

ATR REPORT-2021



**INDIAN FARMERS FERTILISERS CO OPERATIVE LTD.
PARADEEP UNIT**

PREFACE

Annual turnaround of the plant for year 2021 was taken from 15th March 2021 to execute preventive maintenance of static and rotary equipment, statutory IBR inspection and preventive maintenance of Electrical and instrument systems, civil related jobs and for attending critical jobs which were planned for shut down.

After ensuring the availability of the required materials/spares and manpower resources by awarding various purchase orders & works contract for shutdown, It was decided to stop the plant as per the following schedule.

Plant	Stopped on	Started on
DAP Train A	15 th March 2021	15 th April 2021
DAP Train B	12 th March 2021	9 th April 2021
DAP Train C	9 th March 2021	6 th April 2021
SAP Train-1	15 th March 2021	29 th April 2021
SAP Train-2	9 th March 2021	14 th April 2021
PAP	15 th March 2021	7 th April 2021
AFBC Boiler	17 th March 2021	3 rd April 2021
Energy Center	17 th March 2021	5 th April 2021
Bagging	16 th March 2021	2 nd April 2021

The Turnaround was completed smoothly due to meticulous planning of shutdown activities like planning of man power, material and other resources. However, due to the outbreak of pandemic Covid-19 and subsequent lockdown by the central government we faced great difficulties in mobilizing manpower and external agencies for execution of the jobs. In spite of all this difficulties we have completed ATR 2021 successfully in time. Shutdown meetings were conducted through VC to compile Covid-19 norms. Shutdown module utilized to closely monitor critical major jobs of each plant.

Major importance was given to Covid-19 guide line and safety was given top most priority during the execution of shutdown jobs. Lodging - Boarding facilities were provided for all manpower from nearby districts as well as other states. Daily manpower compliance reports were sent to the local government authorities as per their requirement. We also arranged bus

transportation within the district for movement of local manpower due to restriction. Strict vigilance was kept by F&S Deptt. during execution of shut down jobs.

A high level Covid-19 Compliance Committee comprising security head, Doctor in-charge, safety head and vigilance officer was also formed to have a close look as per the Covid-19 guidelines by the Central/State government time to time.

The shutdown report contains details of all jobs executed plant wise and section wise.

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ATR REPORT: 2021

DAP PLANT

TRAIN:A

(17.03.2021 TO 14.03.2021)

01. GRANULATOR:

Type- Rotary drum, Dia- 4.5 Mtr, 9 Mtr long, 8 RPM ,slope 1:16

Following jobs were carried out.

1. Thrust riding ring crack repaired by welding.



2. All four support roller surface were checked and surface found concave. They were mad true by machining & refitted. Clearance in 03nos bearings was beyond acceptable limit so replaced with new ones.



3. Convex surface of both thrust and plane riding ring was made true by grinding (FLSmith grinding team)



2. Bearings of granulator girth gear pinion were inspected, clearance found beyond acceptable limit and hence replaced. Torque tube hub teeth are worn out, hub was replaced with a new one.
3. Main gearbox Lubrication system flushed and oil cooler was cleaned.



4. All 14 EPDM panels were replaced.
5. Cold alignment of granulator done.
6. Ammonia sparger replaced.
7. Fluid coupling replaced.
8. Granulator motor replaced provided by electrical department.

Cold alignment job of Granulator

The purpose of the activities performed in a “Standard Mechanical granulator inspection” is to determine the measures (i.e. adjustments, replacements, modifications, repairs) that have to be taken to achieve and maintain a high availability level of the granulator system.

Important datas of alignment report

Levelling of support roller plane				
Support No.	Difference in height between the support roller		Settlement of Support roller plane	
	Original difference	Difference measured	Change	Accumulated change
	[mm]	[mm]	[mm]	[mm]
I – II	343.75	343.80	+0.05	+0.05

Table 2

The tilting values shown in the table below are pure rotations around the baseplate centres. Therefore, they are the same size numerically but given with opposite signs on the right-hand and the left-hand sides of the baseplates. Please also note that the tilting is stated as seen from the outlet.

Tilting of support roller plane		
Support No.	Difference in height of support roller plane	
	Left-hand side	Right-hand side
	[mm]	[mm]
I	0	0
II	0	0

Table 3

Levelling and tilting of support rollers plane was measured and found with in the allowable limit at all supports.

6.2 Axial balance - Evaluation of axial thrust

Evaluation of axial thrust		
Support No.	Direction of thrust	
	Left roller	Right roller
I	Uphill	Downhill
II	Uphill	Uphill

Table 8

All the support rollers are thrusting the granulator towards uphill except support I LHS roller which is thrusting the granulator towards downhill direction.



Example of a case, where slope difference between Granulator (illustrated by tyre slope) and support rollers exist, may lead to tapered wear patterns in the tyre and rollers, uneven loading on the tyre stopper blocks, bearings and filler bars.

Fig. 7: Support roller inclination

Inclination of supporting rollers [%]				
Support No.	Left-hand roller		Right-hand roller	
	Measured	Ideal	Measured	Ideal
I	6.33	6.25	6.35	6.25
II	6.35	6.25	6.17	6.25

Table 4

5.2 Granulator axis - Recommended corrections

We recommend that the Granulator axis be corrected by adjusting the positions of the supporting rollers in the horizontal direction as shown in the figure below.



Fig. 5: Recommended adjustments of the positions of the supporting rollers

In vertical axis – Granulator shell center will move 3mm High at Discharge support.

In horizontal axis –The Granulator shell centre will remain straight.

In Inclination of Granulator – The Granulator inclination will remain 6.25% after carrying out recommended corrections.

The above recommended support roller adjustments were carried out by FLS.

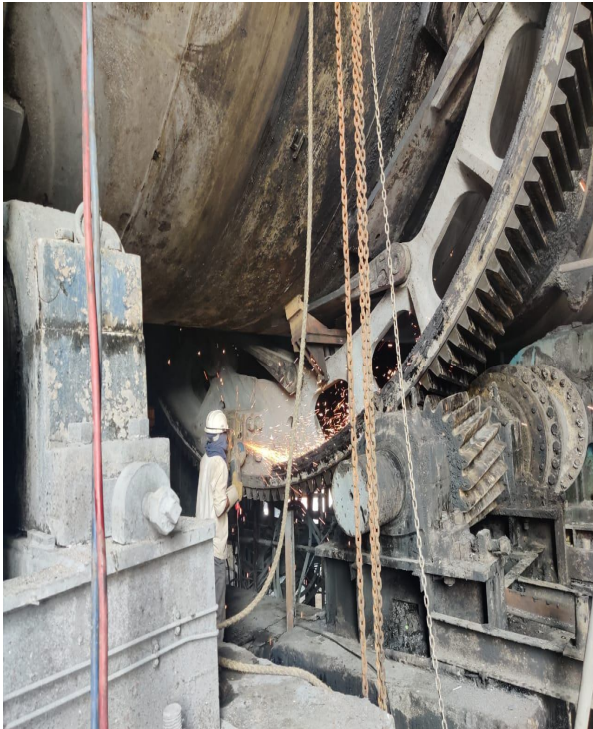
Girth Gear Root Clearance and Backlash Before pinion adjustment					Girth Gear Root Clearance and Backlash After pinion adjustment				
Position	Root clearance		Backlash		Position	Root clearance		Backlash	
	Uphill	Downhill	Uphill	Downhill		Uphill	Downhill	Uphill	Downhill
1	9.0	7.0	3.0	1.0	1	10.1	9.0	6.0	5.7
2	7.0	6.0	3.2	2.5	2	9.7	8.1	5.8	5.2
3	7.6	6.0	4.0	3.0	3	11.2	10.4	6.2	5.8
4	7.3	5.0	5.0	3.5	4	10.6	9.1	5.6	6.2
5	5.8	4.2	4.2	4.0	5	9.1	9.3	5.3	5.6
6	5.5	4.5	4.2	3.8					
7	6.5	5.0	4.5	4.0					
8	4.8	3.0	3.3	1.5					
9	7.0	3.8	3.5	2.2					

2. DRYER:

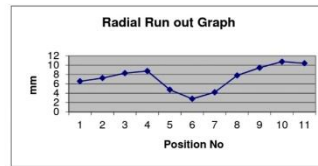
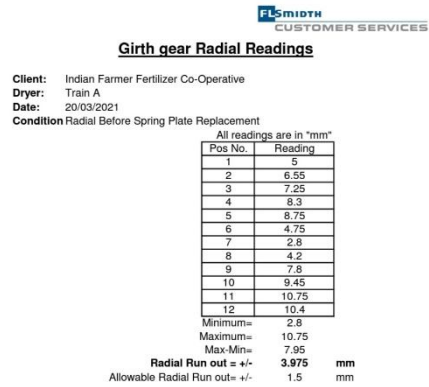
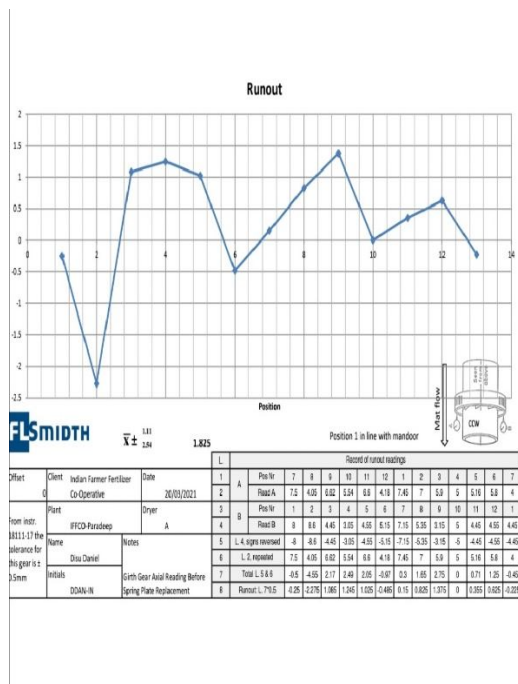
Type- Rotary drum, Dia- 4.5 Mtr, 33 Mtr long, 4 RPM, SLOPE 1:16

Following jobs were carried out

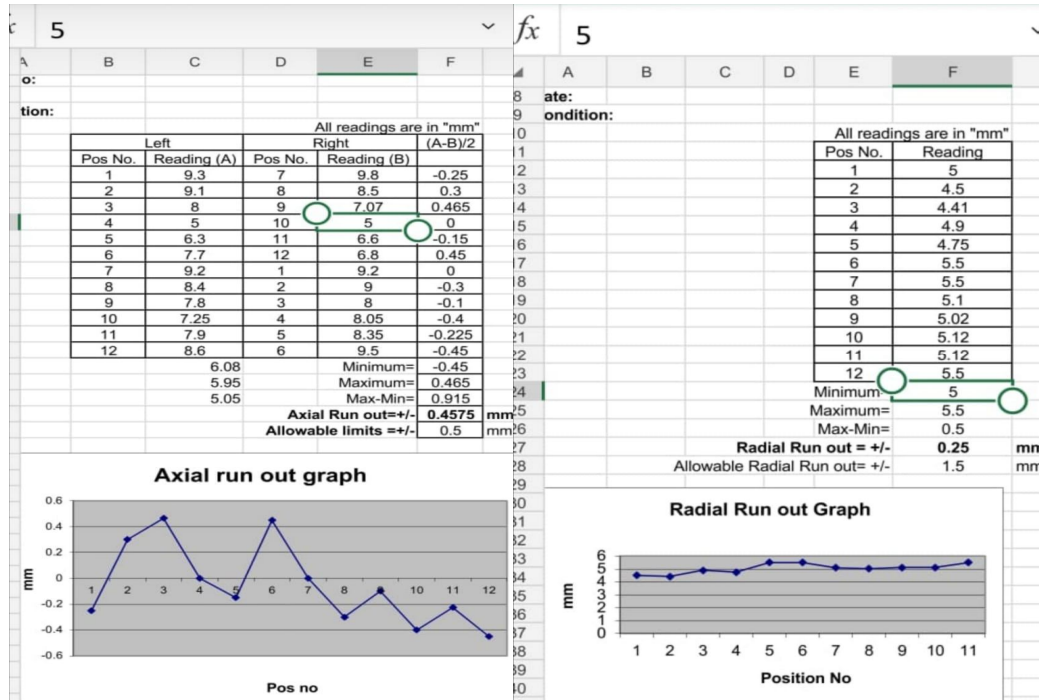
1. All 12 spring plates were replaced. Adjustment done by fixtures for alignment. Spring plates are welded with dryer.



Alignment reading before spring plate replacement



Alignment readings after spring plate replacement



- Pinion replaced with new set of bearings (23160 E).
- Gear box Input oil seal of non-drive side replaced.
- Cold alignment done.
- Torque tube preventive inspection, lubrication done.



6. Leveling, alignment of drive done.
7. Overhauling of lubrication oil system of main gear box done. Tubes of lube oil cooler cleaned.

Cold alignment job of dryer

The purpose of the activities performed in a “Standard Mechanical Dryer inspection” is to determine the measures (i.e. adjustments, replacements, modifications, repairs) that have to be taken to achieve and maintain a high availability level of the Dryer system.

Important datas of alignment report

5.1 Dryer axis - Results of measurements

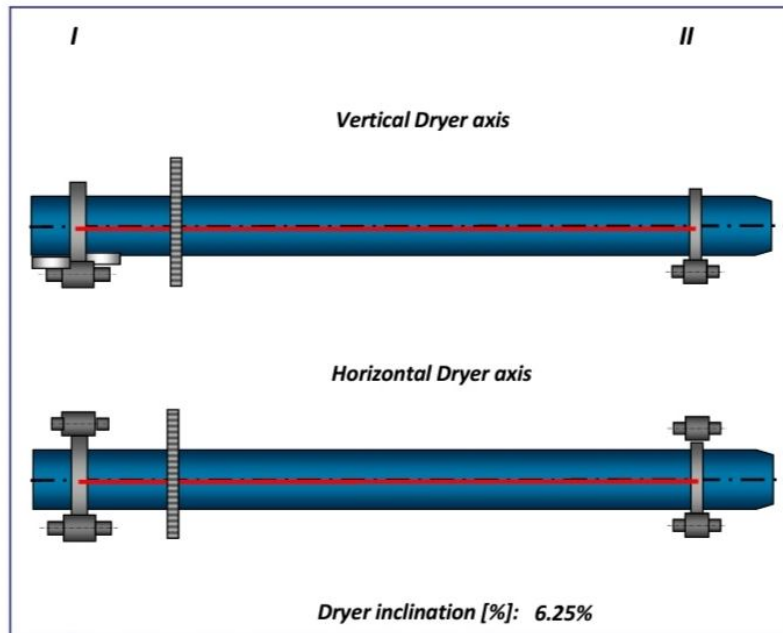


Fig. 4: Dryer axis measured

Both vertical and horizontal axis of dryer is found acceptable.

Dryer inclination is measured as 6.25%. This is acceptable.

Inclination of supporting rollers [%]				
Support No.	Left-hand roller		Right-hand roller	
	Measured	Ideal	Measured	Ideal
I	6.26	6.25	6.28	6.25
II	6.22	6.25	6.25	6.25

Table: 5

Slope of all supporting rollers are measured and found within the acceptable limit at all the supports.

Levelling of support roller plane				
Support No.	Difference in height between the support roller		Settlement of Support roller plane	
	Original difference	Difference measured	Change	Accumulated change
	[mm]	[mm]	[mm]	[mm]
I – II	1224.7	1226.2	+1.5	+1.5

Table 3

The tilting values shown in the table below are pure rotations around the baseplate centres. Therefore, they are the same size numerically but given with opposite signs on the right-hand and the left-hand sides of the baseplates. Please also note that the tilting is stated as seen from the burner's platform.

Tilting of support roller plane		
Support No.	Difference in height of support roller plane	
	Left-hand side	Right-hand side
	[mm]	[mm]
I	+1.0	-1.0
II	0	0

Table 4

Levelling and tilting of support rollers plane was measured and found within the allowable limit at all supports.

7.2 Root Clearance and Backlash

Girth Gear Root Clearance and Backlash After pinion adjustment				
Position	Root clearance		Backlash	
	Uphill	Downhill	Uphill	Downhill
2	11.5	11.7	4.4	4.0
4	11.3	11.3	5.6	4.3
6	10.6	10.5	4.1	3.6
8	11.5	12.5	4.8	4.3
10	11.4	11.4	4.7	4.4
12	11.3	11.6	3.6	3.6

Table 15 Root clearance and Backlash

After pinion alignment with respect to girth gear, the variation of root clearance and backlash is found within the acceptable limit.

3. CHAINMILL:

Chain mill is used to crush oversize material .Type- 40" Dual opposed rotors with 6 link chains

1. All chain mill casings were replaced with in house fabricated casings.
2. All chain mill rotors were replaced with assembled rotors.
3. All chain mill discharge chutes were replaced with in house fabricated chutes.
4. All bearing clearance checked and lubrication done.
5. All chain mill motors were replaced.

04. ELEVATORS:

I. Primary elevator

1. Primary elevator chain and buckets replaced.



2. Primary elevator head and tail sprocket replaced.
3. Fluid coupling replaced.
4. Tail sprocket CI block replaced.
5. Primary elevator head sprocket both bearing (23156 EK) & sleeve (H3156) replaced.
6. Boot doors and hood replaced.
7. Lip seal replaced.

II. Product screen elevator

1. Product screen elevator head sprocket both bearings were inspected and lubricated.
2. Gear box (KCH-450) inspected and oil flushed.
3. Motor replaced as provided by elect. dept.
4. All buckets & chain link inspected & dented buckets & link replaced.
5. Tail sprocket CI block replaced.

III. Product elevator

1. Product elevator head sprocket (overhauled) and both side bearing (23144 EK) & sleeve (H3144) replaced.
2. Gear box (KCH315 Make Elecon) replaced with overhauled one.
3. Motor replaced provided by elect. Dept.
4. All buckets & chain link inspected & dented buckets & link replaced.
5. CI block replaced.

IV. Secondary Elevator

1. Secondary elevator chain and buckets replaced.



2. Secondary elevator head and tail sprocket replaced.

3. Gear box replaced with overhauled one and fluid coupling replaced.



4. Tail sprocket CI block replaced.

5. Secondary elevator head sprocket both bearing (23156 EK) & sleeve (H3156) replaced.

6. Boot doors and hood replaced.

7. Lip seal replaced

05. FINES CONVEYOR:

Fines conveyor is used to convey fines & recycle material to Secondary elevator, Belt width- 2000mm, thickness-20 MM, Grade –HRT-1 total belt length- 97 Mtr. Following jobs are carried out in Fines conveyor.

1. All damaged carrying & return idlers replaced by HPPE idlers.
2. All pulley bearing insp. / lubrication & leveling done & motor replaced.
3. Damaged carrying & return idler with frame replaced.
4. Fines conveyor deck structure repaired for sealing dust at chain mill area.
5. Gear box overhauled & Coupling bolt inspected.

6. Drive chain converted to duplex from triplex.



7. Adjustable sliding base for motor and gearbox fabricated and erected.

8. Conveyor Belt replacement done with hot vulcanizing joint with new one.

(MRF make)

9. Fines discharge chute repaired.

10. All pulley lagging (diamond shape) done.

11. Head pulley hood replaced.

12. Head pulley bearings 23136 CCK, sleeve H3136, Plummer block replaced.

13. Tail pulley & take up pulley bearings (22228CCK) adaptor sleeve H3128, plummer block SNA528 replaced.

14. Skirt board modified to fit soft long skirt rubber.

06. PRODUCT TRANSFER CONVEYOR (70-CONVEYOR)

70- conveyor is used to convey final product material from DAP to Bagging plant , Belt width- 1000mm, thickness-16 MM, Grade –OR total belt length- 170 Mtr.

Following jobs are carried out in 70- conveyor.

- Damaged carrying & return idlers replaced by HPPE idlers.
- All pulley bearing insp / lubrication & leveling done & motor replaced.
- Damaged carrying & return idler with frame replaced & its structure blasted & painted.
- 70- conveyor tail pulley damaged skirt replaced for sealing dust.
- Gear box oil flushed & Coupling bolt inspected / replaced.
- Head pulley hood replaced.
- Conveyor Belt replacement done with hot vulcanizing joint with new one.
- All pulley lagging (diamond shape) done except head pulley.

07. DRYER DISCHARGE CONVEYOR (DDC):

DDC is used to convey material discharged from Dryer to Primary elevator , Belt width- 1500mm, thickness-14 MM, Grade –M24 total belt length- 28 Mtr.

Following jobs are carried out in DDC.

1. All damaged carrying & return idlers replaced by new one.
2. All pulley bearing insp. / lubrication done & its motor replaced.
3. Damaged carrying & return idler with frame replaced & tail pulley base structure repaired & leveled.
4. DDC damaged skirt replaced for sealing dust.
5. Gear box oil flushed & coupling bolt inspected / replaced.
6. Tail pulley adjusting screws are replaced.
7. Conveyor Belt (Endless, joint- hot pre vulcanized) replacement done.



08. Raw Material conveyor

RM. conveyor is used to feed raw material to system through fines conveyor. Belt width 1000mm, Grade-M24 belt length 80m.

Following jobs are carried out in RM.

1. All damaged carrying & return idlers replaced by new one.
2. All pulley bearing insp. / lubrication done & its motor replaced.
3. Damaged skirt replaced for sealing dust.
4. Gear box oil flushed & Coupling bolt inspected / replaced.
5. Tail pulley adjusting screws are replaced.

09. SCRUBBER AREA JOB:

I. Pre Neutralizer

1. PN roof plates are replaced.

2. Acid line flanges are modified and relocated at scrubber 2nd floor for easy maintenance.

II. Pre scrubber

1. Pre-scrubber separator MOC upgraded from MS to 316L.



2. Pre-scrubber spray tower has been revamped with 316L.



3. Pre neutralizer to pre-scrubber spray tower duct revamped with SS316L.

4. 41 and 42 pump discharge plug valves replaced with knife edge gate valve.

5. 42 pump base plate removed repaired and re grouted.



III. Fumes scrubber

Fumes scrubber immediate outlet duct part were upgraded from MS to SS 316L.



IV. Dryer scrubber

Dryer scrubber immediate outlet duct part were upgraded from MS to MOC 316L.



V. Tail gas scrubber

1. All SS 316L lining joints are cleaned 316L strips welded on all joints.



2. 316L lining done up to 9.2 meters.

VI. Ammonia preheater

Ammonia preheater has been elevated to ammonia vaporizer floor for easy operation.



8. CENTRIFUGAL FANS

I. Dust Fan

1. Rotor cleaned inspected. Bearings checked and lubricated.
2. Dust fan damper relocated for easy operation & maintenance.

3. Manhole provided in dust fan inlet duct for cleaning and platform provided for safe working.



II. Fumes Fan

1. Rotor was replaced with in house vane replaced rotor, bearings are checked and lubricated.
2. Base blasting done inspected .Base strengthening done and colored.

III. Dryer Exhaust Fan

1. Base blasting done inspected .Base strengthening done and colored.
2. Bearings are inspected and lubricated.
3. Suction duct damaged rubber lining repaired.
4. Rotor replaced with in house repaired and balanced rotor.

IV. Common Duct

1. All common duct SS lining joints are cleaned inspected and 316L strips welded.



2. All 03 fan discharge common duct connecting to TG scrubber upgraded from CSRL to SS 316L up to nozzle area common duct flange

Before



After



11. COMBUSTION CHAMBER:

1. Chamber register assembly replaced, gun overhauled & fitted.
2. Combustion chamber wind box and inner shell fabricated and replaced.



5. Quench air fan damper replaced.

12. F.O. SYSTEM.

- F.O. station removed from position & its bed repaired, civil work done to raise its elevation.
- Both FO transfer pump kept at one side to keep the direction of rotation same by modification its suction, discharge & steam tracing line & valves.
- Unwanted & corroded pipelines replaced & system make more friendly for operation & maintenance. By modify & rerouting of various lines.

Before



After



13. VIBRATING SCREENS:

1. All oversize & product screen mesh replacement done.



2. Damaged tensioning rail & optimizer tensioning kit replaced in oversize & product screens.
3. Fourth screen at oversize is replaced with 4.2 mm opening.
4. All oversize screen discharge chutes are repaired.

Before



After



5. All screen rubber buffer pad inspected & replaced which are found damaged.

15. Miscellaneous jobs done during ATR-2019 in DAP TR.A

Primary scrubber pump (53) base plate removed repaired and regouted.

1. Sump pit cleaned.
2. FO tank inside cleaned.
3. FO tank inside steam coil checked.
4. Condensate line NRV/Valve, MP/LP steam battery limit valve overhauled.
5. MP/LP Steam common area battery limit valve overhauled.
6. Dryer deduct, cleaning done.
7. Pre scrubber pinch area, header line cleaning done.
8. Dust cyclone plenum and outlet cleaning done.
9. Dryer venturi, down comer line cleaning done.
10. Strong new to PN, branch line cleaning job done.
11. All tank manholes & scrubber shell doors opened for cleaning except Strong acid & weak acid tank.
12. Pre scrubber, down comer line cleaning done.
13. Dryer plenum cleaning done, inlet duct cleaning done.
14. Fumes discharge duct, descaling job done.
15. Pre to PN 4 & 6" line, cleaning done.
16. Dust & fume fan inlet duct cleaning done.

17. Primary to pre line cleaning done.

- 18.W/A to primary cleaning done.
- 19.All Tank agitators gear box oil flushed & its pedestal bearing greased.
- 20.Product screen discharge and inlets cleaning done.
- 21.Primary discharge and inlets cleaning done.
- 22.Fans suction duct cleaning done.
- 23.Dryer venture and separator header line cleaning done.
- 24.Fumes venturi and separator header line cleaning done.
- 25.All damaged insulation of ammonia line & steam line replacement under progress.
- 26.Scrubber nozzles cleaning done.
- 27.Dryer scrubber separator side & venturi side cleaning done.
- 28.Dust & Fumes scrubber separator & venturi side cleaning done.
- 29.PN ammonia sparger both 1 to 8 No. cleaning done.
- 30.Strong acid to PN cleaning done.
- 31.Pre scrubber to FRP duct header line cleaning done.
- 32.Quench air fan outlet duct cleaning done.
- 33.FO main line modified isolation valve shifted to approachable height instead of pipe rack.
- 34.Missing grizzly bar welded inside Dryer outlet.
- 35.FO pump overhauling done.

DAP TRAIN: B

(12/03/2021-----09/04/2021)

GRANULATOR: Following jobs were taken during ATR-2021

- **COLD ALIGNMENT OF GRANULATOR SHELL:** All support rollers bearing clearances, slope of individual support roller and support rollers center distances and slope of shell checked and set according to designed slope 6.25%.
- 4 nos Support roller with new bearings replaced, Train C side uphill support roller fitted with old roller with machined face.
- Downhill tyre with wear ring & tyre pads replaced.
- 2 nos new thrust roller replaced at downhill tyre
- 14 nos of EPDM panel replaced.
- Shell crack at 3 positions welded.
- New Grizzly replaced.
- Hopper rubber liner replaced.
- FLS system filter cleaned & cooler cleaned.
- New ammonia sparger installed.
- New oil seal installed at input & output shaft of gear box.
- New fluid coupling replaced. It was replaced due to wear out of base plate near bottom of sparger.
- Torque tube coupling greasing done.
- Granulator feed end tyre grinding done for increasing the area of contact.



Old tyre pad cutting



New tyre with pad

- **GRANULATOR RUBBER PANNEL REPLACEMENT:** Granulator 14 nos EPDM rubber panels replaced.



EPDM Panel replacement





Grizzly replacement



Ammonia sparger replacement



Discharge end tyre fitting



Feed end tyre grinding

- **DRYER:** Following jobs were taken during ATR-2021 in dryer.
- **COLD ALIGNMENT OF DRYER SHELL:** : All support rollers bearing clearances , slope of individual support roller and support rollers center distances and slope of shell checked and set accordingly.
- Downhill side two support roller replaced with new support roller.



Dryer fluid coupling replaced with new one.

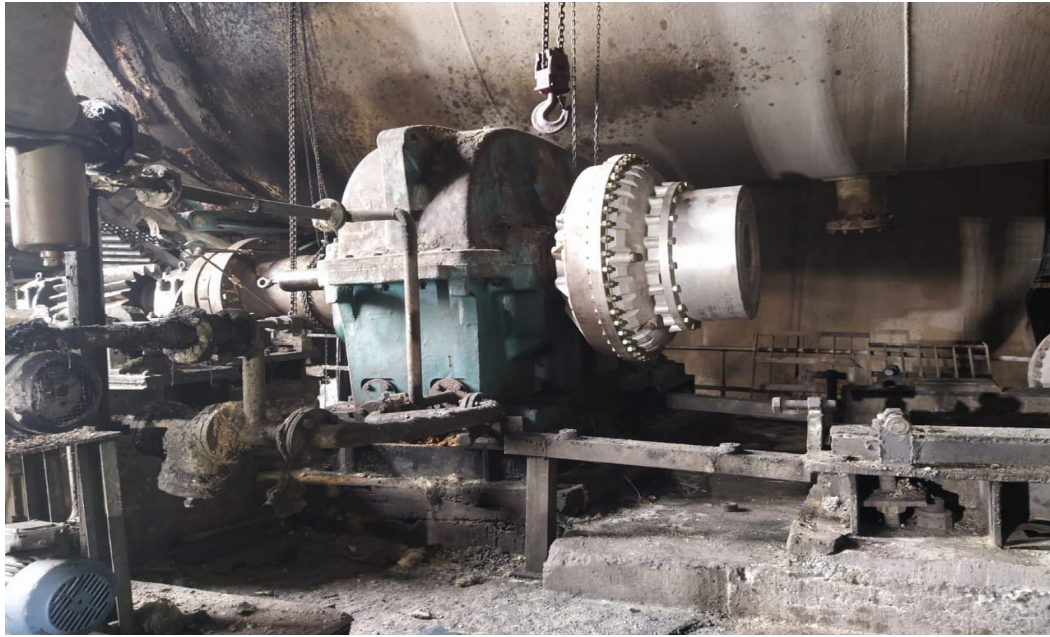
Dryer gear box overhauled & oil seal replaced.

Torque tube coupling hub (pinion side) replaced.

Three broken lifter plate welded inside dryer.

Damaged grizzly plates repaired

Dryer discharge hopper aligned with conveyor axis.



Dryer new fluid coupling



Dryer motor shifting



Dryer discharge hopper welding & new plate erection

CONVEYOR BELTS: Following jobs were taken in conveyor belts.

- **FINES CONVEYOR:** In fines conveyor skirt rubber fixed. Head, bend and tail pulley damaged rubber lagging replaced by new lagging. All bearings clearance checked and lubricated .all damaged idlers replaced. Take up bend column replaced.



Tail pulley shifting



**Take up column grouting
New stand**



Fines conveyor splicing arrangement

DDC, RM AND PRODUCT STORAGE CONVEYOR: In all conveyors skirt rubber replaced by skirt rubber and all damaged pulley lagging replaced by new lagging. All bearings and gearboxes inspected and lubricated. In DDC conveyor all idlers replaced by HPPE idlers. DDC tail pulley pad plate welding done for strengthening. DC side inclined platform leveled.



Tail pulley pad plate welding



DDC side inclined platform leveling under progress

ELEVATORS: Following jobs were taken in elevators during ATR-2021.

- **Secondary elevator:** secondary elevator bucket and chains inspected and 16 damaged buckets replaced and 6 nos of damaged chain pair links replaced.
- Its drive sprocket is worn out hence replaced with spare sprocket shaft assembly with new bearing & blocks
- Gearbox and bearings inspected and lubricated.
- Tail sprocket with CI block replaced.



Old sprocket



New sprocket



Damaged chain link of elevator



Replaced bucket of elevator

- **Primary elevator:** Drive sprocket, gearboxes and head shaft bearings inspected and lubricated. And chain & bucket inspected by manually turning the elevator. CI blocks changed. Primary elevator tail sprocket replaced due to shaft & teeth wornout.



Primary elevator chain bucket inspection



Head sprocket inspection



Gear box fitting

Product screen elevator: Drive sprocket, gearboxes and head shaft bearings inspected and lubricated. And chain & bucket inspected by manually turning the elevator. CI blocks changed. Tail sprocket shaft build up by welding & grinding in position. Gear box base frame replaced.



Product screen elevator new base frame fitting under progress

Product elevator: Drive sprocket, gearboxes and head shaft bearings inspected and lubricated. And chain & bucket inspected by manually turning the elevator. CI blocks changed. New fluid coupling replaced. Tail sprocket shaft build up by welding & grinding in position. Gear box base frame replaced. Product elevator discharge diverter provided for additional chute to polishing screen.



Chain inspection



Discharge diverter fabrication

CHAINMILL: All chain mill site fabricated casing with rotor with new bearing & blocks replaced. Hopper of chainmill 11 and 13 replaced and 11 no chain mill discharge hopper lined with UHDPE liner.

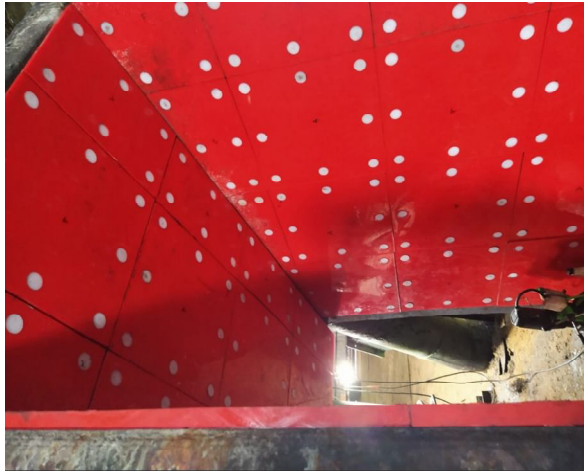
All chainmill casing & inlet diverter liner fitted.



Old casing removal



New casing erection



11 no chainmill hopper



Hopper dismantling

COMBUSTION CHAMBER: It's inner shell completely changed due to ovality & refractory (Fire brick & insulating brick) placed. Heat resistant paint applied on outer shell of combustion chamber. Dryer deduct area corroded plate replaced.



Inner shell replacement under progress

Shot on U10
Vivo AI camera



Inner shell refractory lining under progress



After refractory brick application



Heat dryout process after refractory application



After application of heat resistant paint on outer shell of Combustion chamber

Fumes fans: Fumes fan old corroded base was dismantled & new fabricated base erected with core grouting (Shrinkomp cement grout), Balanced impeller replaced. Damper cleaned & flap bearing greasing done. Fan discharge duct replaced with SS 316L duct. New cone with clearance within 10 mm erected. Fan inlet box MOC upgraded to SS 316L.



New fabricated base frame erected

Dryer exhaust fan: Dryer exhaust fan old corroded base was dismantled & new fabricated base erected with core grouting (Shrinkomp cement grout), Balanced impeller replaced. Damper cleaned & flap bearing greasing done. Discharge bellow replaced. Fan discharge duct replaced with SS 316L duct. New cone with clearance within 10 mm erected. Fan inlet box MOC upgraded to SS 316L.



New fabricated base frame welding under progress.

Dust Fan: Dust fan balanced impeller replaced. Cracked casing welded, damper cleaned & flap bearing greasing done. Discharge & inlet bellow rubber replaced.



Dust fan impeller erection under progress.

Quench Air fan: Quench air fan old corroded base was dismantled & new fabricated base erected with core grouting (Shrinkomp cement grout), Balanced impeller (SS316L) replaced. New Damper replaced. New pedestal replaced.



New impeller with fabricated base & pedestal erection under progress.



Quench air fan discharge damper replacement under progress.

Pre scrubber separator: Pre scrubber separator MOC upgraded to SS316L.
Expansion bellow replaced.



Pre scrubber separator shell fitting under progress.



Rectangular manhole provided in place of circular.



Prescrubber separator bellow replaced



Pre scrubber to fumes scrubber damaged duct FRP lined.

Coating pump: New screw type coating pump with 2" suction line & strainer fitted.



Screw type pump erection under progress

Ammonia Pre Heater elevation: Ammonia pre heater was elevated from ground floor to a height of 3 mtr for collection of condensate which was earlier drained to storm water drain.



Ammonia line inlet fitting under progress.



Ammonia preheater elevated.

Miscellaneous jobs taken during ATR-2021:

- All pipe lines opened for cleaning as per production requirement.
- All man holes and doors opened for cleaning as per production requirement.
- All pumps overhauled.
- FRP duct from pre scrubber repaired by coating 10 mm thick FRP coating.
- Granulator discharge chute one side damaged rubber lining replaced.
- FO pump relocated to MCC side & DOR made same for both the pumps
- Secondary elevator boot door damaged plates replaced to arrest dust and material spillage.
- Primary elevator discharge lip seal and its tail sprocket CI block replaced.
- All spillage points attended at different locations.
- All product and over size screen tensioning and damaged connecting bolts replaced.

DAP TRAIN:C

(Dt. 09.03.2021 TO 06.04.2021)

ATR-2021 in DAP TR-C started on 9th March 2021 & ended up on 6th April 2021.

Mechanical maintenance of following equipment have been carried out which are mentioned below,

GRANULATOR

Type- Rotary Drum, Dia- 4.5 Mtr, 9 Mtr long, 8 RPM

Following jobs were carried out.

9. Girth gear replaced as new.
10. Plain riding ring with chair pad replaced as new.
11. Thrust riding ring grinding work.
12. Uphill side 2nos support roller replaced as new.
13. Downhill side 2nos machined support roller replaced.
14. Thrust roller new replaced.
15. Complete pinion assemble replaced as new.
16. Granulator ammonia sparger replaced.
17. Granulator main drive motor replaced.
18. Lube oil system overhauling and cooler cleaned.
19. All bearing of support roller & pinion inspection & lubrication done.
20. Torque tube preventive inspection & lubrication done.
21. Leveling, alignment of drive side done.
22. Cold alignment of granulator done.
23. 14 nos. EPDM panel Replaced as new.
24. Granulator discharge hopper repair.

Existing girth gear dismantled.



Existing girth gear dismantled.



New girth gear shifting.



New girth gear erection



New Girth Gear Erection



Plain riding ring existing dismantling



Plain riding ring new erection with chair pad



Thrust riding ring grinding work



Granulator rubber panel replacement



Granulator discharge hopper repair



DRYER

Type- Rotary drum, Dia- 4.5 Mtr, 33 Mtr long, 4 RPM

Following jobs were carried out.

8. Cold alignment done.
9. Torque tube preventive inspection & lubrication done.
10. Lub oil system relocated.
11. Lube oil system of main gear box overhauling done with filter cartridge replaced.
12. Lube oil cooler cleaned.
13. Dryer lip seal replaced.
14. Grizzle bar repair.
15. Girth gear rim cracked portion welded by L&T.

Cold alignment of dryer



Dryer girth gear rim welding by L&T



Dryer girth gear cracked portion



Dryer torque tube dismantling and motor alignment



CHAINMILL

Chain mill is used to crush oversize material

Type- 40" Dual opposed rotors with 6 link chains

1. All chain mill casing with rotor replaced with new.
2. All chain mill chute replaced as new.
3. All accessories like plumber block, anti-vibration pad, liner, etc. replaced as new.

Chainmill hopper



Chainmill erection



Chainmill Erection



Chainmill Welding Work



ELEVATORS [Primary | Secondary | Product | Product Screen]

- Product Screen elevator head sprocket replaced.
- Secondary elevator tail sprocket replaced.
- Chain shortening done of secondary and product screen elevator.
- Drive & non drive end bearings inspected & lubricated.
- All buckets & chain link inspected & dented buckets replaced.
- All elevator tail sprocket CI block replaced.
- Boot area door and damaged portion repaired.

Product Elevator boot area damaged door replaced



Secondary Elevator damaged door replaced



Product Screen Elevator head sprocket replacement



Secondary Elevator tail sprocket replacement



FINES CONVEYOR

Fines conveyor is used to convey fines & recycle material to Secondary elevator, Belt width- 2000mm, thickness-20 MM, Grade –HRT-1 total belt length- 97 Mtr. Following jobs are carried out in Fines conveyor.

- All damaged carrying & return idlers replaced by HPPE idlers.
- Belt tracker 2nos return new installed.
- All pulley bearing insp. / lubrication & leveling done.
- Fines conveyor belt replaced.
- Gear box & Coupling bolt inspected / replaced.
- Gear box sliding arrangement adjusted for chain tightening, G.B. oil replacement done.
- Conveyor Belt replacement done with hot vulcanizing joint with new one.
- Fines discharge side gap portion closed for dust sealing.
- Tail & its both bend pulley lagging (diamond shape) done.
- Plain skirt rubber fitted both side up to whole length.
- Discharge chute repair.

Fines Belt Jointing



Fines Conveyor return belt tracker



Fines Conveyor discharge hopper repair



PRODUCT TRANSFER CONVEYOR (70-CONVEYOR)

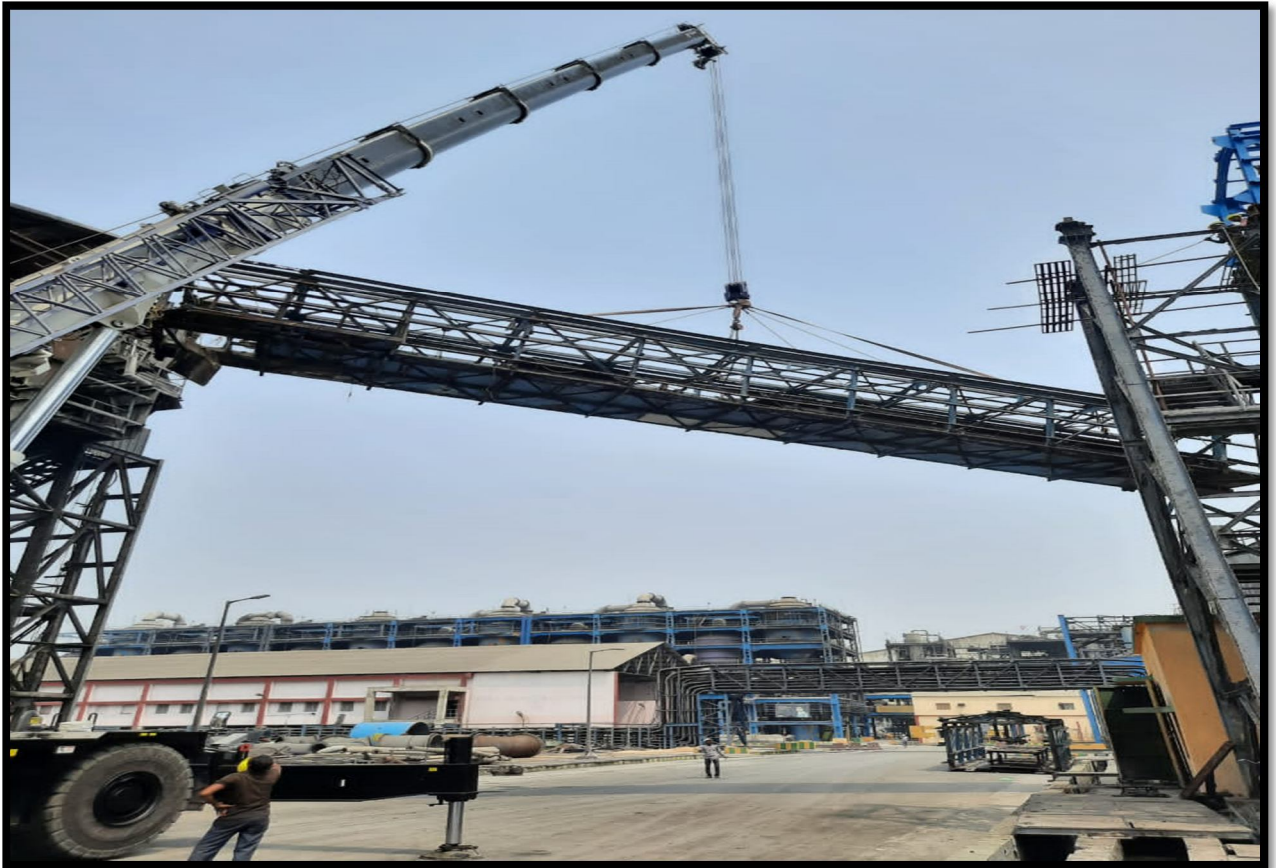
70- conveyor is used to convey final product material from DAP to Bagging plant ,
Belt width- 1000mm, thickness-16 MM, Grade –OR total belt length- 170 Mtr.
Following jobs are carried out in 70- conveyor.

- Complete gallery structure replaced as new.
- Complete drive system changed from worm helical to helical gear box.
- Idler tracker new 2nos carrying and 1no returned replaced as new.
- All damaged carrying & return idlers replaced by HPPE idlers.
- Head pulley side scrapper provided to avoid deposition on pulley.
- Conveyor Belt replacement done with hot vulcanizing joint with new one.
- Both bend & snub pulley lagging (diamond shape) done

Product Conveyor idler replacement.



Product Conveyor Gallery dismantling





Product Conveyor gallery erection



Product Conveyor return belt tracker



Product Conveyor carrying idler tracker



DRYER DISCHARGE CONVEYOR (DDC)

**DDC is used to convey material discharged from Dryer to Primary elevator ,
Belt width- 1500mm, thickness-14 MM, Grade –M24 total belt length- 28 Mtr.**

Following jobs are carried out in DDC.

- All damaged carrying & return idlers replaced with HPPE idlers.
- All pulley bearing insp. / lubrication done.
- Damaged carrying & return idler with frame replaced & tail pulley base structure repaired & leveled its screw take up overhauled.
- DDC damaged skirt replaced with plain skirt rubber for sealing dust.
- Gear box oil flushed & coupling bolt inspected / replaced.
- Head pulley side scrapper provided to avoid deposition on pulley.
- Conveyor Belt (Endless, joint- hot pre vulcanized) replacement done with new one.
- Conveyor structure and stringer made new.

DDC idler bracket and structure



DDC belt



SCRUBBER AREA JOB

- New pre scrubber shell erection and MOC upgraded from MSRL to 316L.
- 41 and 42 pump new installed and line modification.
- 20s pump pipe line modification.
- Dryer and dust and fume inlet below replaced

Dismantling and erection of pre scrubber separator shell



Erection of Pre Scrubber shell



40s new pump replaced and line modification





Suction line below replacement



TAIL GAS SCRUBBER

- TG scrubber metal lining done at inside by provide SS316L strip.
- TG scrubber common new erected (SS316L)

TG Common Duct



TG stag inside repaired by 316L strip welding.





CENTRIFUGAL FANS

1. All fan bearing inspection & lubrication done & Dust & fume fan drive end bearings replaced.
2. Dust & fume fan damper replaced with overhauled one.
3. All fan impeller cleaned & alignment checked.
4. Combustion air fan outlet duct area damper fitted.
5. Dryer exhaust fan NDE side Plummer block SD 3134 replaced.
6. All fan damper flapper bearing units lubricated for better operation of damper.

□

Dust & Fume fan



Dryer Exhaust Fan



AIR RECEIVER TANK

- Air receiver tank base civil foundation done, pipe line modification and painting with hydro test done.

Air Receiver Tank Strengthening



Air Receiver Tank Civil Foundation with Tank



Air Receiver Tank Pipe Line Modification



MISCELLANEOUS jobs done during ATR-2021 in DAP Tr.C

36. Ammonia sparger replacement done.
37. Coating station modification done, new screw type pump erected and pipe line modified.
38. TG tube bundle replaced.
39. Ammonia pre heater relocated (heightened) and its pipe line modified.
40. Dryer lip seal inlet and outlet get replaced as new.
41. Dryer grizzly repairing work done.
42. LP steam line modification done.
43. Chamber shell outside heat protected paint done.
44. Quench air discharge below replaced as new.
45. Quench air impeller replaced by new one.
46. Combustion air fan impeller replaced by new one.
47. Combustion air fan discharge bellow replaced by new one.
48. Both product and oversize screen complete repair work done.
49. Dryer & Granulator lube oil cooler cleaned.
50. Dryer duct, cleaning job completed.
51. Pre scrubber pinch area, header line cleaning done.
52. Dust cyclone plannum and outlet cleaning done.
53. Dryer venture & Dust & Fumes down comer line cleaning done.
54. Dust & Fumes & Dryer separator shell & its down comer line descaling job done.
55. Pre scrubber down comer line cleaning done.
56. Dryer plannum cleaning done, inlet duct cleaning done.
57. Fumes scrubber discharge duct, descaling job done.
58. Dust & fume fan inlet duct cleaning done.
59. S/A Tank pump discharge valve (6" # 150 plug valve) replaced.
60. All Tank agitators gear box oil flushed & its pedestal bearing greased.
61. Product screen discharge and inlets cleaning done.
62. Primary tank discharge and inlets cleaning done.
63. Fans suction duct cleaning done.
64. Dryer venture and separator header line cleaning done.
65. Fumes venture and separator header line cleaning done.
66. All damaged insulation of ammonia line & steam line replacement under progress.
67. Scrubber nozzles cleaning done.
68. Dryer scrubber separator side & venture side cleaning done.
69. Dust & Fumes scr separator & venturi side cleaning done.
70. PN ammonia sparger both 1 to 8 No. cleaning done.
71. Strong acid to PN line cleaning done.
72. Pre scrubber to FRP duct header line cleaning done.

ATR-2021 REPORT

SAP

mechanical

SAP-1 (OR/627) Boiler Area

Plant stopped on	Plant started on	Total days
16.03.2021(OR-627)	29/04/2021	45 days

1. All the 30 nos man holes of Evaporator cut for dry ice blasting and inspection of flag coil tubes.
2. Super heater 1 and 2 top and bottom man holes cut for inspection and thickness measurement of coil bends
3. Economizer all three man holes opened for inspection
4. Chemical cleaning tank with pipe line arranged for cleaning of finned tubes of SH 1 & SH 2 and Economizer top and bottom bank tubes cleaning.
5. All converter 4 beds inlet and out let man holes cut for catalyst cleaning and inspection of division plate weld joint inspection.
6. HHE and CHE tube side and shell side man holes opened / cut for inspection and cleaning.
7. All spring supports are overhauled.
8. Converter 2 bottom insulation replaced and Aluminum cladded which was badly damaged.
9. Economizer Front side and rear side casing plate cut for bends thickness measurement.
10. All dampers in boiler area checked for freeness and gland packing replaced.
11. Inspection of center drum at bed 1 and 2 also at bed 3 & 4 checked for weld joint defects. DP test done. Repairs attended.
12. Converter bed 3 bottom plate found less thk , where patch plates are welded.
13. Converter bed 1 inlet nozzle repairing done by patch plat welding around the nozzle.
14. 4 nos catalyst trays replaced in Bed 1
15. Scaffolding of inside the boiler and neck portion of furnace for inspection of refractory lining and necessary repairs.
16. Boiler bottom plate weld joints DP tested and found some cracks, which are repaired by providing patch plates and welded.
17. Various damaged IBR valves of sizes 1” for vents/ drains replaced with same rating.
18. Both Fabric Bellows are replaced with new one.

ECONOMIZER

ECONOMISER WATER SIDE BEND AND HEADERS INSPECTION AND THICKNESS MEASURED





ECONOMISER GAS SIDE BEND INSPECTION AND THICKNESS MEASUREMENT

ECONOMIZER BOTTOM BANK

Rear side of Economizer Return bends found eroded which are applied with Titanium Putty





ECONOMIZER TOP BANK





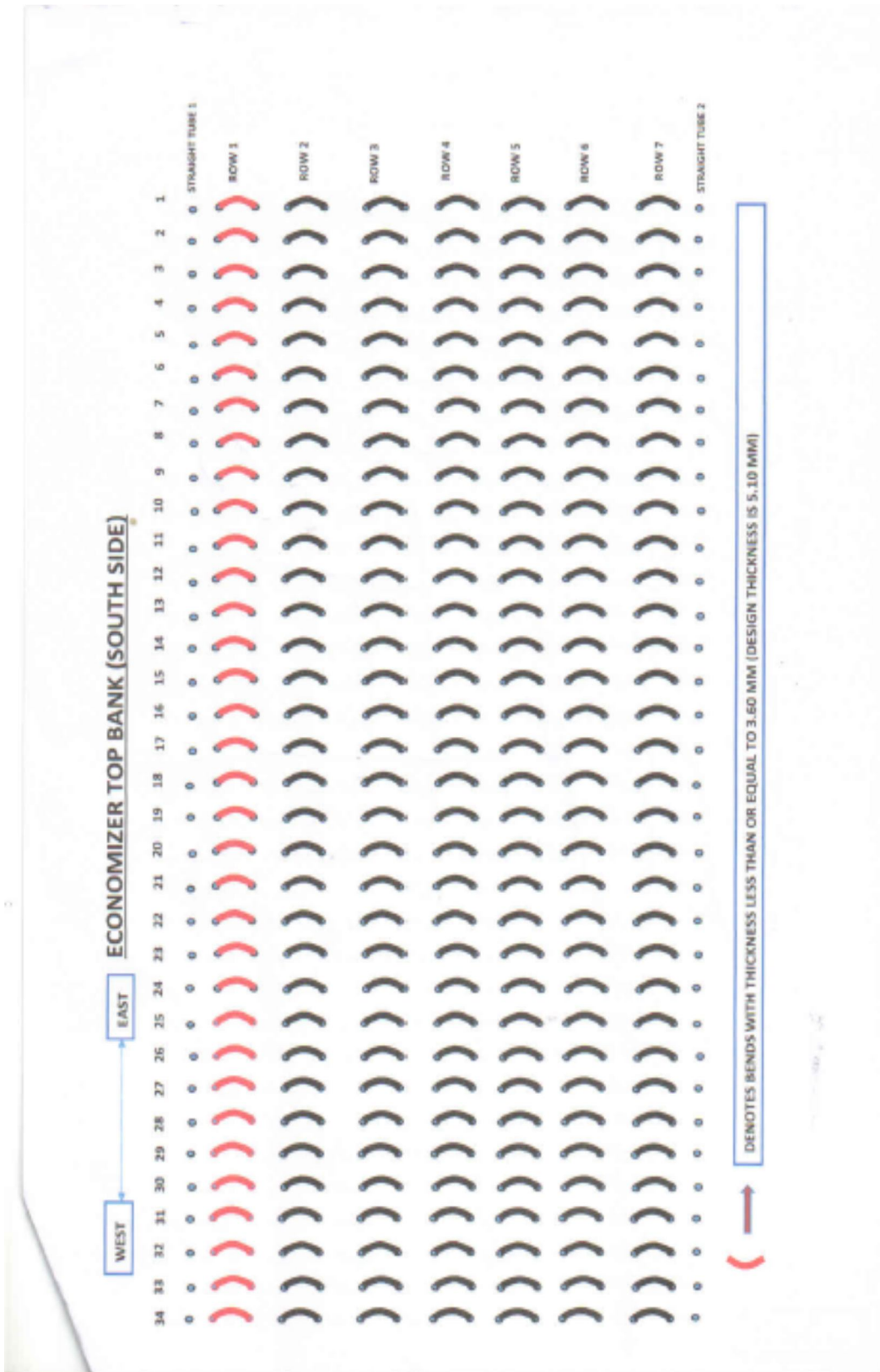
Economiser top bank top 3-row finned tubes and bends are replaced with new one

Each row 34 nos x top 3 rows = 102 nos and 102 bends

ECONOMISER NORTH SIDE (TOP BANK) FINNED TUBES REPLACED (MARKED IN RED COLOUR)



ECONOMISER SOUTH SIDE (TOP BANK) BENDS REPLACED (MARKED IN RED COLOUR)





LCV 1301 Installation



3 way valve joints DP test

BEFORE MODIFICATION



AFTER MODIFICATION



Economiser out let line elbow replaced which was leaked

Pipe line size -



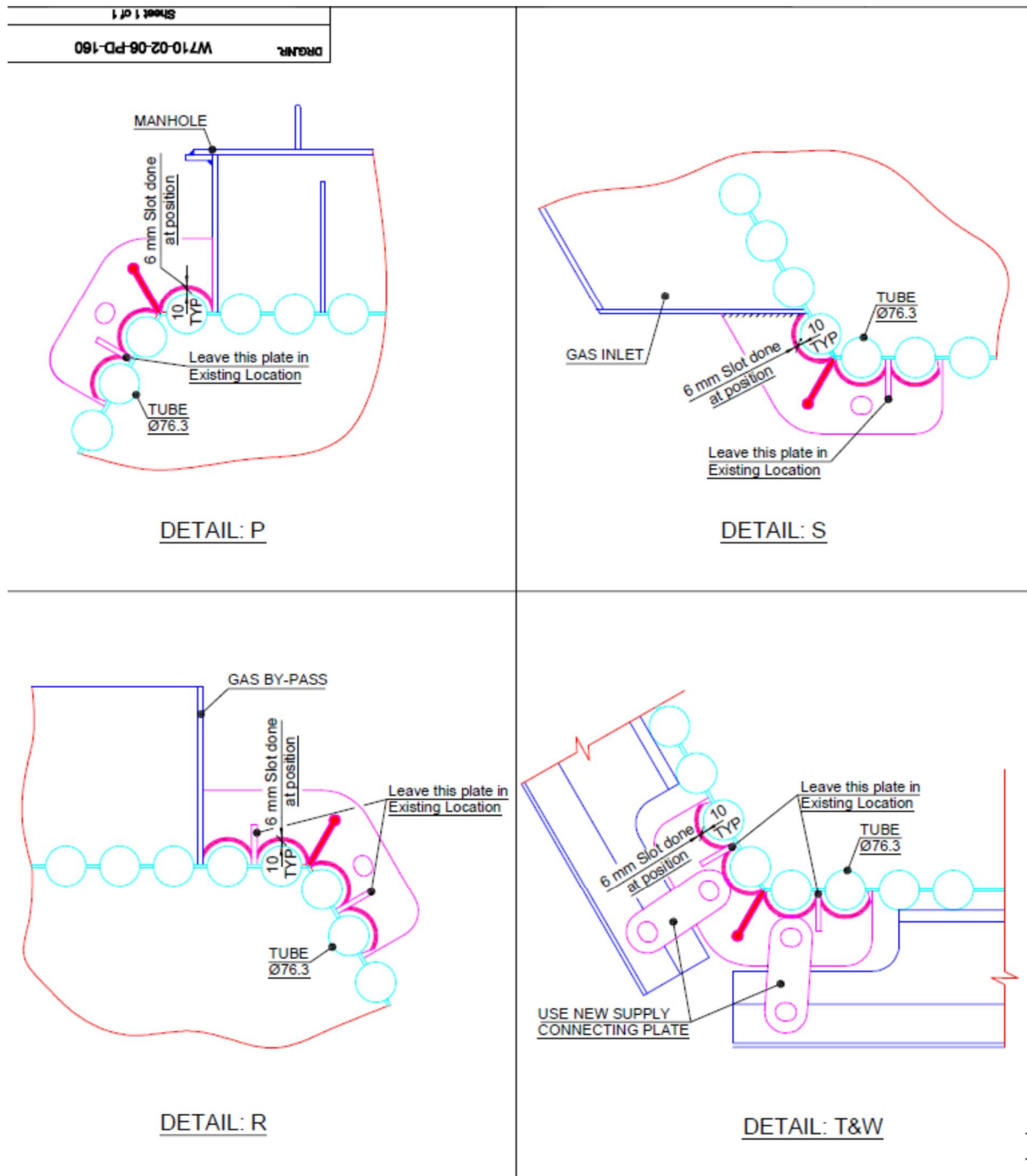
Installation of new support and insulation

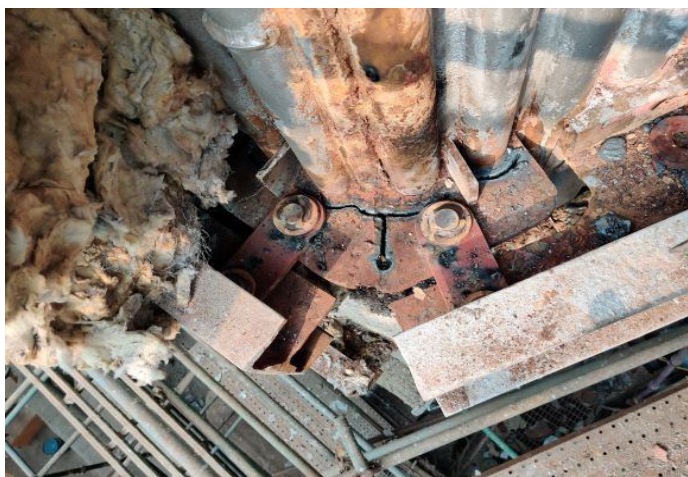


WASTE HEAT RECOVERY BOILER

- a) To avoid membrane tubes failures and restriction of thermal expansion at Buck stay, corner plates of buck stay are modified as follows as suggest by M/s Thermal systems (Hyd.) Pvt Ltd

There are total 58 No of corner plates installed where 42 nos out of 42 nos above radiation zone (i.e. above El +7.4 m) are modified- as per following drawing.











Various pictures of Buck stay corner plate modified at various elevations

Super Heater -1

INLET HEADER AND OUT LET HEADER STUB END TUBES INSPECTION



END caps of both headers of Super Heater 1 cutted for fiberoptic inspection as a part of RLA study of boiler

End cap details –

Inlet and Out let Header - 14 " sch Sch 120- SA 234 Gr WPB

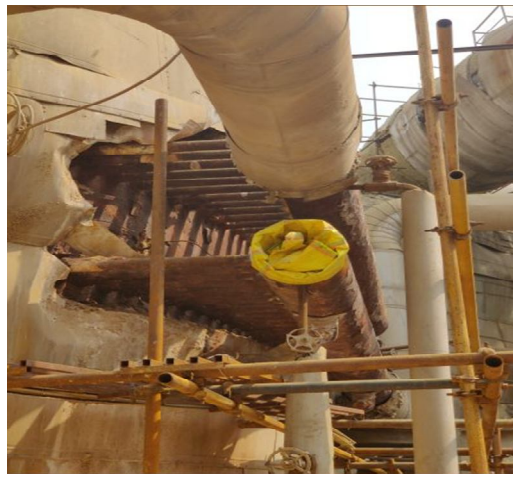
3 way valve replaced at SH- 1 inlet pipe line

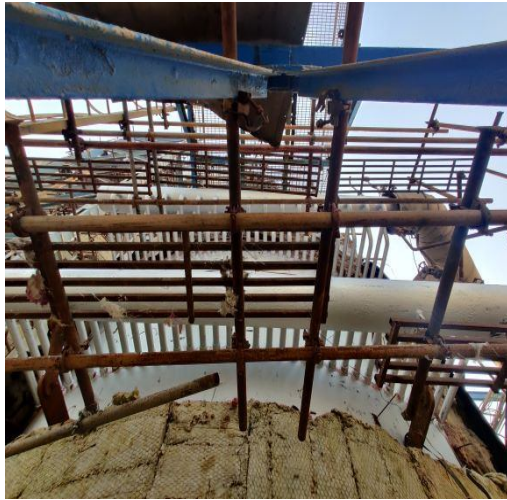
**Valve Size - 12", 600 # -MOC ASTM A217 GR WC6 – Make - Baker Hughes
Qty – 01 no**



SUPER HEATER -2

INLET HEADER & OUTLET HEADER STUB END TUBES INSPECTION





END caps of both headers of Super Heater 2 cutted for fibereotic inspection as a part of RLA study of boiler

End cap details – Bottom bank

Inlet / out let Header - 14 "sch Sch 80- SA 234 Gr WPB

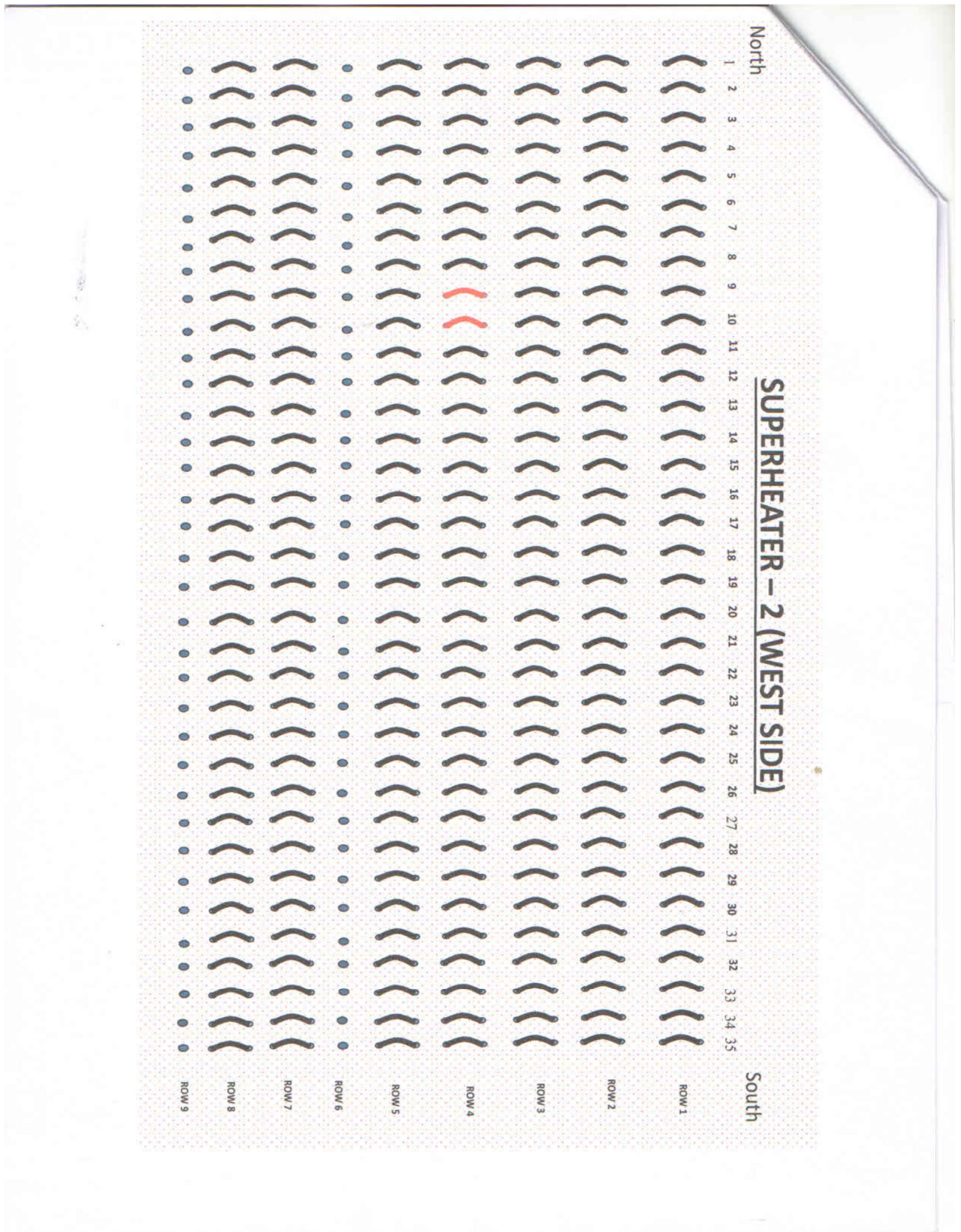
Top bank

Inlet Header - 14 "sch Sch 80- SA 234 Gr WPB

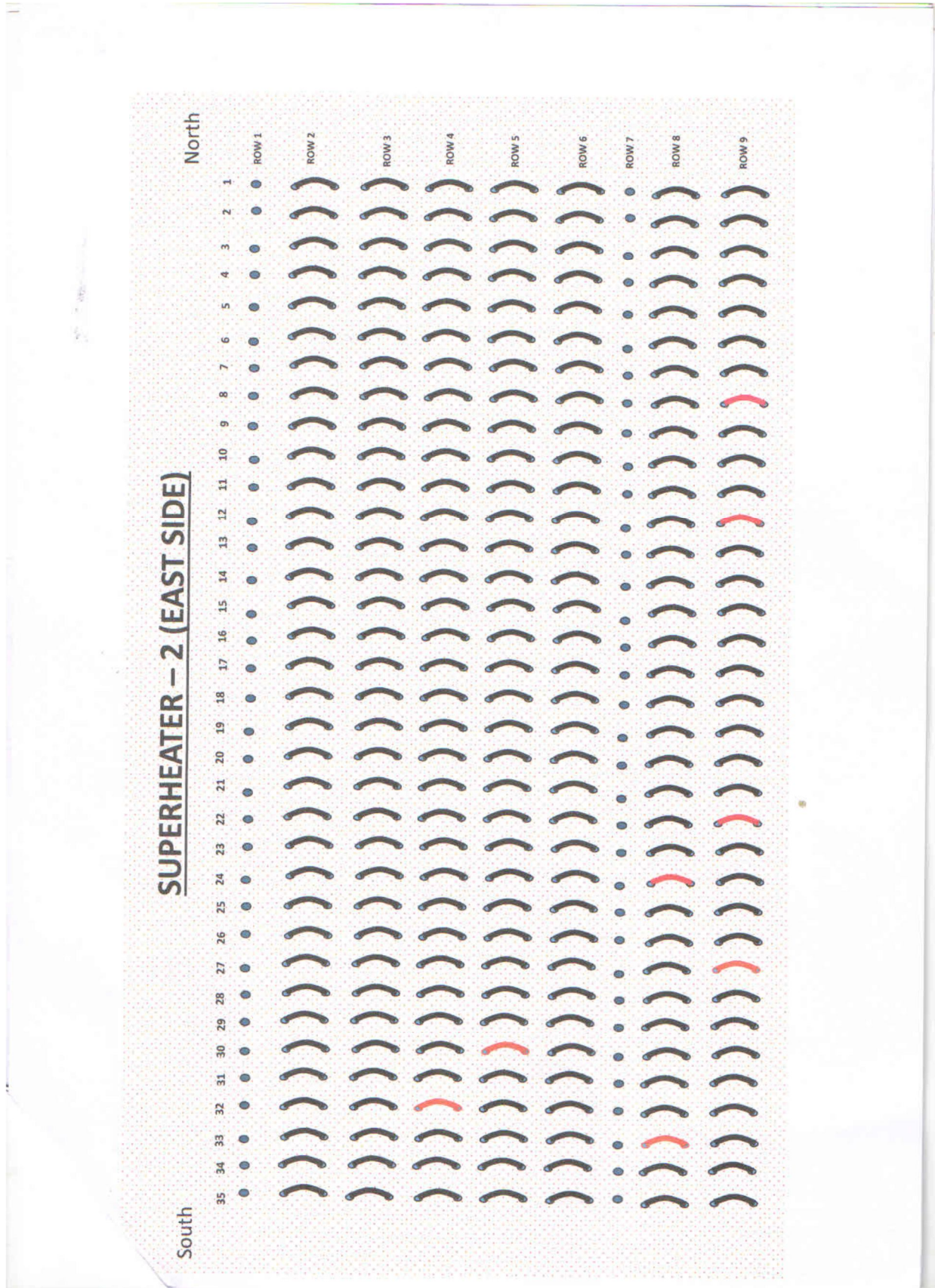
Out let Header - 14 " sch Sch 120- SA 234 Gr WP 11

10 nos of U bends (02 nos in (front side) west side and 08 nos (rear side) East side) in Super Heater 2 found eroded and reduced in thickness by more than 30%. These finned tubes and bends are found thickness less than 3.85 mm where design thickness of U bends is 5.5 mm

SUPER HEATER #2 WEST SIDE BEND MARKED



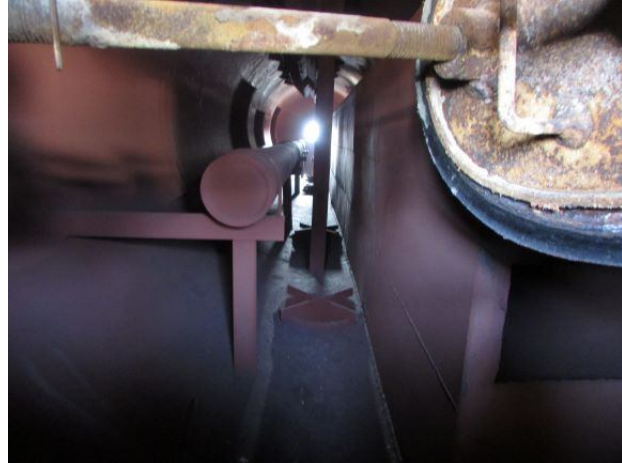
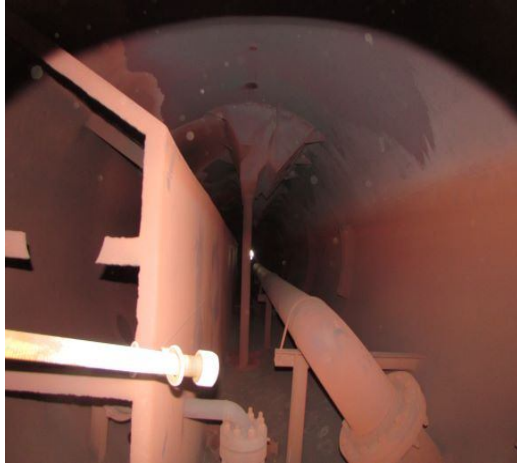
SUPER HEATER # 2 EAST SIDE BENDS MARKED



STEAM DRUM INSPECTION

- a) Steam drum internals checked and found in order. L-seam and C-seam joints with dished head DP test checked found ok.

