Q. **Re 2011 Capital Plan - Individual Capital Projects:**

Project B-5, Upgrade Stack Breeching Unit 1: This project expenditure is estimated at over $3.5 million. The original stack breeching was replaced in 1990, with 20-year life, at a cost of $656,777 (reference: Volume I, Tab 2, page 8, section 3.2). Explain the factors resulting in this almost 6-fold cost inflation.

A. This proposal will be revised. Please refer to the attached.

Upgrade Unit 1 Stack Breeching

Holyrood Thermal Generating Station

The scope of work in the proposal now before the Board was based on the best information available at the time the application was filed. Since then further investigations have provided new information which does not support earlier assessments of the condition of the breeching steel casing, upon which the scope of work was based.

The steel casing is the large conduit that contains the hot flue gas as it travels from the boiler to the exhaust stack and is the core component of the breeching system. If it has to be replaced then the whole system has to be replaced. The proposed replacement of the breeching was based primarily on the condition of the steel casing observed upon visual inspection. Internal and external inspection identified a number of holes in the casing caused by internal corrosion and in recent years a number of steel plates had been installed to patch other holes. In addition, the steel casing expansion joints and the structural steel frame supporting the breeching up above the ground were both observed to have experienced severe corrosion to the extent that it was clear they needed to be replaced. Based on these visual assessments it was assumed that most steel plates in the casing had thinned to the extent that the casing was in very poor condition and also needed to be replaced.

Hydro engaged a testing contractor to perform non-destructive testing on the steel casing to obtain thickness readings on a close grid over its full area to validate its assumption. However, Hydro was unable to complete that work until after the Application was submitted to the Board. The report was received on September 10th, 2010 (see attachment). It indicates that the casing is generally in good condition with a recommendation to patch certain areas where there are holes and plate thinning is excessive, but the expansion joints are reported to be in poor condition and it is recommended that they be replaced.

In light of this new information Hydro now intends to revise the scope of work for the stack breeching upgrade project such that it will change from a complete replacement of the existing system to a refurbishment of the existing system with the intention of extending its service life to the year 2020. It is anticipated that the budget requirement to complete a refurbishment scope of work will be significantly less than that to replace the breeching.

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NF HYDRO

UNIT #1 AIRHEATER TO STACK DUCTING

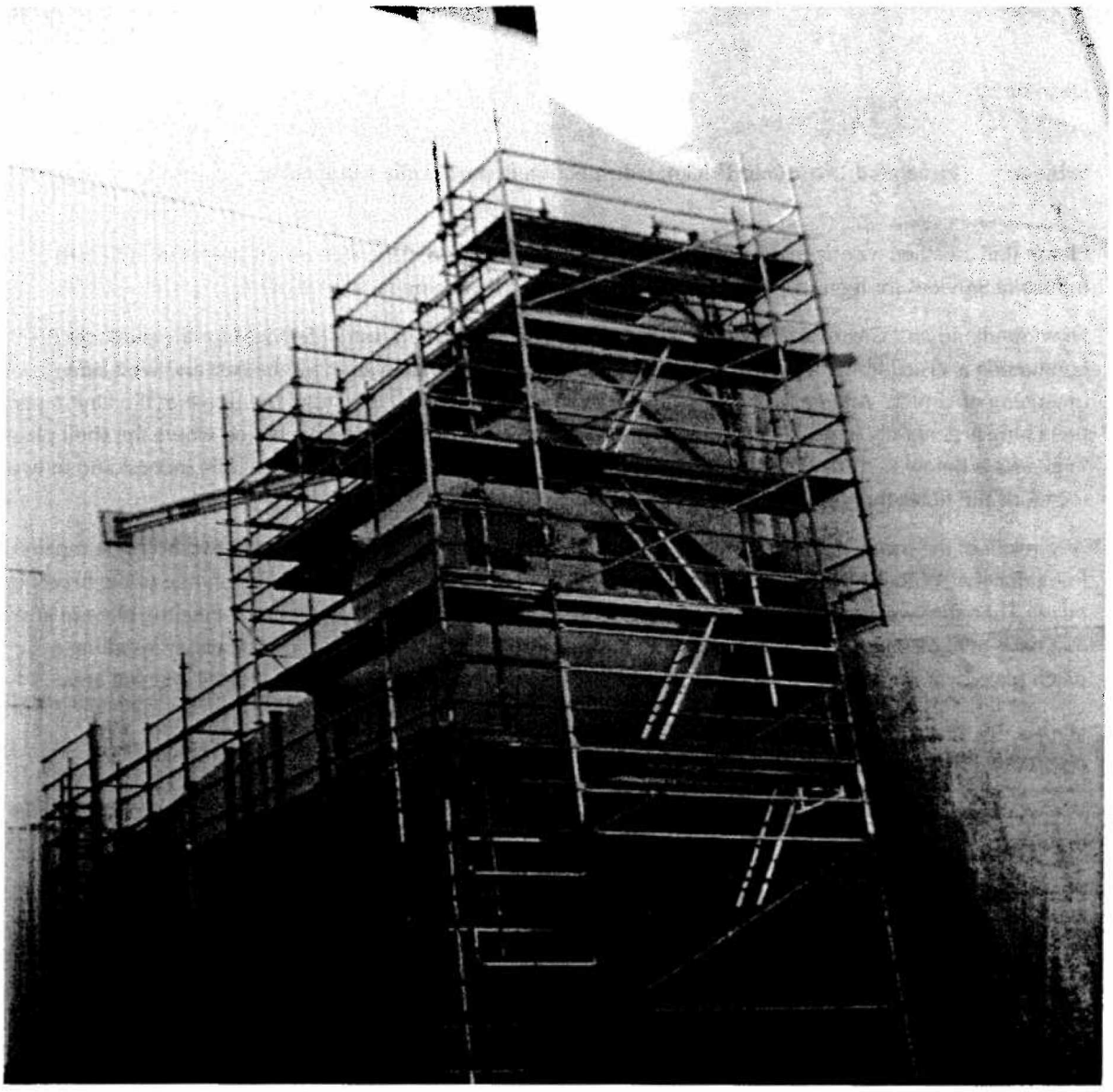

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TABLE OF CONTENTS

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1.1 Description

Unit # 1 Airheater to Stack Ducting. East and West Breeching.

