SHAMS POWER COMPANY

ENGINEERING DIVISION

INSPECTION & CORROSION SECTION

SHAMS 1

LOCATION : R1LBA01BC001

KKS : R1LBA01BC001

GRADE & CLASSIFICATION : 2

CERTIFICATE OF INSPECTION

The equipment detailed below was examined in accordance with the SHAMS code of practice for plant inspection,

ITEM : Booster heater-2 **LOCATION : SHAMS Plant**

TYPE OF INSPECTION : Major **DATE OF INSPECTION : March, 2020**

PLACE OF INSPECTION : IN-SITU **DATE OF LAST INSPECTION : January, 2019**

REPORT :

1.0. SUMMARY

The above booster heater was taken off line, isolated, opened, vented & cleaned for major external & internal inspections and prepared with the required scaffolding.

2.0. SUBJECT

2.1. This is a vertical, cylindrical heater.

Size	Stack Height 13.6
Tube material	P91
Tube supports material	Top : A351 HK40 X End: SA-516 Gr 70
Tube size	Outer diameter 114mm Sch80 corrosion allowance 1.5mm
Number of tubes	104 vertical tubes
Design pressure	Convection: 110 bar X radiant: 110 bar
Design temperature of cleaned tube	Radiant: 601c X convection: 526c for steam
Insulation	Cast-able refractory

.....

The above equipment is/ ~~is not~~ considered suitable for further service under the present operating conditions

NEXT MAJOR INSPECTION DUE : March 2024 **INSPECTED: Osman Ismail**

ENDORSEMENT: 48 MONTHS

REVIEWED: Ali Al Masabai

3.0 HISTORY

This heater was commissioned in 2013. Some periodical inspection pictures and reports since Dec.'2014 are available.

4.0. SCOPE OF INSPECTION

4.1. Visual Inspection of internal and external.
4.2 Replica test
4.3 Ultrasonic thickness survey

5.0. CONDITIONS FOUND

5.1. External:

5.1.1 All painting especially around burners found intact without any evidence of peel off, blistering or overheating, apart from minor color change (blue to white) at very few locations around burner due to very minor flue gas leakage or heat transfer by bracket support impeded in refractory.
5.1.2 All burners connected piping and houses found satisfactory without evidence of any damages.
5.1.3 All ladders, stairways and handrails found in satisfactory condition.
5.1.4 All concrete support found in satisfactory condition without evidence of cracking or spalling.
5.1.5 Manhole found in satisfactory condition without evidence of flue gas leaking or burning, apart from some peep holes found not opening properly.
5.1.6 All external piping insulation found in satisfactory condition.
5.1.7 All earthing lugs found in satisfactory condition.

5.2. Internal:

5.2.1. All external surfaces of all radiation and convection tubes found in satisfactory conditions without evidence of creep, bowing, sagging and overheating.
5.2.2 All piping supports and hungers found satisfactory conditions without evidence of damage or broken.
5.2.3 All insulation (fibers and anchors) found in satisfactory conditions in radiation and convection zones.
5.2.5 All floor bricks found in satisfactory condition apart from minor separation between floor bricks. All separations were filled by refractory cement.
5.2.6 Burners found in satisfactory condition without evidence of back fire.
5.2.7 Refractory around burners found in satisfactory condition without evidence of cracking or spalling.
5.2.8 Fallen down small parts of refectory material found scattered on floor.

(See below attached photos)

5.4 Nondestructive tests

5.4.1 Ultrasonic thickness survey

It was carried out on all tubes at different locations. All reading found satisfactory without evidence of thickness reduction.

5.5 Replica test

It was carried out on 6 on the hottest locations of the tubes. All found satisfactory without any creep voids or metallurgical changes to the original tempered martensitic structure.

6.0. Recommendations

6.1 All deposited material on burner opening should be cleaned.

6.2 Peep holes should be clean and maintain to open smoothly to allow operators clearly check flame condition.

6.3 Heater to be inspected after 4 years as per SHAMS Code of Practice.

7.0. Inspection grade and Interval

In accordance with the latest revision of SHAMS Code of Practice, this booster heater-2 was endorsed for 48 months for next Major Inspection.

FREQUENCY : 48 MONTHS.
ENDORSEMENT : 48 MONTHS,
Next Major Insp. due : March 2024

8.0 Booster Heater Pilot Burner Modification

8.1 Overview

During Outage 2020, pilot burner of BHs was replaced by new higher capacity continuously running pilot burner in order to run BH with lower steam flow requirement. This will help to evaporate the condensate inside U type steam tubes of BHs without much reduction in temperature of BHs' downstream header. Ultimately, it will save gas consumption in HTF-Hs which will be used in BH to generate electricity more efficiently.

The old burner system includes an intermittent igniter. This igniter is brought into service following a purge cycle and is used to ignite main burner operation. Following main burner ignition, the igniter is removed from service.

To accommodate the above mentioned requirement for low heat input stand-by service, a new larger igniter was retrofitted. It will be light off prior to main burner start. Logic in BH PLC were implemented to avoid the pilot burner operation continuously during main burner firing.

