

FRCP CRITICAL PIPING SPOOL INSPECTION AT QADIRPUR GAS FIELD

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Inspection Report



Client	:	Oil and Gas Development Company Limited
Client Contact Person	:	Mr. Safdar Ali Channa – Manager Corrosion
SGS Ref. No.	:	5007268
Contract Ref. No.	:	PROC-SERVICES/CB/CORR-3148/769007/2018
Inspected by	:	Mr. Ali Nawaz – API-570 (Certification No: 66838) Mr. Muhammad Tanveer (Sr. Inspection Engineer) Mr. Ali Uzair (Inspection Engineer) Muhammad Mr. Yar Alvi (Inspection Engineer)
Site	:	Qadirpur Gas Field
Equipment Identification	:	Common Discharge Header, Inlet Cooler & After Cooler Discharge Lines of Train -A, Train-B, & Train-C.
Inspection Date	:	13 th – 30 th May, 2019
Prepared by		Reviewed by
Ali Nawaz Sr. Inspection Engineer		Mashooq Ali Deputy Manager
		

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	FRCP Critical Piping Spool Inspection at Qadirpur	Job no: 5007268 Rev: 0 Page 1 of 2 Date: 24-06-2019
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ANNEXURE – I

Inspection Summery

	FRCP Critical Piping Spool Inspection at Qadirpur	Job no: 5007268 Rev:0
	Inspection Summary Train-A	Pages: 1 of 3 Date: 24-06-2019

1. INTRODUCTION:

Project Title: FRCP Critical Piping Spool Inspection at Qadirpur
 Contract Ref No: PROC-SERVICES/CB/CORR-3148/769007/2018
 Location: Qadirpur Gas Field
 Item Description: Train-A
 Date of Inspection: 13th - 30th May- 2019

2. ITEM INSPECTED:

Below are the inspected FRCP critical piping spools of Train-A,

- Inter Cooler discharge line # NG-01-027-12"-6C20
- Inter Cooler discharge line # NG-01-027-12"-6C20A
- After Cooler Discharge Line # NG-01-033-10"-6C20
- After Cooler Discharge Line # 10"-G-DA2-10006

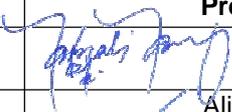
3. PREVIOUS INSPECTION HISTORY:

This inspection was carried out by the recommendation of previous inspection results. Previous UTG history was appended as **Annexure-VI**.

4. SCOPE OF INSPECTION:

Following inspection activities were performed for mechanical Integrity assessment of FRCP critical piping spools.

- Detail external visual inspection as per guideline of API 570.
- Preparation of piping sketches.
- Ultrasonic thickness gauging of piping spool.
- Phased array Ultrasonic testing of selected weld joints.
- Mechanical integrity assessment of piping as per API-570.

Particulars	Prepared By	Reviewed By
Signature		
Name	Ali Nawaz	Mashooq Ali
Date:	24 th June, 2019	24 th June, 2019



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	FRCP Critical Piping Spool Inspection at Qadirpur	Job no: 5007268 Rev:0
	Inspection Summary Train-A	Pages: 2 of 3 Date: 24-06-2019

5. INSPECTION FINDINGS:

Ultrasonic Thickness Measurements (UTG): Ultrasonic thickness gauging was carried out on FRCP critical piping spools of Train-A. However, some locations were not inspected through UTG cause of limited access. Thickness gauging were carried out in each accessible piping and fitting for corrosion rate monitoring, evaluation & next inspection interval determination. Severe metal loss observed at Inter cooler discharge line # NG-01-027-12"-6C20, Inter Cooler discharge line # NG-01-027-12"-6C20A. After Cooler Discharge Line # NG-01-033-10"-6C20.

Detailed report of thickness measurement is appended **Annexure –III**.

Pipe Supports: Observed direct contact of pipe to metal supports. Need to install non metallic shim between pipe and supports. Detail Visual Inspection Report is appended as **Annexure –II**

Stud/Bolts: Observed Short length bolt (Fastener) at flange join. Report is appended as **Annexure –II**

Painting/Coating system: Observed piping spool was unpainted from TML # 38 ~ 39 & TML # 49 ~ 50. Need to be painted after proper surface preparation. Report is appended as **Annexure –II**

Weld joints: Observed service/ construction weld defect during PAUT testing at Inter cooler Discharge Line # NG-01-027-12"-6C20 & After cooler Discharge Line # NG-01-033-10"-6C20. Report is appended as **Annexure –V**

Gauges Calibration: Observed calibration tags/status not found on pressure/temperature gauges. Need to be calibrated and maintain periodically as per plant operation guideline. Report is appended as **Annexure –II**

6. RECOMMENDATION AND CONCLUSION:

On the basis of visual inspection findings, Non-Destructive testing, Design Data Calculations, and API 570 assessments it is concluded that,

Inter Cooler discharge line # NG-01-027-12"-6C20 Severe metal loss observed at 12" diameter SCH 30 (8.38 mm). Minimum thickness was recorded 4.04 mm at TML # 09. Minimum required thickness for 12" diameter to hold design parameters is 5.81 mm.

Also Phased array Ultrasonic Testing result shows that severe root erosion recorded in weld joints, which remaining thickness of weld joints is less than minimum required thickness.

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Signature		
Name	Ali Nawaz	Mashooq Ali
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	FRCP Critical Piping Spool Inspection at Qadirpur	Job no: 5007268 Rev:0
	Inspection Summary Train-A	Pages: 3 of 3 Date: 24-06-2019

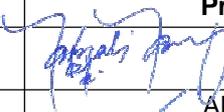
It is strongly recommended that current piping segment shall be replaced with new one to increase the safety and reliability of piping with continue safe operation. Also it is recommended that when replacement activity is performed on piping then stage inspection is recommended.

Inter Cooler discharge line # NG-01-027-12"-6C20A satisfactory to operate on current operating parameters till next recommended inspection interval, next inspection interval is **1 years**.

After Cooler Discharge Line # NG-01-033-10"-6C20 Severe metal loss observed at 10" diameter SCH40 (9.27 mm). Minimum thickness was recorded 4.75 mm at TML # 14. Minimum required thickness for 10" diameter to hold design parameters is 4.90 mm, And Phased array Ultrasonic Testing result shows that construction & service defect is recorded.

It is strongly recommended that current piping shall be replaced with new one to increase the safety and reliability of piping for continue safe operation. Also it is recommended that whenever replacement activity is performed on piping then stage inspection is recommended.

After Cooler Discharge Line # 10"-G-DA2-10006 satisfactory to operate on current operating parameters till next recommended inspection interval, next inspection interval is **5 years**.

Particulars	Prepared By	Reviewed By
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Name	Ali Nawaz	Mashooq Ali
Date:	24 th June, 2019	24 th June, 2019



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ANNEXURE – II

Visual Inspection Report

Reports of Findings and Recommendations of Train-A (Inlet Cooler Discharge Line # NG-01-027-12"-6C20)

Item no.	Ref Pic	Findings / Recommendations
01		<p>Finding: Observed minor corrosion on blind flange and its fasteners near TML # 19,23,28 & 29.</p> <p>Recommendation: Need to be apply existing paint after proper surface preparation.</p>
02		<p>Finding: At the time of inspection observed temperature gauge needle was missed near TML # 31.</p> <p>Recommendation: Need to replace defective temperature gauge with new calibrated gauge.</p>

Particulars	Prepared By	Reviewed By
Signature		
Name	Aii Nawaz	Mashooq Ali
Date:	24 June, 2019	24 June, 2019



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Reports of Findings and Recommendations of Train-A (Inlet Cooler Discharge Line # NG-01-027-12"-6C20)

<p>03</p>		<p>Finding: Observed paint deterioration on stud & bolts near TML # 45,52 & 53.</p> <p>Recommendation: Need to be apply existing paint after proper surface preparation.</p>
<p>04</p>		<p>Finding: At the time of inspection observed minor corrosion at piping spool cause of piping was unpainted from TML # 49 ~ 50.</p> <p>Recommendation: Need to be apply existing paint after proper surface preparation.</p>

Particulars	Prepared By	Reviewed By
Signature		
Name	Aii Nawaz	Mashooq Ali
Date:	24 June, 2019	24 June, 2019



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Reports of Findings and Recommendations of Train-A (Inlet Cooler Discharge Line # NG-01-027-12"-6C20)

<p>05</p>		<p>Finding: Observed flange & its fasteners were paint deteriorated, also blind flange stud bolts were missed near TML # 47.</p> <p>Recommendation: Need to be apply existing paint after proper surface preparation & need to install missing bolts with proper tighten.</p>
<p>06</p>		<p>Finding: Observed uneven and loop sided tightening of bolts at flange joint Near TML # 48.</p> <p>Recommendation: Equal and balance tightening should be made in order to made accomplish a firm and adequate flange joint</p>

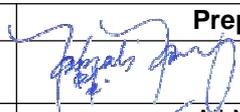
Particulars	Prepared By	Reviewed By
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Name	Ali Nawaz	Mashooq Ali
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Reports of Findings and Recommendations of Train-A (Inter Cooler Discharge Line # NG-01-027-12"-6C20A)

Item no.	Ref Pic	Findings / Recommendations
01		<p>Finding: Observed calibration tags/status not found on pressure/ temperature gauges.</p> <p>Recommendation: Need to be calibrated and maintain periodically as per plant operation guideline. In general annual calibration is recommended.</p>
02		<p>Finding: Observed piping was in direct contact with pipe support near TML # 19.</p> <p>Recommendation: Need to be install non metallic shim plate b/w pipe and support because dissimilar metal contact cause galvanic corrosion.</p>

Particulars	Prepared By	Reviewed By
Signature		
Name	Ali Nawaz	Mashooq Ali
Date:	24 June, 2019	24 June, 2019



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Reports of Findings and Recommendations of Train-A (After Cooler Discharge Line # NG-01-033-10"-6C20 to 10"-G-DA2-10006)

Item no.	Ref Pic	Findings / Recommendations
01		<p>Finding: Observed flange neck was unpainted at TML # 04 & also observed minor corrosion on flange and its fasteners.</p> <p>Recommendation: Need to be apply existing paint after proper surface preparation.</p>
02		<p>Finding: Observed piping spool was unpainted from TML # 38 ~ 39 & Observed calibration tags were not found on pressure/ temperature gauges.</p> <p>Recommendation: Need to be apply existing paint after proper surface preparation & also gauges shall be calibrated and maintain periodically as per plant operation guideline. In general annual calibration is recommended.</p>
03		<p>Finding: Observed paint deterioration on stud & bolts Near TML # 62 & 118.</p> <p>Recommendation: Need to be apply existing paint after proper surface preparation.</p>

Particulars	Prepared By	Reviewed By
Signature		
Name	Ali Nawaz	Mashooq Ali
Date:	24 June, 2019	24 June, 2019



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ANNEXURE – III

Ultrasonic Thickness Report

**INDUSTRIAL SERVICES****ULTRASONIC THICKNESS GAUGING REPORT**

Report No: UTG/5007268/01

Rev. 0

Page: 01 of 02

Date: 15-05-2019

SGS Ref. No: 5007268	Examination Date: 15-05-2019	Data File Name : Train A 12 inch
Client: OGDCL	Object/Part Desc: Inter Cooler Discharge Train A	Thickness Mode : DUAL <input type="checkbox"/> DUAL M <input checked="" type="checkbox"/>
Project: FRCP Critical Piping Spool Inspection at Qadir Pur	Nominal Thickness : 8.38 mm	Drg. Ref No: NG-01-027-12"-6C20
Location: QadirPur Gas Field	Material: CS	Equipment : DMS 2
Examination Code: ASME SEC V	Couplant: Gell	Equipment Serial No: 022DCR
Acceptance Code: API 570	Calibration block: Stepwedge	Probe Type: DDA301
Procedure No:IND-QMS-TP-030	Surface Condition: Painted	Probe Serial No: HGE373

S. No.	TML / CML #	Item Description	Size (Inch)	Measuring Location								Min. Thickness	Avg. Thickness
				1	2	3	4	5	6	7	8		
1	1	End Cap	12	10.78	9.23	9.36	10.78	10.80	9.38	9.48	9.76	9.23	9.95
2	2	End Cap	12	10.97	10.62	9.93	9.79	10.76	10.50	11.14	10.40	9.79	10.51
3	3	Pipe	12	6.47	6.06	6.82	7.02	7.83	8.81	6.36	8.93	6.06	7.29
4	4	Pipe	10	5.44	5.53	4.07	4.64	5.48	5.53	6.05	5.36	4.07	5.26
5	4A	Pipe	10	4.85	5.68	4.71	4.92	5.19	5.22	6.33	6.22	4.71	5.39
6	5	Pipe	12	9.13	8.93	9.04	8.94	7.26	7.28	7.11	6.38	6.38	8.01
7	6	Tee	12 X 12	10.26	11.92	12.18	11.31	10.90	11.08	11.06	11.62	10.26	11.29
8	7	Tee	12 X 12	9.82	12.43	12.45	10.80	10.61	9.97	10.84	10.52	9.82	10.93
9	8	Tee	12 X 12	8.78	10.35	9.38	9.47	9.98	10.21	8.93	8.12	8.12	9.40
10	9	Pipe	12	8.66	8.76	9.73	6.19	6.14	4.04	5.77	5.76	4.04	6.88
11	10	Pipe	10	14.66	14.11	13.88	14.20	14.48	14.35	14.02	14.64	13.88	14.29
12	10A	Pipe	10	14.49	14.81	13.88	14.17	13.44	14.33	13.85	14.24	13.44	14.15
13	11	Pipe	12	8.76	6.66	8.98	7.40	8.67	8.97	7.60	8.82	6.66	8.23
14	12	End Cap	12	10.65	10.65	11.32	10.64	10.51	10.67	10.58	10.70	10.51	10.72
15	13	End Cap	12	9.36	9.12	9.24	9.04	9.15	8.89	9.80	8.92	8.89	9.19
16	14	Pipe	12	6.19	6.78	6.77	5.74	6.23	6.58	5.92	7.08	5.74	6.41
17	15	Pipe	12	7.05	6.99	7.00	6.19	6.16	7.10	6.87	7.12	6.16	6.81
18	16	Elbow	12	8.02	8.15	8.33	7.71	7.89	7.48	7.99	8.01	7.48	7.95
19	17	Elbow	12	8.23	10.30	9.92	7.96	8.03	6.92	7.78	8.19	6.92	8.42
20	18	Elbow	12	9.83	9.78	7.85	7.76	8.04	7.57	7.64	7.76	7.57	8.28
21	19	Pipe	12	9.10	7.91	5.16	6.84	5.57	5.73	8.37	8.99	5.16	7.21
22	20	Pipe	12	6.91	7.04	6.34	6.76	6.87	6.01	5.26	5.70	5.26	6.36
23	21	Pipe	12	7.38	7.66	6.62	5.54	6.52	6.84	6.94	6.40	5.54	6.74
24	22	Pipe	12	7.03	7.27	5.96	6.59	6.03	5.94	5.47	6.83	5.47	6.39
25	23	Pipe	12	7.16	7.11	6.65	6.62	-	-	-	-	6.62	6.89
26	24	Elbow	12	7.67	7.89	8.57	8.11	7.01	7.87	7.77	7.86	7.01	7.84
27	25	Elbow	12	8.18	8.23	9.55	8.40	8.51	8.65	8.54	7.77	7.77	8.48
28	26	Elbow	12	8.40	9.09	8.85	8.14	9.76	8.40	9.60	9.33	8.14	8.95
29	27	Pipe	12	7.46	7.01	8.15	8.63	8.41	7.78	7.10	7.46	7.01	7.75
30	28	Pipe	12	7.62	8.80	8.78	8.84	-	-	-	-	7.62	8.51