STEAM DRUM INSIDE AFTER COMPLETE CLEANING



HYDRASTEP LEVEL INDICATOR INSTALLED ON STEAM DRUM



DISTRIBUTION HEADER INSPECTION HOLES OPENED AND INSPECTED



Joints DP and MP Tested

Distribution pipe lines from distribution header joints DP tested



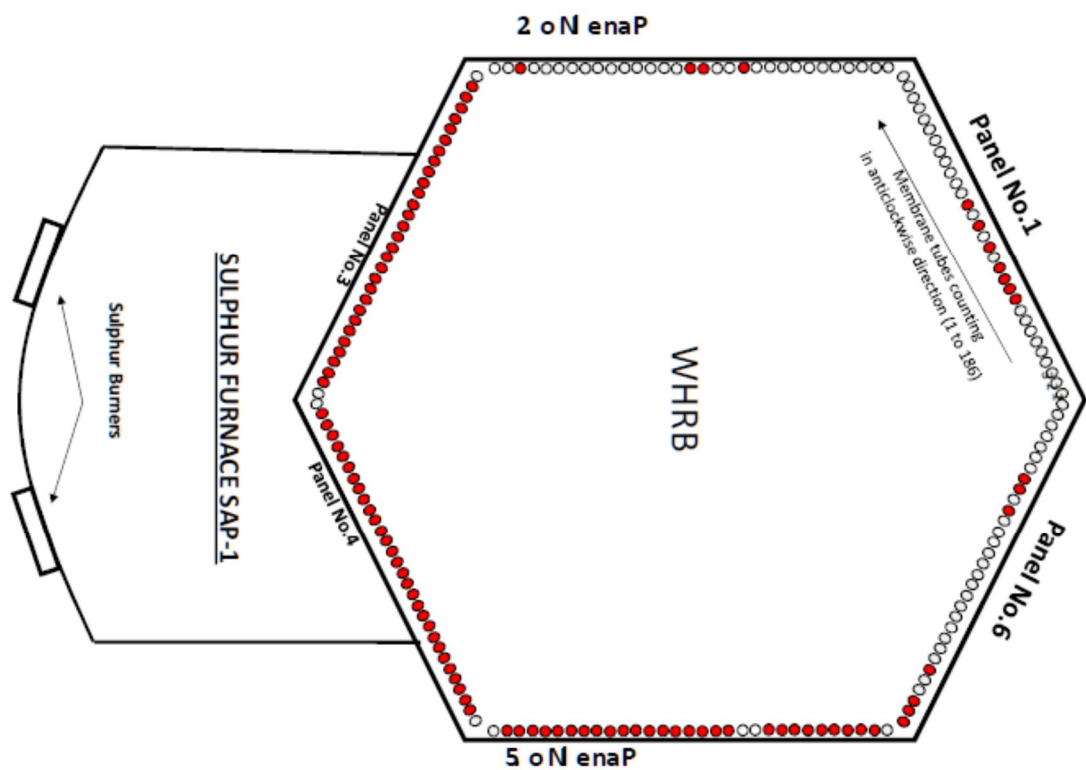
All the stub end joints of distribution pipes 12 nos. at Distribution header and Bottom header are checked with DP test and MP test



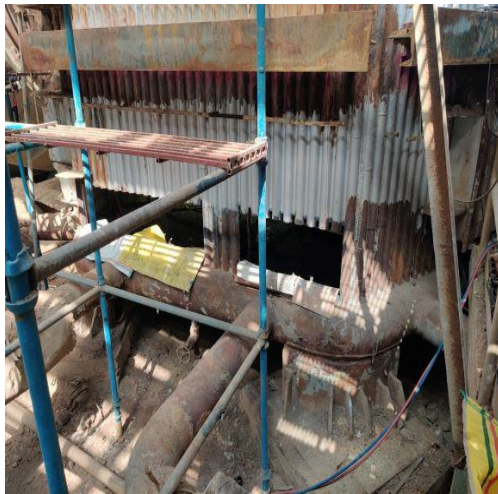
EVAPORATOR WATER WALL PANELS & FLAG COILS

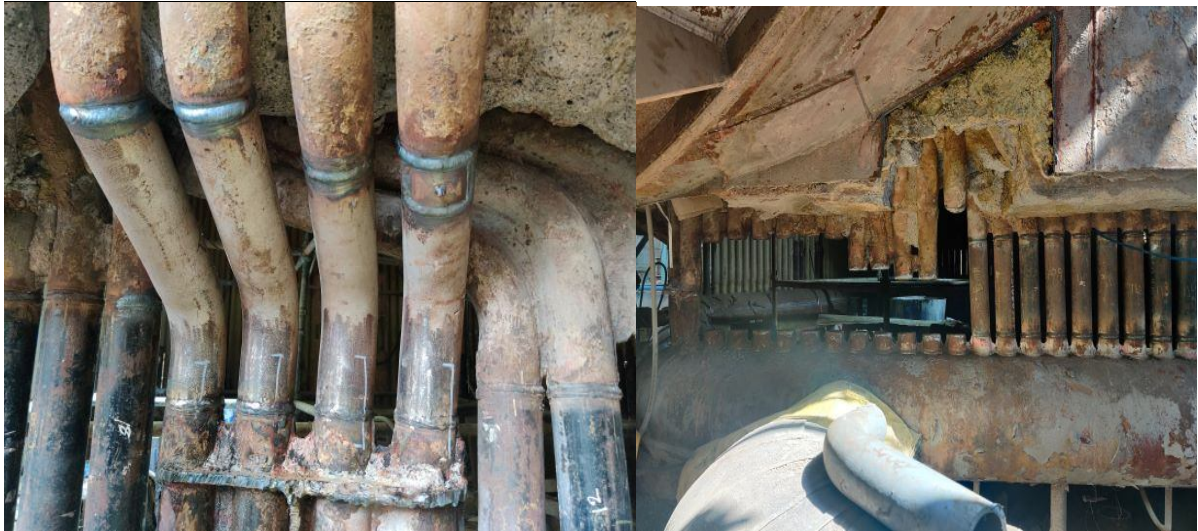
- a) Around 300 mm. length of 90 membrane tubes out of total 186 tubes above bottom header are found eroded badly.

90 nos. membrane tubes measuring 400-500 mm are cut and withdrawn and new membrane tubes are fitted back in position and welded.

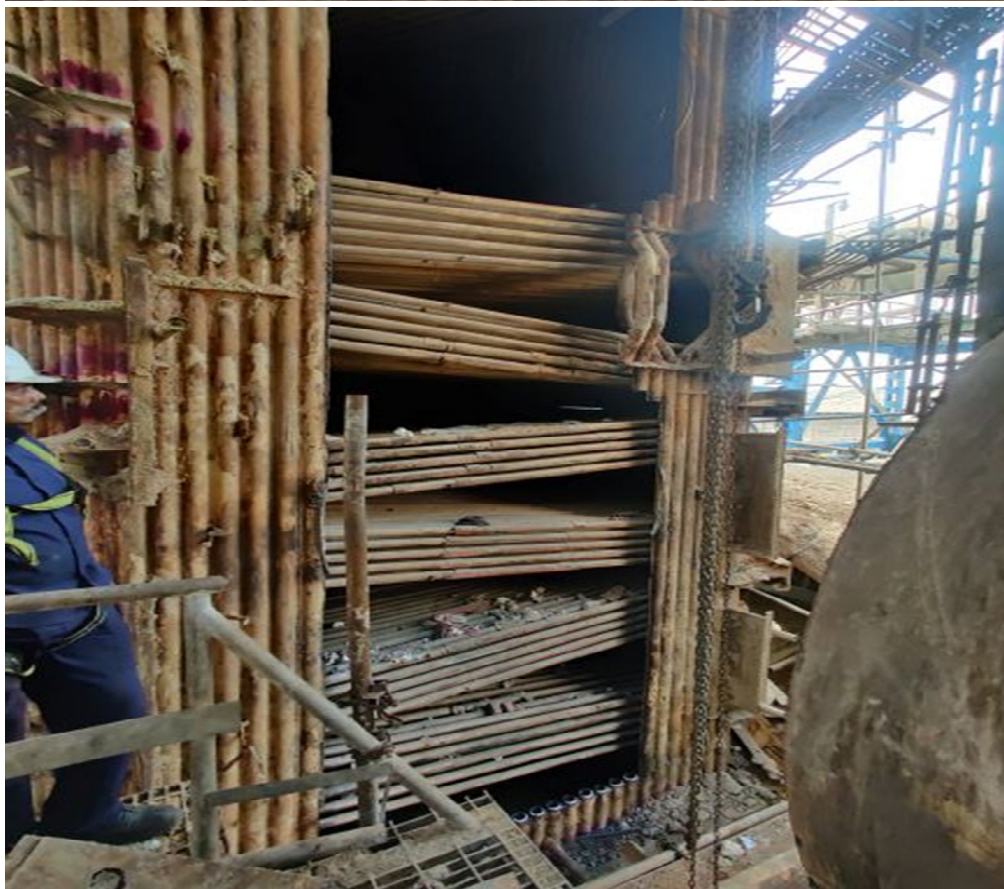


Panel No.	Tube Numbers	Total Number of tubes to replace
1	10, 11, 12, 13, 15, 17, 19	7
2	43, 46, 47, 60	4
3	64 to 92	29
4	95 to 123	29
5	126 to 143 & 146 to 154	27
6	156, 157, 158, 161, 176, 178, 179	7
	TOTAL	103
	Tube No. 82, 83, 84 & 85 in panel No. 3 and Tube No. 105 in Panel No. 4 were found cut near bend portion.	Tube No. 156 & 176 can not be attended as Tube No. 156 is the corner tapered tube of panel & 176 is the tube below the manhole.





Existing Boiler bypass Nozzle bend tubes badly eroded and thickness reduced at bend portion. This by pass nozzle replaced with new assembly .Old by pass nozzle replaced with straight membrane tubes.









After completion of bypass nozzle installation Buck stay supported beams are installed on Panel No 2



Replacement of Expansion Bellow at Boiler Bypass duct – 1800 NB



Bypass bellow supplied – M/s Athulya Bellows

After installation and welding of bypass bellow ,in side brick lining work done



To measure the thermal expansion of Boiler, 05 nos. of thermal expansion measurement provided at Bottom header pedestal supports and one no. at steam drum.



Replacement of Export steam pipe line control valve and its isolation valves

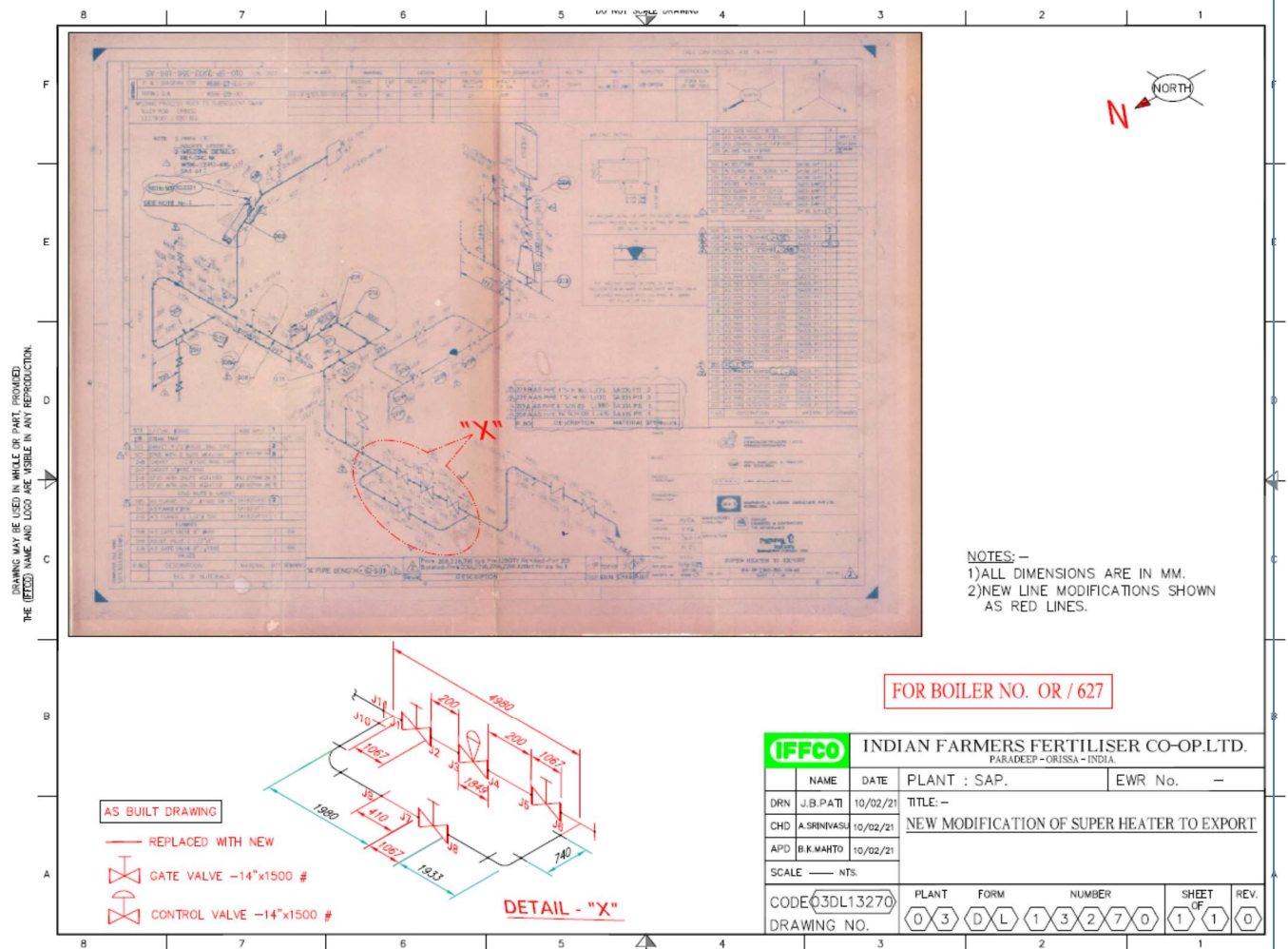
Valves replaced :

Pressure Control Valve – 14 "1500# - MOC - ASTM A217GR WC6 – Make – FISHER – 01 no

Isolation valves – 14" 1500# - MOC - ASTM A217GR WC6 – Make – L & T -Qty - 03 nos

Equal Tee – SA 234 WP 11 – 14 " 1500 # - 01 no

Total No of joints – 11 nos ; PWHT at 650 Deg C - Soaking Time - 60 min





Pre-fabrication of valve assembl

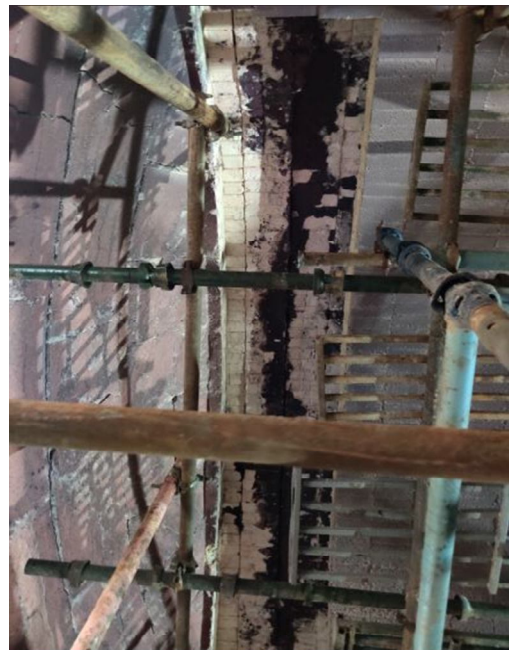
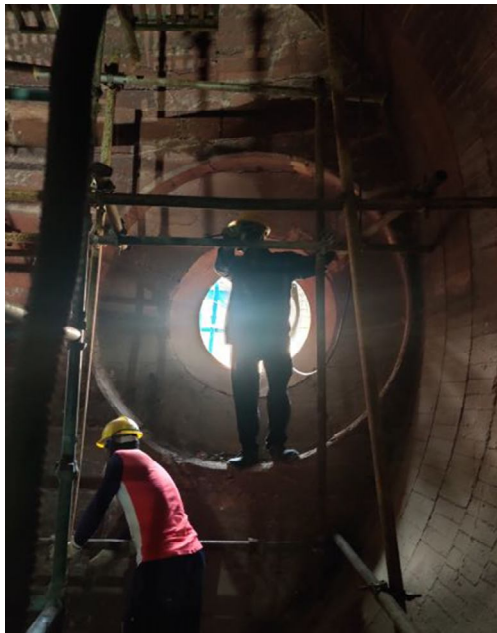


INSTALLATION OF CONTROL VALVE WITH ISOLATION VALVES



AFTER INSULATION AND PLATFORM INSTALLATION

Furnace dished head side brick lining found loosened samme removed and replaced





Brick lining work of furnace to dished head area



Furnace to Boiler neck portion badly damaged where top portion thickness observed 4.00 mm and bottom of shell observed 9.0 mm against 14.0 mm. damaged shell portion replaced with new one



Damaged Shell Plate removed at boiler neck portion due to less thickness





Boiler Bottom plate weld joints buffing DP test done. Some plate are corroded and found less thickness. Patch up plates fitted and welded




All membrane tubes thickness measured which are not replaced , Around 56 nos found less than 3.5 mm thickness, These membrane tubes are buttering welding done and DP tested



WHRB SUPPORT MEASUREMENT AS ON 31/05/21

SAP Train-1



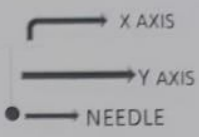
पूरुणतः सहकारी स्वामिन्
Wholly owned by Cooperative
Paradeep Unit

DATE 31/05/21
TIME :- 1.30PM
Load - 44.5 ton/hr

SAP 1 WHRB SUPPORT MEASUREMENT

OPERATING TEMP: 285°C
PRESSURE: 68 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	MOVEMENT IN VERTICAL
NO.1	02.50	01.50	-
NO.2	05.00	02.00	-
NO.3	08.00	-	-
NO.4	04.00	03.00	-
NO.5	02.00	-	-



SAP 2 STEAM DRUMSUPPORT MEASUREMENT

OPERATING TEMP: 278-285°C
PRESSURE: 66 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	MOVEMENT IN VERTICAL
NO.1	18.00	03.00	70.00

← Turbine side
↑ Vertical
Superheater side →
18mm

SAP 2 SH#1 SUPPORT MEASUREMENT

OPERATING TEMP:
PRESSURE:

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	
NO.1	-	-	
NO.2	05.00	-	
NO.3	08.00	-	
NO.4	05.00	-	
NO.5	-	-	

SAP 2 SH#2 SUPPORT MEASUREMENT

OPERATING TEMP:
PRESSURE:

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	
NO.1	-	-	
NO.2	-	-	
NO.3	-	-	
NO.4	-	-	
NO.5	-	-	

SAP-2 (OR/628) Boiler Area

SULPHURIC ACID PLANT -2 stoppage		Total days
08.03.2021(OR-628)	14/04/2021	35 days

19. All the 30 nos man holes of Evaporator cutted for dry ice blasting and inspection of flag coil tubes.
20. Super heater 1 and 2 top and bottom man holes cutted for inspection and thickness measurement of coil bends
21. Economizer all three man holes opened for inspection
22. Chemical cleaning tank with pipe line arranged for cleaning of finned tubes of SH 1 & SH 2 and Economizer top and bottom bank tubes cleaning.
23. All converter 4 beds inlet and out let man holes cutted for catalyst cleaning and inspection of division plate weld joint inspection.
24. HHE and CHE tube side and shell side man holes opened / cutted for inspection and cleaning.
25. All spring supports are overhauled.
26. Converter 2 bottom insulation replaced and Aluminum cladded which was badly damaged.
27. Economizer Front side and rear side casing plate cutted for bends thickness measurement.
28. All dampers in boiler area checked for freeness and gland packing replaced.
29. Inspection of center drum at bed 1 and 2 also at bed 3 &4 checked for weld joint defects. DP test done. Repairs attended.
30. Converter bed 1 inlet nozzle repairing done by patch plat welding around the nozzle.
31. Scaffolding of inside the boiler and neck portion of furnace for inspection of refractory lining and necessary repairs.
32. Boiler bottom plate weld joints DP tested and repairs attended.
33. Various damaged IBR valves of sizes 1” for vents/ drains replaced with same rating.

ECONOMIZER

ECONOMISER WATER SIDE BEND AND HEADERS INSPECTION AND THICKNESS MEASURED



ECONOMISER GAS SIDE BEND INSPECTION AND THICKNESS MEASUREMENT

ECONOMIZER BOTTOM BANK



**Rear side of Economizer
Return bends found
eroded which are
applied with Titanium
Putty**



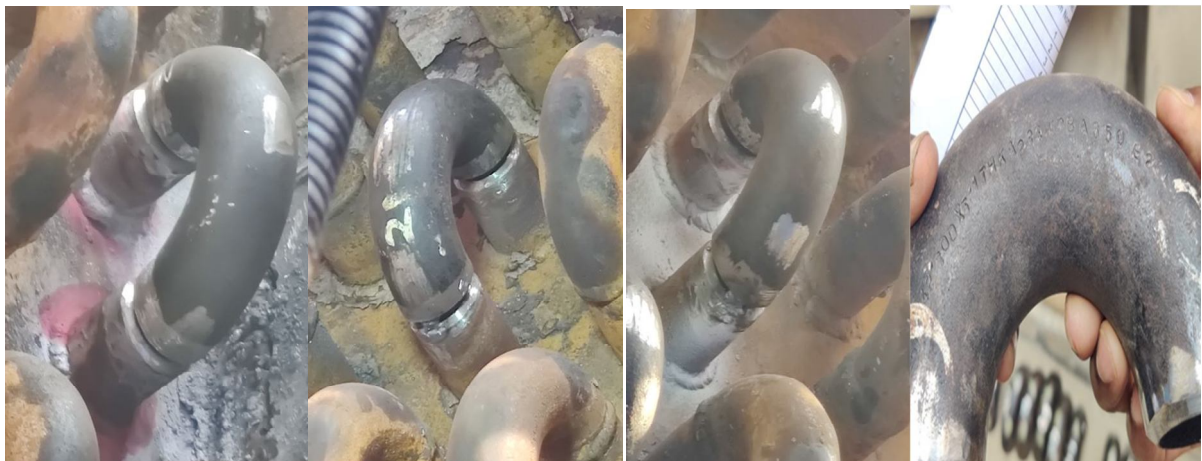
ECONOMIZER TOP BANK



Economiser U-bends in top bank and bottom front and rear side are inspected, marked bends found eroded and reduced in thickness by more than 30%. These bends are found thickness less than 3.6 mm where design thickness of U bends is 5.1 mm.

Economiser Top bank U bends replaced

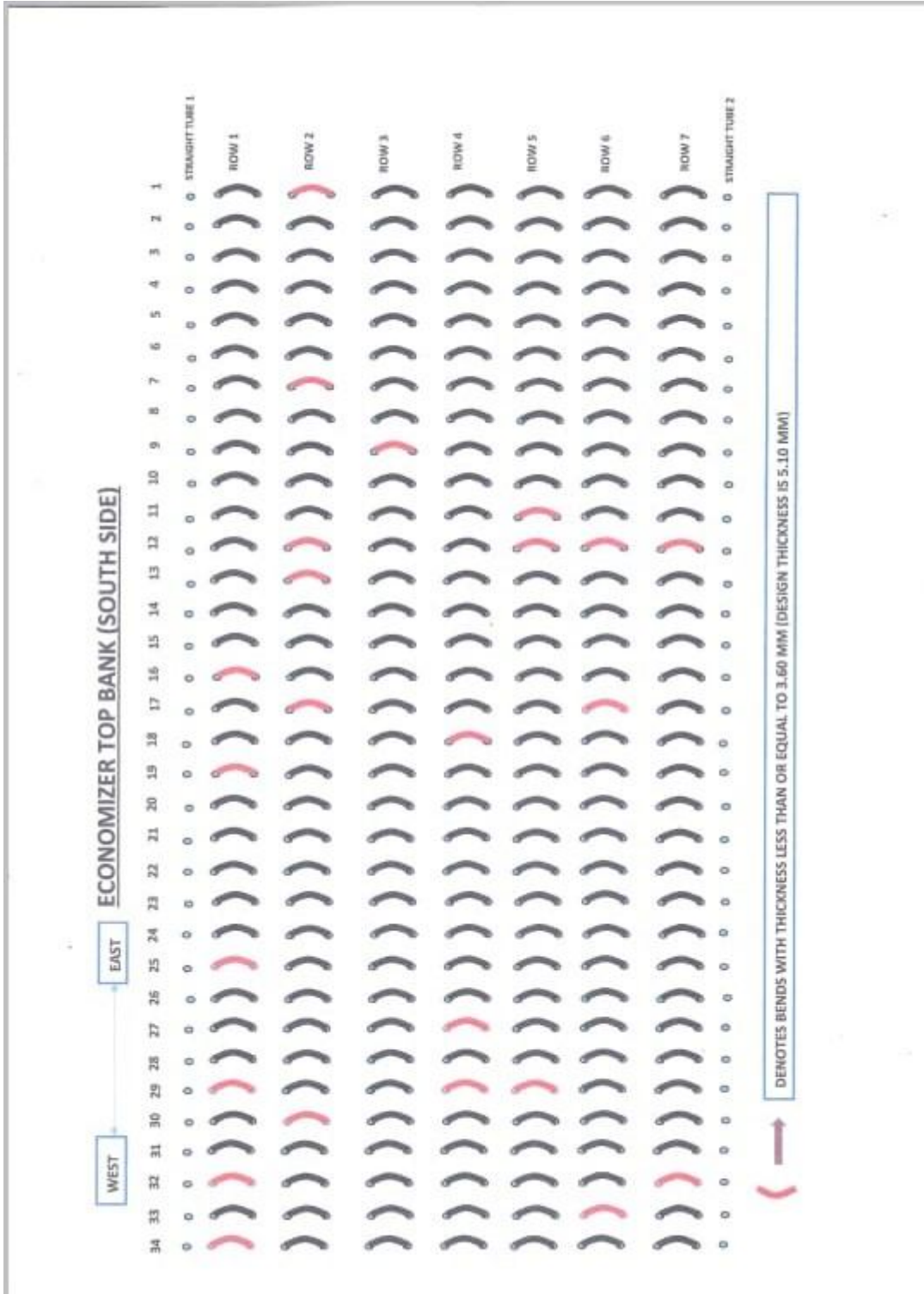
Front side – 24 nos Rear side – 89 nos



ECONOMISER NORTH SIDE (TOP BANK) BENDS REPLACED (MARKED IN RED COLOUR)



ECONOMISER SOUTH SIDE (TOP BANK) BENDS REPLACED (MARKED IN RED COLOUR)



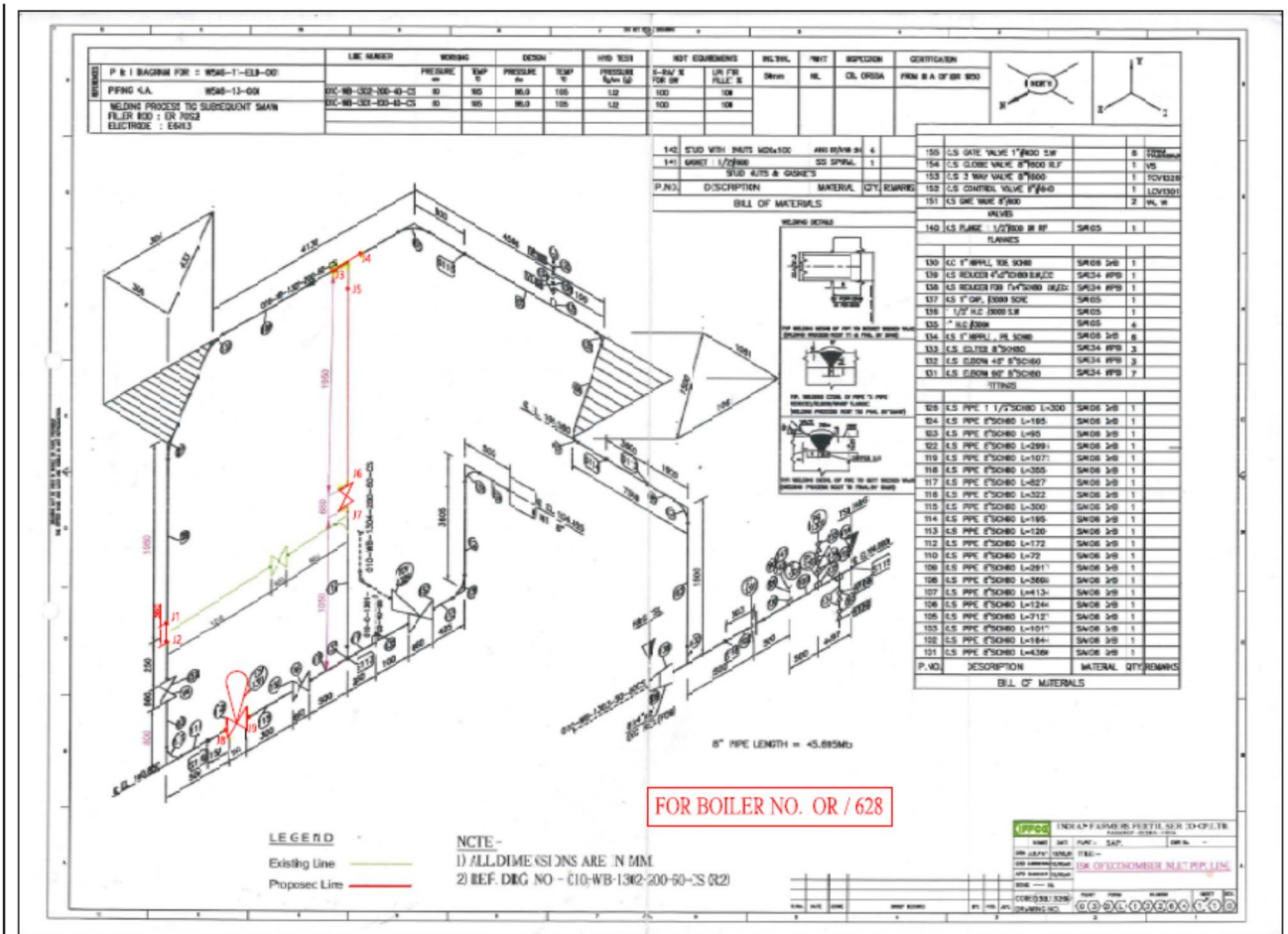
BFW pipe line inlet to Economiser modified and Level control valve and Isolation valve replaced.

Pipe line size : 200 NB sch 60 – OD 219.1 mm x 10.31 mm thk

MOC - SA 106 Gr B - No of Joints – 12 nos

Valve Size - 8", 1500 # - MOC ASTM A217GR WC9 – Make - KSB-MIL CONTROLS Ltd

Isolation Valve - 8", 1500 # - MOC ASTM A217GR WC6 – Make – L & T



BEFORE MODIFICATION



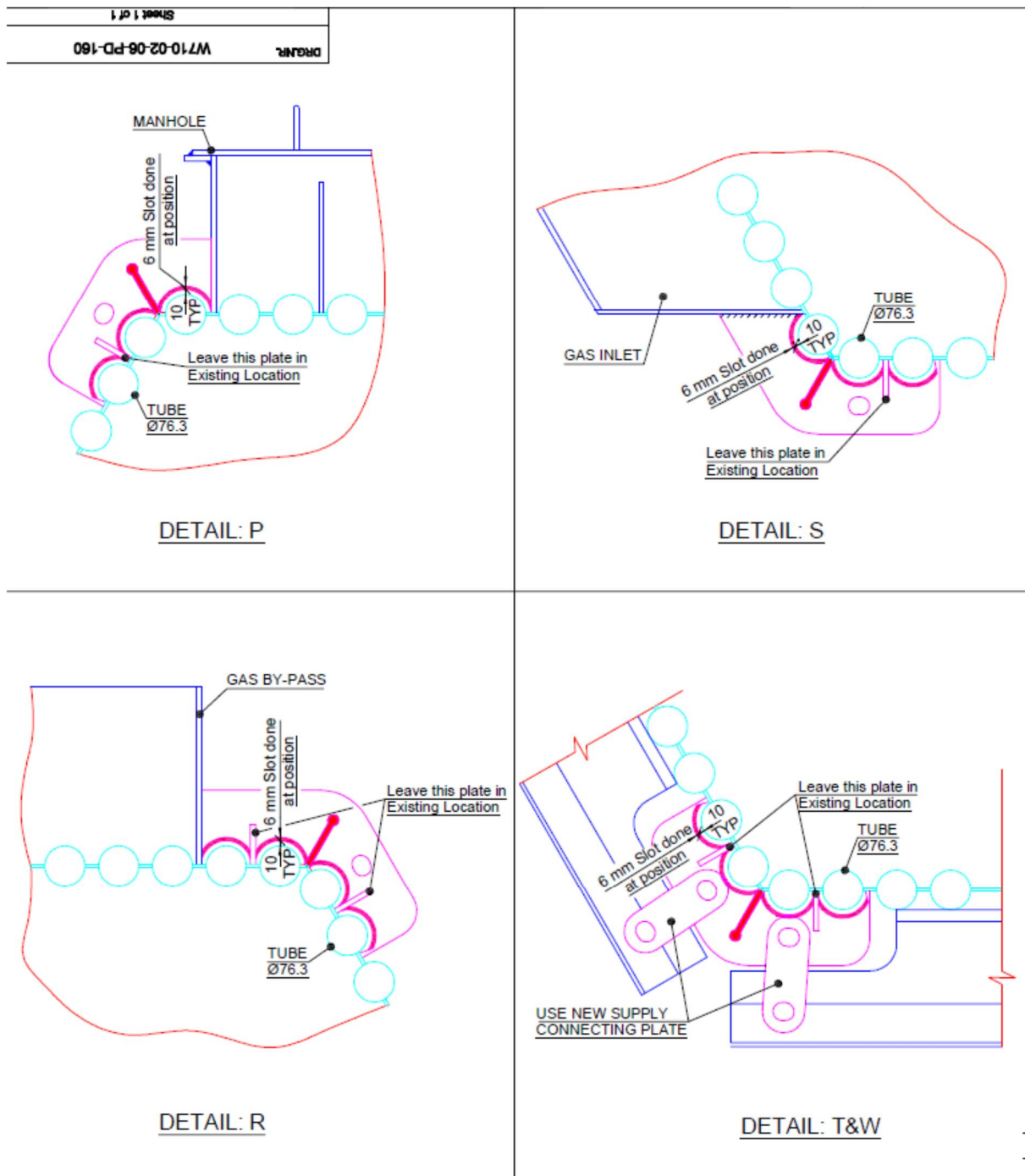
AFTER MODIFICATION



WASTE HEAT RECOVERY BOILER

- b) To avoid membrane tubes failures and restriction of thermal expansion at Buck stay, corner plates of buck stay are modified as follows as suggest by M/s Thermal systems (Hyd.) Pvt Ltd

There are total 58 No of corner plates installed where 38 nos out of 42 nos above radiation zone (i.e. above El +7.4 m) are modified- as per following drawing.







Various pictures of Buck stay corner plate modified at various elevations

Super Heater -1

INLET HEADER AND OUT LET HEADER STUB END TUBES INSPECTION



END caps of both headers of Super Heater 1 cutted for fiberoptic inspection as a part of RLA study of boiler

End cap details –

Inlet and Out let Header - 14 " sch Sch 120- SA 234 Gr WPB

3 way valve replaced at SH- 1 inlet pipe line

**Valve Size - 12", 600 # -MOC ASTM A217 GR WC6 – Make - Baker Hughes
Qty – 01 no**



SUPER HEATER -2

INLET HEADER & OUTLET HEADER STUB END TUBES INSPECTION



**END caps of both headers of Super Heater 2 cutted for
fibereotic inspection as a part of RLA study of boiler**

End cap details – Bottom bank

Inlet / out let Header - 14 "sch Sch 80- SA 234 Gr WPB

Top bank

Inlet Header - 14 "sch Sch 80- SA 234 Gr WPB

Out let Header - 14 " sch Sch 120- SA 234 Gr WP 11

STEAM DRUM INSPECTION

- b) Steam drum internals checked and found in order. L-seam and C-seam joints with dished head DP test checked found ok.

BFW pipe line inside steam drum



STEAM DRUM INSIDE AFTER COMPLETE CLEANING



HYDRASTEP LEVEL INDICATOR INSTALLED ON STEAM DRUM



DISTRIBUTION HEADER INSPECTION HOLES OPENED AND INSPECTED



Joints DP and MP Tested

Distribution pipe lines from distribution header joints DP tested

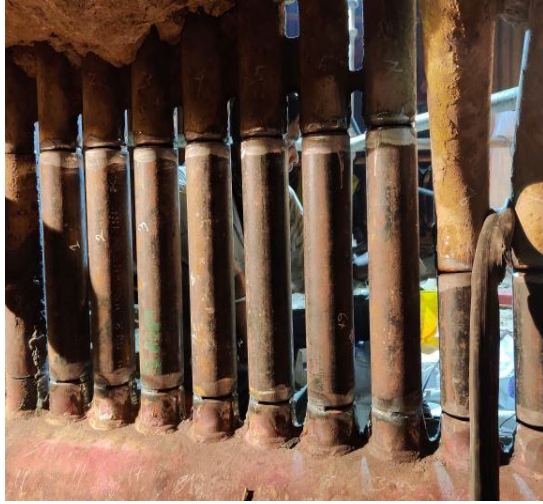


All the stub end joints of distribution pipes 12 nos. at Distribution header and Bottom header are checked with DP test and MP test



EVAPORATOR WATER WALL PANELS & FLAG COILS

- a) Around 300 mm. length of 96 membrane tubes out of total 186 tubes above bottom header are found eroded badly.
96 nos. membrane tubes measuring from bottom header 400-500 mm are cut and withdrawn and new membrane tubes are fitted back in position and welded





Boiler bypass nozzle top portion badly damaged which is replaced with new one.



Replacement of Expansion Bellow at Boiler Bypass duct – 1800 NB



Brick lining of inside of bypass duct



To measure the thermal expansion of Boiler, 05 nos. of thermal expansion measurement provided at Bottom header pedestal supports and one no. at steam drum.



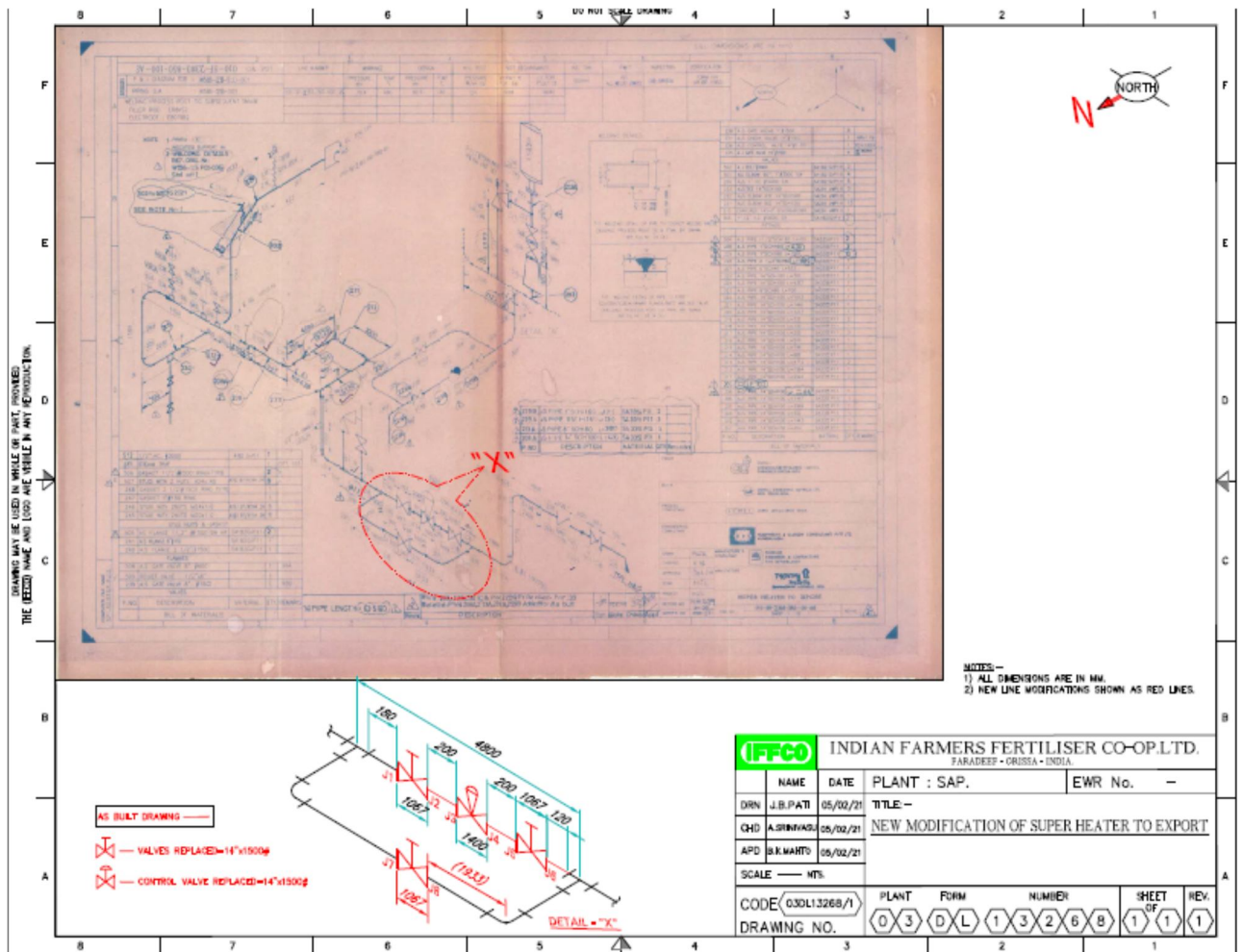
Replacement of export line control valve and its isolation valves

Valves replaced :

Pressure Control Valve – 14 " 1500# - MOC - ASTM A217GR WC6 – Make - Baker Hughes Qty – 01 no

Isolation valves – 14" 1500# - MOC - ASTM A217GR WC6 – Make – L & T -Qty - 03 nos

Total No of joints – 08 nos ; PWHT at 650 Deg C - Soaking Time - 60 min



Pre-fabrication of valve assembly



Removal of valves



INSTALLATION OF CONTROL VALVE WITH ISOLATION VALVES



AFTER INSULATION AND PLATFORM INSTALLATION

Boiler Bottom header refractory castable removed and header checked and bottom plate joints



WHRB SUPPORT MEASUREMENT AS ON 31/05/21

SAP Train-2



पूर्णतः सहकारी स्व
Wholly owned by Coop
Paradeep Unit

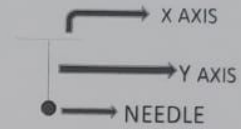
DATE 31/05/2021
TIME : 2:30 PM

Load: 47 TPH

SAP 2 WHRB SUPPORT MEASUREMENT

OPERATING TEMP: 286°C
PRESSURE: 70 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	MOVEMENT IN VERTICAL
NO.1	02.00	05.00	-
NO.2	13.00	02.00	-
NO.3	12.50	01.00	-
NO.4	10.80	02.00	-
NO.5	04.00	-	-



SAP 2 STEAM DRUMSUPPORT MEASUREMENT

OPERATING TEMP: 285°C
PRESSURE: 67 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	MOVEMENT IN VERTICAL
NO.1	30	08	70

P verified

Turbine Side

SAP 2 SH#1 SUPPORT MEASUREMENT

OPERATING TEMP:
PRESSURE:

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	
NO.1	-	-	
NO.2	02.00	-	
NO.3	04.00	-	
NO.4	03.00	-	
NO.5	-	-	

SAP 2 SH#2 SUPPORT MEASUREMENT

OPERATING TEMP: 478°C
PRESSURE: 62.5 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	
NO.1	-	-	
NO.2	02.00	-	
NO.3	04.00	-	
NO.4	05.00	-	
NO.5	-	-	

ATR REPORT -2021

SAP MECHANICAL-MELTING AREA

SULFUR FEED CONVEYORS

A.CONVEYOR 101

1. Head pulley, Snub pulley and Tail pulley both side bearing checked and greasing done with Omega 73.
2. Gear box overhauling done, alignment done and gear coupling checked and greasing done.
4. Primary scrapper blades replaced.
5. Three nos vibrofeeder tray removed and discharge chute repairing done.

B.CONVEYOR 102

1. All pulley bearing checked and greasing done with Omega 73.
2. Gear box oil flushing done with new oil,coupling checked and greasing done.
3. Two nos bend Pulley removed from position and after rubber lagging positioning done with new bearings and sleeve. Greasing done with Omega 73.

C.CONVEYOR 103

1. All pulley bearing checked & greasing done with Omega 73.
2. Damaged carrying idlers are replaced by HPPE idlers with their frames.
3. Gear box checked, oil flushing done and new oil Mesh 320 replaced.
4. Primary scrapper installed.
5. Belt replacement done with new belt.
- 6.Tail pulley bearing changed with new sleeves.



D.CONVEYOR 104 A

1. Conveyor belt removed, conveyor structure replacement done completely.
2. Deck plate new fitting done, Gear box removed and overhauling done.

3. Complete alignment done. Head pulley lagging done and bearing changed.
4. New conveyor belt replacement done and hot vulcanization done.
5. Snub pulley bearing changed.
6. Primary scrapper blades replaced.
7. Main support beam near head pulley strengthening done.



E.CONVEYOR 104 B

1. Conveyor belt removed, conveyor structure replacement done as per requirement.
2. Deck plate new fitting done, Gear box removed and overhauling done.
3. Complete alignment done. Head pulley lagging done and bearing changed.
4. New conveyor belt replacement done and hot vulcanization done.
5. Snub pulley bearing changed.
6. Primary scrapper blades replaced.
7. Main support beam near head pulley strengthening done.

F.SBC 1

1. All pulley bearings greasing done with Omega 73.
2. Gear box oil flushing done.

G.SBC 2

1. Bend pulleys, tail pulley and take up pulley replaced with new bearings.

2. 20 Mtrs belt replaced for smooth running of belt.
3. Gear box oil flushing done, oil seal replaced and alignment done.
4. Old chequered plates and structure replacement done.

CONVEYOR 101 A

1. All pulley bearing checked and greasing done with Omega 73.
2. New automatic belt trackers fitted in both carrying side and return side.

CONVEYOR SBC—1A

1. Head pulley and Tail pulley removed from position for rubber lagging. All the pulley again fitted in position with new sleeves and bearings.
2. Gear box removed overhauling done and fitted again with proper alignment.
3. Worn out belt replacement done. Damaged and ageing idlers replacement done by new HPPE idlers.
4. Damaged idlers stands replaced.

ALL VPTS (Vertical pump tank)

VPT 1:

1. VPT 1 drained out for sulphur cleaning.
2. Pump 136,137 and agitator removed.
3. Insulation removed, thickness done and SS 316 L plate patch work done in vapour space throughout the tank
4. Pump base removed and new pump base with structure replaced.
5. New steam inlet line header with condensate header modification done with manifold system and flexible pre insulated hose.
6. Tank roof plate replaced completely by 8 MM SS 304 plate.
7. Internal coil hydro testing done and repairing done at required places.
8. Overhauled pump and agitator fixing done in position.
9. Hydro testing done of shell then insulation done.
10. Pump discharge line support structures replacement done.
11. Tank roof platform and hand railing fitting done.
12. Tank filling pipe hydro testing done and repairing done and inserted into tank.

13. Tank LT replaced by new one.



VPT -3

1. VPT 3 drained out for sulphur cleaning.
2. Pump 336,337 and agitator removed.
3. Insulation removed, thickness done and SS 316 L plate patch work done in roof plate
4. Recirculation and vent line modification done for ease maintenance of pump and control valve.
5. New steam inlet line header with condensate header modification done with manifold system and flexible pre insulated hose.
6. Return condensate line modification done.
7. Internal coil hydro testing done and repairing done at required places.
8. Overhauled pump and agitator fixing done in position.
9. Hydro testing done of shell then insulation done.
10. Pump discharge line support structures replacement done.
11. Tank roof platform and hand railing fitting done.

12. Tank filling pipe hydro testing done and repairing done and inserted into tank.

13. One temporary platform fabrication and erection done for safety on roof.

VPT -2:

1. VPT 2 drained out for sulphur cleaning.

2. Pump 236,237 and agitator removed.

3. Insulation removed, thickness done, blasting & HR painting done.

4. Pump base structure with support plates of tank replaced.

5. Filling pipe newly fabricated and hydro testing done.

6. Internal coil hydro testing done and found ok.

7. New insulation done of the tank.

8. Various valves in discharge line replaced.



TR 1 VPT

1. VPT drained out for sulphur cleaning.

2. Pump 160,161 removed and overhauling done.

3. Insulation removed, thickness done, found ok.
4. Coil inlet line modification done for drain manhole job.
5. Inlet line valve overhauling done.
6. Internal coil hydro testing done and found ok.
7. New insulation done at damaged portion of the tank.
8. Various steam line valves replaced.
9. Old sulphur discharge line dismantling done.

TR 2 VPT

1. VPT drained out for sulphur cleaning.
2. Pump 260,261 removed and overhauling done.
3. Insulation removed, thickness done, found ok.
4. Two no's new Chemlin make pump installed in position, discharge line modification done new contra tracing lines.
5. Inlet line valve overhauling done.
6. Internal coil hydro testing done and found ok.
7. New insulation done at damaged portion of the tank.
8. Various steam line valves replaced.
9. Pump base new structure with plates replaced.

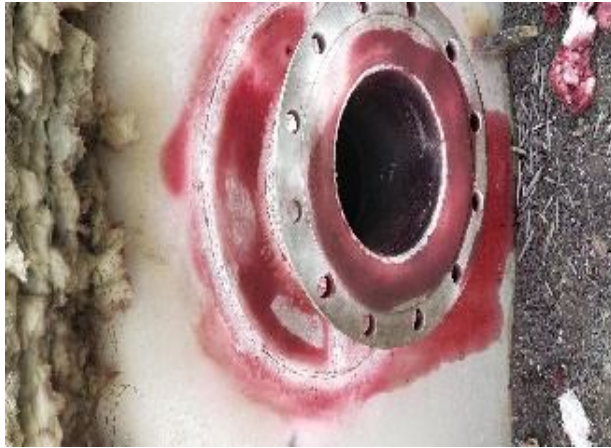


Sulphur Pit (IOCL)

1. Two nos pumps opened and overhauling done.
2. All manholes opened for sulphur cleaning and internal coil thickness checking.
3. All internal coils outlet elbow and pipe replaced in position, chimney opened for cleaning.
4. Inlet line NO 1, 2 & 6 pipe line complete replacement done.
5. All discharge line valves gear box and valve overhauling done.
6. Pump base structure replacement done.

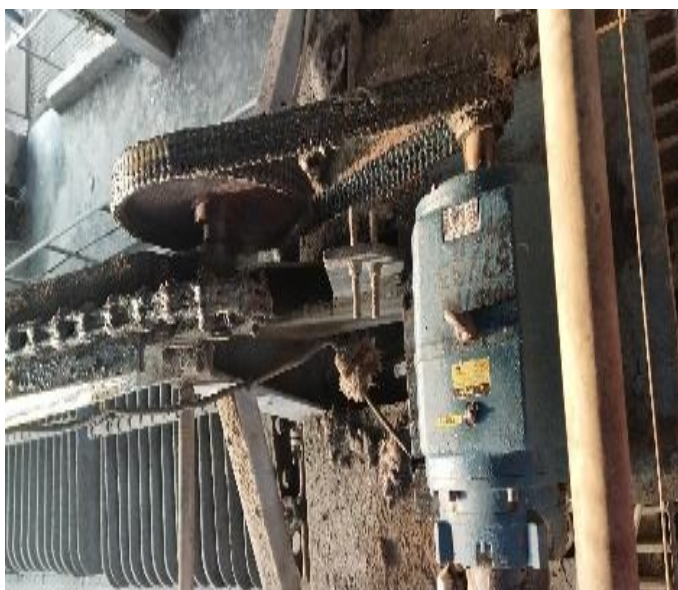
MSST (6000 MT)

1. Tank outlet valve steam line completed, valve overhauling done.
2. New dip tube replacement done.
3. Tank inlet line valve replacement done, LT replaced and taken into line.
4. All steam traps overhauling done, condensate line new replacement done, all valves overhauling done.
5. New 8"*10" jacketed nozzle fabrication done and fitting done in MSST.



Primary sulphur filters

1. All filters opened, structures blasting & painting done.
2. All gear box power pack, sprocket cleaning and overhauling done. South filter chain and sprocket replacement done.
3. Block valve (Male female coupling) opened and machining done.
4. Product line replacement and modification done.
5. New support to pipe line replacement done.
6. All filters leaves (six nos each) removed and fixing done after cleaning.
7. Steam line and condensate line modification done for easy operation.
8. Middle filter shell plate patch work done.
9. Safety valve line of all filters modification done for safety.



Secondary Sulphur filter

1. Secondary filter opened and gasket replaced.
2. All cartridge replacement done.
3. New insulation done.



MELTER 131

1. All roof plates, associated structure, chimney and agitator removed from position.
2. Five nos coil removed from position from base for easy cleaning.
3. Conical portion neck area and flange cleaning done and welding done after thickness measurement.
4. All coils steam trap cleaning done.
5. 01 no new coil replaced and other five nos coil positioning done after cleaning and hydro testing.
6. Complete shell, conical portion, chimney, associated pipe line blasting and HR painting done.
7. All coils, chimney, agitator, roof plates positioning done.
8. Hydro testing of shell done and found ok.
9. Melter overflow nozzle, overflow pipe and filling pipe repairing done and positioning done.
10. Agitator gear box oil flushing done and greasing done.



MELTER 132

1. All roof plates, associated structure, chimney and agitator removed from position.
2. Nine nos coil removed from position from base for easy cleaning.
3. Conical portion neck area, shell thickness measurement done.
4. All coils steam trap cleaning done.
5. 01 no new coil replaced and other eight nos coil positioning done after cleaning and hydro testing.
6. Complete shell, conical portion, chimney, associated pipe line blasting and HR painting done.
7. All coils, chimney, agitator, roof plates positioning done.
8. Hydro testing of shell done and found leakage in shell vertical portion.
9. Shell's vertical portion cleaning done by blasting, 12 mm plate rolling done and 32 mtrs plate of width 300 mm welding done in circumference.
10. Agitator base welding done and three nos blades replaced.
11. Melter overflow nozzle, overflow pipe and filling pipe repairing done and positioning done.
12. Agitator gear box oil flushing done and greasing done.
13. Melter structure replaced as per requirement.
14. Five nos roof plates repairing done and 02 nos roof plate new fabrication done and erection done.
15. Melter complete insulation removed and new insulation done after all mechanical jobs.

MELTER 130

1. All roof plates, associated structure, chimney and agitator removed from position.
2. Six nos coil removed from position from base for easy cleaning.
3. Conical portion neck area, shell thickness measurement done found conical portion weak.

4. All coils steam trap cleaning done.
5. 03 no new coil replaced and other three nos coil positioning done after cleaning and hydro testing.
6. Complete shell, conical portion, chimney, associated pipe line blasting and HR painting done.
7. All coils, chimney, agitator, roof plates positioning done.
8. Hydro testing of shell done and found leakage in shell vertical portion.
9. Conical portion coil cutting done and removed, plate cutting done and new 14 mm plate rolling done and fit up done one by one. All plates of conical portion replaced.
10. Over flow nozzle towards VPT 1 cutting done with shell plate. New plate of 12 mm plate patchwork done.
11. All rafter beam cutting done at the agitator end, agitator base removed and new base of SS 304 (16 mm) fabrication done and fitted in position.
12. All coil base newly fabricated and coil positioning done.
13. After brick lining removal found shell plate thickness very minimum so 12 mm plate patch work done from inside.
14. Pipe line corroded supports changed, over flow nozzle replaced and over flow pipe repairing done and positioning done.
15. External coil fabricated and wrapped in conical portion.
16. Agitator base welding done and lower shaft with new blades replaced.
17. Melter overflow nozzle, overflow pipe and filling pipe repairing done and positioning done.
18. Agitator gear box oil flushing done and greasing done.
19. Melter structure replaced as per requirement.
20. 02 nos roof plates repairing done and 06 nos roof plate new fabrication done and erection done.
21. Melter complete insulation removed and new insulation done after all mechanical jobs.



**REPORT ON INSPECTION AND
PREVENTIVE MAINTENANCE OF
STEAM TURBINE AND TURBO
BLOWER AND BCW PUMPS
TURBINE**

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1.0 TECHNICAL SPECIFICATION OF MACHINE

➤ TECHNICAL DATA OF STEAM TURBINE

MAKE	: M/S SIEMENS
CAPACITY	: 6.237 MW
INPUT SPEED	: 13598 RPM
MAXIMUM GOVERNOR SPEED	: 7057 RPM
TRIP SPEED	: 14958 RPM
INLET STEAM PRESSURE	: 60.2 KG/CM²
EXHAUST STEAM PRESSURE	: 3.8 KG/CM²
INLET STEAM TEMPERATURE	: 480.0⁰ C
EXHAUST STEAM TEMPERATURE	: 195.0⁰ C
DRIVEN MACHINE	: MAIN AIR BLOWER
CONTROL OIL PRESSURE	: 8 BAR
LUBE OIL PRESSURE	: 1.5 BAR

➤ TECHNICAL DATA OF TURBOLOWER

MAKE	: M/S KKK
MODEL	: SFO 1-18-70
MAXIMUM AIR FLOW	: 320000Nm³/Hr.
SPEED	: 3160 RPM
WEIGHT OF ROTOR	: 3878 Kg

➤ TECHNICAL DATA OF STEAM TURBINE OF BCW PUMP

MAKE	: M/S KKK
MODEL	: CF4GM
CAPACITY	: 75 KW
SPEED	: 8192 RPM

➤ TECHNICAL DATA OF STEAM TURBINE OF BFW PUMP

MAKE	: M/S ALSTOM
CAPACITY	: 900 KW
MODEL	: CF4GSS
SPEED	: 8371 RPM

1. SCHEDULE OF PROCEDURE :

SAP#2

DATE: 14.03.21

1. TURBINE TO GEAR BOX AND GEAR BOX TO BLOWER COUPLING GUARD REMOVAL.
2. DE-COUPLING OF TURBINE TO GEAR BOX AND GEAR BOX TO BLOWER.
3. HSS AND LSS DBSE AND DBFF READING TAKEN.
4. TURBINE TO GEAR BOX AND GEAR BOX TO BLOWER ALIGNMENT READING CHECK.

CWP 04 (SAP#2)

1. CWP FRONT SIDE BELLOW AND CASING REMOVED.
2. CWP GEAR BOX ALL CONNECTED PIPE LINES REMOVED.

SAP#2

DATE: 15.03.21

1. TURBINE FRONT AND REAR PEDESTAL TOP COVER REMOVAL.
2. TURBINE FRONT, REAR AND THRUST BEARING TOP HALVES REMOVED.
3. GEAR BOX TOP COVER REMOVED.

CWP 04 (SAP#2)

1. SERVOMOTOR, TRIP BLOCK & GOVERNOR REMOVE.
2. GEAR BOX PP BOLT LOOSE, TOP COVER WILL BE REMOVED TOMORROW IN FRONT OF CLIENT.
3. TURBINE ROTOR DISMANTLE.

SAP#2

DATE: 16.03.21

1. GEAR BOX GEAR WHEEL & PINION FLOAT CHECKED.
2. GEAR WHEEL, PINION TOP HALVE BEARING REMOVAL.
3. BLOWER BEARING PEDESTAL TOP COVER REMOVAL.

SAP#2

DATE: 17.03.21

1. TURBINE FRONT, REAR AND THRUST BEARING BOTTOM HALF REMOVED DPT DONE AND DIMENSION CHECKED.
2. GEAR BOX PINION & GEAR WHEEL BEARING DPT DONE AND DIMENSION CHECK.

CWP 04 (SAP#2)

1. GEAR BOX TOP CASING REMOVED.
2. GEAR BOX PINION & GEAR WHEEL GEAR AND BEARING REMOVED FOUND OK.
3. GEAR BOX FRONT SIDE OIL SEAL FOUND DAMAGE TO BE REPLACED.

SAP#1

DATE: 18.03.21

1. TURBINE TO GEAR BOX AND GEAR BOX TO BLOWER COUPLING GUARD REMOVAL.
2. DE-COUPLING OF TURBINE TO GEAR BOX AND GEAR BOX TO BLOWER.
3. HSS AND LSS DBSE AND DBFF READING TAKEN.

CWP 04(SAP#2)

1. SERVOMOTOR AND TRIP BLOCK SERVICING DONE & CLEANING WORK U/P.

SAP#2

1. GEAR BOX PINION FRONT AND REAR JOURNAL BEARING DIMENSIONAL CROSS CHECKED.
2. GEAR BOX GEAR WHEEL FRONT AND REAR (THRUST CUM JOURNAL AND JOURNAL BEARING) DIMNESIONAL CROSS CHECKED.
3. GEAR BOX BOTTOM HALF BEARING OUTER DIA TO HOUSING BLUE MATCHNG DONE.
4. CLEANING OF PINION AND GEAR WHEEL AND HOUSING U/P.
5. BLOWER DE SIDE BEARING AND THRUST PAD REMOVAL.
6. BLOWER DE SIDE BEARING DP TEST DONE AND DIAMENSIONAL CHECKED.
7. CLEANING OF BEARING SHELL AND BLUE MATCHING DONE.

SAP #2

DATE: 19.03.21

1. GEAR BOX BOTTOM HOUSING AND ALL OIL LINES CLEANING DONE.
2. LOWER BEARING HALVES ON POSITION AND RTD ASSEMBLY DONE.
3. JOURNALS RUN OUT, BACK LASH PINION & GEAR WHEEL, FLOAT CHECKED.
4. PINION & GEAR WHEEL BEARING TOC AND SOC CHECKED.
5. TOP HALVE OF GEAR BOX COVER CLEANING AND GEAR WHEEL SIDE (LSS) OIL SEAL ANTI ROTAION PIN NOT WORKING ON POSITION, SO WE ARE DRILLING 3mmX 10mm DEPTH.
6. BLOWER CARBON SEAL OLD REMOVED.

SAP#1.

1. HSS AND LSS ALIGNMENT CHECKED.
2. GEAR BOX PP BOLTS REMOVED AND ADAPTOR BOLTS SOCKED HEAD (03 NOS) SLIP WELDING U/P.
3. TURBINE REAR BEARING TOP COVER REMOVAL.

CWP 04 (SAP#2)

- 1.GOVERNOR SERVICING DONE AND BELLOW, CASING ETC GASKIT CUTTING.
2. CLEANING WORK U/P

SAP # 2

DATE: 20.03.21

1. GEAR BOX INTERFERENCE CHECKED AND FINAL BOX UP.
2. TURBINE FRONT BEARING DIMENSIONAL CHECKED SHELL ID AND PAD OD PITTING FOUND HIGH 0.06/0.08. RECOMMENDED TO REPLACE.
3. TURBINE REAR BEARING DIMENSIONAL CHECKED SHELL ID AND PAD OD PITTING FOUND HIGH 0.04/0.05.RECOMMENDED TO REPLACE.
4. BLOWER DE SIDE BEARING ASSEMBLY DONE.
5. DE SIDE OIL SEAL REMOVED AND CLEANINNG CLEARANCE CHECKED LHS MIN CLEARANCE AND RHS FOUND HIGH CLEARACNE.
6. CARBON SEAL AREA CLEANING U/P.

SAP#1

1. TURBINE FRONT BEARING PEDESTAL TOP COVER REMOVAL.
2. TURBINE FRONT BEARING, REAR BEARING AND THRUST BEARING TOP HALF REMOVAL.
3. GEAR BOX TOP COVER REMOVAL.
4. GEAR WHEEL, PINION FLOAT CHECKED.
5. GEAR WHEEL, PINION TOP HALF BEARING REMOVAL.
6. BLOWER BEARING PEDESTAL TOP COVER REMOVAL.

BFW 101C

1. BFW PUMP COUPLING DECOUPLE.
2. BFW SERVOMOTOR, GOVERNOR AND TRIP BLOCK REMOVAL.

SAP #2**DATE: 21.03.21**

1. TURBINE FRONT BEARING AND REAR BEARING NEW DIMENSIONAL CHECKED AND LOWER HALVES ON POSITION WITH RTDS FINAL.
2. FRONT AND REAR BEARING PEDESTAL AND INLET OIL LINES AND FACES CLEANING.
3. BEARING FRONT & REAR BLUE MATCHING PP AND PEDESTAL HOUSING TO SHELL OD.
4. BLOWER NDE BEARING REMOVAL, DPT DONE AND DIMENSIONAL CHECKED AND ASSEMBLY.
5. BLOWER BEARING OIL CATCHER CLEARANCE AND INTERFERENCE CHECKED.

SAP#1

1. TURBINE FRONT AND REAR BEARING BORE INSPECTION WITH PADS VISUAL FOUND OK.
2. PINION, GEAR WHEEL TOP & BOTTOM BEARING AND GEAR REMOVAL.
3. CLEANING U/P.

BFW 101C

1. BFW GEAR BOX ALL PIPE LINE REMOVED.
2. BFW BELLOW AND CASING REMOVED.

SAP#2**DATE: 22.03.21**

1. TURBINE FRONT AND REAR BEARING INTERFERENCE CHECKED AND FINAL ASSEMBLY.
2. TURBINE FRONT AND REAR OIL SEAL CLEARANCE CHECKED AND ASSEMBLY.
3. TURBINE THRUST BEARING LOWER AND UPPER HALF ASSEMBLY WITH THRUST FLOAT CHECKED. AXIAL AND RADIAL KEY ASSEMBLY.
4. ROTOR REFERENCE VALUE RECORDED.
5. GEAR BOX ADAPTOR RING ASSEMBLY.

SAP#1

1. GEAR BOX PINION & GEAR WHEEL BEARING DP CHECKED AND BEARINGS BORE DIMENSION CHECKED.
2. PINION GEAR & GEAR WHEEL CLEANING U/P.

CWP 04 (SAP#2)

1. PINION FLOAT (1.75 MM CORRECTED TO 0.25MM) ADJUSTED BY USING SHIM.
2. GEAR BOX FINAL BOX UP.

SAP#2

DATE: 23.03.21

1. TURBINE TO GEAR BOX ALIGNMENT DONE (HSS).
2. GEAR BOX TO BLOWER ALIGNMENT DONE (LSS).
3. HAND BARRING GEAR LEVER LOCK PLATE WELDING 0.03MM.
4. FRONT BEARING TOP COVER FINAL WITH OIL SEAL ASSEMBLY.
5. OVER SPEED TRIP BLOCK LEVER CLEARANCE 0.45 MM RADIAL CORRECTED 0.80 MM AXIAL CLEARANCE FRONT AND REAR DONE.
6. TURBINE FRONT COVER FNAL ASSEMBLY DONE.

SAP#1

1. GEAR BOX BEARING DIMENSIONAL CROSS CHECKED DONE.
2. GEAR BOX BEARING PINION FRONT BEARING (DE SIDE) VERTICAL FOUND HIGH 0.06 MM RECOMMENDED TO NEW BEARING.
3. BLOWER DE SIDE BEARING REMOVAL CLEANING DONE.

CWP 04 (SAP#2)

1. BCW SERVOMOTOR, GOVERNOR AND TRIP BLOCK MOUNT ON POSITION.
2. GEAR BOX ALL PIPE LINE CONNECTED.
3. BELLOW AND CASING FINAL ASSEMBLY.

SAP #2

DATE: 24.03.21

1. TURBINE TO GEAR BOX COUPLING, GEAR BOX TO BLOWER COUPLING
2. TURBINE TO GEAR BOX COUPLING GUARD ASSEMBLY.
3. ROTOR IN AXIAL "0" POSITION AND AXIAL PROBES ASSEMBLY DONE.
4. HSS AND LSS DBSE CHECKED DONE.
5. TURBINE FRONT & REAR, GEAR BOX BEARING OIL LINES ASSEMBLY DONE WITH MESH.
6. TURBINE REAR BEARING TOP COVER FINAL ASSEMBLY DONE WITH OIL SEAL.

SAP#1

1. BLOWER DE BEARING REMOVAL DPT DONE, BORE DIMENSIONAL CHECKED AND ASSEMBLY DONE.
2. BLOWER NDE BEARING REMOVAL DP CHECKED .BORE DIMENSIONAL CHECKED.

BFW 101C

1. BFW GEAR BOX PP OPEN BUT GEAR BOX TOP COVER NOT REMOVED DUE TO NOT AVAILABLE OF CRANE.
2. BFW TURBINE ROTOR DIMANTLE AND MECHANICAL SEAL REMOVED.

SAP#2

DATE: 25.03.21

1. BLOWER AIR SEAL AND TOP COVER ASSEMBLY DONE.
2. BLOWER BEARING OIL LINE WITH MESH ASSEMBLY DONE.
3. GEAR BOX TO BLOWER COUPLING GUARD ASSEMBLY.
4. HOUSE KEEPING OF TURBINE AND BLOWER AREA.

SAP#1

1. GEAR BOX BEARING & HOUSING TO BEARING OD BLUE MATCHING AND BEDDING BLUE CHECKED.
2. PINION & GEAR WHEEL BEARING BOTTOM HALVES AND PINION & GEAR WHEEL PUT ON POSITION.
3. ROTOR RUN OUT, BACKLAH, THRUST FLOAT & FLOAT CHECKED.
4. GEAR BOX BEARING SOC AND TOC CHEKED.

CWP 04 (SAP#1) 1.CWP TURBINE BELLOW AND CASING REMOVED.

CWP 01 (SAP#1) 1.CWP TURBINE BELLOW REMOVED

SAP #1

DATE: 26.03.21

1. PINION FRONT BEARING (NEW) ANTI ROTATIO PIN HOLE DRILLING DONE.
2. TURBINE FRONT BEARING & THRUST BEARING DPT AND BORE DIMENSIONAL CHECKED.
3. GEAR BOX FINAL BOX UP DONE.
4. TURBINE FRONT BEARING BEARING BOTTOM HALVE IN POSITION FINAL WITH RED INSTALLATION.

CWP 04 (SAP#1)

1. CWP TURBINE MECHANICAL SEAL REMOVED FOUND DAMAGE.
2. TURBINE ROTOR DISMANTLE.
3. GEAR BOX ALL CONNECTED PIPE LINE, SERVOMOTOR, GOVERNOR AND TRIP BLOCK REMOVED.

SAP#1

DATE: 27.03.21

1. TURBINE FRONT BEARING TOP HALF ASSEMBLY AND INTERFERNCE CHECKED.
2. TURBINE ROTOR THRUST FLOAT, FREE FLOAT, ROTOR REFERENCE VALUE CHECKED. (FOUND HIGH THRUST FLOAT.)
3. BLOWER NDE BEARING BOTTOM REMOVAL WAITING FOR RTD.
4. TURBINE FRONT BEARING PEDESTAL TOP COVER FRONT FACE PLATE CLEANING.
5. TURBINE FRONT OIL SEAL CLEANING AND BORE DIMENSIONAL CHECKED..
6. TURBINE THRUST PADS NEW ACTIVE SIDE CLEANING DIAMENSIONAL CHECKED.
7. HARD WARE CLEANING AND INSPECTION.
8. THRUST BEARING OIL CATCHER RING CLEARANCE (RADIAL) FOUND VERY HIGH.

CWP 04 (SAP#1) 1. SERVOMOTOR, GOVERNOR AND TRIP BLOCK SERVICING DONE.

CWP 01 (SAP#1)

- 1.CWP TURBINE MECHANICAL SEAL REMOVED FOUND DAMAGE.
2. TURBINE ROTOR DISMANTLE.
3. GEAR BOX ALL CONNECTED PIPE LINE, SERVOMOTOR, GOVERNOR AND TRIP BLOCK REMOVED.
4. GEAR BOX TOP COVER REMOVAL.

BFW 101C 1.GEAR BOX TOP COVER REMOVED

SAP #1

DATE: 28.03.21

1. THRUST FLOAT CHECKED WITH OLD PADS AND NEW PADS.
2. TURBINE REAR BEARING REMOVAL DPT AND BORE DIMENSIONAL CHECKED.
3. TURBINE FRONT OIL SEAL BOTTOM ASSEMBLY U/P.
4. BLOWER NDE BEARING FINAL BOX UP WITH RTDC.

CWP 01 (SAP#1)

1. SERVOMOTOR, GOVERNOR AND TRIP BLOCK SERVICING DONE.
2. GEAR BOX PINION FLOAT IS 0.85 TO 0.25 ADJUSTED.

HOLIDAY DUE TO HOLI

DATE: 29.03.21

SAP#1

DATE: 30.03.21

1. TURBINE THRUST BEARING PAD SCRAPPING 20.14/.15 TO 20.07/.08.
2. THRUST FLOAT, FREE FLOAT CHECKED.
3. BLOWER FRONT AND REAR BEARING RTDC REPLACED AND FINAL BOX UP.
4. BLOWER BEARING INTERFERENCE CHECKED.
5. TURBINE FRONT OIL SEAL TOP AND BOTTOM OIL CLEARANCE CHECKED AND CORRECTION (NEW OIL SEAL).

SAP#2 OIL FLUSHING START.

CWP 04 (SAP#1)

1. GEAR BOX FINAL BOX UP.
2. SERVOMOTOR, GOVERNOR AND TRIP BLOCK MOUNT ON POSITION.
3. GEAR BOX ALL PIPE LINE CONNECTED.
4. TURBINE ROTOR ASSEMBLE.
5. BELLOW AND CASING FINAL ASSEMBLY.

SAP #1

DATE: 31.03.21

1. TURBINE REAR OIL SEAL SET.
2. ROTOR IN AXIAL "0" POSITION AND AXIAL PROBES ASSEMBLY DONE

BFW 101C 1. BFW PINION GEAR GOVERNOR GEAR AND COMPLETE ASSEMBLY CHANGE.
2. BFW TURBINE OIL SEAL REPLACED AND CLEANING U/P .

CWP 01 (SAP#1) 1.TURBINE CASING BROKEN BOLT REMOVED BY WELDING.

- SAP#2** 1.OIL FLUSHING U/P.
2. OIL LECKAGE ATTEND FROM BLOWER REAR SIDE DURING OIL FLUSHING.

SAP#1

DATE: 01.04.21

1. TURBINE FRONT BEARING FINAL BOXUP.
2. TRIP LEAVER RADIAL & AXIAL CLEARANCE CHECKED.
3. TURBINE FRONT OIL GLAND TOP FINAL BOX UP.
4. BLOWER OIL SEAL FRONT & REAR RADIAL CLEARANCE CHECKED FRONT SIDE 0.40 TO 0.50, REAR 0.80 TO 0.90. RECOMMENDED FOR REAR OIL SEAL REPLACE WITH NEW.
5. TURBINE TO GEAR BOX ALIGNMENT.

BFW 101C

1. GEAR BOX FINAL BOX UP.
2. SERVOMOTOR, GOVERNOR AND TRIP BLOCK MOUNT ON POSITION.
3. GEAR BOX ALL PIPE LINE CONNECTED.
4. TURBINE ROTOR ASSEMBLE.
5. BELLOW AND CASING FINAL ASSEMBLY.