8.2 Logic Modifications

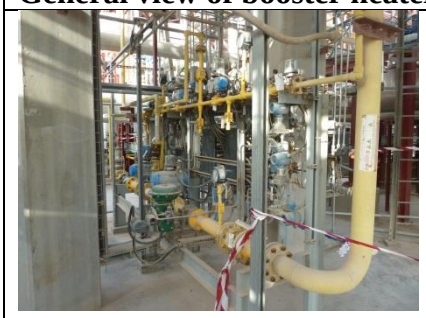
During the light-off sequence, rather than an automatic transfer from igniter operation to main burner operation, when the igniter is brought into service the BMS system will hold this condition giving indication of HOT STANDBY MODE. Air control devices should be held in minimum light-off positions.

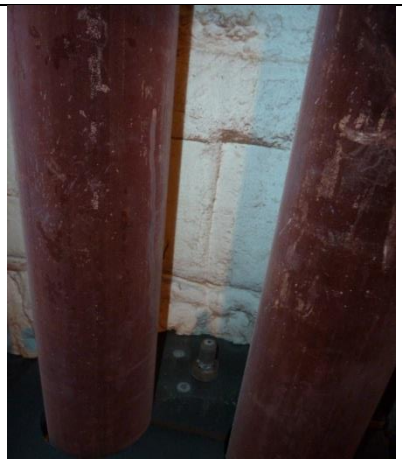
Following a 10 second delay, an option should be provided to site operators to TRANSFER TO MAIN BURNER. This option would continue the already programmed transition sequence to main burner operation. After this transition, the system will release to modulate per current logic.

A flame scanner signal must be maintained during all modes or otherwise the system should initiate a trip.

No automated adjustment of igniter heat input is included in the system. Rather, adjustment of igniter heat input will require mechanical adjustment of the igniter regulator spring setting.

PHOTO

	
General view of booster heater -2	**Air preaheter**
	
Burner connected piping	**Earting lug**
	
Concrete support	**Ladder, stairways and handrail**

	
Burner blades	**Bricks around burner**
	
Fallen down refractory	**Close up view of tube and tube support at radiation zonre**
	
Many way cover	**Wall insulation in radiation zone**

	
General view of tubes at radiation and convection zones	**General view of tubes at radiation zone**

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Form No.: IN-OPF-04 Rev. 13E Dtd. 20-03-2019

LIQUID PENETRANT EXAMINATION REPORT

Report No.:	AD / 53579	Date:	13.03.2020	Page:	1	Of	1
Client :	SHAMS POWER COMPANY	Job No. :					
Location :	MADINAT ZAYED	Item :	BOOSTER HEATER - 2				
Material :	INCONEL	Ref / Procedure No. :	INS/ASME/PT/001				
Thickness :	VARIOUS	Revision :	22				
Surface condition :	AS WELDED & CLEANED	Test Temp. :	AMBIENT (25°)				
Viewing condition :	DAY LIGHT (>1076 LUX)	Penetrant Type / Technique :	VISIBLE SOLVENT REMOVABLE				
Penetrant dwell time :	10 MIN	Dev. Time:	10 MIN				
Date of test :	13.03.2020	ACCP - Criteria :	ASME SEC VIII DIV.1				
Consumables Type & Batch	MAGNAFLUX						

Penetrant Remover	Penetrant	Developer
SKC-S (BATCH NO-180108) JAN 2021	SKL-SP2 (BATCH NO-171201) DEC 2020	SKD-S2 (BATCH NO-180102) JAN 2021

Observation & Evaluation :

100% DPT WAS CARRIED OUT ON THE THERMOCUPLE COVER WELD JOINTS.(AFTER PWHT)

EQUIPMENT NAME :- BOOSTER HEATER - 2

LINE NO :- R1LBA02

JOINT NO :- CT022,CT024,CT026.

PROJECT :- SHAMS OUTAGE MARCH -2020

NO RELEVANT INDICATION WAS OBSERVED DURING THE TIME OF INSPECTION.

FOUND ACCEPTABLE AS PER THE SPECIFICATION.

	ACCEPT	REJECT
RESULT	☑	☐

REPORT FORMAT APPLICABLE ONLY FOR AUH & FUJ FACILITY

LEVEL II TECHNICIAN	CLIENT REP	AI / TPI
Name : VINEETH.P	Name :	Name :
Sign : Vineeth P Poolose	Sign :	Sign :
Date : Sign 13.03.2020	Date :	Date :

INSPEC Level II No. L 717 Date

Dubai Branch : P.O.Box: 86535, Dubai, U.A.E — Tel: 04 3241955 — Fax: 04 3241957 — Email: inspec.dxbcoor@intertek.com
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Fujairah Branch : P.O.Box: ??? Fujairah, U.A.E — Tel: 09 2238754 — Fax: 09 2238754 — Email: inspec.fujcoor@intertek.com
Oman Branch : P.O.Box: 193, P.C: 131, Sultanate of Oman — Tel: 00968 2448 2391 — Fax: 00968 2448 5855 — Email: inspec.muscat@intertek.com
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Form No.: IN-OPF-04 Rev. 13E Dtd. 20-03-2019