1.2 Introduction

As request by Mr. Derek French of Hatch, Team Industrial conducted an Visual and Ultrasonic Thickness inspection of the east and west breeching on Unit #1 . The external inspection was conducted on all accessible areas that were identified by Mr. John Adams of Alstom.

1.3 Access

External access was by means of fixed scaffolding.

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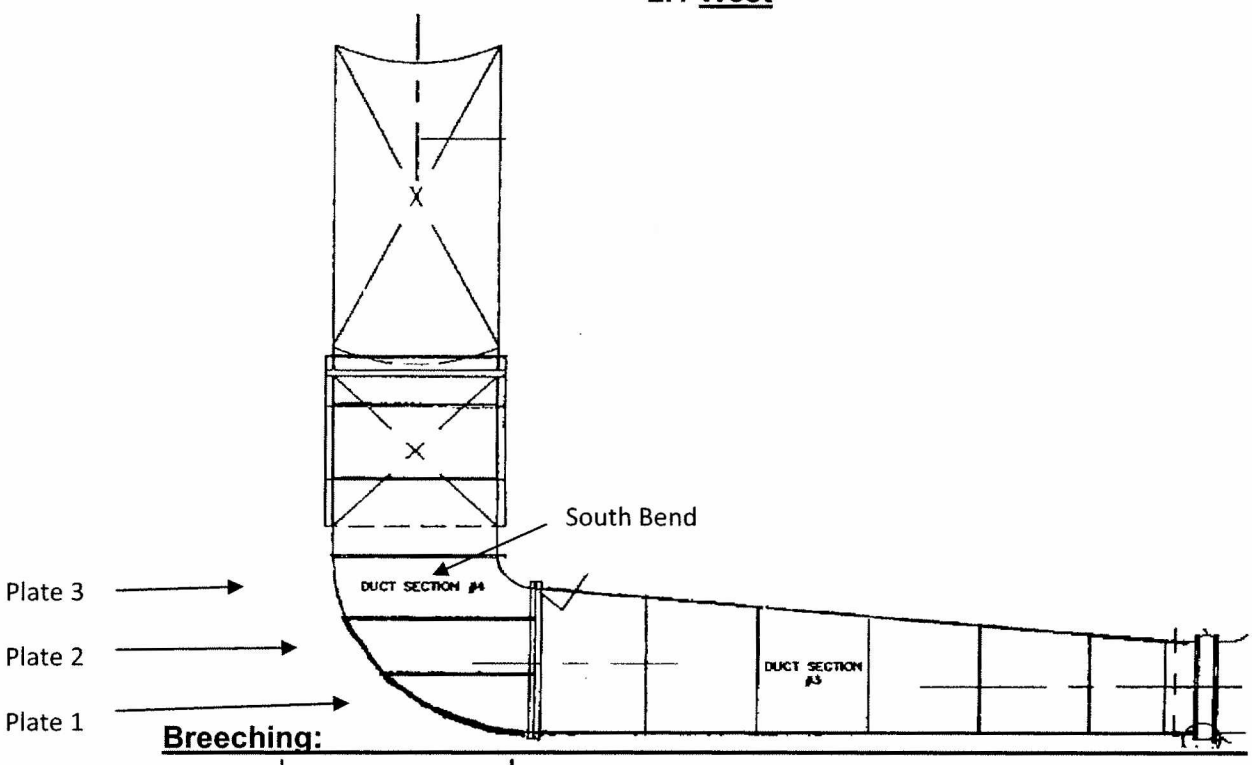
2.0 Inspection

2.1 West



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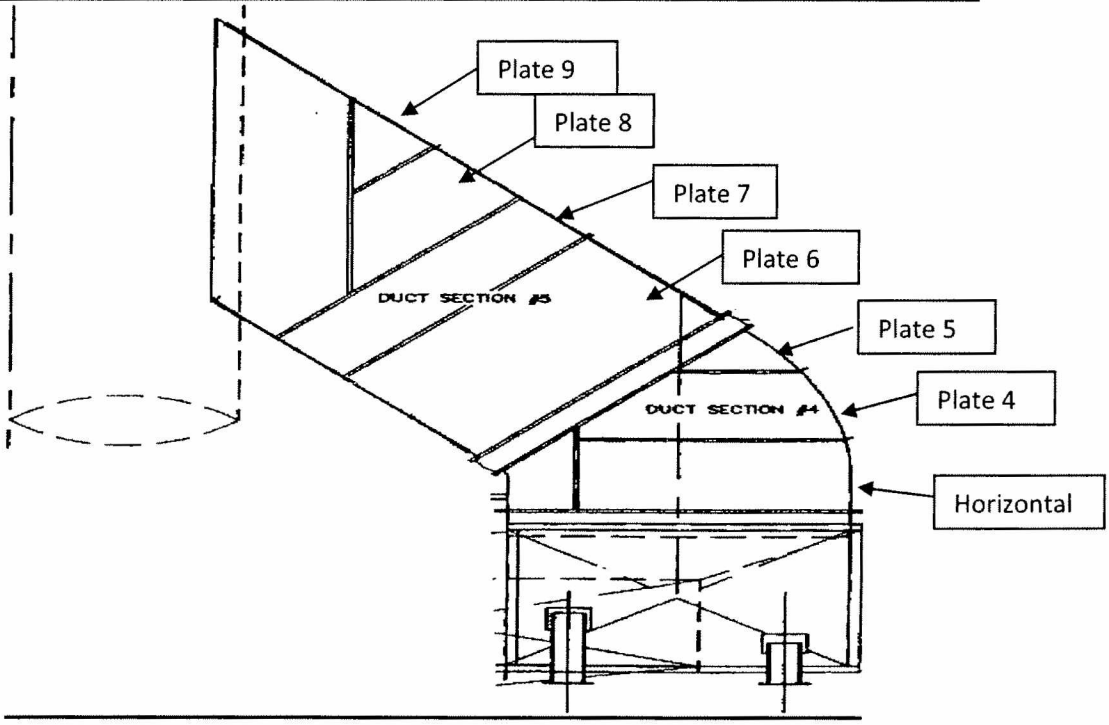