- SAP#2** 1.OIL FLUSHING U/P.

CWP (SAP#1)

DATE: 02.04.21

1. GEAR BOX FINAL BOX UP.
2. SERVOMOTOR, GOVERNOR AND TRIP BLOCK MOUNT ON POSITION.
3. GEAR BOX ALL PIPE LINE CONNECTED.
4. TURBINE ROTOR ASSEMBLE.
5. BELLOW AND CASING FINAL ASSEMBLY.

- SAP#1** 1.TURBINE TO GEAR BOX ALIGNMENT CHECK.

- SAP#2** 1.OIL FLUSHING U/P.

SAP # 1

DATE: 03.04.21

1. OLD ACTUTOR OF TURBINE 03 NOS REMOVED FROM POSITION.
2. TURBINE TO GEAR BOX AND GEAR BOX TO BLOWER FINAL ALIGNMENT CHECK.

- SAP#2** 1.OIL FLUSHING U/P.

SAP # 1

DATE: 04.04.21

1. NEW ACTUATOR OF TURBINE MOUNT ON POSITION.
2. TURBINE TO GEAR BOX COUPLING DONE.

- SAP#2** 1.OIL FLUSHING U/P.

SAP # 1

DATE: 05.04.21

1. TURBINE REAR PEDESTAL FINAL BOX UP.
2. GEAR BOX TO BLOWER COUPLING DONE.
3. BLOWER BEARING TOP COVER ASSEMBLE.
4. TURBINE TO GEAR BOX COUPLING GUARD SET.

SAP#2 1. TRIP BLOCK CHANGE

DATE: 06.04.21

- SAP#1** 1. GEAR BOX TO BLOWER COUPLING GUARD SET.
2. ACTUATOR PIPE LINE CONNECTED.

BFW 101C 1. GEAR BOX TO MOTOR ALIGNMENT DONE.

SAP#2

DATE: 11.04.21

1. TURBINE ROLLING AT 3:45 PM TO 8829 rpm TURBINE SPEED AND 2039 rpm BLOWER SPEED AND TRIP AT 4:30 PM
2. SUDDENLY BURST BOILER TUBE DUE TO WHICH BOILER OFF.

SAP #2

DATE: 12.04.21

1. BOILER CHARGE AND STEAM GENERATION START.

SAP # 2

DATE: 13.04.21

1. TURBINE ROLLING DONE.
2. GAS LECKAGE FOUND IN SUPER HEATER FOR THIS PLANT OFF.

DATE: 15.04.21

SAP#2 TURBINE ROLLING AT 8820 RPM.

SAP#1 TURBINE FRONT BEARING TOP COVER REMOVED DUE TO INSTRUMENT PROBLEM AND AGAIN BOX UP.

DATE: 16.04.21

SAP#2 TURBINE ROLLING AT 12090 RPM.

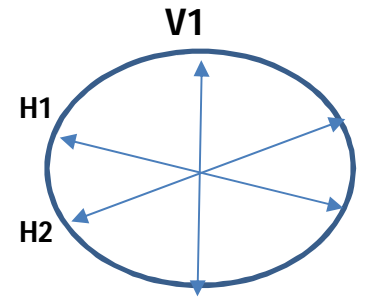
SAP#1 TURBINE FRONT BEARING TOP COVER COVER REMOVED DUE TO INSTRUMENT PROBLEM.

DATE: 17.04.21

SAP#2 TURBINE ROLLING AT 12660 RPM.

SAP#1 OIL FLUSHING START.

2. TURBINE BEARING DIMENSIONS(NEW):



SIDE	POSITION	SHELL ID (D)	PAD THICKNESS (t)	BEARING ID (d= D- 2t)	SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (d-φ)
NDE	V	130.00	15.00	100.00	99.85	0.15
	H1	130.00	15.00			
	H2	130.00	15.00			
				15.00		
				15.00		
DE	V	130.00	15.00	100.00	99.85	0.15
	H1	130.00	15.00			
	H2	130.00	15.00			
				15.00		
				15.00		

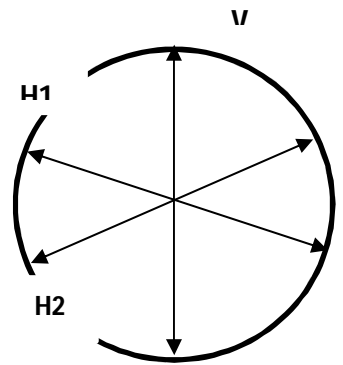
3. TURBINE BEARING DIMENSIONS(OLD):

SIDE	POSITION	SHELL ID (D)	PAD THICKNESS (t)	BEARING ID (d= D- 2t)	SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (d-φ)
NDE	V	130.00	14.98	100.04	99.85	0.19
	H1	130.00	14.98			
	H2	130.00	14.98			
				14.98		
				14.98		
DE	V	130.00	14.98	100.04	99.85	0.19
	H1	130.00	14.98			
	H2	130.00	14.98			
				14.98		
				14.98		

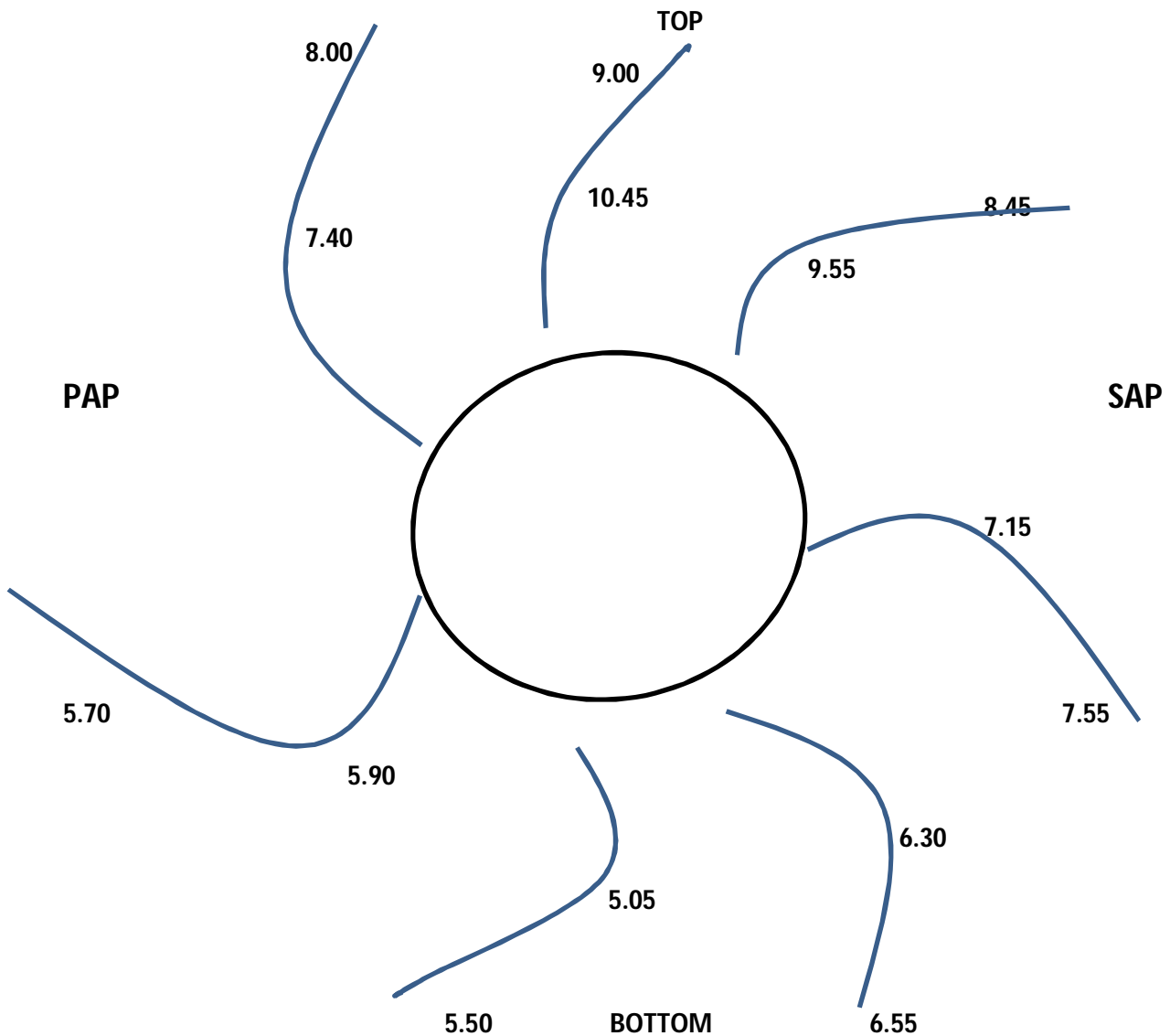
Note : All Dimensions are in mm.

4. BLOWER BEARING DIMENSIONS :

SIDE	POSITION	SHELL ID (D)	PAD THICKNESS (t)	BEARING ID (d= D-2t)	SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (d-φ)
DE	V	260.01	30.00	200.01	199.61	0.40
	H1	260.03	29.99			
	H2	260.00	29.99			
			30.00			
NDE	V	315.00	32.50	250.00	249.60	0.40
	H1	314.98	32.50			
	H2	314.96	32.49			
			32.49			

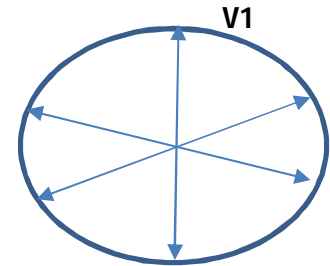


5. BLOWER BLADE RAIDAL CLEARANCE :



Note : All Dimensions are in mm.

6. GEAR BOX BEARING DIMENSTIONS :



➤ GEAR WHEEL BEARING :

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (D - φ)
		FRONT	REAR		
DE	V	160.00	160.01	159.77	0.23
	H1	160.25	160.23		
	H2	160.22	160.20		
NDE	V	159.98	159.99	159.97	0.21
	H1	160.27	160.23		
	H2	160.20	160.24		

➤ PINION BEARING :

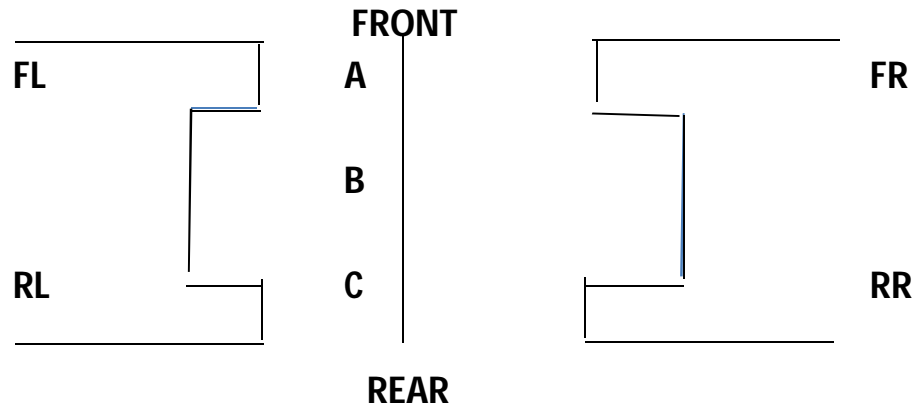
SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (D - φ)
		FRONT	REAR		
DE	V	100.25	100.24	99.82	0.36
	H1	100.08	100.08		
	H2	100.27	100.26		
NDE	V	100.15	100.14	99.82	0.32
	H1	100.00	99.97		
	H2	100.18	100.18		

7. GEAR BOX JOURNAL RUN OUT :

PINION JOURNAL FRONT = 0.01
 PINION JOURNAL REAR = 0.01
 GEAR WHEEL JOURNAL FRONT = 0.00
 GEAR WHEEL FRONT = 0.00

Note : All Dimensions are in mm.

8. GEAR BOX BEARING TOC AND SOC



POSITION		TOC			SOC			
		A	B	C	FL	FR	RL	RR
PINION	FRONT	0.47	0.47	0.46	0.12	0.12	0.10	0.10
	REAR	0.46	0.46	0.46	0.12	0.12	0.10	0.10
GEAR WHEEL	FRONT	0.36	0.34	0.33	0.20	0.20	0.20	0.20
	REAR	0.35	0.34	0.33	0.20	0.20	0.20	0.20

9. BEARING COVER TO BEARING INTERFERENCE :

- TURBINE BEARING (NDE) : 0.00
- TURBINE BEARING (DE) : .002

- GEAR BOX (PINION DE) : 0.03
- GEAR BOX (PINION NDE) : 0.03

- GEAR BOX (GEAR WHEEL DE) : 0.04
- GEAR BOX (GEAR WEHEL NDE) : 0.02

- BLOWER BEARING (DE) : 0.05
- BLOWER BEARING (NDE) : 0.05

Note : All Dimensions are in mm.

10. TURBINE FLOAT :

- ROTAR FLOAT + IVE = 1.80
- IVE = 1.55
- TOTAL FREEE FLOAT = 3.35

THRUST FLOAT WITH ALL INTERNALS = 0.34

11. GEAR BOX FLOAT :

- PINION FLOAT = 1.20
- GEAR WHEEL FLOAT = 0.23

12. GEAR BOX BACKLASH = 0.40

13. TRIP LEVER CLEARANCE :

- RADIAL = 0.80
- AXIAL FRONT = 1.15
- REAR = 1.10

14. DBSE

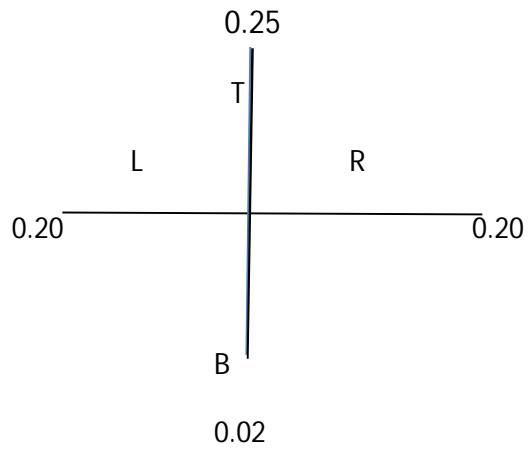
- HSS = 330.00
- LSS = 291.50

15. DBFF

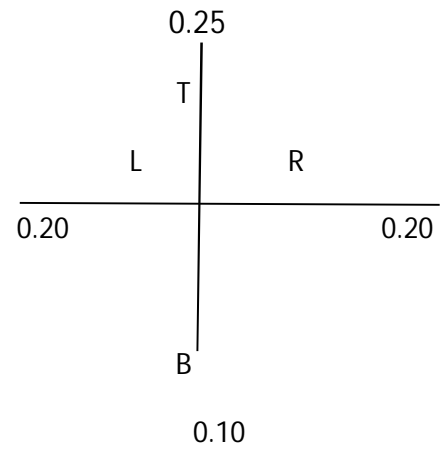
- HSS = 332.00
- LSS = 289.90

Note : All Dimensions are in mm.

16. TURBINE OIL SEAL CLEARANCE

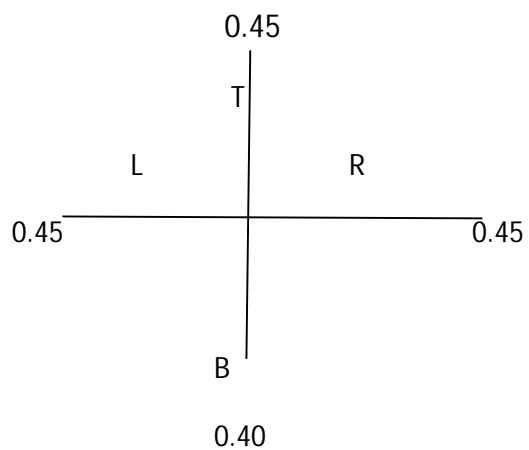


FRONT SIDE

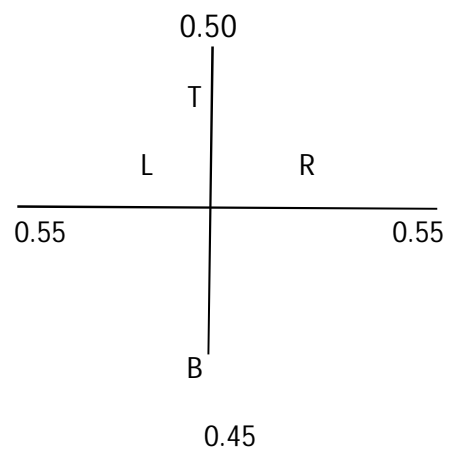


REAR SIDE

17. BLOWER OIL SEAL CLEARANCE



FRONT SIDE



REAR SIDE

Note : All Dimensions are in mm.

18. TURBINE THRUST PAD THICKNESS

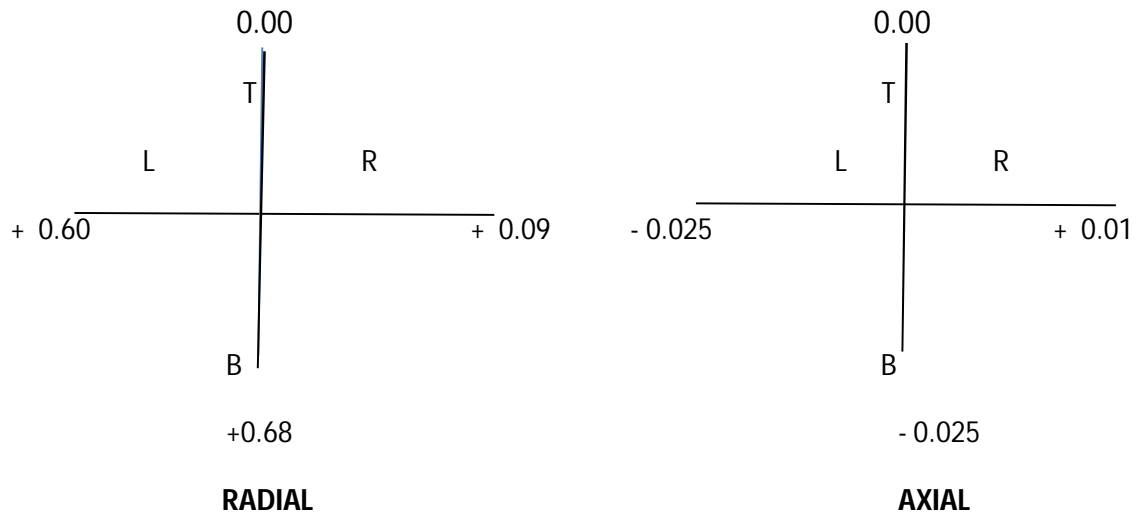
SIDE	1	2	3	4	5	6	7	8
NON ACTIVE	20.00	20.00	20.01	20.01	20.01	20.01	20.01	20.01
ACTIVE	20.04	20.03	20.04	20.04	20.04	20.04	20.04	20.04

19. BLOWER THRUST PAD THICKNESS

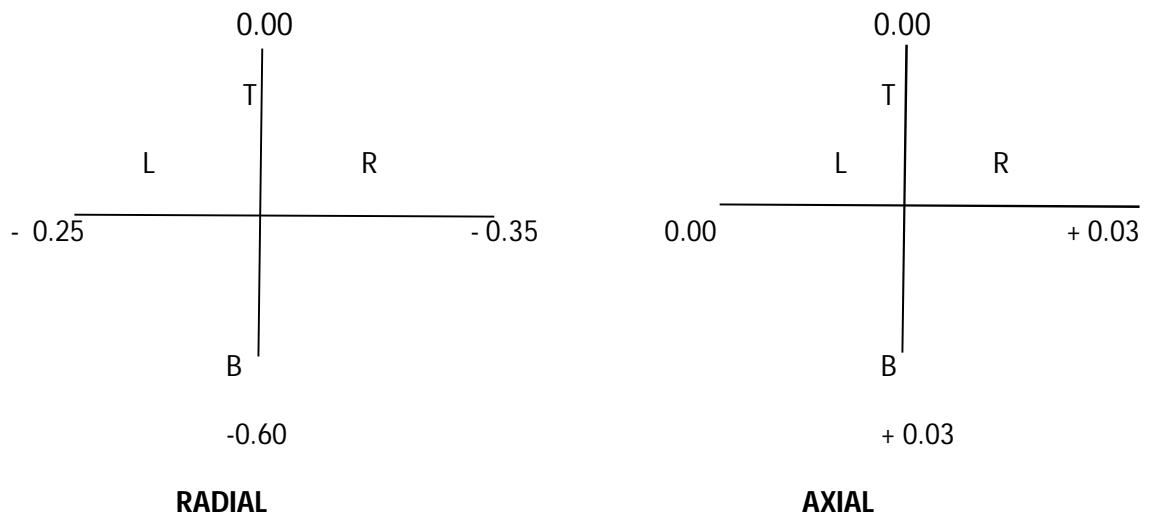
SIDE	1	2	3	4	5	6
ACTIVE	18.99	19.00	19.00	19.00	18.89	19.00
NON ACTIVE	18.98	18.99	18.98	18.99	18.99	18.99

Note: All Dimensions are in mm.

**20. TURBINE TO GEAR BOX ALIGNMENT READING
(DIAL ON GEAR BOX)**

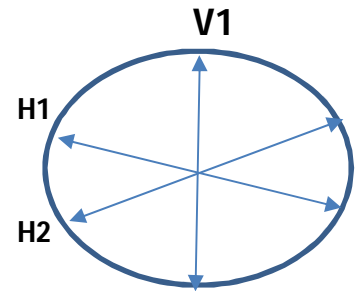


**21. GEAR BOX TO BLOWER ALIGNMENT READING
(DIAL ON BLOWER)**



Note : All Dimensions are in mm.

22. TURBINE BEARING DIMENSIONS :



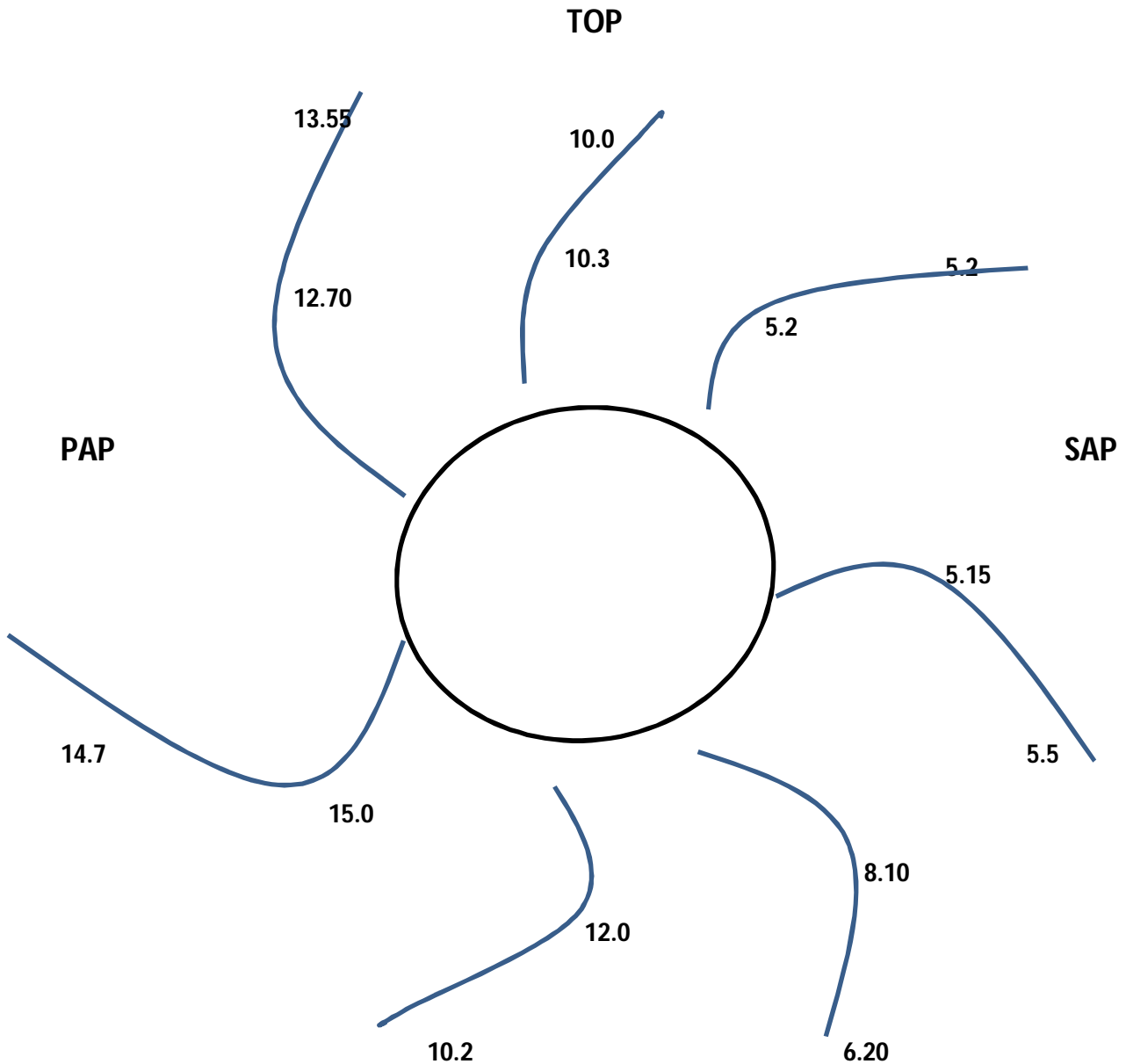
SIDE	POSITION	SHELL ID (D)	PAD THICKNESS (t)	BEARING ID (d= D- 2t)	SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (d-φ)
NDE	V	130.01	14.99	100.03	99.85	0.18
	H1	130.01	14.99			
	H2	130.00	14.99			
			14.99			
			14.99			
DE	V	130.02	14.99	100.03	99.85	0.18
	H1	130.00	14.99			
	H2	130.00	15.00			
			15.00			
			15.00			

23. BLOWER BEARING DIMENSIONS :

SIDE	POSITION	SHELL ID (D)	PAD THICKNESS (t)	BEARING ID (d= D- 2t)	SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (d-φ)
DE	V	260.01	30.00	200.02	199.60	0.42
	H1	260.00	29.99			
	H2	260.01	29.99			
			30.00			
NDE	V	315.02	32.49	251.03	249.60	0.43
	H1	315.02	32.50			
	H2	315.00	32.48			
			32.48			

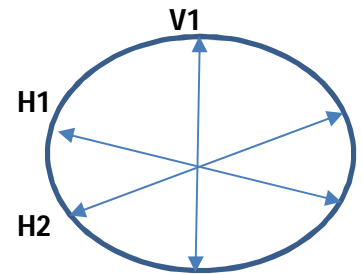
Note: All Dimensions are in mm.

24. BLOWER BLADE RAIDAL CLEARANCE :



Note: All Dimensions are in mm.

25. GEAR BOX BEARING DIMENSTIONS :



➤ **GEAR WHEEL BEARING :**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	TOP OIL CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	160.02	160.02	159.76	0.26
	H1	160.32	160.25		
	H2	160.32	160.39		
NDE	V	160.03	160.05	159.978	0.26
	H1	160.30	160.30		
	H2	160.25	160.28		

➤ **PINION BEARING :**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	100.20	100.20	99.82	0.37
	H1	100.05	100.04		
	H2	100.29	100.28		
NDE	V	100.18	100.19	99.82	0.37
	H1	100.10	100.05		
	H2	100.25	100.29		

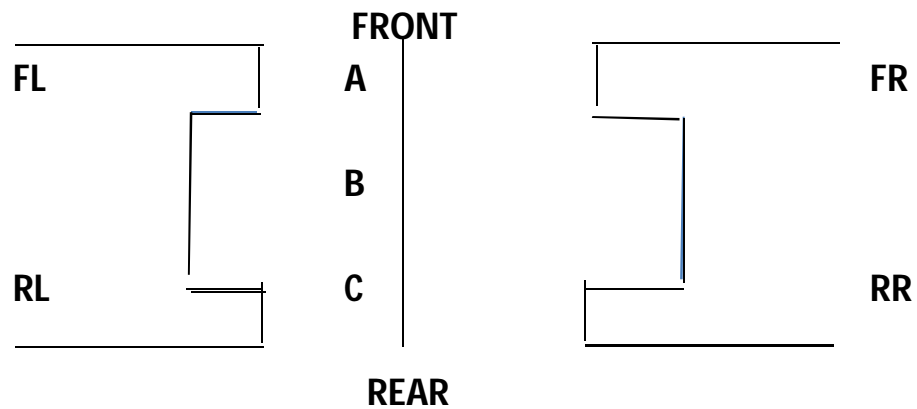
26. GEAR BOX JOURNAL RUN OUT :

PINION JOURNAL FRONT = 0.01
 PINION JOURNAL REAR = 0.01

GEAR WHEEL JOURNAL FRONT = 0.01
 GEAR WHEEL FRONT = 0.02

Note: All Dimensions are in mm.

27. GEAR BOX BEARING TOC AND SOC



POSITION		TOC			SOC			
		A	B	C	FL	FR	RL	RR
PINION	FRONT	0.50	0.50	0.50	0.15	0.20	0.15	0.15
	REAR	0.59	0.59	0.60	0.10	0.10	0.10	0.10
GEAR WHEEL	FRONT	0.55	0.54	0.53	0.20	0.20	0.20	0.20
	REAR	0.61	0.63	0.65	0.20	0.10	0.10	0.10

28. BEARING COVER TO BEARING INTERFERENCE :

- TURBINE BEARING (NDE) : 0.00
- TURBINE BEARING (DE) : 0.02

- GEAR BOX (PINION DE) : 0.03
- GEAR BOX (PINION NDE) : 0.02

- GEAR BOX (GEAR WHEEL DE) : 0.05

➤ GEAR BOX (GEAR WEHEL NDE) : 0.04

➤ BLOWER BEARING (DE) : 0.04

➤ BLOWER BEARING (NDE) : 0.04

Note: All Dimensions are in mm.

29. TURBINE FLOAT :

➤ ROTAR FLOAT + IVE = 1.45

- IVE = 1.88

➤ TOTAL FREEE FLOAT = 3.33

THRUST FLOAT WITH ALL INTERNALS (DISMANTLING) = 0.42

THRUST FLOAT WITH ALL INTERNALS (AFTER CHANGE
ACTIVE SIDE THRUST PAD) = 0.32

30. GEAR BOX FLOAT :

➤ PINION FLOAT = 1.00

➤ GEAR WHEEL FLOAT = 0.20

31. GEAR BOX BACKLASH = 0.43

32. TRIP LEVER CLEARANCE :

➤ RADIAL = 0.80

➤ AXIAL FRONT = 1.20

REAR = 1.00

33. DBSE

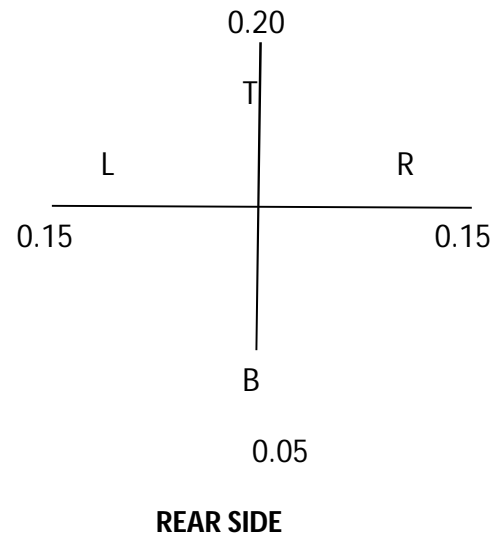
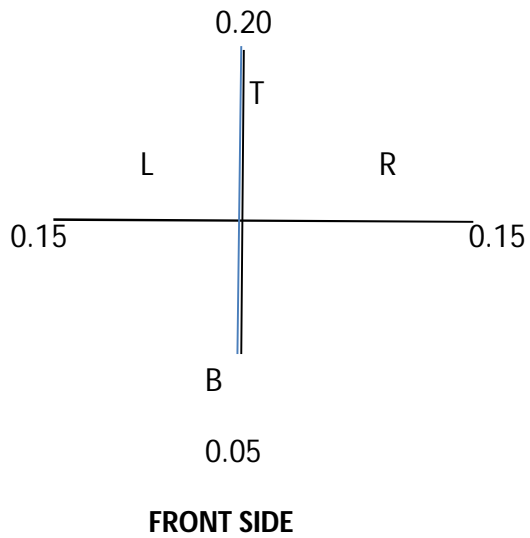
➤ HSS = 330.57

➤ LSS = 291.87

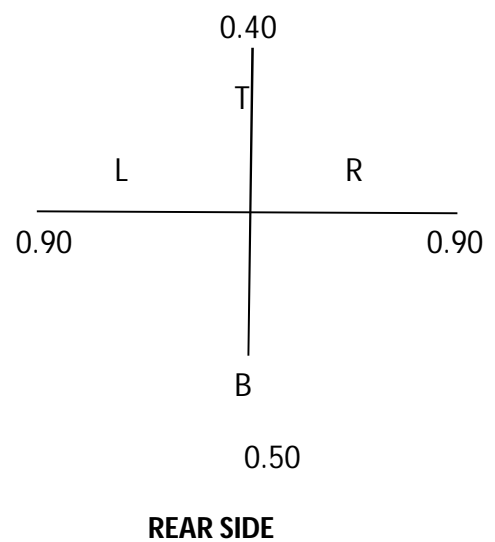
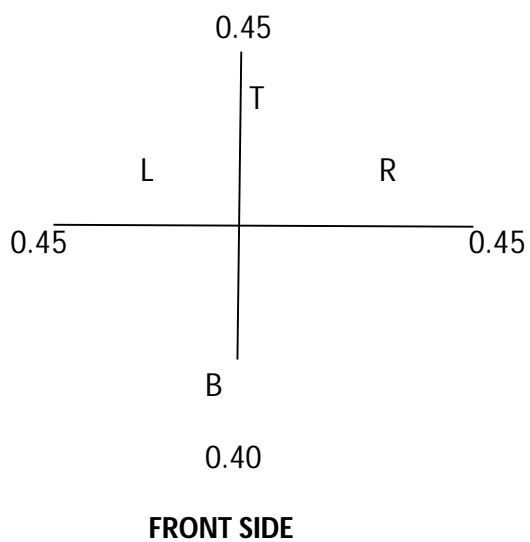
34. DBFF

➤ HSS = 333.45

35. TURBINE OIL SEAL CLEARANCE



36. BLOWER OIL SEAL CLEARANCE



Note : All Dimensions are in mm.

37. TURBINE THRUST PAD THICKNESS

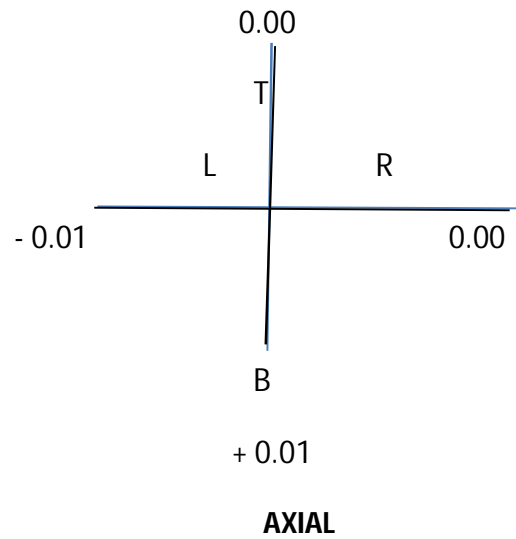
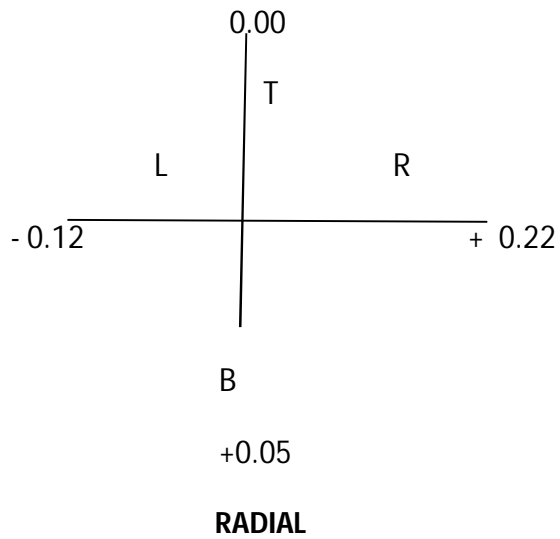
SIDE	1	2	3	4	5	6	7	8
NON ACTIVE	20.00	20.00	20.01	20.01	20.01	20.01	20.01	20.01
ACTIVE (NEW)	20.08	20.08	20.07	20.07	20.08	20.07	20.08	20.07
ACTIVE (OLD)	19.96	19.97	19.98	19.98	19.95	19.95	19.95	19.97

38. BLOWER THRUST PAD THICKNESS

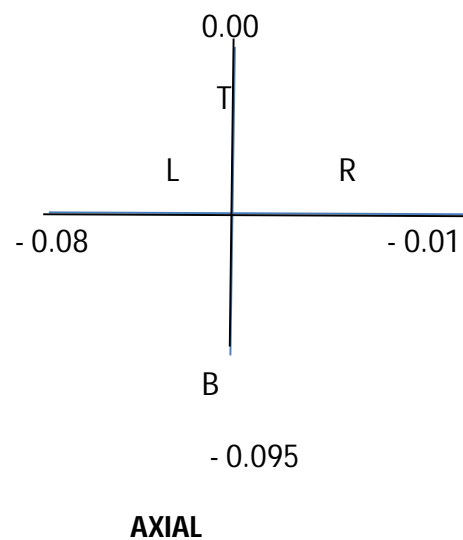
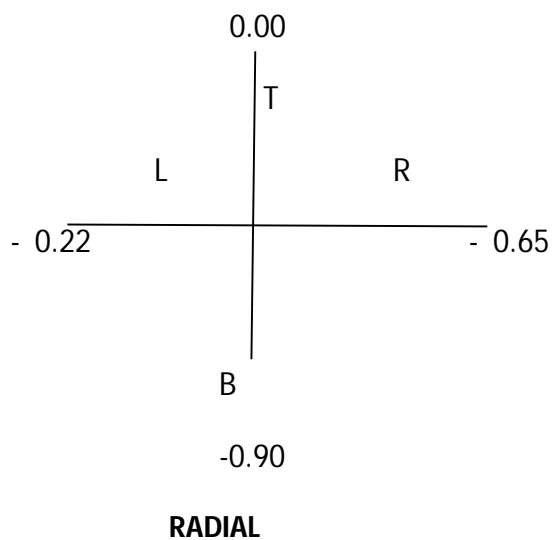
SIDE	1	2	3	4	5	6
ACTIVE	18.99	19.00	19.00	19.00	18.89	19.00
NON ACTIVE	18.98	18.99	18.98	18.99	18.99	18.99

: All Dimensions are in mm.

**39. TURBINE TO GEAR BOX ALIGNMETN READING
(DIAL ON GEAR BOX)**



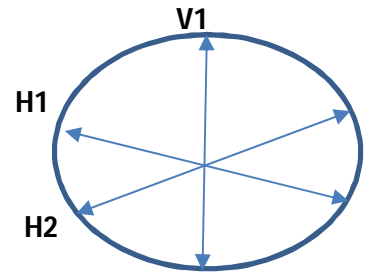
**40. GEAR BOX TO BLOWER ALIGNMETN READING
(DIAL ON BLOWER)**



Note : All Dimensions are in mm.

41. CWP 04 (SAP#2) GEAR BOX BEARING DIMENSTIONS:

- PINION FLOAT = 0.25
- GEAR WHEEL FLOAT = 0.22
- GEAR BACKLASH = 0.18



- **GEAR WHEEL BEARING DIMENSIONS :**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	TOP OIL CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	60.07	60.08	59.93	0.14
	H1	60.12	60.10		
	H2	60.10	60.11		
NDE	V	70.05	70.05	69.96	0.09
	H1	70.06	70.07		
	H2	70.10	70.12		

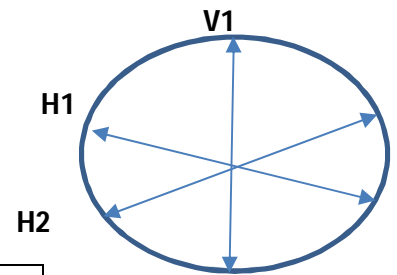
- **PINION BEARING DIMENSIONS:**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	TOP OIL CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	70.02	70.03	69.91	0.11
	H1	70.05	70.04		
	H2	70.06	70.07		
NDE	V	60.05	60.06	59.93	0.12
	H1	60.11	60.10		
	H2	60.10	60.12		

42. BFW 101C GEAR BOX BEARING DIMENSIONS:

- PINION FLOAT = 0.20
- GEAR WHEEL FLOAT = 0.15
- GEAR BACKLASH = 0.18

- GEAR WHEEL BEARING DIMENSIONS :

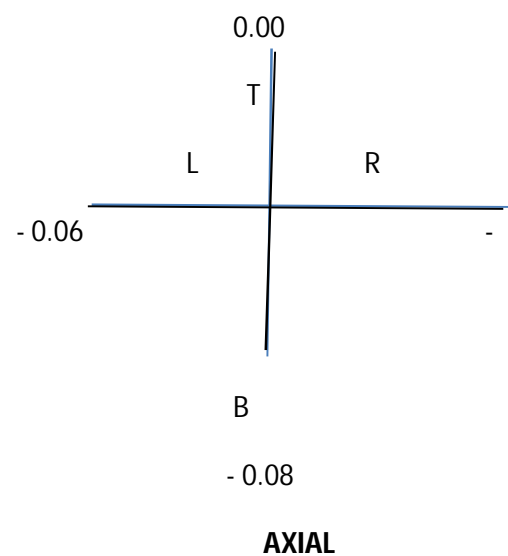
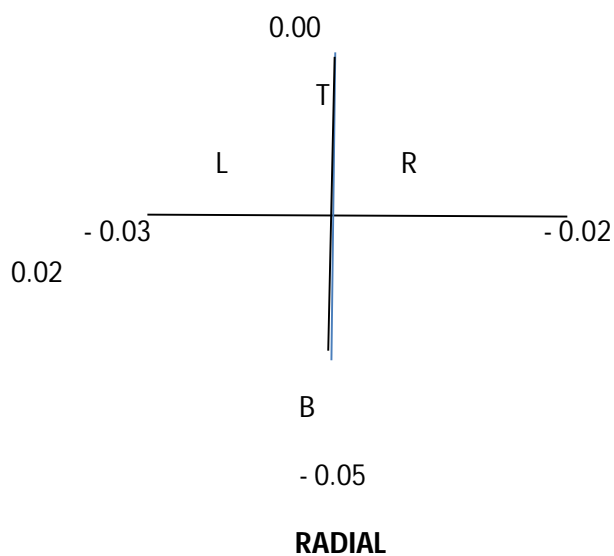


SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (D - φ)
		FRONT	REAR		
DE	V	110.15	110.13	110.28	0.15
	H1	110.16	110.14		
	H2	110.17	110.17		
NDE	V	70.06	70.10	69.95	0.15
	H1	70.10	70.08		
	H2	70.12	70.10		

- PINION BEARING DIMENSIONS:

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (φ)	TOP OIL CLEARANCE (D - φ)
		FRONT	REAR		
DE	V	80.09	80.07	79.92	0.17
	H1	80.13	80.13		
	H2	80.15	80.14		
NDE	V	70.14	70.15	69.95	0.20
	H1	70.26	70.28		
	H2	70.28	70.26		

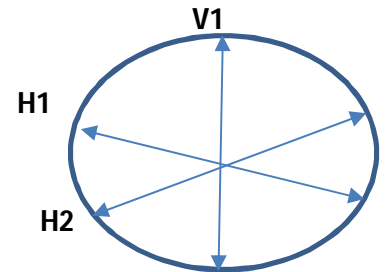
- GEAR BOX TO MOTOR ALIGNMENT READING :



Note : All Dimensions are in mm.

43.CWP 01 (SAP#1) GEAR BOX BEARING DIMENSTIONS :

- PINION FLOAT = 0.25
- GEAR WHEEL FLOAT = 0.26
- GEAR BACKLASH = 0.12



- **GEAR WHEEL BEARING :**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	TOP OIL CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	60.08	60.07	59.94	0.14
	H1	60.12	60.10		
	H2	60.10	60.11		
NDE	V	70.06	70.06	69.95	0.11
	H1	70.07	70.06		
	H2	70.11	70.10		

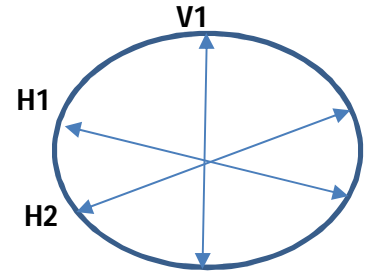
- **PINION BEARING :**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	TOP OIL CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	70.10	70.11	69.92	0.18
	H1	70.05	70.04		
	H2	70.03	70.04		
NDE	V	60.10	60.11	59.94	0.16
	H1	60.08	60.09		
	H2	60.10	60.12		

Note : All Dimensions are in mm.

44. CWP 04 (SAP#2) GEAR BOX BEARING DIMENSTIONS :

- PINION FLOAT = 0.25
- GEAR WHEL FLOAT= 0.25
- GEAR BACKLASH = 0.12



➤ **GEAR WHEEL BEARING :**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	TOP OIL CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	60.02	60.04	59.94	0.10
	H1	60.04	60.03		
	H2	60.00	60.01		
NDE	V	70.06	70.07	69.95	0.12
	H1	70.25	70.23		
	H2	70.21	70.20		

➤ **PINION BEARING :**

SIDE	POSITION	BEARING BORE (D)		SHAFT DIAMETER (ϕ)	TOP OIL CLEARANCE (D - ϕ)
		FRONT	REAR		
DE	V	70.12	70.12	69.93	0.19
	H1	70.06	70.06		
	H2	70.04	70.04		
NDE	V	60.11	60.10	59.93	0.17
	H1	60.09	60.09		
	H2	60.10	60.11		

Note : All Dimensions are in mm.

45.OBSERVATION AND ACTION TAKEN

OBSERVATION	ACTION TAKEN
SAP#2	
TURBINE SHELL ID AND PAD OD PITTING FOUND HIGH IN FRONT 0.06/0.08 & IN REAR 0.04/0.05.	BEARING REPLACE WITH NEW SPARE BEARING.
GEAR BOX ,GEAR WHEEL SIDE ANTIROTATION PIN NOT WORKING.	DRILL DONE 3MMX 10MM DEPTH.
BLOWER CARBON SEAL LECK PROBLEM AS PER CLIENT.	BLOWER CARBON SEAL REPLACED.
HAND BARING GEAR LEVER LOCK PLATE CLEARANCE IS HIGH.	REDUCED BY WELDING OF LOCKING PLATE 0.30 MM.
SAP#1	
GEAR BOX BEARING PINION (DE) SIDE VERTICAL CLEARANCE FOUND HIGH 0.06MM	BEARING REPLACE WITH NEW SPARE BEARING.
TURBINE THRUST FLOAT FOUND HIGH 0.42MM	ADJUST BY REPLACE ACTIVE SIDE THRUST PAD AND FINAL FLOAT IS 0.32MM
TURBINE FRONT SIDE OIL SEAL CLEARANCE IS HIGH 0.40MM	REPLACE OIL SEAL.
BLOWER REAR OIL SEAL RADIAL CLEARANCE IS HIGH 0.90MM	RECOMMENDED FOR REPLACE.
CWP 01 SAP#2	
TURBINE MECHANICAL SEAL CARBON RING DAMAGE.	BROKEN CARBON RING CHANGE WITH NEW.
GEAR BOX BOTTOM OIL SEAL FOUND DAMAGE	OIL SEAL REPLACE WITH NEW.
BFW 101C	

GEAR BOX BOTTOM OIL SEAL FOUND DAMAGE	OIL SEAL REPLACE WITH NEW.
PINION GEAR GOVERNOR GEAR FOUND DAMAGE.	GOVERNOR GEAR COMPLETE ASSEMBLY CHANGE.
CWP 01 SAP#1	

TURBINE MECHANICAL SEAL CARBON RING
DAMAGE.

BROKEN CARBON RING CHANGE
WITH NEW.

CWP 04 SAP#1

TURBINE MECHANICAL SEAL CARBON RING
DAMAGE.

BROKEN CARBON RING CHANGE
WITH NEW.



SAP# 2 BLOWER CARBON SEAL REPLACE.

SAP# 2 BLOWER CARBON SEAL REPLACE.



CWP 01 SAP#1
PINION AND GEAR WHEEL BEARING



GEAR BOX PINION (DE) SIDE BEARING CHANGE DUE TO HIGH CLEARANCE AND IN NEW BEARING ANTIROTATION PIN FOUND IN WRONG POSITION AS PER OLD BEARING



CARBON



SAP#2 TURBINE JOURNAL BEARING, THRUST BEARING PAD
AND GEAR BOX BEARING DPT

SAP#2 BEARING LINE MESH AFTER FIRST TIME OIL FLUSHING



SAP#2 BEARING LINE MESH AFTER FINAL OIL FLUSHING



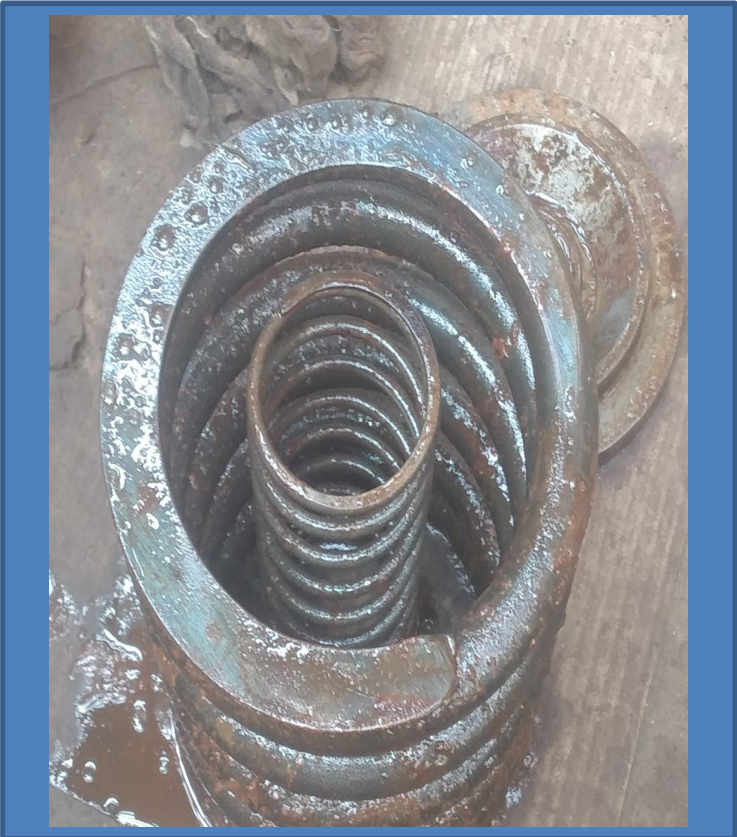
SAP#1 BLOWR BEARING (DE AND NDE SIDE)



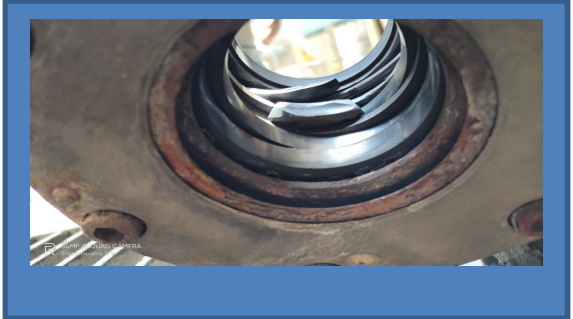
CWP TURBINE ROTOR DISMANTLE



BFW 101C GOVERNOR PINION FOUND DAMAGE



CWP 01 SAP#2 SERVOMOTOR FOUND VERY DIRTY AND WATER IN GEAR BOX HOUSING



CWP 01(SAP2) AND CWP 04 ,01 (SAP1)

MECHANICAL SEAL CARBON RING FOUND DAMAGE



Wholly owned by Cooperatives

ATR-2021

**REPORT ON ROTARY EQUIPMENTS
AND SAFETY VALVE OF SAP#2**

ATR REPORT-2021

ROTARY EQUIPMENT OF SAP#2

Plant stopped on

08/03/2021

plant started on

14/04/2021

2.1 Sulphur Burner & Wind box

- ✓ Both Sulphur Burner removed and Balancing done with new rotary cup.
- ✓ Bearing and Seal replaced with new one.
- ✓ Wind box opened and found the air resister vanes are in damaged and broken condition.
- ✓ All damaged vanes replaced with new vanes made of SS 304 and ,
- ✓ All seal rope replaced with new one and matching face lapped to proper contact with burner sealing face.



Fig 2.1(a) damaged vane of air resister fig 2.1(b) after vane replacement

- ✓ Burner Base rail replaced with new strengthen beam from 75 to 120 Chanel to enhance the burner support strength.



Fig 2.1(c) burner rail after replacement

- ✓ Damaged Burner Hose Metallic Hose of Size 16 “replaced for both the burner with new hose.



Fig 1(d) PA line Hose after replacement with new one

2.2 PA Fan

- ✓ Both PA fan overhauling done fan rotor removed balancing checked, Bearing with sleeve replaced with new bearing and sleeve.
- ✓ Both PA fan Suction and discharge duct expansion bellow replaced with new bellow.



Fig 2.2(a) Damaged suction and discharge below of PA fan



Fig 2.2(b) Suction and discharge bellow after replacement with new one

- ✓ PA fan 2201 (Old) fan converted from pulley drive to direct coupling to run the Fan at increased rpm 3000 rpm to increase the PA header pressure for better combustion efficiency .earlier it was running on 2200 rpm.



Fig 2.2(c) PA fan from pulley drive to direct coupling

- ✓ Arrangement made in both PA fan for sensor fitting on bearing Plummer block to get the vibration feedback on DCS screen.

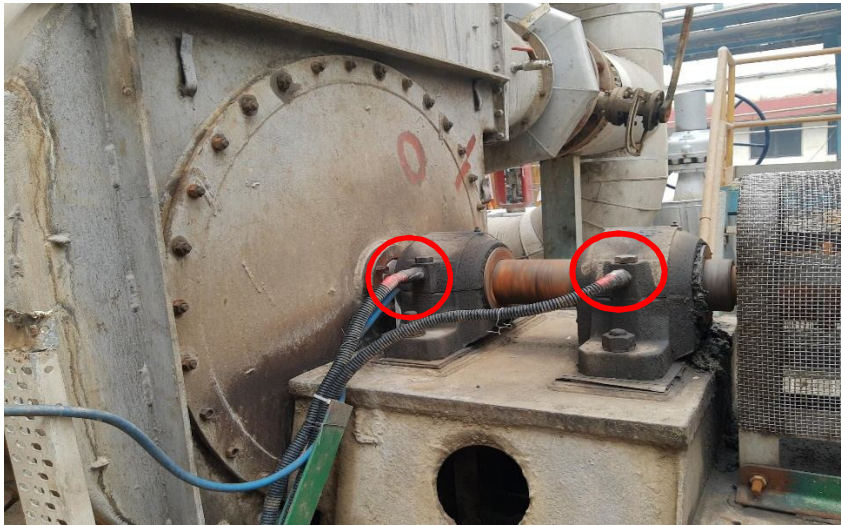


Fig 2.2(d) Vibration sensor arrangement in plummer block of PA fan

2.3 Valve Lapping/repairing Jobs

Train #2

- ✓ Boiler Drum Both Safety Valve removed and lapping/ Servicing done and tested on test bench for set pressure 74 Kg/Cm2 and 75Kg/cm2.
- ✓ Economizer Safety valve Lapping Servicing done and tested on test bench.
- ✓ Super heater Safety valve is replaced with new one and tested on test bench.
- ✓ CBD tank safety valve removed Lapping /Servicing done and tested in in test bench.
- ✓ Startup vent isolation valve which has passing removed and lapping & testing done.
- ✓ Super heater -1 control valve isolation valve ring gasket removed and Valve disc lapping done for proper sealing.
- ✓ Export steam line valve which has jamming problem spindle removed servicing done and installed with smooth operation.
- ✓ BCW pump 1 steam exhaust line isolation valve which has heavy passing removed lapping of disc done and servicing done for smooth operation.



Fig2.3(a) disc insert after lapping



Fig 2.3(b) Scratch on Steam Drum& SH1 Safety valve disc

- ✓ LP deaerator All three safety valve removed and lapping servicing done.



Fig 2.3(c) Lapping / Servicing Job

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Society

ARCO VALVES Pvt Ltd		Issue No.BI Dt 07/04/2021 Rev No. 0	
PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No.	AW/IFCO/P/2021/2	Test Date	29-03-2021
Plant / Unit	IFCO, SAP2	Valve Tag No.	PSV-2302
Make	CROSSBY (TYCO)	Model No.	NA
Set Pressure	74.00 kg/cm ²	Serial No.	NA
CDSP	NA	Calibration details of testing device	
Back Pressure	0 kg/cm ²	Pressure Gauge Range	0-160 kg/cm ²
Vacuum Pressure	NA	Pressure Gauge Tag No.	
Bellow present	NA	Pressure Gauge Calibration	
Size / Rating	2 1/2" X 6" 600 #	Next Due date	
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Pop Set Pressure	74.00 kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	74.00 kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	66.50 kg/cm ²	Tag attached to the valve with test details & lead seal	YES
Back Pressure	0 kg/cm ²		
For ARCO VALVES	FOR IFFCO-SAP- Mechanical	FOR IFFCO-Process	
<i>[Signature]</i> SIGN	<i>[Signature]</i> SIGN	<i>[Signature]</i> SIGN	

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Society

ARCO VALVES Pvt Ltd		Issue No.BI Dt 07/04/2021 Rev No. 0	
PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No.	AW/IFCO/P/2021/2	Test Date	29-03-2021
Plant / Unit	IFCO, SAP2	Valve Tag No.	PSV-2301
Make	CROSSBY (TYCO)	Model No.	NA
Set Pressure	74.00 kg/cm ²	Serial No.	NA
CDSP	NA	Calibration details of testing device	
Back Pressure	NA	Pressure Gauge Range	0-160 kg/cm ²
Vacuum Pressure	NA	Pressure Gauge Tag No.	
Bellow present	NA	Pressure Gauge Calibration	
Size / Rating	2 1/2" X 6" 600 #	Next Due date	
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Pop Set Pressure	74.00 kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	74.00 kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	66.50 kg/cm ²	Bellow Test	NA
Back Pressure	0 kg/cm ²	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP- Mechanical	FOR IFFCO-Process	
<i>[Signature]</i> SIGN	<i>[Signature]</i> SIGN	<i>[Signature]</i> SIGN	

IFFCO
पुणे: इंधन व खाद्य
विकास खाते व खाद्य
सुरक्षा विभाग

ARCO VALVES Pvt Ltd		Issue No.01 Dt 07/04/2021 Rev No. 0	
PSV DISMANTLING SEAT / CALIBRATION CERTIFICATE			
IC No	AV/IFFCO/P/2021/2	Test Date	28-03-2021
Plant / Unit	IFFCO, SAP2	Valve Tag No	PSV-2302
Make	CROSSBY (ITCO)	Model No	NA
Set Pressure	75.00 kg/cm ²	Serial No	NA
Calibration details of testing device			
CDSP	NA	Pressure Gauge Range	0-160 kg/cm ²
Back Pressure	NA	Pressure Gauge Tag No	
Vacuum Pressure	NA	Pressure Gauge Calibration	
Below present	NA	Next Due date	
Size / Rating	2 1/2" X 6" 600 #		
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Prop Set Pressure	75.00 kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	75.00 kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	67.5 kg/cm ²	Below Test	NA
Back Pressure	0 kg/cm ²	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
SIGN	SIGN	SIGN	

IFFCO
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ARCO VALVES Pvt Ltd		Issue No.01 Dt 07/04/2021 Rev No. 0	
PSV DISMANTLING SEAT / CALIBRATION CERTIFICATE			
IC No	AV/IFFCO/P/2021/3	Test Date	28-03-2021
Plant / Unit	IFFCO, SAP2	Valve Tag No	PSV-2303
Make	CROSSBY (ITCO)	Model No	NA
Set Pressure	65.00 kg/cm ²	Serial No	NA
Calibration details of testing device			
CDSP	NA	Pressure Gauge Range	0-160 kg/cm ²
Back Pressure	NA	Pressure Gauge Tag No	
Vacuum Pressure	NA	Pressure Gauge Calibration	
Below present	NA	Next Due date	
Size / Rating	2 1/2" X 6" 600 #		
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Prop Set Pressure	65.00 kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	65.00 kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	58.5 kg/cm ²	Below Test	NA
Back Pressure	0 kg/cm ²	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
SIGN	SIGN	SIGN	

IFFCO
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सुरक्षा विभाग

ARCO VALVES Pvt Ltd		Issue No.01 Dt 07/04/2021 Rev No. 0	
PSV ASSEMBLY REPLACED WITH NEW ONE AND TESTING DONE.			
PSV DISMANTLING SEAT / CALIBRATION CERTIFICATE			
IC No	AV/IFFCO/P/2021/5	Test Date	29-03-2021
Plant / Unit	IFFCO, SAP2	Valve Tag No	PSV-2304
Make	CROSSBY (ITCO)	Model No	NA
Set Pressure	81.00 kg/cm ²	Serial No	NA
Calibration details of testing device			
CDSP	NA	Pressure Gauge Range	0-160 kg/cm ²
Back Pressure	NA	Pressure Gauge Tag No	
Vacuum Pressure	NA	Pressure Gauge Calibration	
Below present	NA	Next Due date	
Size / Rating	2 1/2" X 6" 600 #		
WORK PERFORMED			
PSV ASSEMBLY REPLACED WITH NEW ONE AND TESTING DONE.			
PRESSURE TEST DETAILS			
Pre-Prop Set Pressure	81.00 kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	81.00 kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	75.00 kg/cm ²	Below Test	NA
Back Pressure	0 kg/cm ²	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
SIGN	SIGN	SIGN	

IFFCO
पुणे: इंधन व खाद्य
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सुरक्षा विभाग

ARCO VALVES Pvt Ltd		Issue No.01 Dt 07/04/2021 Rev No. 0	
PSV DISMANTLING SEAT / CALIBRATION CERTIFICATE			
IC No	AV/IFFCO/P/2021/5	Test Date	29-03-2021
Plant / Unit	IFFCO, SAP2	Valve Tag No	PSV-2304
Make	CROSSBY (ITCO)	Model No	NA
Set Pressure	81.00 kg/cm ²	Serial No	NA
Calibration details of testing device			
CDSP	NA	Pressure Gauge Range	0-160 kg/cm ²
Back Pressure	NA	Pressure Gauge Tag No	
Vacuum Pressure	NA	Pressure Gauge Calibration	
Below present	NA	Next Due date	
Size / Rating	2 1/2" X 6" 600 #		
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Prop Set Pressure	81.00 kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	81.00 kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	75.00 kg/cm ²	Below Test	NA
Back Pressure	0 kg/cm ²	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
SIGN	SIGN	SIGN	

2.4 Main Turbine 010 CT 2400(6.237MW)& BCW PUMP TURBINE

2.4.1 Lube Oil Cooler

- ✓ Turbine Both Lube oil cooler cleaned with hydro jetting at pressure 150 kg/cm²
- ✓ Both Cooler of BCW pumps cleaned by hydro jetting machine at pressure 100 kg/cm².
- ✓ Condensate and gland steam cooler of Turbine cleaned by hydro jetting machine at pressure 100 kg/cm².



Fig 2.4.1(a) lube oil cooler before cleaning



Fig2.4.1 (b) lube oil cooler after cooling

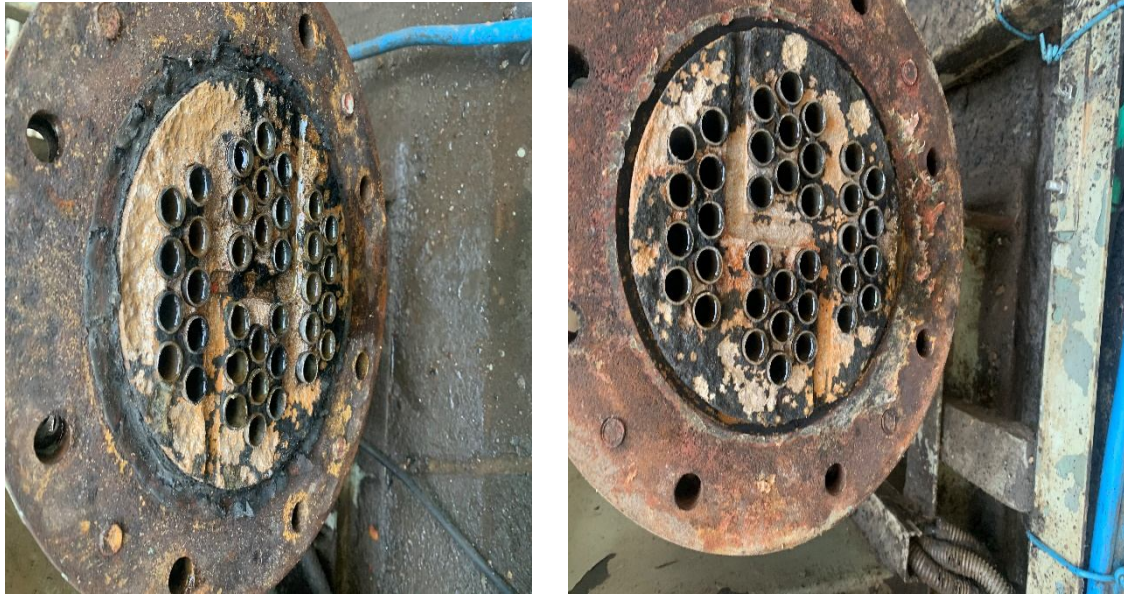


Fig 1.4.1(c) Lube oil cooler bcw turbine after cooling

2.5 BOILER

- ✓ Arrangement is made to measure the thermal expansion of boiler at its each supports and at steam drum.
- ✓ SH-1 & SH-2 support thermal expansion measurement is done along with boiler and steam drum.



Fig 2.5(a) Arrangement for boiler thermal expansion measurement



Fig 2.5(b) Samples after thermal expansion of boiler

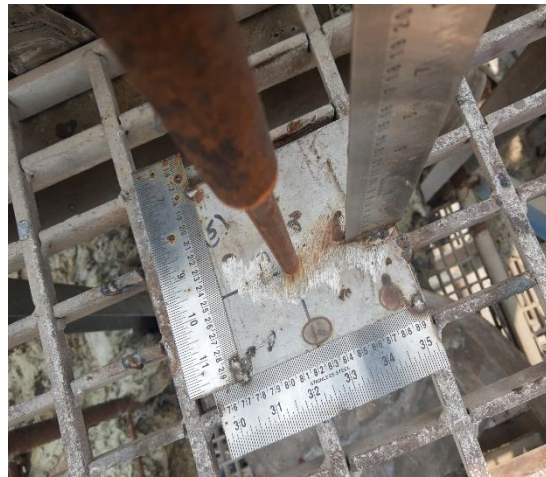


Fig 2.5(c) Arrangement for thermal expansion measurement of steam drum

Term-2

Plant Load: 47 M TPH

(3)

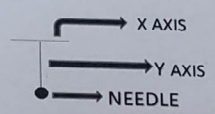


DATE 28.04.2021
TIME 4:30 PM

SAP 2 WHRB SUPPORT MEASUREMENT

OPERATING TEMP: 276.8 °C
PRESSURE: 70 kg/cm²g

SUPPORT	MOVEMENT IN X AXIS mm	MOVEMENT IN Y AXIS mm	MOVEMENT IN VERTICAL
NO.1	04	04	Nil
NO.2	12	02	-"-
NO.3	14	02	-"-
NO.4	10	02	-"-
NO.5	04	Negligible	-"-



Load - 47 TPH
Steam Temp - 478 °C
Drum Pr. : 70 kg/cm²g

SAP 2 STEAM DRUM SUPPORT MEASUREMENT

OPERATING TEMP:
PRESSURE:

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	MOVEMENT IN VERTICAL
NO.1	30 mm	08 mm	70 mm

↑ upward

(Turbine side) (Economiser side)

SAP 2 SH#1 SUPPORT MEASUREMENT

OPERATING TEMP: 283 °C
PRESSURE: 67 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS
NO.1	Negligible	Negligible
NO.2	02	-"-
NO.3	04	-"-
NO.4	03	-"-
NO.5	Negligible	-"-

SAP 2 SH#2 SUPPORT MEASUREMENT

OPERATING TEMP: 478 °C
PRESSURE: 63 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS
NO.1	Negligible	Negligible
NO.2	02	-"-
NO.3	04	-"-
NO.4	05	-"-
NO.5	Negligible	-"-

Fig 2.5(d) Thermal expansion measurement report



Wholly owned by Cooperatives

ATR-2021

**REPORT ON ROTARY EQUIPMENTS
AND SAFETY VALVE OF SAP#1**

ATR REPORT-2021

SAP#1

Plant stopped on

16/03/2021

plant started on

29/04/2021

1.1 Sulphur Burner & Wind box

- ✓ Both Sulphur Burner removed and Balancing done with new rotary cup.
- ✓ Bearing and Seal replaced with new one.
- ✓ Wind box opened and found the air resister vanes are in damaged and broken condition.
- ✓ All damaged vanes replaced with new vanes made of SS 304.
- ✓ Matching plate of wind box SH Side was found wear out which causes so2 gas leakage in between burner face and wind box matching position.
- ✓ This matching plate is indigenously developed in our central workshop and replaced with that newly fabricated one and
- ✓ All seal rope replaced with new one and matching face lapped to proper contact with burner sealing face.



Fig 1.1(a) damaged vane of air resister



fig 1.1(b) after vane replacement



Fig 1.1(c) indigenously developed matching plate

- ✓ Burner Base rail replaced with new strengthen beam from 75 to 120 Chanel to enhance the burner support strength.



Fig 1.1(d) burner rail after replacement

- ✓ Damaged Burner Hose Metallic Hose of Size 16” replaced for both the burner with new hose.



Fig 1.1(e) PA line Hose after replacement with new one

1.2 PA Fan

- ✓ Both PA fan overhauling done fan rotor removed balancing checked, Bearing with sleeve replaced with new bearing and sleeve.



Fig 2.1(a) PA Fan impeller before balancing

- ✓ PA fan 1201 (Old) fan converted from pulley drive to direct coupling to run the Fan at increased rpm 3000 rpm to increase the PA header pressure for better combustion efficiency .earlier it was running on 2200 rpm.

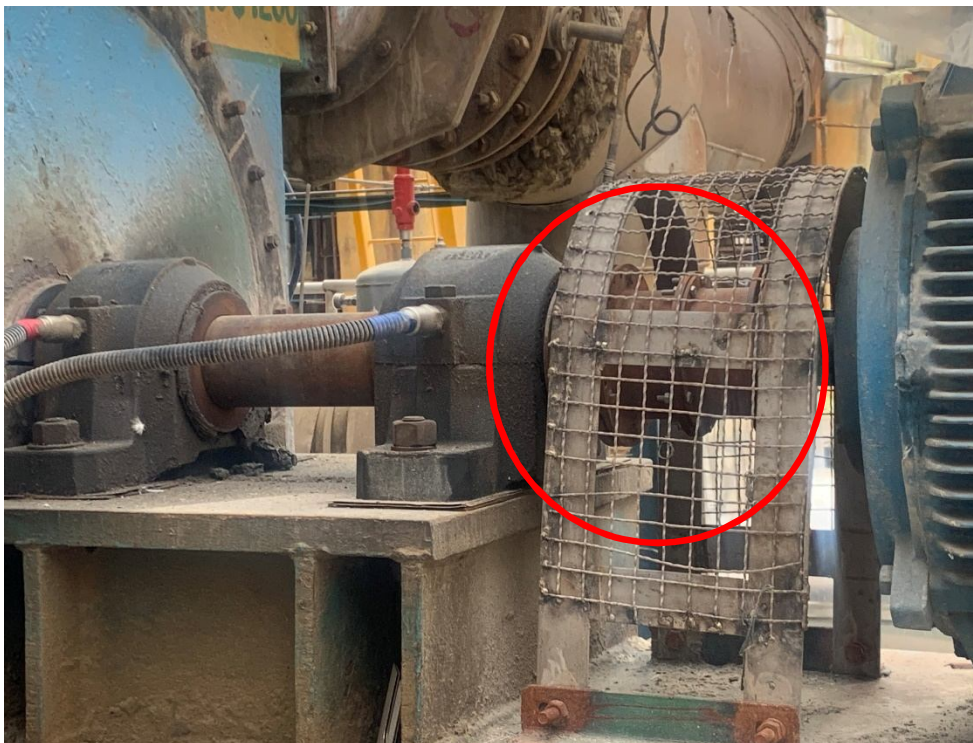


Fig 1.2(c) PA fan from pulley drive to direct coupling

- ✓ Arrangement made in both PA fan for sensor fitting on bearing Plummer block to get the vibration feedback on DCS screen.



Fig 1.2(d) Vibration sensor arrangement in plumber block of PA fan

1.3 Valve Lapping/repairing Jobs

Train #1

- ✓ Boiler Drum Both Safety Valve removed and lapping/ Servicing done and tested on test bench for set pressure 74 Kg/Cm² and 75Kg/cm².
- ✓ Economizer Safety valve Lapping Servicing done and tested on test bench.
- ✓ Super heater Safety valve removed lapping/servicing done with and tested on test bench.
- ✓ CBD tank safety valve removed Lapping /Servicing done and tested in in test bench.
- ✓ Startup vent isolation valve which has passing removed and lapping & testing done.
- ✓ Super heater -1 control valve isolation valve ring gasket removed and Valve disc lapping done for proper sealing.
- ✓ BCW pump 1 steam exhaust line isolation valve which has heavy passing removed lapping of disc done and servicing done for smooth operation.