LIQUID PENETRANT EXAMINATION REPORT

Report No.:	AD / 53578	Date:	12.03.2020	Page:	1	Of	1
Client :	SHAMS POWER COMPANY	Job No. :	-				
Location :	MADINAT ZAYED	Item :	BOOSTER HEATER - 2				
Material :	INCONEL	Ref / Procedure No. :	INS/ASME/PT/001				
Thickness :	VARIOUS	Revision :	22				
Surface condition :	AS WELDED & CLEANED	Test Temp. :	AMBIENT (25°)				
Viewing condition :	DAY LIGHT (>1076 LUX)	Penetrant Type / Technique :	VISIBLE SOLVENT REMOVABLE				
Penetrant dwell time :	10 MIN	Dev. Time:	10 MIN				
Date of test :	12.03.2020	ACCP - Criteria :	ASME SEC VIII DIV.1				
Consumables Type & Batch	MAGNAFLUX						

Penetrant Remover	Penetrant	Developer
SKC-S (BATCH NO-180108) JAN 2021	SKL-SP2 (BATCH NO-171201) DEC 2020	SKD-S2 (BATCH NO-180102) JAN 2021

Observation & Evaluation :

100% DPT WAS CARRIED OUT ON THE BUTTERING LAYERS WELD JOINTS.

EQUIPMENT NAME :- BOOSTER HEATER - 2

LINE NO :- R1LBA02

JOINT NO :- CT022,CT024,CT026.

PROJECT :- SHAMS OUTAGE MARCH -2020

NO RELEVANT INDICATION WAS OBSERVED DURING THE TIME OF INSPECTION.

FOUND ACCEPTABLE AS PER THE SPECIFICATION.

	ACCEPT	REJECT
RESULT	☑	☐

REPORT FORMAT APPLICABLE ONLY FOR AUH & FUJ FACILITY

LEVEL II TECHNICIAN	CLIENT REP	AI / TPI
Name : VINEETH.P	Name :	Name :
Sign :	Sign :	Sign :
Date : 12.03.2020	Date :	Date :

INSPEC Level II No. L 747

Dubai Branch : P.O.Box 26535, Dubai, U.A.E Tel : 04 3241955 Fax: 04 3241957 Email: inspec.dxbcoor@intertek.com
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Oman Branch : P.O.Box 193, P.C. 131, Sultanate of Oman Tel : 00968 2448 2391 Fax: 00968 2448 5855 Email: inspec.muscat@intertek.com
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Form No.: IN-OPF-04 Rev. 13E Dtd. 20-03-2019

LIQUID PENETRANT EXAMINATION REPORT

Report No.:	AD / 53583	Date:	15.03.2020	Page:	1	Of	1
Client :	SHAMS POWER COMPANY	Job No. :	-				
Location :	MADINAT ZAYED	Item :	PIPING				
Material :	CS	Ref / Procedure No. :	INS/ASME/B31.3/PT/001				
Thickness :	VARIOUS	Revision :	06				
Surface condition :	AS WELDED & CLEANED	Test Temp. :	AMBIENT (25°)				
Viewing condition :	DAY LIGHT (>1076 LUX)	Penetrant Type / Technique :	VISIBLE SOLVENT REMOVABLE				
Penetrant dwell time :	10 MIN	Dev. Time:	10 MIN				
Date of test :	15.03.2020	ACCP - Criteria :	ASME B31.3				
Consumables Type & Batch	MAGNAFLUX						

Penetrant Remover	Penetrant	Developer
SKC-S (BATCH NO-180108) JAN 2021	SKL-SP2 (BATCH NO-171201) DEC 2020	SKD-S2 (BATCH NO-180102) JAN 2021

Observation & Evaluation :

100% DPT WAS CARRIED OUT ON THE PIPING WELD JOINTS.

NITROGEN VENT VALVE FROM OVER FLOW TANK 1,2,3,4 & 5.(JOINT-10NOS)

PROJECT :- SHAMS OUTAGE MARCH -2020

NO RELEVANT INDICATION WAS OBSERVED DURING THE TIME OF INSPECTION.

FOUND ACCEPTABLE AS PER THE SPECIFICATION.

	ACCEPT	REJECT
RESULT	☑	☐

REPORT FORMAT APPLICABLE ONLY FOR AUH & FUJ FACILITY

LEVEL II TECHNICIAN	CLIENT REP	AI / TPI
Name : VINEETH.P	Name :	Name :
Sign : Vineeth P Paulose	Sign :	Sign :
Date : 15.03.2020	Date :	Date :

INSPEC Level II No. L 717 Date

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Oman Branch : P.O.Box: 391, P.C.:131, Sultanate of Oman Tel : 00968 2448 2391 Fax: 00968 2448 5855 Email: inspec.muscat@intertek.com
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Form No.: IN-OPF-04 Rev. 13E Dtd. 20-03-2019

LIQUID PENETRANT EXAMINATION REPORT

Report No.:	AD / 53581	Date:	14.03.2020	Page:	1	Of	1
Client :	SHAMS POWER COMPANY	Job No. :	-				
Location :	MADINAT ZAYED	Item :	PIPING				
Material :	CS	Ref / Procedure No. :	INS/ASME/B31.3/PT/001				
Thickness :	VARIOUS	Revision :	06				
Surface condition :	AS WELDED & CLEANED	Test Temp. :	AMBIENT (25°)				
Viewing condition :	DAY LIGHT (>1076 LUX)	Penetrant Type / Technique :	VISIBLE SOLVENT REMOVABLE				
Penetrant dwell time :	10 MIN	Dev. Time:	10 MIN				
Date of test :	14.03.2020	ACCP - Criteria :	ASME B31.3				
Consumables Type & Batch	MAGNAFLUX						

Penetrant Remover	Penetrant	Developer
SKC-S (BATCH NO-180108) JAN 2021	SKL-SP2 (BATCH NO-171201) DEC 2020	SKD-S2 (BATCH NO-180102) JAN 2021

Observation & Evaluation :

100% DPT WAS CARRIED OUT ON THE PIPING WELD JOINTS.

