disassembled by NSPL. A new division plate was installed on Heater 5-4 and the division plate on 5-6 was repaired.

Repair areas - There were several areas in both heaters at the seal plate to barrel edge that were repaired due to gouging the old seal plate.

Seal plates - new seals plates were installed.

All areas were inspected visually and with Magnetic Particle Inspection.

Conclusions and Recommendations

During the next Planned Shutdown, the following areas should be surveyed in addition to the normal boiler survey:

Up Pass 4, SSH Outlet - Due to low UT readings, a full survey should be conducted.

Furnace Walls - Replace four {4} water-wall panels that were not replaced during this shutdown.



EXECUTIVE SUMMARY REPORT

**Nova Scotia Power Incorporated
Trenton Generating Station
Unit # 5
August 2008 – Shutdown**

Summary

The utility boiler for Unit # 5 at Trenton Generating Station was shut down as part of the Planned Annual Maintenance in August 2008.

The unit was accessible for 4 days. The swing stages were installed to conduct inspection on the water walls. No mechanical work was carried out during this outage.

Introduction

During the August 2008 shutdown, the lower water walls were inspected to determine the condition and assessment.

Alstom under the Supervision of Mr. [REDACTED] carried out the swing stage installation and removal. Alstom under the Supervision of Mr. [REDACTED] carried out the Non-Destructive Testing. Mr. [REDACTED] carried out Safety Officer functions.

Lower Furnace

A visual and UT survey was carried out on the waterwalls with the following noted:

No repairs were required on the East and West Water walls. The South Wall was inspected at the IR's with no work required.

The hanging curtains/screens were visually inspected with deterioration noted on the 4 sides.

A boiler hydro was carried out with a small leak detected on the East WW. [REDACTED] repaired this leak using WPS-GTA1.1V-300.

Upper Furnace

Due to time restraints, a crawl thru was carried out in the Upper Furnace cavities with no mechanical work required.

Lower WW Vestibules

The lower vestibules were inspected for ash build-up. No significant ash build up was noted during this outage.

Air Heater

A visual inspection was carried out in the Air Heater with 11 tubes identified to be found leaking. These tubes were plugged during this outage.

Conclusions and Recommendations

During the next Planned Shutdown, the following areas should be surveyed in addition to the normal boiler survey:

A complete boiler inspection should be carried out.

NSPI Engineering evaluate the feasibility of replacing water wall panels based on data from 2007 and 2008.

Furnace Walls – Due to low UT readings and extent of new and existing pad weld overlay, a full wall survey should be conducted.

ALSTOM

EXECUTIVE SUMMARY REPORT

**Nova Scotia Power Incorporated
Trenton Generating Station
Unit # 5
June 2007 – Shutdown**

Summary

The utility boiler for Unit # 5 at Trenton Generating Station was shut down as part of the Planned Annual Maintenance in June 2007.

The major scope of work for the boiler was three {3} waterwall panels replaced, one {1} on the West and two {2} on the South Waterwall. There were five {5} SSH tubes replaced.

Introduction

During the June, 2007 shutdown, the boiler was inspected internally to determine the condition and assessment. Sections of the boiler were repaired to ensure the Unit's integrity could be maintained.

Alstom under the Supervision of Mr. [REDACTED] carried out the repairs. Alstom under the Supervision of Mr. [REDACTED] carried out the Non-Destructive Testing. Mr. [REDACTED] carried out Quality Assurance and Mr. [REDACTED] carried out Safety Officer functions.

Lower Furnace

A visual and UT survey was carried out on the waterwalls with the following.

The South Waterwall {Rear} was surveyed with twelve {12} areas for a total of two hundred sixty-nine inches {269"} overlayed with pad welding. Also, two wall panels were replaced, tubes ten {10} to forty-one {41}, elevation 85'9" to elevation 105'9". The panels are 16 tubes wide and 20' in length.

The East Waterwall {Left} was surveyed with forty-three {43} areas for a total of four hundred eighty-eight inches {488"} overlayed with pad welding. Also there was an access panel removed to install the waterwall panels. This panel was tubes 61, 62 and 63, elevation 60' to 66', 3 tubes wide and 6' in length.

The West Waterwall {Right} was surveyed with forty-five {45} areas for a total of eight hundred ninety-two inches {892"} overlayed with pad welding. Also, one wall panel was replaced, tubes eighty-five {85} to one hundred {100}, elevation 63' to elevation 73'. The panel is 16 tubes wide and 20' in length.

All pad welds were MT Inspected and accepted.

Due to the low UT readings and extent of new and existing pad weld overlay, the wall data should be reviewed for possible panels for 2008.