Remarks:

Particulars	Inspected By	Reviewed by
Name	Ali Uzair	Ali Nawaz
Qualification / Designation	UT Level II/Inspection Engineer	Sr. Inspection Engineer
Signature:		
Date	15/05/2019	15/05/2019

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**INDUSTRIAL SERVICES****ULTRASONIC THICKNESS GAUGING REPORT**

Report No: UTG/5007268/01

Rev. 0

Page: 01 of 01

Date: 15-05-2019

SGS Ref. No: 5007268	Examination Date: 15-05-2019	Data File Name : Train A 12 inch
Client: OGDCL	Object/Part Desc: Inter Cooler Discharge Train A	Thickness Mode : DUAL <input type="checkbox"/> DUAL M <input checked="" type="checkbox"/>
Project: FRCP Critical Piping Spool Inspection at Qadir Pur	Nominal Thickness : 8.40 mm	Drg. Ref No: NG-01-027-12"-6C20
Location: Qadir Pur Gas Field	Material: CS	Equipment : DMS 2
Examination Code: ASME SEC V	Couplant: Gell	Equipment Serial No: 022DCR
Acceptance Code: API 570	Calibration block: Stepwedge	Probe Type: DDA301
Procedure No: IND-QMS-TP-030	Surface Condition: Painted	Probe Serial No: HGE373

S. No.	TML / CML #	Item Description	Size Inch	Measuring Location								Min. Thickness	Avg. Thickness
				1	2	3	4	5	6	7	8		
31	29	Pipe	12	7.79	7.38	7.55	6.04	-	-	-	-	6.04	7.19
32	30	Pipe	12	6.89	7.41	7.13	6.86	7.01	7.20	7.04	7.08	6.86	7.08
33	31	Pipe	12	6.29	6.79	7.07	7.03	-	-	-	-	6.29	6.80
34	32	Pipe	12	5.16	8.62	4.68	7.01	-	-	-	-	4.68	6.37
35	33	Pipe	12	7.09	7.00	8.82	8.36	7.59	7.98	6.31	6.77	6.31	7.49
36	34	Tee	12 X 12	8.55	9.53	9.23	9.51	9.97	9.74	8.89	8.59	8.55	9.25
37	35	Tee	12 X 12	10.68	9.94	9.77	10.01	10.13	10.87	10.75	10.23	9.77	10.30
38	36	Tee	12 X 12	11.30	12.15	12.23	12.11	11.55	10.95	11.30	11.29	10.95	11.61
39	37	Reducer	12 X 10	9.23	9.47	9.60	8.22	7.72	9.56	9.33	9.45	7.72	9.07
40	38	Reducer	12 X 10	11.89	11.00	10.17	10.00	8.91	10.27	11.01	11.03	8.91	10.54
41	39	Pipe	10	7.74	7.91	6.64	6.13	6.02	6.36	6.72	6.43	6.02	6.74
42	40	Pipe	10	8.43	8.45	8.63	8.64	8.78	8.81	8.42	8.40	8.40	8.57
43	41	Elbow	10	10.27	10.32	10.38	10.31	10.49	10.27	10.22	10.06	10.06	10.29
44	42	Elbow	10	10.29	10.63	10.50	10.55	10.32	10.53	10.06	10.14	10.06	10.38
45	43	Elbow	10	10.44	10.32	10.24	10.32	9.87	10.38	10.27	10.61	9.87	10.31
46	44	Reducer	10 X 6	11.61	10.35	13.80	12.32	10.32	13.10	13.80	11.91	10.32	12.15
47	45	Reducer	10 X 6	15.20	14.63	15.31	14.72	14.89	14.18	13.91	14.98	13.91	14.73
48	46	Pipe	12	7.01	6.95	6.65	6.84	6.66	6.82	7.02	6.80	6.65	6.84
49	47	Pipe	12	6.90	6.83	6.87	6.84	-	-	-	-	6.83	6.86
50	48	Pipe	12	6.86	7.28	7.27	7.22	6.84	6.89	6.94	7.21	6.84	7.06
51	49	Pipe	12	9.18	8.57	8.47	8.46	8.36	8.36	8.84	9.05	8.36	8.66
52	50	Pipe	12	8.96	8.93	8.62	8.12	8.09	8.93	8.96	8.29	8.09	8.61
53	51	Tee	12 X 12	10.49	10.23	10.40	10.36	10.60	9.14	10.76	10.83	9.14	10.35
54	52	Tee	12 X 12	11.45	10.76	10.78	12.05	11.69	11.96	12.06	12.04	10.76	11.60
55	53	Tee	12 X 12	8.64	9.47	10.05	10.16	9.02	8.85	8.63	9.26	8.63	9.26
56	54	Reducer	12 X 6	13.73	13.69	13.69	13.06	13.26	13.18	12.99	13.04	12.99	13.33
57	55	Reducer	12 X 6	13.98	13.92	14.00	14.03	14.15	14.28	14.08	13.97	13.92	14.05
58	56	Reducer	6 X 4	7.50	7.55	7.86	8.26	8.37	7.94	8.57	7.68	7.50	7.97
59	57	Reducer	6 X 4	9.28	8.71	7.92	6.88	7.23	7.15	7.80	9.20	6.88	8.02

Remarks:

Particulars	Inspected By	Reviewed by
Name	Ali Uzair	Ali Nawaz
Qualification / Designation	UT Level II/Inspection Engineer	Sr. Inspection Engineer
Signature:		
Date	15/05/2019	15/05/2019

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SGS Pakistan Private Limited - H 3/3, Sector 5, Korangi Industrial Area, Karachi-74900, Pakistan. UAN: 92 (21) 111 222 747 Tel: 92-21-35121388-97 Fax: 92 (21) 3 5121386-87 Web : www.sgs.com

**INDUSTRIAL SERVICES****ULTRASONIC THICKNESS GAUGING REPORT**

Report No: UTG/5007268/01

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Date: 15-05-2019

SGS Ref. No: 5007268	Examination Date: 15-05-2019	Data File Name : Train A 12 inch
Client: OGDCL	Object/Part Desc: Inter Cooler Discharge (Train A)	Thickness Mode : DUAL <input type="checkbox"/> DUAL M <input checked="" type="checkbox"/>
Project: FRCP Critical Piping Spool Inspection at Qadir Pur	Nominal Thickness : 10.31 mm	Drg. Ref No: NG-01-027-12"-6C20A
Location: QadirPur Gas Field	Material: CS	Equipment : DMS 2
Examination Code: ASME SEC V	Couplant: Ultrasonic Gell	Equipment Serial No: 022DCR
Acceptance Code: API 570	Calibration block: Stepwedge	Probe Type: DDA301
Procedure No:IND-QMS-TP-030	Surface Condition: Painted	Probe Serial No: HGE373

S. No.	TML / CML #	Item Description	Size (Inch)	Measuring Location								Min. Thickness	Avg. Thickness
				1	2	3	4	5	6	7	8		
1	1	Elbow	12	8.72	8.05	8.85	8.09	8.27	9.08	8.99	9.40	8.05	8.68
2	2	Elbow	12	8.28	9.58	9.23	9.03	9.32	9.41	9.85	9.05	8.28	9.22
3	3	Elbow	12	8.83	9.40	9.28	7.18	9.18	9.38	8.66	9.38	7.18	8.91
4	4	Pipe	12	8.23	8.09	8.01	7.88	7.70	7.83	7.95	8.09	7.70	7.97
5	5	Pipe	12	7.94	8.05	8.07	8.09	-	-	-	-	7.94	8.04
6	6	Pipe	12	8.03	8.02	8.90	8.04	-	-	-	-	8.02	8.25
7	7	Pipe	12	7.39	7.23	7.80	8.22	7.93	7.93	7.78	7.86	7.23	7.77
8	8	Elbow	12	8.49	9.32	9.38	8.86	9.32	8.32	9.28	9.39	8.32	9.05
9	9	Elbow	12	9.29	8.29	9.29	8.47	8.25	9.09	9.19	9.26	8.25	8.89
10	10	Elbow	12	8.90	9.26	9.10	8.69	9.16	9.45	9.98	9.19	8.69	9.22
11	11	Pipe	12	7.82	7.82	8.05	7.97	8.09	8.02	7.48	8.13	7.48	7.92
12	12	Pipe	12	8.68	7.80	7.69	7.75	8.93	8.78	7.59	7.61	7.59	8.10
13	13	Pipe	12	8.64	8.21	7.78	8.07	8.07	7.89	7.93	7.79	7.78	8.05
14	14	Pipe	12	8.69	8.86	8.10	8.00	8.07	7.52	8.44	8.67	7.52	8.29
15	15	Elbow	12	9.59	9.85	9.37	9.41	9.10	9.49	9.65	9.15	9.10	9.45
16	16	Elbow	12	8.99	10.02	8.66	9.65	9.50	9.44	9.39	9.46	8.66	9.39
17	17	Elbow	12	9.44	9.65	10.22	9.69	9.53	9.54	9.50	9.35	9.35	9.62
18	18	Pipe	12	8.25	8.33	8.57	8.16	8.37	8.21	8.29	8.27	8.16	8.31
19	19	Pipe	12	8.72	8.82	8.13	8.18	9.00	8.84	9.07	7.85	7.85	8.58
20	20	Elbow	12	9.24	9.47	8.34	9.50	9.39	9.77	9.66	9.35	8.34	9.34
21	21	Elbow	12	10.12	10.12	9.39	9.61	8.63	8.74	9.19	8.76	8.63	9.32
22	22	Elbow	12	8.98	8.39	9.81	9.70	9.15	9.29	9.29	9.56	8.39	9.27
23	23	Pipe	12	8.05	8.70	8.09	8.11	8.26	8.81	7.93	8.23	7.93	8.27
24	24	Pipe	12	8.06	8.64	7.92	7.84	8.04	8.89	8.63	8.11	7.84	8.27
25	25	Pipe	12	8.30	8.20	8.86	8.37	8.61	8.78	9.02	8.40	8.20	8.57
26	26	Pipe	12	8.23	8.15	8.92	8.00	7.85	8.02	8.10	8.14	7.85	8.18
27	27	Elbow	12	9.82	9.52	9.78	9.25	9.43	9.54	9.58	9.29	9.25	9.53
28	28	Elbow	12	9.90	9.71	9.55	9.23	9.82	9.65	9.59	9.48	9.23	9.62
29	29	Elbow	12	11.37	11.31	11.31	10.77	11.50	10.51	11.22	11.06	10.51	11.13
30	30	Pipe	12	9.09	9.09	8.66	9.34	8.95	8.89	9.12	9.31	8.66	9.06

Remarks:

Particulars	Inspected By	Reviewed by
Name	Ali Uzair	Ali Nawaz
Qualification / Designation	UT Level II/Inspection Engineer	Sr. Inspection Engineer
Signature:		
Date	15/05/2019	15/05/2019

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**INDUSTRIAL SERVICES****ULTRASONIC THICKNESS GAUGING REPORT**

Report No: UTG/5007268/01

Rev. 0

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Date: 16-05-2019

SGS Ref. No: 5007268	Examination Date: 16-05-2019	Data File Name : Train A 12 inch
Client: OGDCL	Object/Part Desc: After Cooler Discharge Train A	Thickness Mode : DUAL <input type="checkbox"/> DUAL M <input checked="" type="checkbox"/>
Project: FRCP Critical Piping Spool Inspection at Qadir Pur	Nominal Thickness : 9.27 mm	Drg. Ref No: NG-01-033-10"-6C20 to G-DA2-10006
Location: Qadir Pur Gas Field	Material: CS	Equipment : DMS 2
Examination Code: ASME SEC V	Couplant: Gell	Equipment Serial No: 022DCR
Acceptance Code: API 570	Calibration block: Stepwedge	Probe Type: DDA301
Procedure No: IND-QMS-TP-030	Surface Condition: Painted	Probe Serial No: HGE373

S. No.	TML / CML #	Item Description	Size (Inch)	Measuring Location								Min. Thickness	Avg. Thickness
				1	2	3	4	5	6	7	8		
1	1	End Cap	10	10.95	10.98	10.91	10.90	11.10	10.20	10.81	10.87	10.20	10.84
2	2	End Cap	10	12.28	12.11	12.05	12.20	12.45	12.17	12.29	12.55	12.05	12.26
3	3	Pipe	10	8.58	8.33	8.12	7.11	8.59	8.66	8.35	8.01	7.11	8.22
4	4	Pipe	8	7.75	7.30	7.32	6.54	7.25	6.58	6.74	6.74	6.54	7.03
5	5	Pipe	10	7.72	6.96	7.38	6.71	6.83	7.19	6.80	6.70	6.70	7.04
6	6	Tee	10 x10	13.67	14.52	13.47	13.47	13.57	13.43	13.49	14.32	13.43	13.74
7	7	Tee	10 x10	12.26	12.32	12.77	11.75	11.79	11.57	11.56	11.51	11.51	11.94
8	8	Tee	10 x10	11.11	12.43	12.56	11.21	12.28	11.15	10.88	12.01	10.88	11.70
9	9	Pipe	10	9.09	8.35	7.35	6.59	6.13	6.19	7.80	7.88	6.13	7.42
10	10	Pipe	8	6.79	7.26	5.91	6.07	-	-	-	-	5.91	6.51
11	11	Pipe	10	9.56	9.32	9.59	7.53	9.65	8.54	7.25	7.28	7.25	8.59
12	12	End Cap	10	11.09	12.54	12.06	12.33	12.07	11.75	11.87	11.88	11.09	11.95
13	13	End Cap	10	11.06	11.13	10.89	10.93	10.95	10.96	10.90	11.22	10.89	11.01
14	14	Pipe	10	5.64	5.57	5.55	6.09	6.66	5.89	4.75	5.34	4.75	5.69
15	15	Pipe	10	6.36	6.58	6.47	6.42	6.51	6.56	6.41	6.70	6.36	0.00
16	16	Elbow	10	9.58	9.67	9.76	9.56	9.95	9.94	10.05	9.78	9.56	0.00
17	17	Elbow	10	10.36	9.54	9.15	9.15	9.20	10.85	10.60	10.84	9.15	0.00
18	18	Elbow	10	10.33	10.27	8.97	9.69	9.14	8.98	9.17	9.08	8.97	0.00
19	19	Pipe	10	7.98	8.22	6.67	6.76	6.84	6.74	7.21	6.26	6.26	0.00
20	20	Pipe	10	7.99	7.96	7.91	7.50	-	-	-	-	7.50	0.00
21	21	Pipe	10	7.09	6.79	7.06	6.98	6.39	6.26	5.72	6.26	5.72	0.00
22	22	Pipe	10	8.73	8.32	8.22	7.75	9.09	8.88	7.73	8.92	7.73	0.00
23	23	Pipe	10	8.74	8.16	8.52	8.05	8.81	8.79	8.40	8.80	8.05	0.00
24	24	Elbow	10	9.97	10.38	10.00	9.31	9.26	9.91	9.90	9.99	9.26	0.00
25	25	Elbow	10	9.91	10.71	9.83	9.11	10.56	9.88	9.87	9.59	9.11	9.93
26	26	Elbow	10	9.9	9.63	9.61	9.67	9.7	10.23	10.63	9.9	9.61	9.93
27	27	Pipe	10	8.01	7.99	7.64	7.54	8.15	8.10	8.18	8.04	7.54	7.96
28	28	Pipe	10	7.23	7.99	7.79	8.48	7.82	8.15	7.86	7.76	7.23	7.89
29	29	Elbow	10	10.72	10.75	10.84	11.15	11.96	10.67	10.83	10.94	10.67	10.98
30	30	Elbow	10	11.08	10.83	10.98	9.82	9.95	12.09	10.89	9.96	9.82	10.70