LINE NO :- R1LBP10AA001

JOINT :- SECONDARY BY PASS AT TEMPERSTURE LINE SPRAY NOZZLE (SOUTH & NORTH) WELD JOINTS.

PROJECT :- SHAMS OUTAGE MARCH -2020

NO RELEVANT INDICATION WAS OBSERVED DURING THE TIME OF INSPECTION.

FOUND ACCEPTABLE AS PER THE SPECIFICATION.

	ACCEPT	REJECT
RESULT	☑	☐

REPORT FORMAT APPLICABLE ONLY FOR AUH & FUJ FACILITY

LEVEL II TECHNICIAN	CLIENT REP	AI / TPI
Name : VINEETH.P	Name :	Name :
Sign :	Sign :	Sign :
Date : 14.03.2020	Date :	Date :

Dubai Branch : P O Box: 06545, Dubai, U.A.E Tel : 04 3241955 Fax: 04 3241957 Email: inspec.dxbcoor@intertek.com
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Abu Dhabi Branch : P O Box: 31727, Abu Dhabi, U.A.E Tel : 02 6225810 Fax: 02 6225830 Email: inspec.adhcoor@intertek.com
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Oman Branch : P O Box: 191, P.C. 111, Sultanate of Oman Tel : 00968 2448 2391 Fax: 00968 2448 5855 Email: inspec.muscat@intertek.com
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Form No.: IN-LABF-12 Rev. 6 Dtd.: 15-Nov-2018

REPLICA METALLOGRAPHY REPORT

DATE OF TEST:	17-Mar-2020	REPORT NO.:	LAB/AD/469	DATE OF REPORT:	25-Mar-2020	PAGE:	1	OF	1
CLIENT:	SHAMS POWER COMPANY								
JOB No.:	591								
CONTACT DETAILS:	Mr. Osman Ismail								

REPLICA METALLOGRAPHY (As per ASTM E-1351)

Project:	Maintenance Shutdown
Vessel:	BOOSTER HEATER NO. 2
Size:	N/A
Material:	ASTM A335 Gr. P91
Locations:	Outlet Pipe
Spot No.:	1

PHOTOS:

Location: Base Metal ; Etchant: Fry's Reagent; Magnification: 200x

Observations:

Microstructure revealed equiaxed ferrite with some tempered martensite and carbides in sharp contrast to the fully tempered martensite structure of the virgin material.

No other metallurgical anomalies were observed.

Mechanical Lab Supervisor	Senior Metallurgist	Operations Manager
Name : AVINASH MATRE	GOPI KRISHNAN MURUGESAN	MOHAMMED ALAWNEH
Sign :		
Date :	19/03/20	

Dubai Branch	: P O Box: 96535, **Dubai, U.A.E**	Tel : 04 3241955	Fax: 04 3241957	Email: inspec.dxbcoor@intertek.com
Sharjah Branch	: P O Box: 6130, **Sharjah, U.A.E**	Tel : 06 506 1300	Fax: 06 536 1173	Email: inspec.shjcoor@intertek.com
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Fujairah Branch	: P O Box: 7907, **Fujairah, U.A.E**	Tel : 09 2238754	Fax: 09 2238754	Email: inspec.fujcoor@intertek.com
Oman Branch	: P O Box: 193, P.C: 131, **Sultanate of Oman**	Tel : 00968 2448 2391	Fax: 00968 2448 5855	Email: inspec.muscat@intertek.com
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Form No.: IN-LABF-12 Rev. 6 Dtd.: 15-Nov-2018

REPLICA METALLOGRAPHY REPORT

DATE OF TEST:	17-Mar-2020	REPORT NO.:	LAB/AD/470	DATE OF REPORT:	25-Mar-2020	PAGE:	1	OF	1
CLIENT:	SHAMS POWER COMPANY								
JOB No.:	591								
CONTACT DETAILS:	Mr. Osman Ismail								

REPLICA METALLOGRAPHY (As per ASTM E-1351)

Project:	Maintenance Shutdown
Vessel:	BOOSTER HEATER NO. 2
Size:	N/A
Material:	ASTM A335 Gr. P91
Locations:	Inlet Pipe
Spot No.:	2

PHOTOS:

Location: Base Metal ; Etchant: Fry's Reagent; Magnification: 200x

Observations:

Microstructure revealed equiaxed ferrite with some tempered martensite and carbides in sharp contrast to the fully tempered martensite structure of the virgin material.

No other metallurgical anomalies were observed.