Cold ReHeat - Up Pass # 6 - 8th Floor

The survey of this section revealed two {2} areas for a total of six inches {6} identified for pad weld overlay. Also there were thirteen {13} shields identified for replacement.

Secondary SH Inlet / Intermediate - Up Pass 5 - 8 ½ Floor

The survey of this section revealed zero {0} areas for pad weld overlay and there were zero {0} shields identified for replacement.

Secondary SH Intermediate / Outlet - Up Pass 4 - 9 Floor

The survey of this section revealed zero {0} areas identified for pad weld overlay and there were zero {0} shields identified for replacement. There were five {5} tubes replaced due to low UT readings.

ReHeat 2 Inlet / Intermediate - Up Pass 3 - 9 ½ Floor

The survey of this section revealed four {4} areas for a total of twenty-two inches {22"} identified for pad weld overlay. Also there were sixteen {16} shields identified for replacement.

ReHeat 2 Intermediate / Finish - Up Pass 2 - 10 Floor

The survey of this section revealed zero {0} areas for pad weld overlay and there were nine {9} shields identified for replacement.

Primary SH Finish - Up Pass 1 - 10 ½ Floor

The survey of this section revealed zero {0} areas identified for pad weld overlay and there were zero {0} shields identified for replacement.

Primary SH 3 - Down Pass # 1 - 10 ½ Floor

The survey of this section revealed twenty-two {22} areas for a total of one hundred thirty-nine inches {139"} identified for pad weld overlay.

Primary SH 3 / SH 2 - Down Pass # 2 - 10 Floor

The survey of this section revealed twelve {12} areas for a total of ninety-four inches {94"} identified for pad weld overlay. Also there were six {6} shields identified for replacement.

Primary SH 2 / SH 1 - Down Pass # 3 - 9 ½ Floor

The survey of this section revealed zero {0} areas identified for pad weld overlay and there were zero {0} shields identified for replacement.

Primary SH 1 - Down Pass # 4 - 9 Floor

The survey of this section revealed seven {7} areas for a total of twenty-three inches {23"} identified for pad weld overlay.

Primary SH 1 – Down Pass # 5 – 8 ½ Floor

The survey of this section revealed two (2) areas for a total of four inches (4") identified for pad weld overlay.

West, Center and East Economizer – 8 Floor

The three (3) sections of the Upper and Lower Economizer were inspected with no mechanical work required during this outage.

Headers

The following headers were visually inspected:

Primary SH Outlet Header – 10 % visual inspection was performed with no defects noted.

RH 2 Finish Outlet Header – 10 % visual inspection was performed with leaks noted in the seal boxes.

RH 2 Header – 10 % visual inspection was performed with leaks noted in the seal boxes.

Secondary SH Outlet Header – 10 % visual inspection was performed with leaks noted in the seal boxes.

Secondary SH Inlet Header – 10 % visual inspection was performed with leaks noted in the seal boxes.

Cold ReHeat Inlet Header – 10 % visual inspection was performed with leaks noted in the seal boxes.

Steam Drum

The circumferential welds on the heads and the circumferential to longitudinal weld "T"s on the East and West Heads were inspected with Wet Fluorescent Magnetic Particle Inspection. The down-corners and all attachment welds on the heads were also inspected with MPI. No defects were noted. There were several cans with minor cracking and holes. These were repaired, inspected and accepted.

Blow-down Tank

No inspection was performed in this vessel during 2007 S/D.

Conclusions and Recommendations

During the next Planned Shutdown, the following areas should be surveyed in addition to the normal boiler survey:

UP Pass 4, SSH Outlet - Due to low UT readings, a full survey should be conducted.

Furnace Walls – Due to low UT readings and extent of new and existing pad weld overlay, a full wall survey should be conducted.



ALSTOM

EXECUTIVE SUMMARY REPORT

**Nova Scotia Power Incorporated
Trenton Generating Station
Unit # 5
June 2006 – Shutdown**

Summary

The utility boiler for Unit # 5 at Trenton Generating Station was shut down as part of the Planned Annual Maintenance in June 2006.

The major scope of work for the boiler was the Life Assessment Inspection. In addition to the assessment, 13 RH Intermediate Hairpin Bends were replaced to complete the 2005 project. There were also two (2) waterwall panels replaced, one on the East and one on the West Waterwall. There were three (3) ReHeat 2 Finish tube samples replaced. There were 2 tubes replaced at the RH 2 Finish Outlet Header due to a tube leak. Additional support was added to the Economizer support beam. The bottom ash screens on the South, West and East were replaced during the shutdown.

Due to findings of the assessment, forty-one (41) tubes were replaced due to low wall thickness in the Secondary SH Outlet on the 9th Floor.