Fig 1.3(a) disc insert after lapping









Fig 1.3(b) Steam Drum both Safety valve disc after lapping









Fig 1.3(c) Servicing Job samples




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PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No	AV/IFCO/P/2021/6	Test Date	27-03-2021
Plant / Unit	IFCO, SAP1	Valve Tag No	PSV - 1301
Make	CROSSBY (TYCO)	Model No	NA
Set Pressure	74.00 Kg/cm ²	Serial No	NA
CDSP	NA	Calibration details of testing device	
Back Pressure	NA	Pressure Gauge Range	0-160 Kg/cm ²
Vacuum Pressure	NA	Pressure Gauge Tag No	
Bellow present	NA	Pressure Gauge Calibration	21-09-2021
Next Due date			
Size / Rating	2 1/2" X 6" 600 #		
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Top Set Pressure	74.00 Kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	74.00 Kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	66.50 Kg/cm ²	Bellow Test	NA
Back Pressure	0 Kg/cm ²	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFCO-SAP-Mechanical	FOR IFCO-Process	
			
SIGN	SIGN	SIGN	

ARCO VALVES Pvt Ltd		Issue No.01 Dt 10/04/2021 Rev No. 0	
PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No	AV/IFCO/P/2021/7	Test Date	27-03-2021
Plant / Unit	IFCO, SAP1	Valve Tag No	PSV - 1302
Make	CROSSBY (TYCO)	Model No	NA
Set Pressure	75.00 Kg/cm ²	Serial No	NA
CDSP	NA	Calibration details of testing device	
Back Pressure	NA	Pressure Gauge Range	0-160 Kg/cm ²
Vacuum Pressure	NA	Pressure Gauge Tag No	
Bellow present	NA	Pressure Gauge Calibration	21-09-2021
Next Due date			
Size / Rating	2 1/2" X 6" 600 #		
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Top Set Pressure	75.00 Kg/cm ²	Number of drops At 90% CDSP	0
Test Bench Set Pressure	75.00 Kg/cm ²	Test Media	NITROGEN
Leak test pressure 90% CDSP	67.50 Kg/cm ²	Bellow Test	NA
Back Pressure	0 Kg/cm ²	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFCO-SAP-Mechanical	FOR IFCO-Process	
			
SIGN	SIGN	SIGN	

ARCO VALVES Pvt Ltd		Issue No.01 Dt 10/04/2021 Rev No. 0	
PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No	AV/IFFCO/P/2021/8	Test Date	27-03-2021
Plant / Unit	IFFCO, SAP1	Valve Tag No	PSV - 1303
Make	CROSSBY (TYCO)	Model No	NA
Set Pressure	65.00 Kg/cm2	Serial No	NA
COSP	NA	Calibration details of testing device	
Back Pressure	NA	Pressure Gauge Range	0-160 Kg/cm 2
Vacuum Pressure	NA	Pressure Gauge Tag No	
Below present	NA	Pressure Gauge Calibration	Next Due date
Size / Rating	2 1/2" X 6" 600 #	Next Due date	21-09-2021
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Pop Set Pressure	63.00 Kg/cm2	Number of drops At 90% COSP	0
Test Bench Set Pressure	63.00Kg/cm2	Test Media	NITROGEN
Leak test pressure 90% COSP	58.50 Kg/cm2	Bellow Test	NA
Back Pressure	0 Kg/cm2	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
			

ARCO VALVES Pvt Ltd		Issue No.01 Dt 10/04/2021 Rev No. 0	
PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No	AV/IFFCO/P/2021/9	Test Date	27-03-2021
Plant / Unit	IFFCO, SAP1	Valve Tag No	PSV - 1304
Make	CROSSBY (TYCO)	Model No	NA
Set Pressure	70.00 Kg/cm2	Serial No	NA
COSP	NA	Calibration details of testing device	
Back Pressure	NA	Pressure Gauge Range	0-160 Kg/cm 2
Vacuum Pressure	NA	Pressure Gauge Tag No	
Below present	NA	Pressure Gauge Calibration	Next Due date
Size / Rating	2 1/2" X 6" 600 #	Next Due date	21-09-2021
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Pop Set Pressure	70.00 Kg/cm2	Number of drops At 90% COSP	0
Test Bench Set Pressure	70.00Kg/cm2	Test Media	NITROGEN
Leak test pressure 90% COSP	63.00 Kg/cm2	Bellow Test	NA
Back Pressure	0 Kg/cm2	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
			

ARCO VALVES Pvt Ltd		Issue No.01 Dt 10/04/2021 Rev No. 0	
PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No	AV/IFFCO/P/2021/12	Test Date	30-04-2021
Plant / Unit	IFFCO, SAP1	Valve Tag No	PSV - 1305
Make	CROSSBY (TYCO)	Model No	NA
Set Pressure	91.35 Kg/cm2	Serial No	NA
COSP	NA	Calibration details of testing device	
Back Pressure	NA	Pressure Gauge Range	0-160 Kg/cm 2
Vacuum Pressure	NA	Pressure Gauge Tag No	
Below present	NA	Pressure Gauge Calibration	Next Due date
Size / Rating	3" X 6" 300 #	Next Due date	21-09-2021
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Pop Set Pressure	91.35 Kg/cm2	Number of drops At 90% COSP	0
Test Bench Set Pressure	91.35 Kg/cm2	Test Media	NITROGEN
Leak test pressure 90% COSP	91.32 Kg/cm2	Bellow Test	NA
Back Pressure	0 Kg/cm2	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
			

ARCO VALVES Pvt Ltd		Issue No.01 Dt 10/04/2021 Rev No. 0	
PRESSURE RELIEF SAFETY VALVE TEST / CALIBRATION CERTIFICATE			
TC No	AV/IFFCO/P/2021/10	Test Date	29-03-2021
Plant / Unit	IFFCO, SAP1	Valve Tag No	PSV - 1306
Make	CROSSBY (TYCO)	Model No	NA
Set Pressure	84.00 Kg/cm2	Serial No	NA
COSP	NA	Calibration details of testing device	
Back Pressure	NA	Pressure Gauge Range	0-160 Kg/cm 2
Vacuum Pressure	NA	Pressure Gauge Tag No	
Below present	NA	Pressure Gauge Calibration	Next Due date
Size / Rating	2" X 3" 600 #	Next Due date	21-09-2021
WORK PERFORMED			
PSV DISMANTLING SEAT AND PLUG LAPPING, ASSEMBLY AND TESTING			
PRESSURE TEST DETAILS			
Pre-Pop Set Pressure	84.00 Kg/cm2	Number of drops At 90% COSP	0
Test Bench Set Pressure	84.00Kg/cm2	Test Media	NITROGEN
Leak test pressure 90% COSP	75.60 Kg/cm2	Bellow Test	NA
Back Pressure	0 Kg/cm2	Tag attached to the valve with test details & lead seal	YES
For ARCO VALVES	FOR IFFCO-SAP-Mechanical	FOR IFFCO-Process	
			



पुनः सहायी स्वामित्व
 100% भारतीय कंपनियों
 परियोजना इकाई

1.4 Main Turbine 010 CT 1400(6.237MW), BCW Turbine (75 KW)

1.4.1 Lube Oil Cooler

- ✓ Turbine Both Lube oil cooler cleaned with hydro jetting at pressure 150 kg/cm²
- ✓ Both Cooler of BCW pumps cleaned by hydro jetting machine at pressure 100 kg/cm².
- ✓ Condensate and gland steam cooler of Turbine cleaned by hydro jetting machine at pressure 100 kg/cm².



Fig1. 4.1(a) lube oil cooler before cleaning



Fig 1.4.1(b) lube oil cooler after cooling



Fig 1.4.1(c) lube oil cooler



Fig 1.4.1(d) Lube oil cooler bfw turbine after cleaning



Fig 1.4.1(e) lube oil cooler of bcw turbine before and after cleaning

1.5 BOILER

- ✓ Arrangement is made to measure the thermal expansion of boiler at its each supports and at steam drum.
- ✓ SH-1 & SH-2 support thermal expansion measurement is done along with boiler and steam drum.



Fig 1.5(a) Arrangement for boiler thermal expansion measurement



Fig 1.5(b) Samples after thermal expansion of boiler

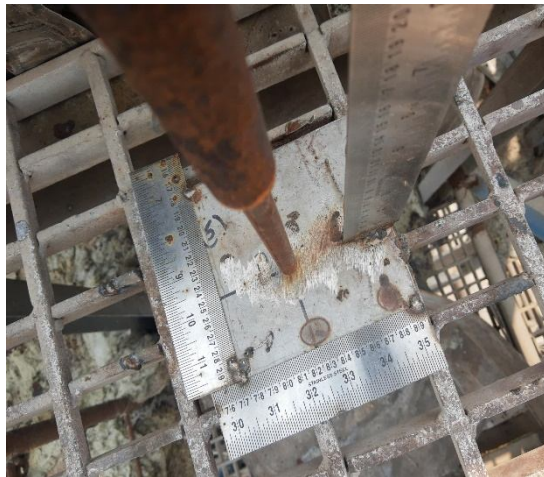


Fig 1.5(c) Arrangement for thermal expansion measurement of steam drum

SAP #1



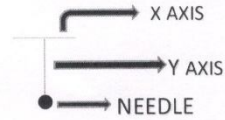
पूर्णतः सहकारी स्वामित्व
Wholly owned by Cooperatives
Paradeep Unit

DATE 10.5.2021
TIME 5:00 P.M.

SAP #1 WHRB SUPPORT MEASUREMENT

OPERATING TEMP: 278 °C
PRESSURE: 58 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	MOVEMENT IN VERTICAL
NO.1	NIL	NIL	NIL
NO.2	04	NIL	NIL
NO.3	06	NIL	NIL
NO.4	NIL	NIL	NIL
NO.5	NIL	NIL	NIL



42 TPI

SAP #1 STEAM DRUMSUPPORT MEASUREMENT

OPERATING TEMP: 278 °C
PRESSURE: 66 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	MOVEMENT IN VERTICAL mm
NO.1	17 mm	NIL	69

SAP #1 SH#1 SUPPORT MEASUREMENT

OPERATING TEMP: 410 °C
PRESSURE: 84 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	
NO.1	NIL	NIL	
NO.2	05	NIL	
NO.3	08	NIL	
NO.4	05	NIL	
NO.5	NIL	NIL	

SAP #1 SH#2 SUPPORT MEASUREMENT

OPERATING TEMP: 480 °C
PRESSURE: 62 kg/cm²

SUPPORT	MOVEMENT IN X AXIS	MOVEMENT IN Y AXIS	
NO.1	-	-	
NO.2	-	-	
NO.3	-	-	
NO.4	-	-	
NO.5	-	-	

* Expansion of WHRB Support of SAP#1 is less as comparison to SAP#2.

* Drum Lifting (Vertical Expansion) is Same. However linear expansion is less 56% of SAP #2.

Fig 1.5(d) Thermal expansion report

ATR – 2021

PAP

(Process)

Annual shut down activity of Phosphoric Acid Plant in the year 2021 was started on 16th March and completed on 07th April. During this period many activities related to process and equipment overhauling, cleaning jobs at different locations were undertaken. The area wise major cleaning activities are as per followings.

1. Slurry Surge Tank(SST)
2. Reactor.
3. Fume scrubber and Pre scrubber
4. Old & New Cooling Tower.
5. Vacuum Cooler and Pre condenser seal tanks etc.
6. Evaporator
7. Hot well trench
8. Belt Filter & Filtration area
9. Ball Mill & SST area
10. Pump Tank
11. New Pump tank
12. Vessel & Line Cleaning
13. RPSS area
14. Gypsum Tank

1. Slurry Surge Tank (SST) cleaning: Huge deposition of Material was found inside of SST. The deposition of material was cleaned with the help of skid loader. Agitator blades replaced. Damaged baffle plates were strengthened. Also patch up strengthening was carried out over thinned portions of the tank wall. Apprx. **400 MT** of rock was removed.



SST Cleaning with skid loader



SST after cleaning

2. Reactor: As a part of Annual Turn Round- 2021, Reactor draining was started in 'A' shift on 17/03/2021. After water filling, Reactor washing continued till 19/03/2021 for degasification of fluorine compounds. Finally liquor draining was completed at 08.00AM on 20/03/2021.

After opening of manholes, it was observed that there is huge deposition of very hard scale on reactor walls. Deposition was there on floor. Quantity of material in annular zone was approx. 350 MT. De scaling of both side walls of annular zone was done carefully with the help of one JCB machine with constant supervision and without any harm to brick lining. Care was taken to complete the activity in the safest manner. Entire scale material was removed through the agitator openings by net & rope (Jhula). Baffle columns cleaning was done. Cleaning of vacuum cooler 110,112 & 113 was done. All four vacuum coolers outlet pipe and seal leg cleaning & descaling done. Around 300 MT material was removed from these vessels. Complete cleaning of adjustment & Filter feed tank was done. Around 300 MT material was removed from both tanks. Heavy scaling was observed in VCST, around 350 MT material was removed from tank. Wall brick lining of agitator 130 compartment was in bulged condition. It was renewed.



Annular Manway before cleaning



Annular Manway after cleaning



Deposition on Reactor walls



Reactor annular section inside cleaning with JCB



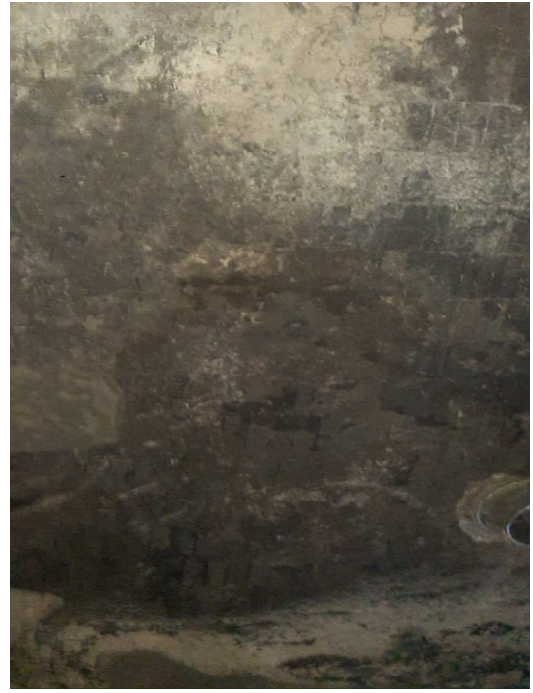
Annular section before cleaning



Annular section after cleaning



FFT wall before cleaning



FFT wall after cleaning



Adjustment tank wall before cleaning



Adjustment tank wall after



VCST manway before descaling



VCST manway after descaling





VCST wall before cleaning



VCST wall after cleaning



Seal Leg before cleaning



Seal Leg after cleaning

- Fumes scrubber and Pre scrubber:** Fumes duct was cleaned and all leakage points were repaired. Damaged portion of fumes inlet duct inside pre scrubber was also repaired. New vertical gate provided in Fumes duct. Pre scrubber inner shell and its outlet duct to Fumes scrubber completely descaled and cleaned. Deposition over Fumes scrubber inlet duct and entire fumes scrubber chamber cleaned. Fumes scrubber inside bottom damaged plates replaced and joint portion rubber lining done.



Fumes duct before cleaning



Fumes duct after cleaning



Pre scrubber inner shell before cleaning



Pre scrubber inner shell after cleaning



Pre scrubber bottom cone before cleaning



Pre scrubber bottom cone after cleaning



Fumes scrubber chamber before cleaning



Fumes Scrubber chamber after cleaning

- 4. Old Cooling Tower and New cooling tower:** New cooling tower basins of Cell no. 1, 2 3 & 4 cleaning done. Old cooling tower basins of all Cell cleaned. New Cooling Tower Cell no. 1, 2 & 3 damaged brick lining repaired. Old Cooling Tower Cell no. 2 damaged brick lining repaired. All walls, strainers and deck of both New & Old Cooling Tower was cleaned. Mist eliminators of Cell no- 1 to 8 except Cell no-3 of old Cooling tower cleaned.



Old Cooling Tower Cell before cleaning



Old Cooling Tower Cell after cleaning



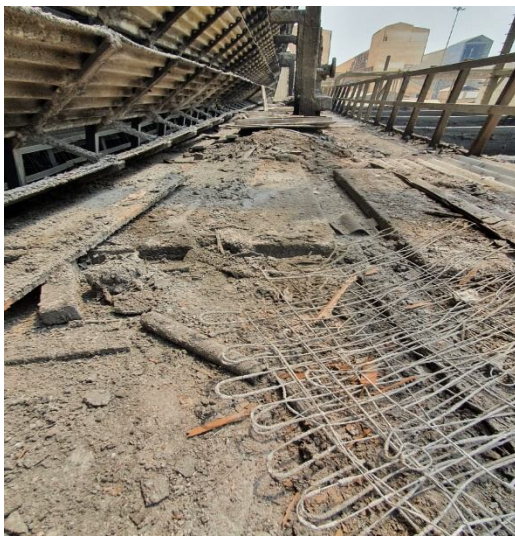
Old Cooling Tower mist eliminator cleaning



Cooling Tower Strainer before cleaning



Cooling Tower straner after cleaning



Cooling Tower deck before cleaning



Cooling Tower deck after cleaning



New Cooling Tower cold well cell wall
repairing

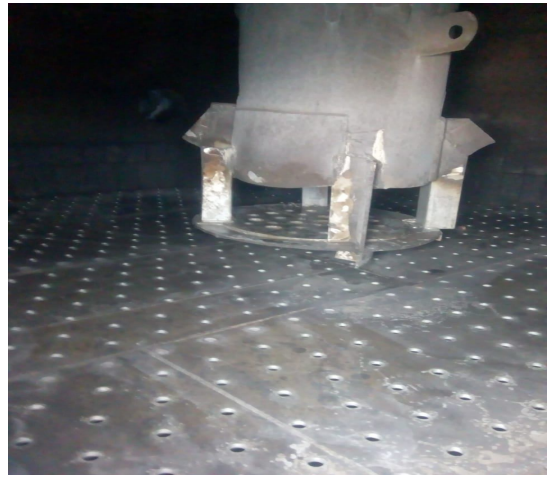


New Cooling Tower cold well cell after
repairing

5. **Vac. Cooler Pre condenser seal tanks cleaning:** Depositions in Pre condenser seal tanks (both old and new) were also cleaned.
6. **Evaporator:** All evaporator entrainment separator and barometric condenser cleaned. Evaporator area sump cleaned and drain cleaned to take up major repairing jobs by Civil Dept.



Evaporator entrainment separator cleaning



Evaporator barometric condenser before and after cleaning



Evaporator area sump cleaning



Evaporator area drain cleaning

7. Hot Well Trench:

Hot well trench covered roof cutting done at three places and cleaning of the trench done thoroughly up to hot well.



Hot well trench before cleaning



Hot well trench after cleaning

8. Belt Filter and Filtration:

All belt filter manifolds removed and cleaned. All belt filter vacuum box cleaned. All belt filter filtrate hose dismantled and cleaned. All filtrate seal tank cleaned in

filtration section. Final wash trench cleaning and brick lining done. Filtration section floor brick lining done. Cloth wash tank steam sparger repaired. Gypsum discharge line of 292 and 293 pump cleaned.

9. Ball Mill & SST Area:

All ball mills water washed and cleaned. Balls were segregated and rejected quantity was topped up with new charge in Ball Mill- C & A. All MST (mill slurry tank) and old SST (slurry surge tank) cleaned.



Ball mills water washed



Ball mills charged with new and segregated balls



Old SST cleaned

10. Pump tank cleaning:

Pump tank manhole was opened during the annual shut down and bottom floor found with hard scale deposit along with gypsum. Tank was cleaned thoroughly.



Pump Tank before cleaning



Pump Tank after cleaning

11. New pump tank cleaning: New pump tank manhole was opened during the annual shut down and found to be containing hard gypsum depositions. Tank was cleaned thoroughly.



New pump tank before cleaning



New pump tank after

12. Vessel & Line Cleaning: All the suction & discharge lines of Acid transfer pumps were cleaned thoroughly.



Misc Pipe Line before Cleaning



Misc Pipe Line after Cleaning

13. RPSS area cleaning:

Entire conveyor area spillage was cleaned.

14. Gypsum Tank:

Deposition inside Gypsum Tank has been cleaned.



Major Jobs Done during ATR-2021

1. Belt Conveyor 104, 106A & 106 B were replaced.
2. Conveyor gallery checker plates of 106A & 106B replaced.
3. Bottom face of Conveyor gallery of belt conveyor 104, 105 blasting and painting done.
4. SST side wall damaged plates replaced.
5. SST agitator blades replaced.
6. New sulphuric acid line replaced with SS.
7. Defoamer dosing tank replaced.
8. Renewal of Bulged brick lining of wall of cooler feed compartment
9. New brick lining of Final wash trench.
10. Evaporator C & F steam isolation valve was replaced.
11. MSRL make Weak acid distribution box (WADB) replaced with that of SS.
12. NPT repairing done.
13. Old Cooling Tower Cell no. 2 & New Cooling Tower Cell no. 1, 2 & 3 wall damaged brick lining repairing done.
14. P-494 & P- 495 discharge header line replaced with SS and line modification done.
15. Process water header line replaced at acid storage area.
16. Clean condensate header line replaced from Evaporator A to G area.
17. Several steam traps in LP steam line of Evaporator section.
18. Evaporator area sump cleaning done, civil work done and bottom portion is provided with SS plate.
19. Evaporator area drain brick lining done.
20. Evaporator B to H steam control valve replaced.
21. Instrument Air Line replacement done.
22. P-442 base work renewal.
23. Cold Well pump 629 suction and discharge valve replaced.
24. P-611 suction piece and valve replaced.
25. Evaporator B Barometric Condenser seal tank outlet pipe replaced.



Wholly owned by Cooperatives

PHOSPHORIC ACID PLANT – MECHANICAL DEPT. ANNUAL TURNAROUND REPORT



Plant	Stopped on	Started on	Maintenance duration, days
PAP	15.03.21	07.04.21	24

PAP-Mechanical Department

- Annual shut down activity of Phosphoric acid plant in the year 2021 was started on 25th March and completed on 12th April. During this period, various maintenance activities has been carried out in different sections in Phosphoric Acid Plant
- Complete shutdown process started from Shutdown work identification, Shutdown work planning , Shutdown work scheduling , Resources Planning, Shutdown work execution, Entry of major job's History in PMMS Module, Preparation of Shut down Report for the job executed .
- Maintenance job includes, overhauling & replacement of defective / worn-out equipment, up-gradation of material for reliability improvement & trouble-free operation of plant.
- Various sections in Phosphoric Acid Plant are :
 - RPSS & BALL MILL SECTION
 - REACTOR SECTION
 - FILTRATION SECTION
 - BELT FILTER SECTION
 - CONCENTRATION SECTION.
- In this report, Section wise maintenance job list has been mentioned separately.

REACTOR SECTION

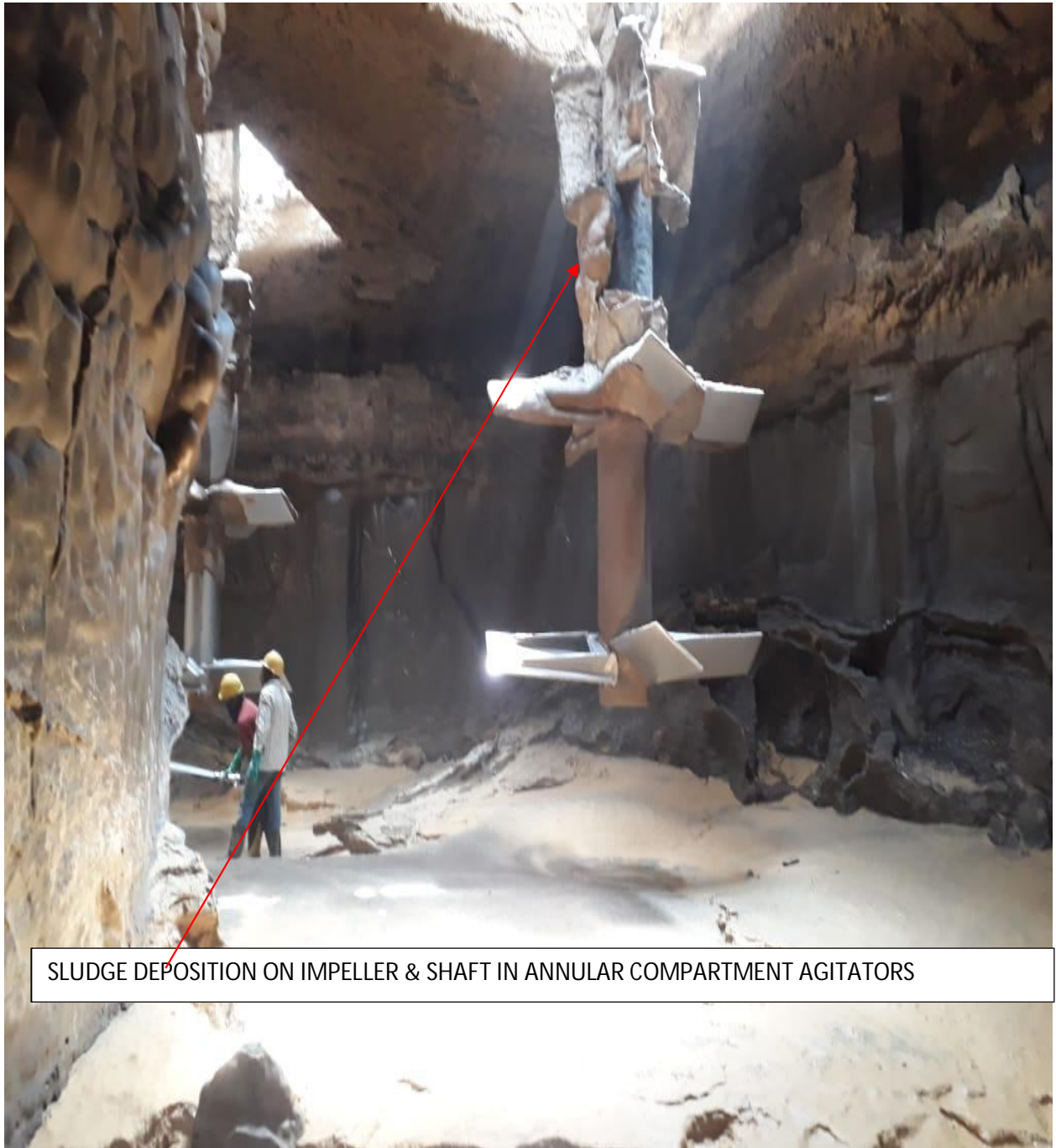
Condition of Reactor Agitators and Action taken:

Observation:

- 1) It was noticed significant sludge deposition on annular compartment agitators, specifically in the rock feeding points i.e. agitator location 05.111 & 05.112 and these were replaced with spare repaired agitators respectively.
- 2) Further, it was observed that Sludge deposition on remaining annular compartment agitators (i.e. agitators from 05.113 to 05.117) was found significantly high & erosion - corrosion on the agitator's impeller was also noticed. Thus, the subject agitators of annular compartment were replaced with spare repaired PBT type agitator, MOC: SS-904L as per original design.
- 3) Furthermore, the agitators in other compartment, which were noticed erosion & corrosion on the impeller & shaft, were replaced with spare repaired PBT type agitator, MOC: SS-904L as per original design. Agitator replacement status report is enclosed.
- 4) Above mentioned agitator assembly were removed from the position followed by removal of gear box, motor, base frame.
- 5) Condition of Gear box oil was checked and existing oil replaced based on visual & physical condition of lubrication oil.
- 6) Oil Filters were inspected cleaned and boxed –up. New Filters were fitted in seven (07) no. of Gear box.
- 7) Overhauling of lube oil pumps of gear box was carried out and fitted after successful overhauling activities.
- 8) Complete unit of agitator assembly was erected followed by levelling, alignment & commissioning activities.

REACTOR AGITATOR REPLACEMENT STATUS REPORT:

Name of Compartment	Total No. of Agitator Installed	Agitator Tag No.	Action Taken	Remark
Annular	7	05-111 to 05-117	All Seven (07) agitators replaced with spare repaired PBT type agitator , MOC: SS-904L as per original design.	<p>Out of Fifteen (15) no. of agitators, 12 agitators were replaced (11 no. repaired agitator & 01 No. New Agitator) and remaining three (03) agitators were in-situ repaired.</p>
Central	2	05-120 & 05-130	Agitator (05-130) was replaced with spare repaired PBT type agitator & Agitator (05-120) was In-situ repaired	
VCFT	2	05-171 & 05-172	Agitator (05-172) was replaced with spare repaired PBT type agitator & Agitator (05-171) was In-situ repaired	
VCST	2	05-141 & 05-142	Agitator (05-142) was replaced with spare repaired PBT type agitator & Agitator (05-141) was In-situ repaired	
Adjustment	1	05-150	Replaced with spare repaired PBT type agitator , as per original design.	
FFT	1	05-160	Replaced with New PBT type agitator , as per original design.	



SLUDGE DEPOSITION ON IMPELLER & SHAFT IN ANNULAR COMPARTMENT AGITATORS



REPAIRED SPARE AGITATORS INSTALLED IN 05-111 & 05-112 LOCATION IN ANNULAR COMPARTMENT.



REPAIRED SPARE AGITATORS INSTALLED IN 05-113 & 05-114 LOCATION IN ANNULAR COMPARTMENT



REPAIRED SPARE AGITATORS INSTALLED IN 05-115 & 05-116 LOCATION IN ANNULAR COMPARTMENT

Overhauling of Vacuum Cooler Circulation Pumps:

Observation:

There are four (04) nos. of vacuum cooler circulation pumps used in phosphoric acid plant, handling with hot reactor slurry at approx. 85 deg. cent. Containing mixture of

approx. 27% of phosphoric acid, gypsum with unreacted Sulphuric acid, fluorine, fluorides, silicate chips, silica and un-reacted organic & inorganic impurities.

Service media is Phospho-gypsum slurry, which is highly erosive & corrosive in nature. Thus, all the wetted parts of the subject pumps were checked thoroughly & corrective action taken in all pumps as per following manner:

Vacuum Cooler circulation pump (P-113):

- Suction spool piece, Impeller & Shaft sleeves of the subject vacuum cooler circulation pump, size: 48" NB was found worn out significantly.
- Thus, suction spool piece, Impeller & shaft sleeves of the subject pump was replaced with new one to improve pumping efficiency & overall performance of the reactor circuit.
- Vortex breaker provided in suction spool piece to avoid churning in the pump.
- New Impeller of MOC: Sanicro-28 was fitted by maintaining uniform impeller radial clearance of 4.5 mm around the circumference.
- New rubber expansion bellow of size: 48" NB X 350 mm was provided in the suction & discharge line.
- Complete discharge Pipe-line was upgraded to SS-904L .
- The subject pump was handed over to operation after replacing the damaged pump components as cited above.



VORTEX BREAKER PROVIDED IN SUTION SPOOL PIECE IN (P-113) TO AVOID CHURNING IN THE PUMP



NEW / FABRICATED "Y - PIECE" INSTALLED IN P-113 PUMP DISCHARGE

Vacuum Cooler circulation pumps (P-110, P-111 & P - 112):

- Impeller & Shaft sleeves of vacuum cooler circulation pump (P-110 & P-112), Size: 42" NB was found worn out significantly.

- It was noticed that impeller clearance was around 15 mm through-out the circumference.
- New Impeller of MOC: Sanicro-28 was fitted by maintaining uniform impeller radial clearance of 3 mm around the circumference
- Necessary patch work / repair was carried out in the casing with SS -904L Plate of thickness : 10 mm
- New Knife edge gate valve (Size : 42" NB) was provided in the Vacuum Cooler Circulation Pump (P-112) & New Knife edge gate valve (Size : 48" NB) was Installed in the Vacuum Cooler Circulation Pump (P-111)
- Suction spool piece & reducer were repaired.
- New rubber expansion bellows were provided in the suction & discharge line.
- Pumps were handed over to operation after replacing the damaged pump components as cited above.

Overhauling of Knife edge gate valve of Vacuum Cooler Circulation Pump:

Each Vacuum Cooler circulation pump is provided with a knife edge gate valve, installed in the reactor outlet for isolation purposes.

- Seat, MOC : EPDM, of the Valve (Size : 42" NB) installed in P-110 Pump location & P-113 Pump location found damaged towards reactor outlet . Thus, complete seat & liner assembly were replaced with new one.
- New Knife edge gate valve of size: 48" NB was installed in P-111 Pump circuit.
- New Knife edge gate valve of size: 42" NB was installed in P-112 Pump circuit

MIXING TEE REPLACEMENT:

Mixing Tee Tag No. : 20-37. 410

- All Mixing Tee (total: 04nos.) were taken out for Inspection & found damaged in the sulphuric acid inlet pipe (inner pipe) and complete mixing tee assembly (Four Nos.) were replaced with new one.

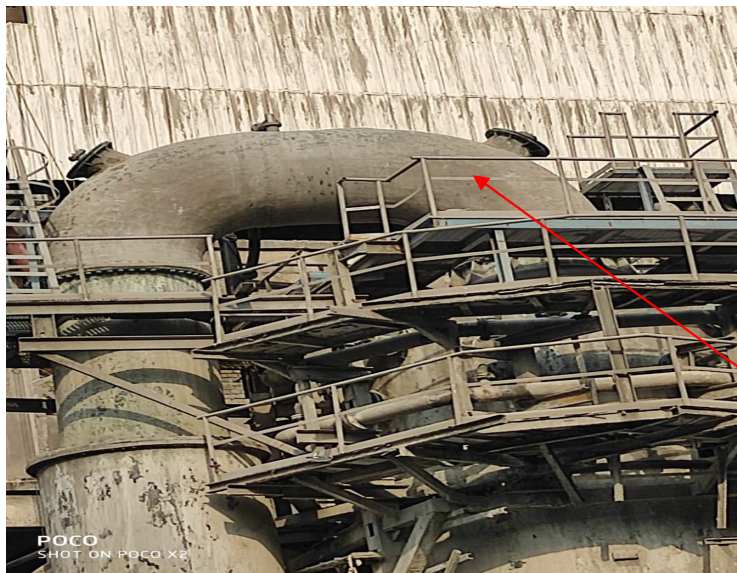


'U' duct removal & Pre-scrubber nozzle cleaning:

- The 'U' Duct was removed from its position.
- The duct was cleaned by water washing on the ground & boxed up at its position.
- Necessary scaffolding was made in the pre-scrubber.
- All nozzles were dismantled, cleaned & fitted.



U- DUCT DISMANTLED FOR CLEANING PURPOSES.



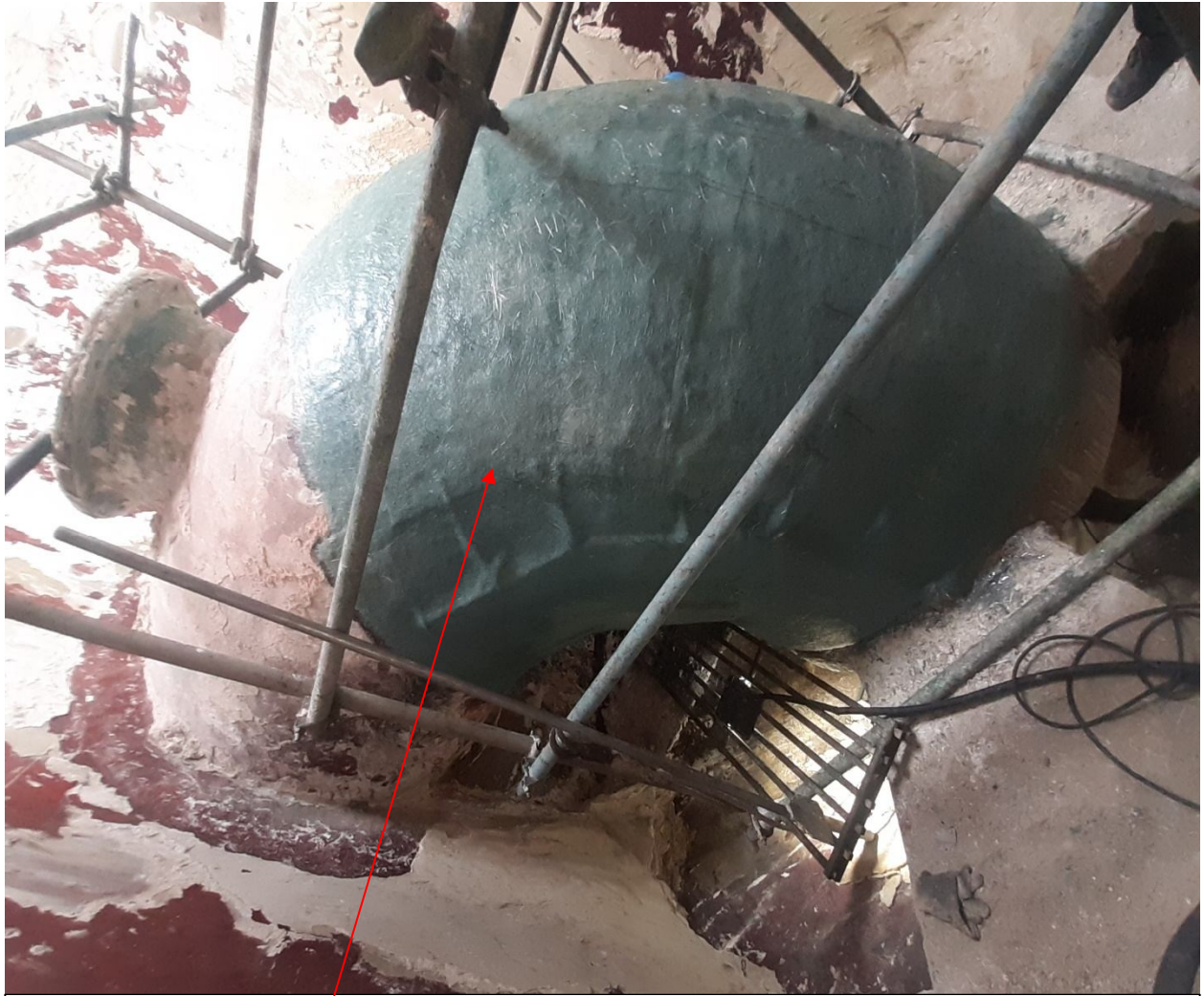
'U- DUCT' BOXED -UP AFTER CLEANING

MISCELLANEOUS JOB LIST CARRIED OUT IN REACTOR SECTION DURING ATR-20:

- 110, 111, 112, and 113 all the vacuum cooler inlet and outlet T pieces opened, cleaned & boxed-up.
- 110,111,112 and 113 vacuum cooler seal legs were dismantled and it was observed that the wall thickness has been altered (eroded / corroded) considerably, which may affect the pipes ability to meet relevant operation requirement. Thus, all the four vacuum cooler seal legs were replaced with new / fabricated seal legs.
- Fumes duct manhole and manholes of fumes scrubbing system opened for inspection & cleaning purposes and the damaged portion of the ducts were repaired with **Vinyl ester resin**, which has a greater strength and mechanical properties.
- Damaged portion of the pre-scrubber inside duct was also repaired with **Vinyl ester resin**.
- Provision is made by putting a damper on the fumes duct line for isolation purposes, so that maintenance jobs in the duct can be taken during shut down.
- Scaffolding made inside reactor for cleaning purposes.
- All the thermo-wells were opened & boxed-up as per instrumentation requirement.
- Hydraulic power pack filters cleaned and boxed up.



PROVISION OF DAMPER / ISOLATOR IN THE FUMES DUCT



PRE-SCRUBBER INSIDE DUCT REPAIR WITH FRP VINYL ESTER RESIN MATERIAL



NEW FABRICATED SEAL LEGS PROVIDED IN ALL FOUR VACUUM COLLAR OF SIZE: 1200 mm dia. X 3 mtr. Lg. (each.) X 10 mm Thk. MOC: SS 904L.

RPSS & BALL MILL SECTION

Conveyor Tag No. : 20-29.104

- The damaged conveyor belt of length: 475 mtr. & width: 1200 mm was replaced with new belt followed by shifting, positioning & jointing with hot vulcanization process.
- Defective idlers in Conveyor 104 replaced with New HPPE Idlers.
- Pulley lagging of Drive Pulley and Snub pulley found damaged and new lagging was carried out to improve the drive performance and to get extended life from the pulley.
- Other pulleys i.e. bend pulley, take up pulley & tail pulley were checked & made free / greasing done for smooth pulling of belt.
- Gear Box was replaced as observed abnormal sound from the existing gear box unit.
- Hydraulic oil of fluid coupling was replaced & greasing in gear coupling was done.
- One Electro-magnet was installed in drive end of conveyor to remove the foreign tramp metals from bulk material on the belt conveyor. The magnet shall adheres ferrous contaminants to the belt and it will restrict to passes in to the Ball Mill, MST Pumps etc., which damage shell liner & lifter bar assembly & also damage to the pump.
- Discharge chute of conveyor (104-A) was found damaged / corroded and replaced with a new fabricated chute.





NEW ELECTRO-MAGNET PROVIDED IN THE DRIVE END OF THE CONVEYOR TO REMOVE FOREIGN METALLIC PARTICLES



NEW FABRICATED DISCHARGE CHUTE PROVIDED IN CONVEYOR (104-A)

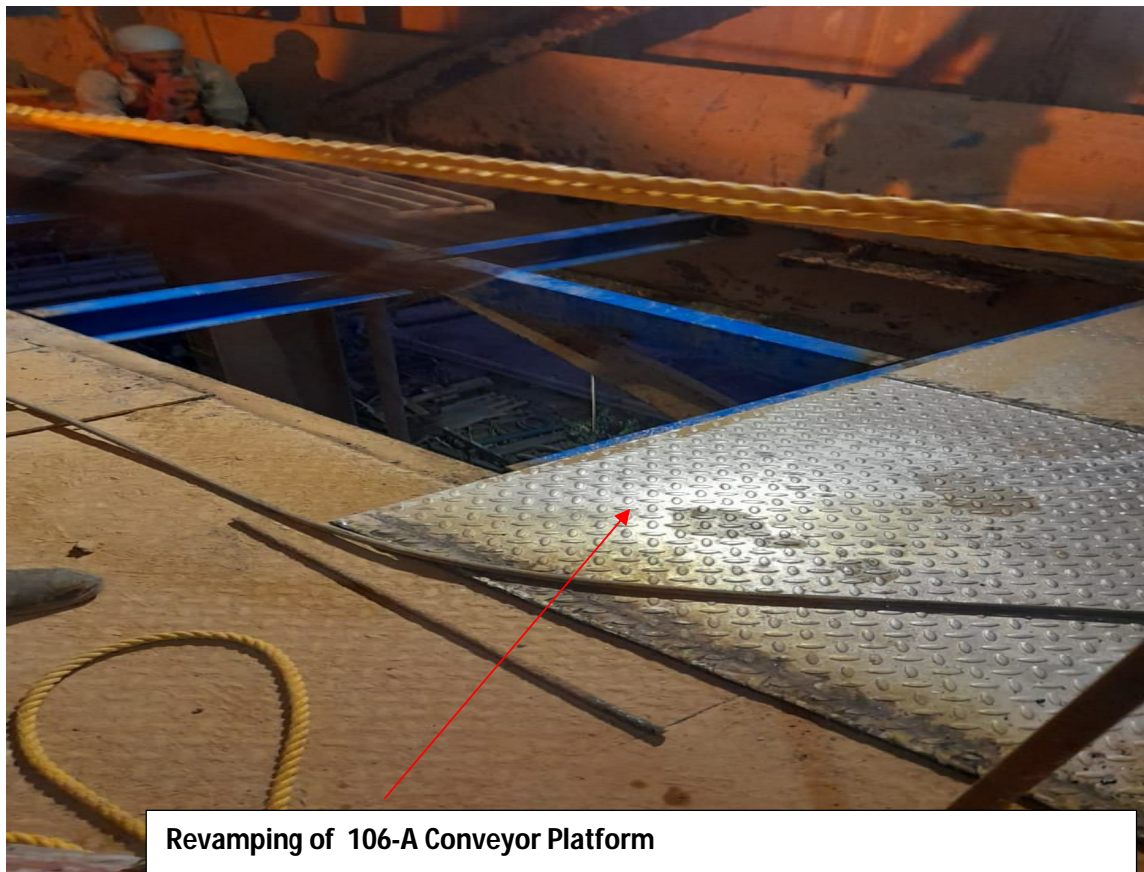
Conveyor Tag No. : 20-29.105

- Drive side & non drive side i.e. snub pulley, bend pulley, take up pulley & tail pulley were checked & made free / greasing done for smooth pulling of the belt.
- Damaged skirt rubber (appx. 10 mtr.) replaced.
- Gear Box oil replaced & greasing in gear coupling was carried out.
- New purlin was provided at the head end of the conveyor shed for sheeting purposes .



Conveyor Tag No. : 20-29.106 'A'

- The damaged conveyor belt of length: 32 mtr. & width: 1200 mm was replaced with new belt followed by shifting, positioning & jointing by hot vulcanization process.
- All carrying, Impact & return idlers were checked & made free for smooth pulling of the belt.
- Defective / Faulty Idlers were replaced.
- Damaged skirt rubber (appx.12 mtr.) Replaced and damaged skirt plate repaired.
- Gear Box oil replaced.
- Drive side & non drive side i.e. snub pulley, bend pulley, take up pulley & tail pulley were checked & made free / greasing done for smooth pulling of the belt.
- Damaged chequered plate with supporting structures of conveyor platform were revamped with new supporting structures, fixing with new chequered plate.



Revamping of 106-A Conveyor Platform

Conveyor Tag No. : 20-29.106 'B'

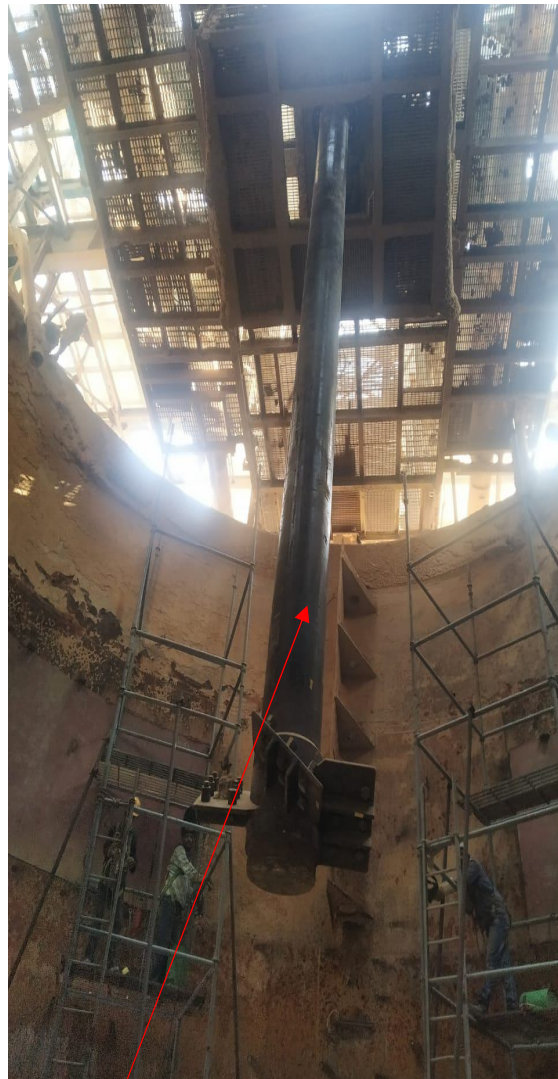
- The damaged conveyor belt of length: 48 mtr. & width: 1200 mm was replaced with new belt followed by shifting, positioning & jointing by hot vulcanization process.
- All carrying, Impact & return idlers were checked & made free for smooth pulling of the belt.
- Defective / Faulty Idlers were replaced.
- Damaged skirt rubber (appx.12 mtr.) Replaced
- Gear Box oil replaced.
- Drive side & non drive side i.e. snub pulley, bend pulley, take up pulley & tail pulley were checked & made free / greasing done for smooth pulling of the belt.

SST AGITATOR SHAFT & BLADE ASSEMBLY REPLACEMENT:**SST AGITATOR TAG NO. : 20-05.30**

- Manhole opened for inspection.
- Necessary scaffolding made for replacement of damaged agitator blade.
- Old / damaged agitator shaft and blades were removed.
- New agitator shaft with blade assembly was installed.



OLD / WORN OUT AGITATOR ASSEMBLY



NEW AGITATOR ASSY. INSTALLED.

SLURRY SURGE TANK TAG NO. : 20-09.30

Existing System, Constraints & Job carried out to overcome the issues:

Slurry Surge Tank (SST), MOC: Carbon Steel, Shell Thk.: 12 mm is equipped with an agitator assembly. It is dealing with erosive solids so erosion effects on the shell of the tank & mixer's wetted part are considerably high, as the media is rock phosphate slurry i.e. 30% Wt of water + 70% Wt of Rock Phosphate. Thus, due to high wear & erosion effects, the thickness of the shell comes down drastically . We have measured the shell thickness in the subject slurry surge tank and thinned-out portions were strengthened with HARDOX 400 (Wear Plate) to overcome the problems of erosion

issues & to enhance performance . Damaged baffle plates & ribs were replaced / strengthened.



BALL MILL TAG NO: 20-27.010 A/B/C/D

MISCELLANEOUS SHUT DOWN MAINTENANCE JOBS

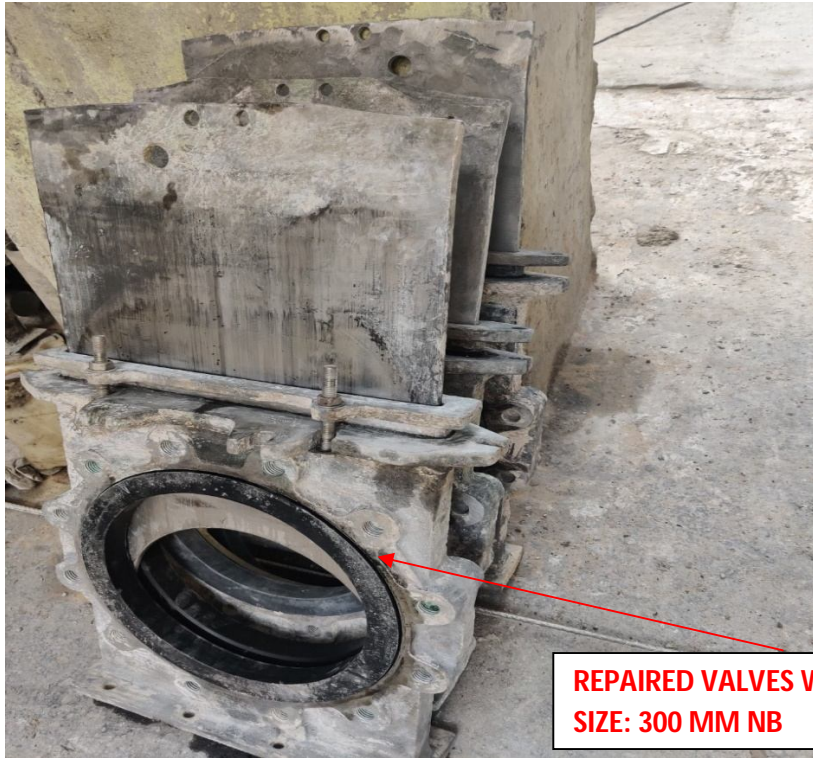
- Maintenance in main trunion bearing (Inlet & out let) , geared coupling, main gear box, MST Agitator gear box, screen Feed Pump, Reactor Feed Pump, weigh feeder gear box, weigh feeder & fluid coupling were carried out followed by greasing, oil replacement, all base bolt tightening, MST blade repairing, defective idler replacement works and defective components replacement
- All Ball Mill manholes were opened for ball segregation.
- Repairing of feed spout, packing, distance piece & hoppers was carried out.

- Trommel Screen of Ball Mill – “C” was repaired.
- Screen hoppers of Ball Mill – “B” & Ball Mill – “D” were repaired & Damaged product hopper of Ball Mill – “A” was repaired.
- Oil leakage from trunion bearing of Ball Mill (A, B & C) arrested.

FILTRATION SECTION

OVERHAULING OF KNIFE EDGE GATE VALVES IN FILTER FEED PUMPS SUCTION LINE AND GYPSUM PUMP SUCTION & HEADER VALVES

- All Suction line knife edge gate valves of Filter feed Pumps were overhauled.
- Inspection was carried out on each part of the valves.
- Damaged sheet & Liners were replaced.
- Eight (08) nos. suction nozzles out of Twelve (12) were completely revamped by removing the worn-out sleeve with new fabricated SS-904L sleeve and the sleeve flange attached with tank nozzle was also upgraded to SS-904L
- Remaining four (04) nos. Suction nozzles were cleaned & necessary repair carried out in the damaged portion of the nozzles and boxed – up.
- Two (02) nos. of suction valve (12” NB) of Filter feed pump (P-134 & P-135) was replaced with new one, as the gate of the subject valves were observed thinned out considerably and also hard to operate during plant operation.
- Two nos. of Gypsum Pump discharge header valve (24” NB) was replaced with new one, as it was observed hard to operate during plant operation.
- Remaining valves of Gypsum Pump discharge line (24” NB) were repaired by replacing seat & liner assembly.



**REPAIRED VALVES WITH NEW SEAT & LINER ASSEMBLY,
SIZE: 300 MM NB**

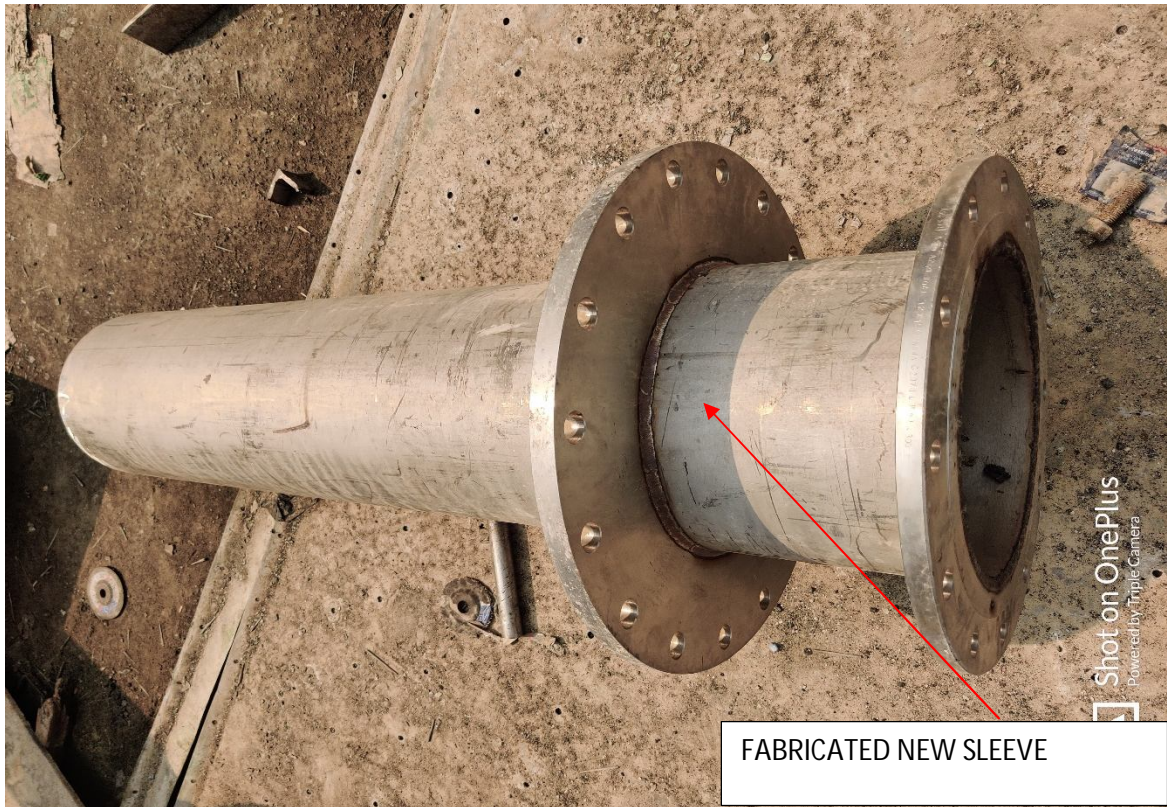


**REPAIRED VALVES WITH NEW SEAT & LINER
ASSEMBLY, SIZE: 600 MM NB**

**REACTOR FILTER FEED COMPARTMENT / TANK NOZZLE SLEEVE
REPLACEMENT JOB:**

There are total 12 nos. of nozzles exists in Filter feed compartment in Reactor and Filter Feed Pumps are connected thru. These nozzles and discharges to Belt Filter. It is observed that the sleeve inserted in-to the nozzles are completely corroded and worn-out and there is a chance of leakage thru. These nozzle. Further, the nozzle flange (MOC: MS) also found corroded. The subject job was very challenging and critical in nature, as the nozzles are connected to Reactor. The subject job was carried out successfully by removing the worn-out sleeve with new fabricated SS-904L sleeve and the sleeve flange attached with tank nozzle was also upgraded to SS-904L.







NEW SLEEVE FITTED

REVAMPING OF GUPSUM SLURRY PUMP:

Gypsum Slurry Pump: Tag No. : 20.01.292

It is observed that the flow rate in the subject pump (P-292) is too low due to worn-out pump internals / components and the base of fluid coupling and Motor was damaged / corroded, causes vibration in the system. Further, the temperature of the fluid coupling hydraulic oil was very high during operation and the performance of the heat exchanger of Fluid Coupling & Gear Box was also not satisfactory, due to less heat transfer rate. Thus, the complete system was revamped as per the following activities and completed successfully.

- 1) Complete New Pump with new Pump base was installed by replacing the existing (old) Pump.
- 2) Motor and Fluid Coupling base was repaired / revamped.
- 3) New Fluid Coupling was installed by replacing old one.
- 4) Heat Exchanger of both gear box & Fluid Coupling were replaced.
- 5) Complete system alignment was done i.e from Pump to Gear box, Gear box to Fluid Coupling and Fluid Coupling to Motor .

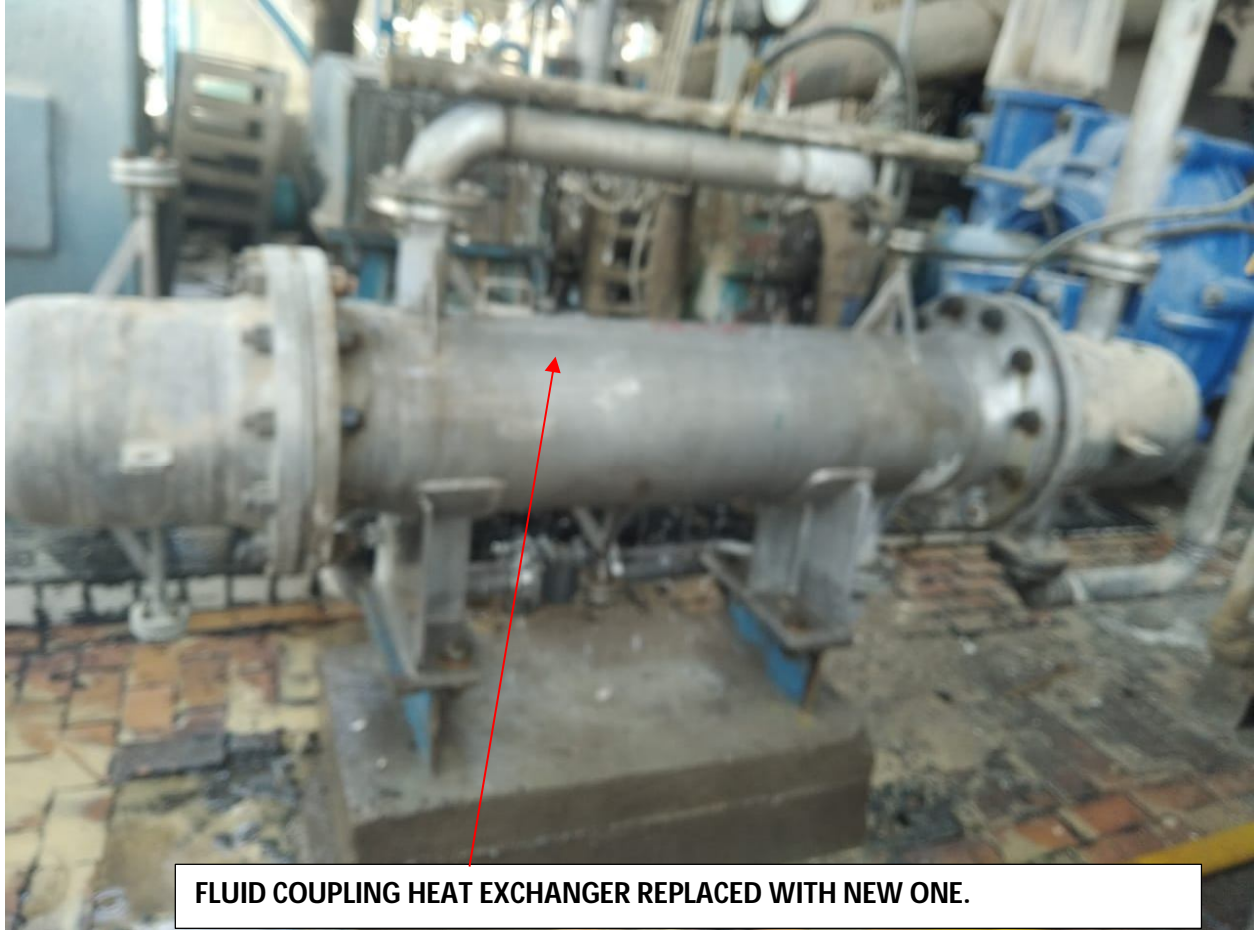


REPLACEMENT OF GYPSUM SLURRY PUMP (P-293) GEAR BOX HEAT EXCHANGER:



GEAR BOX HEAT EXCHANGER REPLACED WITH NEW ONE.

REPLACEMENT OF GYPSUM SLURRY PUMP (P-292) FLUID COUPLING HEAT EXCHANGER:



Gypsum Slurry Pump: Tag No. : 20.01.293

It is observed that the flow rate in the subject pump (P-293) is too low due to worn-out pump internals / components (observed crack from volute liner) and the base of fluid coupling and Motor was damaged / corroded, causes vibration in the system. Further, the temperature of the fluid coupling hydraulic oil was very high during operation and the performance of the fluid coupling was found not satisfactory. Thus, the complete system was revamped as per the following activities and completed successfully.

- 1) Complete New Pump with new Pump base was installed by replacing the existing (old) Pump.
- 2) Motor and Fluid Coupling base was repaired / revamped.
- 3) New Fluid Coupling was installed by replacing old one.
- 4) Lubrication system were overhauled.
- 5) Complete system alignment was done i.e. from Pump to Gear box, Gear box to Fluid Coupling and Fluid Coupling to Motor .



NEW PUMP INSTALLED IN (P-293) GYPSUM SLURRY PUMP.

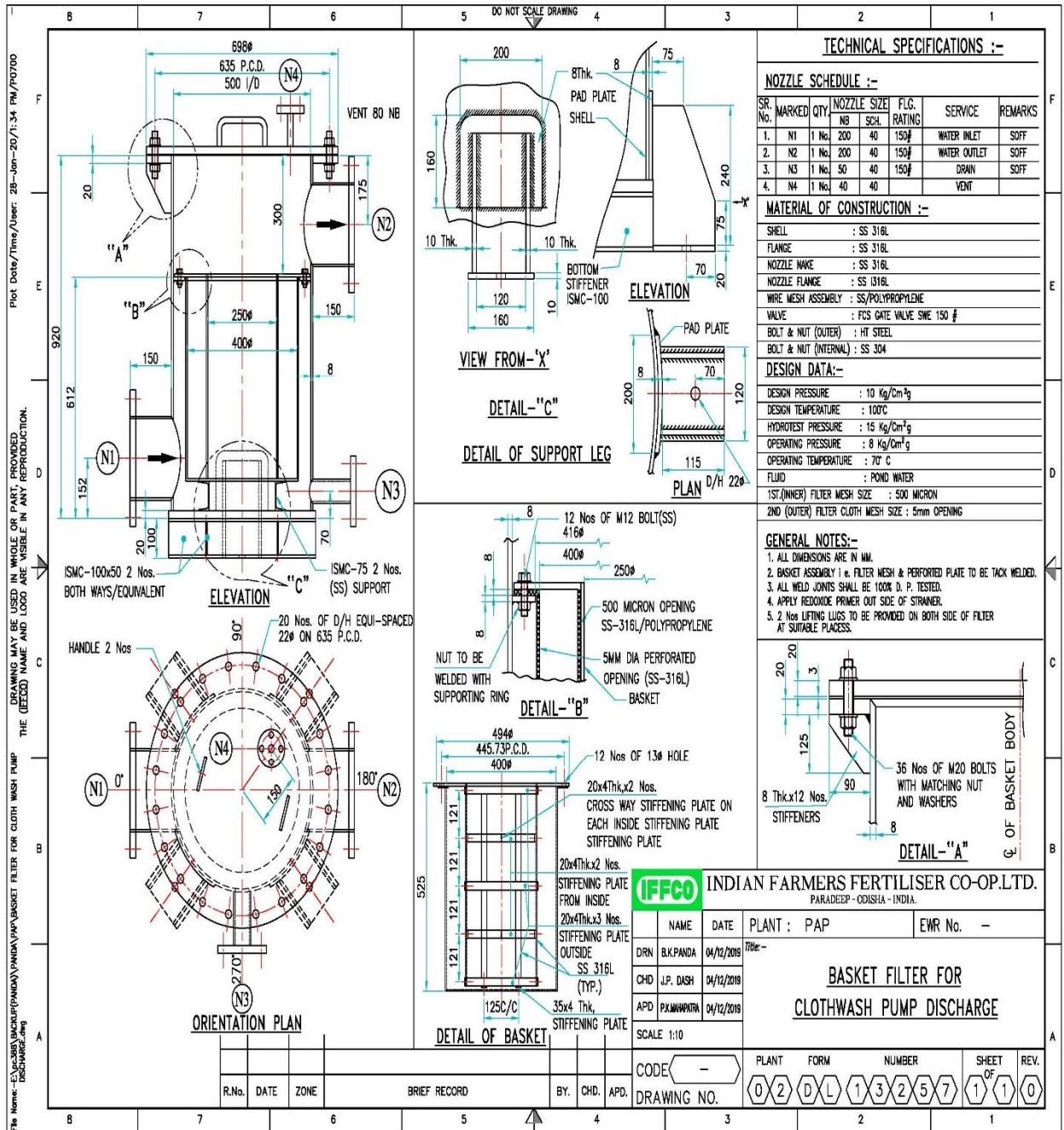
INSTALLATION OF NEW BASKET FILTER IN CLOTH WASH PUMP DISCHARGE LINE TO AVOID CHOCKING OF CLOTH WASH SPRAY NOZZLE AT BELT FILTER :

Existing System: Water from cloth wash tank is pumped to individual filter cloth for cloth washing. The arrangement for water spraying on the cloths is through three nos. (Two for cloth washing and one for pulley washing) perforated pipes of 2" NB size. There are no nozzles on the cloth wash header as solid content in pond water, which is being used for cloth wash, may block the nozzle opening and with the present arrangement cloth washing is not effective.

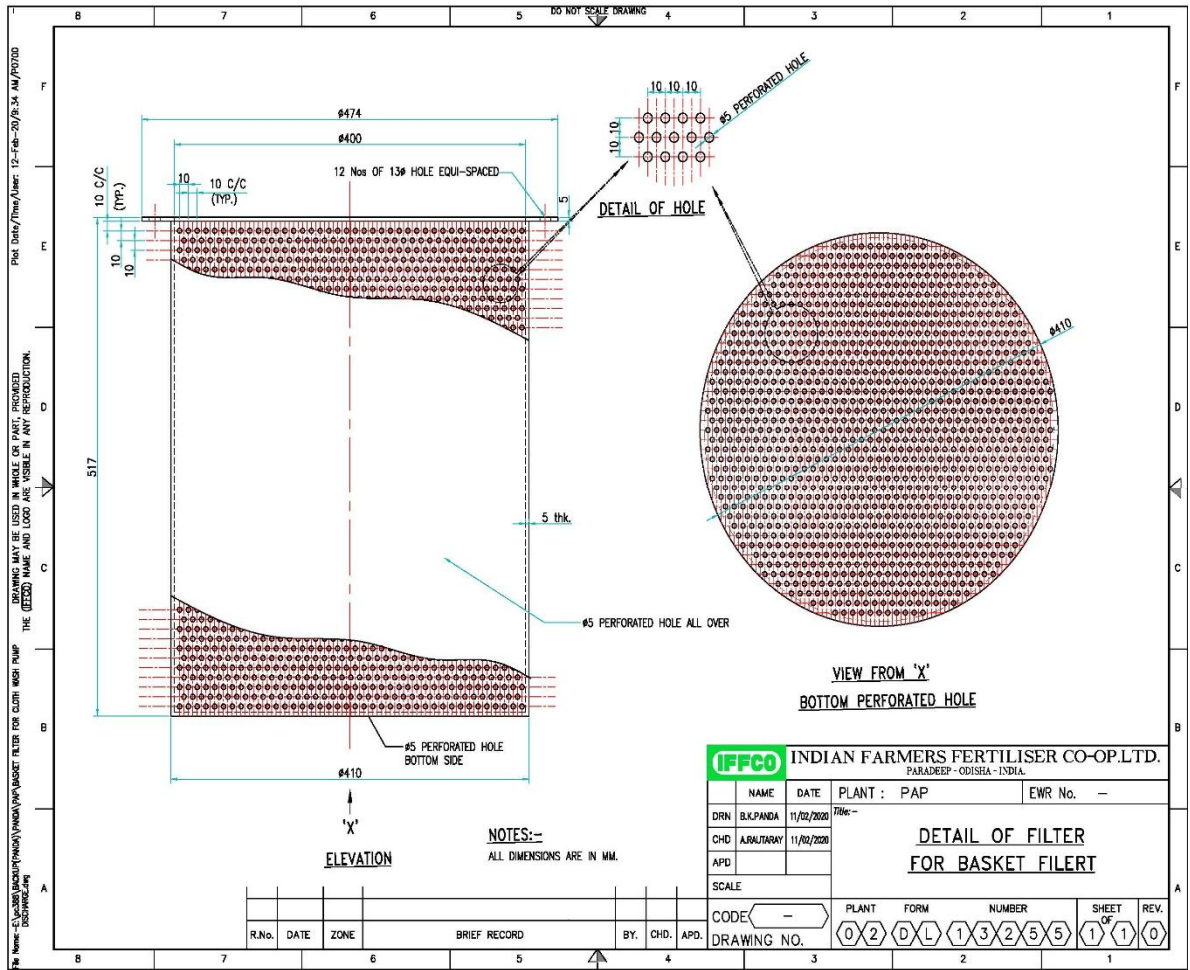
There are three pumps installed for cloth wash service. Two Pumps of capacity of 227.1 m³/Hr. at 2.72 kg / cm² discharge pressure and one pump of 550 m³/Hr. at 7.50 kg / cm² discharge pressure are installed for the service. Normally, at a time one higher capacity pump or both lower capacity pumps are operated.

Modification Carried Out: Two nos. of basket filter were installed at the discharge of the cloth wash pump .Each basket Filter has two stage filtration : one course filtration of 5 mm SS-316L wire mesh and the second stage of fine filtration of 500 micron PP Filter cloth . This will help in removing solid content from the water going to cloth wash and filter cloth can be effectively washed with arrangement of spray nozzles

BASKET FILTER DETAILS FOR CLOTH WASH PUMP DISCHARGE :



FILTER DETAILS FOR BASKET FILTER:



IFFCO		INDIAN FARMERS FERTILISER CO-OP.LTD. <small>PARADEEP - ODISHA - INDIA.</small>	
NAME	DATE	PLANT : PAP	EWR No. -
DRN. B.K.PANDA	11/02/2020	Title:-	
CHD. ARJUNARAY	11/02/2020	DETAIL OF FILTER FOR BASKET FILTER	
APD			
SCALE			
CODE	PLANT	FORM	NUMBER
---	02	DL	13255
DRAWING NO.		SHEET OF	REV.
		11	0

BELT FILTER SECTION

REPLACEMENT OF FILTER E TAIL PULLEY:

- Continuous abnormal sound was observed from Tail Pulley of Belt Filter 'E'. Pulley was checked & inspected thoroughly. Cracks were observed near the shaft of the pulley. Thus, replacement of the subject pulley was carried out with a new Pulley as per following activities :
- Tail Pulley was adjusted to its maximum permissible limit to loose the belt.
- Mother belt was clamped at Tail Pulley/Head Pulley side.
- Made gap between mother belt and Pulley by inserting a pipe between them after making chain block arrangements.
- Made Pulley free with help of Chain Block arrangements
- Removed Floor and associated structure from gear box side to make space for pulley removal. Also removed necessary cloth return Rollers.
- Drive end & Non-drive end bearing of the pulleys along with Cartridge of Gear box side were removed.
- Removed pulley from position slowly with help of EOT Crane and chain block arrangements.
- Cleaned bearings and cartridges. Bearing & cartridges found OK & installed the same in new pulley.
- Checked and levelled the base before installation of new pulley.
- Installed new pulley with help of Chain block arrangements.
- Installed Floor and associated structure which was removed from gear box side to make space for pulley removal. Also installed necessary cloth return Rollers.
- Belt tension was adjusted as it was set before pulley removal.



Installation of Belt Filter E Tail Pulley under Progress

REPLACEMENT OF COMPLETE AIR BOX TOP COVER OF FILTER 'D'

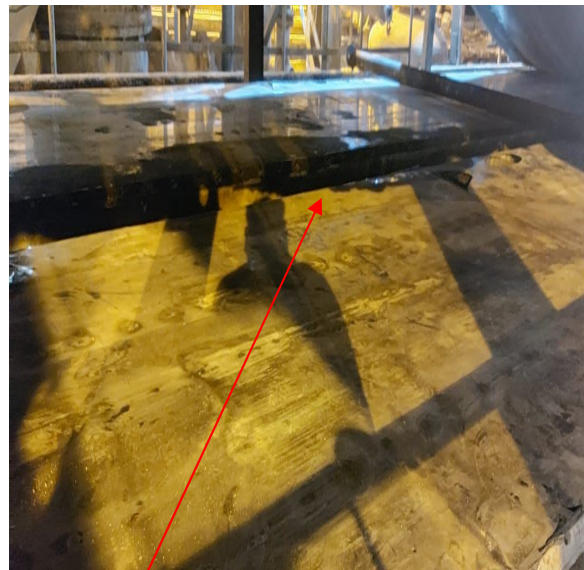
While checking the Vacuum Box of Belt Filter D, it was observed that some peeled-off rubber was there at some sections of the box. The belt was checked thoroughly and found that some sharp edged has been developed at the corners of Air Box Top Cover. It was decided that Air Box Top Cover shall be checked thoroughly & damaged portions will be replaced. As the damaged portions were replaced from tail pulley end side, it was found that Top Cover has been damaged throughout the length. Hence the complete air box top cover was replaced as per the following activities.