Mechanical Lab Supervisor	Senior Metallurgist	Operations Manager
Name : AVINASH MATRE	GOPI KRISHNAN MURUGESAN	MOHAMMED ALAWNEH
Sign :		
Date :	19/03/20	

Dubai Branch	: P O Box: 96535, Dubai, U.A.E	Tel : 04 3241955	Fax: 04 3241957	Email: inspec.dxbcoor@intertek.com
Sharjah Branch	: P O Box: 6130, Sharjah, U.A.E	Tel : 06 506 1300	Fax: 06 536 1173	Email: inspec.shjcoor@intertek.com
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Form No.: IN-LABF-12 Rev. 6 Dtd.: 15-Nov-2018

REPLICA METALLOGRAPHY REPORT

DATE OF TEST:	17-Mar-2020	REPORT NO.:	LAB/AD/471	DATE OF REPORT:	25-Mar-2020	PAGE:	1	OF	1
CLIENT:	SHAMS POWER COMPANY								
JOB No.:	591								
CONTACT DETAILS:	Mr. Osman Ismail								

REPLICA METALLOGRAPHY (As per ASTM E-1351)

Project:	Maintenance Shutdown
Vessel:	BOOSTER HEATER NO. 1
Size:	N/A
Material:	ASTM A335 Gr. P91
Locations:	Inlet Pipe
Spot No.:	3

PHOTOS:

Location: Base Metal ; Etchant: Fry's Reagent; Magnification: 200x

Observations:

Microstructure revealed tempered martensite and some carbides at the examined location.

No significant metallurgical anomalies were observed.

Mechanical Lab Supervisor	Senior Metallurgist	Operations Manager
Name : AVINASH MATRE	GOPI KRISHNAN MURUGESAN	MOHAMMED ALAWNEH
Sign :		
Date :	19/03/20	

Dubai Branch	: P O Box: 96535, Dubai, U.A.E	Tel : 04 3241955	Fax: 04 3241957	Email: inspec.dxbcoor@intertek.com
Sharjah Branch	: P O Box: 6130, Sharjah, U.A.E	Tel : 06 506 1300	Fax: 06 536 1173	Email: inspec.shjcoor@intertek.com
Abu Dhabi Branch	: P O Box: 41227, Abu Dhabi, U.A.E	Tel : 02 6225820	Fax: 02 6225830	Email: inspec.adhcoor@intertek.com
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Oman Branch	: P O Box: 193, P.C: 131, Sultanate of Oman	Tel : 00968 2448 2391	Fax: 00968 2448 5855	Email: inspec.muscat@intertek.com
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NON DESTRUCTIVE TESTING, HEAT TREATMENT, ADVANCED INSPECTION SERVICES,
CALIBRATION SERVICES AND MECHANICAL & METALLURGICAL LAB SERVICES
intertek.com

Form No.: IN-LABF-12 Rev. 6 Dtd.: 15-Nov-2018

REPLICA METALLOGRAPHY REPORT

DATE OF TEST:	17-Mar-2020	REPORT NO.:	LAB/AD/472	DATE OF REPORT:	25-Mar-2020	PAGE:	1	OF	1
CLIENT:	SHAMS POWER COMPANY								
JOB No.:	591								
CONTACT DETAILS:	Mr. Osman Ismail								

REPLICA METALLOGRAPHY (As per ASTM E-1351)

Project:	Maintenance Shutdown
Vessel:	MAIN STEAM INLET
Size:	N/A
Material:	ASTM A335 Gr. P91
Locations:	MAIN STEAM INLET NEAR TO TURBINE
Spot No.:	4

PHOTOS:

Location: Base Metal ; Etchant: Fry's Reagent; Magnification: 200x

Observations:

Microstructure revealed tempered martensite and some carbides at the examined location.

No significant metallurgical anomalies were observed.

Mechanical Lab Supervisor	Senior Metallurgist	Operations Manager
Name : AVINASH MATRE	GOPI KRISHNAN MURUGESAN	MOHAMMED ALAWNEH
Sign :		
Date :	19/03/20	

Dubai Branch	: P O Box: 96535, Dubai, U.A.E	Tel : 04 3241955	Fax: 04 3241957	Email: inspec.dxbcoor@intertek.com
Sharjah Branch	: P O Box: 6130, Sharjah, U.A.E	Tel : 06 506 1300	Fax: 06 536 1173	Email: inspec.shjcoor@intertek.com
Abu Dhabi Branch	: P O Box: 41227, Abu Dhabi, U.A.E	Tel : 02 6225820	Fax: 02 6225830	Email: inspec.adhcoor@intertek.com
Fujairah Branch	: P O Box: 7907, Fujairah, U.A.E	Tel : 09 2238754	Fax: 09 2238754	Email: inspec.fujcoor@intertek.com
Oman Branch	: P O Box: 193, P.C: 131. Sultanate of Oman	Tel : 00968 2448 2391	Fax: 00968 2448 5855	Email: inspec.muscat@intertek.com
Registered Office	: 33-37 Athol Street, Douglas, IM1, 1LB, Isle of Man. Company Number 010728V.			