Introduction

During the June, 2006 shutdown, the boiler was inspected internally to determine the condition and assessment. Sections of the boiler were repaired to ensure the Unit's integrity could be maintained.

Alstom under the Supervision of Mr. [REDACTED] carried out the repairs. Alstom under the Supervision of Mr. [REDACTED] carried out the Non-Destructive Testing. Mr. [REDACTED] carried out Quality Assurance and Mr. [REDACTED] carried out Safety Officer functions.

Lower Furnace

The South Waterwall was inspected from Elev. 60' – 104' as well as at the IR's. There was no mechanical work required. Results of this Section are found in Tab # 2 and 3.

The East Waterwall was surveyed from 2' below the IR's, centerline of the IR's, and 2' above the IR's. The East wall was also surveyed from Tube 1-111 at Elev. 60' – 104' {8' intervals}. Due to existing pad weld overlay, it was decided to replace a panel from Tube 59-74 at Elevation 87' to 105'. There were thirty-two (32) of thirty-two (32) butt welds radiographed and found acceptable. Results of this Section are found in Tab # 4 and 5 of the attached NDE report.

The West Waterwall was also surveyed at the IR's. The West wall was also surveyed from Tube 1-111 at Elev. 60' – 104' {8' intervals}. Due to existing pad weld overlay, it was decided to replace a panel from Tube 33 – 48 at Elevation 62' – 80'. There were thirty-three (33) of thirty-three (33) butt welds radiographed. There was one

repair. This area was repaired, re-radiographed and found acceptable. Results of this Section are found in Tab # 6 and 7.

Cold ReHeat - Up Pass # 6 - 8th Floor

The bifurcates at the front and division wall, the wall penetrations were visually inspected and 50% of the platens on tubes 1-20 were inspected with UT as per the scope of work supplied by Generation Services. The survey of this section revealed one (1) deteriorated shield. Results of this section are found in Tab # 8 of the attached NDE Report.

Secondary SH Inlet - Up Pass 6 to 5 - 8 to 8 1/2 Floor

The front and division wall penetrations were visually inspected and 25% of the platens on tubes 1-24 were inspected with UT as per the scope of work supplied by Generation Services. The mechanical work required in this section was that 5 areas on the elements for a total of 22" required weld overlay as well as 28 deteriorated shields. There was also 14 areas for a total of 47.5" on the walls that required weld overlay. The weld overlay was carried out, inspected and found acceptable. Results of this section are found in Tab # 9 of the attached NDE Report.

Secondary SH Intermediate - Up Pass 5 to 4 - 8 1/2 to 9 Floor

The front and division wall were visually inspected and 50% of the platens on tubes 25-56 were inspected with UT as per the scope of work supplied by Generation Services. There were nine (9) shields identified for replacement. Results of this section are found in Tab # 10 of the attached NDE Report.

Secondary SH Outlet - Up Pass 4 to 3 - 9 to 9 1/2 Floor

The scope of work as supplied by Generation Services was carried out as well as an extensive survey was carried out due to low wall thickness measurements on tubes 57-68. The survey detected forty-one (41) tubes with wall thickness below ASME code. These tubes were replaced during this outage. There was 10% or 9 of 82 butt welds radiographed and found acceptable. Results of this section are found in Tab # 11 of the attached NDE Report.

ReHeat 2 Inlet - Up Pass 4 to 3 - 9 to 9 1/2 Floor

The ReHeat Inlet section on tubes 1-10 were inspected with nineteen (19) areas for a total of seventy-nine (79) inches identified for pad weld overlay. There were also thirty-four (34) shields identified for replacement. The pad weld overlay areas were repaired, inspected and found acceptable. Results of this section are found on Tab # 12 of the attached NDE Report.

ReHeat 2 Intermediate - Up Pass 3 to 2 - 9 1/2 to 10 Floor

The ReHeat Intermediate section from tubes 11-30 were inspected with one (1) area for a total of fifteen (15) inches identified for weld overlay. There were also eight (8) shields identified for replacement. The pad weld overlay was repaired, inspected and found acceptable. In addition to the survey, there were thirteen (13) hairpin bends replaced to complete replacements from the 2005 shutdown. There were 52 of 52 butt welds radiographed. One repair was detected. This area was repaired, re-radiographed and found acceptable. Results of this section are found in Tab # 13 of the attached NDE Report.