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UNIT #1 WEST AIRHEATER TO STACK DUCTING

SECTION # 3 EAST

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
T	.254	.253	.253	.251	.212	.254	.254	.249	.250	.250	.251	.269	.269	.262
B	.252	.253	.245	.253	.253	.248	.253	.240	.231	.250	.249	.268	.268	.269
M	.243	.250	.254	.249	.246	.250	.245	.250	.239	.252	.238	.269	.263	.264

SECTION #3 WEST

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
T	.253	.254	.251	.252	.252	.254	.253	.254	.250	.244	.251	.269	.269	.268
B	.253	.254	.239	.254	.250	.253	.254	.249	.252	N/A	N/A	N/A	N/A	N/A
M	.249	.233	.249	.247	.251	.252	.253	.251	.251	N/A	N/A	N/A	N/A	N/A

SECTION #3 TOP

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	.246	.248	.249	.245	.248	.248	.248	.248	.246	.247	.245	.261	.266	.258
B	.247	.248	.247	.248	.248	.248	.249	.248	.247	.249	.236	.262	.251	.245
C	.248	.248	.247	.248	.246	.249	.247	.247	.232	.248	.230	.262	.269	.268
D	.246	.245	.247	.247	.248	.246	.248	.249	.230	.247	.248	.262	.236	.248
E	.246	.247	.246	.246	.247	.243	.245	.219	.246	.248	.246	.264	.244	.218

SECTION # 3 BOTTOM

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	.247	.246	.246	.245	.242	.246	.244	.244	.244	.245	.248	.266	.266	.257
B	.244	.247	.244	.246	.246	.245	.243	.244	.243	.243	.246	.266	.267	.261
C	.240	.248	.248	.246	.237	.246	.246	.246	.245	.245	.243	.261	.266	.260
D	.249	.244	.249	.240	.247	.248	.249	.240	.246	.246	.246	.261	.261	.257
E	.247	.246	.247	.246	.242	.249	.248	.237	.242	.238	.243	.266	.260	.258

- Location #1 starts I ft. from plant, remainder @ 2 ft. intervals.
- Top & Bottom locations only, A is on the west.
- All reading recorded in inches.
- L is the location

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SECTION # 4 (WEST)

Working South to North

Plate #1

Location	A	B	C	D
1	.249	.252	.253	N/A
2	.248	.250	.250	.252

Plate #2

Location	A	B	C	D
1	.246	.253	.251	.252
2	.250	.250	.251	.250

Plate #3

Location	A	B	C	D	E
1	.249	.253	.249	.253	.246
2	.249	.251	.250	.248	.248
3	N/A	.253	.254	.253	.247

Horizontal

Location	A	B	C	D
1	.249	.255	.251	.247
2	.250	.249	.250	.240
3	.254	.250	.249	.251

Plate #4

Location	A	B	C	D
1	.250	.250	.250	.231
2	.252	.255	.255	.250
3	.253	.256	.257	.251

Plate #5

Location	A	B	C	D
1	.248	.248	.251	.256
2	.228	.229	.251	.250

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SECTION # 4 (EAST)

Working South to North

Plate #1

Location	A	B	C	D
1	.251	.251	.250	N/A
2	N/A	N/A	N/A	.250

Plate #2

Location	A	B	C	D
1	.247	.253	.248	.250
2	.248	.251	.252	.249

Plate #3

Location	A	B	C	D	E
1	.249	.250	.253	.253	.251
2	.250	.254	.253	.251	.249
3	N/A	.255	.254	.246	.251

Horizontal

Location	A	B	C	D
1	.249	.250	.250	.249
2	.229	**.172**	**.197**	**.190**

Plate #4

N/A

Plate #5

N/A

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 4 (NORTH)

Working East to West

Plate # 1

Location	A	B	C	D
1	.250	.251	.250	.251
2	.250	.248	.249	.250
3	.251	.250	.249	.251
4	.252	.258	.248	.249

Plate # 2

Location	A	B	C	D
1	.252	.253	.258	.258
2	.254	.244	.226	.258
3	.252	.230	.203	.195

Plate # 3

Location	A	B	C	D
1	.209	.227	.228	**.191**
2	.234	.249	.227	.219
3	.227	.234	.235	.208

Horizontal

Location	A	B	C	D
1	.228	.231	.250	.244
2	**.199**	.253	.254	.250
3	.204	.251	.250	.251

Plate # 4

Location	A	B	C	D
1	.249	.251	.252	.250
2	.255	.253	.250	.251

Plate # 5

Location	A	B
1	.220	.249

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SECTION # 4 (SOUTH)

Working East to West

South Bend

Location	A	B	C	D
1	.245	.250	.252	.253

Horizontal

Location	A	B	C	D
1	.251	.240	.249	.250
2	.246	.250	.250	.249
3	.241	.249	.247	.250

Plate # 4

Location	A	B	C	D
1	.209	.250	.251	.254
2	.220	.254	.254	.253

Plate # 5

Location	A	B
1	.230	.250

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SECTION # 5 (NORTH)

Working East to West

Plate # 6

Location	A	B	C	D
1	.240	.237	.249	.248
2	.249	.249	.254	.251
3	.248	.248	.251	.247