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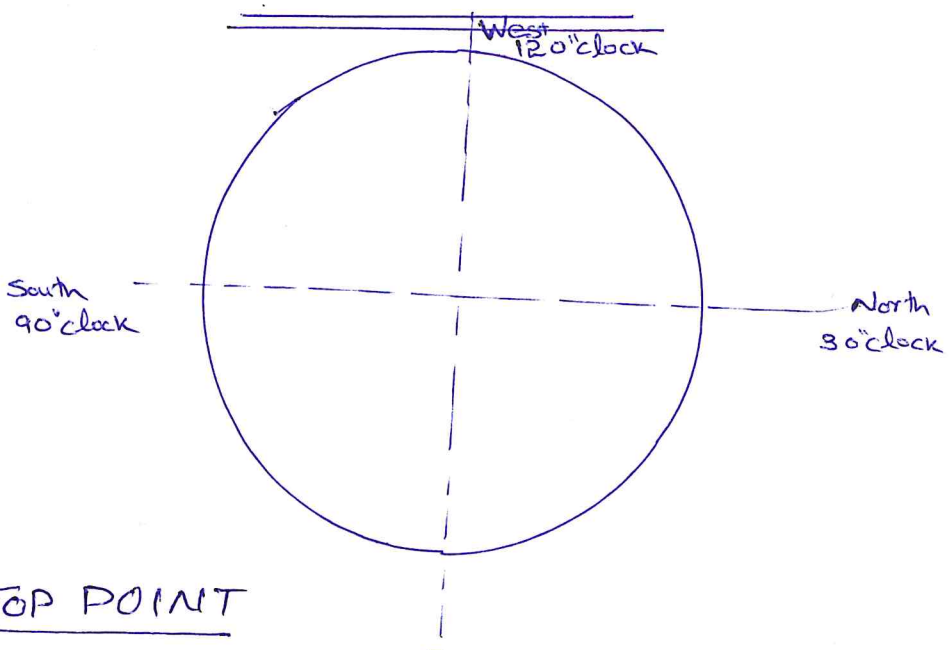
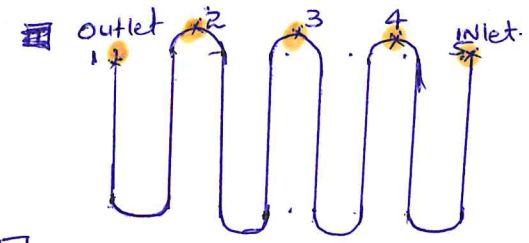
BOOSTER HEATER-2



TOP POINT



1 TOP ELBOW & Tube
① Tube = 16.05
② Elbow = 13.25
③ Elbow = 12.90
④ Elbow = 10.05
⑤ Tube = 8.25

2 TOP ELBOW & TUBE
① Elbow = 19.90
② Elbow = 12.50
③ Elbow = 12.95
④ Elbow = 9.75
⑤ Tube = 8.05

3 TOP ELBOW & TUBE
① Tube = 16.75
② Elbow = 13.50
③ Elbow = 13.25
④ Elbow = 9.70
⑤ Tube = 8.50

4 TOP ELBOW & TUBE
① Tube = 16.85
② Elbow = 12.75
③ Elbow = 12.95
④ Elbow = 9.95
⑤ Tube = 8.55

5 TOP ELBOW & Tube
① 16.30 = Tube
② 12.95 = Elbow
③ 13.10 = Elbow
④ 10.10 = Elbow
⑤ 8.30 = Tube

6 TOP ELBOW & TUBE
① Tube = 16.60
② Elbow = 13.30
③ Elbow = 13.45
④ Elbow = 9.50
⑤ Elbow = 9.95

7 TOP ELBOW & TUBE
① Tube = 16.35
② Elbow = 13.35
③ Elbow = 11.85
④ Elbow = 9.50
⑤ Tube = 8.45

8 TOP ELBOW & TUBE
① Tube = 17.45
② Elbow = 12.80
③ Elbow = 12.40
④ Elbow = 10.00
⑤ Elbow = 9.90

9 TOP ELBOW & TUBE
① Elbow = 20.10
② Elbow = 13.40
③ Elbow = 13.85
④ Elbow = 9.95
⑤ Tube = 8.65

10 TOP ELBOW & TUBE
① Tube = 16.05
② Elbow = 13.85
③ Elbow = 12.85
④ Elbow = 9.95
⑤ Tube = 8.15

11 TOP ELBOW & TUBE
① Tube = 16.35
② Elbow = 13.50
③ Elbow = 12.85
④ Elbow = 9.60
⑤ Tube = 8.70

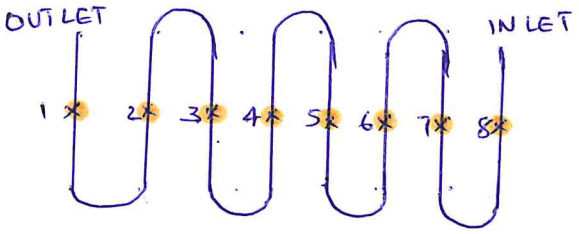
12 TOP ELBOW & TUBE
① Tube = 16.02
② Elbow = 13.75
③ Elbow = 13.50
④ Elbow = 9.35
⑤ Elbow = 9.70