ReHeat 2 Finish - Up Pass 2 to 1 - 10 to 10 1/2 Floor

The ReHeat 2 Finish section from tubes 31-40 were inspected during the shutdown. Fourteen (14) areas for a total of sixty-four (64) inches were identified for pad weld overlay. These areas were repaired, inspected and found acceptable during the shutdown. In addition there were three (3) tube samples removed and replaced. There were six (6) of six (6) butt welds radiographed. There was one repair detected. This tube was repaired, re-radiographed and found acceptable. There were also two (2) tubes on the RH 2 Finish Outlet Header replaced during the shutdown. The butt welds were radiographed and found acceptable. The fillet weld attachment welds from the header to tube were inspected with Magnetic Particles and found acceptable. The header was stress relieved. Results of this section are found in Tab # 14 of the attached NDE Report.

Primary SH Finish – Up Pass 2 to 1 – 10 to 10 ½ Floor

The scope of work supplied by Generation Services on Tubes 1-4 was completed with no mechanical work required. Results of this section are found in Tab # 15 of the attached NDE Report.

Primary SH Crossovers – Up Pass 1 to Down Pass # 1 – 10 ½ Floor

The crossovers between up pass # 1 and down pass # 1 were inspected with one shield identified for replacement. Results of this section are found in Tab # 16 of the attached NDE Report.

Screen Tubes – Up Pass 1 to Down Pass # 1 – 10 ½ Floor

The screen tubes were surveyed with four (4) areas identified for pad weld overlay. These areas were repaired, inspected and found acceptable. Results of this section are found in Tab # 17 of the attached NDE Report.

Primary SH 3 – Down Pass # 1 to 2 – 10 ½ to 10 Floor

The scope of work supplied by Generation Services was completed on tubes 5 – 20. There were two (2) shields identified for replacement. Results of this section are found in Tab # 18 of the attached NDE Report.

Primary SH 2 – Down Pass # 2 to 3 – 10 ½ to 10 Floor

A detailed survey was carried out on tubes 21 – 44 due to the large quantity of existing pad weld overlaid areas. The survey detected forty (40) areas for a total of two hundred forty-nine (249) inches that required pad weld overlay. There were also thirty-four (34) shields identified for replacement. The areas were pad weld overlaid, inspected and found acceptable. Results of this section are found in Tab # 19.

Primary SH 1 – Down Pass # 3 to 4 – 9 ½ to 9 Floor

This section was surveyed as per the scope of work by Generation Services. There were three (3) areas for a total of 16" that required pad weld overlay. These areas were repaired, inspected and found acceptable. Results of this section are found in tab # 20.

West, Center and East Economizer – 8 Floor

The three (3) sections of the Upper and Lower Economizer were inspected as per the scope of work supplied by Generation Services. No mechanical work was required during this outage. Results of this section are found in Tab # 21, 22 and 23 of the attached NDE Report.

Headers

The following headers were inspected as per the scope of work supplied by Generation Services:

c/o Nova Scotia Power Inc
Lingan Generating Station
New Waterford, N.S. Canada
Tel.: (902) 862-6422 Ext 3331
Fax: (902) 862-6087

ALSTOM Canada Inc.

3 of 6

Primary SH Outlet Header – 10% MPI. The tube ligaments on Platens 1, 2, 11, 22, 43 and 44 were inspected with Wet Fluorescent Magnetic Particle Inspection with no defects noted. Results of this header are found in Tab # 24 of the attached NDE Report.

RH 2 Finish Outlet Header – 100% MPI. The tube ligament on platen # 1-T-40 required repair by pad weld overlay. The tube ligaments on platen # 2-T39, 40 were replaced due to tubes with holes. These tubes were replaced with new tubing, inspected with radiography on the butt welds, Magnetic Particle Inspection on the fillet attachment welds and found acceptable. The header was stress relieved. No other indications were noted on the remaining tube ligament to header fillet welds. Results of this header are found in Tab # 25 of the attached NDE Report.

Secondary SH Outlet Header – 100% MPI. The tube ligaments on the forty-four (44) platens were inspected with Wet Fluorescent Magnetic Particle Inspection with no defects noted. Results of this header are found in Tab # 26 of the attached NDE Report.

Secondary SH Inlet Header – 10% MPI. The tube ligaments on Platens 1, 2, 3, 4, 14, 19, 24, 29, 34, 40, 41, 42, 43 and 44 were inspected with Wet Fluorescent Magnetic Particle Inspection with no defects noted. Results of this header are found in Tab # 27 of the attached NDE Report.

Cold ReHeat Inlet Header – 10% MPI. The tube ligaments on Platens 1, 2, 3, 4, 7, 8, 9, 10, 11, 12, 13, 14, 19, 20, 21, 22 were inspected with Wet Fluorescent Magnetic Particle Inspection with no defects noted. Results of this header are found in Tab # 28 of the attached NDE Report.

Steam Drum

The circumferential welds on the heads and the circumferential to longitudinal weld "T"s on the East and West Heads were inspected with Wet Fluorescent Magnetic Particle Inspection. The down-comers and all attachment welds on the heads were also inspected with MPI. No defects were noted. Results of the steam drum are found in Tab # 29 of the attached NDE Report.