Remarks:

Particulars	Inspected By	Reviewed by
Name	Ali Uzair	Ali Nawaz
Qualification / Designation	UT Level II/Inspection Engineer	Sr. Inspection Engineer
Signature:		
Date	15/05/2019	15/05/2019

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INDUSTRIAL SERVICES

ULTRASONIC THICKNESS GAUGING REPORT

Report No: UTG/5007268/01
 Rev. 0
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 Date: 16-05-2019

SGS Ref. No: 5007268	Examination Date: 16-05-2019	Data File Name : Train A 12 inch
Client: OGDCL	Object/Part Desc: After Cooler Discharge Train A	Thickness Mode : DUAL <input type="checkbox"/> DUAL M <input checked="" type="checkbox"/>
Project: FRCP Critical Piping Spool Inspection at Qadir Pur	Nominal Thickness : 9.27 mm	Drg. Ref No: NG-01-033-10"-6C20 to G-DA2-10006
Location: Qadir Pur Gas Field	Material: CS	Equipment : DMS 2
Examination Code: ASME SEC V	Couplant: Gell	Equipment Serial No: 022DCR
Acceptance Code: API 570	Calibration block: Stepwedge	Probe Type: DDA301
Procedure No: IND-QMS-TP-030	Surface Condition: Painted	Probe Serial No: HGE373

S. No.	TML / CML #	Item Description	Size Inch	Measuring Location								Min. Thickness	Avg. Thickness
				1	2	3	4	5	6	7	8		
31	31	Elbow	10	11.56	11.14	11.74	10.91	10.82	10.69	10.57	10.67	10.57	11.01
32	32	Pipe	10	8.79	7.42	7.30	7.18	7.26	6.96	6.70	7.10	6.70	7.34
33	33	Pipe	10	7.44	7.09	7.02	7.01	-	-	-	-	7.01	7.14
34	34	Pipe	10	8.28	7.51	7.11	7.90	7.18	7.44	7.60	7.20	7.11	7.53
35	35	Elbow	10	10.04	10.48	10.65	11.40	11.34	11.08	10.91	11.04	10.04	10.87
36	36	Elbow	10	10.21	10.61	10.85	11.77	11.99	10.72	10.20	10.45	10.20	10.85
37	37	Elbow	10	9.95	10.56	11.01	10.51	9.61	9.93	9.51	9.04	9.04	10.02
38	38	Pipe	10	14.03	13.80	13.75	14.21	14.07	13.77	13.11	12.92	12.92	13.71
39	39	Pipe	10	12.69	13.54	13.59	12.89	-	-	-	-	12.69	13.18
40	40	Pipe	10	13.12	12.98	13.34	13.40	-	-	-	-	12.98	13.21
41	41	Pipe	10	14.01	13.98	13.63	13.45	13.30	13.19	13.40	13.34	13.19	13.54
42	42	Elbow	10	10.76	10.54	10.48	10.35	10.55	9.73	10.28	9.49	9.49	10.27
43	43	Elbow	10	10.96	11.01	12.35	11.20	11.23	11.02	10.53	10.47	10.47	11.10
44	44	Elbow	10	11.15	11.06	10.35	10.82	10.14	10.59	10.31	10.70	10.14	10.64
45	45	Pipe	10	9.40	8.95	7.80	7.41	6.91	6.94	7.53	8.71	6.91	7.96
46	46	Pipe	10	8.03	8.75	7.91	8.81	-	-	-	-	7.91	8.38
47	47	Pipe	10	9.18	8.69	8.74	8.66	-	-	-	-	8.66	8.82
48	48	Pipe	10	9.05	8.78	7.54	7.42	7.85	7.82	8.50	8.24	7.42	8.15
49	49	Tee	10 x 10	12.24	13.10	11.51	12.11	14.09	10.96	12.69	11.91	10.96	12.33
50	50	Tee	10 x 10	13.37	12.66	12.24	12.07	12.75	12.78	12.55	12.28	12.07	12.59
51	51	Tee	10 x 10	11.34	9.72	13.14	12.60	11.51	12.25	10.77	11.08	9.72	11.55
52	52	Pipe	10	9.09	9.76	9.24	8.14	9.41	10.48	9.03	7.93	7.93	9.14
53	53	Pipe	10	9.27	9.27	9.67	9.30	7.39	8.60	7.49	7.46	7.39	8.56
54	54	Pipe	10	9.45	7.00	6.95	7.03	7.29	7.55	6.93	7.15	6.93	7.42
55	55	Pipe	10	9.56	9.43	9.47	9.13	9.25	7.71	9.49	9.31	7.71	9.17
56	56	Tee	10 x 10	11.37	10.7	9.93	9.93	9.76	9.49	9.67	9.55	7.71	9.17
57	57	Tee	10 x 10	11.69	13.28	13.13	11.81	12.12	11.60	12.54	12.60	11.60	12.35
58	58	Tee	10 x 10	10.98	10.48	10.34	11.82	13.41	12.10	10.87	11.41	10.34	11.43
59	59	Pipe	10	9.52	9.51	9.64	9.31	7.34	8.31	9.40	9.74	7.34	9.10
60	60	Pipe	10	9.65	9.01	9.80	9.21	-	-	-	-	9.01	9.42

Remarks:

Particulars	Inspected By	Reviewed by
Name	Ali Uzair	Ali Nawaz
Qualification / Designation	UT Level II/Inspection Engineer	Sr. Inspection Engineer
Signature:		
Date	15/05/2019	15/05/2019

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**INDUSTRIAL SERVICES****ULTRASONIC THICKNESS GAUGING REPORT**

Report No: UTG/5007268/01

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Date: 16-05-2019

SGS Ref. No: 5007268	Examination Date: 16-05-2019	Data File Name : Train A 12 inch
Client: OGDCL	Object/Part Desc: After Cooler Discharge Train A	Thickness Mode : DUAL <input type="checkbox"/> DUAL M <input checked="" type="checkbox"/>
Project: FRCP Critical Piping Spool Inspection at Qadir Pur	Nominal Thickness : 9.27 mm	Drg. Ref No: NG-01-033-10"-6C20 to G-DA2-10006
Location: Qadir Pur Gas Field	Material: CS	Equipment : DMS 2
Examination Code: ASME SEC V	Couplant: Gell	Equipment Serial No: 022DCR
Acceptance Code: API 570	Calibration block: Stepwedge	Probe Type: DDA301
Procedure No: IND-QMS-TP-030	Surface Condition: Painted	Probe Serial No: HGE373

S. No.	TML / CML #	Item Description	Size Inch	Measuring Location								Min. Thickness	Avg. Thickness
				1	2	3	4	5	6	7	8		
61	61	Pipe	10	9.64	9.46	9.93	9.86	-	-	-	-	9.46	9.72
62	62	Pipe	10	9.58	9.43	9.62	9.90	9.80	10.04	9.54	9.55	9.43	9.68
63	63	Reducer	10 x 6	12.61	13.45	10.97	11.69	13.70	12.93	12.59	12.75	10.97	12.59
64	64	Reducer	10 x 6	13.45	13.51	13.04	11.62	10.98	12.56	11.35	12.34	10.98	12.36
65	65	Reducer	6 x 3	7.47	7.81	7.18	8.08	8.00	8.17	8.17	9.37	7.18	8.03
66	66	Reducer	6 x 3	8.51	8.99	8.14	8.34	-	-	-	-	8.14	8.50
67	67	Pipe	3	6.21	6.33	6.37	6.30	-	-	-	-	6.21	6.30
68	68	Pipe	3	6.24	6.34	6.21	6.42	-	-	-	-	6.21	6.30
69	69	Elbow	3	5.12	5.89	6.10	6.34	5.95	5.92	-	-	5.12	5.89
70	70	Tee	3 x 3	6.97	7.67	6.42	7.22	7.61	-	-	-	6.42	7.18
71	71	Pipe	3	6.27	5.99	6.16	6.34	-	-	-	-	5.99	6.19
72	72	Pipe	3	5.92	6.17	6.36	6.03	-	-	-	-	5.92	6.12
73	73	Elbow	3	5.68	5.77	6.40	6.03	5.81	5.83	-	-	5.68	5.92
74	74	Pipe	3	6.20	6.25	6.11	5.81	-	-	-	-	5.81	6.09
75	75	Pipe	3	6.11	5.98	6.01	6.00	-	-	-	-	5.98	6.03
76	76	Pipe	10	9.54	9.66	8.37	9.57	9.65	9.46	9.32	9.43	8.37	9.38
77	77	Pipe	10	9.76	10.33	9.58	9.11	9.79	9.93	9.93	9.91	9.11	9.79
78	78	Elbow	10	11.86	11.79	12.24	10.96	10.77	11.87	11.11	11.18	10.77	11.47
79	79	Elbow	10	11.42	12.02	11.80	12.60	12.76	11.22	11.31	11.91	11.22	11.88
80	80	Elbow	10	11.87	12.44	11.55	11.15	12.29	10.92	11.05	11.21	10.92	11.56
81	81	Elbow	10	11.67	11.58	10.99	11.06	12.00	10.82	11.08	12.13	10.82	11.42
82	82	Elbow	10	11.59	11.69	11.23	11.51	12.38	12.17	10.98	12.50	10.98	11.76
83	83	Elbow	10	11.65	11.70	11.21	12.23	11.15	11.46	11.02	11.60	11.02	11.50
84	84	Pipe	10	9.35	9.61	9.68	9.75	9.46	8.93	9.94	9.43	8.93	9.52
85	85	Pipe	10	8.83	8.91	8.44	8.92	-	-	-	-	8.44	8.78
86	86	Pipe	10	9.24	8.59	8.79	9.08	9.75	9.63	9.73	8.58	8.44	8.78
87	87	Elbow	10	11.82	10.73	11.92	11.01	12.20	12.35	11.89	11.55	10.73	11.68
88	88	Elbow	10	11.39	11.36	11.62	11.13	11.40	12.60	12.14	11.29	11.13	11.62
89	89	Elbow	10	11.25	11.72	11.93	11.90	11.34	11.22	11.33	11.87	11.22	11.57
90	90	Elbow	10	11.32	10.91	12.05	12.18	11.72	11.58	11.99	11.42	10.91	11.65

Remarks:

Particulars	Inspected By	Reviewed by
Name	Ali Uzair	Ali Nawaz
Qualification / Designation	UT Level II/Inspection Engineer	Sr. Inspection Engineer
Signature:		
Date	15/05/2019	15/05/2019

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**INDUSTRIAL SERVICES****ULTRASONIC THICKNESS GAUGING REPORT**

Report No: UTG/5007268/01

Rev. 0

Page: 04 of 05

Date: 16-05-2019

SGS Ref. No: 5007268	Examination Date: 16-05-2019	Data File Name : Train A 12 inch
Client: OGDCL	Object/Part Desc: After Cooler Discharge Train A	Thickness Mode : DUAL <input type="checkbox"/> DUAL M <input checked="" type="checkbox"/>
Project: FRCP Critical Piping Spool Inspection at Qadir Pur	Nominal Thickness : SCH. 40/SCH.80	Drg. Ref No: NG-01-033-10"-6C20 to G-DA2-10006
Location: Qadir Pur Gas Field	Material: CS	Equipment : DMS 2
Examination Code: ASME SEC V	Couplant: Gell	Equipment Serial No: 022DCR
Acceptance Code: API 570	Calibration block: Stepwedge	Probe Type: DDA301
Procedure No: IND-QMS-TP-030	Surface Condition: Painted	Probe Serial No: HGE373

S. No.	TML / CML #	Item Description	Size Inch	Measuring Location								Min. Thickness	Avg. Thickness
				1	2	3	4	5	6	7	8		
91	91	Elbow	10	11.51	11.31	12.25	12.64	12.64	12.54	12.63	11.53	11.31	12.13
92	92	Elbow	10	11.50	11.92	11.17	11.95	11.48	11.79	12.18	11.69	11.17	11.71
93	93	Pipe	10	9.73	9.94	10.02	10.02	10.40	10.14	8.74	9.75	8.74	9.84
94	94	Pipe	10	9.66	9.78	8.97	8.52	8.90	9.81	9.12	9.57	8.52	9.29
95	95	Elbow	10	12.35	11.58	11.91	12.99	10.62	11.76	12.33	11.94	10.62	11.94
96	96	Elbow	10	11.22	12.51	13.55	11.88	12.66	11.82	11.80	11.09	11.09	12.07
97	97	Elbow	10	11.19	11.80	11.34	11.68	11.14	12.24	12.02	12.19	11.14	11.70
98	98	Reducer	10 x 6	10.55	10.81	11.49	11.16	10.22	11.45	11.39	11.05	10.22	11.02
99	99	Reducer	10 x 6	12.43	13.95	11.39	11.07	12.91	12.65	12.62	13.05	11.07	12.51
100	100	Reducer	6 x 4	7.60	7.62	7.39	7.58	8.06	7.72	7.91	7.51	7.39	7.67
101	101	Reducer	6 x 4	11.96	11.80	9.12	8.42	8.28	8.69	8.68	7.49	7.49	9.31
102	102	Tee	2 x 2	5.64	5.74	6.11	5.66	5.92	5.91	-	-	5.64	5.83
103	103	Pipe	2	4.68	4.61	4.47	4.65	-	-	-	-	4.47	4.60
104	104	Pipe	2	4.07	4.53	4.78	4.18	-	-	-	-	4.07	4.39
105	105	Elbow	2	4.05	4.55	4.87	5.26	5.78	4.94	-	-	4.05	4.91
106	106	Pipe	2	8.54	7.67	8.20	8.24	-	-	-	-	7.67	8.16
107	107	Pipe	2	8.94	8.66	9.71	8.49	-	-	-	-	8.49	8.95
108	108	Tee	2 x 2	10.77	10.01	10.69	10.57	9.99	10.40	10.46	9.91	9.91	10.35
109	109	Pipe	2	8.89	9.25	8.99	9.28	-	-	-	-	8.89	9.10
110	110	Tee	2 x 2	9.84	10.60	11.39	10.14	8.66	-	-	-	8.66	10.13
111	111	Pipe	2	8.97	8.71	9.32	9.04	-	-	-	-	8.71	9.01
112	112	Pipe	2	9.11	9.40	9.27	9.09	-	-	-	-	9.09	9.22
113	113	Pipe	2	8.96	8.61	9.26	8.77	8.85	-	-	-	8.61	8.89
114	114	Pipe	2	8.83	9.01	8.19	8.46	-	-	-	-	8.19	8.62
115	115	Elbow	2	8.78	8.51	8.01	9.49	9.19	9.86	-	-	8.01	8.97
116	116	Pipe	2	9.03	9.4	9.15	9.19	-	-	-	-	8.01	8.97
117	117	Pipe	2	9.24	8.59	8.73	8.65	-	-	-	-	8.59	8.80
118	118	Pipe	10	15.30	14.47	14.48	14.57	14.93	14.18	15.03	15.18	14.18	14.77
119	119	Pipe	10	15.22	14.77	14.60	15.41	-	-	-	-	14.60	15.00
120	120	Pipe	10	14.87	14.83	14.69	15.30	15.17	14.59	14.79	15.60	14.59	14.98

Remarks:

Particulars	Inspected By	Reviewed by
Name	Ali Uzair	Ali Nawaz
Qualification / Designation	UT Level II/Inspection Engineer	Sr. Inspection Engineer
Signature:		
Date	15/05/2019	15/05/2019