13 TOP ELBOW & TUBE
① Elbow = 19.98
② Elbow = 13.50
④ Elbow = 9.70
⑤ Tube = 8.25

Tech - SHER ALI
10/03/2020

DATE:- 10/03/2020

MIDDLE - POINT



1 MIDDLE TUBE

① 15.95
② 16.18
③ 13.15
④ 12.85
⑤ 12.30
⑥ 8.35
⑦ 8.75
⑧ 8.25

2 MIDDLE TUBE

① 17.40
② 17.80
③ 12.55
④ 12.50
⑤ 12.90
⑥ 8.50
⑦ 8.00
⑧ 8.45

3 MIDDLE TUBE

① 17.05
② 17.15
③ 12.36
④ 11.95
⑤ 12.15
⑥ 8.30
⑦ 8.50
⑧ 8.35

4 MIDDLE TUBE

① 16.85
② 17.05
③ 12.85
④ 12.80
⑤ 13.05
⑥ 8.50
⑦ 8.25
⑧ 8.65

5 MIDDLE TUBE

① 16.95
② 16.50
③ 13.65
④ 13.25
⑤ 12.85
⑥ 8.65
⑦ 8.15
⑧ 8.35

6 MIDDLE TUBE

① 16.45
② 17.15
③ 13.15
④ 12.25
⑤ 13.15
⑥ 8.15
⑦ 8.50
⑧ 8.20

7 MIDDLE TUBE

① 16.65
② 16.15
③ 12.25
④ 12.60
⑤ 12.45
⑥ 8.60
⑦ 8.45
⑧ 8.60

8 MIDDLE TUBE

① 17.45
② 16.20
③ 12.05
④ 12.00
⑤ 11.95
⑥ 8.35
⑦ 8.25
⑧ 8.35

9 MIDDLE TUBE

① 16.90
② 16.55
③ 12.00
④ 12.05
⑤ 12.15
⑥ 8.40
⑦ 8.85
⑧ 8.30

10 MIDDLE TUBE

① 16.50
② 17.35
③ 12.15
④ 12.25
⑤ 11.85
⑥ 8.30
⑦ 8.35
⑧ 8.50

11 MIDDLE TUBE

① 16.35
② 16.30
③ 12.35
④ 11.90
⑤ 11.85
⑥ 8.15
⑦ 8.25
⑧ 8.20

12 MIDDLE TUBE

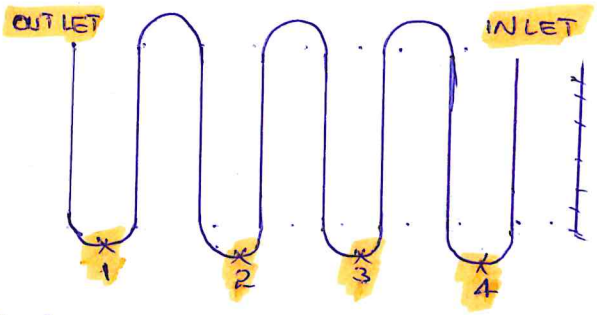
① 16.50
② 16.35
③ 11.95
④ 12.00
⑤ 12.20
⑥ 8.35
⑦ 8.15
⑧ 8.20