Plate # 7

Location	A	B	C	D
1	.250	.250	.251	.249
2	.252	.249	.248	.248
3	.252	.251	.250	.250

Plate # 8

Location	A	B	C
1	.251	.251	.249
2	.251	.250	.248
3	.247	.245	.241

Plate # 9

Location	A	B
1	.249	.251
2	.249	.252

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SECTION # 5 (SOUTH)

Working West to East

Plate # 6

Location	A	B	C	D
1	.245	.248	.241	.247
2	.250	.246	.250	.250
3	.250	.246	.250	.250

Plate # 7

Location	A	B	C	D
1	.247	.250	.247	.247
2	.246	.246	.245	.245
3	.247	.246	.247	.246

Plate # 8

Location	A	B	C
1	.250	.250	.245
2	.250	.249	.249
3	.251	.246	.251

Plate # 9

Location	A	B
1	.247	.251
2	.240	.251

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 5 (WEST)

Working North to South

Plate # 6

Location	A	B	C	D
1	.252	.235	.250	.210
2	.250	.250	.248	.235
3	.251	.250	.255	.255

Plate # 7

Location	A	B	C	D
1	.234	.255	.250	.252
2	.252	.244	.244	.250
3	.252	.250	.253	.244

Plate # 8

Location	A	B	C	D
1	.210	.230	.229	.241
2	.215	.229	.240	.248

Plate # 9

Location	A	B	C	D
1	.250	.248	.250	.246
2	.251	.247	.251	.250

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 5 (EAST)

Working North to South

Plate # 6

Location	A	B	C	D
1	.251	N/A	N/A	.239

- Location #1 located at bottom.

TEAM® Industrial Services
TISI Canada Inc.

2.1 East Breeching

UNIT #1 EAST AIRHEATER TO STACK DUCTING

SECTION # 3 EAST

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
T	.250	.252	.246	.249	.246	.250	.247	.253	.251	.249	.247	.246	.218	.229
B	.249	.251	.239	.250	.249	.252	.249	.251	.249	.242	.239	.236	.242	.239
M	.249	.249	.250	.245	.250	.236	.249	.248	.246	.246	.233	.244	.229	.240

SECTION # 3 WEST

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
T	.249	.259	.258	.259	.257	.247	.255	.258	.257	.249	.255	.227	.239	.239
B	.249	.255	.257	.258	.257	.256	.255	.257	.259	.255	.255	**.181**	.219	**.194**
M	.246	.251	.249	.258	.253	.252	.257	.255	.255	.252	.257	.214	**.199**	.240

SECTION #3 TOP

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	.249	.251	.250	.249	.247	.252	.248	.249	.249	.243	.249	.202	.221	**.198**
B	.250	.250	.250	.249	.252	.250	.244	.246	.249	**.191**	.249	.214	**.172**	.226
C	.249	.249	.209	.249	.256	.256	.259	.254	.251	.248	.235	.225	.210	**.199**
D	.247	.241	.251	.254	.252	.244	.256	.249	.255	.251	.234	**.197**	.223	**.196**
E	.242	.246	.248	.244	.236	.235								

SECTION #3 BOTTOM

L	1	2	3	4	5	6	7	8	9	10	11	12	13	14
A	.252	.232	.249	.256	.262	.262	.259	.251	.258	.255	.251	.249	.247	.247
B	.251	.250	.248	.252	.260	.260	.258	.258	.259	.254	.254	**.190**	**.192**	.210
C	.246	.247	.246	.247	.259	.260	.241	.247	.252	.250	.251	**.175**	**.170**	**.171**
D	.250	.235	.248	.251	.260	.261	.259	.240	.250	.253	.253	.248	.249	.221
E	.247	.249	.248	.251	.261	.260								

- Location #1 starts I ft. from plant, remainder @ 2 ft. intervals.
- Top & Bottom locations only, A is on the west.
- All reading recorded in inches.
- L is the location

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 4 (EAST)

Working South to North

Plate #1

Location	A	B	C	D
1	.252	.250	.246	N/A
2	.243	.249	.253	.255

Plate #2

Location	A	B	C	D
1	.253	.253	.248	N/A
2	.253	.251	.252	.242

Plate #3

Location	A	B	C	D	E
1	.229	.249	.249	.249	.227
2	.251	.255	.253	.253	.249
3	N/A	.254	.254	.251	.244

Horizontal

Location	A	B	C	D
1	.255	.255	.253	.252
2	.248	.250	.253	.249
3	.252	.253	.249	.239

Plate #4

Location	A	B	C	D
1	**.198**	.255	.255	**Hole**
2	.251	.244	.253	.239
3	**.199**	.254	.253	.225

Plate #5

Location	A	B	C	D
1	.254	**.199**	**.199**	.219
2	.248	.209	.229	.218

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 4 (WEST)

Working South to North

Plate #1

Location	A	B	C	D
1	**.198**	.252	.255	N/A
2	.238	.251	.250	.250

Plate #2

Location	A	B	C	D
1	.252	.253	.253	N/A
2	.253	.255	.255	.251

Plate #3

Location	A	B	C	D	E
1	.208	.217	.252	.253	.248
2	.228	.250	.250	.254	.237
3	N/A	.230	.253	.245	.252

Horizontal

Location	A	B	C	D
1	**.199**	N/A	N/A	.250
2	.201	N/A	N/A	.251

Plate #4

N/A

Plate #5

N/A

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 4 (NORTH)

Working East to West

Plate # 1

Location	A	B	C	D
1	.217	.255	.251	.255
2	**.195**	.246	.250	.255
3	.206	.253	.254	.250
4	**.181**	.252	.252	.248

Plate # 2

Location	A	B	C	D
1	.229	.249	.249	.249
2	.251	.255	.253	.253
3	N/A	.254	.254	.251