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ANNEXURE – IV

Design Data Calculation

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	15.05.2019

FRCP Piping Spool Inspection At Qadirpur

Pipeline Identification: NG-01-027-12"-6C20 (Train-A)

Design Data

Design Code	ASME B 31.3		
Material	API 5L X60		
Dia / Sch	12"/ 30		
Design Pressure (P)	910	psig	
Design Temp	170	°F	
Operating Pressure	549	psig	
Operating Temp	117	°F	

Calculation Inputs

Service period	21.25	years	
Outside dia (D)	12.750	inches	
Original thickness ($t_{initial}$)	8.38	mm	API 574 (Table-1)
Previous Thickness; determined from last inspection	5.34	mm	TML # 09 (Previous UTG Report)
Thickness determined from inspection (t)	4.04	mm	TML # 09
	0.1591	inches	
Corrosion Allowance	Note-1	mm	
Allowable Stress (S)	25000	psi	ASME B31.3 (Table A-1)
Longitudinal Weld Efficiency (E)	1		ASME B31.3 (Table A-1B)
Value of coefficient (Y)	0.4		ASME B31.3 (Table 304.1.1)
Time between current and previous	2.25	years	
Recommended Insp Interval	0	years	API -570 Table-2
	0	months	

Calculation Outputs

Pressure Design Thickness (Internal Pressure) (Note-4)	5.8095	mm	ASME B31.3, Chapter II Eq (3a)
	0.2287	inches	
Minimum Structural Thickness	2.80	mm	API-RP-574, Table-6
	0.11	inches	
Minimum Required Thickness (Note-2)	5.81	mm	API-RP-574,
		inches	
Observed Corrosion Rate (LT)	0.204	mm / year	API-570, Sec 7.1.1
Observed Corrosion Rate (ST)	0.578	mm / year	API-570, Sec 7.1.1
Estimated Corrosion loss (CL) by date of next inspection (Note-3)	0.0000	mm	API-570, Table 7-1
	0.0000	inches	
MAWP (Note-4)	624	psig	API-570, Table 7-1
MAWP till next inspection (Note-4)	624	psig	API-570, Table 7-1
Remaining Life	-3.06	years	API-570, Section 7.1 Based on ST corrosion rate

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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 1 of 2, Dated: 01-10-2014

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	15.05.2019

FRCP Piping Spool Inspection At Qadirpur

Conclusion:

Unsatisfactory to operate on current parameters. It is strongly recommended that current portion is replaced with new one in order to increase the integrity of piping for continuous safe operation. Also it is strongly recommended that whenever replacement activity is performed on piping then stage inspection is recommended.

Note-1: Not Available

Note-2: Greater of internal Pressure Thickness or Structural Thickness.

Note-3: Based on Larger of the Long Term (LT) corrosion rate or Short Term (ST) corrosion rate

Note-4: Calculated for assessment purpose only. This allowable working pressure will not exceed the original design condition, until/unless rerating to be carried out by engineering

Particulars	Inspected By	Reviewed By
Signature		
Name	Ali Nawaz	Mashooq Ali
Date	14-05-2019	14-05-2019



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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 2 of 2, Dated: 01-10-2014

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	15.05.2019

FRCP Piping Spool Inspection At Qadirpur

Pipeline Identification: NG-01-027-12"-6C20A (Train-A)

Design Data

Design Code	ASME B 31.3		
Material	API 5L X60		
Dia / Sch	12"/ 40		
Design Pressure (P)	910	psig	
Design Temp	170	°F	
Operating Pressure	549	psig	
Operating Temp	116	°F	

Calculation Inputs

Service period	21.25	years	
Outside dia (D)	12.750	inches	
Original thickness (t _{initial})	10.31	mm	API 574 (Table-1)
Previous Thickness; determined from last inspection	8.71	mm	TML # 19 (Previous UTG Report)
Thickness determined from inspection (t)	7.18	mm	TML # 03
	0.2827	inches	
Corrosion Allowance	Note-1	mm	
Allowable Stress (S)	25000	psi	ASME B31.3 (Table A-1)
Longitudinal Weld Efficiency (E)	1		ASME B31.3 (Table A-1B)
Value of coefficient (Y)	0.4		ASME B31.3 (Table 304.1.1)
Time between current and previous	2.25	years	
Recommended Insp Interval	1	years	API -570 Table-2
	12	months	

Calculation Outputs

Pressure Design Thickness (Internal Pressure)	5.8095	mm	ASME B31.3, Chapter II Eq (3a)
	0.2287	inches	
Minimum Structural Thickness	2.80	mm	API-RP-574, Table-6
	0.11	inches	
Minimum Required Thickness (Note-2)	5.81	mm	API-RP-574,
		inches	
Observed Corrosion Rate (LT)	0.147	mm / year	API-570, Sec 7.1.1
Observed Corrosion Rate (ST)	0.680	mm / year	API-570, Sec 7.1.1
Estimated Corrosion loss (CL) by date of next inspection (Note-3)	0.6800	mm	API-570, Table 7-1
	0.0268	inches	
MAWP (Note-4)	1109	psig	API-570, Table 7-1
MAWP till next inspection (Note-4)	899	psig	API-570, Table 7-1
Remaining Life	2.02	years	API-570, Section 7.1 Based on ST corrosion rate

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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 1 of 2, Dated: 01-10-2014

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	15.05.2019

FRCP Piping Spool Inspection At Qadirpur

Conclusion:

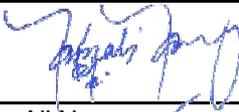
Satisfactory to operate on current parameters till next inspection interval. Next inspection interval is 01 year.

Note-1: Not Available

Note-2: Greater of internal Pressure Thickness or Structural Thickness.

Note-3: Based on Larger of the Long Term (LT) corrosion rate or Short Term (ST) corrosion rate

Note-4: Calculated for assessment purpose only. This allowable working pressure will not exceed the original design condition, until/unless rerating to be carried out by engineering

Particulars	Inspected By	Reviewed By
Signature		
Name	Ali Nawaz	Mashooq Ali
Date	14-05-2019	14-05-2019



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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 2 of 2, Dated: 01-10-2014

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	16.05.2019

FRCP Piping Spool Inspection At Qadirpur

Pipeline Identification: NG-01-033-10"-6C20 (Train-A)

Design Data

Design Code	ASME B 31.3		
Material	API 5L X60		
Dia / Sch	10"/ 40		
Design Pressure (P)	910	psig	
Design Temp	170	°F	
Operating Pressure	747	psig	
Operating Temp	130	°F	

Calculation Inputs

Service period	21.25	years	
Outside dia (D)	10.750	inches	
Original thickness (t _{initial})	9.27	mm	API 574 (Table-1)
Previous Thickness; determined from last inspection	5	mm	TML # 14 (Previous UTG Report)
Thickness determined from inspection (t)	4.75	mm	TML # 14
	0.1870	inches	
Corrosion Allowance	Note-1	mm	
Allowable Stress (S)	25000	psi	ASME B31.3 (Table A-1)
Longitudinal Weld Efficiency (E)	1		ASME B31.3 (Table A-1B)
Value of coefficient (Y)	0.4		ASME B31.3 (Table 304.1.1)
Time between current and previous	2.25	years	
Recommended Insp Interval	0	years	API -570 Table-2
	0	months	

Calculation Outputs

Pressure Design Thickness (Internal Pressure)	4.8982	mm	ASME B31.3, Chapter II Eq (3a)
	0.1928	inches	
Minimum Structural Thickness	2.80	mm	API-RP-574, Table-6
	0.11	inches	
Minimum Required Thickness (Note-2)	4.90	mm	API-RP-574,
		inches	
Observed Corrosion Rate (LT)	0.213	mm / year	API-570, Sec 7.1.1
Observed Corrosion Rate (ST)	0.111	mm / year	API-570, Sec 7.1.1
Estimated Corrosion loss (CL) by date of next inspection (Note-3)	0.0000	mm	API-570, Table 7-1
	0.0000	inches	
MAWP (Note-4)	870	psig	API-570, Table 7-1
MAWP till next inspection (Note-4)	870	psig	API-570, Table 7-1
Remaining Life	-0.70	years	API-570, Section 7.1 Based on ST corrosion rate

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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 1 of 2, Dated: 01-10-2014

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	16.05.2019

FRCP Piping Spool Inspection At Qadirpur

Conclusion:

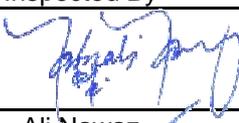
Unsatisfactory to operate on current parameters. It is strongly recommended that current portion is replaced with new one in order to increase the integrity of wellhead piping for continuous safe operation. Also it is strongly recommended that whenever replacement activity is performed on piping then stage inspection is recommended.

Note-1: Not Available

Note-2: Greater of internal Pressure Thickness or Structural Thickness.

Note-3: Based on Larger of the Long Term (LT) corrosion rate or Short Term (ST) corrosion rate

Note-4: Calculated for assessment purpose only. This allowable working pressure will not exceed the original design condition, until/unless rerating to be carried out by engineering

Particulars	Inspected By	Reviewed By
Signature		
Name	Ali Nawaz	Mashooq Ali
Date	14-05-2019	14-05-2019



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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 2 of 2, Dated: 01-10-2014

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	16.05.2019

FRCP Piping Spool Inspection At Qadirpur

Pipeline Identification: 10"-G-DA2-10006 (Train-A)

Design Data

Design Code	ASME B 31.3		
Material	A-106 Gr. B (Assumed)		
Dia / Sch	10"/ 80		
Design Pressure (P)	910	psig	
Design Temp	170	°F	
Operating Pressure	747	psig	
Operating Temp	130	°F	

Calculation Inputs

Service period	21.25	years	
Outside dia (D)	10.750	inches	
Original thickness (t _{initial})	15.09	mm	API 574 (Table-1)
Previous Thickness; determined from last inspection	13.29	mm	TML # 127 (Previous UTG Report)
Thickness determined from inspection (t)	13.20	mm	TML # 123
	0.5197	inches	
Corrosion Allowance	Note-1	mm	
Allowable Stress (S)	20000	psi	ASME B31.3 (Table A-1)
Longitudinal Weld Efficiency (E)	1		ASME B31.3 (Table A-1B)
Value of coefficient (Y)	0.4		ASME B31.3 (Table 304.1.1)
Time between current and previous	2.25	years	
Recommended Insp Interval	5	years	API -570 Table-2
	60	months	

Calculation Outputs

Pressure Design Thickness (Internal Pressure)	6.1009	mm	ASME B31.3, Chapter II Eq (3a)
	0.2402	inches	
Minimum Structural Thickness	2.80	mm	API-RP-574, Table-6
	0.11	inches	
Minimum Required Thickness (Note-2)	6.10	mm	API-RP-574,
		inches	
Observed Corrosion Rate (LT)	0.089	mm / year	API-570, Sec 7.1.1
Observed Corrosion Rate (ST)	0.040	mm / year	API-570, Sec 7.1.1
Estimated Corrosion loss (CL) by date of next inspection (Note-3)	0.4447	mm	API-570, Table 7-1
	0.0175	inches	
MAWP (Note-4)	1934	psig	API-570, Table 7-1
MAWP till next inspection (Note-4)	1803	psig	API-570, Table 7-1
Remaining Life	79.82	years	API-570, Section 7.1 Based on ST corrosion rate

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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 1 of 2, Dated: 01-10-2014

	INDUSTRIAL SERVICES	Job #	5007268
	Design Data/Calculation Sheet	Rev:	0
		Page:	01 of 02
		Date:	16.05.2019

FRCP Piping Spool Inspection At Qadirpur

Conclusion:

Satisfactory to operate on current parameters till next inspection interval. Next inspection interval is 05 years.

Note-1: Not Available

Note-2: Greater of internal Pressure Thickness or Structural Thickness.

Note-3: Based on Larger of the Long Term (LT) corrosion rate or Short Term (ST) corrosion rate

Note-4: Calculated for assessment purpose only. This allowable working pressure will not exceed the original design condition, until/unless rerating to be carried out by engineering

Particulars	Inspected By	Reviewed By
Signature		
Name	Ali Nawaz	Mashooq Ali
Date	14-05-2019	14-05-2019



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Title: Calculation Sheet for Process Piping (B 31.3), Ref: IND-QMS-FOR-019, Revision: 00, Page: 2 of 2, Dated: 01-10-2014

ANNEXURE – V

**Phased Array Ultrasonic
Testing**

INSPECTION DESCRIPTION

SGS Job No.	5007267	Equipment	Piping Spool of Train A	Date of Examination	29 May. 2019
Client	OGDCL	Material	CS	Weld Method	SMAW
Project	(JT-PP-QP-033) PRCP Piping Spools Inspection.	Drawing No.	-----	Weld Prep.	Single Vee
Location	Qadirpur Gas Field	Wall Thickness	12.70 mm	Procedure No	IND-QMS-TP-45
Examination Code	ASME Sec V Article 23	Surface Condition	Clean	Equipment Calibration Sheet	As per procedure
Acceptance Code	ASME B 31.3	Surface Temperature	Ambient	Data Folder Name	PAUT of Thall West Well-1

EQUIPMENT & ACCESSORIES DESCRIPTION

Equipment Make	Olympus	Probe ID	5L-64-A-2	Calibration Block	BCB Curvature
Equip. S/N	OMNI2-MX2 102292	Probe S/N	F-1184	Reference Block	BCB Curvature
Acquisition Software	MXU 4.1	Wedge ID	N-55S-A-2	Scanner	Manual Scanner
Analysis Software	Tomo View-2.10R7	Wedge S/N	-	Encoder S/N	ENC-01
Storage Device	SD-Card	Couplant	Water	Encoder Resolution	-

EQUIPMENT SETTING

Voltage	40	Reference Sensitivity	26~32	Focus Mode	Range
Bits/sample	8	Scanning Sensitivity	32~38	PRF	40

Reference Marking Detail

Limitations & Un-accessibilities if Any :

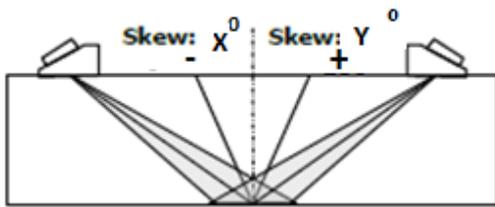


Figure 1:-Phased Array Probe Skews

(For Omniscan X & Y are 90 & 270 respectively whereas for TD Scan X & Y are 0 & 180 respectively)