13 MIDDLE TUBE

① 17.65
② 16.85
③ 12.35
④ 12.25
⑤ 12.35
⑥ 8.25
⑦ 8.65
⑧ 8.80

Tech. SHER ALI
10/03/2020

BOTTAMELBOW



1 BOTTAMELBOW

① 16.35
② 12.75
③ 9.05
④ 9.45

2 BOTTAMELBOW

① 16.05
② 13.45
③ 9.65
④ 9.85

3 BOTTAMELBOW

① 15.75
② 12.85
③ 9.95
④ 9.35

4 BOTTAMELBOW

① 15.95
② 12.85
③ 9.65
④ 9.85

5 BOTTAMELBOW

① 15.15
② 12.45
③ 9.85
④ 9.75

6 BOTTAMELBOW

① 15.65
② 13.35
③ 9.85
④ 9.80

7 BOTTAMELBOW

① 15.80
② 13.25
③ 9.75
④ 9.50

8 BOTTAMELBOW

① 15.70
② 12.65
③ 9.55
④ 9.65

9 BOTTAMELBOW

① 15.95
② 12.95
③ 9.95
④ 9.55

10 BOTTAMELBOW

① 15.90
② 12.30
③ 9.75
④ 8.95

11 BOTTAMELBOW

① 15.97
② 12.80
③ 9.65
④ 9.75

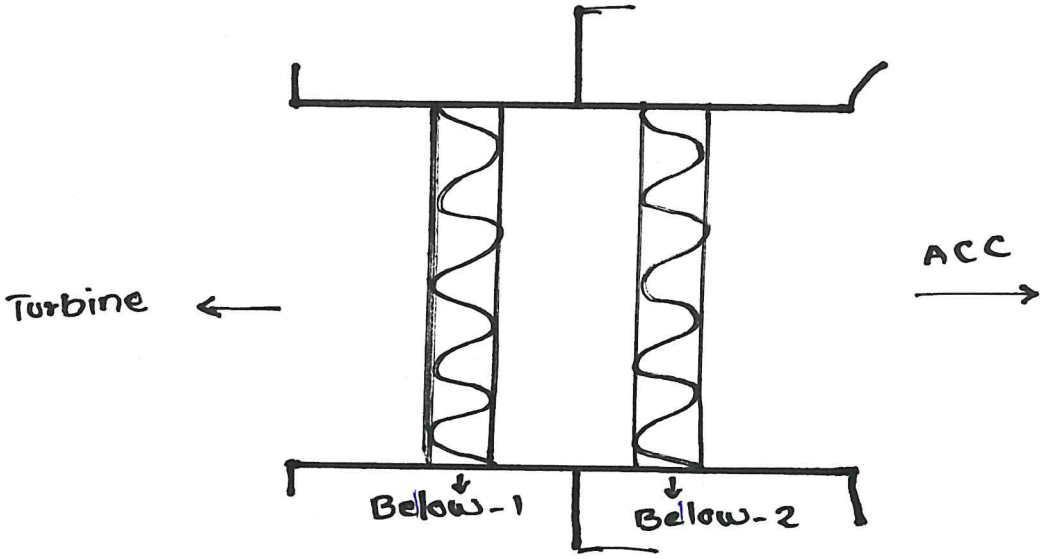
12 BOTTAMELBOW

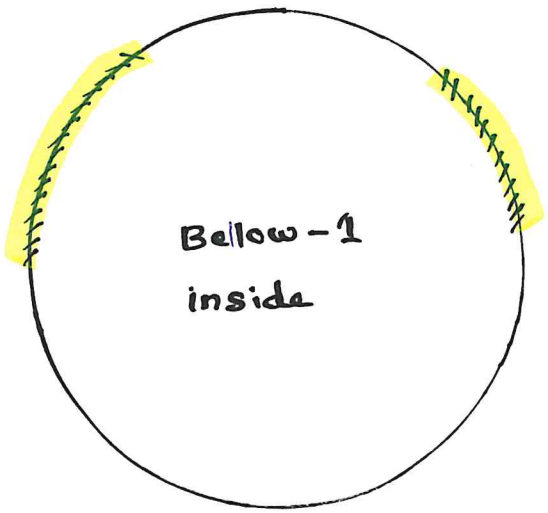
① 15.45
② 12.50
③ 9.80
④ 9.45

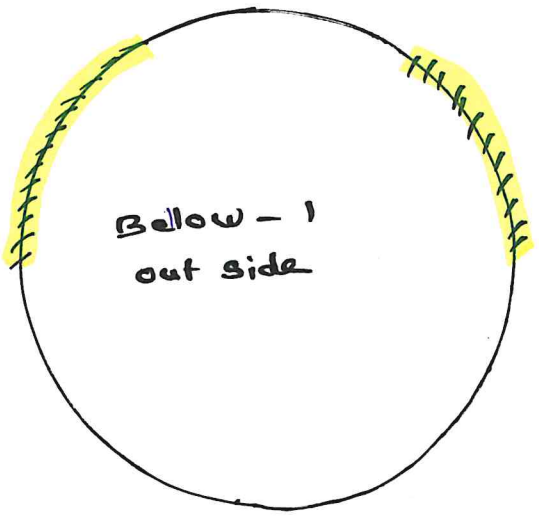
13 BOTTAMELBOW

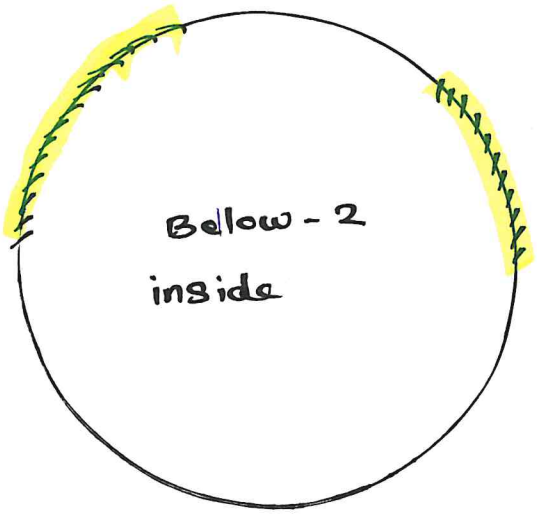
① 16.10
② 12.75
③ 9.55
④ 9.95

Turbine Bellow - DPT Done (Highlighted Areas) - 10/03/20









① //// /// //// — DPT Done

Tech. MD. Enamul Huque.
10/03/2020

DPT DETAITES BELOW

Date : 10-03-2020

(1) Turbine expension bellows Acces Areas DPT Done
& see attached list

(2) R1JD-16AA510 HTF SYSTEM Drain Line
2"Ø = 3 Joints DPT Done

(3) PumP-1 R1JD A09-BR001- HTF Line
3/4" to valve 1 Joint

(4) P-2 R1JD 001-PT001- HTF Line
2"- to valve&PIPe 2 Joints

(5) P-2 R1JD A22-BR001-HTF Line (Drain Line)
3/4" to valve&PIPe 2 Joints

(6) P-2 R1JD A01-AT001-HTF
3/4"-PIPe to valve 1 Joint

(7) P-3 R1JD A52-BR06 - HTF-Line
2" with valve&Joint 2 Joints

(8) P-3 R1JD A02-AT001-HTF Line
3/4" to valve 1 Joint

(9) P-4 R1JD A53-BR010-HTF Line
2" to valve&PIPe 2 Joints

(10) P-5 R1JD A54-BR010-HTF Line
2" to valve&PIPe 2 Joints

(11) P-6 R1JD 55-BR010-HTF Line
2" to valve&PIPe 2 Joints

(12) R1JB47-BR010-HTF-Line-JointNo-2
Transmitter Temp Line
Weldolet to NIPPle-PIPe } 3 Joints 3/4"

Tech-MD. Enamul Huque
10/03/2020