- The cloth rollers, feed dam rollers & bowed rollers were removed from the position.

- The structural members near tail pulley removed to adjust the tail pulley for loosening of the mother belt.
- All the wash stands & deck items removed from the belt.
- Arrangement were made to lift the mother belt segment wise. It was lifted up to suit to remove & replace the damaged Air box Top Cover segment wise. Accordingly chain block & other arrangements were made.
- Damaged top cover removed from the mother belt lifted up segments.
- Bottom Cover was cleaned as a lot of sludge deposition was there on Air Box bottom Cover.
- New Top Cover plates were installed.
- Bolt tightened & levelling of Top Cover with reference to Top Cover done.
- Air Box Plates levelled & aligned with reference to pulleys.
- The procedure was repeated till all the plates of top cover were replaced.
- All the deck items & distribution boxes were installed.
- The structural members near tail pulley installed.
- Tail Pulley adjusted to suit the belt tension for running.



Top Cover replacement job



Damaged Air Box Top Cover

Under Progress

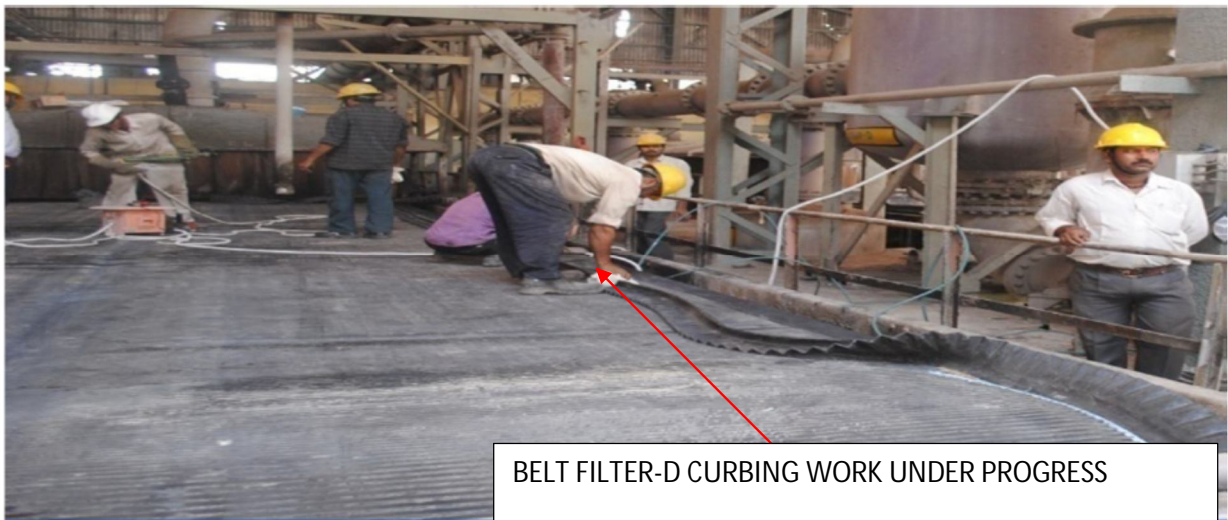
COMPLETE REPLACEMENT OF SEAL STRIP IN BELT FILTER - 'B & D'

- Lowered down the vacuum box.

- Wear belt removed.
- Removed of seal strip by opening of bolts.
- Cleaning the vacuum box and the place where seal strip stands.
- Fixing of buta seal on the vacuum box.
- Installation of new seal strip carried out followed by leveling, installation of wear belt & seal water connection.
- Took up the vacuum box into the position & the gap adjusted between the mother belt & wear belt.

COMPLETE REPLACEMENT OF CURBING IN BELT FILTER - 'D'

- Filter cloth was removed.
- Cake wash & 4th wash distribution box, flap dam stand were removed.
- Old curbing removed by cutting & surface preparation were made for fixing of new curbing.
- New curbing fixed by SC – 2000 adhesive.
- Cake wash & 4th wash distribution box, flap dam stand were installed in position
- Filter cloth was installed & cloth tracking done.



Replacement of Main Drive Motor of Filter A, B,C D, E & F

- All the main Drive Motors of Belt Filters were electrically inspected.
- Cable Connection was disconnected.

- Old Motors removed out from position, new motors installed and alignment done.



New Motor installation



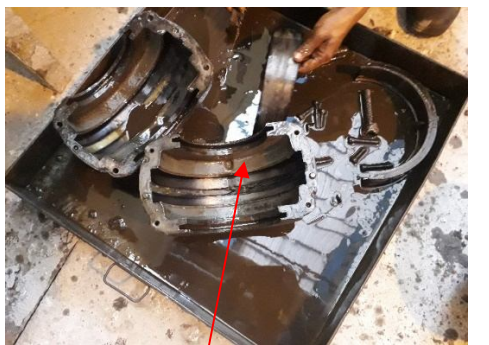
Old Removed out Motor

Replacement of Air Suspension Blower Drive Motor of Filter A, B, C, D, E & F.

- All the main Drive Motors of Belt Filters were electrically inspected.
- Cable Connection was disconnected.
- Old Motors removed out from position, new motors installed and alignment done.

Replacement of Damaged Bearings of Head and Tail Pulleys of Filters:

- Bearings of Head Pulley and Tail Pulley of Filters were inspected
- Bearings of Head Pulley of Belt Filter D (Both Drive side and non-drive side) were found damaged.
- Bearing of Non drive side of Belt Filter B Tail Pulley was also found damaged
- .Other Bearings were also checked & found OK.
- The pulleys were locked with Chain Block arrangement, damaged bearings were taken out, new bearings were installed, and tension of Belts readjusted.



Old Removed out bearing



New Bearing ready for installation

Overhauling Of Suspension Air Blowers:

- Bearings of All suspension blowers were inspected.
- Balancing of Rotor of Blower A, B, C, & D was carried out.
- The Rotor of all four fans were balanced.
- Bearings, base bolts, drive belts inspected and corrective measures were taken.
- Finally Blowers were assembled and taken into operation after NDT testing.



Air Suspension Blower after overhauling

Cleaning of Air Duct of Belt Suspension Blower:

- End dummy of Air Duct opened.
- Heavy sludge deposition observed in Air Ducts.
- Air Ducts cleaned and boxed up.



Chocked Air Duct



Air Duct after cleaning.

Replacement of Damaged Belt Return and Cloth Rollers in all seven filters:

- Belt Return Rollers and Cloth Rollers of all seven filters were inspected.
- It was observed that bearing portion of shaft in some rollers were worn out. Drum of Some Belt Return Rollers were also found corroded due to damaging of rubber lining.
- The damaged rollers were taken out and new rollers were installed.



Damaged taken out Rollers



New Rollers ready for installation

Replacement of damaged Feed Distribution Boxes

- Feed Distribution Boxes of all seven filters were checked.
- Distribution boxes of Filter F were found thinned out and some holes were also observed.
- Both Feed distribution boxes of Filter F were replaced with new distribution boxes.

MICELLANEOUS SHUT DOWN MAINTENANCE JOBS

The Jobs carried out during ATR-2021 are summarized as below:

- Replacement of Filter E Tail Pulley.
 - Replacement of Complete Air Box Top Cover of Filter D
 - Complete Replacement of Belt Filter D Curbs on both side.
 - Repairing/replacement of Grizzly screen of all Filters along with repairing of Gypsum Hopper
 - Repairing of damaged portions of 500 NB MSRL Vacuum duct of all filters
 - Damaged Motor Base Frame of Filter C & F repaired.
 - Removal of 300 NB filtrate manifold of all Filters & box up after cleaning.
 - Flocculent dosing line provided to individual filters. Flow meters installed. Damaged isolation valves to be replaced.
 - Replacement of Seal Strip of Belt Filter 'B & D' was carried out.
 - Replacement of badly corroded & damaged supports in Belt Filter G, F & D.
 - Replacement of partial Seal Strips in Belt Filter A, C, E & F.
 - Head Pulley Bearing of Belt Filter D (Both Drive side and Non Drive side) were replaced.
 - Replacement of passing seal water line isolation valve of Filter E.
 - Repairing/replacement of deflector plates/pipes of all filters
 - Removal of inspection dummies of all five vassals in all filters for inspection & box up after necessary inspection & cleaning.
 - Non Drive side of Belt Filter D Tail Pulley Bearing was replaced.
 - Tail Pulley Bearing of Filter A & C also inspected, found OK.
-
- Complete overhauling of Air Suspension Blowers of Filters, A, B, C, D & F was done. It includes balancing of Rotors, checking of bearings, boxing up and alignment along with foundation bolts tightening.
 - Damaged Portion of Fumes Duct was repaired by Super Vinyl Ester Resin.
 - All filter vacuum box lowered for inspection.
 - All Filtrate hoses, manifolds & Filter feed distribution Y Piece of Filter 'A' to 'F' opened, cleaned & boxed up.
 - All vapor lines, end blinds opened for inspection.
 - All filter condenser manholes opened for the inspection of packing.

- Cloth wash header & cloth wash pipes dismantled for cleaning purposes.
- Distribution Tray of Belt Filter – F was replaced along with supporting channel structure.
- Faulty Sluice water valves replaced.
- All head pulley & tail pulley bearing inspected & lubricated properly.
- Damaged Flap dam rubber of Filter A to G replaced.
- Damaged Lift lever bearings of vacuum box in filter A, B, C, D, E & F replaced.
- Vacuum Box of Filter ‘A’ to ‘F’ leveling & alignment done.
- Repairing of damaged Vacuum box sections of all filters.
- First piece of Vacuum Box of of Filter ‘A’ to ‘G’ opened. Along with it, seal water partition piece of the Vacuum Box also opened for checking Gasket. Damaged gasket repaired and Vacuum Box boxed up after water cleaning.
- ‘D & F’ – Filter sluice header line valve replaced with new one.
- ‘G’ – Filter pond water line header valve replaced.
- Damaged bearing of Belt Return Roller & Cloth return roller in All Seven Filters were replaced.
- Damaged Flap dam rubber of Filter A to F replaced.
- All head pulley & tail pulley bearing inspected & lubricated properly.
- Main drive Motor of Filter A, B, C, D, E & F were replaced.
- Air Blower drive Motor of Filters A, B, C, D, E & F were replaced.
- Air duct of all seven filters were opened, cleaned and boxed up. Heavy gypsum deposition was observed in the ducts.
- Patch Plates were provided in Gypsum Hopper of Belt Filter A, B, C, D, E & F.
- All hoses like cloudy, product, return, 3rd wash & 4th wash in B/F – A, B, C, D, E, F were removed for cleaning & boxed up.
- Greasing of Belt Return Rollers and Cloth Rollers of All seven filters was done. Damaged Grease Nipples were replaced.
- Wear Belts of Belt Filter B, F, & D were replaced.
- Acid Trap Vassal of Belt Filter F, D & C was repaired with patch work.

EVAPORATION SECTION

OVERHAULING OF EVAPORATOR CIRCULATION PUMP:

All circulation pumps except in evaporator A were overhauled.

Eva B: Bearing housing, shaft, sleeve, casing wear ring replaced. Discharge pipe welding repair done. Impeller clearance found within limit, hence same impeller used.

Eva C: Bearing housing, shaft, sleeve, casing wear ring replaced. Reducer flange of discharge pipe replaced. Welding repair done in discharge pipe. Impeller clearance found within limit, hence same impeller used.

Eva D: Impeller and casing wear ring replaced. Suction bellow replaced.

Eva E: Bearing housing, sleeve, casing wear ring, impeller replaced. Casing repair work done. Reducer flange of discharge pipe replaced.

Eva F: Old casing was having leakage. Hence casing was replaced with casing removed from Eva A. Casing wear ring, impeller replaced. Base frame repair work done.

Eva G: Rotor assembly removed. Checked for shaft run out and bearing clearance, found Ok.

Eva H: Shaft, sleeve, casing wear ring replaced. Impeller clearance found within limit, hence same impeller used. Seal water line modified.

Motor of Evaporator B, C, F and H were sent for overhauling and installed after overhauling.



WORN OUT IMPELLER REMOVED FROM EVAPORATOR CIRCULATION PUMP –D



Clearance between impeller vanes and casing wear ring was high (6 to 10 mm).

WORN-OUT IMPELLER



New impeller fitted with less clearance (2.5 to 4.5 mm), resulted to increase in Flow & thereby increasing velocity in heat exchanger tubes which will reduce chocking of tubes & improve heat transfer, resulted to enhance overall performance of evaporator circuit.

NEW IMPELLER FITTED

MAINTENANCE OF GRAPHITE HEAT EXCHANGER:

In heat exchanger A to F, Shell to top tube sheet flange joint used to have heavy leakage during hydro test in case of tube failure checking/after tube cleaning. Scaffolding was erected along the periphery to check the joint, some bolts were found loose. All bolts were cleaned properly and then tightened. All heat exchanger tube cleaning done and Hydro tested @ 3.5 kg/cm² and no leakage observed from the above said joint . Leaked tubes were plugged and plugs of already plugged tubes were examined for defect. Re- hydro test was done after tube plugging.



MAINTENANCE OF LP STEAM HEADER AND BRANCHES IN EVAPORATION SECTION:

Steam Isolation valves replaced in evaporator C and F. Isolation valves of D and E were overhauled and re-installed. Steam control valve replaced in evaporator C, E, F and H. Steam traps of branch lines replaced with IBT type steam trap. In steam main header, new traps installed in 5 places and one trap replaced. Isolation valves provided in flow meter impulse lines.

The steam header thickness was checked near steam trap installation. **Observed thickness ranged from 4.42 to 7.93 mm on bottom half of the pipe.**

CONDENSATE HEADER / BRANCHES REVAMPING WORK:

Old Condensate header and branch lines were of CS MOC. Leakages were observed during operation. Hence the header and branch lines up to control station were replaced with SS 316L piping.

INSTRUMENT AIRLINE REPLACEMENT ON ROOF TOP OF EVAPORATION AREA:

Existing instrument airline was of CS MOC and corroded at several location. This was also laid outside hand rail on top of evaporator which made the maintenance very difficult. Hence a new SS 304 header was laid inside the hand rail.

REVAMPING OF ACID DRAINING SYSTEM OF FLASH CHAMBER – CIRCULATOR-HEAT EXCHANGER CIRCUIT IN EVAPORATION:

Drain connection in discharge line of evaporator circulation pump was in a zigzag manner. This made it very difficult for maintenance in case of a leakage. Hence the drain connections were suitably modified in evaporator B, C, D, and E. The drain header was dismantled and checked for defect. Thickness check was done at several point and found OK. Base frame of drain pumps (P-390 and P-391) was revamped.

EVAPORATION AREA SUMP REVAMPING WORK:

Evaporator area sump pump base was damaged. Pump was also not providing enough head. Hence a new pump with new priming tank was installed. Platform above sump was also in damaged condition. A new platform was fabricated and erected. Evaporator bottom was found damaged under the agitator. Hence a 16 mm thk 904L plate was placed on the brick lined bottom of the sump.

EVAPORATOR 'E' BAROMETRIC CONDENSER SEAL TANK ROOF REPAIR WORK:

Barometric condenser seal tank roof of Evaporator E was damaged at certain places. Roof plate was changed in damaged area and rubber lining done.

EVAPORATOR 'B' BAROMETRIC CONDENSER SEAL TANK OUTLET PIPE INSTALLTION WORK:

Hot well channel was opened for inspection. It was found that barometric condenser outlet pipe of evaporator B was partially damaged. Existing pipe was of CS MOC rubber lined on both inside and outside. A new pipe of SS 316 MOC was installed. Pipe dia: 1050 mm NB.

**AFBC
BOILER
SHUTDOWN
REPORT
ATR - 2021**

Duration of ATR-21 in AFBC Boiler

<u>Boiler</u>	<u>Stoppage</u>	<u>Start-up</u>
OR/805	17.03.2021	06.04.2021
OR/806	13.03.2021(already was in stop condition)	03.04.20201

Boiler(OR-805) IBR certification

Problem:

Annual open IBR inspection was due in the month of June-21 but it was decided to carry out open IBR inspection during ATR-21 for further renewal of next one year.

Following activities carried out during Annual IBR certification of Boiler OR-805

1	Boiler OR-805 shutdown activities started from 18.03.2021(boiler-1 was in stopped condition since 10.03.21)
2	Insulation removal of Economiser duct, steam drum & mud drum ,IBSH header ,Furnace panel
3	Manhole opening (penthouse, primary sup.htr. convection bank, economiser, wind box duct, FD discharge duct, steam drum, Mud drum),Economiser shielding removal & buffing and fit-up after inspection.
4	Steam drum Internal removal/inspection/fit-up & box-up.
5	Scaffolding (cup lock) preparation in Boiler furnace, Prim.super.htr. & convection bank Area and pr.parts cleaning i.e. water panel, inbed coil, economiser, pri.sup.htr, convection, risers, etc.
6	Thickness measurement
7	Overhauling of valves (MSSV,NRV,Feed isolation ,safety valves etc) of both AFBC
8	Replacement of one MSSV and one NRV in boiler-2
	Replacement of 6 nos of inbed coil(3,6-inner,outer RHS and 10-inner,outer LHS)
9	Furnace bed material draining,nozzle pinning,,Refractory work
10	Refractory work in wall & bed coil along with Bed material charging in boiler furnace for fluidisation.
11	Hydrotest of Boiler-2(OR-805) in presence of IBR authority



FIXING OF CUPLOCK TYPE SCAFFOLDING IN BOILER FURNACE FOR CLEANING & INSPECTION.



Thickness measurement carried out at various pr.parts in boiler

.Thickness measurement of various pr. Parts as follows

- Panel tubes
- Evaporator coil
- Economiser coil
- IBSH coil
- Primary sup.htr coil
- Convection bank

Thickness job was carried out by Inspection dept.



FURNACE JOB

Agency: M/s Jyoti Enterprises & M/s Western Corrosion

Order No-252004191049, 2520041900365

- 1. Furnace bed material cleaning cleaning/nozzle pinning & charging**
- 2. Application of phoscast-90 XR refractory in evaporator coil in furnace.**



- 3. Bubble caps pinning, bed material charging in furnace.**
- 4. Refractory work in furnace**

Furnace Pr. Parts cleaning was carried out by M/S Unique Ent.

Scaffolding prepared by M/S Unique constructions by same above order

Bubble caps pinning & bed material charging was carried out by M/S Jyoti Ent.(252004191049)

Refractory applied in boiler-2 furnace at damaged portion in furnace wall. Refractory job was carried out by M/S Western Corrosion controller (WP No.-252004200365).

Inspection of Boiler # 1 & 2 Pent House, Air Pre Heater, Primary Super Heater & Convection bank area :-

Observations:-

1. Ash leakage observed in Boiler # 1 & 2 Convection area(Goose neck) same has been arrested
2. Ash deposit found in Boiler # 1& 2 Convection bank tube area, cleaning done
3. Ash deposit & leakages found in Boiler # 1 & 2 pent house area, arrested by application of Kaowool mastic & refractory application

Replacement of one MSSV & NRV in Boiler OR-805

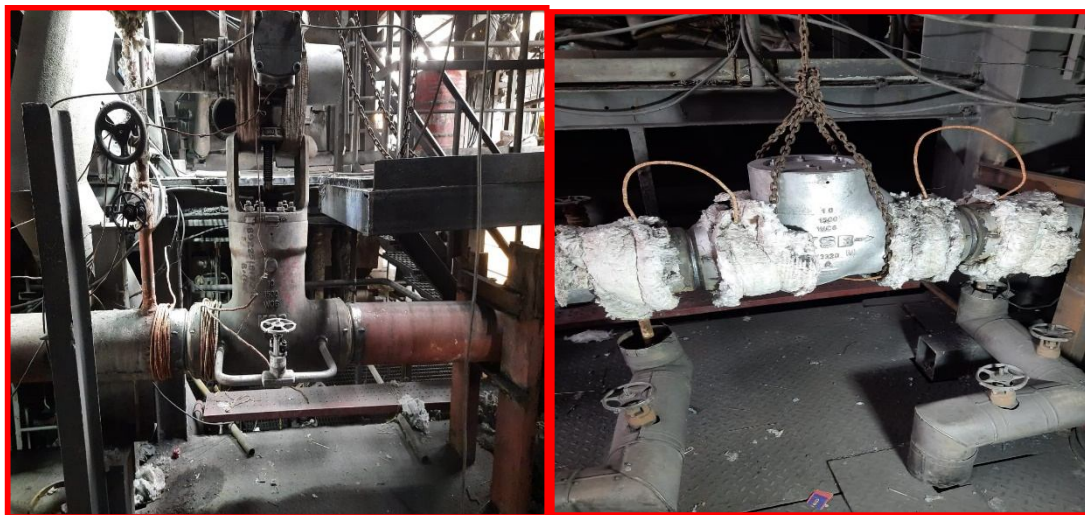
Problem: Old valves (MSSV & NRV) are 10", 900# and observed passing from another boiler during normal boiler shutdown and at the time of boiler hydrotest

Activity: these old valves got replaced by new one as per instruction of ADFB & according to IBR procedure.

Agency: M/s Unique Constructions

Order No-252004190264

One MSSV & NRV replaced in boiler OR-805 & 806



Replacement of 6 nos of inbed coil in boiler OR-805

Problem: Thickness was observed low (more than 30% of metal reduction) in coil no.-10(LHS) & 3,6(RHS). Inform to ADFB and repair order prepared.

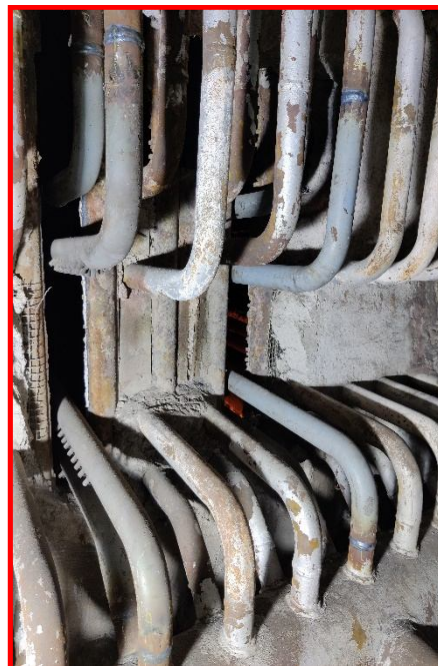
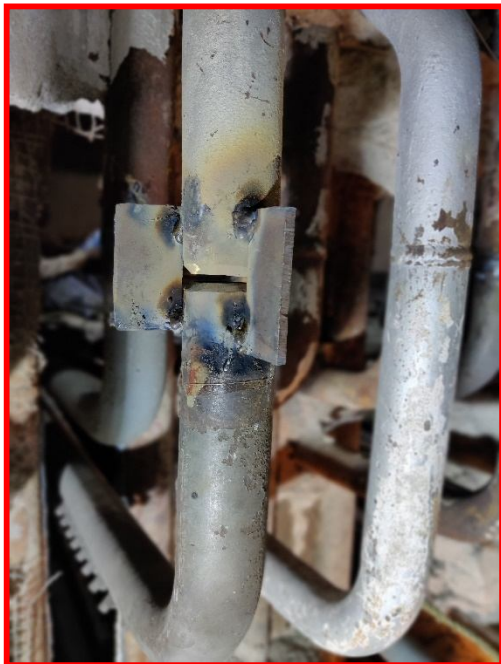
Activity: Above affected coil replaced by new one as per IBR procedure

Agency: M/s Unique Constructions

Order No-252004190264

Outer & inner coil of 3,6 nos of RHS

Outer & inner coil of 10 no of LHS



Replacement of 5 nos of Primary Superheater coil in boiler OR-805

Problem: Thickness was observed low (more than 30% of metal reduction) in coil no.-14,23,24,32,44 Inform to ADFB .

Activity: Above affected coil replaced by new one

Agency: M/s Unique Constructions

Order No-252004190264

Overhauling of Pr. Part Valves & NRV (B # OR/805 & OR/806).

The various high pressure valves and safety valves overhauling and maintenance are carried out during ATR-21. The job was carried out by M/S-EFCO. The details are described as follows with some photographs.

Problem: Routine annual Overhauling of high pressure valve & SV for plant healthiness for interruptible boiler operation throughout the year.

Activities: Valve dismantling, inspection, damaged spare replacement, lapping, box-up and hot tightening at 10 Kg pressure.

The following valves overhauling and maintenance are carried out during ATR-2019.

Sl. No.	Valve Name	Valve Size	Jobs Carried out	Spares consumed	Remarks
Boiler# 1 (OR-806)					
1	Startup Vent isolation valve	4"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
2	MSSV (1500 class)	10"			New Replaced in both boiler
3	MSSV (1500 class)	10"	Overhauling, Lapping, Blue matching done	1. Pr. Seal ring 2. Gland packing rings	
4	Feed water main isolation valve	6"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
5	100% CV inlet isolation valve	6"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
6	100% CV outlet isolation valve	6"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	

7	30% CV inlet isolation valve	4"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
8	30% CV outlet isolation valve	4"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
9	Mainstream safety valve	2"	Overhauling, Lapping, Blue matching done.	Found OK(No spare consumed)	Trevi test done by M/s Nicco Engg during start-up (Design set pr. 66.3 Kg/Cm2)
10	Steam drum safety valve(LHS)	2-1/2"	Overhauling, Lapping, Blue matching done.	Found OK(No spare consumed)	Trevi test done by M/s Nicco Engg during start-up (Design set pr. 74 Kg/Cm2)
11	Steam drum safety valve(RHS)	2-1/2"	Overhauling, Lapping, Blue matching done.	Found OK(No spare consumed)	Trevi test done by M/s Nicco Engg during start-up (Design set pr. 75 Kg/Cm2)
Boiler# 2 (OR-805)					
12	Main Steam line NRV	10"			New Replaced in both boiler
13	MSSV (1500 class)	10"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland rope. 3.Stem 4.Disc holder	
14	MSSV (1500 class)	10"			New Replaced in both boiler
15	Startup vent isolation valve	4"	Overhauling, Lapping, Blue matching done.	1Pr. Seal ring 2.Gland packing	Stuffing box repaired and required to be

					replaced in next opportunity
15	100% CV inlet isolation valve	6"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
16	100% CV outlet isolation valve	6"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
17	30% CV inlet isolation valve	4"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
18	30% CV outlet isolation valve	4"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
19	Feed water main isolation valve	6"	Overhauling, Lapping, Blue matching done	1. Pr. Seal ring 2. Gland packing rings	
20	Mainstream safety valve	2"	Overhauling, Lapping, Blue matching done.	Found OK(No spare consumed)	Trevi test will be done by M/s Nicco Engg during start-up (Design set pr. 66.3 Kg/Cm2)
21	Steam drum safety valve(LHS)	2-1/2"	Overhauling, Lapping, Blue matching done.	Found OK(No spare consumed)	Trevi test will be done by M/s Nicco Engg during start-up (Design set pr. 74 Kg/Cm2)
22	Steam drum safety valve(RHS)	2-1/2"	Overhauling, Lapping, Blue matching done.	Found OK(No spare consumed)	Trevi test will be done by M/s Nicco Engg during start-up (Design set pr. 75 Kg/Cm2)

Deaerator & PRDS Line

23	Steam isolation valve (Main)	4"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	.
24	1 st PRDS I/L isolation valve	4"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
25	1 st PRDS O/L isolation valve	6"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
26	2 nd PRDS bypass valve	6"	Overhauling, Lapping, Blue matching done	1. Gland rope and gasket.	
27	1 st PRDS O/L safety valve (PRV)	4" x 6"	Overhauling, Lapping, and test bench pr. Set & leak test done.	No	Set pr. 34 kg/cm ² ..
28	2 nd PRDS O/L safety valve (PRV)	8"X10"	Overhauling, Lapping, and test bench pr. Set & leak test done.	No	Set pr. 1.85 kg/cm ² . valve replacement.
29	Deaerator top safety valve	3"/L/4"	Overhauling, Lapping, and test bench pr. Set & leak test done.	NO	Set pr. 7 kg/cm ² .
30	2 nd PRDS O/L valve	10"	Overhauling, Lapping, Blue matching done	1. Pr. Seal ring 2. Gland packing rings	
31	Air receiver tank PRV (plant & instrument)	1-1/2"	Overhauling, Lapping, Blue matching done	NO	Set Pr. 10 Kg/Cm ²

BFWP LINE

32	BFWP-A Suction valve	10"	Overhauling, Lapping, Blue matching done.	1. Pr. Seal ring 2. Gland packing rings	
33	BFWP- B Suction valve	10"	Overhauling, Lapping, Blue matching done.	1.Gland packing	
34	BFWP- C Suction valve	10"	Overhauling, Lapping, Blue matching done.	1.Gland packing	

Total 34 nos of valves overhauling done as per above mentioned list

Photographs of valve overhauling job during ATR-21

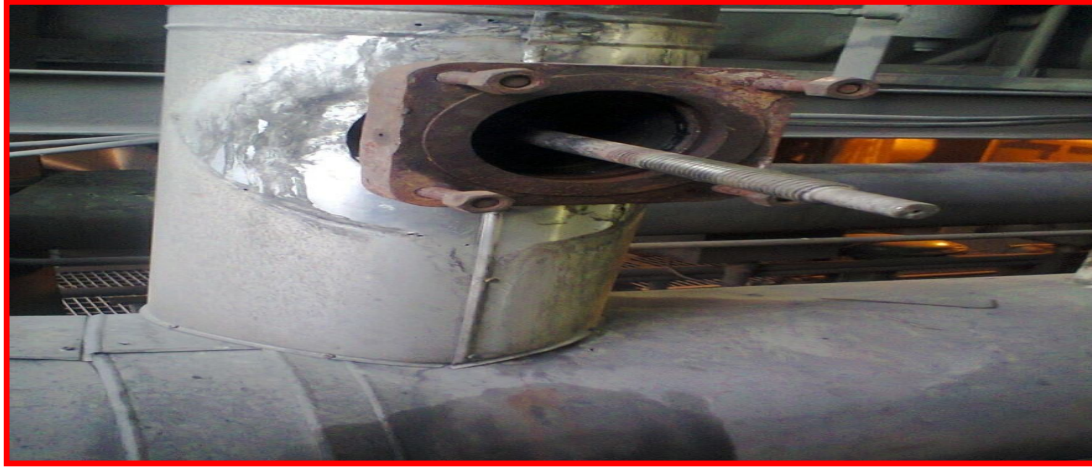
Boiler-1 MSSV overhauling





Boiler-2 MSSV overhauling





Start-up vent isolation valve overhauling

OVERHAULING OF SAFETY VALVE(BOILER-805)

**OVERHAULING OF SAFETY VALVE(MAIN STEAM LINE)
BOILER OR-805**



**OVERHAULING OF STEAM DRUM SAFETY VALVE-LHS
BOILER OR-805**



**OVERHAULING OF SAFETY VALVE STEAM DRUM-RHS
BOILER -OR 805**



OVERHAULING OF SAFETY VALVE(BOILER-806)

OVERHAULING OF SAFETY VALVE(MAIN STEAM LINE)
BOILER OR-806



OVERHAULING OF STEAM DRUM SAFETY VALVE-LHS
BOILER OR-806



OVERHAULING OF STEAM DRUM SAFETY VALVE-LHS BOILER OR-806

New Disc insert replaced in Boiler-1 MSL safety valve & Boiler-2 steam drum S/V-
LHS



HYDROTEST

Boiler-2 hydrotest done on dtd. 05.04.2021 at 112.5 Kg/cm² in presence of ADFB.



Boiler-2 ESP inlet duct replacement

Problem: Flu gas leakages was observed and corrosion found at various places in the duct and due to this it create the turbulence iin ESP and cause of high SPM, high load on ID/FD fan also occurred due to this.

Activity: Corroded ESP inlet duct replaced in Boiler-2

Agency: M/s Behera Engg

Order No-2520041912656



Gearbox replacement in C7 Conv

Agency Involved: Deptt.

Duration: From: 18th Mar 2021 to: 20th May 2021 Total Days: 3

Problem: Due to abnormal sound and both oil seal were damaged.

Planning: It was planned to replace the gearbox to replace with new one same work order .

Job execution: Job was carried out by Boiler Deptt. Job started on 28/04/2018

Activity involved

1. Removal of old gear box with motor
2. Removal of Pulley coupling.
3. Replacement of both bearings of Drive pulley
4. Both new motor and gearbox were fitted with new coupling
5. Pulley to gearbox alignment done.
6. Motor to gearbox alignment done
7. Trial run taken.

Belt replacement of C6 Conveyor

Agency Involved: Deptt. & Jointing by M/s Thejo Engg

Duration: From: 18th Mar 2021 To: 20th May 2021 Total Days: 3

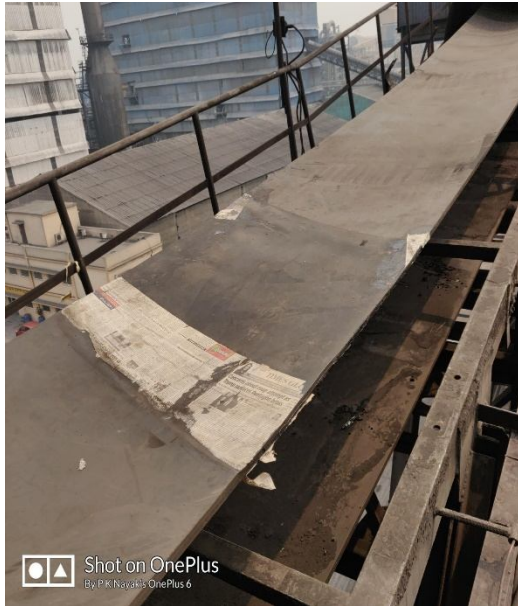
Problem: Belt thickness was lessened.

Planning: It was planned to replace the belt of Conveyor.

Job execution: Job was carried out by Boiler Deptt. Job started on 18/03/2021

Activity involved

1. Removal of old old belt
2. Erection of new belt.
3. Removal of idler frames
4. Tension given to belt as per take up pulley
5. Hot vulcanization of belt.
6. Refixing of idler frames with new idlers
7. Trial run taken.



Drag chain, Sprcket replacement of DCF1 of Boiler # 2

Agency Involved: Deptt.

Duration: From: 18th Mar 2021

To: 18th Mar 2021

Total Days: 1

Problem: Drag Chain with sprockets were damaged.

Planning: It was planned to replace the Drag chain with integral sprocket .

Job execution: Job was carried out by Boiler Deptt. Job started on 18/03/2021

Activity involved

1. Removal of old chain
2. Removal of drive sproket.
3. Removal of Bearings
4. Sprocket with shaft assembling
5. Fixing of both drive wheel and Trailing wheel. With new bearing
6. Erection of new drag chain
7. Tension giving to chain.
8. Trial run taken



Drag chain, Sprcket replacement of DCF2 of Boiler # 2

Agency Involved: Deptt.

Duration: From: 19th Mar 2021

To: 19th Mar 2021

Total Days: 1

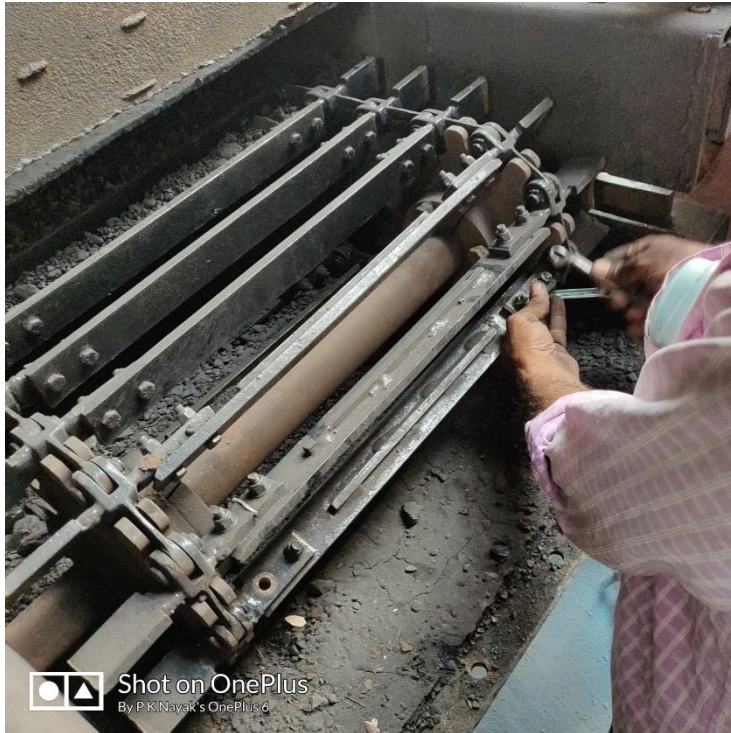
Problem: Drag Chain with sprockets were damaged.

Planning: It was planned to replace the Drag chain with integral sprocket.

Job execution: Job was carried out by Boiler Deptt. Job started on 19/03/2021

Activity involved

1. Removal of old chain
2. Removal of drive sprocket.
3. Removal of Bearings
4. Sprocket with shaft assembling
5. Fixing of both drive wheel and Trailing wheel. With new bearing
6. Erection of new drag chain
7. Tension giving to chain.
8. Trial run taken



Drag chain, Sprcket replacement of DCF3 of Boiler # 2

Agency Involved: Deptt.

Duration: From: 20th Mar 2021

To: 20th Mar 2021

Total Days: 1

Problem: Drag Chain with sprockets were damaged.

Planning: It was planned to replace the Drag chain with integral sprocket.

Job execution: Job was carried out by Boiler Deptt. Job started on 20/03/2021

Activity involved

1. Removal of old chain
2. Removal of drive sprocket.
3. Removal of Bearings
4. Sprocket with shaft assembling
5. Fixing of both drive wheel and Trailing wheel. With new bearing
6. Erection of new drag chain
7. Tension giving to chain.

8. Trial run taken



Drag chain, Sprcket replacement of DCF5 of Boiler # 2

Agency Involved: Deptt.

Duration: From: 21st Mar 2021

To: 21st Mar 2021

Total Days: 1

Problem: Drag Chain with sprockets were damaged.

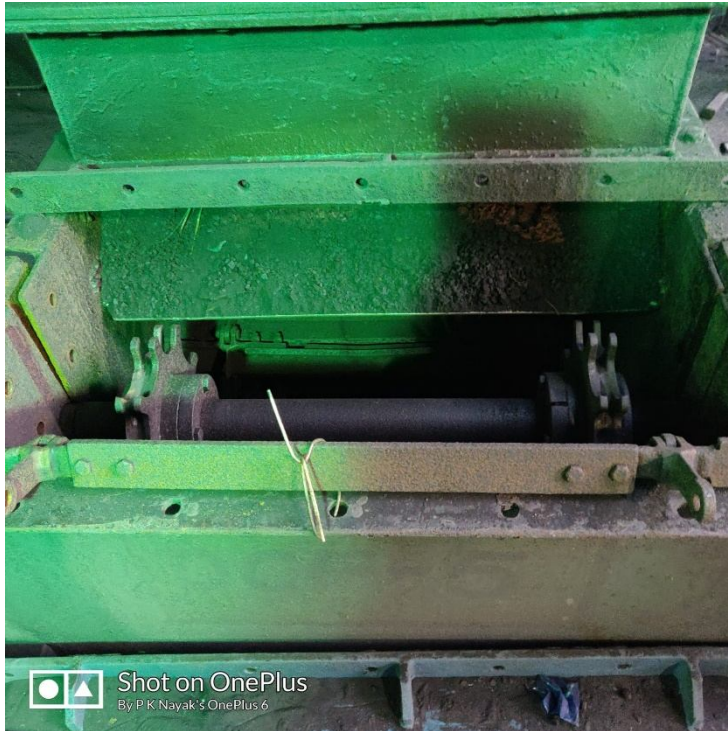
Planning: It was planned to replace the Drag chain with integral sprocket.

Job execution: Job was carried out by Boiler Deptt. Job started on 21/03/2021

Activity involved

1. Removal of old chain
2. Removal of drive sprocket.
3. Removal of Bearings
4. Sprocket with shaft assembling
5. Fixing of both drive wheel and Trailing wheel. With new bearing
6. Erection of new drag chain

7. Tension giving to chain.
8. Trial run taken



Drag chain, Sprcket replacement of DCF3 of Boiler # 1

Agency Involved: Deptt.

Duration: From: 22nd Mar 2021 To: 22nd Mar 2021 Total Days: 1

Problem: Drag Chain with sprockets were damaged.

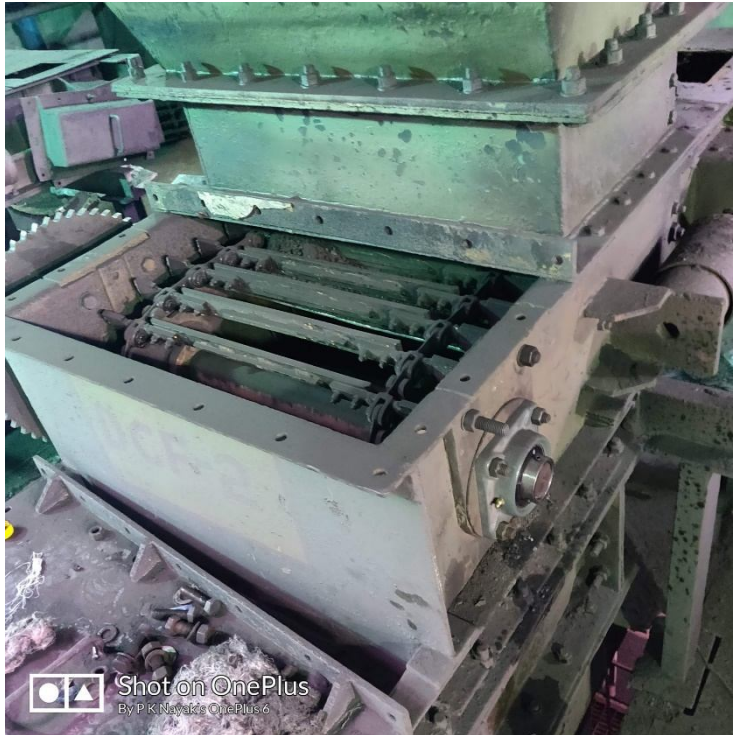
Planning: It was planned to replace the Drag chain with integral sprocket.

Job execution: Job was carried out by Boiler Deptt. Job started on 22/03/2021

Activity involved

1. Removal of old chain
2. Removal of drive sprocket.
3. Removal of Bearings
4. Sprocket with shaft assembling
5. Fixing of both drive wheel and Trailing wheel. With new bearing
6. Erection of new drag chain

7. Tension giving to chain.
8. Trial run taken



Drag chain, Sprcket replacement of DCF4 of Boiler # 1

Agency Involved: Deptt.

Duration: From: 23rd Mar 2021 To: 23rd Mar 2021 Total Days: 1

Problem: Drag Chain with sprockets were damaged.

Planning: It was planned to replace the Drag chain with integral sprocket.

Job execution: Job was carried out by Boiler Deptt. Job started on 23/03/2021

Activity involved

1. Removal of old chain
2. Removal of drive sprocket.
3. Removal of Bearings
4. Sprocket with shaft assembling
5. Fixing of both drive wheel and Trailing wheel. With new bearing
6. Erection of new drag chain

7. Tension giving to chain.
8. Trial run taken



Drum sprocket replacement of Ash Unloader-1 of Old Silo

Agency Involved: Deptt.

Duration: From: 24th Mar 2021

To: 26th Mar 2021

Total Days: 3

Problem: Drum sprockets was damaged.

Planning: It was planned to replace the Drum sprocket.

Job execution: Job was carried out by Boiler Deptt. Job started on 24/03/2021

Activity involved

1. Removal of old Intake valve
2. Removal of drive chain with adjuster
3. Removal of pedestal
4. Removal of old sprocket
5. Fixing of new sprocket

6. Fixing of pedestal
7. Refitting new chain, seal.
8. Refitting of adjuster
9. Trial run taken



Bearing and gearbox inspection of New Paddle mix unloader

Agency Involved: Deptt.

Duration: From: 27th Mar 2021

To: 28th Mar 2021

Total Days: 2

Problem: Drum sprockets was damaged.

Planning: It was planned to inspect the condition of bearings and gearbox

Job execution: Job was carried out by Boiler Deptt. Job started on 27/03/2021

Activity involved

1. Removal of bearing cover
2. Cleaning of bearing with diesel
3. Fixing of bearings
4. Greasing of bearings

5. Draining of old oil of gearbox
6. Refilling new oil
7. Removal of timing belt cover
8. Tension giving to the belt
9. Trial run taken



Motor Replacement of C6 Conveyor

Agency Involved: Deptt.

Duration: From: 21st Mar 2021

To: 22nd Mar 2021

Total Days: 2

Problem: Motor replaced as per Elect.deptt.

Planning: It was planned to replace the motor

Job execution: Job was carried out by Boiler Deptt. Job started on 21/03/2021

Activity involved

1. Removal of old motor and taking down with Chain pulley
2. Fixing of new coupling of motor
3. Erection of new motor with Crane to the conv. floor
4. Motor to gear box alignment

5. DOR checking in decoupled position
6. Fixing of coupling bolts
7. Trial run taken

Motor Replacement of C5 Conveyor

Agency Involved: Deptt.

Duration: From: 23rd Mar 2021 To: 24th Mar 2021 Total Days: 2

Problem: Motor replaced as per Elect.deptt.

Planning: It was planned to replace the motor

Job execution: Job was carried out by Boiler Deptt. Job started on 23/03/2021

Activity involved

1. Removal of old motor and taking down with Chain pulley
2. Fixing of new coupling of motor
3. Erection of new motor with Crane to the conv floor
4. Gearbox input coupling removal
5. New oil seal replacement
6. Motor positioned on base with Chain pulley
7. Motor to gear box alignment
8. DOR checking in decoupled position
9. Fixing of coupling bolts

Trial run taken

Coal bunker maintenance

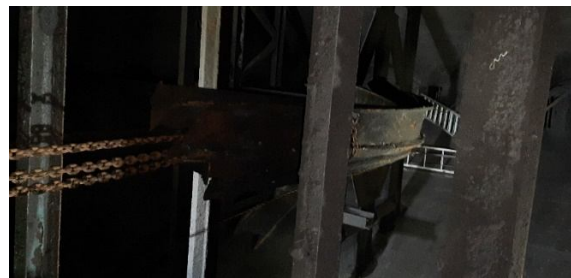
Replacement of damaged Structure in Boiler # 2 Coal Bunker of AFBC Boiler:

Observations:-

- **04 Nos of Hopper Tie Beam found damaged & dropped in the Hopper.**
- **Boiler # 2 side Coal Bunker floor some chequered plate found corroded.**



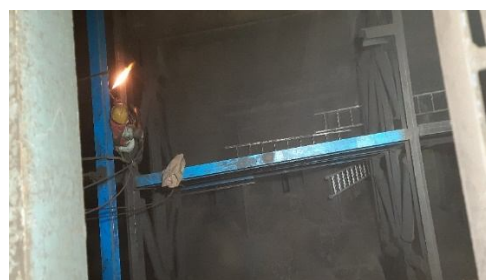
DAMAGED BEAM INSIDE BUNKER



DAMAGED BEAM REMOVAL WORK

Action taken: -

- Dropped Beams are removed from Boiler # 2 Coal Bunker.
- New Beams are fitted in appropriate position.
- Corroded Chequered Plates are replaced by New Plates.



Inspection of Boiler # 2 Old and New ESP & accordingly damaged parts are replaced as per Inspection report:

Observations:-

- Some Collecting Hammers, Emitting Hammers , CI Bearing, found damage in Boiler # 2 New & Old ESP.
- Some Collecting & Emitting Anvil Pads Bolt found missing & some in loose condition.

- 02 Nos of Collecting plate found misaligned.
- Boiler # 2 Old ESP Hopper guide plate found shifted.



**DAMAGED HAMMERS MARKING DONE IN BOILER # 2 ESP
BOILER # 2 HOPPER GUIDE PLATE IN SHIFTED POSITION**

Action taken: -

- All the damaged Collecting Hammers, Emitting Hammers & CI Bearing replaced with new one.
- All the Collecting & Emitting Anvil Pads new bolt fitted and tightened & then Tac Welding done.
- 02 Nos of Collecting plate Aligned.
- Boiler # 2 Old ESP Hopper plate positioned to its original place.



NEW HAMMERS & CI BEARINGS FITTED IN EMITTING ZONE OF BOILER # 2

Replacement of damaged Bag Filters used in both Ash Silo of AFBC Boiler:

Observations:-

- Maximum number of Bags are in Choked condition & some Bags are found in damaged condition.

- 07 nos of SS cage are found in damaged condition in Old Silo & 05 Nos SS cage are found in damaged condition in New Silo.



OLD BAGS WITH SS CAGE REMOVING WITH CAGE ARE LIFTING



NEW BAGS FITTED



NEW BAGS WITH SS CAGE FITED INSIDE THE VENT FILTER BOX

Hydrotest of both air receiver tank of plant air & instrument air



Discharge valve replacement of Plant air receiver tank



Deaerator drain pipe replacement



Deaerator DM water inlet line replacement at top of deaerator



Thickness measurement & insulation replacement of deaerator



----- X X X -----

ATR-2021 Report

ENERGY CENTER

Period: 17.03.2021 -03.04.2021

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ENERGY CENTRE

1. TG Cooling Tower & Water Line Jobs

A) COOLING TOWER PUMPS

TG CIRCULATING WATER PUMP

Make	: MATHER & PLATT
Type of pump	: 30"/30" ALE-T DV
Capacity	: 7750 m3/hr
Net head	: 37.86 M
Drive	: Electric Motor

I. OVERHAULING OF COOLING TOWER PUMPS C & S AND INSPECTION OF PUMP A

Problem

During shut down in the year 2019 it was observed that the impeller of TG CT Pump C & S was eroded.

Planning

It was planned to replace TG CT Pump C & S impeller with new spare impeller and inspection of TG CT Pump A to be done.

Activity involved

1. Removal of Top casing of TG CT pumps A, C & S.
2. Cleaning of top casing and parting plane of pumps.
3. Inspection of white metal lined journal bearings and Ball bearing.
4. Replacement of Rotor assembly in TG CT Pump C & S due to erosion on impeller vanes with spare rotor.
5. Repair of bottom casing of pump A, C & S done near neck ring area with Steel putty.
6. Boxed-up Pump with proper gasket.
7. TG CT pump A impeller also found slightly eroded.

Execution of job

This job was executed by IFFCO Technicians and in the supervision of IFFCO Engineer.

Spares used

1. Dynamically balanced new spare rotor assembly (two nos).
2. Deep groove ball Bearing (6315) three no.
3. Neck ring.



CASING BOX UP OF TG CT PUMP 'C'



REPAIRING OF CASING



TG CT PUMP S IMPELLER FITTING



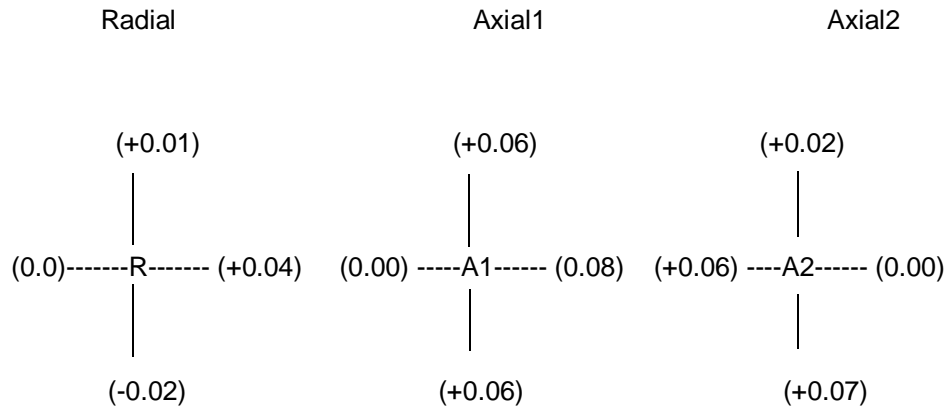
TG CT PUMP S IMPELLER FITTING

ALIGNMENT READING

TG COOLING TOWER PUMP "C" ALIGNMENT READING

TG cooling tower pump C alignment done after the motor overhauling done by Electrical Dept.

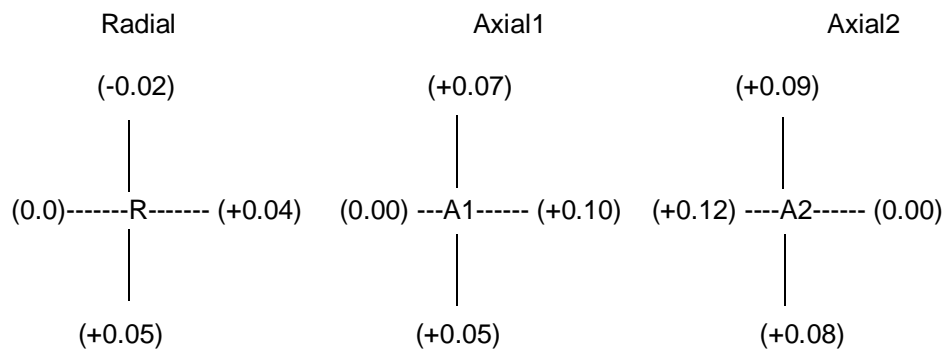
Pump "C"



TG COOLING TOWER PUMP "S" ALIGNMENT READING

TG cooling tower pump C alignment done after the motor overhauling done by Electrical Dept.

Pump "S"



B) TG COOLING TOWER (MAKE : PAHARPUR COOLING TOWER LTD.)

Type	: Double Cross Flow Induced draft
No of cell	: 10 (Ten)
Model no	: 6615-4.0-10
Capacity	: 33000m ³ /hr.
HW temp.	: 43 deg.centigrade
CW temp.	: 35 deg.centigrade
WB temp.	: 31 deg.centigrade

II. CLEANING OF TG COOLING TOWER SUMP AND BASIN

Planning

It was planned to cleaning of mud, sludge, debris which was expected to settle down from the sump & basin.

Action taken

BPA No.252004192052 was placed on M/S P P Enterprises to carry-out the cleaning job of sump & basin.

Execution of job

This job was executed by M/S P P Enterprises in the supervision of IFFCO Engineer.

Before cleaning



During cleaning



After cleaning



III. REPLACEMENT OF FLOW CONTROL VALVES FOR TG CT

Problem:-

It was observed that cooling tower old flow control valves of cell no 1 & 2 cannot isolate water completely.

Planning

It was planned to replace old flow control valves with new flow control valves for upcoming revamping of TG Cooling Tower with pultruded material.

Action taken

New flow control valve purchased from M/S Paharpur Cooling Tower (P.O. no. 252004210546)

Execution of job

This job has been done by M/S Behera Engineering (BPA No.252004200949).



Removal of old FCV



New FCV after installation

IV. REPAIR OF TG COOLING TOWER BLOW DOWN LINE

Problem

TG Cooling Tower Cell No 7, 8, 9 & 10 blow down line become highly corroded.

Planning

It was planned to fit 5" SS pipe inside existing 6" old pipeline and to be welded. 6" flange to be fitted outside for Cell no.7, 8, 9 & 10 and grouting to be done from inside the cell.

Action taken

Prefabrication job had been done before shut down. During shut down old portion removed and prefabricated portion welded and inside portion grouted by civil dept.

Execution of job

This job was executed by M/S Behera Engineering (BPA No.252004200949) and grouting done by Civil Dept.

Material Used:-4 no's of SS flange of Size 6" and SS pipe of size 5".



S.S. pipe and flange fitting



Grouting of S.S. pipe

V. OVERHAULING OF OLD BLOW DOWN VALVES

Problem

3 old blow down valves of size 6" and 150 # were non-operational and jam.

Planning

It was planned to overhaul 3 valves.

Action taken

Valves opened from position and handed over for overhauling.

Execution of job

This job was executed by M/S Arco Valves (BPA No. 252004212099) in the supervision of IFFCO Engineers.

Spares used:-80 studs of size 20*150 mm, 30 studs of size 12*80 mm.



Blue matching of valve disc

VI. INSPECTION AND CLEANING OF VAG FILTER

Problem

Frequent backwash observed, mud & ash was suspected inside.

Planning

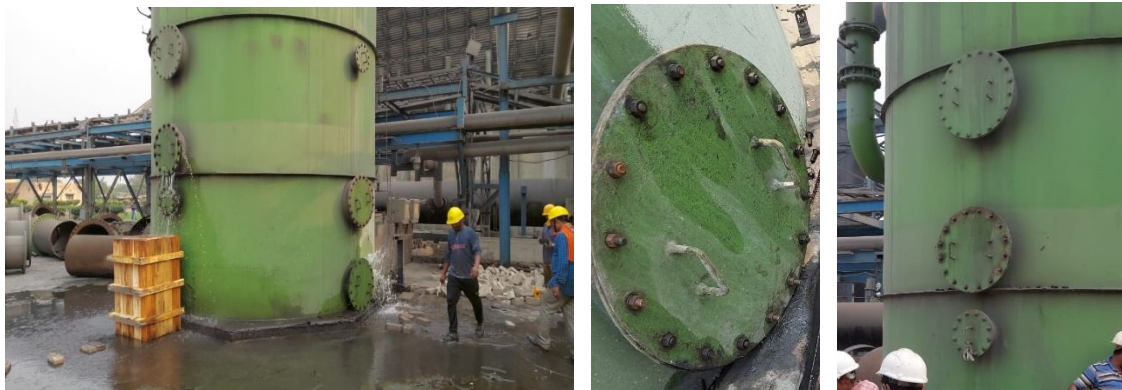
It was planned to inspect and clean VAG filter.

Action taken

02 no's of Manhole opened and after inspection, mud and ash found inside after that cleaning has been done.

Execution of job

This job was executed by IFFCO Technician with supply manpower from M/S Rajeswari Enterprises & in the supervision of IFFCO Engineers.



VII. OVERHAULING OF TG COOLING TOWER SLUICE GATE NO 1, 2, 9 & 10

Problem

All four sluice gate were non-operational and rusted.

Planning

W.O. no. placed to M/S Modern Engineering Supply of spares and overhauling of sluice gates.

Action taken

Overhauling of 4 sluice gates has been done Shafts and gearbox has been replaced with new one. After overhauling painting has been done. Now it's working smoothly.

Execution of job

This job was executed by M/S Modern Engineering (BPA No.252004201808) under the supervision of IFFCO Engineers.

Spares used: - 4 Shafts and 4 gearbox, 20 mm plates and 16 anchoring bolts.



Before overhauling



During overhauling



After overhauling

VIII. REROUTING OF TG COOLING TOWER BLOWDOWN TO PAP FILTRATION PIPELINE

Problem

Previously for maintenance of TG Cooling tower pump S and its motor there is no approach for smaller size hydra as tapping for the blowdown was taken from the discharge line of TG Cooling tower pump S.

Planning

It was planned to reroute TG Cooling Tower blow down line to PAP from existing tapping of cooling tower pumps common discharge header.

Execution of job

This job was executed by M/S Behera Engineering (BPA No.252004200949) under the supervision of IFFCO Engineer.

Spares used

One Fabricated Tee



IX. TG-2 CONDENSER INLET AND OUTLET VALVE REPLACEMENT

Problem

It was observed that the old condenser inlet and outlet valve did not isolate properly.

Planning

It was planned to replace one pair of TG-2 condenser inlet and outlet valve will be replaced with triple offset butterfly valve.

Action taken

One pair new triple offset butterfly valves purchased from M/S (P.O. no.252004211235)

Execution of job

This job was executed by M/S Behera Engineering (BPA No.252004200949) under the supervision of IFFCO Engineer.

Spares used

Two nos. of 1000mm NB triple offset butterfly valves.



X. SUCTION AND DISCHARGE VALVES & PIPING REPLACEMENT OF TG COOLING TOWER PUMPS A, C & S AND DISCHARGE PIPING REPLACEMENT OF TG COOLING TOWER PUMPS B & D.

Problem

Suction valve and discharge valves of TG Cooling tower pumps A, C & S were not operational and also the suction and discharge header thickness reduced due to corrosion & erosion.

Planning

It was planned to replace old suction and discharge valve of TG cooling tower pump A, C & S and also their suction and discharge header. Also it was planned to replace discharge header of TG cooling tower pump B & D. New suction and discharge header expansion bellow purchased.

Action taken

Three pair new butterfly valve purchased from M/S (P.O. no. 252004192125) and 12 mm M.S. plates rolled for fabrication of suction and discharge header pipe

Execution of job

This job was executed by M/S Behera Engineering (BPA No.252004200949) under the supervision of IFFCO Engineer.

Spares used

Three nos. of 1000mm NB butterfly valve and three nos. of 1300mm NB butterfly valve.





I. REMOVAL OF INTERCONNECTION BETWEEN TG COOLING TOWER PUMP DISCHARGE AND COMPRESSOR COOLING WATER PUMP DISCHARGE.

Problem

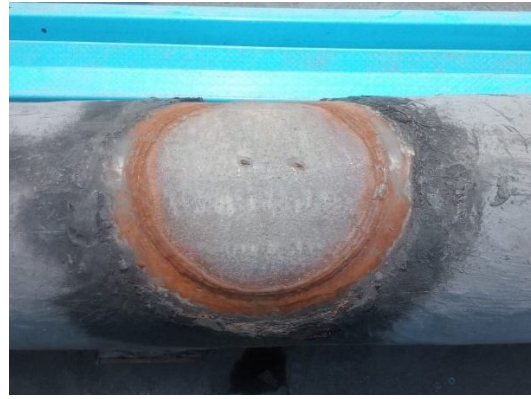
The interconnection between Compressor cooling water pump 103A and TG Cooling tower pump 101S discharge header removed as it didn't serve the purpose (using cooling water from TG Cooling tower pump discharge for cooling compressor). Also the interconnection line is creating difficulty for maintenance of TG Cooling Tower pump 101S.

Planning

It was planned to replace the discharge header of TG Cooling Tower pump 101S and patch to be welded in the discharge header of Compressor Cooling water pump 103A.

Execution of job

This job was executed by M/S Behera Engineering (BPA No.252004200949) under the supervision of IFFCO Engineer.



2. LPS2 Header Bellow and Elbow replacement

I. Replacement of Expansion Bellows (5 Nos) in LP steam header

Introduction

This report contains the details of maintenance job carried in LPS2 header during ATR 21. LPS2 header OSBL drawing no B2517 is to be referred for the understanding and details of LP steam header. ATR 21 started from 17th march 2021. All the steam bellows shifted at their respective location of job.

Job start date: 17/03/2021

Job Completion date: 03/04/2021

Problem

Steam bellows were procured from M/s Flextherm after recommendation of replacement of bellows from M/s Systech during their flexibility analysis to improve the reliability & safety of LP steam header. Old bellow photo are attached and it shows the condition of bellows in operation. This was urgently required for replacement. Supports were rectified to position the header.





Planning

It was planned to replace old expansion bellow of LPS2 header (5 Nos) with new one.

Activity involved

1. The LP steam header was depressurized.
2. The temperature of header was brought down up to ambient temperature.
3. Insulation was removed and the surrounding area was cleaned for maintenance.
4. The steam header was locked to avoid any shifting of header.
5. The positions for cutting the bellow was marked with precise measurement and alignments
6. The sling/chain block etc. (lifting device) was properly placed as per requirement.
7. The cutting of header to replace bellow was started.
8. the old bellow/elbow was removed safely
9. Edge preparation was carried both in header & piece to be replaced.
10. Fit up of the bellow was done & checked its fitment for welding.
11. First welding was TIG after that DP test was done.
12. Hot pass with arc & fill up – final welding was done.
13. Radiography test was carried as per requirement.
14. The surface of weld joints were finished.
15. Locking of header was removed.
16. insulation was applied before charging of header

Execution of job

This job was executed by M/S Behera Engineering (BPA No.252004202227)

Spares used

Steam Bellows:

Nominal size: 950 NB

Axial movement: 160 mm

Overall length of bellow with stub end: 850 mm

Quantity: 5 nos.



II. Replacement of 750 NB Elbow (1 Nos) in LP steam Header near SAP

Problem

750mm NB elbow (near SAP) of LPS2 header was having erosion & thinning.

Planning

It was planned to replace old elbow (750mm NB) of LPS2 header with new one.

Activity involved

1. The LP steam header was depressurized.
2. The temperature of header was brought down up to ambient temperature.
3. Insulation was removed and the surrounding area was cleaned for maintenance.
4. The steam header was locked to avoid any shifting of header.
5. The positions for cutting the bellow was marked with precise measurement and alignments
6. The sling/chain block etc. (lifting device) was properly placed as per requirement.
7. The cutting of header to replace elbow was started.
8. the old bellow/elbow was removed safely
9. Edge preparation was carried both in header & piece to be replaced.
10. Fit up of the elbow was done & checked its fitment for welding.
11. First welding was TIG after that DP test was done.
12. Hot pass with arc & fill up – final welding was done.
13. Radiography test was carried as per requirement.
14. The surface of weld joints were finished.
15. Locking of header was removed.

16. insulation was applied before charging of header

Execution of job

This job was executed by M/S Behera Engineering (BPA No.252004202227)

Spares used

Elbow

Size 750 NB

Quantity: 1

Thickness: 10 mm



LPS2 Header Support

LPS2 Header Insulation

3. Isolation Valves and Safety Valves Overhauling

Contractor- EFCO MASCHINENBAU INDIA PVT. LTD.

W/O No – 6600/252004212171, Order Date- 25-Jan-2021

Jobs start Dated- 19-March-2021

(1) TG-1 MSSV.

1. Technical Detail: - Gate valve 300NB, 1500#, Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc

- . Blue matching
- . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142080145000	1
2	Gland packing ring	2520142080124800	10

(2) .TG-2 MSSV.

1. Technical Detail:- Gate valve 300NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142080145000	1
2	Gland packing ring	2520142080124800	10

(3).TG-1 PRDS isolation valve No-1.

1. Technical Detail:- Gate valve 150NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve

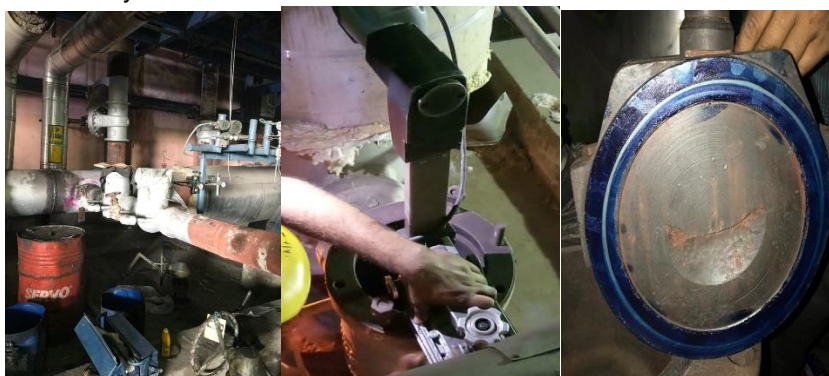


3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142100145000	1
2	Gland packing ring	2520142100124800	8

(4). TG-1 PRDS isolation valve No- 2.

1. Technical Detail:- Gate valve 150NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



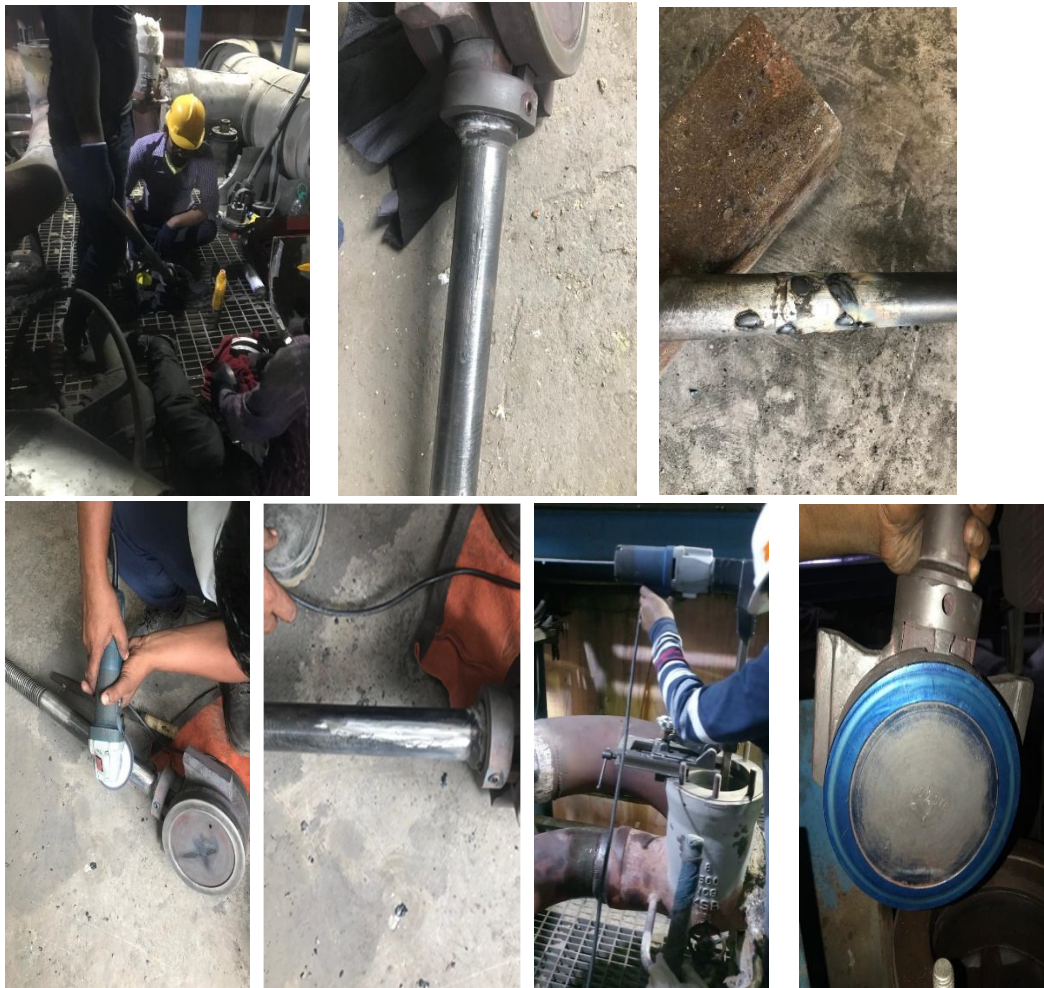
3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142100145000	1
2	Gland packing ring	2520142100124800	8

(5). New HP-LP isolation valve No-1.

1. Technical Detail: - Gate valve 200NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve

Repairing: - Scratch marks are seen on stem of the valve. Welding was done to repair scratches on stem. ESAB 309 electrodes are used for welding. After welding stem send to workshop for machining and polishing.



3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142090145000	1
2	Gland packing ring	2520142090124800	8

(6). New HP-LP steam isolation valve No-2.

1. Technical detail: - Gate valve 200NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142090145000	1
2	Gland packing ring	2520142090124800	8

(7). Old HP-LP steam isolation valve.

1. Technical Detail :- Gate valve 200NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142090145000	1
2	Gland packing ring	2520142090124800	8

(8). New HP-MP isolation valve.

1. Technical Detail: - Gate valve 200NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



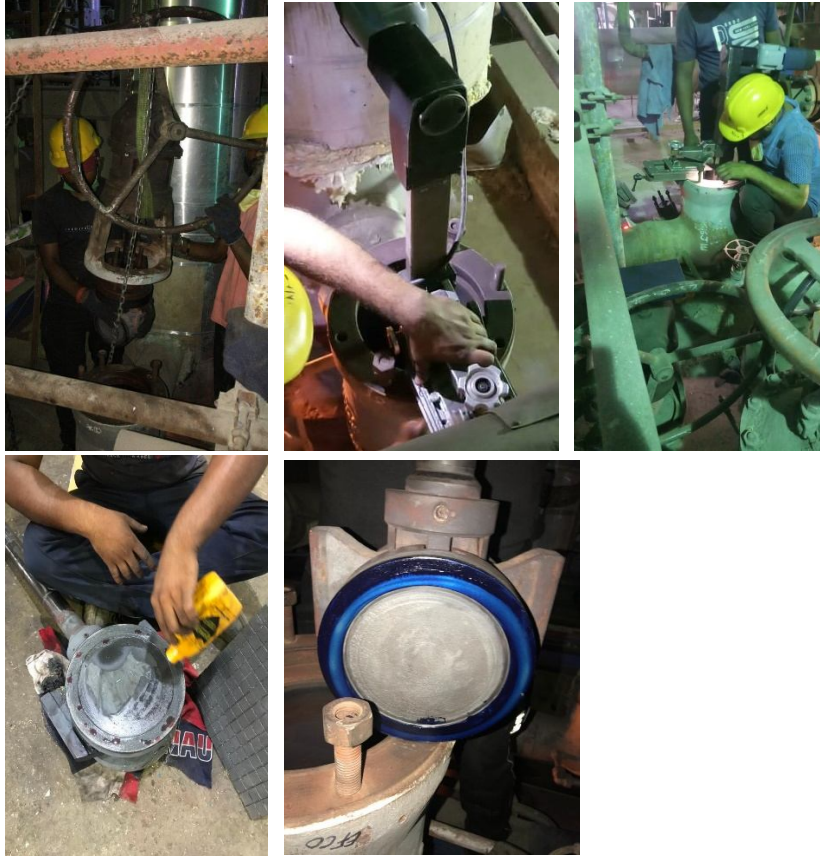
3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142090145000	1
2	Gland packing ring	2520142090124800	8

(9). Old HP-MP isolation valve No-1.

1. Technical Detail: - Gate valve 200NB, 1500# , Pressure seal type.
2. Procedure of overhauling:

- . Dismantling
- . Cleaning of all parts
- . Lapping of valve seat
- . Lapping of valve disc
- . Blue matching
- . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142090145000	1
2	Gland packing ring	2520142090124800	8

(10). TG-1 V4530 for GSC .