Blow-down Tank

A visual inspection was carried out in the blow-down tank. There was no liner in this vessel. Minor wall loss was noted on the bottom discharge line and minor pitting on the bottom head. Results of the blow-down tank are found in Tab # 30 of the attached NDE Report.

Service Air Tank

Visual and UT Thickness was carried out on the service air tank with no defects noted. Results of the service air tank are found in Tab # 31 of the attached NDE Report.

Instrument Air Tank

Visual and UT Thickness was carried out on the instrument air tank with no defects noted. Results of the instrument air tank are found in Tab # 32 of the attached NDE Report.

Flash Tank

Visual and UT Thickness was carried out on the flash tank with minor wear noted on the bottom header. Results of the flash tank are found in Tab # 33 of the attached NDE Report.

General Service Cooling Water tank (GSCW)

Visual and UT Thickness was carried out on the GSCW tank with no defects noted. Results of the GSCW tank are found in Tab # 34 of the attached NDE Report.

Boiler Vents and Drains

Ultrasonic thickness measurements were carried out on the boiler vents and drains as per drawing G-1294/123M16. See Report # 35 of the attached NDE Report for results.

Cascade Drain Lines

UT thickness measurements were carried out on the cascade drains and the low load regulating valve. Results of the lines are found in Tab # 36 of the attached NDE Report.

Economizer Inlet Header Lines

UT thickness measurements were carried out on the economizer header inlet lines. Results of the lines are found in Tab # 37 of the attached NDE Report.

Misc. MPI

Color Contrast Magnetic Particle Inspection was carried out on the following components:

Aux. Steam Control Valve - 10th Floor

Aux. Steam Valve - 2nd Floor

Flash Tank Header

Soot Blower Drain 2nd Floor

Blow Down System 2nd Floor

Results of these inspections are found in Tab # 38 of the attached NDE Report.

HP - IP Loop Piping

Ultrasonic thickness was carried out on the HP and IP Loop Piping at the turbine. Results are found in Tab # 40 of the attached NDE Report.

HP Inner Upper Casing

A visual and Magnetic Particle Inspection was carried out on the HP Inner Upper Casing. Results are found in Tab # 41 of the attached NDE Report.

HP Rotor

A visual and Magnetic Particle Inspection was carried out on the HP Rotor. Results are found in Tab # 42 of the attached NDE Report.

Lower Economizer Inlet Header

A visual and UT Thickness was carried out on the Lower Economizer Inlet Header tube Ligaments. Results are found in Tab # 43 of the attached NDE Report.

Conclusions and Recommendations

The report to be reviewed for recommendations and conclusions by Generations Services as part of the Life Assessment.

Pages 28-41 have been removed due to confidentiality.



QUOTATION

4040 Steinberg
St Laurent, QC
H4R 2G7

Ph (514) 331-1225
Fax (514) 331-4255
Toll Free (877) 331-1225

Quote for: Nova Scotia Power - Trenton Generat
P.O.Box 190
Trenton, NS B0K 1X0

Quote # AAAQ2154

Attn: [REDACTED]
Phone: [REDACTED]
Email: [REDACTED]

Date 05/14/10
Prepared by: [REDACTED]
Terms N30 - OAC
FOB Toronto
Delivery: 6 - 8 Weeks ARO

Regarding: Procon Boiler Leak Detection with Air Purge

Thank you for allowing us the opportunity to provide the following quotation

Qty	PC	Description	Unit Price	Ext. Price
1	X	Air purge Controller Item LS-515-E3-R1	[REDACTED]	[REDACTED]
1	S2	Procon Type T96+ Airpurge- Boiler Acoustic Steam Leak Detection Equipment consisting of: - (2) Airborne waveguide assembly comprising; Stub Pipe, 45 deg. Elbow, Extension pipe up to 800 mm long, 1" Isolation Valve, Heat Isolator Details generally as Drawing: LS309-M3 - (2) Acoustic transducer, type T96, with rear connector sealed to IP65, & PVC Transducer Lead 3 metre long Details generally as Drawing: LS309-M3 - (2) Acoustic Head Amplifier, type T96 mounted in steel box Providing both processed/calibrated 4-20mA, and RMS Audio output signals Air Purge option- solenoid valve, Isolation valve with strainer for air supply (mounted on side of head amplifier enclosure) seedrawing LS-403-M3 Details generally as Drawings: LS309-M3, &. LS404-M3 - (1) Acoustic Calibrator, 94dB - (2) Equipment PSU's - (1) Equipment documentation in the English language	[REDACTED]	[REDACTED]
1	S2	Commissioning (Mandatory) Senior engineer 1/2 days on site, to provide assistance with commissioning, and training of selected staff. Includes 2 days travelling. Price quoted is daily rate per 8 hour day Overtime and Weekend working: 1.5 times day rate. Plus: Air travel, travel to site, (from London, UK) Hotels, plus all other necessary expenses: cost + 10%	[REDACTED]	[REDACTED]