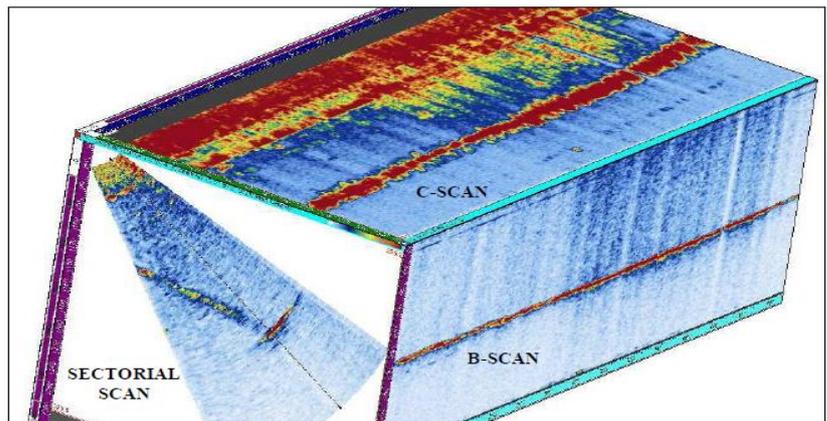


Figure 2:- Different Phased Array Images



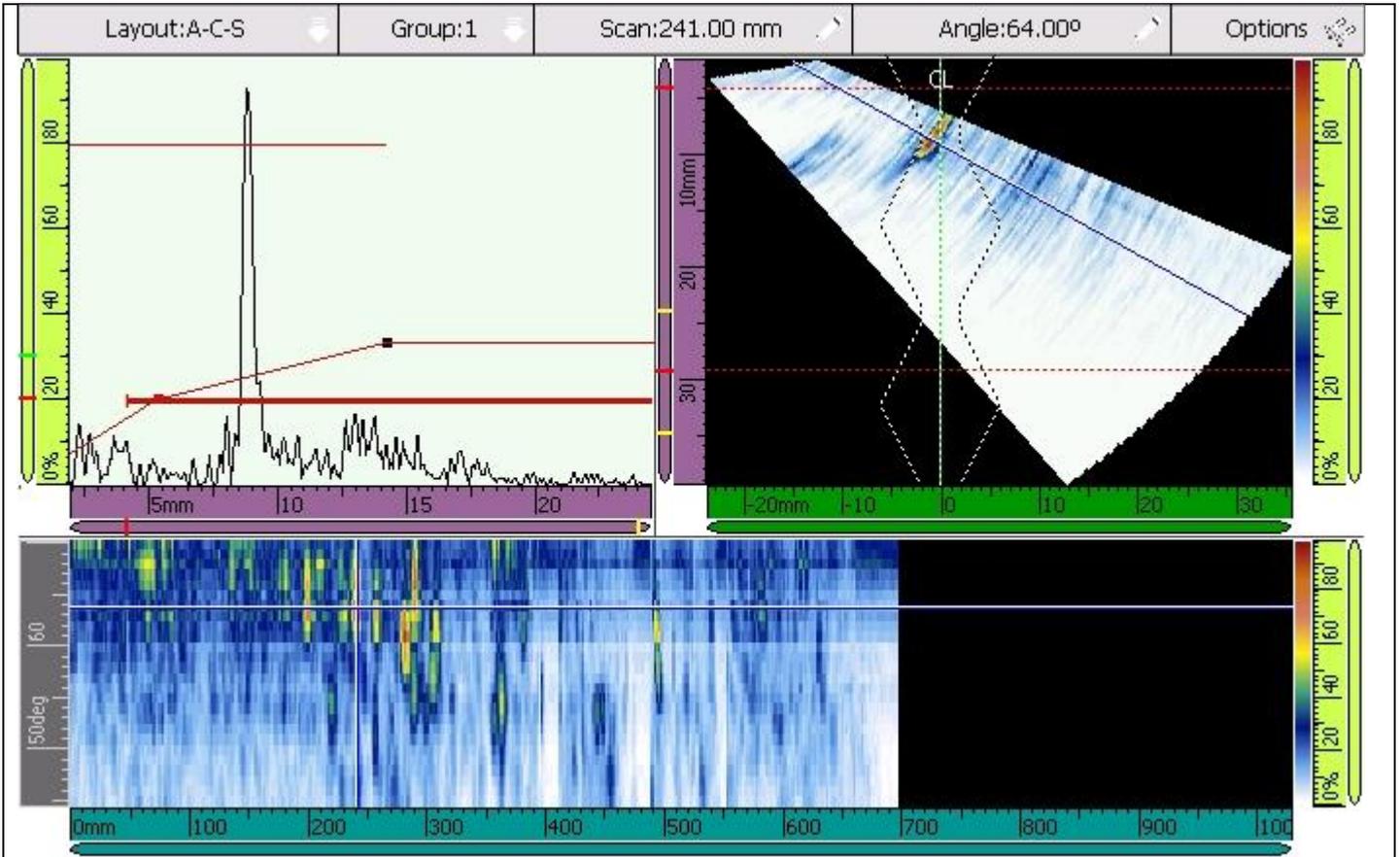
(JT-PP-QP-033) PRCP Piping
Spools Inspection.
PHASED ARRAY EXAMINATION
REPORT

Report No: PAUT/5007268/03

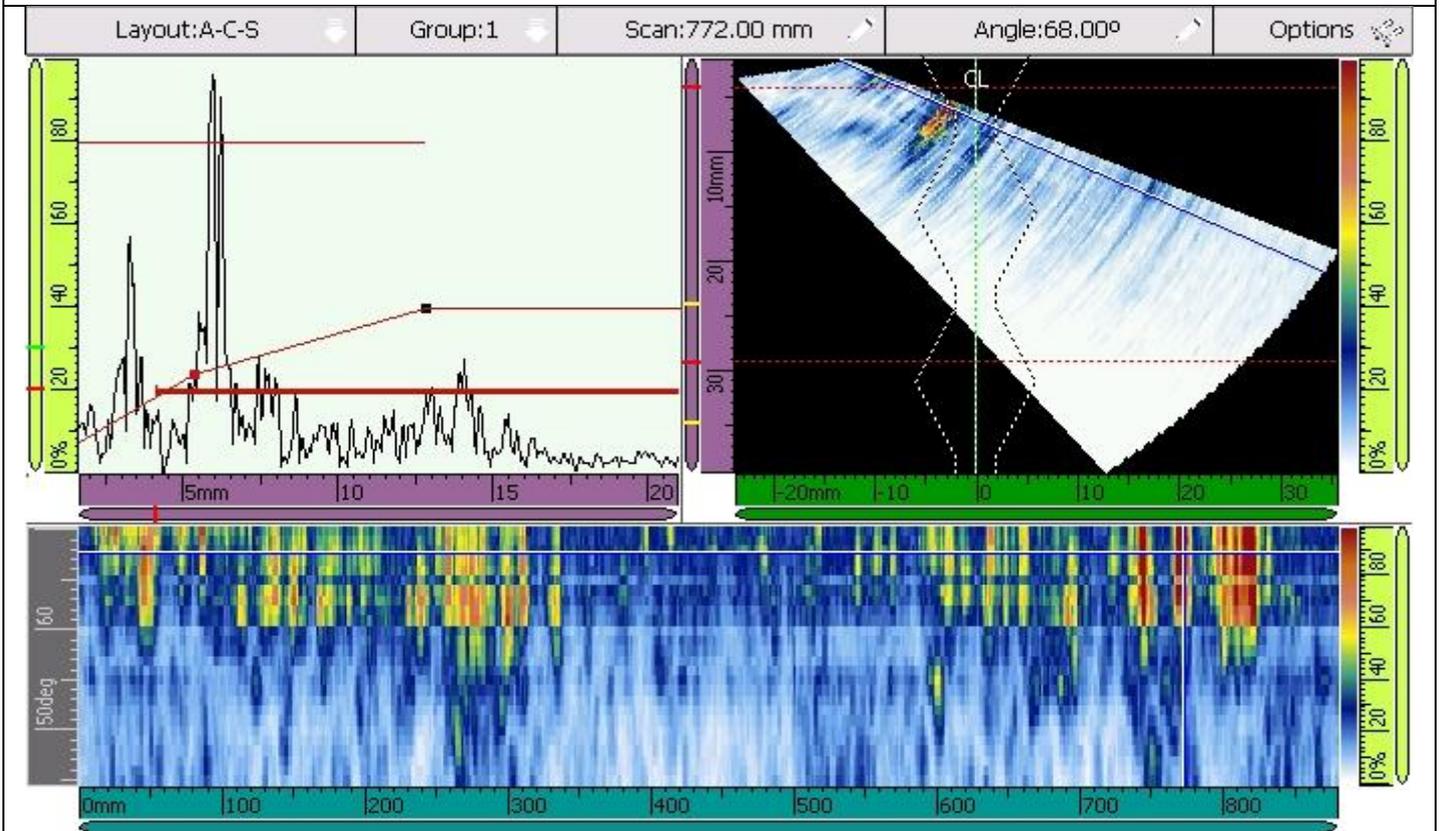
Rev :00

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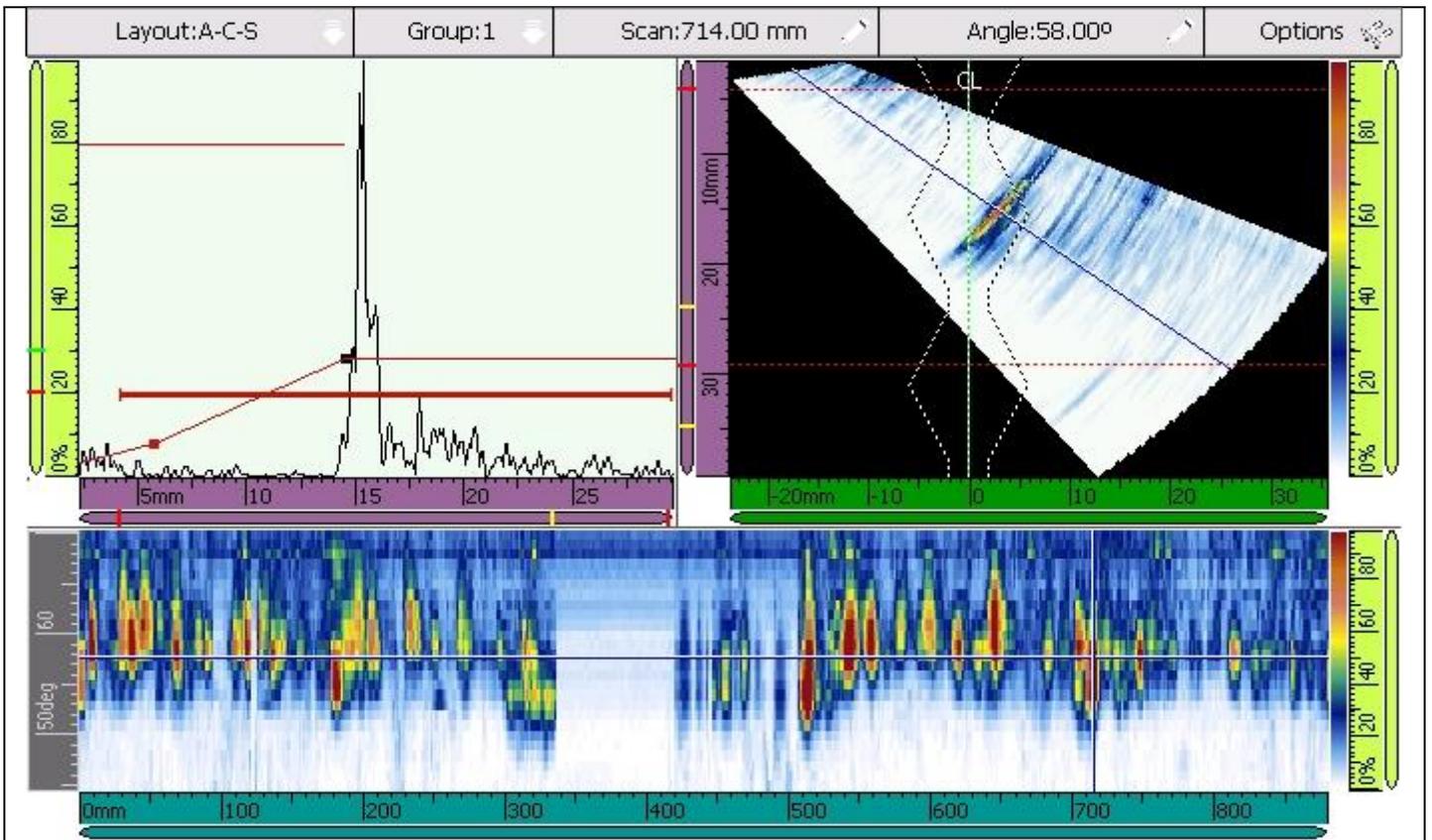
Date: 29 May, 2019



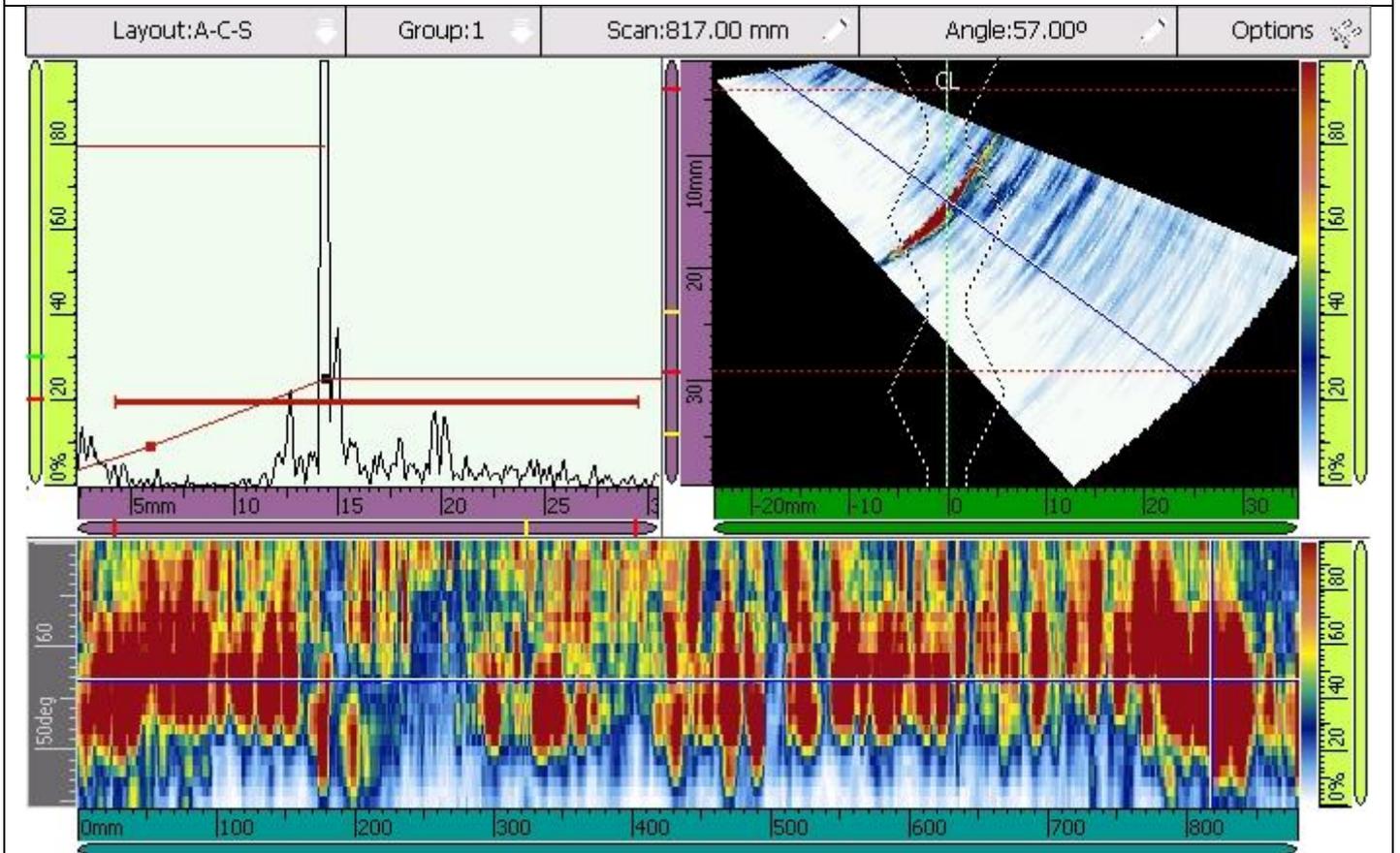
NG-01-027-12''-6C20-W-01



NG-01-027-12''-6C20-W-02



NG-01-027-12"-6C20-W-03



NG-01-027-12"-6C20-W-04



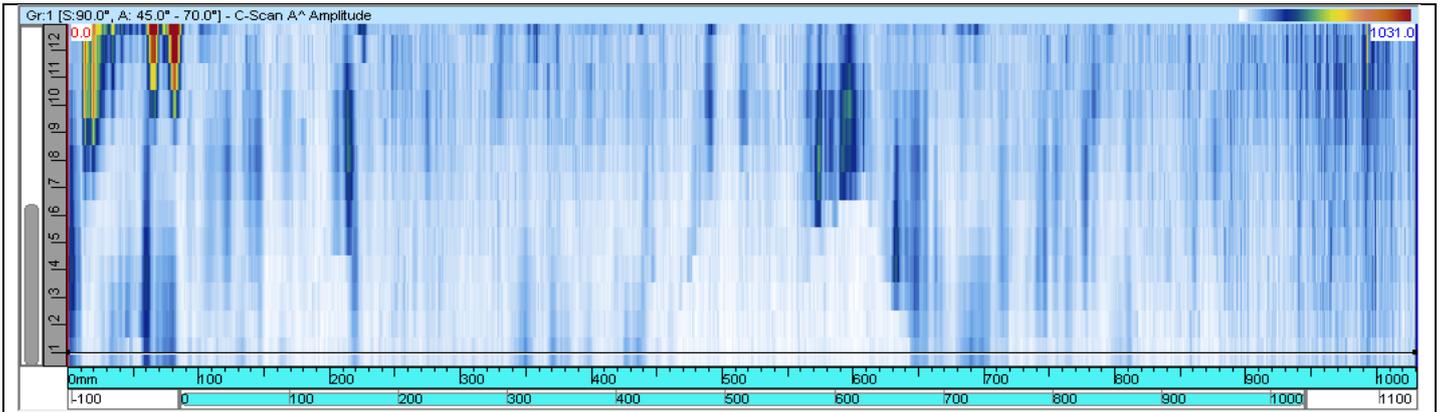
(JT-PP-QP-033) PRCP Piping
Spools Inspection.
PHASED ARRAY EXAMINATION
REPORT