4. Technical Detail :- Gate valve 200NB, 600# .
5. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve

Repairing: - As the seat of the disc was found very thin so it was welded to build by using Xuper 680 CGS electrodes and machining done at central workshop.

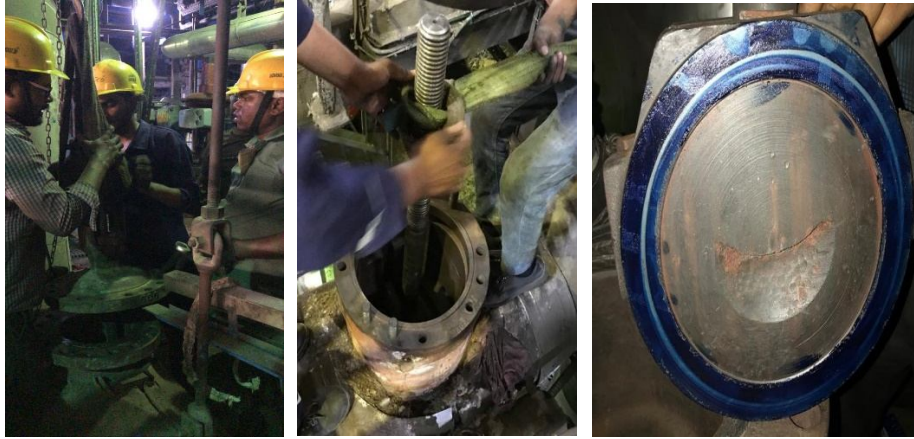


6. Spare used

Sl. No.	Material	Code	Quantity
1	Gland packing metallic rope-8mm size	0000993383507020	2 meter
2	Metallic gasket 3mm size		

(11). TG-2 V4530 for GSC .

1. Technical Detail :- Gate valve 200NB, 600# .
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Gland packing metallic rope-8mm size	0000993383509020	2 meter
2	Metallic gasket 3mm size		

(12). TG-1 Cross over drain valve 1910

1. Technical Detail :- Gate valve 200NB, 1500# , Pressure seal type.
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve

Repairing: - Scratch marks on disc are welded to repair by using Xuper 680 CGS electrodes and welded disc was send to workshop for machining and polishing.

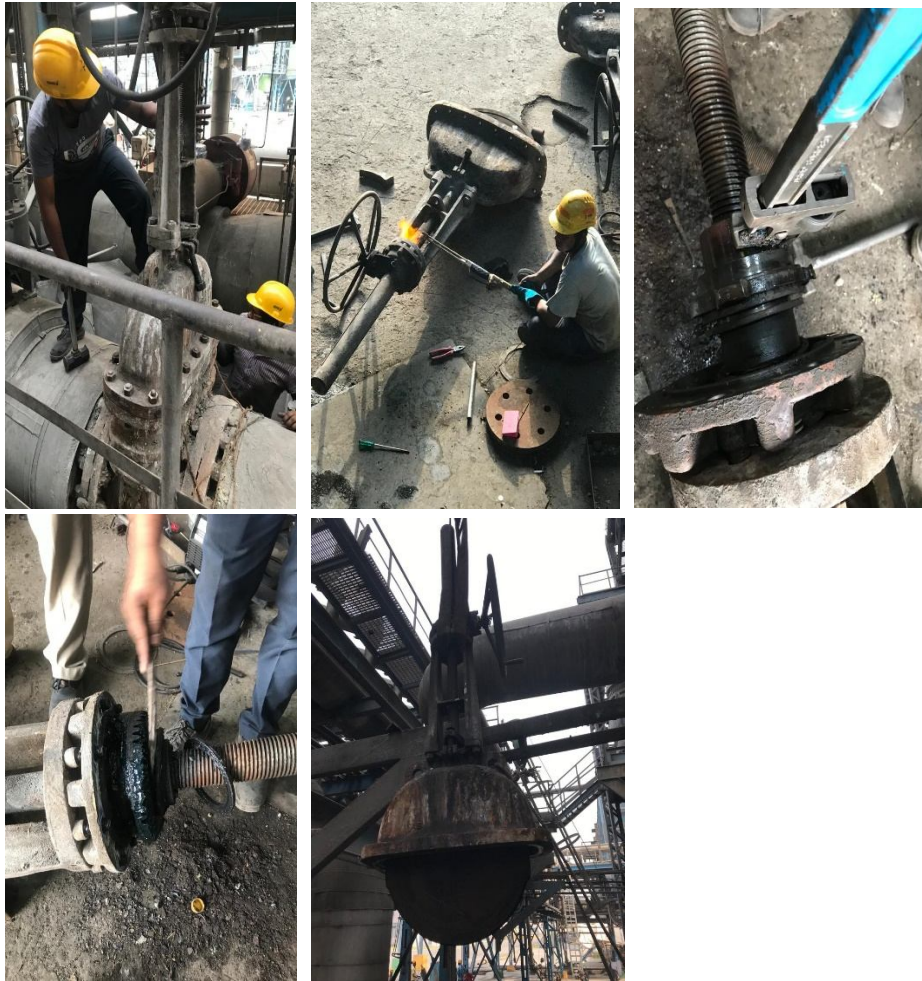


3. Spare used

Sl. No.	Material	Code	Quantity
1	Pressure seal ring	2520142180067210	1
2	Gland packing ring	2520142180024820	1

(13). PAP LP steam bypass isolation valve (Upstream).

1. Technical Detail :- Gate valve 600NB, 150# .
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



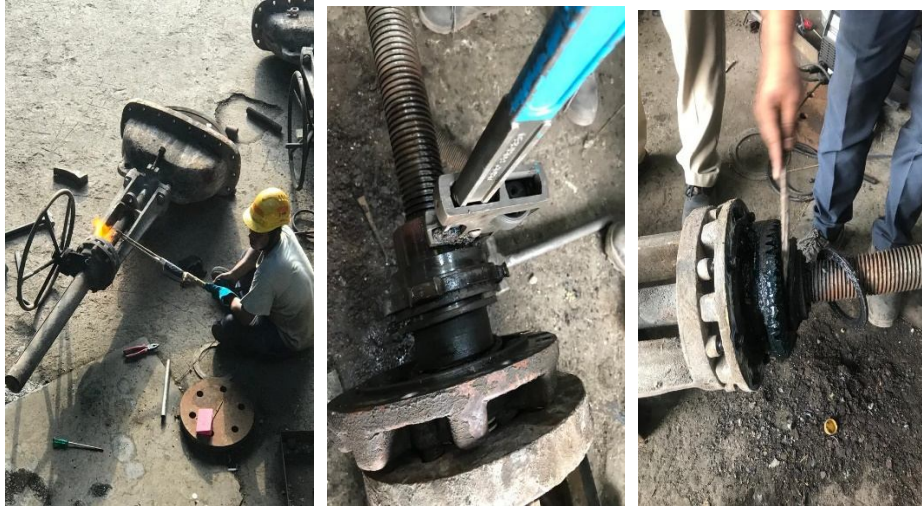
During dismantling it was observed that valve is in stuck-up condition. Dismantling done by heating the check nuts (both mild Steel & brass check nut).
 Brass check nut thread was damaged and new thread developed in central work shop.
 Gear box of valve was not operating properly.
 Bearing of Gearbox was replaced.

3. Spare used

Sl. No.	Material		Quantity
1	Gland packing metallic rope- 12mm size	0000993383509020	2 meter
2	Metallic gasket 3mm size	0000993401315040	
3	Gear box bearing 51118		1
4	Gear box bearing 51119		1

(14).PAP LP steam bypass isolation valve (Downstream).

1. Technical Detail :- Gate valve 600NB, 150# .
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Blue matching
 - . Assembly of valve



During dismantling it was observed that valve is in stuck-up condition. Dismantling done by heating the check nuts (both mild Steel & brass check nut). Brass check nut thread was damaged and new thread developed in central work shop. Gear box of valve was not operating properly. Bearing of Gearbox was replaced.

3. Spare used

Sl. No.	Material	Code	Quantity
1	Gland packing metallic rope-12mm size	0000993383509020	2 meter
2	Metallic gasket 3mm size	0000993401315040	
3	Gear box bearing 51118		1
4	Gear box bearing 51119		1

(15). LP Safety valves near LP steam vent area .

1. Technical Detail :- LP Steam line safety valves
 I/L – 200/150#/RF, O/L – 300/150#/RF Quantity-5
 I/L - 200/300#/RF, O/L – 300/150#/RF Quantity-5
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Disc of safety valve(PAP-10)	2520149021017302	1
2	Bearing(Series-51106) of safety valve(PAP-5)	0000996090106000	1
3	Adjustment screw		1
4	3 mm metallic gasket	0000993401315040	

(16). LP Safety valve inside TG building .

1. Technical Detail :- Safety valve 150/200# .
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Assembly of valve



3. Spare used

Sl. No.	Material	Code	Quantity
1	Disc	2520149020917302	1
2	3mm metallic gasket	0000993401315040	

(17). MP Safety valve inside TG building .

1. Technical Detail :- Safety valve 100/150# .
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Assembly of valve, .Set pressure testing





3. Spare used

Sl. No.	Material	Code	Quantity
1	Disc	2520142170017310	1
2	3mm metallic gasket	0000993401315040	

(18). HP Safety valve .

1. Technical Detail :- Safety valve 150NB,1500# .(02 Nos.)
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Assembly of valve
 - .Set pressure testing





3. Spare used

Sl. No.	Material	Code	Quantity
1	RJT ring gasket	0000993510536010	2

(19). Replacement of HP Safety valve (New)

1. Technical Detail :- Safety valve 100NB,1500# .(01 Nos.)
2. Procedure of overhauling:
 - .Set pressure testing



1. Spare used
- 2.

Sl. No.	Material	Code	Quantity
1	RJT ring gasket	0000993510529010	1

(20).Spare HP Safety valve

1. Technical Detail :- Safety valve 100NB,1500# .(02 Nos.)
2. Procedure of overhauling:
 - . Dismantling
 - . Cleaning of all parts
 - . Lapping of valve seat
 - . Lapping of valve disc
 - . Assembly of valve
 - .Set pressure testing

. After overhauling and testing of spare HP safety valve (100NB, 1500#) send to store. (Repaired code-2520142230044511)

List of PSV overhauling and testing during ATR 2021.

Sr. No	Model no./TAG no.	Safety Valve	Size	Rating	Set Pressure(Kg/Cm ²)		Overhauling & Testing Date	Overhauling due Date
					Design	By N2		
• LP STEAM LINE SAFETY VALVES								
1	PSV1504.01/ B165/CC61AA4 X 36	LP Steam (PAP-1)	8"	150#	3.47	4.0	29/03/2021	28/03/2022
2	PSV1504.01/ B165/CC61AA4 X 36	LP Steam (PAP-2)	8"	150#	3.47	4.0	29/03/2021	28/03/2022
3	PSV1504.01/ B165/CC61AA4 X 36	LP Steam (PAP-3)	8"	150#	3.47	4.0	29/03/2021	28/03/2022
4	PSV1504.01/ B165/CC61AA4 X 36	LP Steam (PAP-4)	8"	150#	3.47	4.0	29/03/2021	28/03/2022
5	PSV1504.01/ B165/CC61AA4 X 36	LP Steam (PAP-5)	8"	150#	3.47	4.0	29/03/2021	28/03/2022
6	PSV1502.01/ B165/CC61BA4 X 36	LP Steam (PAP-6)	8"	300#	4.97	5.4	29/03/2021	28/03/2022
7	PSV1502.01/ B165/CC61BA4 X 36	LP Steam (PAP-7)	8"	300#	4.97	5.3	29/03/2021	28/03/2022
8	PSV1502.01/ B165/CC61BA4 X 36	LP Steam (PAP-8)	8"	300#	4.97	5.3	29/03/2021	28/03/2022
9	PSV1502.01/ B165/CC61BA4 X 36	LP Steam (PAP-9)	8"	300#	4.97	5.4	29/03/2021	28/03/2022
10	PSV1502.01/ B165/CC61BA4 X 36	LP Steam (PAP-10)	8"	300#	4.97	5.4	29/03/2021	28/03/2022
11	NA	LP Steam (TG)	6"	300#	4.97	5.3	29/03/2021	28/03/2022
• MP STEAM LINE SAFETY VALVES								
13	2520842200 044522	MP Steam (TG)	4"	300#	18.6	18.9	29/03/2021	28/03/2022
• HP STEAM LINE SAFETY VALVES								
16	PSV-1508A	HP Steam (TG)	4"	1500#	64.3	65.2	29/03/2021	28/03/2022
17	PSV-1508C	HP Steam (TG)	6"	1500#	67.37	68.1	29/03/2021	28/03/2022
18	PSV-1508C	HP Steam (TG)	6"	1500#	67.37	68.1	29/03/2021	28/03/2022

4. TG-1 PRDS (2630) replacement job:

Job Description

PRDS PCV and TCV are replaced and new nozzle assembly for desuperheating was installed.

Reason

Existing PRDS was not maintaining temperature of steam to the required value. So it is decided to replace present type of PRDS with a new different type of PRDS.

Material Used

1. 25 NB Pipe
2. 25 NB equal Tee
3. 25 NB elbow
4. 25 NB strainer
5. 25 NB valve
6. 25 NB flange
7. 25 NB TCV
8. 100 NB PCV
9. 250 NBX100 NB Reducer
10. 250 NB Pipe
11. Nozzle assembly

Agency Involved

M/S Behera Engineering Pvt. Ltd.

W/O No. 252004200949dt.04.09.2019

Job Duration

From: 18/03/2021

To : 26/03/2021

Details of Job Performed

Insulation was removed from steam and water headers. Surrounding area was cleaned for maintenance. The steam header was locked and supported to avoid any shifting of header. Old PCV was removed from position by opening bolts from all flanges.



Figure 1: Old PCV removed and flange cutting started

Chain block was properly placed as per requirement to remove the PCV. Both flanges were removed by cutting with cutting machine. Existing 250 NBX100 NB Reducer was not matching with PCV end dia so this reducer was removed and replaced also. The header was marked for cutting as per measurement to install new PCV which is with welded type ends.



Figure 2: Short piece



Figure 3: Nozzles for desuperheating

A short piece of 250NB pipe of 300MM length was added to complete fit up of steam header. There are two 100MM joints and two 250MM joints in this steam header job. One branch was prepared in 250MM steam header for installation of nozzle assembly.

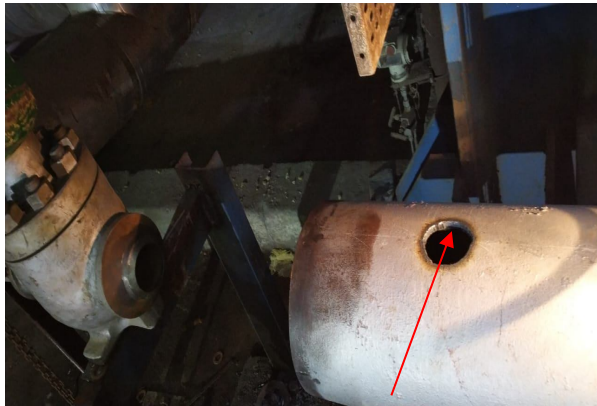


Figure 4: Pocket made for branching

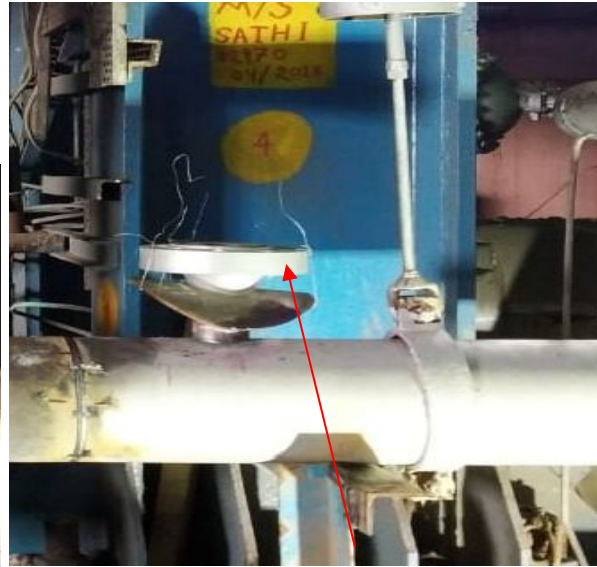


Figure 5: Flange assembly fitted

This branch joint is padded suitably that are shown in figures below. The cutting of header was done as marked.



Figure 6: Branch joint pad fitted



Figure 7: Branch joint pad is welded



Figure 8: Header cutting

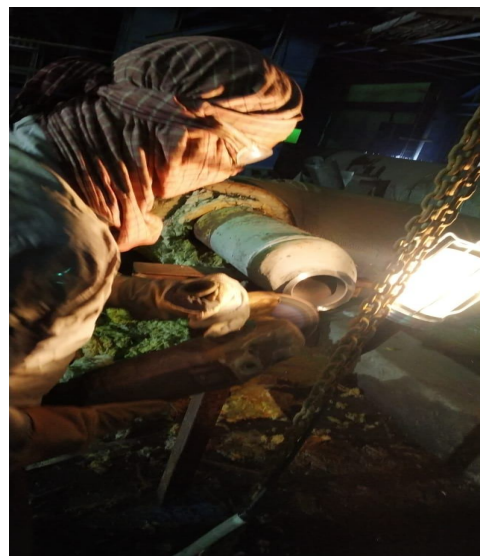
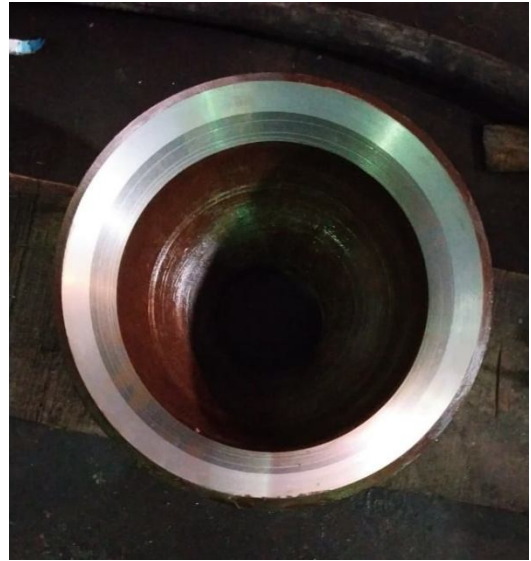


Figure 9: Edge preparation



Figure 10: Reducer at workshop for machining



Figure

11: Reducer after machining to match ID

Edge preparation for all joint ends was carried out. Reducer edge was prepared at workshop by machining to match ID with pipe.



Figure 12: All items are fitted

New PCV was positioned and fit up of PCV, reducer, short piece and branch pipe were done & checked for its fitment for welding. Preheating of joints was done for welding.



Figure 13: Preheating and root welding



Figure 14: Root welding & hot passes completed and preheating for fill up & final welding

Root welding started with TIG and hot pass was with arc. Radiography test was carried out as per requirement. After that fill up & final welding done. The surfaces of weld joints were finished. Again RT was carried out. SR of steam header was done.



Figure 15: Final welding completed



Figure 16: Preparing for TCV positioning

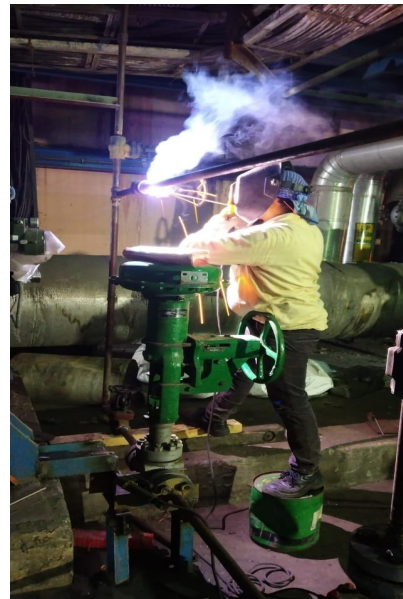


Figure 17: 25NB Pipe fabrication

The TCV was positioned and required pipe fabrication was carried out as per scheme. Locking of header was removed. Finally insulation was applied before charging of header.

5. TG-1 new LCV hook up job:

Job Description

Prefabricated new LCV setup was hooked up with condensate system of TG-1 in parallel with the existing LCV.

Reason

Existing LCV is imported, spares are costly and difficult to arrange, that affects maintenance of LCV. So it is decided to try indigenous systems for condenser level control. A parallel LCV is installed and commissioned successfully.

Material Used

1. 150 NB Pipe
2. 150 NB equal Tee
3. 150 NB elbow
4. 150 NB valve
5. 150 NB flange
6. 150 NB LCV
7. 80 NB FCV for recirculation
8. 80 NB Pipe
9. 80 NB equal Tee
10. 80 NB elbow
11. 80 NB valve
12. 150X150X80 NB unequal Tee

Agency Involved

M/S Behera Engineering Pvt. Ltd.

W/O No. 252004200949dt.04.09.2019

Job Duration

From: 21/03/2021

To : 28/03/2021

Details of Job Performed

Scaffolding work was done prior to start the job. Condensate header was drained and locked to avoid any shifting of header. The positions for cutting the condensate header were marked with precise measurement and alignments. The cutting of headers to hook up was done.



Figure 1: Header cutting done and edge preparation is under progress



Figure2: Old valve edges are prepared

Edge preparation was carried out both in 150 NB headers & 80 NB pipe line.



Figure 3: 150 NB joints fit up job is under progress



Figure 4: 80 NB pipe fit up completed

Fit up of the joints was done & checked for its fitment for welding. Excluding prefabricated job there are eight 150 NB joints and three 80 NB joints.



Figure 5: Root welding (TIG) completed

First welding was started with TIG for root joints after that DP test was done.

As DP test was cleared arc welding started for hot pass, fill up and final welding for joints. The surfaces of weld joints were finished.

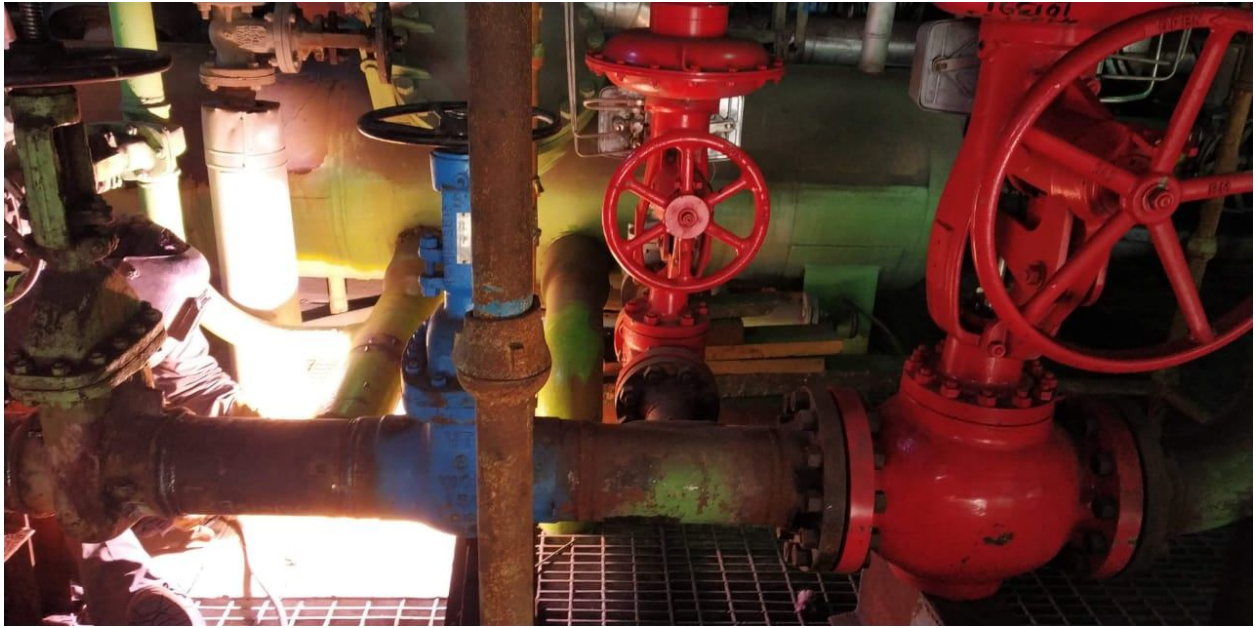


Figure 6; Final welding under progress

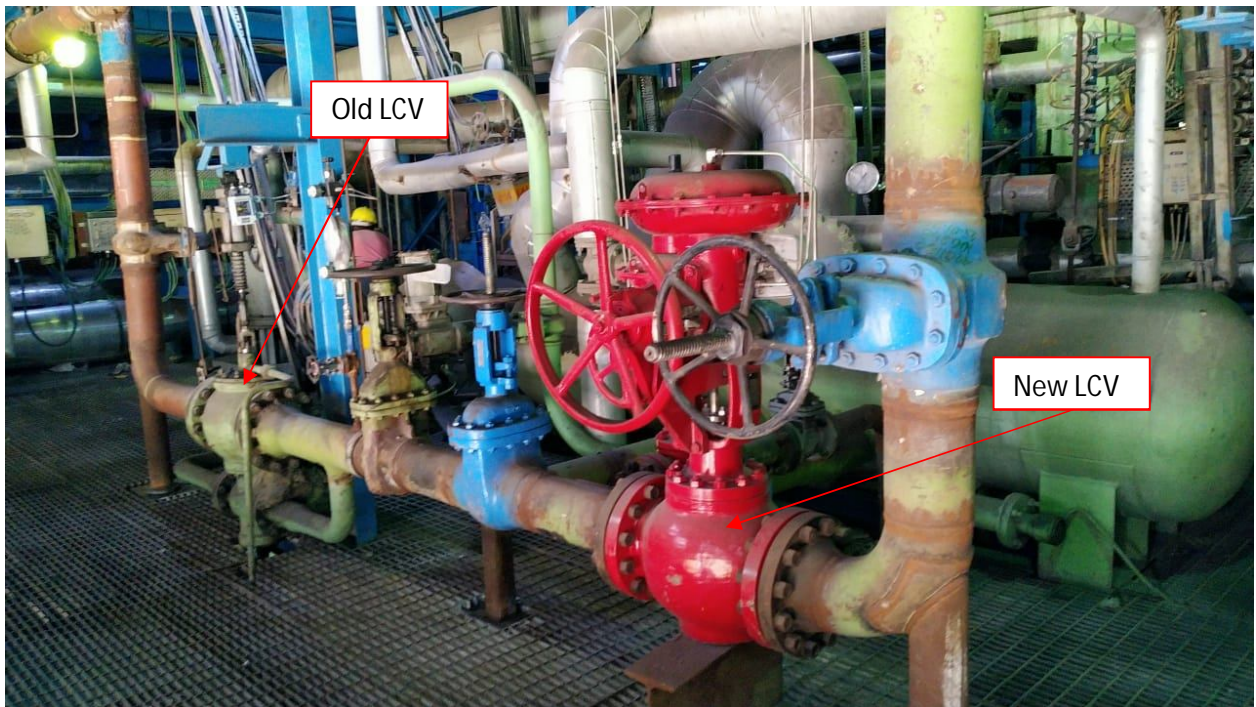


Figure 7: LCV hook up job completed

Suitable supports are provided. Locking of header was removed.

6. HP/LP PRDS(new) elbow replacement job:

Job Description

Two 400 NB elbows (90°) along with one 400 NB pipe piece were replaced in downstream header of HP to LP PRDS(new).

Reason

During thickness measurement of HP to LP PRDS(new) downstream header it was found the thickness of these elbows got reduced. So it was decided to replace these elbows as spares were available.

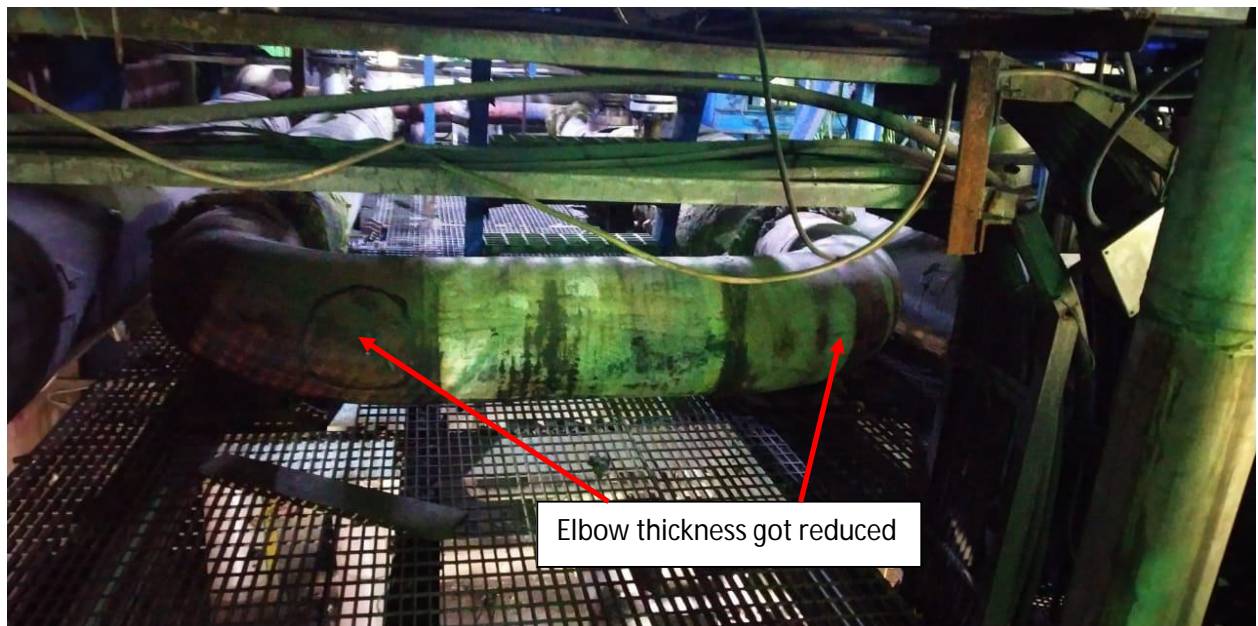


Figure 1: New HP/LP PRDS downstream header elbows thickness measured

Material Used

1. 400 NB Pipe
2. 400 NB elbow (90°)

Agency Involved

M/S Behera Engineering Pvt. Ltd.

W/O No. 252004200949dt.04.09.2019

Job Duration

From: 26/03/2021

To : 31/03/2021

Details of Job Performed

Insulation was removed from alongside steam headers to provide work front for this job. The surrounding area was cleaned for maintenance. The steam header was locked to avoid any shifting of header. The positions for cutting elbows were marked with precise measurement. Slings & chain blocks were properly placed to hold elbows are to be removed. Cutting of header to replace elbows was started. Old elbows were removed safely.



Figure 2: 400 NB LP header portion to be replaced is removed

A short pipe piece in between the elbows was also replaced for proper fitting. Total four joints were there. Edge preparation was carried both in header & pieces to be replaced.

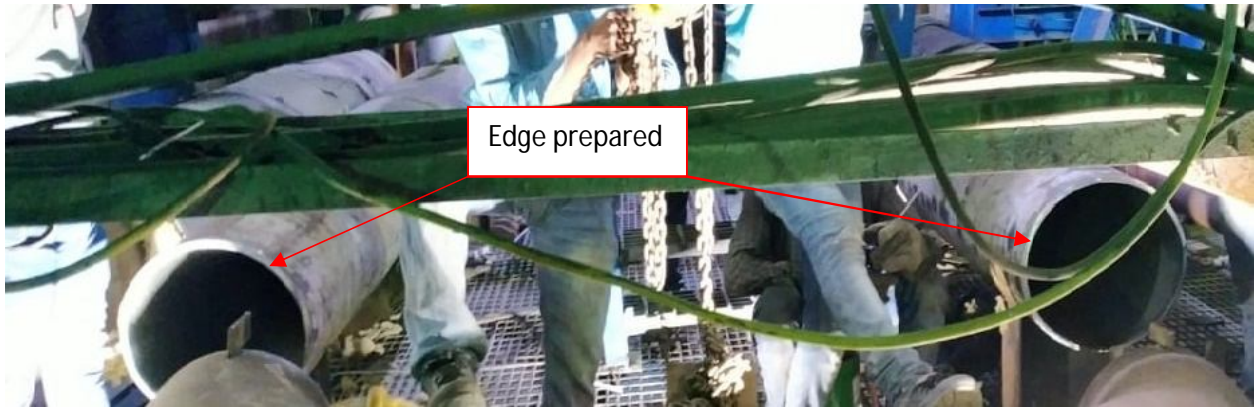


Figure 3: Pipe edges are prepared

Fit up of the elbows were done & checked for its fitment for welding.

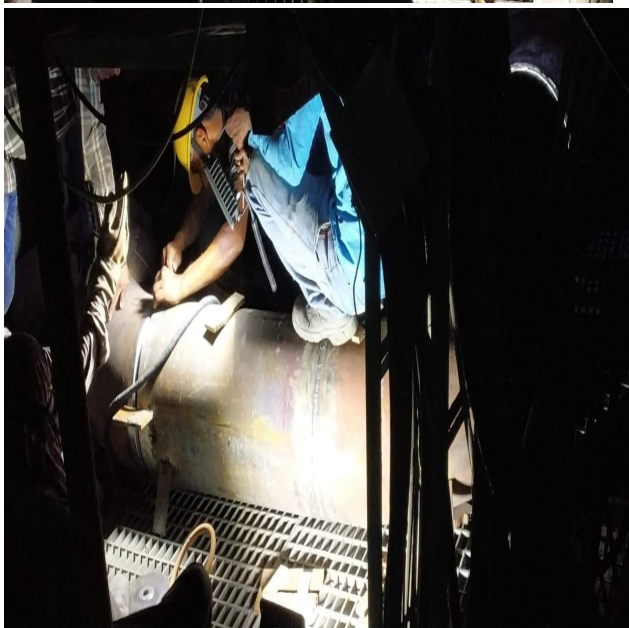


Figure 4 & 5: Elbow & Pipe fit up under progress



Figure 6: Elbow fit up under progress



Figure 7 & 8: Both Elbows are fitted and ready for welding

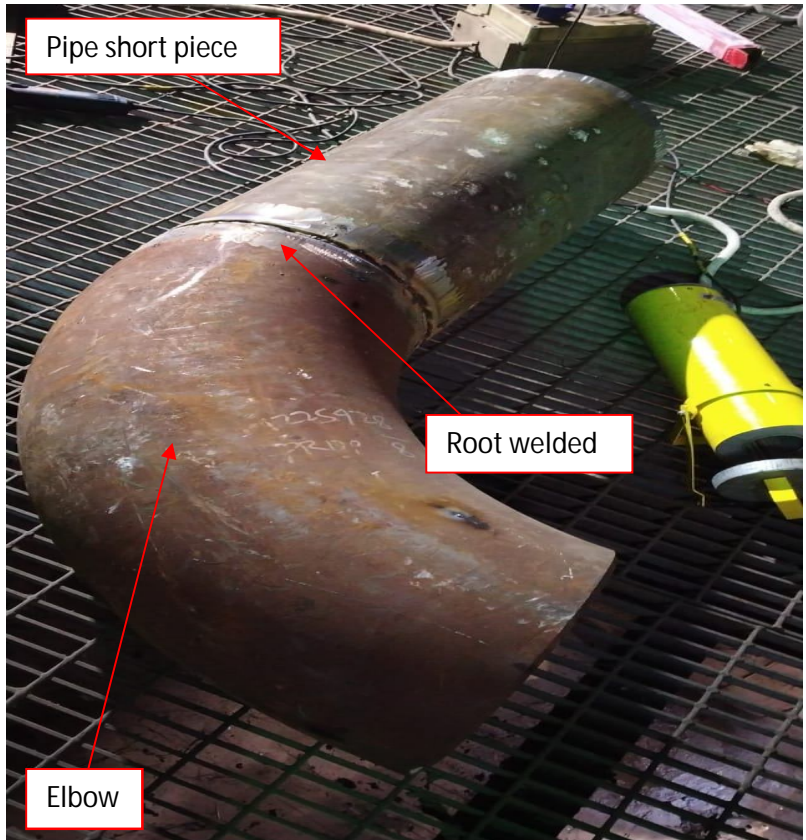


Figure 9: Joint root welding done

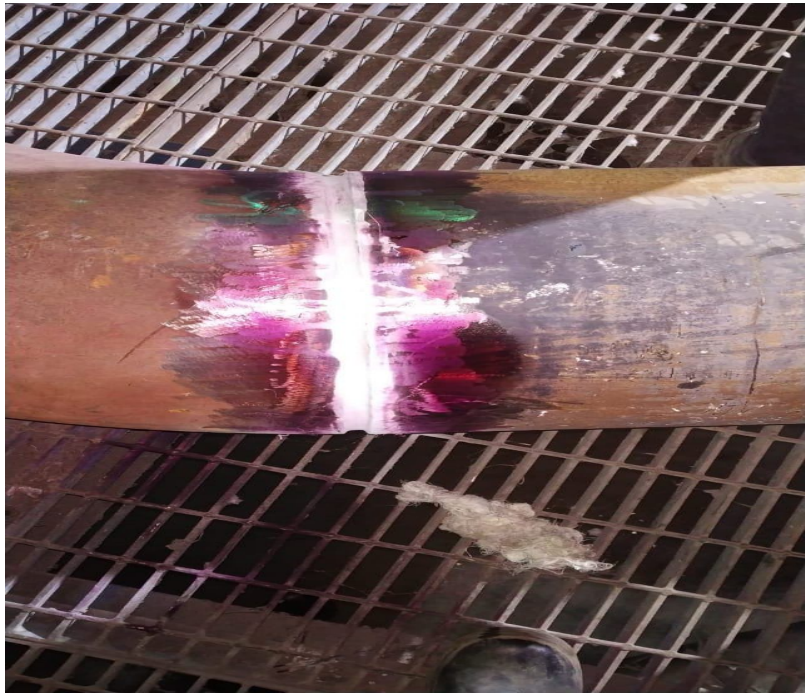


Figure 10: DP test for Joint-1 root welding

Welding started with TIG for root pass and after completion of root welding DP test was done for all joints.



Figure 11: DP test for Joint-2 root welding



Figure 12: DP test for Joint-3 & 4 roots welding

As DP test was cleared arc welding started for hot pass, fill up & final welding for all joints one by one.



Figure 13: Final welding for joint-4 under progress

The surfaces of weld joints were finished. Welding joint radiography test was carried out as per requirement. After getting clearance from NDT section locking of header was removed.



Figure 14: Header locking removal & insulation application



Figure 15: Insulation completed

Proper insulation was applied before charging of header.

7. TG-1 GOP NRV replacement job:

Job Description

NRV in discharge header of both governing oil pumps at TG-1 are replaced.

Reason

During operation of the plant passing observed through NRV in discharge header of both governing oil pumps at TG-1. Maintenance was tried for several times but it was not succeeded. Then it is decided to replace these NRVs with different type of NRV. The difference between old & new NRV is old NRV disc was mounted on cover plate but new NRV disc is mounted on valve body.

Material Used

1. 100 NB Pipe
2. 100 NB NRV



Figure 1: New NRV

Agency Involved

M/S Behera Engineering Pvt. Ltd.

W/O No. 252004200949dt.04.09.2019

Job Duration

From: 31/03/2021

To : 02/04/2021

Details of Job Performed

As the job was to be carried out inside TG-1 oil system room which is highly fire prone area so it was done under close monitoring of Fire & Safety personnel to avoid fire hazard. Oil drained from header and surrounding area was cleaned for maintenance work. The positions for cutting the NRV were marked with precise measurement and alignments. Slings are used to hold items to be removed. GOP(S) NRV was removed by cutting along the marking using cutting wheel. GOP(M) NRV and discharge isolation valve location was odd with respect to oil room floor. To relocate NRV and discharge isolation valve both were removed by cutting along the marking using cutting wheel.



Figure 2: GOP(M) header after cutting NRV & valve

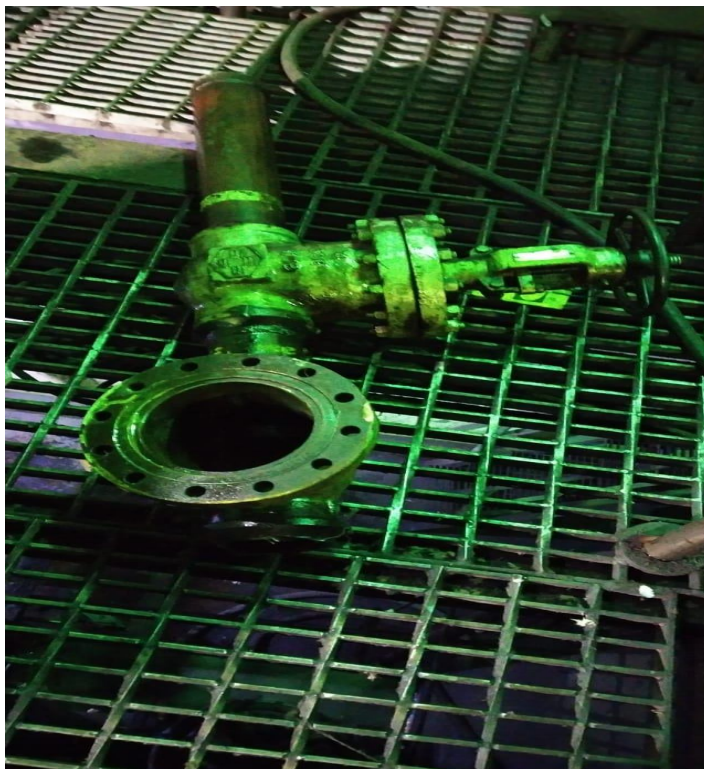


Figure 3: GOP(M) NRV & Isolation valve removed



Figure 4: GOP(S) discharge pipe edge preparation is under progress

Edge preparation was carried both in header & items to be replaced. Fit up of new NRV was done & checked its fitment for welding in GOP(S) discharge header. Root welding completed and DP test was done.



All welding are done by TIG. For GOP(M) pipe piece, NRV & isolation valve are fitted & checked its fitment for welding at a location outside oil room. This assembly joints roots were welded and it was

shifted to the oil system room where it was fitted with GOP(M) discharge header. Both end joint roots of that assembly were welded and DP test for all root joints was done.



Figure 6: GOP(M) NRV replaced and Valve & NRV relocated

After clearing DP test final welding for all joints in both pumps header were completed. The surfaces of weld joints were finished.



Figure 7: GOP(S) NRV after replacement



Figure 8: GOP(M) NRV after relocation & replacement

Both NRVs are checked for passing and found ok. Now these are in operation.

8. PAUT of HP steam header joints:

Job Description

PAUT (Phased Array Ultrasonic Testing) was carried out to detect and image defects if any in welding joints of HP steam headers. Final report is awaited from Inspection section.

Reason

HP steam header healthiness is checked every year during ATR in a phased manner. This year we have offered 18 nos. joints to be tested for HP steam header inside TG building.

Agency Involved

Inspection Section

Job Duration

From: 23/03/2021

To : 27/03/2021

Details of Job Performed

Before starting of PAUT insulation was removed from all the selected joints of HP steam header surface.

Figure 1: Insulation removal under progress



Figure 2: Insulation removed from HP steam header



After removal of insulation surface cleaning of the joint area was carried out by buffing.



Figure 3: Joint surface cleaning under progress using buffing machine

Then Inspection section had started testing of joints by DP test followed by PAUT.



Figure 4: Testing of joints under progress

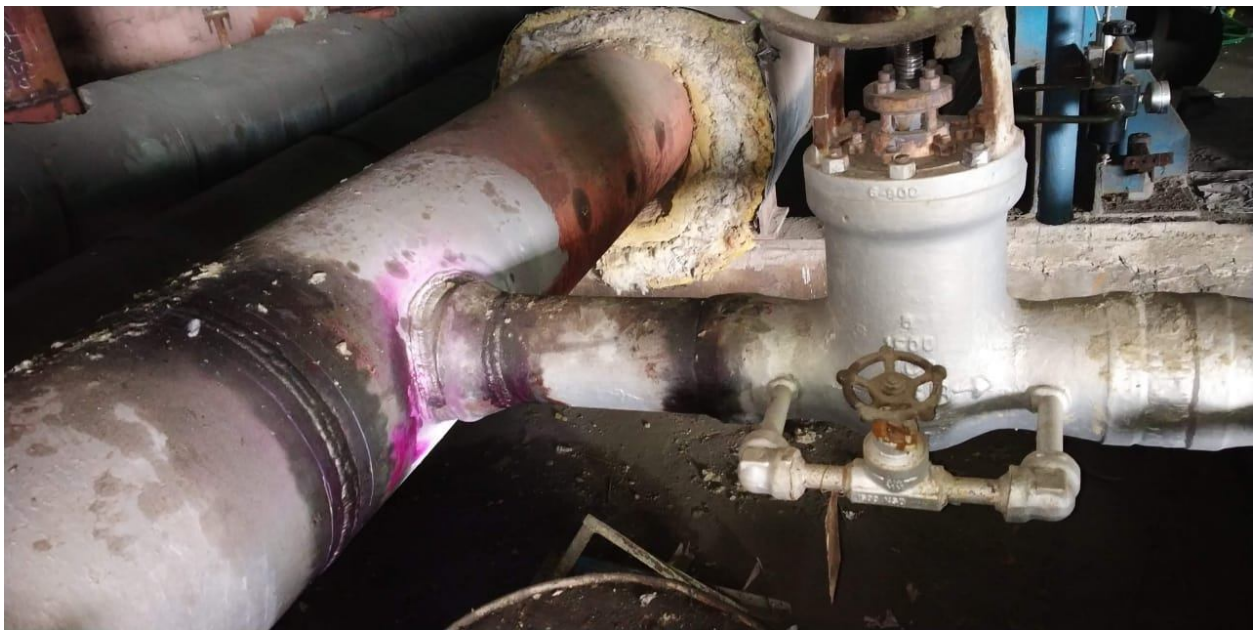


Figure 5: PAUT completed joints



Figure 6: PAUT of joint under progress



Figure 7: Insulation work after completion of PAUT

After completion of the job final report is yet to be submitted by concerned section. Again insulation was applied to the exposed surfaces of HP steam header.

9. Replacement of TG-1 Condensate Extraction Pump A, B & C

Problem: Low pressure was observed during high load in old pumps.

Planning: CEPs procured & delivered.

Action taken: Departmentally manpower engaged under supervision of M/s KSB.

Execution of job: Executed by IFFC O technician

Material used: Three CEPs



10. HP steam header vent valve replacement

Problem: Passing of steam observed

Planning: Job to be carried in ATR

Action taken: material issued from stores

Execution of job: It was done by Departmentally

Material used: -1" Pipe Sch- 140 IBR , valve 1" 1500# IBR



11. Replacement of MP vent control valve

Problem: Crack in body of PCV observed

Planning: PCV procured earlier.

Action taken: Material issued from store

Execution of job: The job was executed by M/S Behera engg (W.O no-252004202227 Dt.23.01.2020).

Material used: PCV



12. Installation of anubar in comp cooling water line

Problem: New installation required to measure water flow

Planning: Material was procured by Inst. section

Action taken:

Execution of job: It was carried departmentally

Material used: Anubar



13. TG-1 Generator cooler cleaning

Problem: Choking of cooler was suspected as gen temperature observed high.

Planning: Order place on M/s Eco projects to carry out the job.

Action taken: Job was planned for ATR.

Execution of job: M/s Eco projects carried the job.

TG-1 Generator cooler dismantling & Cooler tube cleaning.



Cooler tube cleaning and painting.



Cooler hydro tested & fitted in position.



14.CONDENSER TUBE CLEANING

Condenser Specification

Type : - Shell and tube type surface condensers
No. of tubes : - 7000
Diameter of tube : - 25mm
Length of tube : - 9 mts.
M.O.C. Of tubes : - SS304

Agency Involved: M/s 5S Engineering Co. **W.O. No: 6600/252004201321**

Duration: From: 19th March 2021 To: 22th March 2021 Total Days: 04

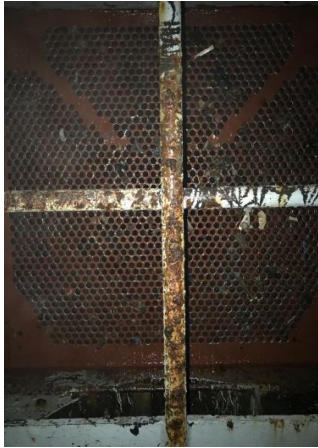
Problem: It was observed in the past that temperatures and vacuum in the condenser are increased due to ash and dust ingress into cooling tower which in turn tend to deposit inside the condenser tubes.

It has been planned to clean the condenser tubes by hydro jet method with pressure 180 -200 bar during ATR-2021.

Action taken: Work was allotted to M/s 5S Engineering Co. against P.O. No.-6600 / 252004201321 to carry out the job by hydro jet method using flexible hoses within allotted time.

Job execution: The job of hydro jetting for both TG condensers was executed by M/s 5S Engineering Co. under the supervision of IFFCO Engineer. Job started on 19/03/2021 and completed on 22/03/2021.

PHOTOGRAPH OF CONDENSER TUBE CLEANING:



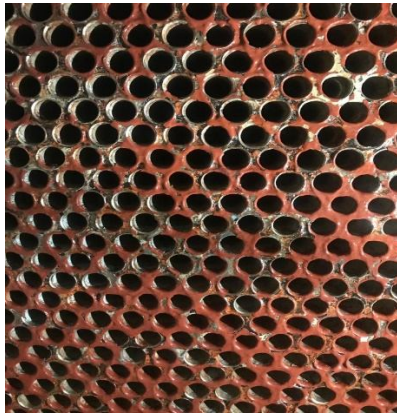
Before cleaning



Hydro jet cleaning



Inspection of cleaning



After final cleaning

15.CONDENSER TUBE SHEET COATING

Agency Involved: M/s Wearrist Technologies **W.O. No:** 252004202619

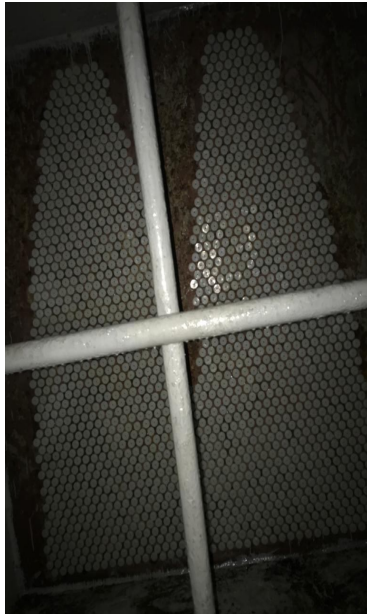
Duration: From: 26th March 2021 To: 27th March 2021 Total Days: 05

Problem: During inspection of condenser water box it was observed that at some locations of tube sheet area, previously applied coating was damaged and become rusted.

Action taken: To prevent further rusting of tube sheet area, action was taken and coating work was allotted to M/s Wearrist Technologies against P.O. No.-6600 /252004202619 to carry out the coating job for both condensers.

Job execution: The job of coating for both TG condensers was executed by M/s agencies under the supervision of IFFCO Engineer. Job started on 26/03/2021 and completed on 27/03/2021.

PHOTOGRAPH OF CONDENSER TUBE SHEET COATING:



Plugging the face of tubes



Covering of tubes & header



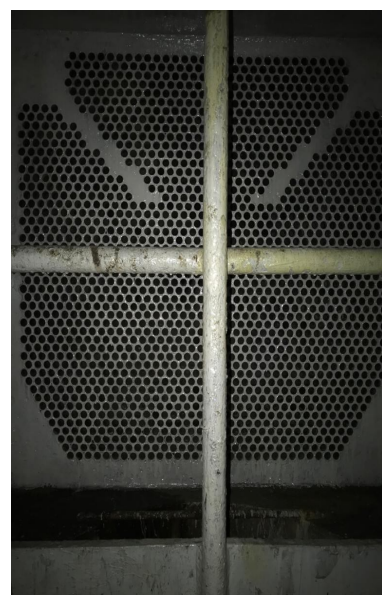
After sand blasting



After sand blasting



Final ceramic coating



Final ceramic coating on tubes sheet

16.OIL COOLER TUBE CLEANING

There are four nos. of oil coolers for turbine oil cooling. Two oil coolers are for each TG set.

Agency Involved: M/s 5S Engineering Co.

W.O. No: 252004201321

Duration: From: 26th March 2021 To: 26th March 2021 Total Days: 01

NUMBER OF TUBES:-178

DIAMETER OF TUBES:-19 mm

LENGTH OF TUBES: - 1.83 mts.

Problem: Due to deposition of ash & sludge in the tubes it is observed that the oil temperature rises.

Planning: It was planned to clean the tubes of oil cooler by hydrojet method.

The job was allocated to M/s 5S Engineering Co. Included in the same work order with the condenser cleaning- OrderNo.-6600/252004201321.

Job execution: Job was carried out by the Usha Hydrodynamics in one day under the supervision of IFFCO Engineer. Cleaning was done at 180-200 bar pressure. Job started on 26/03/2021 and completed on same day.

PHOTOGRAPH OF OIL COOLER TUBE CLEANING:



Cooler tubes cleaning



After cleaning

17.OIL COOLER TUBE SHEET COATING

Agency Involved: M/s Wearrist Technologies **W.O. No:** 252004202619

Duration: From: 26th March 2021 To: 27th March 2021 Total Days: 02

Problem: During inspection of oil cooler tube sheet it was observed that at some locations of tube sheet area, previously applied coating was damaged and become rusted.

Action taken: To prevent further rusting of tube sheet area, action was taken and coating work was allotted to M/s Wearrist Technologies agencies against P.O. No.-6600 /252004202619 to carry out the coating job for oil coolers of both Turbines.

Job execution: The job of coating for both oil coolers was executed by M/s Wearrist Technologies agencies under the supervision of IFFCO Engineer. Job started on 26/03/2021 and completed on 27/03/2021.

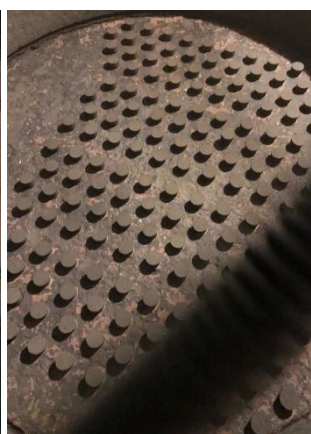
PHOTOGRAPH OF OIL COOLER TUBE SHEET COATING:



Plugging of tubes faces



Sand blasting



After sand blasting



After sand blasting



Final ceramic coating

ATR-2021 Report

BAGGING PLANT

Period: 16.03.2021 -02.04.2021

A REPORT ON EXECUTION OF VARIOUS MECHANICAL
MAINTENANCE WORKS CARRIED-OUT DURING ATR-2021(16th
March- to 02nd, April-2021) AT BAGGING -PLANT.

REPLACEMENT OF CORRODED GALLERY STRUCTURE OF BC- 130 & 132:

1. The badly corroded portion (Gallery 1 & 2 -Around 45 Mtrs) of the conveyor gallery BC- 130 / 132 along with its support trestle No- 1 (4 leg support) & take-up structure (2 leg) including its platform had been replaced with complete new pre-fabricated structures during the ATR within a period of 18 days w.e f:16.03.2021. Further, the civil structures **(Total 06 Nos)** were also constructed over which the newly fabricated trestles were placed with base plates having 06 holes instead of 04 holes as earlier. **One no of additional support** structure was also installed near by the take-up structure prior to the cutting of gallery No-2.

2. Foundation bolts (new) having size: Size: M 36 X 1222 MM LONG procured vide PO No: **252004211950** were used. **(Total Nos used: 44 Nos).**

2. Complete rubber lagging done in head pulley (02 Nos), snub pulley (02 Nos), bend pulley (04 Nos)

3. Bearing and sleeves replaced in all 4 bend pulleys, one snub pulley. All other bearings were cleaned, checked and lubricated.

4. New gear **Coupling-NGC-8 replaced in BC-130** along with new drive motor .Drive alignment done.

5. New belt trainers & tungsten carbide scrappers were installed in BC- 130.

6. Tail pulley bearings overhauled and SP-320 gear oil completely replaced along with fluid coupling oil in both BC- 130 & 132.

7. Cable **(both electrical & instrumentation)** were replaced with proper dressing in their respective cable trays.

8. Corroded portal columns on both sides of **gallery No-3 which were** found to be badly corroded during physical inspection were also replaced with new.

9. New Motor and Gear coupling –NGC-8- replaced in BC- 130. Gear coupling and fluid couplings of both BC- 130 & 132 were inspected and found OK.

Photo snaps of Corroded Gallery-BC- 130 & 132:

The badly corroded & sagged portion of the BC- 1130 / 132 as shown in the photo snaps were completely replaced with new pre-fabricated structures.

CRANE ENGAGED FOR THE SAID WORK: LIBHERR -400MT CAP.

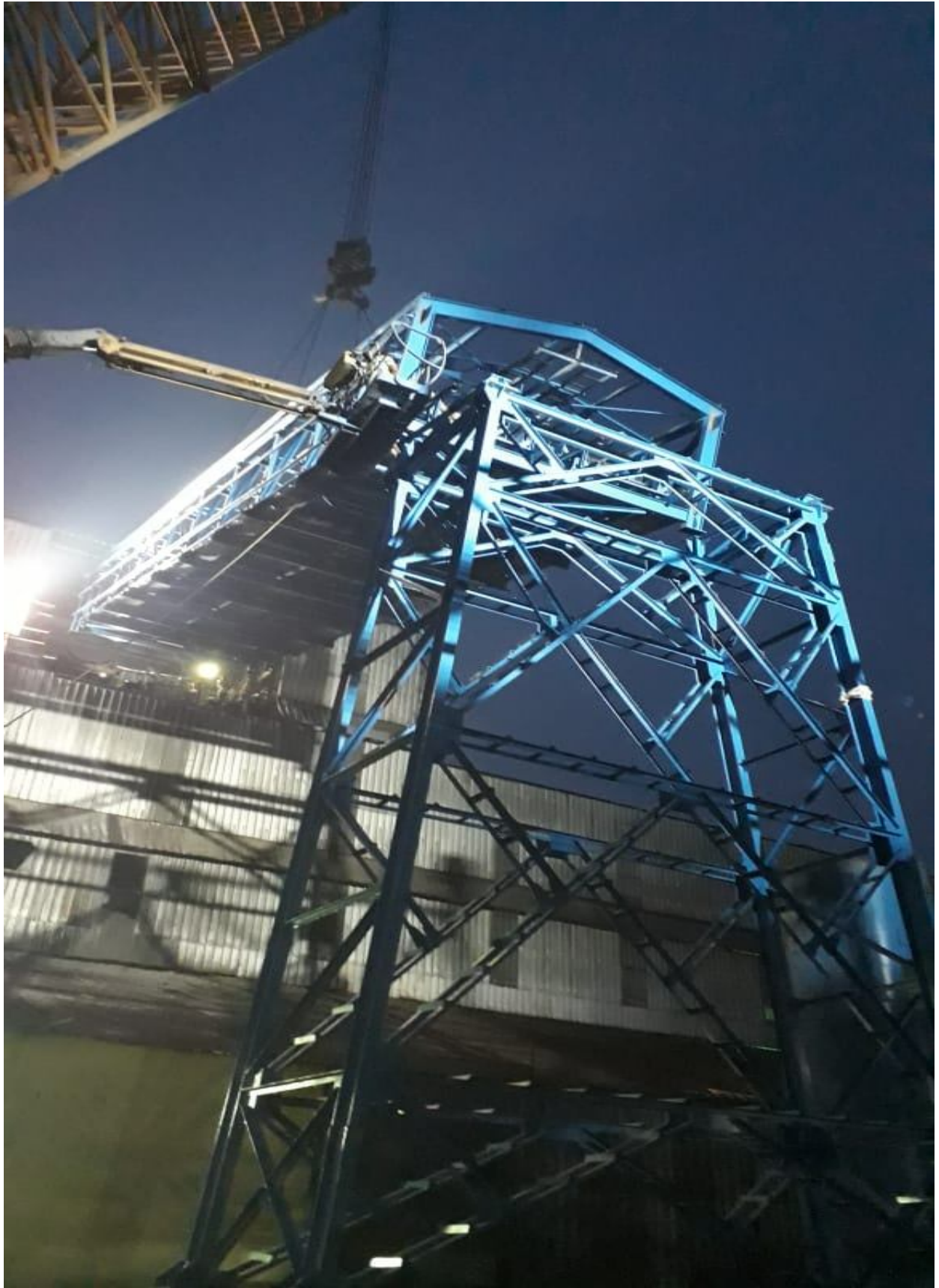




SAGGED PORTION OF GALLERY- BC- 130 /132 – BAGGING PLANT



NEW GALLERY FOR ERECTION



NEWLY FABRICATED TESTLE NO -1 & GALLERY NO-1 AFTER ERECTION



ALL NEW GALLERIES – 1 & 2 ALONG WITH TRESTLE NO-1 & 3 AFTER ERECTION:



**CIVIL FOUNDATION WORKS ASSOCIATED WITH THE ABOVE REPLACEMENT
JOB: 130 & 132 TRESTLES:**





Belt Conveyor Replacement Jobs: BC-130 & 132

Specification of the Belt Used:

Width: 1400MM RATING 1000/4 GRADE OR, AS PER IS 1891 PART-III COVER THICKNESS 4mm TOP x 4mm BOTTOM NN, MOULDED EDGE, HEAVY DUTY

Length: 300Mtrs for each conveyor 130 & 132 (Total -600Mtrs)

Date of replacement: 02.04.2021 & 03.04.2021 respectively.

Belt Conveyor Replacement Jobs: BC-107 & 108

Specification of the Belt Used:

Width: 1000MM RATING 800/4 GRADE "OR" AS PER IS 1891 PART-III COVER THICKNESS: 6 MM TOP X 4MM BOTTOM

Length: 155Mtrs for each conveyor 107 & 108 (Total -310Mtrs)

Date of joint: 13.03.2021-BC-107 & 18.03.2021-BC-108



Belt Conveyor Replacement Jobs: BC-102 & 104

Specification of the Belt Used:

Width: 1000MM RATING 800/4 GRADE "OR" AS PER IS 1891 PART-III COVER THICKNESS: 6 MM TOP X 4MM BOTTOM

Length: 205Mtrs for each conveyor 107 & 108 (Total -410Mtrs)

Date of joint: 24.03.2021-BC-102 & 20.03.2021-BC-104



Belt Conveyor Replacement Jobs: BC-101

Specification of the Belt Used:

Width: 1000MM RATING 800/4 GRADE "OR" AS PER IS 1891 PART-III COVER THICKNESS: 6 MM TOP X 4MM BOTTOM

Length: 205Mtrs (Total -205 Mtrs used)

Date of joint: 24.03.2021

Belt Conveyor Replacement Jobs: BC-113

Width: 1000MM RATING 800/4 GRADE "OR" AS PER IS 1891 PART-III COVER THICKNESS: 6 MM TOP X 4MM BOTTOM

Length: 100 Mtrs (Total -100 Mtrs used)

Date of Joint: 20.03.2021

BEARING REPLACEMENT WORKS IN BC-107:

All the defective bearings identified during shut down have been replaced with new.



Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley – 01 No bearing + 01 sleeve

Tail Pulley: 01 No bearing + 01 sleeve

Bend Pulley: All 4 Bearings + 4 Sleeves.

Take-up pulley Bearing + Sleeve: 02 Nos each replaced with new.

Pressure pulley: 02 No of bearings along with sleeve –Replaced with new.

BEARING REPLACEMENT WORKS IN BC-108:

All the defective bearings identified during shut down inspection had been replaced with new.

Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley – 01 No bearing + 01 sleeve

Tail Pulley: 01 No bearing + 01 sleeve

Bend Pulley: 3 Bearings + 3 Sleeves.

Take-up pulley Bearing + Sleeve: 01 No each replaced with new. (Other one found O.K)—hence, only greasing done with EP-2 Servo gem.

Pressure pulley: 02 No of bearings along with sleeve –Replaced with new.



BEARING REPLACEMENT WORKS IN BC-101:

All the defective bearings identified during shut down inspection had been replaced with new.

Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley – Found O K (Only greasing done with EP-2 Servo gem)

Tail Pulley: 01 No bearing + 01 sleeve

Bend Pulley: 2 Bearings + 2 Sleeves. –DS.

Take-up pulley Bearing + Sleeve: 02 Nos each replaced with new. (Greasing done with OMEGA-89.

BEARING REPLACEMENT WORKS IN BC-102:

All the defective bearings identified during shut down inspection had been replaced with new.

Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley – Found O K (Only greasing done with EP-2)

Snub Pulley: Bearing – 01 No & Sleeve -01 No replaced with new.

Tail Pulley: 02 No bearing + 02 sleeve

Bend Pulley: 2 Bearings + 2 Sleeves. –DS & NDS.

Take-up pulley Bearing + Sleeve: Found O.K. (Greasing done with EP-2).



BEARING REPLACEMENT WORKS IN BC-104:

All the defective bearings identified during shut down inspection had been replaced with new.

Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley – Found O.K (Only greasing done with SERVO-GEM-EP-2)

Snub Pulley: Bearing – 01 No & Sleeve -01 No replaced with new.

Tail Pulley: 02 No bearing + 02 sleeve

Bend Pulley: 1 Bearings + 1 Sleeves.

Take-up pulley Bearing + Sleeve: Found O.K. (Greasing done with EP-2).

Multi discs also replaced in the fluid coupling Model: SDFC-320 of BC-108.

BEARING REPLACEMENT WORKS IN BC-130 & 132:

All the defective bearings identified during shut down inspection had been replaced with new.

Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley –01 No (Replaced with new) - 2nd one- Found O.K (Only greasing done with EP-2)

Snub Pulley: Bearing – 01 No & Sleeve -01 No replaced with new.

Tail Pulley: 03 No bearing + 03 sleeve

Bend Pulley: 8 Bearings + 8 Sleeves.

Take-up pulley Bearing 02 Nos replaced + Sleeve: Found O.K. (Greasing done with EP-2).



BEARING REPLACEMENT WORKS IN BC-112 & 113:

All the defective bearings identified during shut down inspection had been replaced with new.

Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley – 01 No Replaced. Other one no found OK. (Greasing done with EP-2)

Snub Pulley: Bearing – 01 No & Sleeve -01 No replaced with new.

Tail Pulley: 02 No bearing + 02 sleeve

Bend Pulley: 2 Bearings + 2 Sleeves. –DS & NDS.

Take-up pulley Bearing + Sleeve: Found O.K. (Greasing done with EP-2).

BEARING REPLACEMENT WORKS IN BC-111 & 116:

All the defective bearings identified during shut down inspection had been replaced with new.

Taper sleeve/ Adapter sleeves have also been replaced with new.

Pulleys Covered: Head Pulley –found OK. (Greasing done with EP-2)

Snub Pulley: Bearing – 01 No & Sleeve -01 No replaced with new.

Tail Pulley: 02 No bearing + 02 sleeve

Bend Pulley: 2 Bearings + 2 Sleeves. –DS & NDS.

VARIOUS PULLEY LAGGING WORKS CARRIED OUT DURING ATR-2021:

Pulley Lagging Work carried out in -BC-101, 102, 104, 107, 108, 112, 113,130,132.

Date of execution: 12.03.2021 (BC-107):

Agencies Involved: **M/s: Rajeswari Ent, for positioning of pulley** to facilitate lagging works & **M/s: Thejo Engineering** engaged for rubber lagging works.

Pulley Details: Dia-330 x FW-1150 –04 Nos – BC-107

Pulley Details: Dia-400 x FW-1150 –01 No – BC-107



Date of execution: 21/03/2021 (BC-108):

Agencies Involved: **M/s: Rajeswari Ent, for positioning of pulley** to facilitate lagging works & **M/s: Thejo Engineering** engaged for rubber lagging works.

Pulley Details: Dia-330 x FW-1150 –04 Nos – BC-108

Pulley Details: Dia-400 x FW-1150 –01 No – BC-108

Date of execution: 17.03.2021 (BC-104):

Agencies Involved: **M/s: Rajeswari Ent, for positioning of pulley** to facilitate lagging works & **M/s: Thejo Engineering** engaged for rubber lagging works.

Pulley Details: Dia-330 x FW-1150 –02 Nos – BC-104

Pulley Details: Dia-223 x FW-1150 –01 No – BC-104



Date of execution: 18.03.2021 (BC-101):

Agencies Involved: **M/s M/s: Rajeswari Ent**, for positioning of pulley to facilitate lagging works & **M/s: Thejo Engineering** engaged for rubber lagging works.

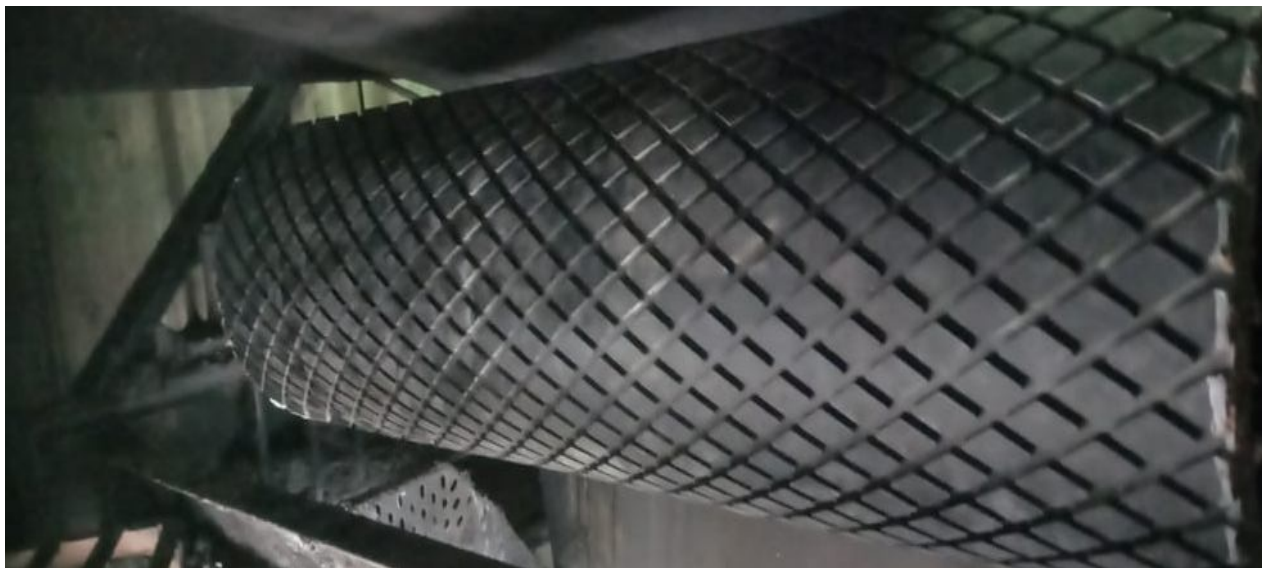
Pulley Details: Dia-330 x FW-1150 –03 Nos – BC-101



Date of execution: 30.03.2021 (BC-111):

Agencies Involved: **M/s:Rajeswari Ent**, for positioning of pulley to facilitate lagging works & **M/s: Thejo Engineering** engaged for rubber lagging works.

Pulley Details: Dia-400 x FW-1600 –03 Nos – BC-111



Date of execution: 24.03.2021 (BC-102):

Agencies Involved: **M/s: Rajeswari Ent, for positioning of pulley to facilitate lagging works & M/s: Thejo Engineering engaged for rubber lagging works.**

Pulley Details: Dia-330 x FW-1150 –02 Nos – BC-102

Pulley Details: Dia-223 x FW-1150 –02 No – BC-102

Date of execution: 24.03.2021 & 20.03.2021 (BC-130 & 132):

Agencies Involved: **M/s: Rajeswari Ent, for positioning of pulley to facilitate lagging works & M/s: Thejo Engineering engaged for rubber lagging works.**

Pulley Details: Dia-630 x FW-1600 –01 Nos – BC-130

Pulley Details: Dia-500 x FW-1600 –03 No – BC-130

Pulley Details: Dia-630 x FW-1600 –01 Nos – BC-132

Pulley Details: Dia-500 x FW-1600 –03 No – BC-132

Maintenance / Overhauling of vibrating screens:



Drive shaft with pulley- 01 SET REPLACED

New taper sleeve with finished bore & key way replaced in 123 screen.

New cardan shaft Big & small both replaced in SCREEN-120 & Big One replaced in SCREEN-123

Panels -10 Nos replaced in both the screens along with complete new fasteners and clamps

Rubber buffers and springs – 6-Nos replace with new

Buck strip rubber ring also replaced in both the screens.

Gear Box – OIL FLUSHING DONE & NEW OIL SP-320-OF DESIRED QNTY. REPLACED.

BEARINGS & PLUMMER BLOCKS – 01 SET, (SN-512) & BEARING- 22212 EK/W33 + H-312, EACH REPLACED ON DRIVE & NON DRIVE SIDE OF THE SCREEN-123.

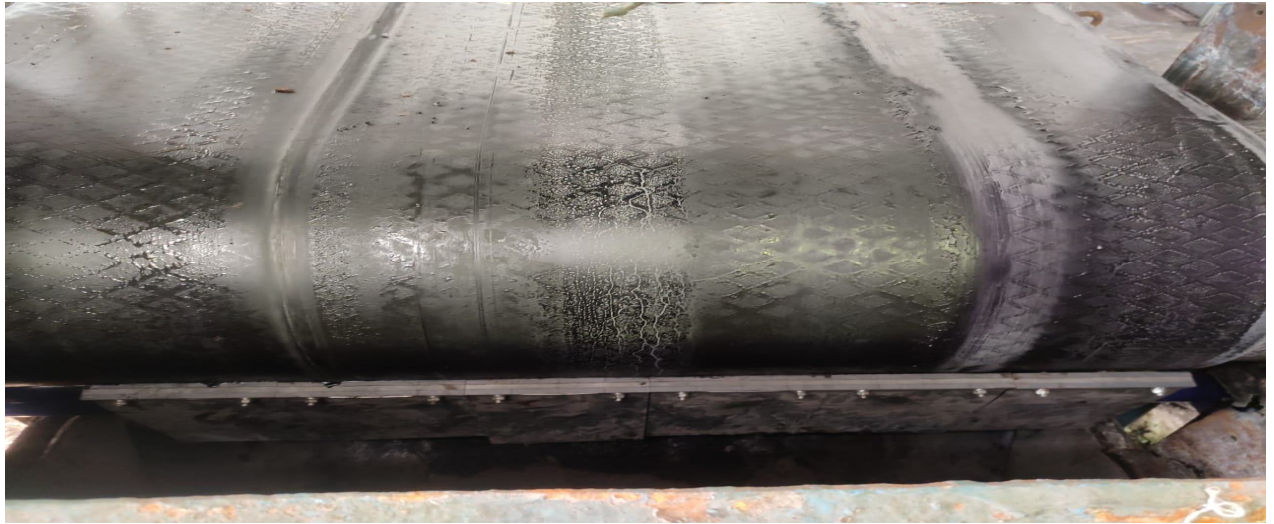
REPLACEMENT OF TUNGSTEN CARBIDE SCRAPPERS WITH SS-316 SHIELD:

Specially designed tungsten carbide tipped scrappers best suited for oil mixed products those were procured from M/s: Flexco (USA) have been installed in PHS – **Conveyor No: 101,102,104**, of belt width -1000mm & **PHS-203,130,130-A** of 1400mm width .