Qty	PC	Description	Unit Price	Ext. Price
		Any waiting time not attributable to Procon shall be charged extra at the daily / hourly rate, plus any additional costs and expenses.		
		<i>Price quoted for commissioning is the Daily rate per 8 hour day</i>		

MINUM CHARGE ORDER IS \$500.00. WE ACCEPT VISA, MASTERCARD AND COMPANY CHEQUES FOR ORDERS UNDER \$500.00

PRICES SUBJECT TO CHANGE - ALL TRAINING OR CONSULTING SERVICES TO BE BILLED AT PUBLISHED RATES FOR EACH ACTIVITY INVOLVED - ALL PRODUCTS PROPOSED ABOVE ARE COVERED BY A LIMITED ONE YEAR WARRANTY, COVERING PARTS AND LABOR ON A DEPOT BASIS - WE SPECIFICALLY DISCLAIMS ANY AND ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTIES OR WITH REGARD TO ANY LICENSED PRODUCTS. WE SHALL NOT BE LIABLE FOR ANY LOSS OF PROFITS, BUSINESS, DATA, INTERRUPTION OF BUSINESS, NOR FOR INCIDENTAL OR CONSEQUENTIAL FITNESS OF PURPOSE, DAMAGES RELATED

SAFWAY**Scaffolding & Access Solutions**

Phone: 902-468-9235		www.safway.com	
Fax: 902-468-9237			
DATE June 30, 2010	JOB NAME Trenton #5 QD	JOB NUMBER	
CUSTOMER Nova Scotia Power		JOB SITE CONTACT	
CONTACT [REDACTED]		PERSON AUTHORIZED TO REQUEST CHANGE ORDERS	
ADDRESS PO Box 190 Trenton, NS B0K 1X0		JOB SITE ADDRESS	
PHONE 755-5811	FAX 755-3722	PHONE 396-9182	FAX
CONTRACT PRICE \$		INCLUDING WEEKS EQUIPMENT RENTAL	
EXTENDED EQUIPMENT RENTAL \$		PER DAY	
THIS QUOTATION IS VALID FOR 60 DAYS			
SPECIAL TERMS AND CONDITIONS AND DESCRIPTION OF WORK			

Pricing

Based on 8 weeks rental, install and removal labour
estimated engineering charges, consumables
shipping of proposed platform

\$ 53,600.00 (7)

Questions:

Will a forklift be supplied? Or do we rent one?

Will a meeting room be available for July 20 (QD ORIENTATION)

Is there a lunch room available for the two days or do we supply a trailer?

Notes:

I have not budgeted for any down time beyond our control

Estimated 12 hours to install platform.

Required two 220volt power supplies for four XE 701 motors

Please call if you have any questions or if additional information is required. If this is the approved option for Nova Scotia Power please let me know today if possible. It will take some time to mobilize the gear and get it to site.



Labour charge-out rate summary

Company: P.C.S. / Eastern	Type: N.S.P.I. 2009 - Inspection / Standard	Province / area: Nova Scotia / All
Trade: Inspection services	Code: TNSALL	Agreement : New Construction
Effective from: 5/1/2010 To: 12/31/2010		

	1st shift		2nd shift		3rd shift		
Occupation	R/T	O/T 2X	R/T	O/T 2X	R/T	O/T 2X	T/T
Supervisor							
Q.A. Lead							
Q.A. Representative1							
Level 2							
Level 2 (<3 Cert.)							
Level 1							
Level 1 (<2 Cert.)							
AECB operator							
Helper							



Other charges

		<u>Other charges</u>		
	Charged @ Cost		Charged @ Cost	
Subsistence:		Misc. supplies :		
O/T Meal allowance :		Sub contracts :		
Daily travel allowance:		Site purchased materials:		
Travel fares:		Small Tools and consumables will be charged (if applicable) at:		
Misc. premiums:				

Note: If the occupation & rates are in red italic, this indicates a rate override (see comment section below)

This series of rates was compiled on: 1/6/2010 8:38:31 AM by [REDACTED]



May 17, 2010

Email: [REDACTED]

Mr. [REDACTED]
Nova Scotia Power Co.
PO Box 190
Trenton, NS
BOK 1XO Canada

Subject: OST Services' (OSTS) Proposal No. 10-FS-116-1
Piping, Pipe Support and Restraint Inspection
Trenton Station - Unit No. 5

Mr. [REDACTED]:

We are pleased to outline our proposal to perform a piping, pipe support and restraint inspection at the Trenton Station.