Plate # 3

Location	A	B	C	D
1	.254	.253	.249	.244
2	.250	.249	.244	.209
3	.244	.244	.249	.217

Horizontal

Location	A	B	C	D
1	.250	.248	.246	.248
2	**.165**	**.177**	**.171**	**.198**
3	.249	.246	**.198**	.239

Plate # 4

Location	A	B	C	D
1	.250	.253	.254	.241
2	.254	.243	**.162**	**.189**

Plate # 5

Location	A	B
1	**.199**	**.197**

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 4 (SOUTH)

Working East to West

South Bend

Location	A	B	C	D
1	.252	.250	.253	.249

Horizontal

Location	A	B	C	D
1	.253	.253	.252	.252
2	**.160**	.232	.232	.249
3	**.149**	.226	.254	.236

Plate # 4

Location	A	B	C	D
1	.254	.255	.253	.223
2	.255	.250	.228	**.199**

Plate # 5

Location	A	B
1	**.196**	.210

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 5 (NORTH)

Working East to West

Plate # 6

Location	A	B	C	D
1	.248	.251	.250	.250
2	.250	.235	.253	.251
3	.251	.240	.254	.250

Plate # 7

Location	A	B	C	D
1	.239	.250	.254	.249
2	.210	.255	.254	.250
3	.222	.223	.254	.252

Plate # 8

Location	A	B	C
1	.250	.227	.250
2	.221	.240	.240
3	.240	.244	.252

Plate # 9

Location	A	B
1	**.196**	**.174**
2	**.199**	**.194**

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 5 (SOUTH)

Working East to West

Plate # 6

Location	A	B	C	D
1	.249	.253	.220	.249
2	.245	.251	.249	.250
3	.251	.250	.250	.253

Plate # 7

Location	A	B	C	D
1	.250	.252	.250	.250
2	.251	.251	.250	.250
3	.250	.255	.254	.251

Plate # 8

Location	A	B	C
1	.250	.221	.253
2	.251	.248	.245
3	**.195**	.253	.250

Plate # 9

Location	A	B
1	.239	**.199**
2	.231	.240

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 5 (EAST)

Working South to North

Plate # 6

Location	A	B	C	D
1	**.189**	.216	.207	.246
2	.250	.249	**.194**	.241
3	.249	.245	.241	**.176**

Plate # 7

Location	A	B	C	D
1	.244	.237	.250	.248
2	.250	.250	.249	.250
3	.251	.248	.241	**.198**

Plate #8

Location	A	B	C	D
1	.250	.253	.240	.236
2	.253	.239	.236	.242

Plate # 9

Location	A	B	C	D
1	.230	**.183**	**.179**	.218
2	.231	.218	.213	.221

TEAM® Industrial Services
TISI Canada Inc.

SECTION # 5 (WEST)

Working North to South

Plate # 6

	A	B	C	D
1	.249	N/A	N/A	.235

- Location #1 located at bottom.

TEAM® Industrial Services
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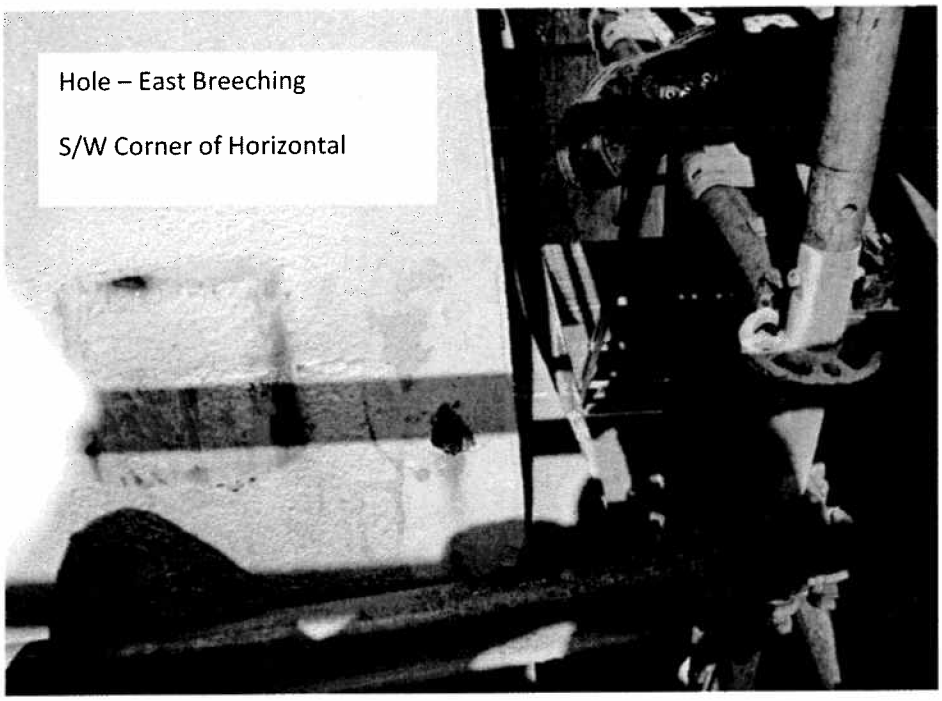
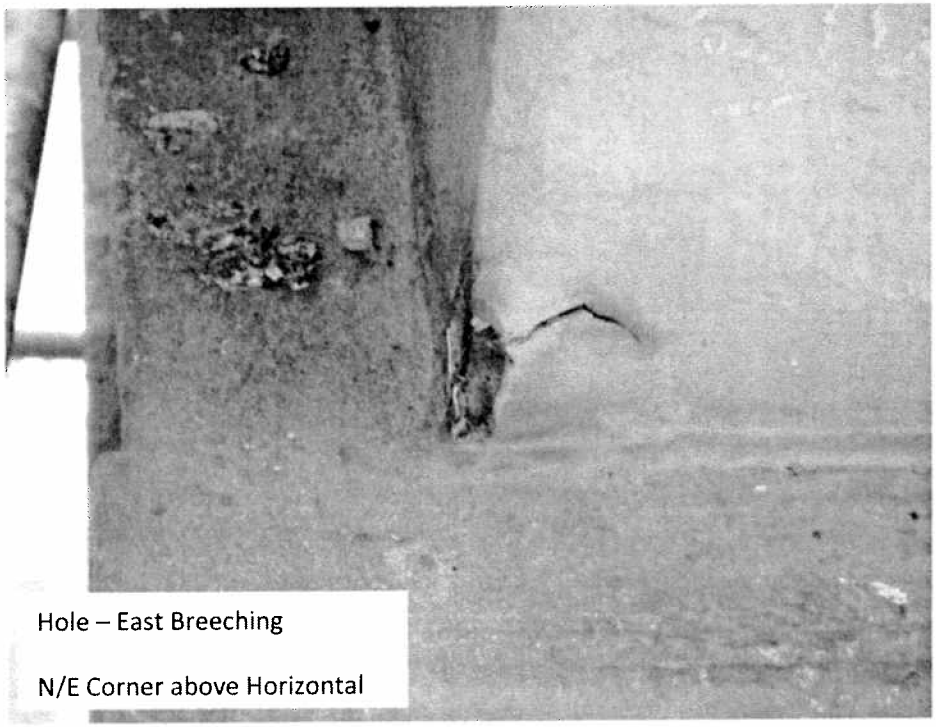
3.0 Photographs:



Hole – East Breeching

S/W Corner of Horizontal



Hole – East Breeching

N/E Corner above Horizontal

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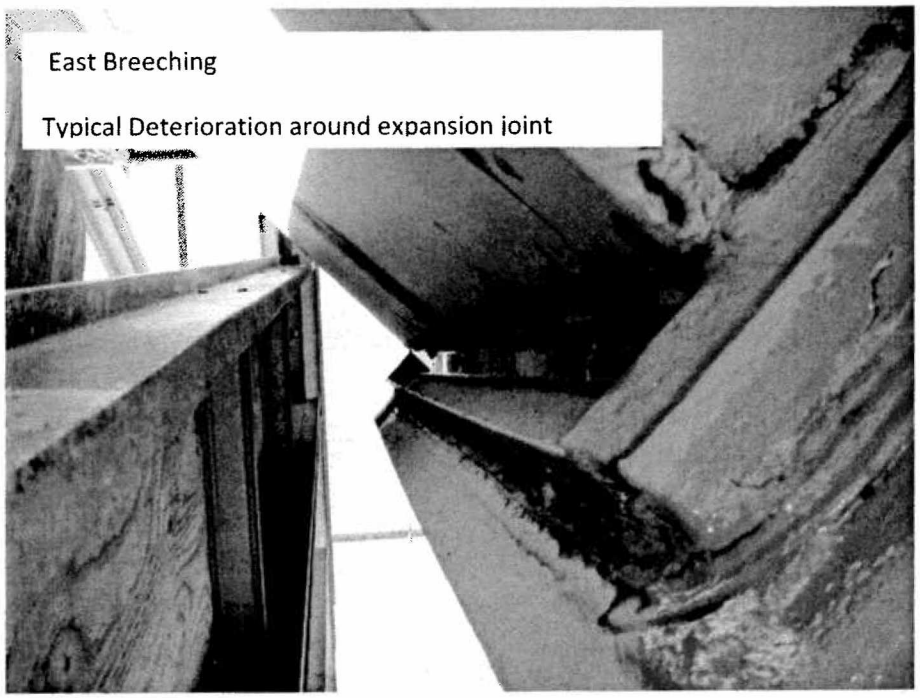
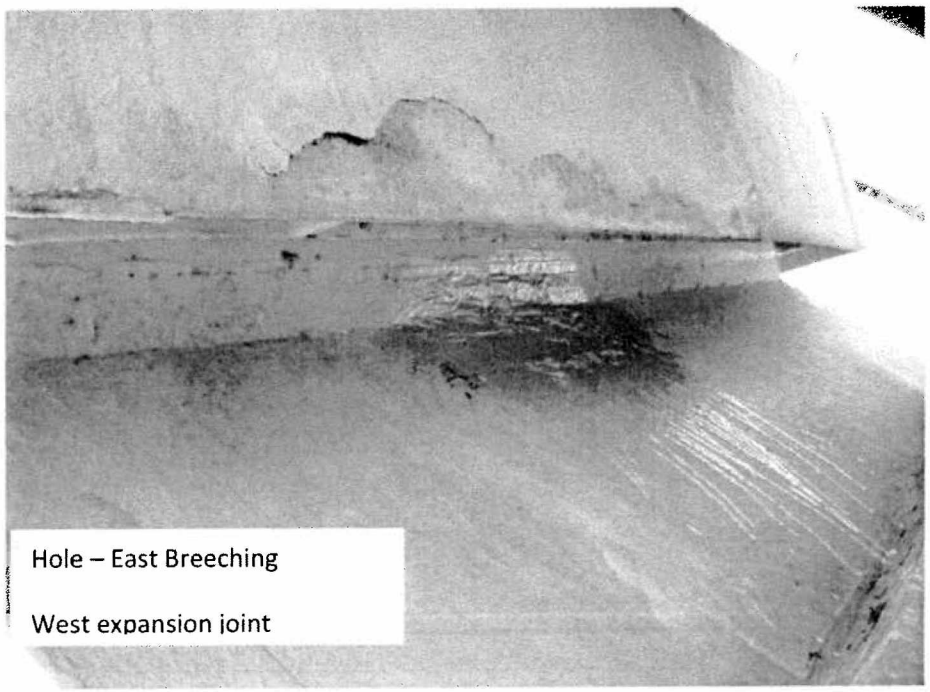