Quality of scrapping / cleaning as observed after installation and commissioning seems to be excellent .

Photographs associated with the same have been attached herewith .





REDMI NOTE 8 PRO
AI QUAD CAMERA

AUTOMATIC-BELT TRAINER INSTALLATION IN BC- 130 :

Automatic belt trainers on trial basis have been installed on the carrying as well as return side of BC- 130 with a vision to minimise the spillage during running condition of the conveyor.

Now the installed trainers are working satisfactorily since installation .





RETURN SIDE OF BC- 130:

Maintenance of slat & portable conveyors:

Complete chain assembly replaced in slat 3, 4 & 14.

Bearings replaced in SLAT NO: 1, 2, 3, 4, 12, 13, 14, 9, 10, 11 –Completely New bearing & sleeves replaced.

Gear Box SUMA-7 oil seal leakage arrested in slat -6, 4, 3, 11, 14.

SP-320 Gear oil completely replaced in all SLAT CONVEYORS EXCEPT: SLAT No: 8,6,7,5. (As we had already replaced in the 1st week of March-2021).

Portable Conveyor BELTS replaced in PC- 5, 6. (BELT WIDTH-650MM)

Tail Pulley bearings replaced in PC: 1,2,3,4, 9, and 10, 11,12,13,14.

AIR RECEIVER: SAFETY VALVE OVERHAULING, TESTING & SETTING

Details of the safety relief valve:

MODEL NO: F/0C61AA4, SL NO: 108082

SIZE: 40 X 50 SET PR: 9.97 KG/SQ.CM

BODY: SA-216-WCB, TRIM: SS-316, CONE INLET: 150RF & CONE OUTLET: 150RF



TEST CARRIED OUT BY: M/S: EFCO MASCHINENBAU- HYDERABAD

TEST CARRIED OUT AT: ENERGY CENTRE. (March-2021)

HYDROTEST OF THE INSTRUMENTATION AIR TANK ALSO CARRIED OUT BY THE CENTRAL WORKSHOP IN CORDINATION WITH THE MAINTENACE & OPERATION TEAM OF BAGGING PLANT UNDER THE SUPERVISION OF THE COMPETENT PERSON DEPLOYED BY DIRECOR OF F& B- GOVT.OF ODISHA.



RESULT: SATISFACTORY (O.K). –FOUND TO BE FIT FOR USE.

ANNUAL SHUTDOWN REPORT-2021

UTILITIES & offSITE

MECHANICAL

SAP cooling tower blow down valves:

1. 7 no of cooling tower blow down valves were dismantled from position for inspection.
2. Cleaning and greasing done and valves were fitted back in to the position.

Recirculation PUMP A

- Pump Top Casing dismantled.
- Bearing housing end covers and top covers of NDE and DE side removed.
- Both side gland followers were removed.
- Rotor assembly removed from the bottom casing.
- Individual parts were inspected visually.

Some of the critical problems observed during dismantling/inspection are mentioned below.

1. Minor Pitting found on both side of suction eye impeller area.
2. Thrust bearing found ok.
3. D.E & NDE side journal bearings found in good condition with little scratching & dents.
4. Gland packing were found severely worn out but Gland sleeves were in good condition.
5. Previously coated antifriction coating in the top and bottom casing found peeled off.

Remedial action taken against the problems:

1. A complete rotor assembly (repaired) was made ready for erection.
2. Impeller vane shroud portion that were pitted severely were welded and sent for dynamic mass balancing, balancing report is attached.
3. Both the bearings housing were cleaned with diesel; throat bush sitting position, casing neck ring sitting position were also cleaned properly.
4. Both side journal bearings are replaced with new journal bearings, journal bearings were polished and blue matching was done with an excellent matched area.
5. DE side gland sleeve was replaced with a new gland sleeve.
6. NDE side THRUST Bearing was replaced with a new 6318C3 bearing.
7. New Casing gasket & Hollow core type PTFE gland packing provided.
8. Clearance of both NDE & DE side journal bearing were taken and are 0.11mm & 0.13mm respectively.
9. Finally bearing housing top cover and casing top cover tightened.

10. Top casing and bottom casing pitted portion were built up and applied with ITW coating.



Rotor Assembly Condition after top casing removal



Rotor Assembly Condition after cleaning

11. Alignment was done by laser alignment machine and axial and radial reading are 0.04 and .03 mm respectively.

12. Pump Suction valve 1200NB Dia. Replaced.



Suction Valve before Replacement



Suction Valve After Replacement

Balancing report of CT pump “A” rotor assembly

INDIAN FARMERS FERTILISER COOPERATIVE LIMITED
PARADEEP UNIT
INSPECTION SECTION
BALANCING REPORT



पूर्णतः सहकारी स्वामित्व
Wholly owned by Cooperative
Paradeep Unit

Date: 18.03.2021

PLANT	: U & O
EQUIPMENT	: Cooling Tower Pump Impeller (Spare)
ROTOR ASSEMBLY WEIGHT	: 790 KG
BALANCING GRADE	: G 2.5
TOLERANCE / PLANE	: 25.035 kgmm
DIMENSION	: A= 900 mm B= 190 mm C= 900 mm R1= 400 mm R2= 400 mm
Diameter at Pedestal 1	= 90 mm
Diameter at Pedestal 2	= 130mm
Diameter at Belt Drive	= 160 mm
Field RPM	= 745
Balancing RPM	= 205

INITIAL UNBALANCING:

STAT
90.5 g at 301 deg
(1.2 Tol)

FINAL RESIDUAL UNBALANCE LEFT ON THE ROTOR ASSEMBLY:

STAT
13.8 g at 127 deg
(In Tol)

Remarks (If any):

Balancing was carried out by using trial mass as per grade G 2.5 of ISO 1940. Location marked on the rotor for addition of mass.

Reported By

J BHOWAL

Reviewed By

D UMAPATHI

Approved By

MANOJ KUMAR

Recirculation PUMP B(Small Dia Impeller.)

- Pump Top Casing dismantled.
- Bearing housing end covers and top covers of NDE and DE side removed.
- Both side gland followers were removed.
- Rotor assembly removed from the bottom casing.
- Individual parts were inspected visually.

Some of the critical problems observed during dismantling/inspection are mentioned below.

1. Minor Pitting found on both side of suction eye impeller area.
2. Thrust bearing inner race found damaged and distorted.
3. D.E & NDE side journal bearings found in good condition with little scratching & dents.
4. Gland packing were found severely worn out but Gland sleeves were in good condition.
5. Previously coated antifriction coating in the top and bottom casing found peeled off.

Remedial action taken against the problems:

1. The pitting portion of impeller eye was welded properly and sent to workshop for dynamic mass balancing.
2. A copy of balancing report is attached herewith for reference.
3. Individual parts like throat bush, gland pusher, casing wear ring, were cleaned and buffing done where ever necessary
4. DE and NDE side bearing housing were thoroughly cleaned with diesel.
5. Both side journal bearings are replaced with new journal bearings, journal bearings were polished and blue matching was done with an excellent matched area
6. NDE side THRUST Bearing was replaced with a new 6318C3 bearing.
7. Top casing and bottom casing pitted portion were built up and applied with ITW coating.
8. New Casing gasket & Hollow core type PTFE gland packing provided.
9. After fitting of journal bearings, clearance was taken and found within limit (0.11 mm and 0.13mm for DE and NDE Side respectively).
10. Finally bearing housing top cover and casing top cover tightened



Fig: SAP cooling tower Pump B casing rotor condition.



Rotor assembly during erection

11. Alignment was done by laser alignment machine and axial and radial reading are 0.04 and .03 mm respectively.

Balancing report of CT pump "B" rotor assembly

INDIAN FARMERS FERTILISER COOPERATIVE LIMITED
PARADEEP UNIT
INSPECTION SECTION
BALANCING REPORT



Date: 22-03-2021

PLANT	: U & O
EQUIPMENT	: Cooling Tower Pump Impeller (PUMP-B)
ROTOR ASSEMBLY WEIGHT	: 790 KG
BALANCING GRADE	: G 2.5
TOLERANCE / PLANE	: 25.035 kgmm
DIMENSION	: A= 910 mm
	: B= 190 mm
	: C= 880 mm
	: R1= 380 mm
	: R2= 380 mm
Diameter at Pedestal 1	= 90 mm
Diameter at Pedestal 2	= 130mm
Diameter at Belt Drive	= 160 mm
Field RPM	= 745
Balancing RPM	= 205

INITIAL UNBALANCE:

STAT
128 g at 261 deg
(1.92 Tol)

FINAL RESIDUAL UNBALANCE LEFT ON THE ROTOR ASSEMBLY:

STAT
10.9 g at 186 deg
(in Tol)

Remarks (If any):

Residual unbalance on the rotor is within tolerable limit as per Grade G 2.5 of ISO 1940.

Reported By

J BHOWAL

Reviewed By

D UMAPATHI

Approved By

MANOJ KUMAR

Page 1 of 1

Recirculation PUMP C(Small Dia Impeller)

- Pump Top Casing dismantled.
- Bearing housing end covers and top covers of NDE and DE side removed.
- Both side gland followers were removed.
- Rotor assembly removed from the bottom casing.
- Individual parts were inspected visually.

Some of the critical problems observed during dismantling/inspection are mentioned below.

1. Minor Pitting found on both side of suction eye impeller area.
2. D.E & NDE side journal bearings found in good condition with little scratching & dents.
3. Gland packing were found severely worn out but Gland sleeves were in good condition.
4. Previously coated antifriction coating in the top and bottom casing found peeled off.

Remedial action taken against the problems:

1. The pitting portion of impeller eye was welded properly and sent for dynamic mass balancing, balancing report attached.
2. Both side bearings housing were cleaned with diesel; throat bush, casing wear ring and gland packing position were also buffed.
3. Both side journal bearings are replaced with new journal bearings, journal bearings were polished and blue matching was done with an excellent matched area
4. NDE side THRUST Bearing replaced with a new 6318C3 bearing.
5. Top casing and bottom casing pitted portion were built up and applied with ITW coating.
6. New Casing gasket & Hollow core type PTFE gland packing provided.
7. Clearance of the both side journal bearings, DE and NDE, taken (0.12mm and 0.13mm) found within the permissible limit.
8. Finally pump boxed up, alignment done and readings are mentioned below.



FIG: Pump C casing and Rotor assembly.

9. Alignment was done by laser alignment machine and axial and radial reading are 0.02 and .04 mm respectively.
10. Pump Discharge valve of 1000mm Dia. Replaced.

Balancing Report of Pump-C

INDIAN FARMERS FERTILISER COOPERATIVE LIMITED
PARADEEP UNIT
INSPECTION SECTION
BALANCING REPORT



पूर्णतः सहकारी स्वामित्व
Wholly owned by Cooperatives
Paradeep Unit

Date: 20-03-2021

PLANT	: U & O
EQUIPMENT	: Cooling Tower Pump Impeller(Spare)
ROTOR ASSEMBLY WEIGHT	: 760 KG
BALANCING GRADE	: G 2.5
TOLERANCE / PLANE	: 25.035 kgmm
DIMENSION	: A= 900 mm
	: B= 190 mm
	: C= 900 mm
	: R1= 400 mm
	: R2= 400 mm
	: = 90 mm
Diameter at Pedestal 1	: = 130mm
Diameter at Pedestal 2	: = 160 mm
Diameter at Belt Drive	: = 745
Field RPM	: = 201
Balancing RPM	

INITIAL UNBALANCE:

STAT
107 g at 222 deg
(1.6 Tol)

FINAL RESIDUAL UNBALANCE LEFT ON THE ROTOR ASSEMBLY:

STAT
3.35 g at 25 deg
(in Tol)

Remarks (If any):

Residual unbalance on the rotor is within tolerable limit as per Grade G 2.5 of ISO 1940.

Reported By

J BHOWAL

Reviewed By

D UMAPATHI

Approved By

MANOJ KUMAR

Page 1 of 1

Recirculation PUMP S:

- Pump Top Casing dismantled.
- Bearing housing end covers and top covers of NDE and DE side removed.
- Both side gland followers were removed.
- Rotor assembly removed from the bottom casing.
- Individual parts were inspected visually.

Some of the critical problems observed during dismantling/inspection are mentioned below.

1. Minor Pitting found on both side of suction eye impeller area.
2. Thrust bearing found ok.
3. D.E & NDE side journal bearings found in good condition with little scratching & dents.
4. Gland packing were found severely worn out, DE side gland sleeve found damaged
5. Previously coated antifriction coating in the top and bottom casing found peeled off.

Remedial action taken against the problems:

1. A complete rotor assembly (repaired) was made ready for erection.
2. Impeller vane shroud portion that were pitted severely were welded and sent for dynamic mass balancing, balancing report is attached.
3. Both the bearings housing were cleaned with diesel; throat bush sitting position, casing neck ring sitting position were also cleaned properly.
4. Both side journal bearings are replaced with new journal bearings, journal bearings were polished and blue matching was done with an excellent matched area.
5. DE side gland sleeve was replaced with a new gland sleeve.
6. NDE side THRUST Bearing was replaced with a new 6318C3 bearing.
7. New Casing gasket & Hollow core type PTFE gland packing provided.
8. Clearance of both NDE & DE side journal bearing were taken and are 0.12mm & 0.13mm respectively.
9. Finally bearing housing top cover and casing top cover tightened.
10. Top casing and bottom casing pitted portion were built up and applied with ITW coating.
11. Alignment was done by laser alignment machine and axial and radial reading are 0.05 and .04 mm respectively.





casing.

Fig: Rotor Assembly of pump S and Top

Misc. Maint activities :

A. 750MM Filter water line

1. Complete Shutdown was taken for 36 Hr for replacing 90 Mtrs length of 750 NB pipe.
2. Existing line's damaged portion was cut from both the side and hooked up with the new fabricated line.
4. DP test of the root run was carried out and found no defects.
5. After completion of welding drain points were boxed up and water charged in the line, found no leakage.



Fig-Filter water line after Replacement

B. 500 MM TG Cooling tower cooling water line

1. Cooling water line to reciprocating and centrifugal air compressor inlet line approximate length 6 mtrs dismantled, fabrication erection and hookup done.
2. Fitment, DP test carried out after root run and final welding done.



TG Cooling tower line Replacement before



TG Cooling tower line Replacement after

C. 4" Tapping for Condensate Line

4" Tapping for condensate transfer line to DM plant was provided in front SAP Cooling Tower.



4" Tapping for Condensate Line

D. Neutralization Pit Pump damaged Suction strainer removal, fabrication and erection of new suction strainer of SS 304 jally.



Neutralization Pit Pump Suction strainer before.



Neutralization pit pump suction strainer after replacement.

E. New FO Storage tank Pre-Commissioning Job:

1. 2" FO recirculation line hook up with the existing 3" FO discharge line to DAP.
2. Hookup of 3" FO transfer pump suction line with the existing line.
3. 4" FO unloading line hookup with the existing unloading line.

F. Hydro testing of plant air receiver at 12 Kg/Cm².

G. Bottom Manhole of Degasser water storage tank of old DM plant removed for rubber lining inspection, rubber line found in good condition.

H. Bottom manhole of polished condensate storage tank removed for thickness measurement of bottom plate & shell plate, no major thickness reduction observed.

F. SAP Cooling Tower Discharge header PH and Temperature meter nipple replacement.



PH and Temperature Nipple before Replacement



PH and Temperature nipple After Replacement

Maintenance Activities in Ammonia Storage Area.

Ammonia Transfer Pump A:

1. After complete depressuring of the pump and the barrel the inlet & outlet flanges were disconnected from the pump.
2. Decoupling of the pump done and motor removed.
3. All the associated inlet and outlet methanol piping for the Mechanical seal were removed and after that mechanical seal removed from position.
4. Pump discharge bend and motor stool piece were removed from the position.
5. The column pipes along with the pump suction were removed from the barrel.

Observation:

After complete removal of the pump each and every parts were inspected for re usability and following observations were made:

1. Depressuring pipe that is connected with the pump for DP of barrel was found disconnected from the pump and its fitting fallen in the barrel.
2. 2 Nos.Stage bush were found worn out and damaged.
3. Column pipe carrier bush and sleeve found in good condition.

4. O-rings used in the suction casing and stage casing were found damaged.
5. All the 3 Nos of impeller and sleeves were found in good condition.
6. Conical couplings for the column shaft were found in good condition.
7. Motor stool piece found corroded and pitted.

Assembly Procedure:

1. After completion of visual inspection all the spares were cleaned thoroughly.
2. The runout and straightness of the shaft were checked and found within the tolerance limit.
3. Assembly of the stage casing and impellers were done, 2 Nos. of new stage bush were used.
4. While assembling of impeller and stage casing clearance of impeller and stage casing were measured and found within the limit
5. All the stage gasket and suction casing gasket and orings were replaced with new Gasket and orings.
6. After complete assembly of impellers, stage casing and column pipes the pump is ready for erection.
7. Fitting that was fallen in the pump barrel was removed and the barrel was completely cleaned before erection of the pump.
8. Pump sole plate buffing and cleaning done.
9. Motor stool piece blasting and painting done before erection.
10. Pump assembly consisting of stage casing, column pipes and discharge bend were positioned and tightened on the sole plate.
11. Mechanical seal and all the associated pipings for the mechanical seal were connected.
12. Bearing housing along with bearing fitted and float adjusted.
13. After adjusting float mechanical seal and bearing housing fully tightened.
14. Coupling half of pump shaft and motor shaft fitted and motor positioned on the motor stool.
15. No load vibration of the motor taken and after Normal vibration report Pump and motor coupled and offered for vibration in load condition.



Ammonia Transfer pump-A Ready or Erection.

Ammonia Transfer Pump B:

1. After complete de-pressuring of the pump and the barrel the inlet & outlet flanges were disconnected from the pump.
2. Decoupling of the pump done and motor removed.
3. All the associated inlet and outlet methanol piping for the Mechanical seal were removed and after that mechanical seal removed from position.
4. Pump discharge bend and motor stool piece were removed from the position.
5. The column pipes along with the pump suction were removed from the barrel.

Assembly Procedure:

The Existing Ammonia transfer pump B with 4 Nos of impeller is to be replaced with 3 Nos of impeller for ease of operation.

Before shutdown One Standby ammonia Transfer Pump with **3 nos** of Impellers was made ready for the above purpose. The assembly procedure is mention as below:

1. The runout and straightness of the shaft were checked and found within the tolerance limit.
2. Assembly of the stage casing and impellers 3 in Nos were done, new stage bush were used.
3. While assembling of impeller and stage casing clearance of impeller and stage casing were measured and found within the limit
4. All the stage gasket and suction casing gasket and orings were replaced with new Gasket and orings.
5. After complete assembly of impellers, stage casing and column pipes the pump is ready for erection.
6. Pump barrel was completely cleaned before erection of the pump.
7. Pump sole plate buffing and cleaning done.
8. Motor stool piece blasting and painting done before erection.
9. Pump assembly consisting of stage casing, column pipes and discharge bend were positioned and tightened on the sole plate.
10. The existing Dry type Mechanical seal is replaced with a new Wet type methanol based mechanical seal and all the associated pipings for the mechanical seal were connected.
11. Bearing housing along with bearing fitted and float adjusted.
12. After adjusting float mechanical seal and bearing housing fully tightened.
13. Coupling half of pump shaft and motor shaft fitted and motor positioned on the motor stool.
14. No load vibration of the motor taken and after Normal vibration report Pump and motor coupled and offered for vibration in load condition.



Ammonia transfer pump B ready for erection.

Miscellaneous Maint. activities in Ammonia storage Area:

1. Ammonia Transfer Pump 'A' Suction Drain Line Replacement done.
2. Ammonia Transfer pump 'A' Suction Pressure gauge Nipple Replaced.
3. Ammonia transfer Pump 'A' Discharge Line nipple replaced.
4. Ammonia transfer Pump 'A' Discharge Line pressure gauge Nipple replaced.
5. 18 Nos of Ammonia drain line nozzle weldment DP and thickness measurement done, no porosity and thickness reduction found.



Ammonia Tr pump.drain line pressure gauge nipple welding



6. Ammonia storage tank 'A' Pilot valve vapour inlet line support welding done.
7. 8" Ammonia transfer line safety relief valve replaced with a new SRV with set pressure 22.5 Kg/Cm².
8. 8 Mtrs lengths of 12" ammonia suction line cold insulation near transfer pump A replaced with insitu foam cold insulation.

9. 30 Mtrs lengths of 8" ammonia transfer line cold insulation replaced with insitu foam cold insulation.
10. All the discharge line up to ARC valve cold insulation removed and new insitu foam insulation done.
11. 8" Ammonia transfer line old damaged insulation near T8 area and SAP CT front area was replaced with new insulation Approx. length 150 Mtrs.



Insulation of 12" Ammonia suction and discharge line

CIVIL



Repairing of brick lining of one wall inside reactor (#130)

Brick lining on one of the wall in compartment # 130 was found bulged and this was observed during ATR 2019 and metallic supports were provided to the brick wall to hold them in position. And it was decided to repair this wall during ATR 2020. Order was placed accordingly and material was also procured.

The work could not be done during ATR 2020 due to Covid 19 pandemic and nation side lockdown declared. Fortunately the condition of the wall was found to be as it was in 2019.

During ATR 2021, the work was taken up and completed satisfactorily.

The executing agency was M/s Arcoy Industries and the material used in work was also supplied by them.

Works carried out---

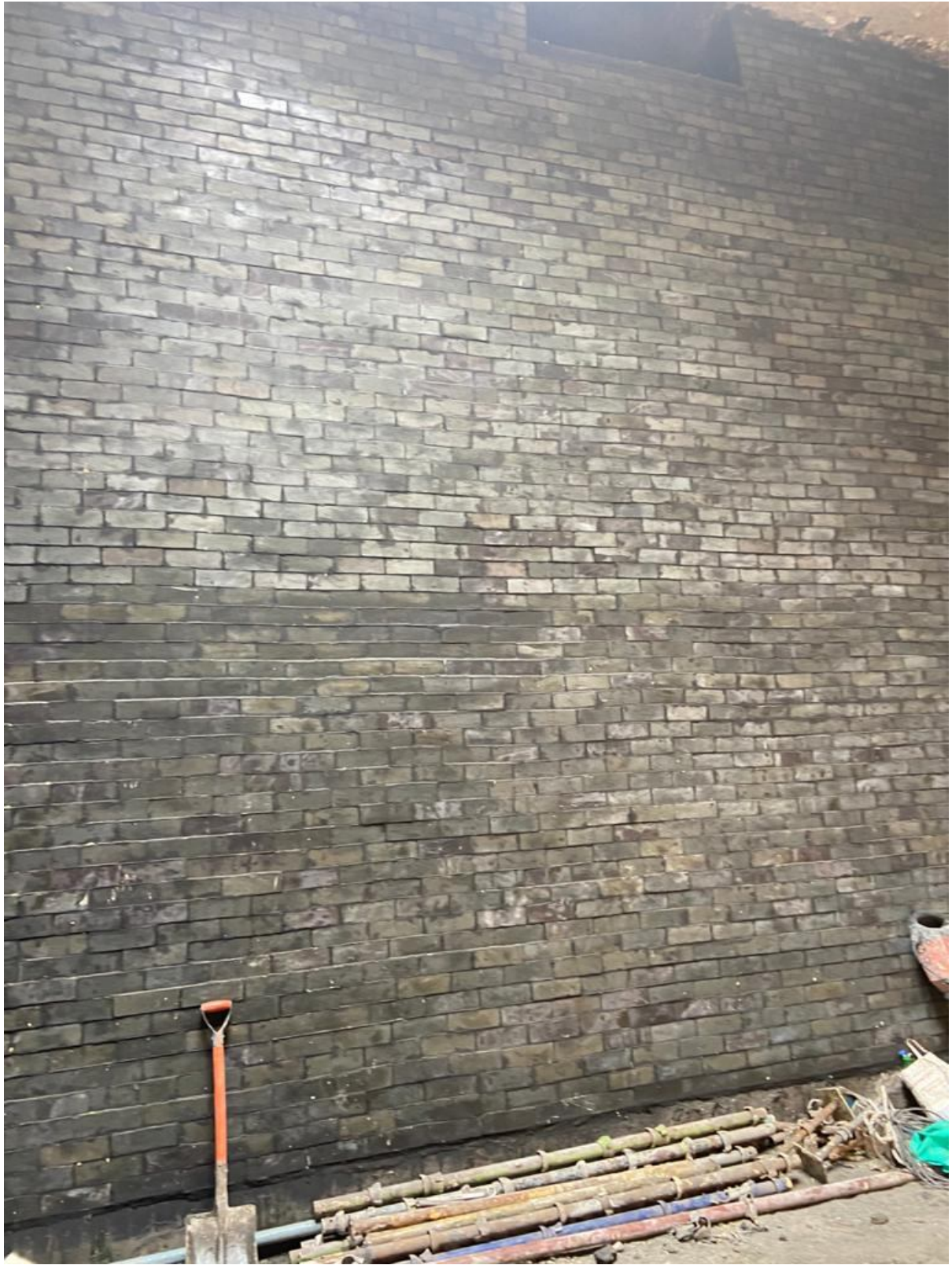
1. Dismantling of the carbon bricks on entire wall (gap observed between concrete wall and bricks as 80mm avg and maximum 115mm at centre portion).
2. Removal of deposits, grinding and cleaning (thru waterjet) of entire concrete surface.
3. Washing of entire surface with detergent soap solution.
4. Copper slag blasting over concrete surface.
5. Application of Arcopatch mortar (Avg 3 mm thick) over concrete surface as a conductive layer.
6. Buffing (thru grinder) of entire conductive layer to make the surface rough.
7. Laying of rubber lining, 4 mm thick Arcobutyl (Rubber) with the help of Arco AD -1 adhesive (cold bonding system) over conductive layer.
8. Application of Arfurane -C primer over rubber lined surface.
9. Laying of carbon bricks (horizontally) in 115 mm thickness by using Arfurane -C mortar.

PHOTOGRAPHS (BEFORE)



PHOTOGRAPHS (AFTER)





Renovation of refractory brick lining in DAP trains A, B & C

The combustion chambers at DAP Train-A, B & C required renovation of refractory and insulation brick work, it was taken up during the shutdown. Also, inside the duct of the chamber castable refractory brick work was repaired, this required dismantling of the existing refractory, castable & insulation bricks and carting the debris from combustion floor of respective DAP plants.

The job was completed as per the specifications of the work order and in the prescribed time period.

TrainA: Complete brick lining was dismantled and removed.

New Insulation and Fire brick lining was done.

Replacement of complete cell.

Application of castable was done inside duct.

Dry out of the brick lining

Train B: Complete brick lining was dismantled and removed.

New Insulation and Fire brick lining was done.

Replacement of complete cell.

Application of castable was done inside duct.

Dry out of the brick lining

Train C: Repairing /replacement of damages brick lining and castable

AFTER BRICK LINING IN COMBUSTION CHAMBERS





PARADEEP UNIT

ATR 2021 REPORT
INSTRUMENTATION SECTION

SULFURIC ACID PLANT

Instrumentation

BOILER AREA

- Old & Obsolete Boiler drum level control valve of SAP-1 (10LCV1301) was replaced with new Dresser make control valve.

Old 10LCV1301 before Replacement



New 10LCV1301 after Replacement



- Old & Obsolete 3-Way temperature control valve of Super-heater-1 (10TCV-1506) was replaced with new Dresser make control valve in SAP-1.

Old 3-Way 10TCV1506 before Replacement



New 3-Way 10TCV1506 after Replacement

- Old & Obsolete export steam pressure control valve of SAP-1 (10PCV-1304) was replaced with new Fisher make control valve.

OLD Export Control Valve Tag 10PCV1304



New Export steam Control Valve Tag 10PCV1304



Hydrastep Electronic Level Indicator:

Delta Mobrey make electronic level indicator was Installed & commissioned in boiler drum of SAP-1 with remote display unit installed in control room for direct level indication.

HYDRASTEP INSTALLATION IN SAP-1 BOILER DRUM



- Old & Obsolete export steam pressure control valve of SAP-2 (10PCV-2304) was replaced with new Dresser make control valve.

OLD Export steam PCV Tag 10PCV2304



New Export steam PCV Tag 10PCV2304



- Old & Obsolete 3-Way temperature control valve of Super-heater-1 (10TCV-2506) was replaced with new Dresser make control valve in SAP-2.

OLD 3-Way Control Valve 10TCV2506



New 3-Way Control Valve 10TCV2506



- Old & Obsolete Boiler drum level control valve of SAP-2 (10LCV2301) was replaced with new KSB MIL make control valve.

OLD Drum level Control Valve Tag 10LCV2301



New Drum level Control Valve Tag 10LCV2301



- **Hydrastep Electronic Level Indicator:**

Delta Mobrey make electronic level indicator was Installed & Commissioned in boiler drum of SAP-2 with remote display unit installed in control room for direct level indication.

HYDRASTEP INSTALLATION IN SAP-2 BOILER



- Old damaged molten sulphur flow head along with transmitter was replaced with a new ones in SAP-2 (10FT2206).

OLD Sulphur Flow meter



New Sulphur Flow meter



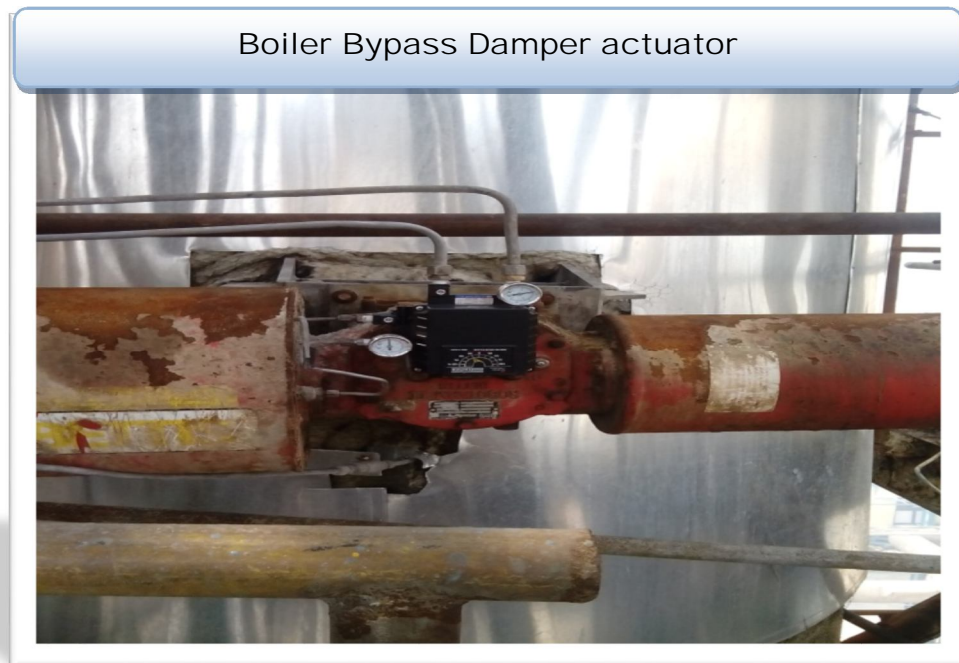
- Diesel flow meters for both burners of SAP-1 & 2 dismantled, cleaned & checked. Found ok

Diesel Flowmeter



- Old CS Condensate pots were replaced with new SS condensate pots for the following:
 - i> CBD tank level HP & LP tapping points.
 - ii> Boiler drum LT of SAP-1 & 2.

- Export steam line instruments FT1302, PT1304, PT1331, FT2302, PT2304 & PT2331 were checked & calibrated.
- Furnace thermowell & elements of TE1202, TE2202, TE1202A & TE2202A were removed, cleaned & inspected. Damaged one was replaced with new one.
- SAP-2 boiler bypass damper actuator was replaced with a spare. Operation check & found Ok.



- CWP-1, 2, 3, 4: All trip related instruments (Pr. Switches, Pr. Transmitter) were checked & calibrated. Trip Solenoid of CWP-1 & 4 were cleaned, overhauled & checked, found ok.
- SAP-1 CWP-2 & 3: Cable laying, termination & related DCS job carried out to operate Discharge valve with Motorized actuator from DCS & getting position feedback in DCS.
- Pressure gauges installed in Boiler drum, SH-1, SH-2, Economizer (SAP-1 & 2) were calibrated & re-installed.
- Damage bearing RTD elements of CWP turbine replaced in SAP-1, 2.

- New vibration probes were installed both PA fans of SAP-1 & 2.
- All control valves were cleaned, calibrated & stroke checking was carried out in both trains.

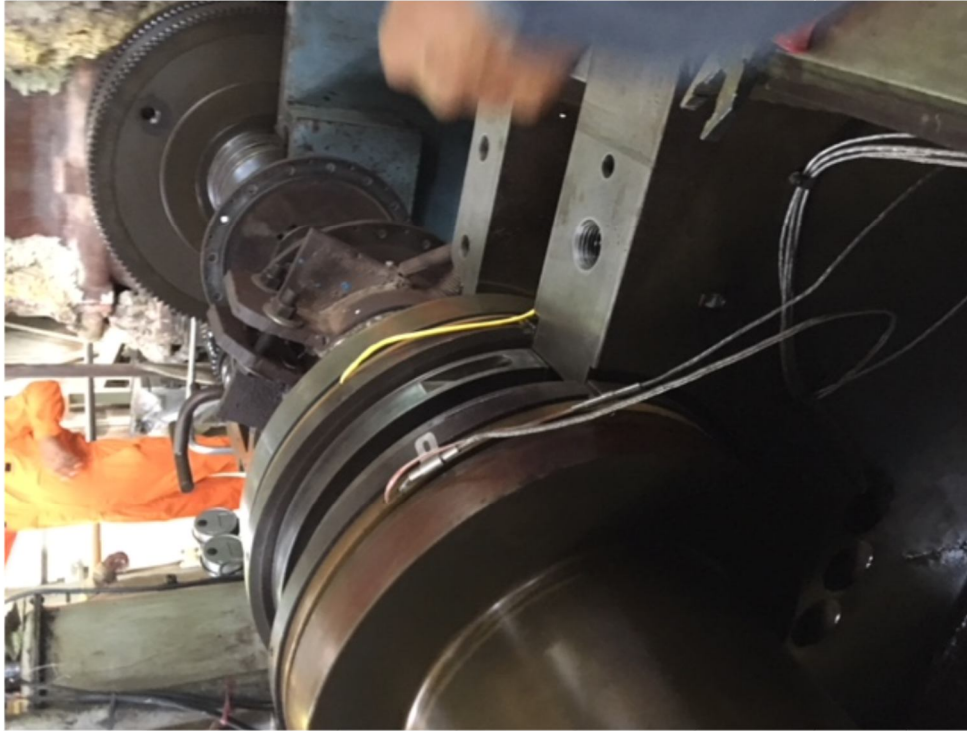


Vibration Probe installation In PA Fan

ACID AREA

- Main Air blower turbine house: All vibration probes were removed, cleaned & inspected. Found ok.
- Damaged vibration probe housing were replaced with new ones.
- Bearing RTD of turbine & air blower were inspected & damaged RTD probes were replaced with new ones.
- All Trip Solenoids installed in Trip Block of SAP-1 MAB turbine were removed, cleaned, overhauled & checked. Found ok. In SAP-2 brand new Trip Solenoids were installed in Trip Block.

Main Air Blower Turbine RTD Inspection



- Turbine inlet steam flow meters FT1560 & FT2560 were calibrated.
- Turbine house pressure switches, pressure transmitters, pressure gauges were checked & calibrated in both trains. New RTD element was installed in turbine exhaust line in both trains to provide temp indication in DCS.
- Turbine, Gear box and Blower vibration probes were removed to facilitate Mechanical maintenance jobs. They were installed back after completion of Mechanical maintenance jobs in both trains.

- Turbine speed probes SE761/762 & local speed indicator physical inspection & tightness carried out for both train SAP-1, 2.
- Turbine and Gear box bearing temperature elements TE-215, 217, 245, 249, 261, 265, 269 and 273 were checked in both trains.



Main Air Blower Turbine Gauge Board Inst.

- Annubars installed in SAP-1 & 2 Air Blower discharge were dismantled & cleaned. Transmitters were cleaned & checked.
- The following dip tubes were removed from line, cleaned, visually checked & re-installed: LT1440, LT1420A, LT1440A, LT1450A.



U-seal LT Removal for Cleaning & maintenance.

- 10AV2450 & 10LV2440 control valves were replaced due to gland leakage & damaged actuators.

Control Valve replaced for 10AV2450, 10LV2440

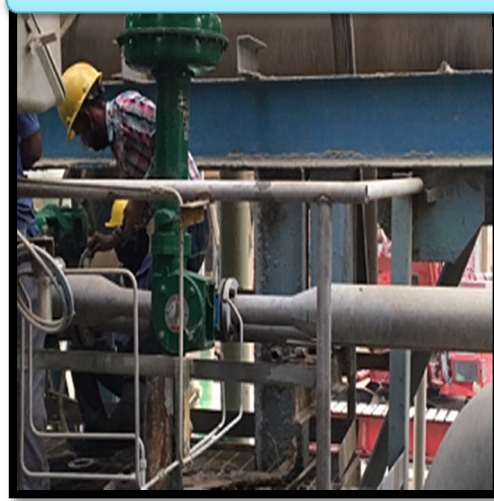


- The body of the following control valves were replaced due to gland & body leakage 10AV1450, 10LV1440.

10AV1450 body Replacement.



10LV1440 body Replacement.



- Stroke checking & calibration carried out for all control valves of acid area in both the trains.
- Valve body of 10LV1460 level control valve was replaced with a new AL20 MOC valve body.



**Valve Body
Gland Leakage**

- Blower suction airline instruments PT1402, PT2402 and FT2401 were calibrated.
- Blower discharge airline instruments PT1422, PT1403, PT2422 & PT2403 were calibrated.

- New Metal tube rotameters were installed for dilution water flow to FAT & IAT in both trains.
- FAT-Chimney Damper: Existing damper with pneumatic actuator was replaced by new damper with Motorised actuator in both trains. Cable laying, termination & related DCS jobs carried out to operate the dampers from DCS & getting Open/Close feedback.
- Existing damaged Dip-tube of IAT pump tank LT was replaced by new PTFE Dip-tube in both trains.
- New O₂ analyser was installed & commissioned in stack.
- Air Filter for air blower – All 75 nos. SOV operation was checked out of which 5 Nos. SOVs were replaced in each train.

COMMON AREA

- Melting area: LT-130, 131, 132, 107, 108, 103, 103A were calibrated.
- HP Deaerator area control valves LV1536, TV1510A, PV2602A/B, PV1392 and PV1504 general cleaning, calibration & stroke checking carried out.
- Old & damaged vent dryer control panel of Acid Storage Tank-A was replaced with a new control panel. Operation was checked & found ok.



2602A & 2602B servicing & maintenance Carried out.

- LPS line instruments PT1504, PT0110 and PT1392 were calibrated.
- Turbo driven BFW pump critical instrument such as pressure transmitter, pressure gauge & pressure switches were calibrated.

- Trip solenoid valve of BFW-101C & A cleaned & checked. Found ok.

- Old & damaged Pressure control valve of LPS-1 (10PCV1555) was replaced with new Dresser make control valve.

Old PCV-1555 Control Valve



New PCV-1555 Control Valve



- The following control valves of Melting area were cleaned, calibrated & stroke checking was carried out: LCV105, LCV360, LCV105A, LCV130, LCV131 & LCV132.
- TCV1510 De-superheating Control valve cleaning, calibration & stroke checking carried out.
- Melting Area Operator room local display unit: general cleaning, checking of parameter carried out.



OPERATOR ROOM IN MELTING AREA

- Melter-132 VPT re-circulating control valve 10LCV0132 was relocated for ease of maintenance.

Control valve before relocation



Control valve after Re-location

- BFP 101A, B, C, S critical instruments pressure Tx. , pressure s/w such as PT101B-LD, PT101S-LD, PT101A-LO, PT101C-LO, PT101A-ES, PT101C-ES, FT101A-IS, FT101C-IS, PS2-A, PS5-A, PS1-A, PS2-C, PS5-C, PS1-C and PT1543 were calibrated .

- Process water and cooling water flow meters FT1403 and FT1402 were calibrated.
- Instrument air pressure transmitter PT1645 was calibrated.

UPSS

- UPSS servicing was carried out by the service engineer.
- Battery voltage checked, general cleaning of battery bank & battery bank load testing carried out.

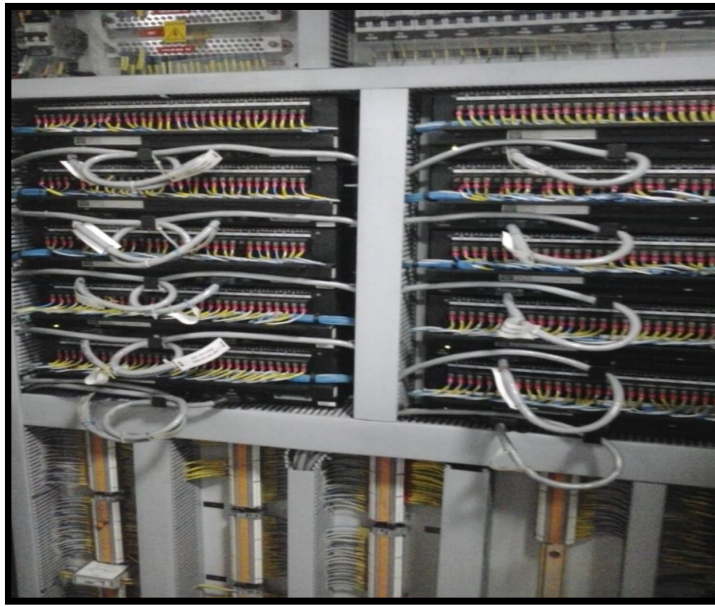


BATTERY BANK



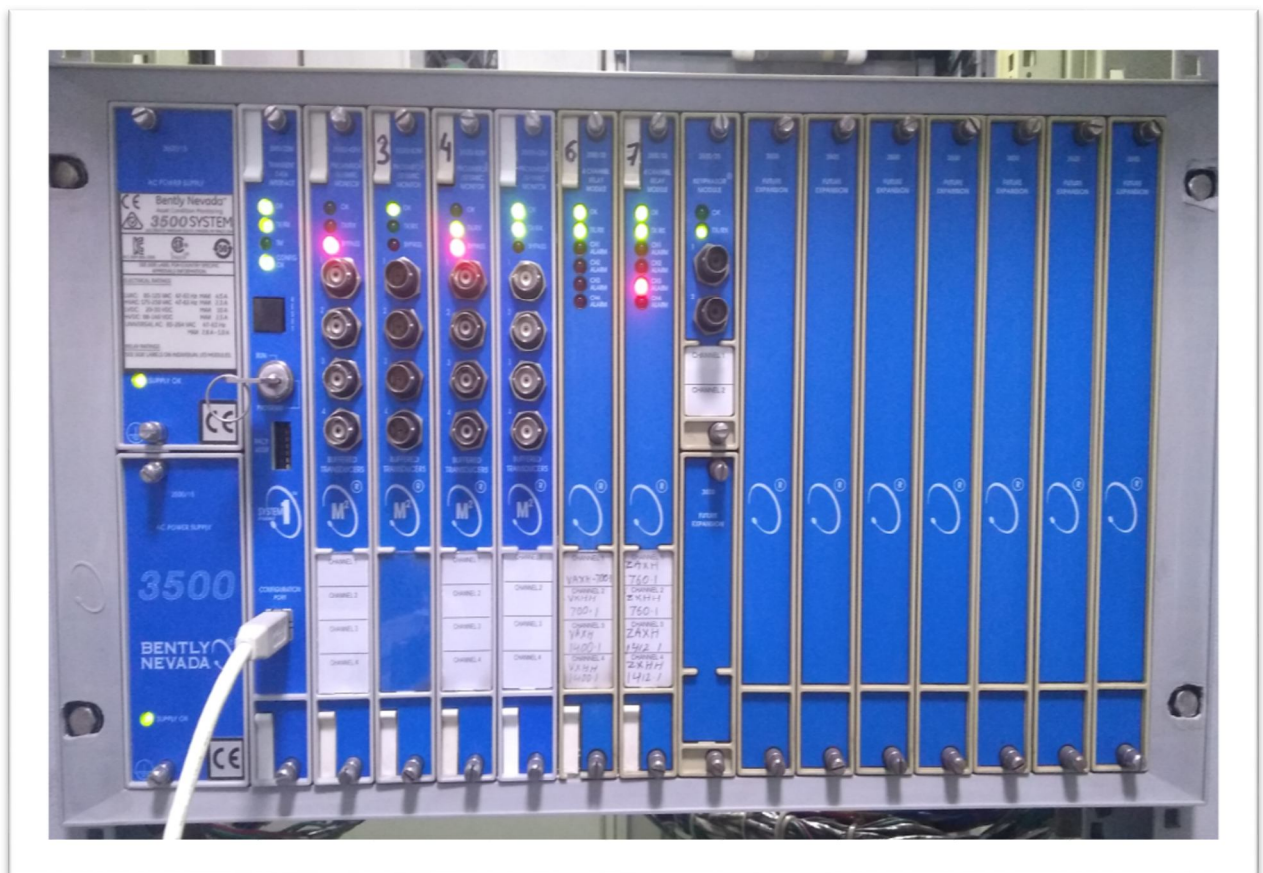
UPS

DCS



- General cleaning, checking were carried out in DCS System cabinets, Marshalling cabinets, Operator stations. Inter station connectivity was checked found ok.
- Voltages of power supply card of each node noted down as per shut down schedule.
- New Trip logic of Diesel SOV with Flame scanner (for both trains) developed in DCS as per approval. Logic checked & found ok.
- Logic Modification: Tripping of both Sulphur pumps with reducing speed of MAB turbine (< 3000 RPM) was incorporated in existing logic as per approval in both trains.
- New Input Signal Isolators were installed in Turbine Speed Readout loop (from WWG) in both trains. Now the speed displayed on WWG-505 controller & in DCS are matching.

VMS (Bentley Nevada):



- Old VMS rack was replaced with upgraded 19" rack. Installation & commissioning of SAP-2 VMS rack was carried out by service engg of M/s BHGE.
- RIM card of SAP-1 VMS was replaced by new TDI card in SAP-1 VMS.
- Individual cleaning & checking of I/O cards of VMS carried out.

ANODIC PROTECTION SYSTEM:

- Control panel for Anodic Protection System of SAP-1 IAT Acid cooler 10E1440 was removed as new alloy cooler was installed by Mech-SAP.
- Reference electrode were checked for IAT cooler 10E1441, found okay.
- Anodic protection panel for IAT cooler 10E1441 was cleaned & termination tightness check.

PAP Instrumentation

RPSS Area

1. Maintenance of Belt scale system in C-104 has been done. Load Cell frame alignment, belt scale calibration, cleaning of Belt scale panel also done with SPIL Engineer. Damaged load cell JB also replaced.



2. C-104 new magnet signal has been taken in line.

Ball Mill & SST area

1. All Ball Mill weigh feeders (A/B/C/D) inspection, cleaning, maintenance, load cell frame alignment & calibration done. Damaged idlers of weigh feeder conveyors also changed by mechanical to ensure better accuracy & measurement. Damaged load cell JBs are replaced.
2. All Ball Mill water Control valves (FV-200 A/B/C/D) maintenance, checking and calibration done.
3. All magnetic flowmeters in water service line of Ball Mills are cleaned & checked.
4. 3 nos trunnion bearing RTDs has been replaced in Ball Mill A inlet side.
5. Modification of SS tubing, damaged SS tubes & fittings replacement job done for all the discharge gate valves-pneumatic cylinders in Ball Mill area.

6. All pressure switches of the lubrication systems are calibrated to their respective set points. Faulty pressure switches & pressure gauges are replaced with new switches & gauges.
7. Damaged FRP JB replaced with SS JB for Ball Mill A gearbox lubrication system.



8. All Ball Mill RTDs checking and calibration has been done.
9. All Suction-discharge pneumatic cylinders are checked for any damage in Ball Mill-SST area. Damaged cylinders are replaced. Painting for all the cylinders are also done.
10. All Ball Mill & Reactor feed density meters maintenance & checking have been done.
11. Ball Mill A/B/C/D Siemens S7 PLC cleaning, maintenance, & fault checking done with M/s Fox Solutions Engineer. Control desks are also cleaned.

Circulator-Reactor-Filter Feed area

1. Reactor area all agitator gearbox flow switches cleaning, maintenance & calibration done to their respective set points (Set point for large gearbox- 20 LPM & for small gearbox- 09 LPM). Faulty flow switch replaced in 05.150 agitator gearbox.
2. Reactor area all JB's, RTD's maintenance & checking done.

3. 20-FV-410/409/415/416 (Sulphuric acid Control valves) cleaning, overhauling, stroke checking and calibration done.
4. Reactor thermowells removed for inspection and maintenance.
5. All pneumatic cylinders of FFT gate valves cleaning, overhauling and maintenance done.
6. In Filter Feed area, local control panels cleaning & maintenance done.
7. All barometric condenser orifice tapping points have been de chocked in circulator area.
8. Air header manifold near old pre condenser area relocated to reactor floor.
9. Sulfuric Acid flow meters FIT-409/410-1/410-2/415/416 zero checking done. Their calibration also checked and found ok.

Belt Filter area

1. All Belt Filter area J.B. maintenance done.
2. Belt Filter area all bleed valves PY-829 A/B/C/D/E/F/ maintenance, stroke checking & calibration done.
3. Belt Filter area all final wash control valves FY-807 A/B/C/D/E/F maintenance, stroke checking & calibration done.
4. Belt Filter area all condenser water on/off valves HV-807-2 A/B/C/D/E/F operation checked and found ok.
5. All magnetic flow meters in Belt Filter area cleaning, checking & maintenance have been done.
6. All limit switches in Belt Filters are cleaned & inspected. Damaged switches were replaced.
7. Overload monitoring systems are installed in 3 nos. EOT cranes in Belt Filter area.



8. Modification of SS tubing, damaged SS tubes & fittings replacement job done for all the control valves in Belt Filter area except G.

Filtration area

1. Filtration area all control valves (3rd wash, 4th wash & cake wash) were removed from line for maintenance. Damaged control valves are replaced with new valves. Stroke checking & calibration of all the control valves are done.
2. Filtration area all seal tank dip tubes cleaning, maintenance done. Level transmitters proper mounting and calibration also done.
3. All magnetic flow heads of Filtration section are removed from line for cleaning, checking and maintenance. Faulty flow heads and flow converters are replaced.
4. Modification of SS tubing, damaged SS tubes & fittings replacement job done for selected control valves in Filtration area except G.
5. Filtration A & E cake wash steam control valves have been replaced with new valves.



New M/s MIL make Control Valves in Filtration A & E.

6. Damaged steam control valve is replaced with a new control valve in cloth wash tank.



New M/s Fisher make Cloth was steam Control Valve

7. Electromagnetic flowmeters are installed in flocculent dosing lines in respective belt filters to monitor flocculent consumption in individual filters & also cumulative.



M/s Krohne Marshall make Electromagnetic Flowmeters in Flocculent lines

8. Low range (0 - 1600 LPH & 0 - 2400 LPH) flow switches are replaced with higher range (0 - 4000 LPH) switches in the vacuum box section of the Belt Filters A, B, C, D & E).



M/s D K Instruments make flow switches in Vacuum box of Belt Filters

Gypsum pump area

1. Gypsum pumps 01.291/01.292/01.293 all pressure switches & RTDs maintenance and calibration done.
2. Cleaning & maintenance of Gypsum pump Miller unit has been done

Fume Scrubber area

1. Calibration and maintenance of fume scrubber's vibration sensors has been done.
2. Maintenance & calibration of Old & New Fume Scrubber pressure transmitters have been done.

Acid Storage area

1. Acid storage area all strong & weak acid flow heads removed from line. Their checking, cleaning, de-scaling and maintenance have been done.
2. Radar level transmitters in all the storage tanks including pump tank & new pump tank have been cleaned & cross checked for any fault.

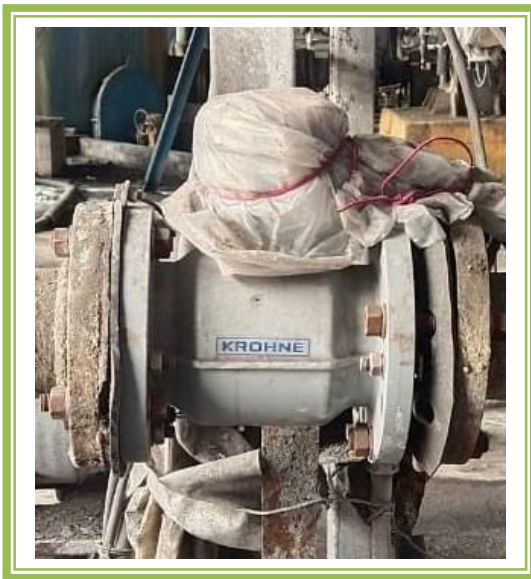
Evaporator area

1. All feed flow heads (FIT-1005 A/BC/D/E/F/G/H) are removed from line for de scaling, checking, & maintenance.
2. Maintenance & repairing of feed control valves (FY- 1005A/B/C/D/E/F/G/H) have been done.
3. All feed control valves stroke checking and calibration done.
4. All LP steam control valves (FY- 1004A/B/C/D/E/F/G/H) are removed from line for inspection, checking & maintenance.
5. Evaporator area TIT-1006 A/B/C/D/E/F/G/H & TIT-1010 A/B/C/D/E/F/G/H all RTD's & thermowells removed for inspection & maintenance. One no thermowell set has been replaced in Evaporator F.
6. All steam flow (FIT-1004 A/B/C/D/E/F/G/H) transmitters checking, maintenance & calibration done.
7. Damaged LP steam control valves are replaced in Evaporators D, E, F, & H.

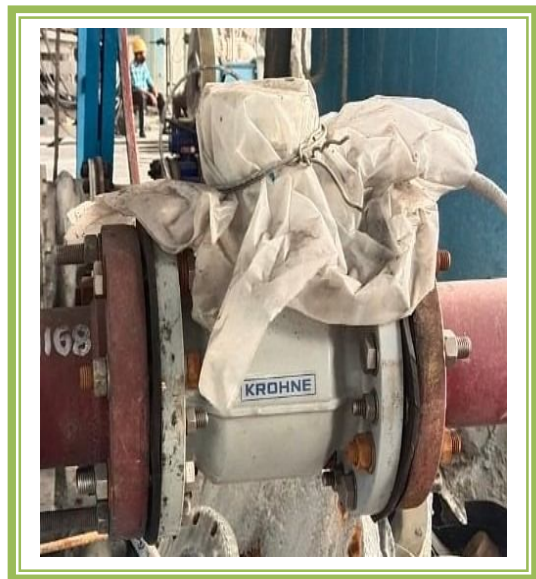


New M/s Mascot make valves replaced in Evaporator D, E & H LP steam

8. All Evaporator area steam control valves FY-1004 A/B/C/D/E/F/G/H stroke checking & calibration done.
9. Evaporator area FIT-1113 A/B/C/D/E/F/G/H all impulse tubes & nozzle de-chocking, damaged tubes replacement and transmitter checking & maintenance done.
10. Product flow heads (3" size) have been changed with new 4" size heads in Evaporator B & D.



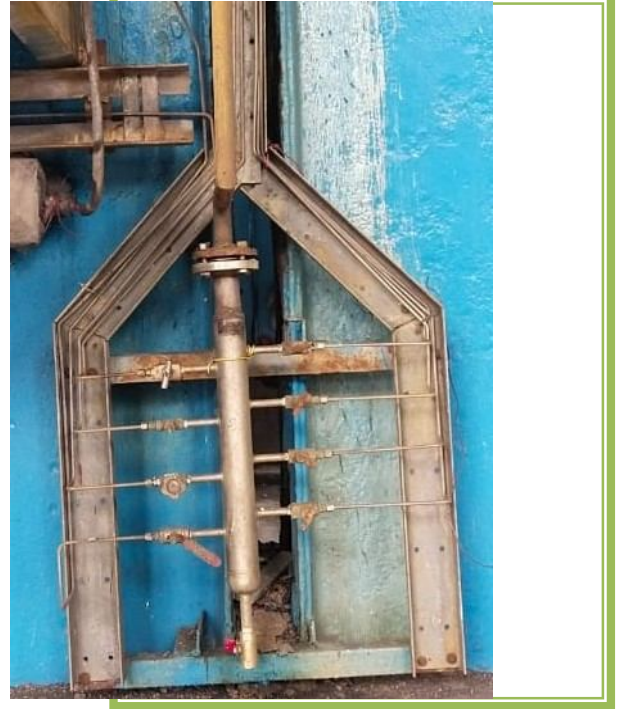
Evap B



Evap D

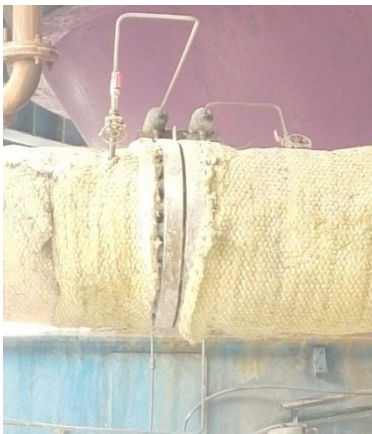
11. Maintenance & calibration of all the conductivity analysers have been done.
12. All dip tubes of FSA tanks inspection & maintenance done.
13. Maintenance of all on-off valves in all the Evaporators have been done.
14. New SS tubing job has been done for all the feed (FY-1005) & clean condensate (LY-1000-1) control valves.

15. New SS tubing job has been done for all the bleed control valves from new instrument air header line.
16. Damaged & corroded Instrument air manifolds-Isolation valves were replaced with new air header manifolds with isolation ball valves in the ground floor of all the Evaporators. New SS tubing from these new manifolds to control valves & on off valves are also done.



New Instrument Air Manifolds in Evaporator area

17. Damaged root isolation valves of orifice meters (LP Steam flow meters) tapings are replaced with new isolation valves. New SS tubing from these isolation valves to steam flow transmitters are also done.



New Root isolation valves of Orifice tapings

18. DP type pressure transmitters are installed in Evaporator C & E for flash chamber level measurement.



Evap E

19. Pressure transmitters are installed in Evaporator B & G circulator pump discharge lines to monitor pump efficiency and performance.

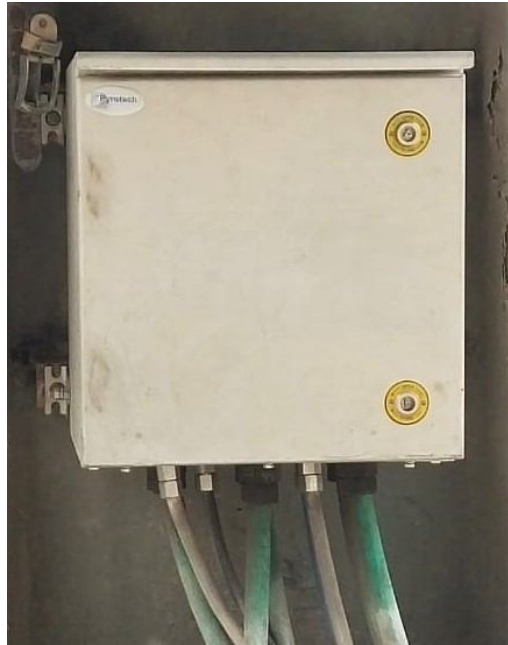
Cooling Tower area

1. Dip tube level meter in old cold well is replaced with new high frequency low beam radar level transmitter.



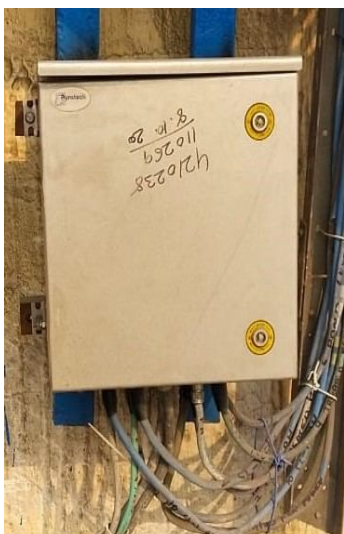
New M/s Vega make Radar level transmitter

2. Cleaning & maintenance of radar level transmitters in new cold well & hot well has been done.
3. Old vibration sensor panel of cooling tower fans was removed. All vibration signals are incorporated in a single SS JB.



ETP area

1. Main Signal & power JB in ETP has been replaced with new SS JB. Cables identification, marking, unwanted cable removal, & complete ferruling, lugging also done.

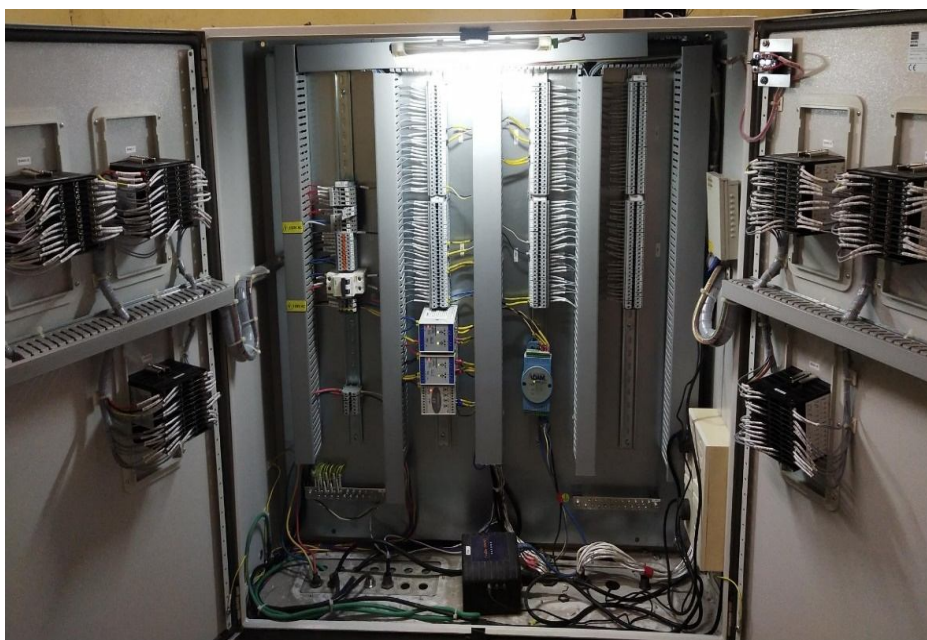


2. Obsolete pH control panel in ETP is replaced with new Masibus make control panel. All Old panel removal, sorting of cables, new panel erection, cable entry, glanding, lugging all jobs done within the given time.

BEFORE



AFTER



AFTER



3. ETP Clarifier I and II control valve cleaning, maintenance and stroke checking done.
4. ETP area all pH sensors cleaning & calibration have been done.

Old CHP control room

1. Obsolete GE Fanuc PLC system replaced with Schneider make PLC system. Old PLC panels removal, sorting of cables, marking, new panel erection, cable entry, glanding, lugging, communication with new PLC & YOKOGAWA DCS & finally loop checking, all jobs are completed within the stipulated time period. The new PLC has upgraded hardware & higher capacity to accommodate existing I/O signals of PAP along with new signals of new ongoing clarifier system & other future projects.

Old Panel during Removal



New Panel after replacement



New Panel after replacement



DCS Control Room

1. DCS shutdown was taken and following jobs were performed with M/s Yokogawa service Engineers:
 - a. All cabinets were cleaned.
 - b. FCS checking and Filter cleaning done.
 - c. All modules in the system cabinet were racked out for cleaning.
 - d. All terminal boards in the marshalling cabinet were cleaned, tightened.
 - e. All filters removed and filter cleaning done.
 - f. Data backup taken by service Engineer.
 - g. Old CPU batteries are replaced with new batteries.

Jobs for UPS

1. Maintenance of UPS system has been done.

Other Jobs

1. Maintenance of HF analyser has been done. Its field instruments parts (Transmitter/Receiver) Unit, its guided pipes inside stack was found damaged. Hence these are replaced with spares.
2. Maintenance & cleaning of PM analyser have been done.
3. Damaged signal JB in Old gypsum pond area has been replaced with new SS JB.
4. Cleaning, buffing & painting of all pneumatic cylinders have been done during ATR.



DAP Instrumentation

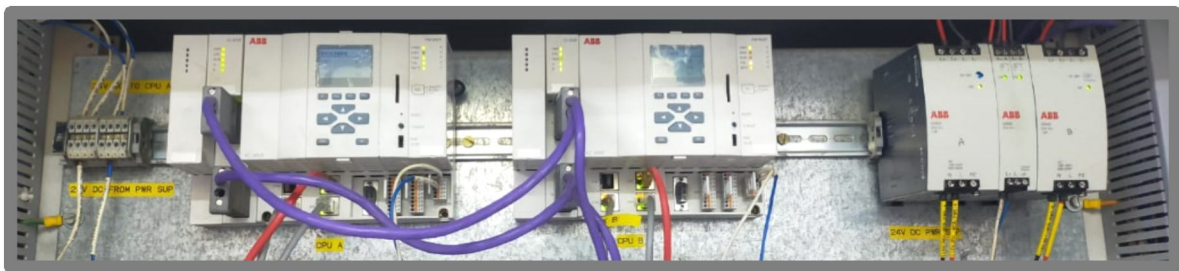
Instrument control room related jobs:

Train-A

1. Upgradation of Train A ABB DCS from 800 F to 900 F

Activities done:

1. 2 number of ABB 800 F controllers were removed.
2. 2 number of RLM blocks were removed.
3. 2 number of ABB 900F controllers and power supply were installed.
4. 5 numbers of HMI's were upgraded from Windows XP to Windows 10.
5. Both the controllers were checked for manual changeovers.
6. OPC gateway configuration was done.
7. Loop checking was done for AI/AO/DI/DO signals.
8. Report package was installed in the same.



2. Cable dressing jobs carried out for Auxiliary panel, removal of unwanted cables have been done in the marshalling.

BEFORE



AFTER



3. Five numbers of I/O (4 AI and 1 AO) card added and its subsequent wiring was done from card to Marshalling terminals.

Train-B

1. Node expansion done in Yokogawa DCS.

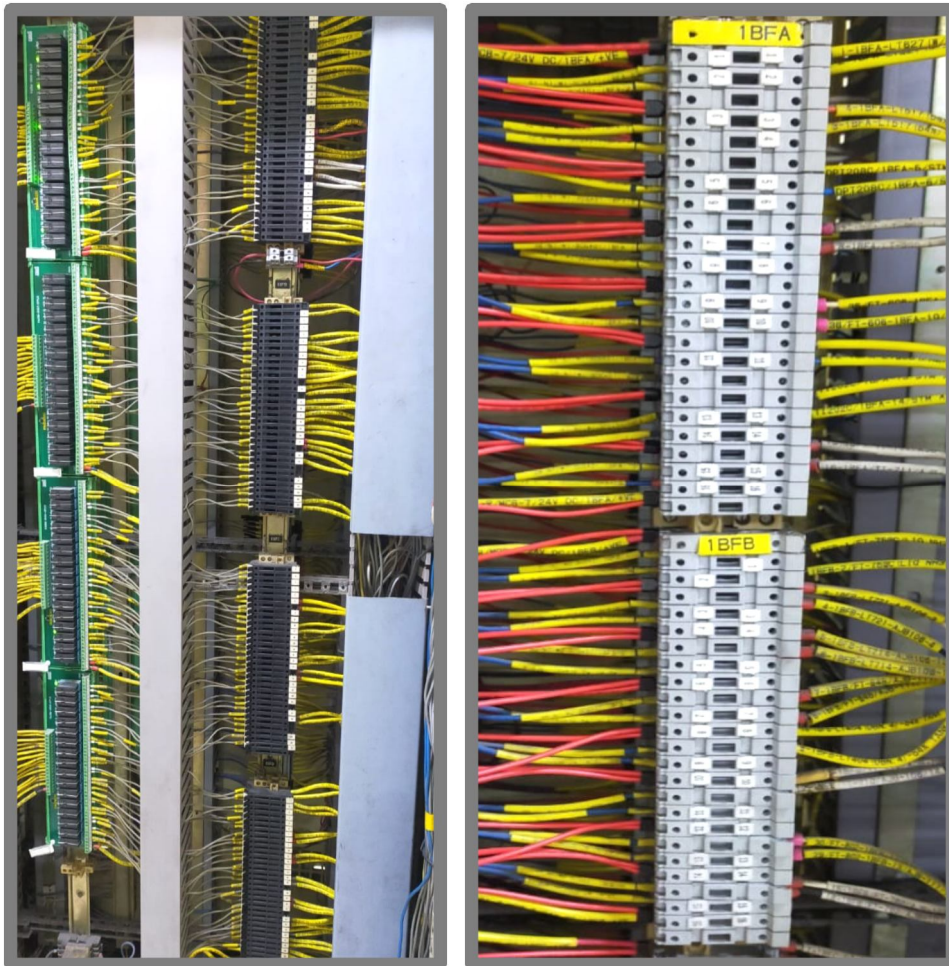
Activities done

1. Installation of new Node interface unit, I/O cards and signal conditioning boards.
2. Wiring from I/O cards to marshalling terminals was done.
3. Loop checking was done.



Train-C

1. Cable dressing jobs carried out for PDB panel, removal of unwanted cables inside the panels have been done in the marshalling.
2. Cable dressing jobs carried out for Marshalling panels, removal of unwanted cables, proper ferruling and termination have been done inside the marshalling panels



3. Five numbers of I/O (4 AI and 1 AO) card added and its subsequent wiring was done from card to Marshalling terminals.
4. Cleaning of earth strip, proper termination of cables were carried out for all the marshalling cabinets. (Also done in Train-A & B)



Field Instrument related jobs:

FV-759 A (Liquid Ammonia)

Issues Reported: None

Activities done:

1. Control valve changed with spare one.
2. Gland termination of solenoid valve was checked.
3. Positioner servicing done.

FV-759 B/C (Liquid Ammonia)

Issues Reported: Passing

Activities done:

MIL make new control valve was installed.



LV-721 A/B/C (Ammonia to TG Vap.)

Issues Reported: None

Activities done:

1. Valve Leakage test was done.
2. Gland termination of solenoid valve was checked.
3. Positioner servicing done.

LV-714 A/B/C (Ammonia to TG Vap.)

Issues reported: None

Activities done:

1. Valve Leakage test was done.
2. Gland termination of solenoid valve was checked.
3. Positioner servicing done.

FV-717 A/B (LP Steam to Pre heater)

Issues reported: None

Activities done:

1. Valve Leakage test was done.
2. Positioner servicing done.

FV-717 C (LP Steam to Pre heater)

Issues reported: Passing

Activities done:

New Valve body of MIL make was installed.



FV-101 A/C (Vapour ammonia to PN)

Issues reported: None

Activities done:

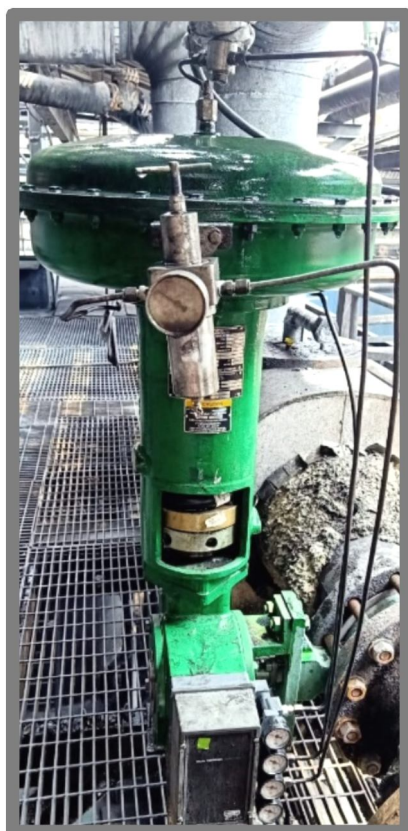
1. Valve body inspection done.
2. Gland termination of solenoid valve was checked.
3. Positioner servicing done.

FV-101 B (Vapour ammonia to PN)

Issues reported: Passing

Activities done:

Fisher make new control valve was installed.



FV-104 B (Vapour Ammonia to Granulator)

Issues reported: None

Activities done:

1. Valve body inspection done.
2. Gland termination of solenoid valve was checked.
3. Positioner servicing done.

FV-104 A/C (Vapour ammonia to Granulator)

Issues reported: Passing

Activities done:

Fisher make new control valve was installed.



TV-755 A/B/C (Pre heater condensate outlet)

New Control valve was installed in Train A and Train B.



XV-102 A/B/C (MP steam to PN)

Issues reported: None

Activities done:

Gland termination of solenoid valve was checked.

XV-118 A/C (MP steam to ammonia sparger)

Issues reported: None

Activities done:

Gland termination of solenoid valve was checked.

XV-118 B (MP steam to ammonia sparger)

Issues reported: Passing

Activities done:

MIL make new on/off valve was installed.



XV-111 A/B/C (MP steam to slurry header)

Issues reported: None

Activities done:

Gland termination of solenoid valve was checked.