Scope of Work

In general, all work would be performed in accordance with the attached technical specification, ASME B31.1 (Appendix V), and the NBIC code. The basic scope of work includes the following:

- Perform a hot inspection with the unit on line and with the piping systems at their operating temperatures.
- Perform a cold inspection during a planned outage (currently July 2010) and provide technical direction for repairs/adjustments, if desired.

Inspections would be directed at the piping, pipe supports, restraints and any applied snubbers utilized on the following systems:

- Main Steam
- Hot Reheat
- Cold Reheat
- Boiler Feed-Discharge from last stage heater to the economizer inlet.
- Cursory inspections will also be performed throughout the unit.

Pricing

To perform the work outlined above, we quote an estimated price of [REDACTED]

OCEAN STATE TECHNICAL SERVICES

55 Chapman Street ■ Providence, Rhode Island 02905 ■ (401) 467-8661 ■ Fax (401) 467-8662 ■ www.ostservices.com

Pages 47 to 56 have been removed due to confidentiality.

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

REDACTED

Generation Responses

Request IR-G16:

With respect to page 41, CI# 38724, TRE5 - Superheater, Reheater and Boiler Upgrades,

a) Please provide copies of correspondence, studies and reports that require this work be done in 2010.

b) Provide a breakdown of the estimated \$1,549,614 cost.

Response IR-G16:

a-b) Please refer to Confidential Attachment 1 and Confidential Attachment 2.

Confidential Attachment 1 provides a NSPI Inspection of the Trenton Unit 5 boiler blow down tank. Personnel names and power production cost estimates have been redacted from this document. Employees of NSPI are entitled to privacy protection, in the same way as employees in other companies and industry. Good human resource practices and privacy legislation requires NSPI to protect certain confidential personnel information and documentation from disclosure.

Power production contract and material cost estimates are redacted to mitigate the risk of prospective proponents having access to project budget information. All purchase orders and contracts for supply of materials and installation have not yet been issued or finalized.

The more a supplier is aware of NSPI's specific requirements, the better their ability to obtain the highest price, reduce competition and ultimately increase the cost for NSPI and its customers. The cost of such transparency is not always immediately evident. Information from regulatory proceedings can provide competitive advantages over other suppliers, and that could be advantageous in bidding or negotiation. Higher prices, or avoidable contractual

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

REDACTED

1 Response IR-G16: (cont'd)

2
3 constraints, will result in unnecessary higher costs to customers.

4
5 Confidential Attachment 2 provides NSPI's project cost estimate. For the reasons identified
6 above the estimated costs for materials and contracts are confidential.

Generation Services

Page 1 of 2

[REDACTED]

From: [REDACTED]
Sent: February 16, 2010 2:04 PM
To: [REDACTED]
Subject: 6_8_4 Boiler Blow Down Tank.doc

**Nova Scotia Power Inc.
Trenton Generating Station Unit No. 5 - 2006 Shutdown
Generation Services
Inspection Findings and Recommendations Report**

Project: TRE5 Assessment - Life Extension Work- 2015

Report by: [REDACTED] W.O. No.: 203816 Date: 2006-06-30
Rev.: 0

Item No. : 6 Sub-Item No. : 8-4 System No. Ref. : 363

Equipment:
Boiler Blow Down Tank

Executive Summary:

During the 2006 annual shutdown, the Boiler Blow Down Tank was inspected. It was found that the tank, was in relatively poor condition. For life extension, the recommendation is to do a complete replacement of the tank and the discharge line. The capital cost for this replacement would be [REDACTED].

Equipment History:

The existing Boiler Blow Down Tank is the original tank which was installed in 1969. The tank's stainless steel liner failed and was removed in 1982. The liner has not been replaced to this date. The tank has been repaired on several occasions due to cracking.

Scope of Inspection Results:

The tank was inspected from inside only. A complete visual inspection was done and UT was done on certain areas. There were 2 areas identified in the bottom head which had signs of erosion, UT readings were taken in these areas, the lowest reading was 0.805". Erosion was also noted on the bottom discharge line, UT readings were taken in these areas, the lowest reading was 0.204".