East Breeching

Typical Deterioration around expansion joint



Hole – East Breeching

West expansion joint

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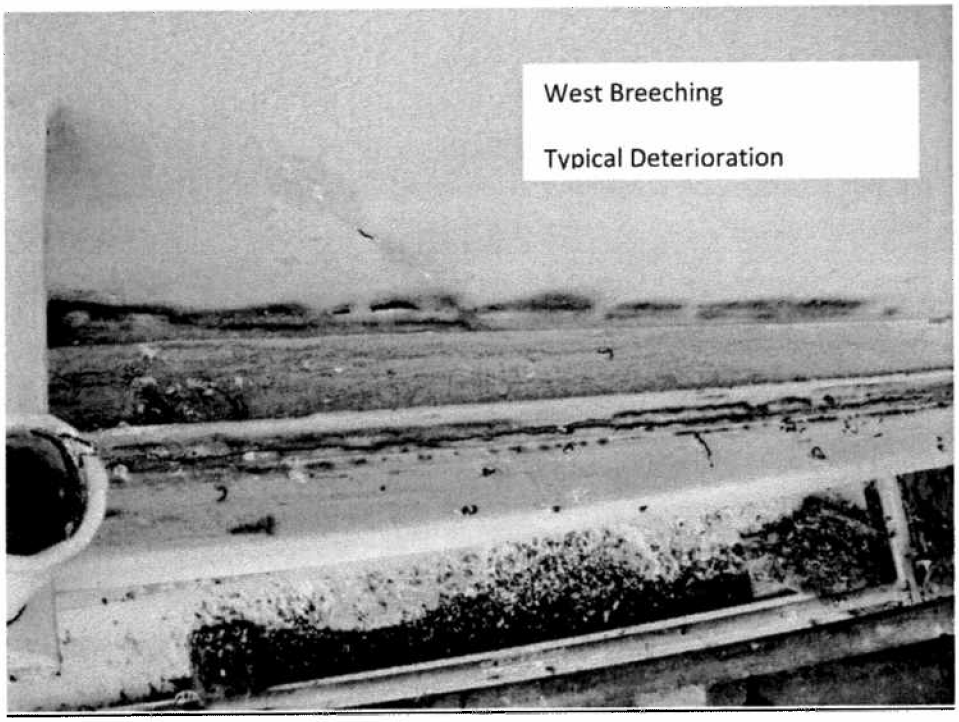