Report No: PAUT/5007268/03

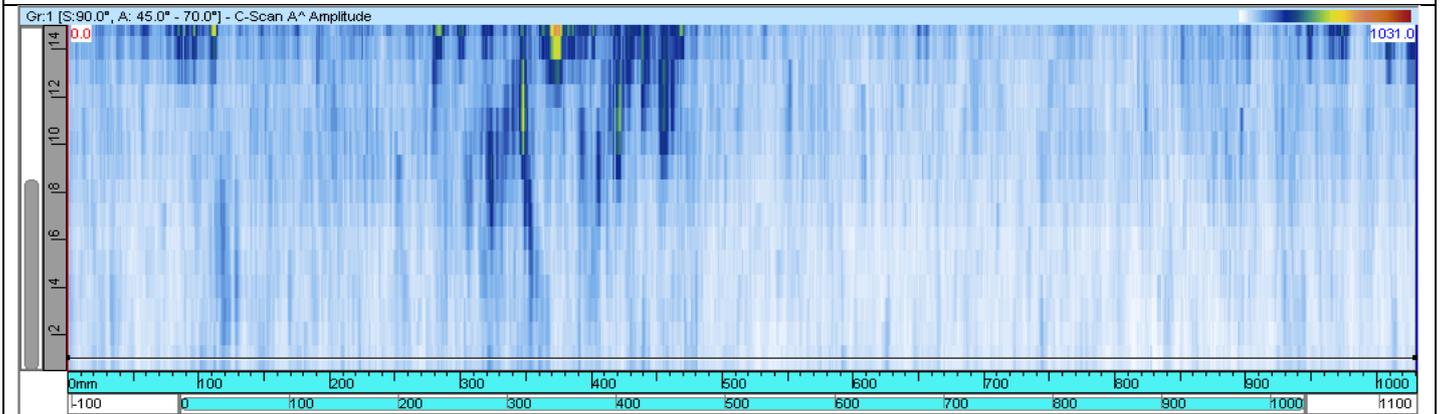
Rev :00

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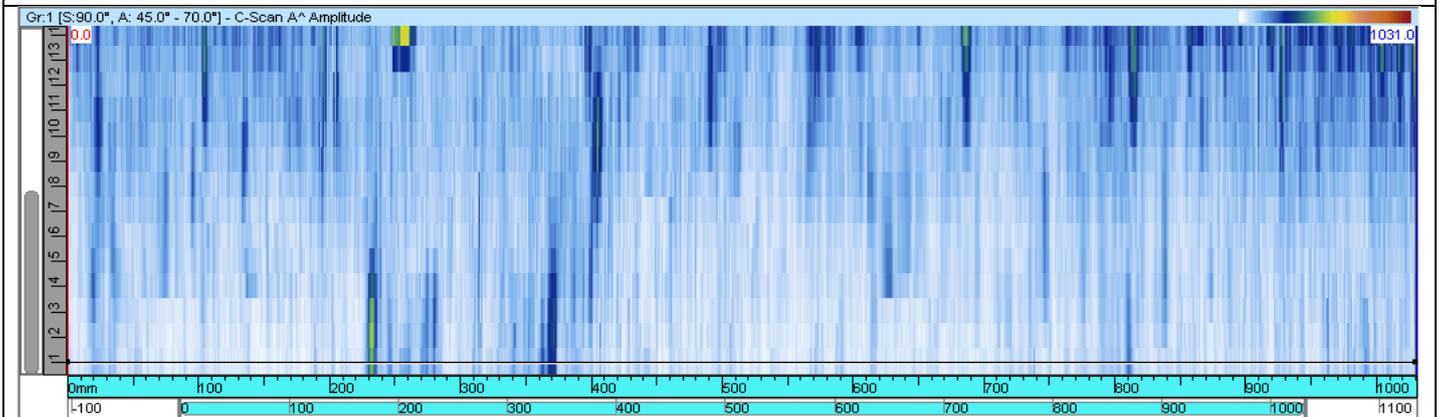
Date: 29 May, 2019



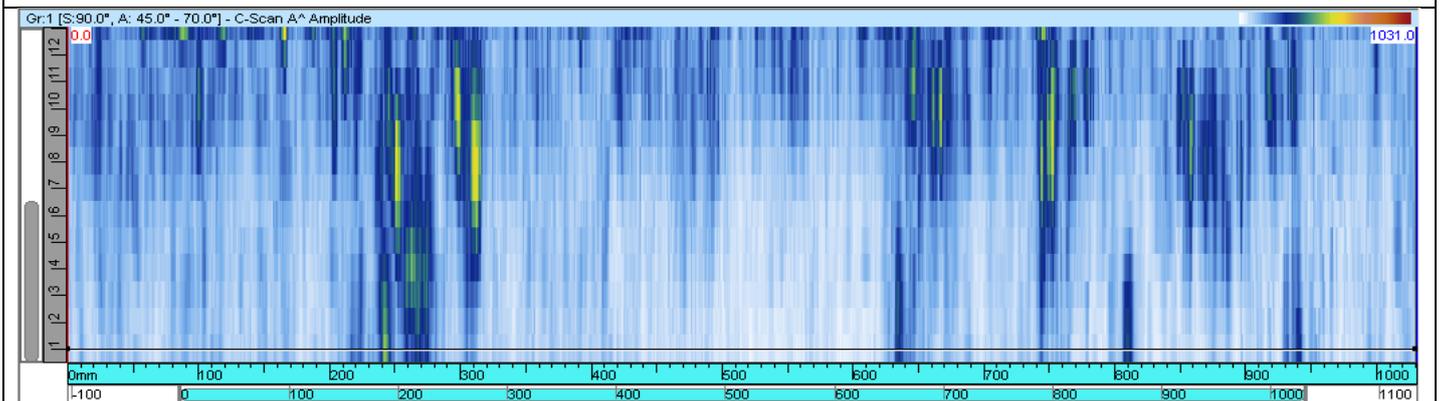
NG-01-027-12''-6C20-W-05



NG-01-027-12''-6C20A-W-01



NG-01-027-12''-6C20A-W-02



NG-01-027-12''-6C20A-W-03



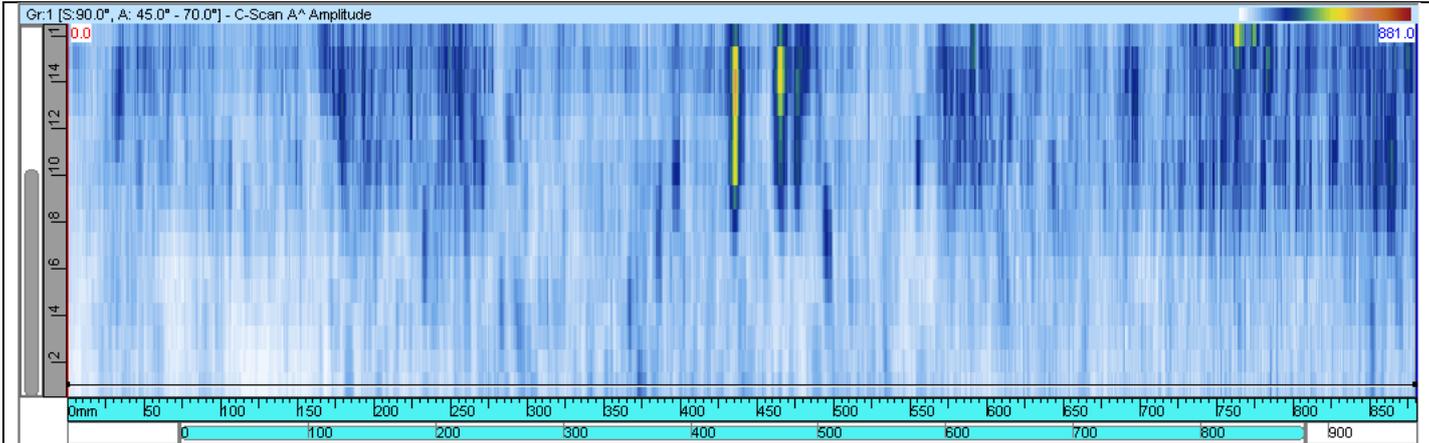
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Spools Inspection.
PHASED ARRAY EXAMINATION
REPORT

Report No: PAUT/5007268/03

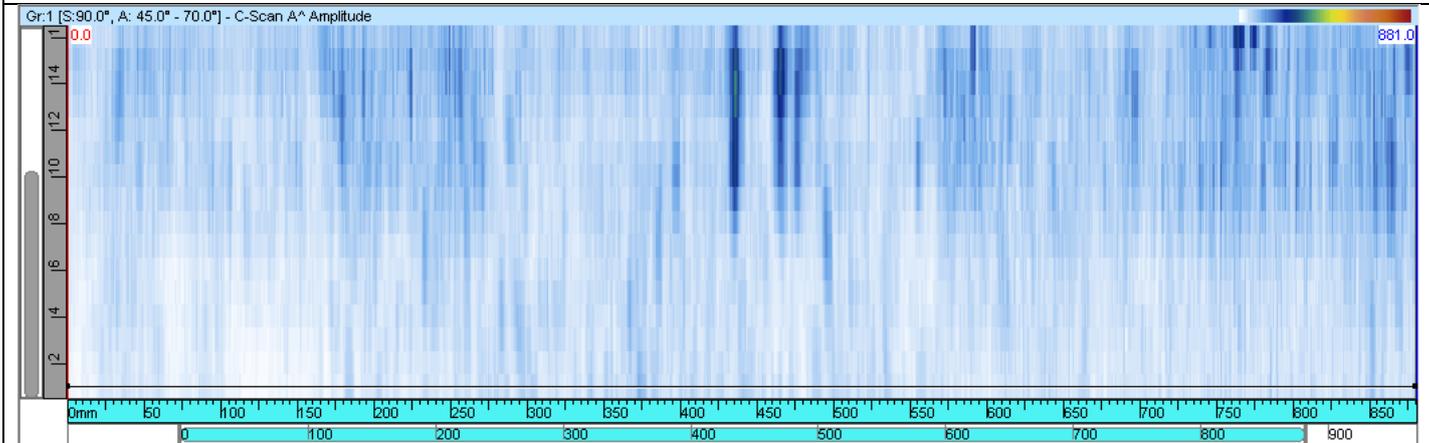
Rev :00

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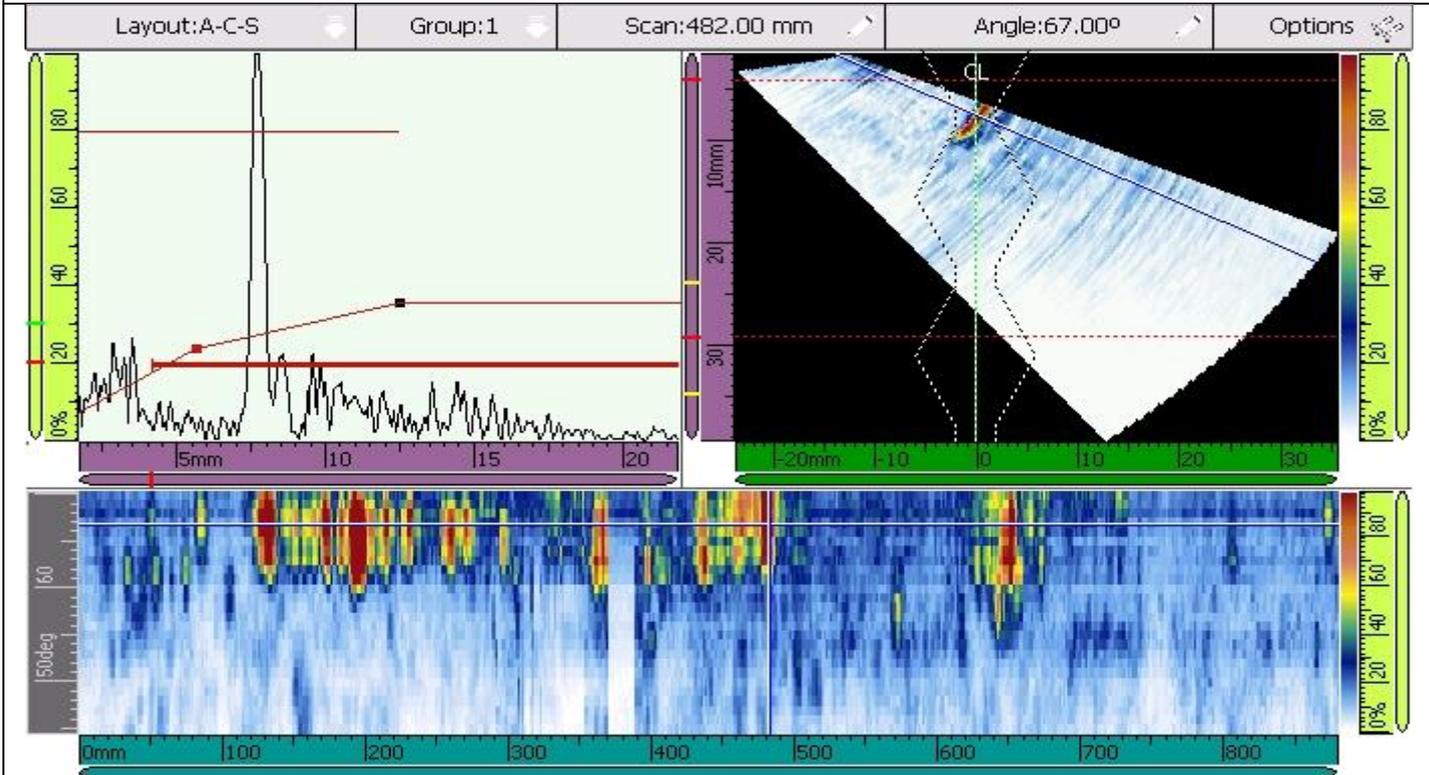
Date: 29 May, 2019