The following are reference documents:

A-50N5-9-130-50-001	Vertical Blowdown Tank
A-50N5-2-363-51-001	Flow Diagram -- Boiler Drains Vents & Blowdown
A-50N5-2-717-51-019	Blowdown Tank (may be condenser blowdown)
A-50N5-2-363-51-002	Argt of Boiler Blowdown Vent & Drain Piping
A-50N5-2-363-51-003	Argt of Boiler Blowdown Vent & Drain Piping
A-50N5-2-364-51-042	Plan Elevation & Detail of Blowdown Tank Header

16/02/2010

Generation Services

Page 2 of 2

- A-50N5-9-092-54-002 Vertical Blow Down Tank
- A-50N5-9-097-50-001 Boiler Blow Down Tank
- A-50N5 Boiler Blow Down Tank Discharge Piping
- Alstom Report -- Dated July 2005
- Alstom Report -- Dated June 2006

Recommendations:

Recommendation is to do complete replacement of tank and discharge line including new insulation and cladding

Capital Estimate:

Inspection budget estimate with supporting documentation if available.

- Contract Costs (Tank & Pipe Fabricator)
- Contract Costs (Tank & Pipe Installation)
- Material Costs (Insulation/Cladding)
- Contract Costs (Insulation Contractor)
- Engineering & Contract Admin.
- Others

Total Cost

Schedule:

Summary of Schedule Timings

- [REDACTED]
- [REDACTED]

TRENTON GENERATING STATION - PROJECT COST ESTIMATE (2010)							
FP# :	38724						
Title :	Tre5 Superheater, Reheater and Boiler Upgrades						
Item	Description	Acct	Actv	Unit	Quantity	Unit Price	Total
1	Supply of Materials						
1.1	Blowdown tank	012	013	Each	1		
1.2	Headers (4)	012	013	Lot	1		
1.3	Misc piping	012	013	Lot	1		
1.4	Consumables	012	013	Lot	1		
1.5	Boiler doors	012	013	Each	6		
1.6	Tubing Cold reheat	012	013	Each	11		
1.7	Shields / clips cold reheat	012	013	Each	77		
1.8	Tubing SSH out	012	013	Each	20		
1.9							
1.10	Platen alignment material	012	013	Lot	1		
1.11	Velocity screens	012	013	Each	1		
1.12	Ultrasonic leak detection	012	013	Each	2		
						Sub-Total	
2	Equipment Rental & Charges						
2.1	Scaffold	013	013	Lot	1		
2.2	Trailers	013	013	Each	3	\$ 2,000.00	\$ 6,000.00
2.3	Tooling	013	013	Lot	1	\$ 5,000.00	\$ 5,000.00
						Sub-Total	
3	Plant Labour						
3.1	Manwatch	004	013	Hour			\$ 33,600.00
3.2	Misc lab- materials handling	001	013	Hour			\$ 12,500.00
3.3	Ultrasonic leak detection	001	013	Hour			\$ 7,500.00
3.4	BD lines	001	013	Hour			\$ 23,000.00
3.5	Reheat line adjust	001	013	Hour			\$ 20,000.00
3.6	Boilermaker support	004	013	Hour			\$ 5,000.00
						Sub-Total	\$ 101,600.00
4	Contractor Labour						
4.1	Install Tank	013	013	Hour	960		
4.2	Tie in headers	013	013	Hour	180		
4.3	Inspection	013	013	Hour	3840		
4.4	Install boiler doors	013	013	Hour	240		
4.5	Cold reheat	013	013	Hour	960		
4.6	SSHoutlet	013	013	Hour	960		
4.7							
4.8	Platen alignment	013	013	Hour	1200		
4.9	Velocity screen	013	013	Hour	960		
5.0	Ultrasonic leak detection	013	013	Hour	100		
5.1	Reheat piping adjustment	013	013	Hour	480		
5.2							
5.3	Mob/Demob	013	013	Hour	160		
5.4	Scaffolding	013	013	Lot	1		
5.5							
						Sub-Total	
5	Engineering & Project Management						
5.1	OST- reheat piping adjustment	028	085	Lot	1	\$ 30,000.00	\$ 30,000.00
5.2	Contract supervision-external	028	087	Lot	1		
5.3	Engineering -internal	001	085	Lot	1	\$ 10,000.00	\$ 10,000.00
5.4	Engineering - external	028	085	Lot	1		
						Sub-Total	
6	Indirect Costs						
6.1	Interest Capitalized	094	N/A	Lot	1	\$ 378.10	\$ 378.10
6.2	Thermal Regular Labour AO	095	005	Lot	1	\$ 19,323.10	\$ 19,323.10
6.3	Thermal Term Labour AO	095	005	Lot	1	\$ 10,217.42	\$ 10,217.42
6.4	Thermal & Hydro Contracts AO	095	005	Lot	1	\$ 61,845.10	\$ 61,845.10
6.5							\$ -
6.6							\$ -
						Sub-Total	\$ 91,763.72
Project Cost Estimate						Total	\$ 1,549,613.00
7	Retirement Costs						
7.1							\$ -