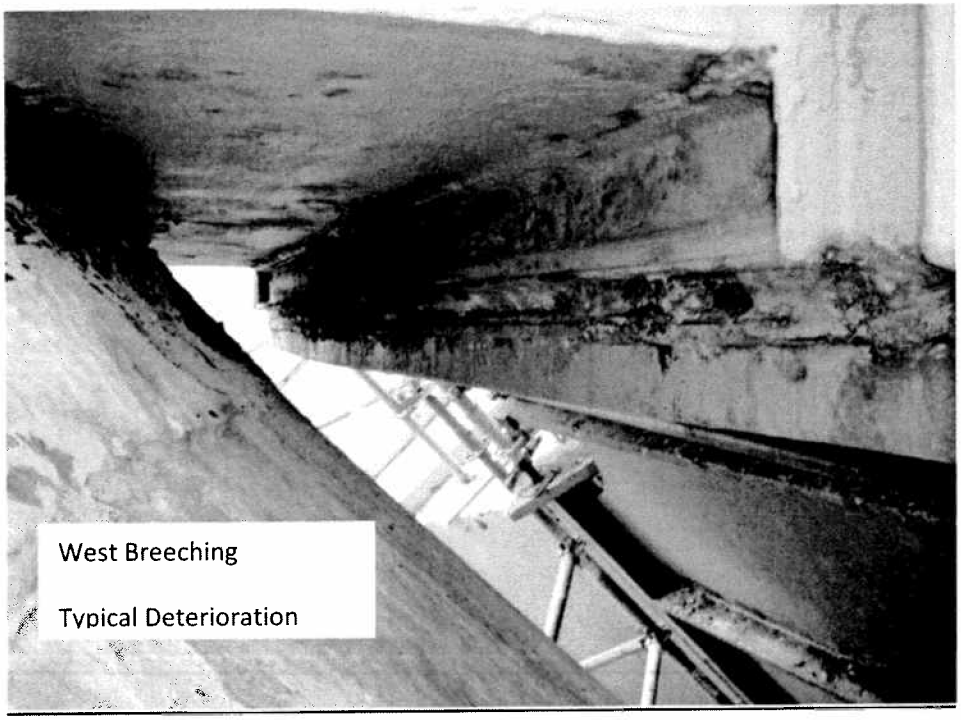

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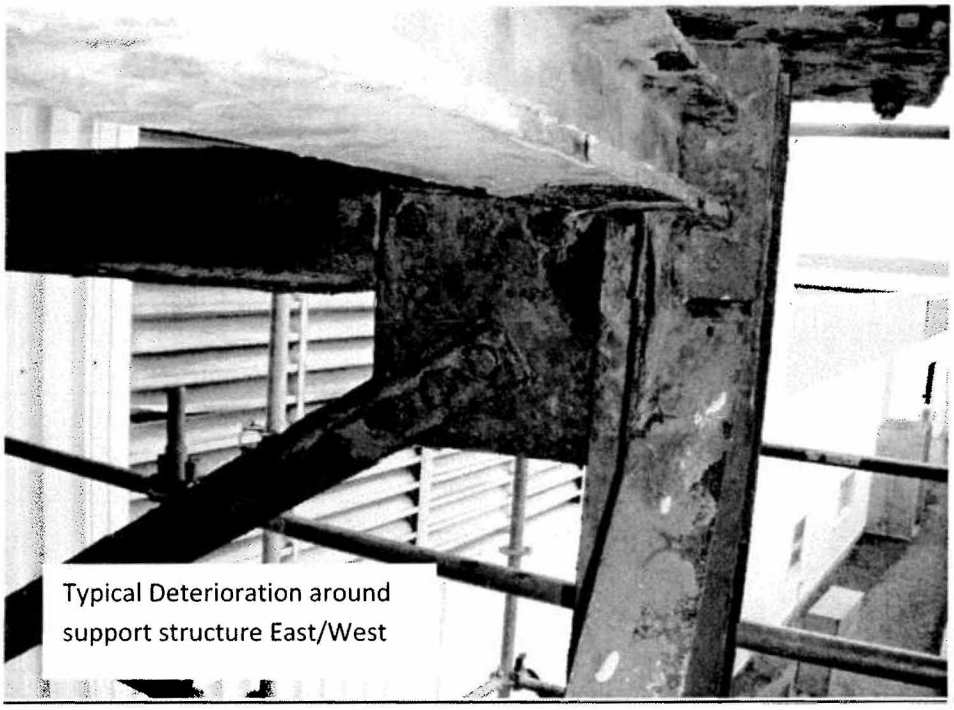
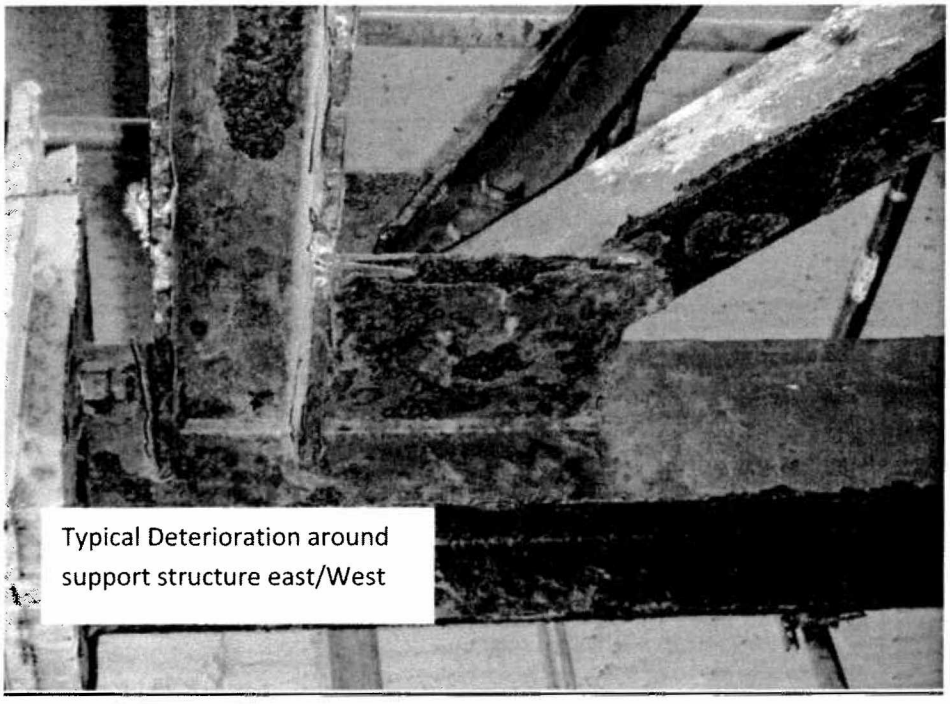


Typical Deterioration around support structure East/West



Typical Deterioration around support structure east/West

TEAM®

ULTRASONIC EXAMINATION REPORT

ISO 9001:2008

Branch Office: 41 Sagona Ave, Mt. Pearl, NFLD. A1N 4P9 Telephone: 709-745-1818 * Fax 709-745-5401

Job Number: 52080638	Client Specifications: QA/QC
Client Name: Hatch	Acceptance: Client info
Date/Time Of Examination: August 24-31, 2010	Procedure: UT– GP– 01 REV 1
Work Location: Holyrood, NL	Technique: ASME V
	P.O. Number: Verbal

Type of Fabrication: **Weld** **Casting** **Forging** **Plate x** **Other**

Part/Assy No.:	Dwg No.:	Heat No.:	Pattern No.:
N/A	N/A	N/A	N/A

Scope: This report covers the ultrasonic thickness measurements and visual inspection of Unit # 1 Airheater to Stack Ducting located at NF Hydro, Holyrood, NL.

Results: See the attached sheets for ultrasonic thickness measurements, photographs and results.

All readings are recorded in inches and the drawings are not to scale.
Only accessible areas were inspected.

Total Parts Inspected	Total Parts Accepted	Total Parts Rejected
N/A	N/A	N/A

Scan: 0 deg.

Surface Finish: Painted

ULTRASONIC EQUIPMENT				TRANSDUCER			
Make	**Model**	**S/N**	**Cal. Date**	**Angle**	**Size**	**Frequency**	**S/N**
Panametrics	37DLPlus	071524109	Aug 24,2010	0	.434	5MHz	600648

Calibration Block: 0.100"-0.500" **Serial No.:** 06-6438

Couplant: Exosen 30 **Batch No.:** 11006303

Print Name / Signature			
TEAM TECHNICIAN: Cyril Pretty	**Certification: 4353**	ACCP Level II	☐
	CGSB 48.9712 Level 1	X SNT-TC-1A Level II	X

Print Name	Signature	Date
CLIENT REPRESENTATIVE FINAL ACCEPTANCE: N/A		

TEAM® Industrial Services
TISI Canada Inc.

5.0 Summary

The ultrasonic thickness survey was completed on all accessible areas of both the east and west breeching. Several thickness measurements were taken at each location with the lowest recorded. There are isolated areas that have wall loss less than .200 inches. It appears that the nominal wall thickness was .250 inches. The overall paint condition is fair to good with deterioration noted around the stiffeners. All observed holes were covered with Devon and painted. There is a lot of deterioration around both expansion joints.