NG-01-033-10''-6C20-W-01



NG-01-033-10''-6C20-W-01



NG-01-033-10''-6C20-W-03



(JT-PP-QP-033) PRCP Piping
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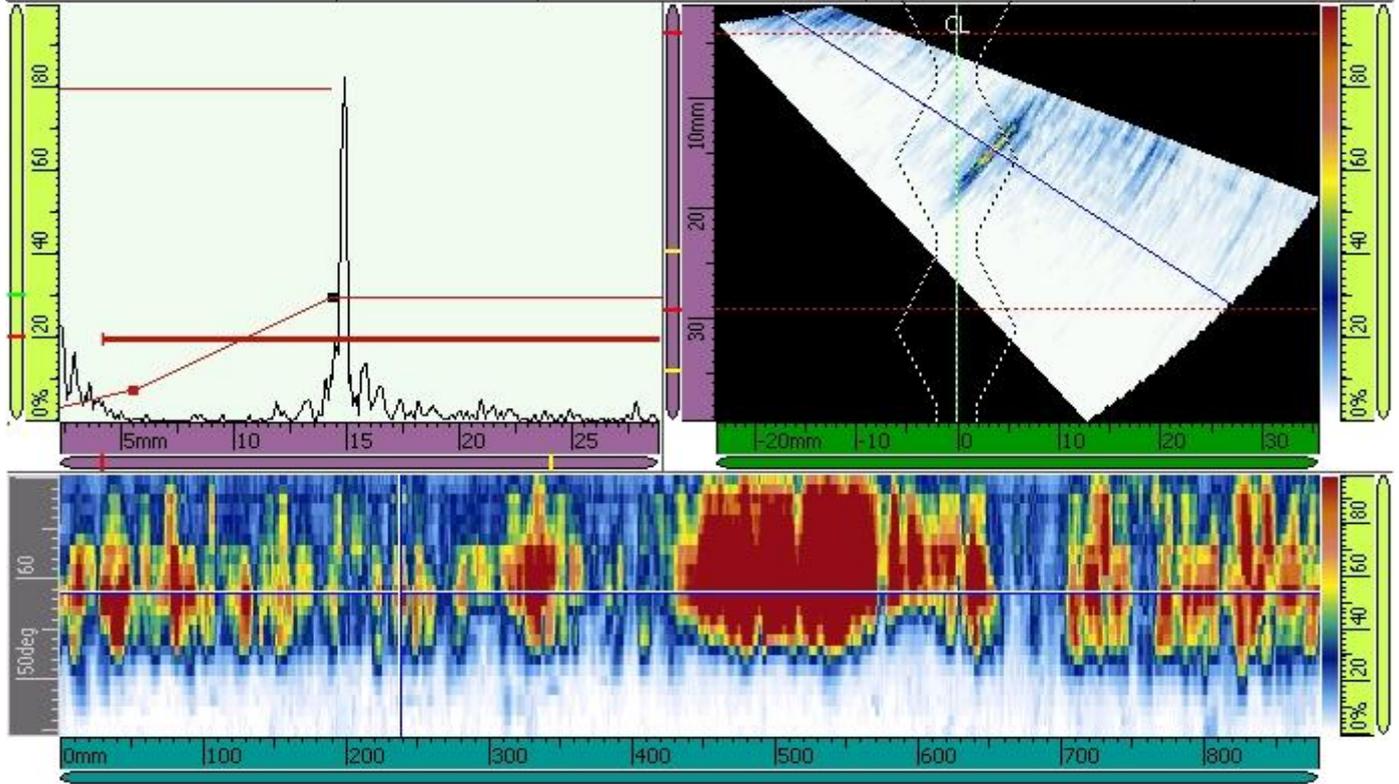
Layout:A-C-S

Group:1

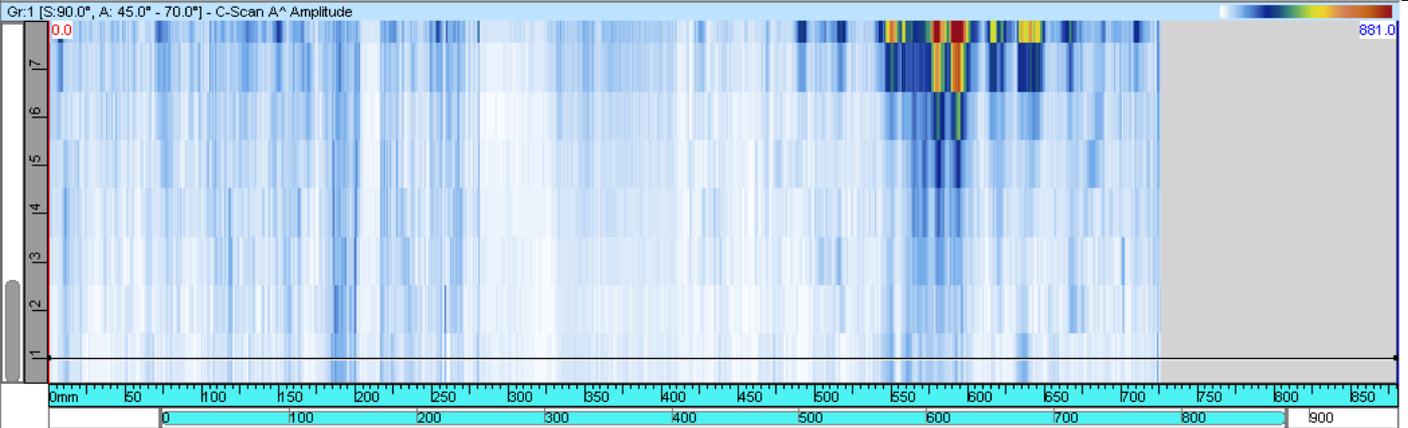
Scan:236.00 mm

Angle:59.00°

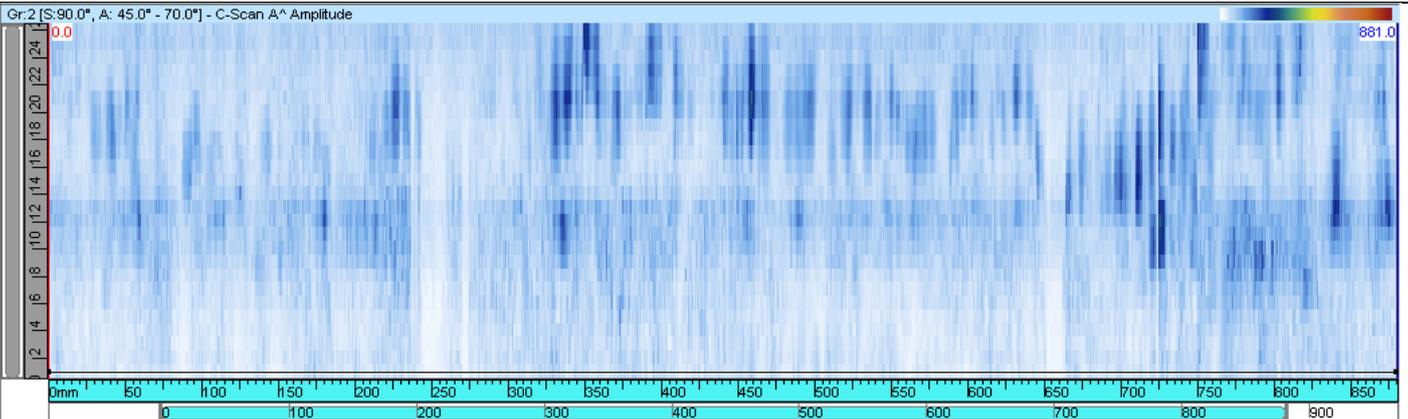
Options



NG-01-033-10"-6C20-W-04



NG-01-033-10"-6C20-W-05



10"-G-DA2-10006-W-01



**(JT-PP-QP-033) PRCP Piping
Spools Inspection.**
**PHASED ARRAY EXAMINATION
REPORT**

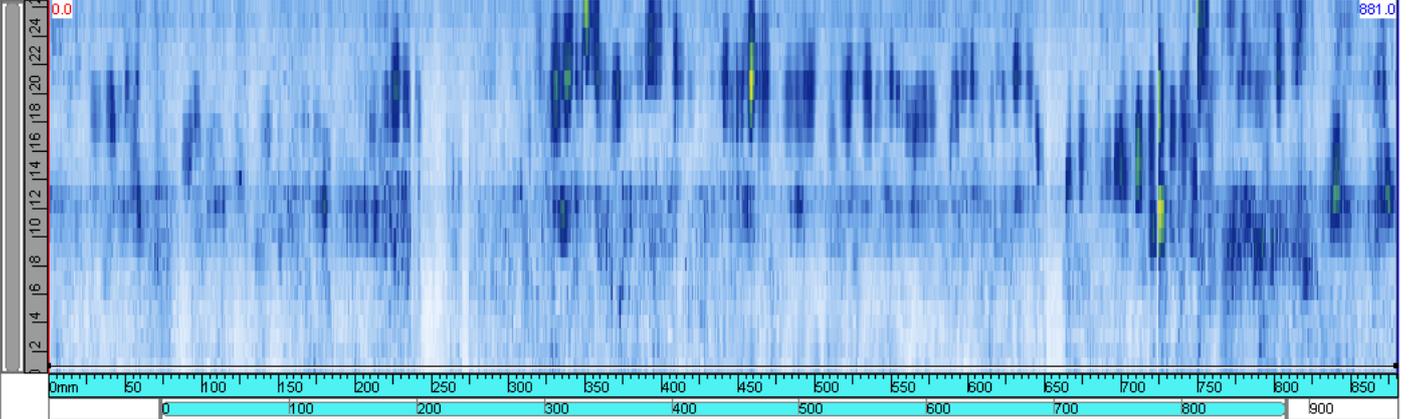
Report No: PAUT/5007268/03

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Date: 29 May. 2019

Cr:2 [S:90.0°, A: 45.0° - 70.0°] - C-Scan A* Amplitude



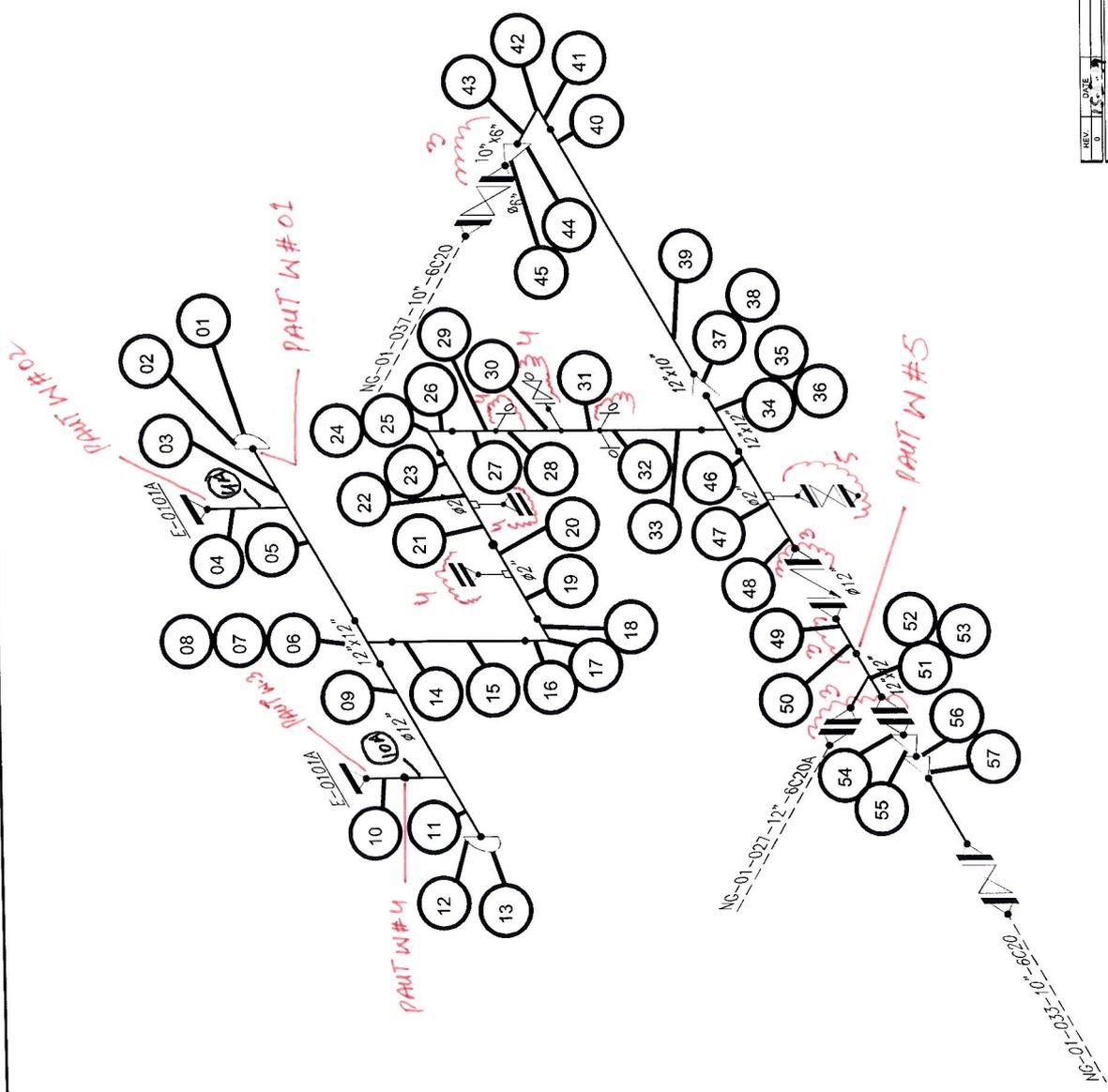
10"-G-DA2-10006-W-02

ANNEXURE – VI

Defect & TML ID Sketch

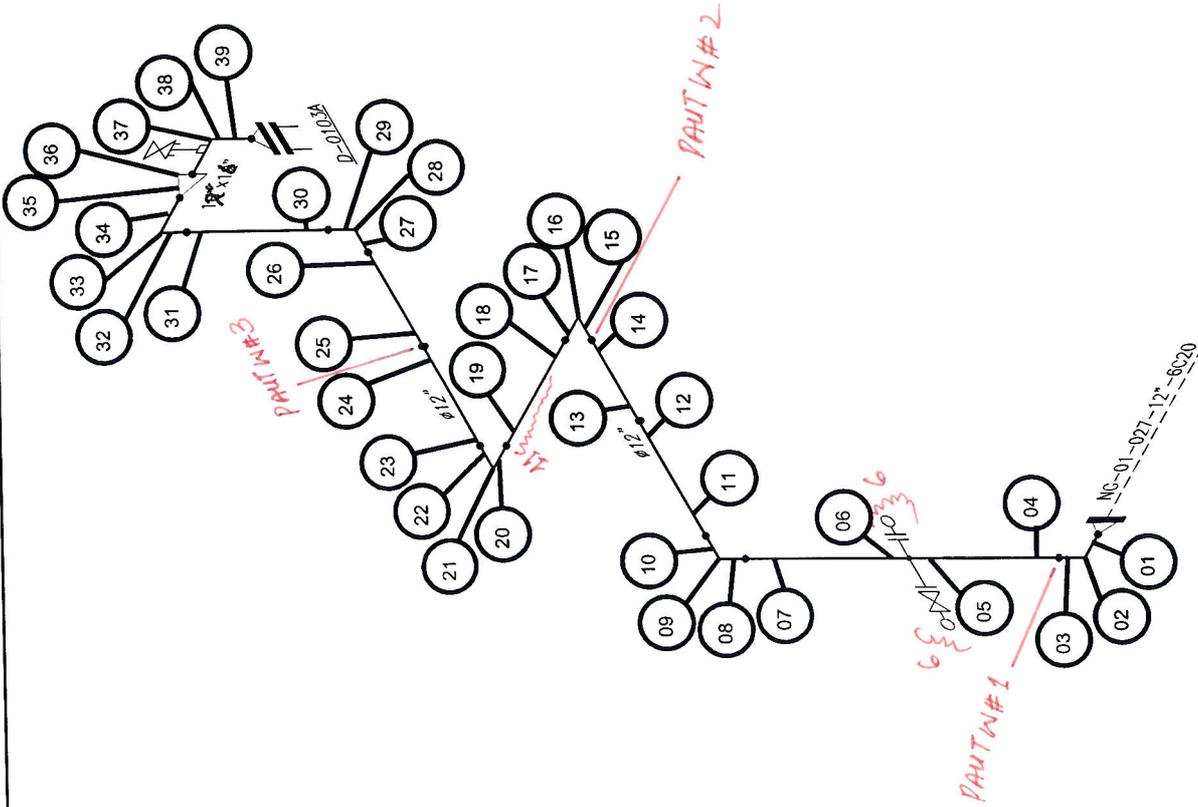
Defect ID'S

1. Support Damage
2. Short Bolting
3. Paint Damage
4. Corrosion
5. Nut/bolts Missing
6. Gauges Calibration
7. Misalignment
8. Leakage
9. Missed Support
10. Direct Contact to Soil
11. Gap b/w pipe and support
12. Direct contact with pipe supports.
13. Self-growing vegetation



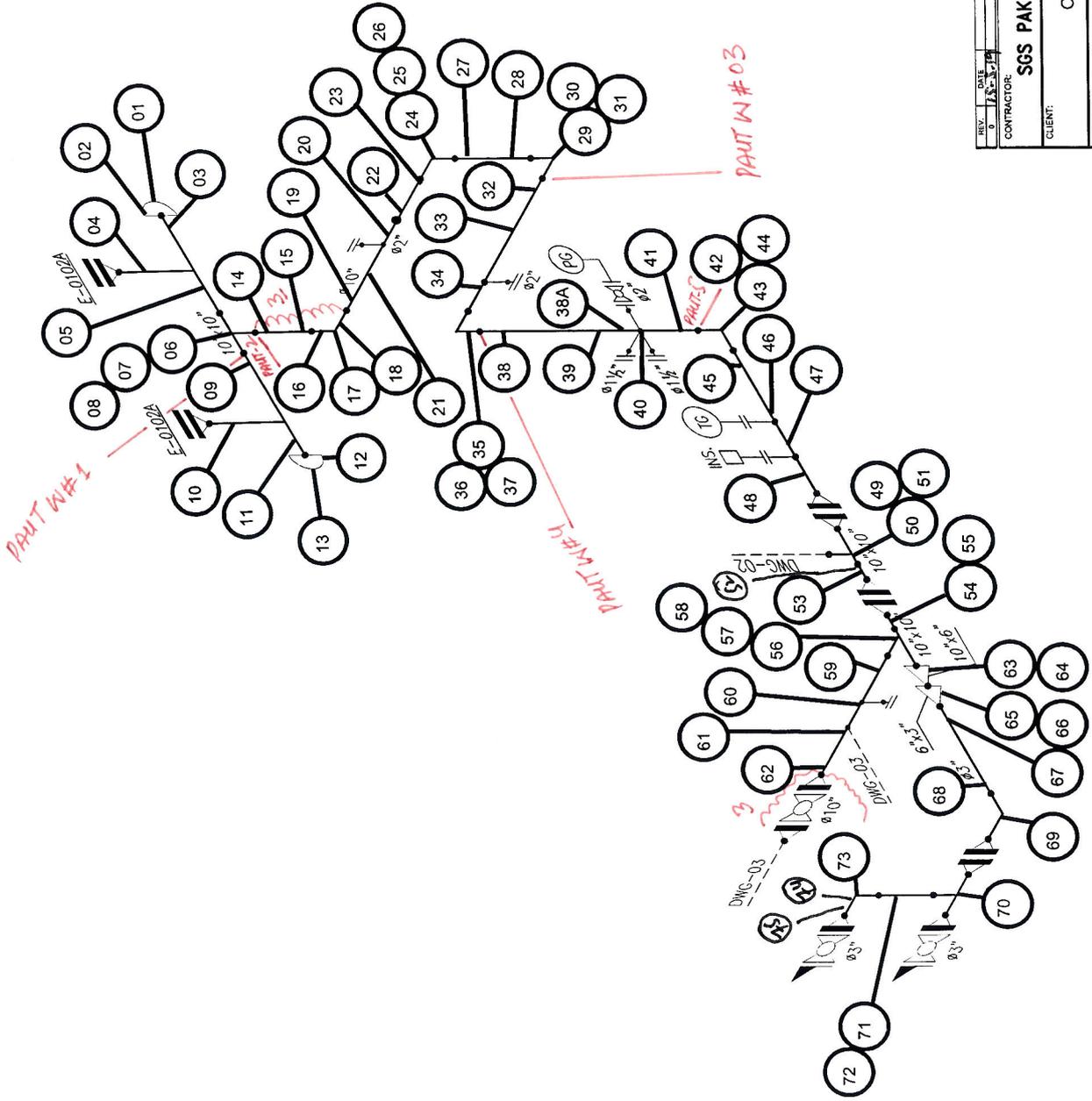
REV.	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHECKED
0	12-01-2014	FIRST ISSUE	S. S. S.	P. S. S.
CONTRACTOR: SGS PAKISTAN (Pvt.) Ltd. CLIENT: OGDCL TITLE: TRAIN-A NG-01-027-12"-6C20 INTER COOLER DISCHARGE				
JOB. NO. See P-68 DWG. NO.			DWG-01	
LOCATION: QADIR PUR			SCALE: N.T.S	

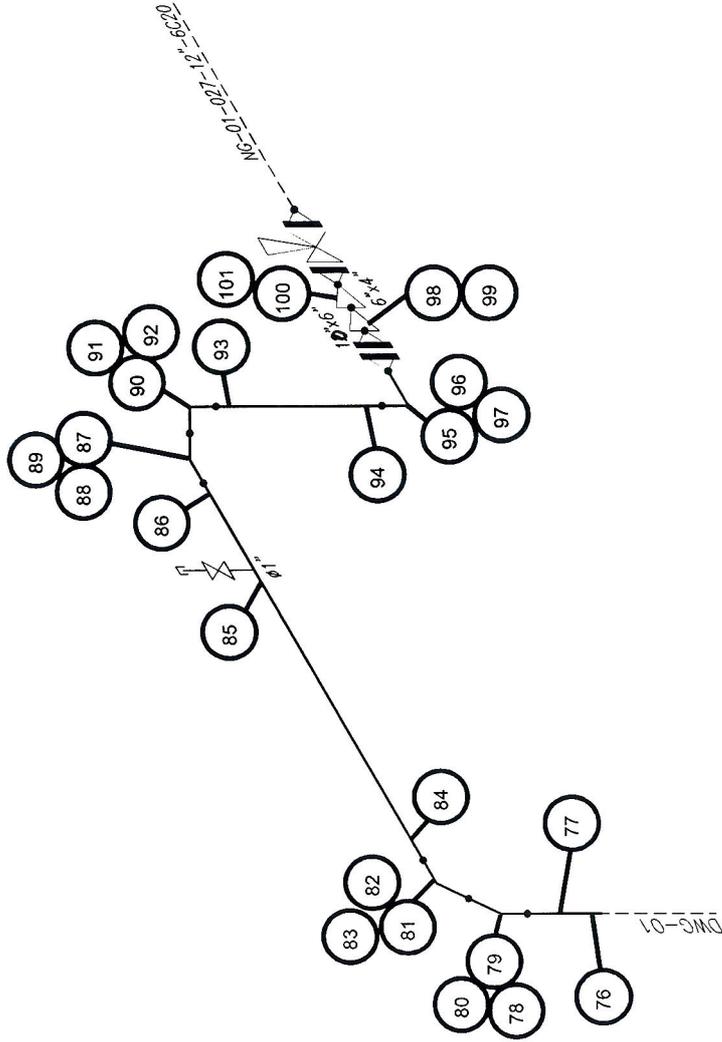
Defect & TML ID Sketch



Defect & TML ID Sketch

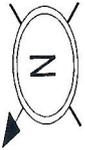
REV.	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHECKED BY
0	25.5.14	FIRST ISSUE	SEAS	PARSE
CONTRACTOR: SGS PAKISTAN (Pvt.) Ltd.				
JOB. NO. 5007260				
CLIENT: OGDCL				
DWG. NO. DWG-01				
TITLE: TRAIN-A				
LOCATION: GADIR PUR				
NG-01-027-12"-6C20 A				
INTER COOLER DISCHARGE				
SCALE: N.T.S				



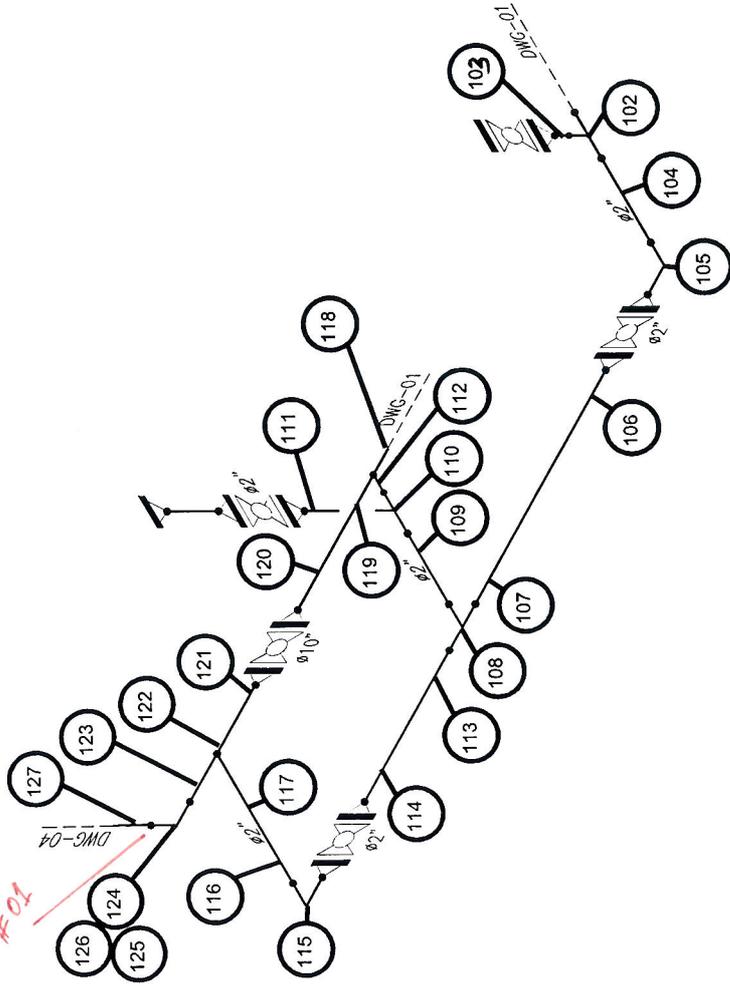


REV.	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHECKED
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CONTRACTOR: SGS PAKISTAN (Pvt.) Ltd.			JOB. NO. 5007268	
CLIENT: OGDCL			DWG. NO. DWG-02	
TITLE: TRAIN-A NG-01-033-10-6C20			LOCATION: GADIR PUR	
AFTER COOLER DISCHARGE			SCALE: N.T.S	

Defeat & TML ID Sketch



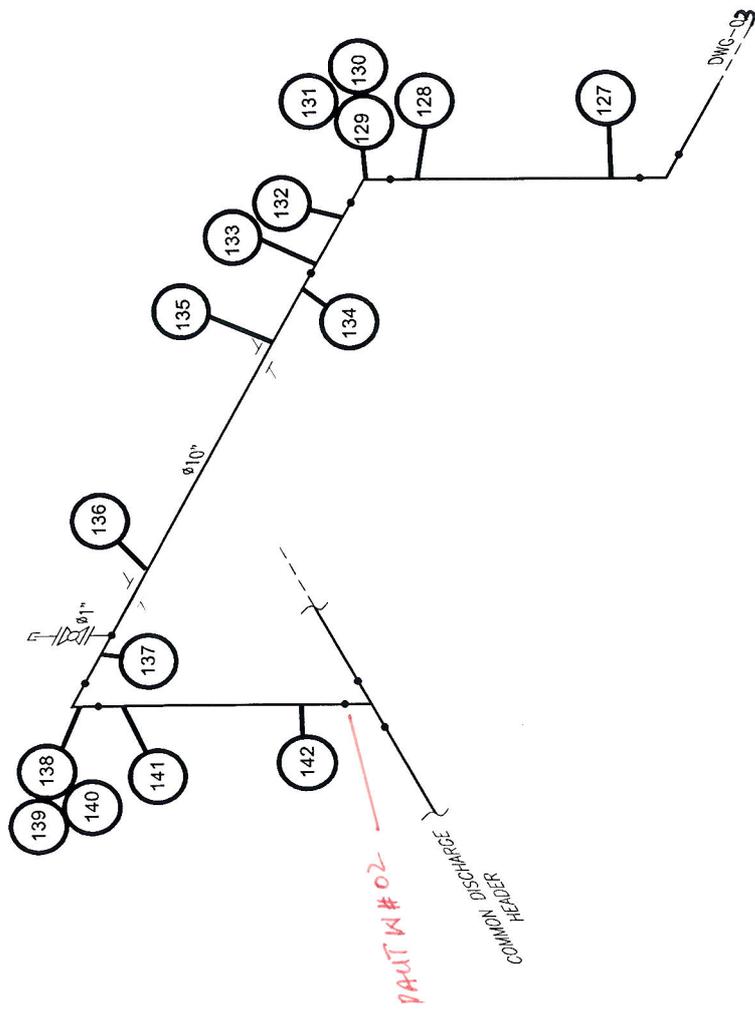
PAINT-W#01



REV.	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHECKED
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CONTRACTOR:	SGS PAKISTAN (Pvt.) Ltd.	JOB NO.	5007268
CLIENT:	OGDCL	DWG. NO.	DWG-03
TITLE:	TRAIN-A 10"-G-DA2-10006	LOCATION:	GADIR PUR
	AFTER COOLER DISCHARGE	SCALE	N.T.S

Defect TML ID Sketch



REV.	DATE	DESCRIPTION OF REVISION	DRAWN BY	CHECKED
0	15-1-19	FIRST ISSUE	SEJAZ	PAZ

CONTRACTOR: **SGS PAKISTAN (Pvt.) Ltd.**
JOB. NO. **5007268**

CLIENT: **OGDCL**
DWG. NO. **DWG-04**

TITLE: **TRAIN-A
10"-G-DA2-10006**
LOCATION: **QADIR PUR**

AFTER COOLER DISCHARGE
SCALE **N.T.S**

Defect TML ID sketch