PV-210 A/B (MP steam to chamber)

Issues reported: None

Activities done:

1. Valve Leakage test was done.
2. Positioner servicing done.

Slurry valve actuators Main and Recycle A/B/C

Issues reported: None

Activities done:

1. Buffing and painting.
2. 12 no. of Actuators were checked for leakage.

FV-200 A/B/C (FO to chamber)

Issues reported: None

Activities done:

1. Valve Leakage test was done.
2. Positioner servicing done.

FT-200 A/B/C

Issues reported: None

Activities done:

1. Cleaning of flow chamber of the FT.
2. Cleaning of strainer section of FT.
3. Tightening of the cable termination.



70 Conveyor Belt weigher for Train A

Activities done:

1. Idler alignment was checked in presence of the service engineer.
2. Healthiness of the load cell was checked and it was found faulty, both the load cells were changed.
3. Zero and span calibration was done.

70 Conveyor Belt weigher for Train B

Activities done:

1. Idler alignment was checked in presence of the service engineer.
2. Healthiness of the load cell frame & load cell were checked
3. Zero and span calibration was done.

70 Conveyor Belt weigher for Train C

Activities done:

1. Belt Weigher frame was removed from old conveyor frame, its buffing and painting done.
2. Belt weigher frame was installed in New conveyor frame, idler alignment was checked in presence of the service engineer
3. Healthiness of the load cell frame and load cell were checked.
4. Zero and span calibration was done.



Weigh feeder Train A/B/C:

Activities done:

1. Weighing area rollers levelling was checked in presence of Service engineer.
2. Healthiness of the load cell frame & load cell were checked
3. Zero and span calibration was done.

Magnetic flowmeter for Train A/B/C

Activities done:

1. TB tightness in pulse converter and Flow head were checked.
2. Gland termination for the flow head and pulse converter were checked.
3. Flow heads were descaled.
4. New Krohne Marshall make flow head installed in FT-609C, FT-762A/C.

FT-609C



FT-762A/C



Dip tube LIT's of Train A/B/C

Activities done:

All the dip tubes were removed for cleaning and inspection.

Cable Tray

1. Damaged cable tray above Train B Fines conveyor drive end was removed.

BEFORE



AFTER



2. Damaged cable tray near Train C 70 Conveyor Tail end was restored by giving extra support for strength.

BEFORE



AFTER

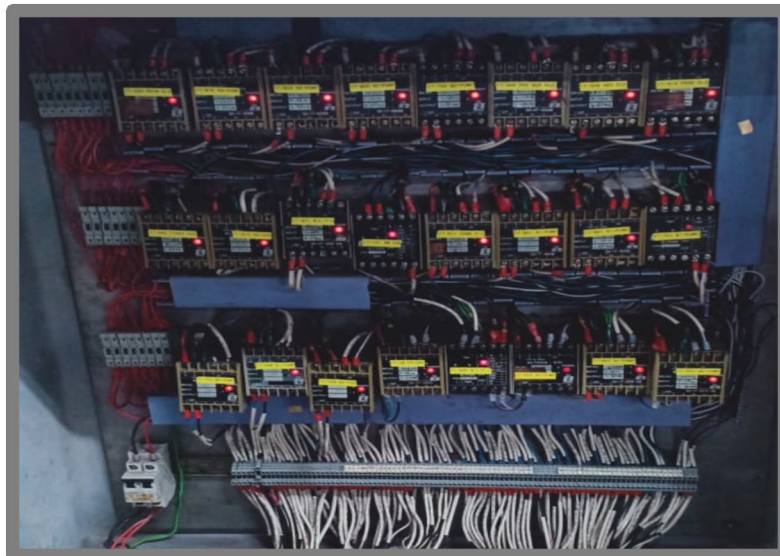


Misc. Jobs in all three trains

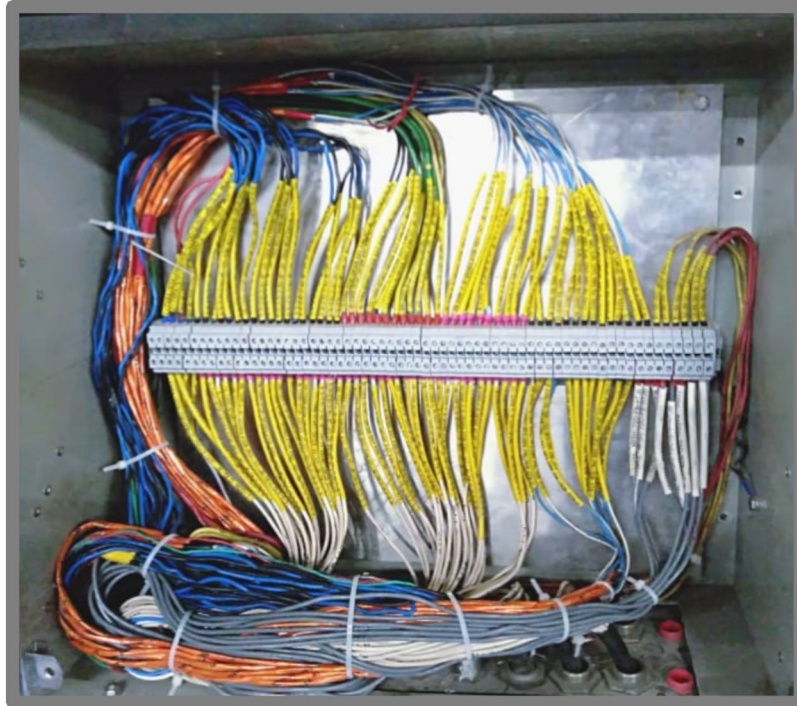
1. Orifice assembly installation done in LP steam common header line.



2. All the IT panel Junction box cleaning, proper ferruling, terminal tightness and checking done.



3. JB cleaning, proper ferruling, terminal tightness and maintenance done for all three trains.



4. All the SOV's cleaning, maintenance and checking done. Damaged SOV's have been replaced.
5. All the Thermowell & RTD's checking and cable tightening done.
6. All the Pressure Transmitter of Dryer and Granulator Lubrication system checking and maintenance done.
7. All the pneumatic actuators buffing, painting and checking done.

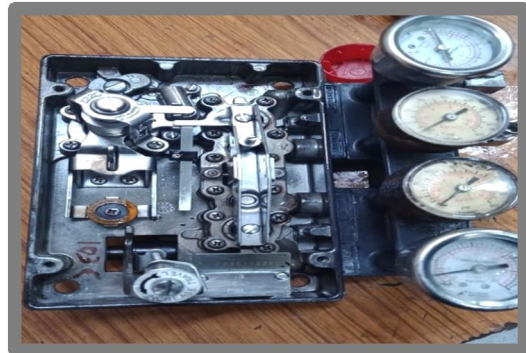


8. All the pneumatic positioners were disassembled, cleaned and calibrated.

BEFORE



AFTER



AMC related activities:

TRAIN A/B/C DCS:

2. Panel cleaning was done.
3. Controllers were restarted and forced main-standby (Toggle) switch over between the controllers were checked.
4. Healthiness of the I/O cards were checked.
5. Latest backup was taken and records were kept for the same.

UPS:

1. Power Distribution Unit was changed for all three DAP Trains.
2. SCVS unit was changed for DAP Train A&B.
3. Battery bank healthiness checking done.
4. Preventive maintenance activities of UPS was done in presence of service engineer.

PDU



SCVS



AFBC BOILER & COAL HANDLING PLANT Instrumentation

PIC 005: Deaerator pressure control valve replaced

ISSUES REPORTED

- Leakage from its bonnet

MAINTENANCE ACTIVITIES

- Control valve replaced with new one
- Control Valve Stroke Calibration done
- Control valve SS Tubing done



Old Control Valve



New Control Valve

LIC001: Deaerator water Level control valve

MAINTENANCE ACTIVITIES

- Cage cleaning done.
- Control Valve Cleaning and overhauling done.
- Control Valve Stroke Calibration done

SPARES USED

- Gasket, Seal Ring, Backup Ring and gland packing.



50PCV 003: Deaerator PRDS pressure Control Valve

MAINTENANCE ACTIVITIES

- Cage cleaning done.
- Control Valve Cleaning and overhauling done.
- Control Valve Stroke Calibration done

SPARES USED

- Gasket, Piston Ring and gland packing were replaced.

50TCV 004: Deaerator PRDS Temperature Control Valve

MAINTENANCE ACTIVITIES

- Cage cleaning done.
- Control Valve Cleaning and overhauling done.
- Control Valve Stroke Calibration done

SPARES USED

- Gasket and gland packing were replaced.



Stroke Calibration and cleaning done for following control valves:

50FCV 104A, 50TCV 205A, 50FCV 601A, 50LCV 109A, 50FCV 106A, 50FCV 104B,
50TCV 205B, 50FCV 601B, 50LCV 109B, 50LCV 106B

MAINTENANCE ACTIVITIES

1. Valve cleaning done

2. Stroke checking done
3. Damaged AFR replaced

➤ **Pneumatic Cylinders**

ESP Intake Cylinders: - 50 XV 553A, 50 XV 554A, 50 XV 555A, 50 XV 553B, 50 XV 554B, 50 XV 555B

Wind Box Cylinders: - 50 HIC 416B, HIC 417B, HIC 418B, HIC 419B, HIC 420B, 50 HIC 416A, HIC 417A, HIC 418A, HIC 419A, HIC 420A

ID Fan Cylinders: - 50 HIC 301A, 50 HIC 302A, 50 HIC 301B, 50 HIC 302B

FD Fan Cylinders: - 50 HIC 402A, 50 HIC 403A, 50 HIC 402B, 50 HIC 403B

PA Fan Cylinders:- 50 HIC 408A, 50 HIC 409A, 50 HIC 408B, 50 HIC 409B

MAINTENANCE ACTIVITIES

1. Power Cylinder Cleaning and overhauling done.
2. Stroke calibration done
3. Damaged AFR replaced.

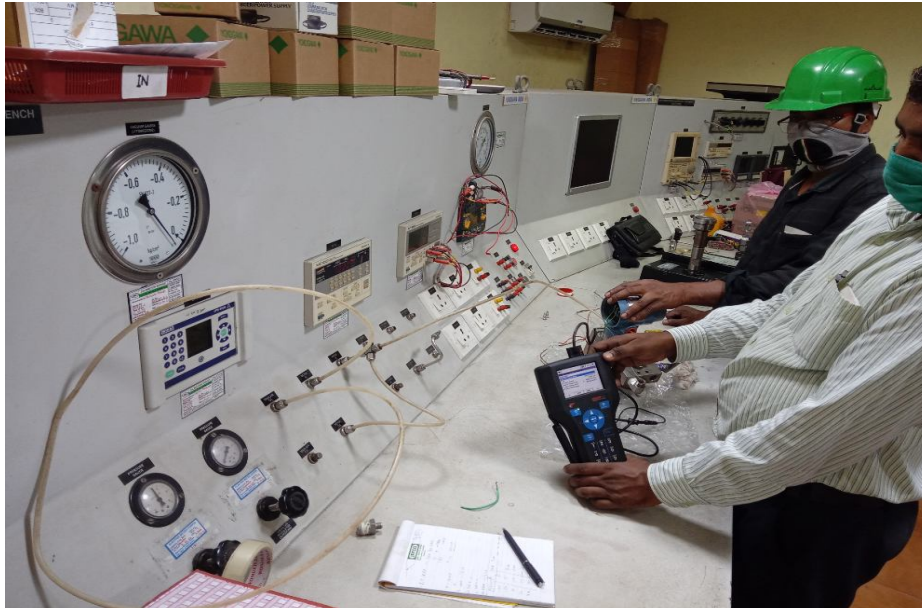




Other Miscellaneous Shutdown Jobs :

- Replacement of damaged and old Air filters regulators job done.
- Both AFBC Boilers steam drum PT & LT, Furnace Pr. Transmitter, Deaerator level transmitter, main steam flow transmitter, feed water flow transmitter, Steam drum and main steam line pressure gauges were calibrated at instrument calibration lab.



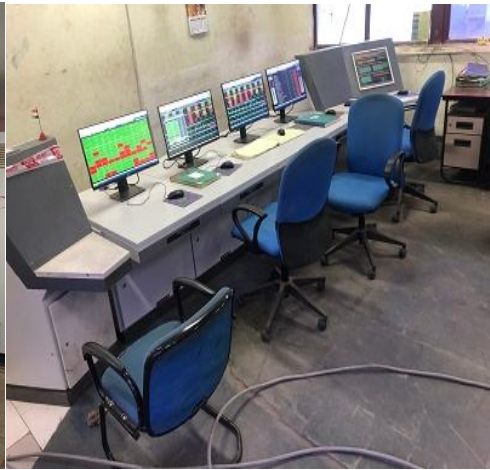


- Both AFBC Boiler's ESP ash Hopper Level Sensors & its Transmitter (high & low level) maintenance and calibration done.
- Both Boiler Ash handling system's all Pressure gauges, Solenoid valves, ash conveying valve and ash intake valve servicing and maintenance job done.
- New flame scanners were installed at each burner of boiler and its indication with alarm were also provided in DCS.
- All field junction box cleaning, termination tightness, polythene covering job were done, some of the damaged field JB were also replaced with a new one.

YOKOGAWA DCS- BOILER

MAINTENANCE ACTIVITY

1. Offline download done for all the FCS.
2. Panels and HMI consoles cleaning done.
3. All IO cards, processor healthiness checking done.
4. CP 461 controller card replaced with new CP471 module.





- CHP PLC panel were cleaned by vacuum cleaner & blower and its HMI was also relocated with in the control room as per the operation requirement.

ENERGY CENTRE / UTILITY & OFFSITES

Instrumentation

PCV2630: TG-1 PRDS

ISSUES REPORTED

- Temperature not maintaining.
- Ageing.

MAINTENANCE ACTIVITIES

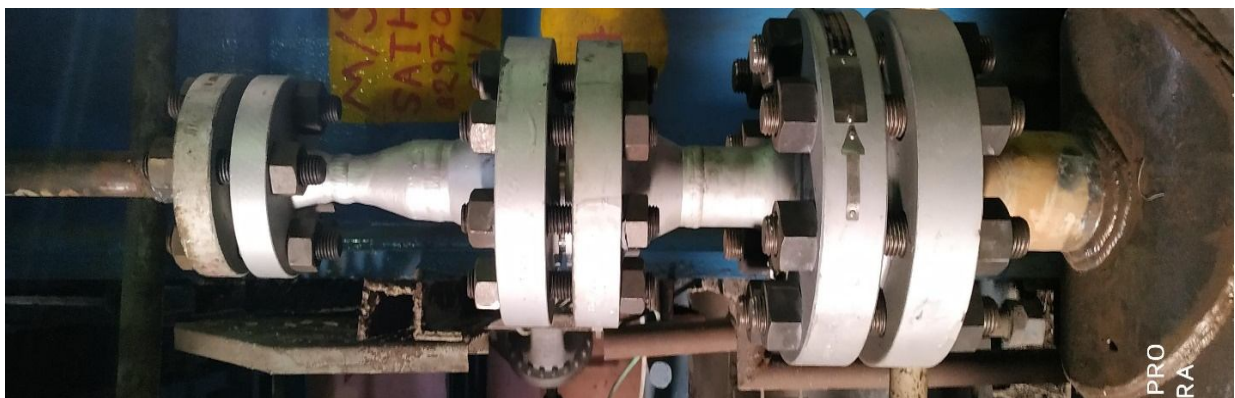
- PCV, TCV with spray nozzle replaced.



Old



New



NEW ATTEMPERATOR

PCV2632: HP to LP steam PRDS Old

ISSUES REPORTED

1. Low steam flow.

MAINTENANCE ACTIVITIES

- Cage cleaning done.
- Piston rings replaced.
- Plug stem replaced.
- Air filter regulators replaced.
- Cleaning and overhauling done.

SPARES USED

- Gasket, Piston Ring, plug stem and gland packing were replaced.



CAGE



PCV2632

PCV2632N: HP to LP steam PRDS new

MAINTENANCE ACTIVITIES

- Cage cleaning done.
- Piston rings replaced.
- Air filter regulators replaced.
- Cleaning and overhauling done.

SPARES USED

- Gasket, Piston Ring and gland packing were replaced.

PCV1551N: HP to MP steam PRDS new

ISSUES REPORTED

- Slow operation

MAINTENANCE ACTIVITIES

- Cage cleaning
- Plug cleaning.
- Gland packing, piston ring and gasket replaced

SPARES USED:

- Gland packing, piston ring and gasket



PCV1552: HP to MP steam air heater DAP

ISSUES REPORTED

- Low flow rate

MAINTENANCE ACTIVITIES

- Cage cleaned
- Plug cleaned.
- Gland packing, piston ring and gasket replaced

SPARES USED:

- Gland packing, piston ring, I/P and gasket



PCV2631: TG2 HP- LP PCV

MAINTENANCE ACTIVITIES

- Cage replaced
- Plug cleaned.
- Gland packing, piston ring and gasket replaced

SPARES USED:

- Cage, gland packing, piston ring and gasket



PCV1507: MP steam vent control valve

ISSUES REPORTED

- Small cracks inside the valve body.

MAINTENANCE ACTIVITIES

- Complete valve replaced.



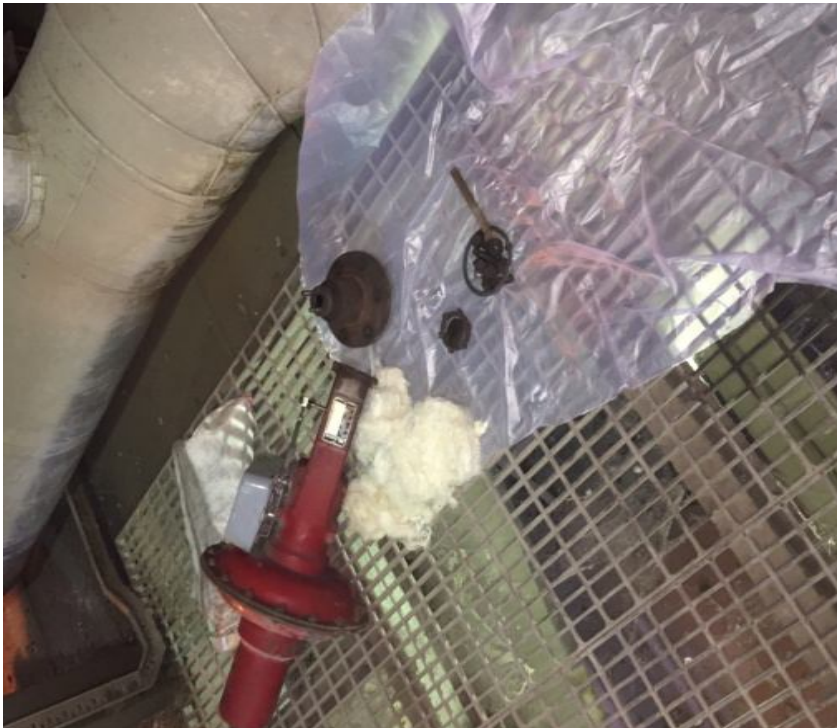
1PCV4510 : Gland Steam PCV for TG 1

MAINTENANCE ACTIVITIES

- Piston cleaned
- Gland packing and gasket replaced.
- Valve overhauling done
- Stroke checking done from control room.

SPARES USED:

- Gland packing and gasket.
- Positioner
- Plug stem
- I/P replaced



1TCV9024: Cooling water line to lube oil.

MAINTENANCE ACTIVITIES

- Piston cleaned
- Gland packing and gasket replaced.
- Valve overhauling done. Stroke checking done from control room.

SPARES USED:

- Gland packing and body gasket.



TCV9024

TCV2632, TCV2632N, TCV2631, TCV1551N & 2TCV1552:Temp.
Control valve for PRDS

MAINTENANCE ACTIVITIES

- Piston cleaned
- Gland packing and gasket replaced.
- Valve overhauling done
- Stroke checking done from control room.

SPARES USED:

- Gland packing and gasket







PAP VENT AREA

PCV1513: LP steam vent control valve

MAINTENANCE ACTIVITIES

- Air filter regulator replaced.
- Stroke checking done from control room.

SPARES USED

- Air filters regulators& positioner

PCV1514: LP steam to PAP pressure control valve

MAINTENANCE ACTIVITIES

- Stroke adjustment and zero adjustment done.
- Air filter regulators replaced

SPARES USED

- Air filter regulator.

PCV1514A: LP steam to PAP bypass line pressure control valve

MAINTENANCE ACTIVITIES

- Stroke adjustment and zero adjustment done.
- Air filter regulators replaced

SPARES USED

- Air filter regulator.

PCV1503: LP steam to PAP cake wash line pressure control valve

ISSUES REPORTED

- Slow operation

MAINTENANCE ACTIVITIES

- Actuator overhauling done.
- 1/4" AFR replaced with 1/2".

SPARES USED

- Air filter regulator
- I/P replaced.

FCV906: MP steam to DAP flow control valve

ISSUES REPORTED

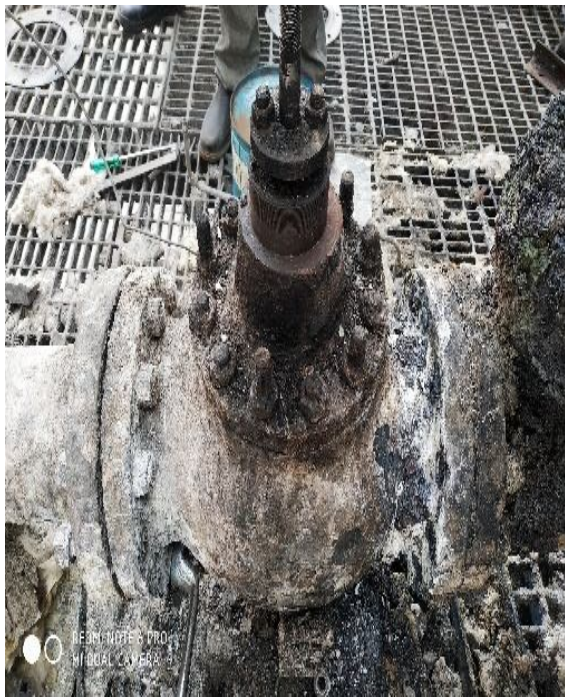
- Bonnet bolts damaged condition, valve body corroded.

MAINTENANCE ACTIVITIES

- Actuator decoupled from valve and complete overhauling performed.
- Valve body replaced.
- I/P with positioner replaced
- AFR replaced with new one.
- I/P branch cable replaced.

SPARES USED

- Valve body, and air filter regulator.



Old



New

Additions:

LCV 31_001A (Main valve) & LCV 31_001B (recirculation valve) added in parallel in addition to present LCV to maintain stand by condition.



LCV31_001A



LCV31_001B

DM PLANT DCS PANEL PRE SHUTDOWN JOB ACTIVITIES:

1. Prepared all I/O tag list with nest loading reference.
2. All marshaling panels ferruling with lugs completed.
3. All field junction box labeled.
4. Base frame fabrication completed for panels.

INSTRUMENT CALIBRATION & OTHER SHUTDOWN JOBS

1. TG1 all the lube oil pressure and vacuum switches calibration done.
2. TG 1 cross over temperature Thermocouples replaced.
3. TG 1 lube oil, jack oil and control stage Pressure transmitter's calibration done.



4. Cleaning and stroke checking of all control valves done.
5. TG1 all motorized gate valves operation checking done through DCS.
6. Replacement of damaged and old air filters regulators done.
7. Cleaning and polythene covering done for all instruments.
8. PT2630 relocated.
9. Replacement of old and damaged junction boxes and branch cables in TG 1.

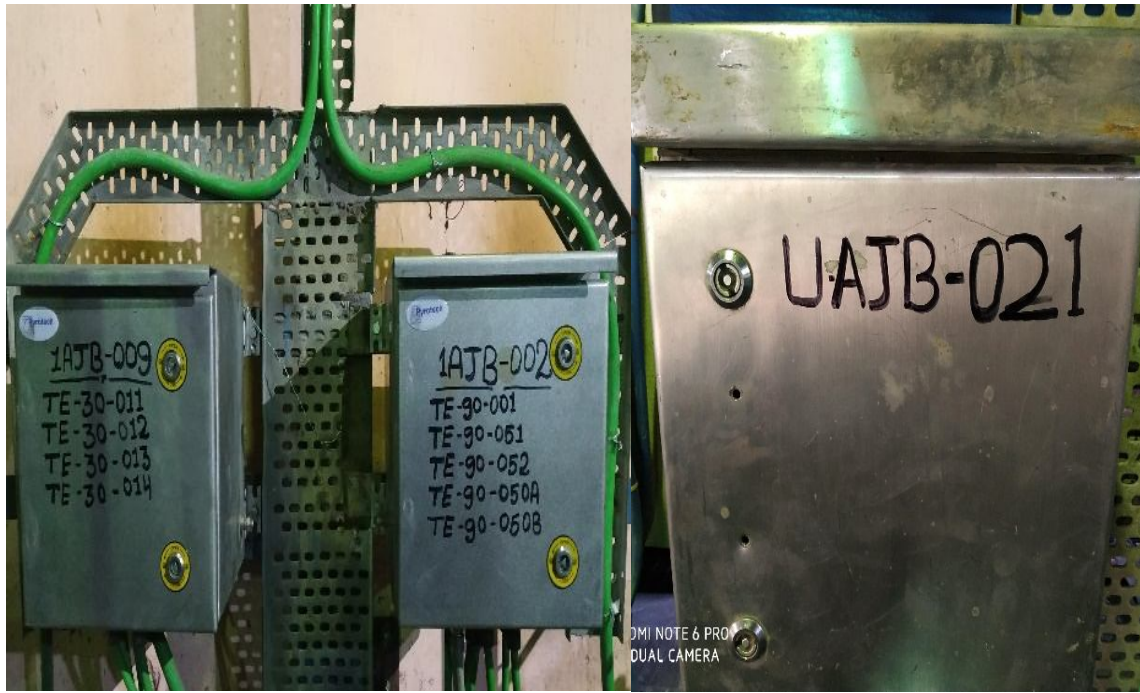


Figure 2 NEW

Figure 3

NEW

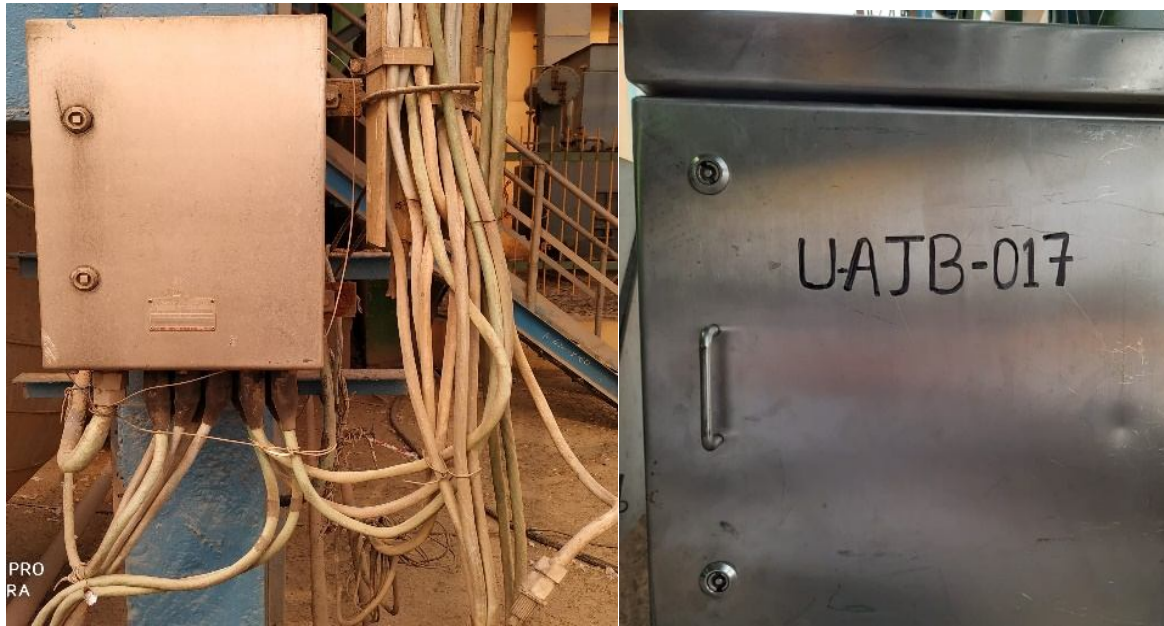


Figure 4 OLD

Figure 5 NEW

10. FT1411 Flow transmitter (Annubar flow meter) installed, taken into service for compressor cooling water line.



11. Replacement of Erratic Pressure gauges and ball valves for condensate extraction pump suction, discharge gauge board at TG-1.
12. TG-1 Generator winding temperature junction box maintenance done.
13. PCV 1501 HP vent valve positioner changed, stroke checking done.
14. FT 907 calibrated, branch cable replaced.
15. UAJB 106 at SAPCT replaced.
16. UAJB012 laid cable terminations done.
17. LCV 1406 TGCT make up valve overhauling, stroke adjustment, positioner calibration and actuator painting done.
18. Air manifold hook up at new F.O tank recirculation valve.

DCS RELATED ACTIVITIES

SIEMENS DCS-SPPA-T3000- ENERGY CENTRE

1. The entire shutdown related maintenance activity for DCS were performed.
2. Two number of faulty power supply unit replaced.
3. DCS Panels and HMI consoles cleaning done.
4. Junk files were deleted in the server.
5. Patches up gradation done.
6. One number of faulty DI module replaced.

7. TG 1 Newly commissioned LCV 13_001A (Main), LCV 13_001B (recirculation) control valves logic defined, taken into service.

YOKOGAWA DCS AT DM PLANT / AMMONIA STORAGE:

1. Shutdown maintenance activities taken up with M/s Yokogawa.
2. All controllers, I/O cards racked out and their cleaning done with contact cleaner.
3. All marshalling panels vacuum cleaning done. All signal conditioning boards & prefab connectors contact cleaning done.
4. Controller redundancy checked, tuning parameters saved & project database backup taken.



BAGGING PLANT

Instrumentation

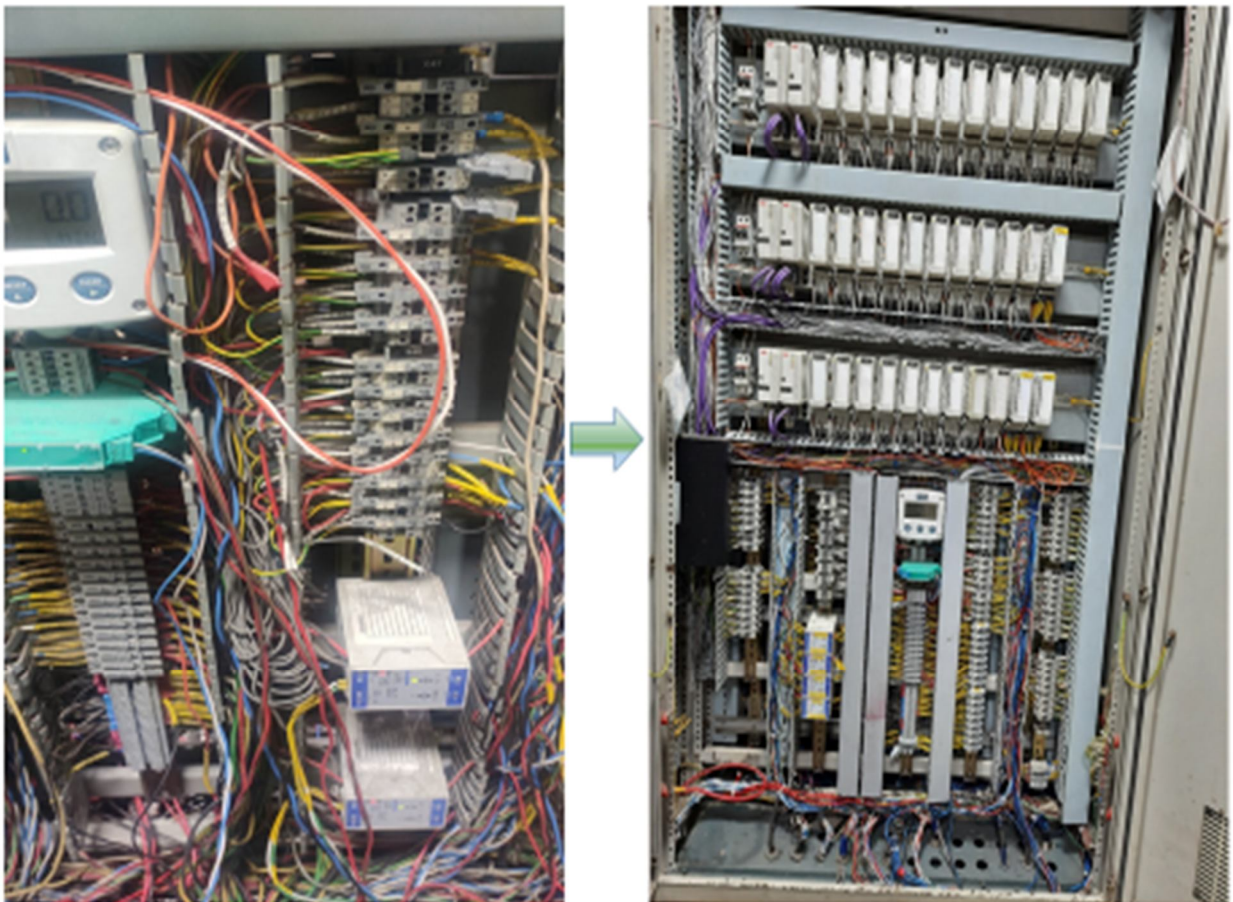
DCS Panel

Re-routing, segregation & dressing of cables done in DCS panel.

BEFORE

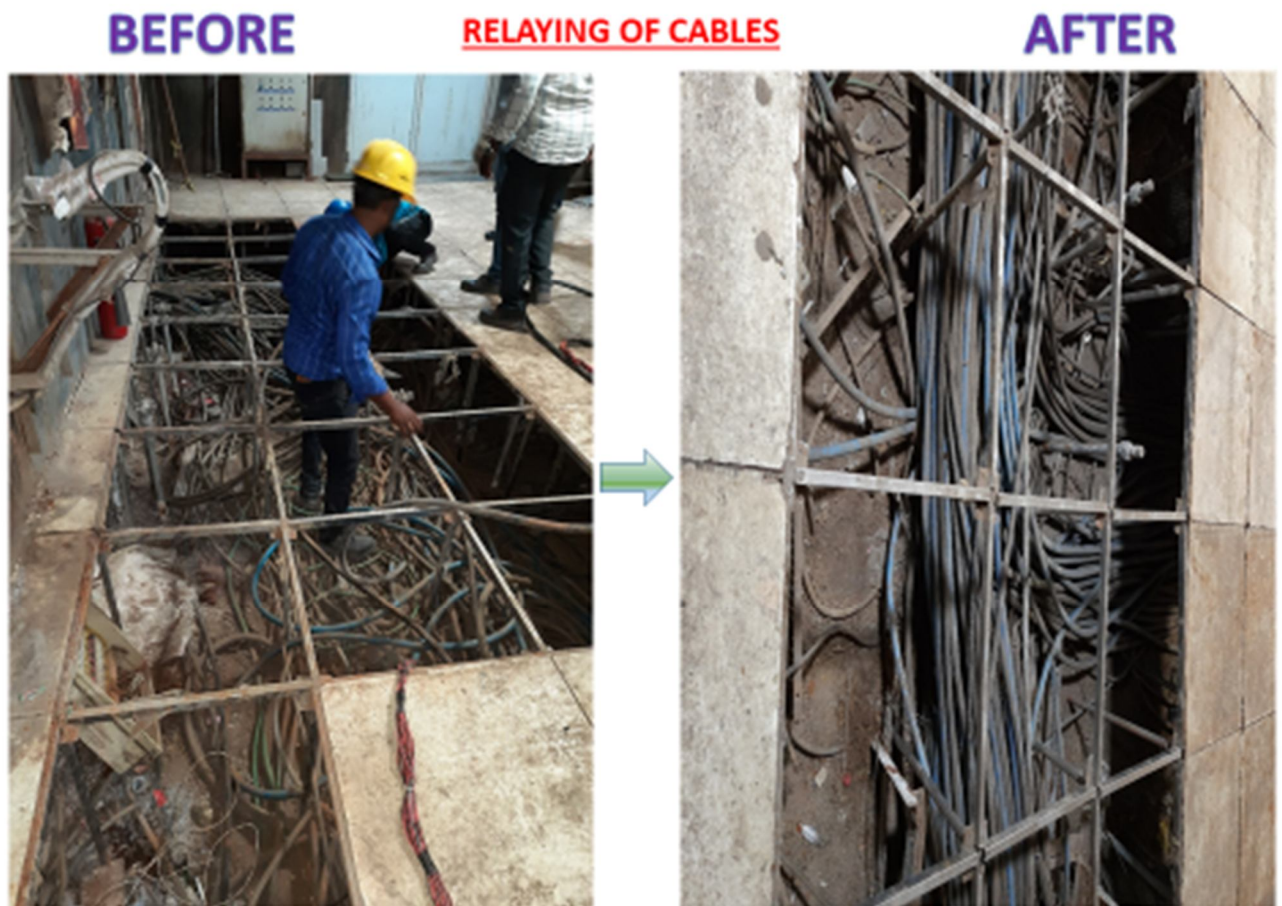
BAGGING DCS PANNEL

AFTER



Control Room area

Field cables coming to DCS control room were segregated & routed properly through the cable trench.



BEFORE

INFRONT OF PH OFFICE

AFTER



DAP Substation

Cable dressing & ferruling work done in the marshalling panel at DAP substation.

Inspection Activities

Of

ATR 2021

During March & April 2021



Wholly owned by Cooperatives

REPORT OF INSPECTION SECTION ACTIVITIES IN AFBC BOILER SHUTDOWN - ATR - 2021

INDEX

1. Introduction
2. OR/805:
 1. Visual inspection:
 2. Thickness measurement
 3. Dye penetrant testing
 4. Radiography Testing
 5. Pre-heating & Stress Reliving
3. OR/806:
 - a. Thickness measurement
 - b. Dye penetrant testing
 - c. Radiography Testing
 - d. Pre-heating & Stress Reliving

1. Introduction:

- AFBC Boilers were taken in to the annual shutdown as follows :

Duration of ATR-21 in AFBC Boiler

<u>Boiler</u>	<u>Stoppage</u>	<u>Start-up</u>
OR/805	17.03.2021	06.04.2021
OR/806	13.03.2021 (already was in stop condition)	03.04.2021

- Various Non-destructive activities were carried out during above said ATR-2021 period in both boilers (OR/805 and OR/806) and BFW area.

4. OR/805:

The following activities were carried out;

- Visual inspection
 - Thickness measurement
 - Dye penetrant testing
 - Radiography Testing
 - Pre-heating & Stress Relieving
- Visual Inspection: Visual Inspection was carried out in In-bed evaporator coils, in-bed super heater coils and panel tubes. All are intact.
 - Thickness measurement: Thickness measurement of various parts as follows
 - Panel tubes
 - Evaporator coil
 - Economiser coil
 - IBSH coil
 - Primary sup.htr coil
 - Dye penetrant testing: DP Test carried out in In-bed evaporator coils both LHS and RHS which were replaced with new coils. Reports are attached.
 - Radiography Testing: RT carried out in In-bed evaporator coils both LHS and RHS which were replaced with new coils. Reports are attached. Replacement of 6 nos of inbed coil (3,6-inner,outer RHS and 10-inner,outer LHS).
 - Pre-heating & Stress Relieving: Pre-heating & Stress Relieving were carried out in 10" MSSV valve and 10" NRV valve which are in main steam line. Total joints - 04 no's.

5. OR/806 :

The following activities were carried out;

- a. Visual inspection
 - b. Thickness measurement
 - c. Dye penetrant testing
 - d. Radiography Testing
 - e. Pre-heating & Stress Reliving
- a. Visual Inspection: Visual Inspection was carried out in In-bed evaporator coils, in-bed super heater coils and panel tubes. All are intact.

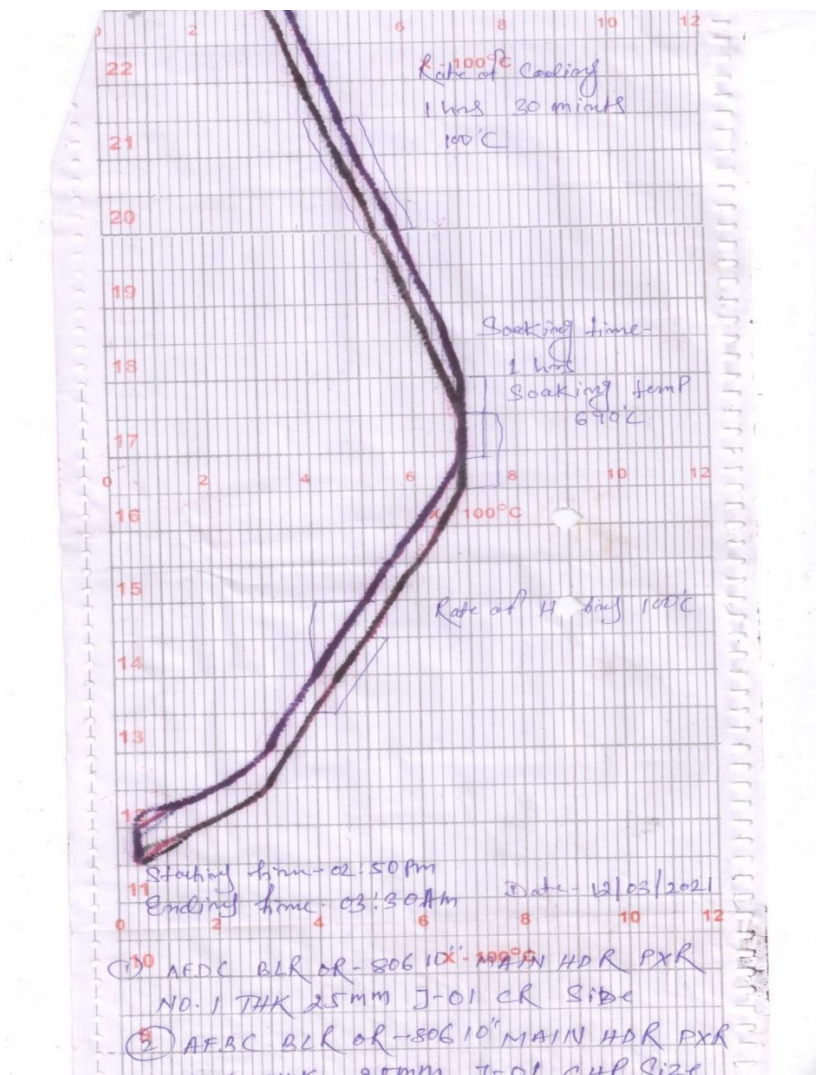
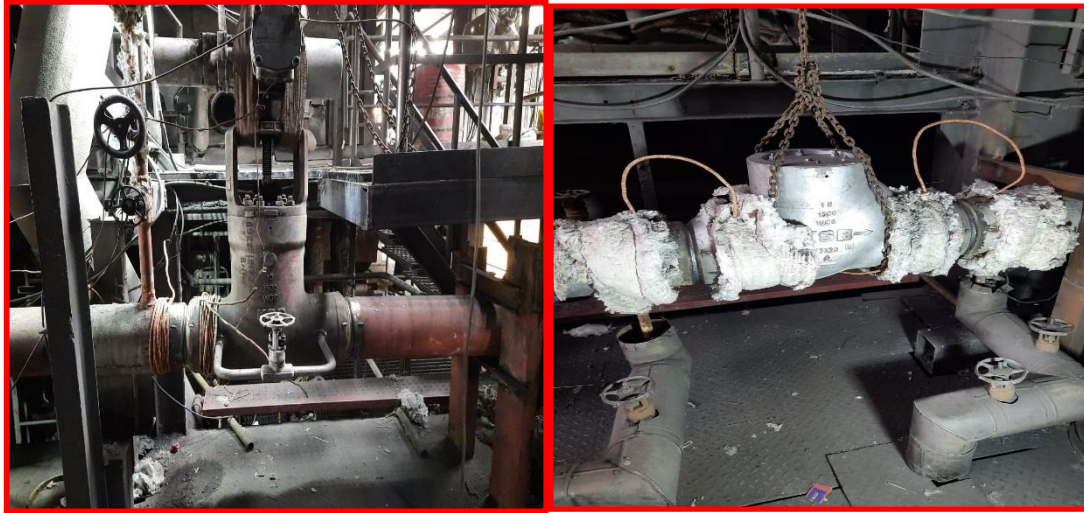


- b. Thickness measurement: Thickness measurement of various pr. Parts as follows
- Panel tubes
 - Evaporator coil
 - Economiser coil

- IBSH coil
- Primary sup.htr coil



- Dye penetrant testing: DP Test carried out in In-bed evaporator coils both LHS and RHS which were replaced with new coils. Reports are attached.
- Radiography Testing: RT carried out in In-bed evaporator coils both LHS and RHS which were replaced with new coils. Reports are attached.
- Pre-heating & Stress Reliving: Pre-heating & Stress Reliving were carried out in 10" MSSV valve and 10" NRV valve which are in main steam line. Total joints - 04 no's.



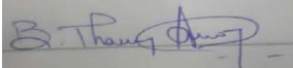



Radiography of the following joints was carried out during shutdown at AFBC boiler:

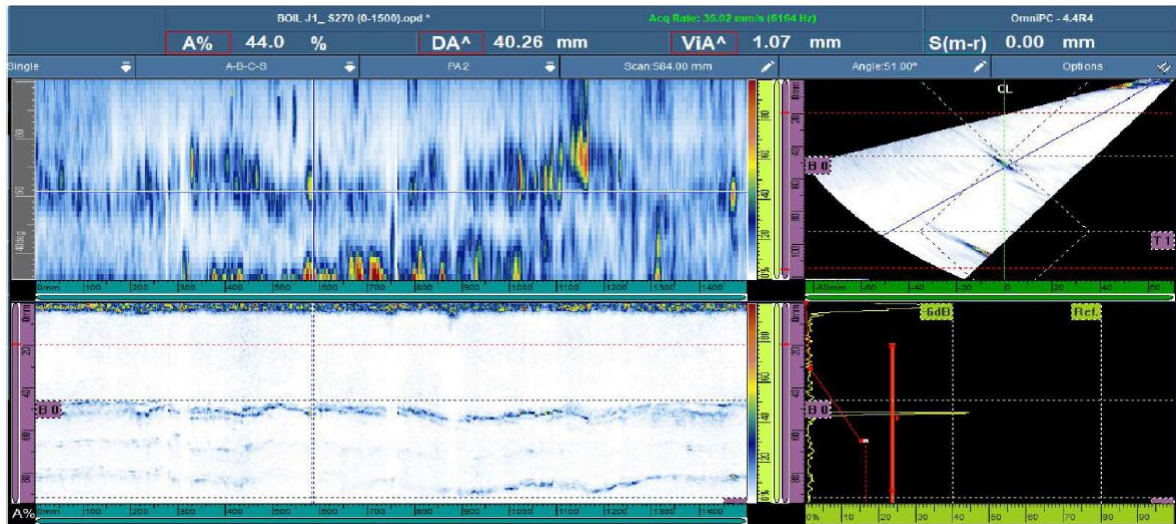
- 01) 10" NB AFBC BOILER (OR-806) MAIN HEADER JOINT NO 1 & 2
- 02) 10" NB AFBC BOILER (OR-806) NRV CONTROL ROOM & ESP SIDE-04 NOS.
- 03) 10" NB AFBC BOILER (OR-806) MSSV CONTROL ROOM SIDE -02 NOS.
- 04) AFBC BOILER (OR-805) INBED EVAPORETOR COIL AT LHS & RHS-23 NOS.
- 05) 02" NB AFBC BOILER (OR-805) PSH COIL -22 NOS
- 06) 10" NB IN AFBC BOILER – BFW PUM DISCHARGE LINE-JOINT 01 NO.
- 07) 14" NB BFW HEADER –JOINT 01 NO.
- 08) AFBC BOILER (OR-806) MAIN HEADER STEAM NOZZLE JOINT NO: 03 NOS

Phased Array Ultrasonic Testing (PAUT)

Phased Array Ultrasonic Testing (PAUT) was carried out in common main header – total -04no's of joint's checked and found intact.

 Your Asset Integrity Specialist		PAUT Examination Report				 Wholly owned by Cooperatives								
Project / Client		IFFCO		Report No		IRC/IFFCO/PAUT/2021/02								
Location		IFFCO - PARADEEP		Date		03-04-2021								
NDT Agency		IRC ENGINEERING SERVICES INDIA PVT LTD		Material		P11								
Work Order No		6580/252004212684		Dia & Thickness		AS MENTIONED BELOW								
Procedure No.		IRC/PAUT/2021/05 Rev 0		Job Location		AFBC BOILER UNIT								
Acceptance Criteria		ASME Section VIII Div 2		Line No. / Dwg No.		AS MENTIONED BELOW								
INSTRUMENT DATA														
Equipment/Version		OMNISCAN MX2		PAUT Probe		5L64A2								
Machine Sr No		OMNI-MX2-103241		PAUT Wedge		SA2-N55S-IHC								
Calibration due date		03-Feb-22		TOFD Probe		C653								
Cal Block		SDH BLOCK/ IOW BLOCK		TOFD Wedge		ST1-60L-IHS								
				Couplant		Oil + Grease mix								
				Surface condition		SMOOTH								
				Surface Temperature		AMBIENT								
				Scanning Surface		On weld(top surface)								
TECHNIQUE DETAILS-PAUT														
JOB THICKNESS(mm)	Groups	skew	Probe	Wedge	Index	Aperture	Start Element	Last Element	Angle (degrees)	Gain				
52 mm	PA1	90/270	5L64A2	SA2N55S-IHC	±70	16	1	16	36-70	33+6db				
	PA2					16	48	63	36-70	39+6db				
	PA3					16	1	64	0	42+6db				
	PA4					8	1	64	30	43.4+6db				
WELD JOINT DETAILS														
SL NO	LINE No.	WELD No.	WELDER No.	SCAN LENGTH	SKEW	IND NO	START	LENGTH	HEIGHT	DEPTH	a/l	a/t	TYPE	REMARKS/RESULT
1														REFER ATTACHED INDICATION TABLE
Comments:														
Scanned & Interpreted By IRC (PAUT Level-II)				Reviewed / Approved By IRC NDT Level-III				Client / EIC IFFCO						
Name: TAMEEM ANZAR				Name: BALAJI RAO M				Name: D. UMAPATHI						
								Sign:						
Sign:				Sign:				Date:						
Date: 06-04-2021				Date: 06-04-2021										

INDICATION TABLE FOR AFBC BOILER PLANT (4 JOINTS)															
SR No	WELD No	Dia & Thk	SCAN AREA	SKEW	IND No	START	LENGTH (l)	HEIGHT (a)	DEPTH	a/l	a/t	TYPE	REMARKS / RESULT	TYPE	
1	J1	18" x 52	0-1500	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-	
2	J2	18" x 52	0-1500	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-	
3	J3	18" x 52	0-1500	S90/S270	1	637	8	3.5	17.3	0.219	0.034	SUB SURFACE	ACCEPT	INCLUSION	
4	J4	18" x 52	0-1500	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-	



**REPORT OF
INSPECTION SECTION ACTIVITIES IN
ENERGY CENTRE
SHUTDOWN - ATR - 2021**

INDEX

1 Introduction

6. Thickness measurement
7. Dye penetrant testing
8. Radiography Testing
9. Pre-heating & Stress Reliving

2 Phased Array Ultrasonic Testing (PAUT) & Time of flight diffraction Testing (TOFD)

a) Thickness measurement :

- Thickness measurement was carried out in Two 400 NB elbows (90°) along with one 400 NB pipe piece were replaced in downstream header of HP to LP PRDS (new).



b) Dye penetrant testing:

- DP Test carried in Replacement of Expansion Bellows(5 Nos) in LP steam header
- DP Test carried in Replacement of 750 NB Elbow(1 Nos) in LP steam Header near SAP



- DP Test carried in Replacement of 750 NB Elbow(1 Nos) in LP steam Header near SAP
- Two 400 NB elbows (90°) along with one 400 NB pipe piece were replaced in downstream header of HP to LP PRDS (new).

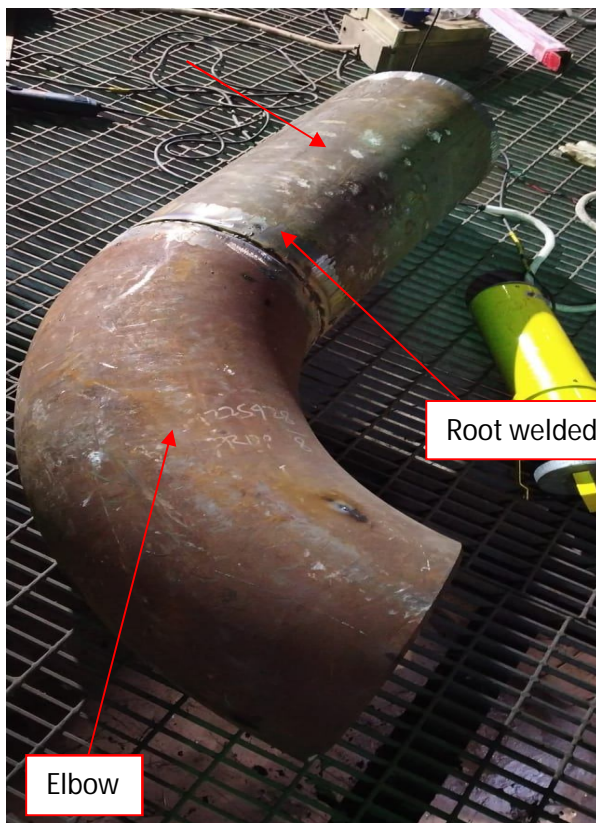


Figure 9: Joint root welding done

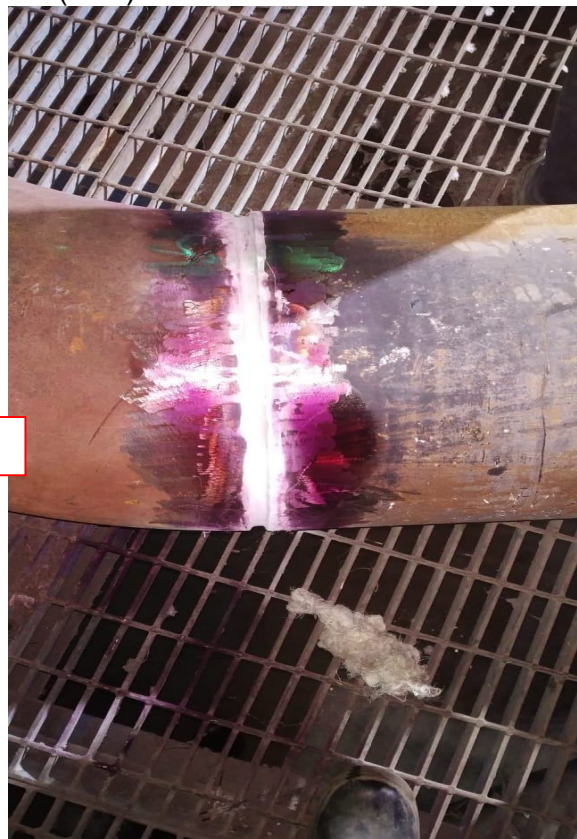


Figure 10: DP test for Joint-1 root welding

Welding started with TIG for root pass and after completion of root welding DP test was done for all joints.



Figure 11: DP test for Joint-2 root welding



Figure 12: DP test for Joint-3 & 4 roots welding

C) Radiography of the following joints was carried out during shutdown at Energy Centre:

- 01) 38" NB LPS TO BELLOW 3 AT SAP END- JOINT 01
- 02) 4" PRDS LINE LP TO HP – JOINT 02NOS.
- 03) 10" PRDS LINE LP TO HP – JOINT 02NOS.
- 04) 16" NB HP TO LP PRDS LINE –JOINT 01 NO.

-

- **Major NDT jobs were carried out in replacement job of TG-1 PRDS (2630)**

- i) DP Test carried out as follows:



Figure 6: Branch joint pad fitted



Figure 7: Branch joint pad is welded

ii) Preheating and stress relieving was carried out:



Figure 13: Preheating and root welding



Figure 14: Root welding & hot passes completed and preheating for fill up & final welding

Root welding started with TIG and hot pass was with arc. Radiography test was carried out as per requirement. After that fill up & final welding done. The surfaces of weld joints were finished. Again RT was carried out. SR of steam header was done.

Figure 15: Final welding completed

2. PAUT & TOFD of HP steam header joints:

- PAUT (Phased Array Ultrasonic Testing) was carried out to detect and image defects if any in welding joints of HP steam headers. Final report is awaited from Inspection section. HP steam header healthiness is checked every year during ATR in a phased manner. This year we have offered 18 nos. joints to be tested for HP steam header inside TG building.
- Then Inspection section team started testing of joints by DP test followed by PAUT.



Figure 5: PAUT completed joints



PAUT & TOFD Report :



PAUT Examination Report



Project / Client	IFFCO	Report No	IRC/IFFCO/PAUT/2021/01
Location	IFFCO - PARADEEP	Date	23-03-2021 TO 29-03-2021
NDT Agency	IRC ENGINEERING SERVICES INDIA PVT LTD	Material	P11
Work Order No	6580/252004212684	Dia & Thickness	AS MENTIONED BELOW
Procedure No.	IRC/PAUT/2021/05 Rev 0	Job Location	ENERGY CENTER PLANT
Acceptance Criteria	ASME Section VIII Div 2	Line No. / Dwg No.	B2517-000-L54-002

INSTRUMENT DATA

Equipment/Version	OMNISCAN MX2	PAUT Probe	5L64A2	Couplant	Oil + Grease mix
Machine Sr No	OMNI-MX2-103241	PAUT Wedge	SA2-N55S-IHC	Surface condition	SMOOTH
Calibration due date	03-Feb-22	TOFD Probe	C653	Surface Temperature	AMBIENT
Cal Block	SDH BLOCK/ IOW BLOCK	TOFD Wedge	ST1-60L-IHS	Scanning Surface	On weld(top surface)

TECHNIQUE DETAILS-PAUT

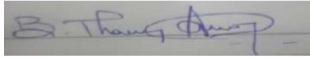

JOB THICKNESS(mm)	Groups	skew	Probe	Wedge	Index	Aperture	Start Element	Last Element	Angle (degrees)	Gain
18/22/29/52/68 mm	PA1	90/270	5L64A2	SA2N55S-IHC	±25 / 35 / 55 / 75	16	1	16	36-70	33+6db
	PA2					16	48	63	36-/0	39+6db
	PA3					16	1	64	0	42+6db
	PA4					8	1	64	30	43.4+6db

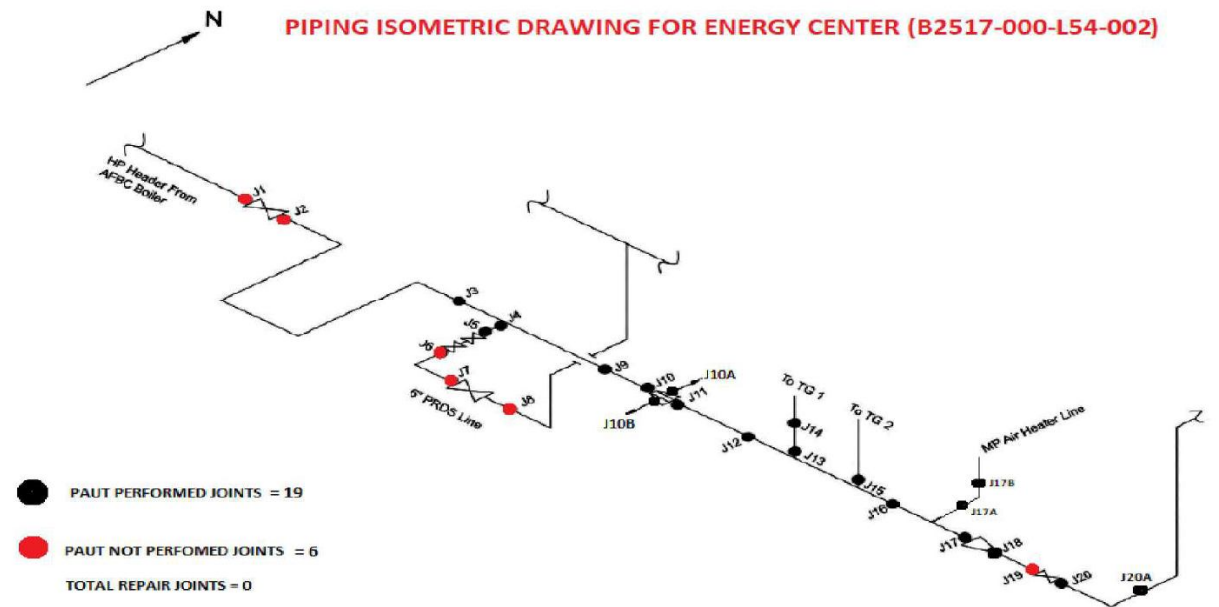
TECHNIQUE DETAILS-TOFD

JOB THICKNESS(mm)	Probe	Wedge	PCS	Angles	Gain
48/68mm	C563	ST1-60L-IHS	120/145	60°	89/91db

WELD JOINT DETAILS

SL NO	LINE No.	WELD No.	WELDER No.	SCAN LENGTH	SKEW	IND NO	START	LENGTH	HEIGHT	DEPTH	a/l	a/t	TYPE	REMARKS/RESULT
1														REFER ATTACHED INDICATION TABLE

Scanned & Interpreted By IRC (PAUT Level-II)	Reviewed / Approved By IRC NDT Level-III	Client / EIC IFFCO
Name: TAMEEM ANZAR  Sign: Date: 06-04-2021	Name: BALAJI RAO M  Sign: Date: 06-04-2021	Name: D. UMAPATHI Sign: Date:

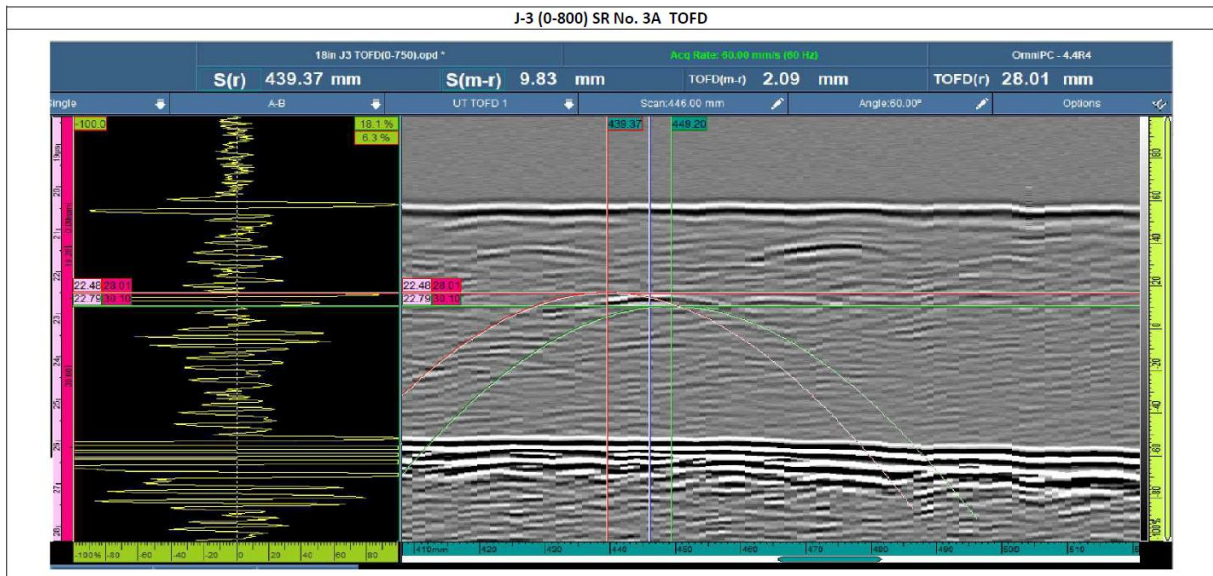
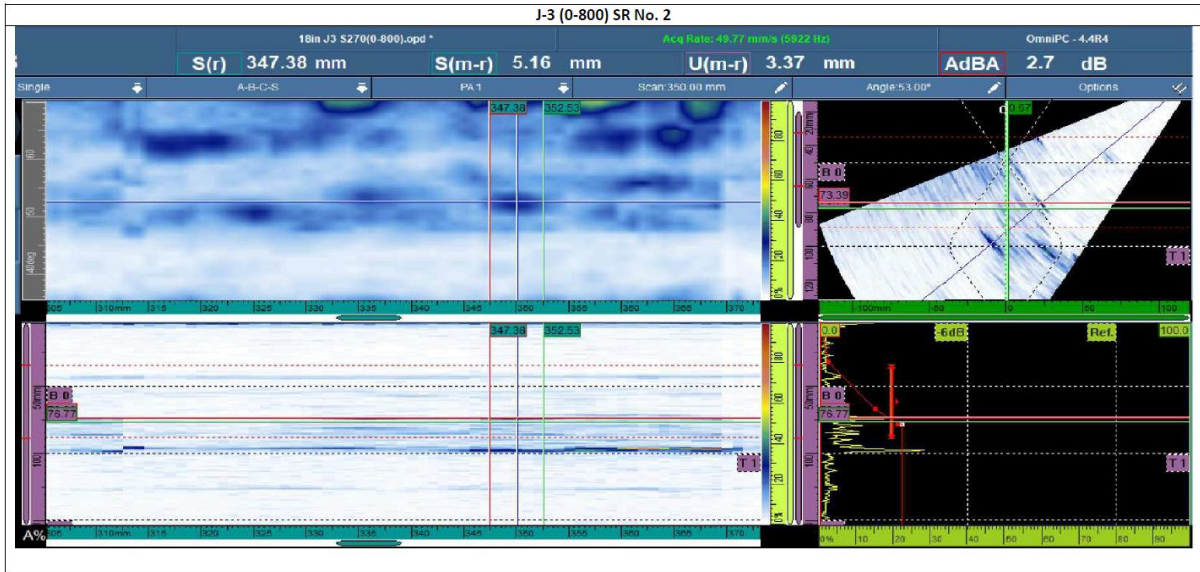


INDICATION TABLE FOR ENERGY CENTER (21 JOINTS)														
SR No	WELD No	Dia & Thk	SCAN AREA	SKEW	IND No	START	LENGTH (l)	HEIGHT (a)	DEPTH	a/l	a/t	TYPE	REMARKS / RESULT	TYPE
1	J-3	18" x 52	0-800	S270	1	322	4	2.7	15.4	0.338	0.028	SUB-SURFACE	ACCEPT	LOF
2			0-800	S270	2	347	5.1	3.3	21.3	0.324	0.034	SUB-SURFACE	ACCEPT	LOF
3			0-800	S90	3	454	8.3	2.4	25.6	0.145	0.025	SUB-SURFACE	ACCEPT	SLAG/INCLUSION
4			750-1600	S270	4	1136	5.4	2.4	24.5	0.222	0.025	SUB-SURFACE	ACCEPT	SLAG/INCLUSION
5	J-4	6" x 18	0-550	S270	-	-	-	-	-	-	-	-	ACCEPT	-
6	J-5	6" x 18	0-550	S270	-	-	-	-	-	-	-	-	ACCEPT	-
7	J-9	18" x 52	0-800	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
8			750-1600	S90/S270	-	-	-	-	-	-	-	-	-	ACCEPT
9	J-10	18" x 52	0-800	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
10			750-1600	S90/S270	-	-	-	-	-	-	-	-	-	ACCEPT
11	J-10A	32-39	0-520	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
12	J-10B	32-39	0-520	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
13	J-11	32" x 68	0-1000	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
14			1000-2600	S90/S270	-	-	-	-	-	-	-	-	-	ACCEPT
15	J-12	32" x 68	0-1000	S270	1	350	6.4	4.8	24.7	0.375	0.035	SUB-SURFACE	ACCEPT	INCLUSION
16				S270	2	477	9.5	4.8	26.1	0.253	0.035	SUB-SURFACE	ACCEPT	INCLUSION
17				S270	3	587	12.5	3	24.5	0.120	0.022	SUB-SURFACE	ACCEPT	INCLUSION
18			1000-2600	S270	4	1253	7.9	3.5	31.2	0.222	0.026	SUB-SURFACE	ACCEPT	INCLUSION
19				S270	5	1467	12	3.7	29.4	0.154	0.027	SUB-SURFACE	ACCEPT	INCLUSION
20				S270	6	2228	5.4	3.9	48.3	0.361	0.029	SUB-SURFACE	ACCEPT	INCLUSION
21	J-13	18" x 52	0-1350	S90	-	-	-	-	-	-	-	-	ACCEPT	-
22			1300-2700	S90	-	-	-	-	-	-	-	-	-	ACCEPT
23	J-14	18" x 52	0-800	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
24			800-1600	S90/S270	-	-	-	-	-	-	-	-	-	ACCEPT
25	J-15	18" x 52	0-1350	S90	-	-	-	-	-	-	-	-	ACCEPT	-
26			1300-2700	S90	-	-	-	-	-	-	-	-	-	ACCEPT

INDICATION TABLE FOR ENERGY CENTER														
SR No	WELD No	Dia & Thk	SCAN AREA	SKEW	IND No	START	LENGTH (l)	HEIGHT (a)	DEPTH	a/l	a/t	TYPE	REMARKS / RESULT	TYPE
27	J-16	32" x 68	0-1000	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
28			1000-2600	S90/S270	-	-	-	-	-	-	-	-	-	ACCEPT
29	J-17	32" x 68	0-1000	S90	-	-	-	-	-	-	-	-	ACCEPT	-
30			1000-2600	S90	-	-	-	-	-	-	-	-	-	ACCEPT
31	J-17 A	12" x 29	0-1050	S90	-	-	-	-	-	-	-	-	ACCEPT	-
32	J-17 B	12" x 29	0-1050	S90	-	-	-	-	-	-	-	-	ACCEPT	-
33	J-18	20" x 52	0-800	S270	-	-	-	-	-	-	-	-	ACCEPT	-
34			750-1600	S270	-	-	-	-	-	-	-	-	-	ACCEPT
35	J-20	20" x 52	0-1000	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
36			1000-2000	S90/S270	-	-	-	-	-	-	-	-	-	ACCEPT
37	J-20A	20" x 52	0-1000	S90/S270	-	-	-	-	-	-	-	-	ACCEPT	-
38			1000-2000	S90/S270	-	-	-	-	-	-	-	-	-	ACCEPT
39	J-1 NEW	8" x 22	0-700	S90	-	-	-	-	-	-	-	-	ACCEPT	-
40	J-1 OLD	8" x 22	0-700	S90	-	-	-	-	-	-	-	-	ACCEPT	-

NOTE:

1. PAUT WAS CARRIED OUT IN ALL ACCESSABLE AREAS
2. LINE NO FOR JOINT J-1 NEW – 8"- NEW PRDS HP TO LP LINE
3. LINE NO FOR JOINT J-1 OLD – 8"- OLD PRDS HP TO LP LINE



SHUT DOWN REPORT




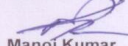
INSPECTION

DAP-A

INDEX

PLANT – DAP TR # A		
1	THICKNESS MEASUREMENT OF 4" NBSULPHURIC ACID LINE FROM DAP TR # A PIPE RACK TO PN TANK	
2	THICKNESS MEASUREMENT OF 904L STRONG ACID TANK SHELL	
3	THICKNESS MEASUREMENT OF PRE SEPERATOR	
4	THICKNESS MEASUREMENT OF PN TANK	
5	THICKNESS MEASUREMENT OF DUST & FUME VENTURE TOWER	
6	THICKNESS MEASUREMENT OF DRYER SCRUBBER SEPARATOR	
7	THICKNESS MEASUREMENT OF DUST & FUME SCRUBBER SEPARATOR	
8	THICKNESS MEASUREMENT OF DRYER VENTURE TOWER	
9	THICKNESS MEASUREMENT OF TG SCRUBBER & DUCT	
10	THICKNESS MEASUREMENT OF PRIMARY SCRUBBER TANK	
11	THICKNESS MEASUREMENT OF PRE TOWER	
12	THICKNESS MEASUREMENT OF PRE SCRUBBER TANK	

THICKNESS MEASUREMENT OF 4" NB SULPHURIC ACID LINE FROM DAP TR # A PIPE RACK TO PN TANK. MAXIMUM THICKNESS OBSERVED 6.95 MM & MINIMUM THICKNESS IS 4.41 MM

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD. PARADEEP UNIT-INSPECTION SECTION THICKNESS MEASUREMENT REPORT		 Wholly owned by Cooperatives Paradeep Unit						
MWR no. & Date :		Plant : DAP TR # A	Department : Maintenance					
Testing equipment details: UTG 10 Thickness meter		Accuracy : +/-0.01 mm	Page no :- 01					
Equipment / Line no description :- 4" NB SULPHURIC ACID LINE FROM DAP TR#A PIPE RACK TO PN TANK			Date of testing : 22.03.2021					
Design thickness : 4" NB SCH-40 (6.02MM)								
Reference Sketch :								
Measured thickness in mm								
SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
1	4" NB			5.25	5	5.36	5.45	
2	B	5.43	5.43					5.3
3		5.85	5.21			5.84	5.88	
4								
5		5.43	5.37			5.2	5.38	
6		5.18	5.44			5.56	5.59	
7		5.21	5.36			5.61	5.23	
8		5.12	5.53			5.52	5.89	
9		5.84	5.19			5.94	5.78	
10								
11				4.41	4.94	4.99	4.87	
12				6.32	6.95	6.22	6.38	
13	B		5.52	5.82				5.7
14			5.28	5.41	5.52			
15		6.14	5.18					6.2
16				6.12	6.31	6.28	6.31	
17				6.14	6.2	6.11	6.28	
18				5.9	5.28	6.01	5.91	
19		5.9	5.47			5.87	5.28	
20		5.07	5.07			4.83	4.76	
21				5.76	5.42	5.87	5.82	
22		5.2	5.14					5.31
Remarks :- Maximum thickness 6.95 mm & minimum thickness 4.41 mm in ss line Reduction 26.74 %								
Reported By			Reviewed By			Approved By		
 Nirmal sahoo			 D Umrao			 Manoj Kumar		

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



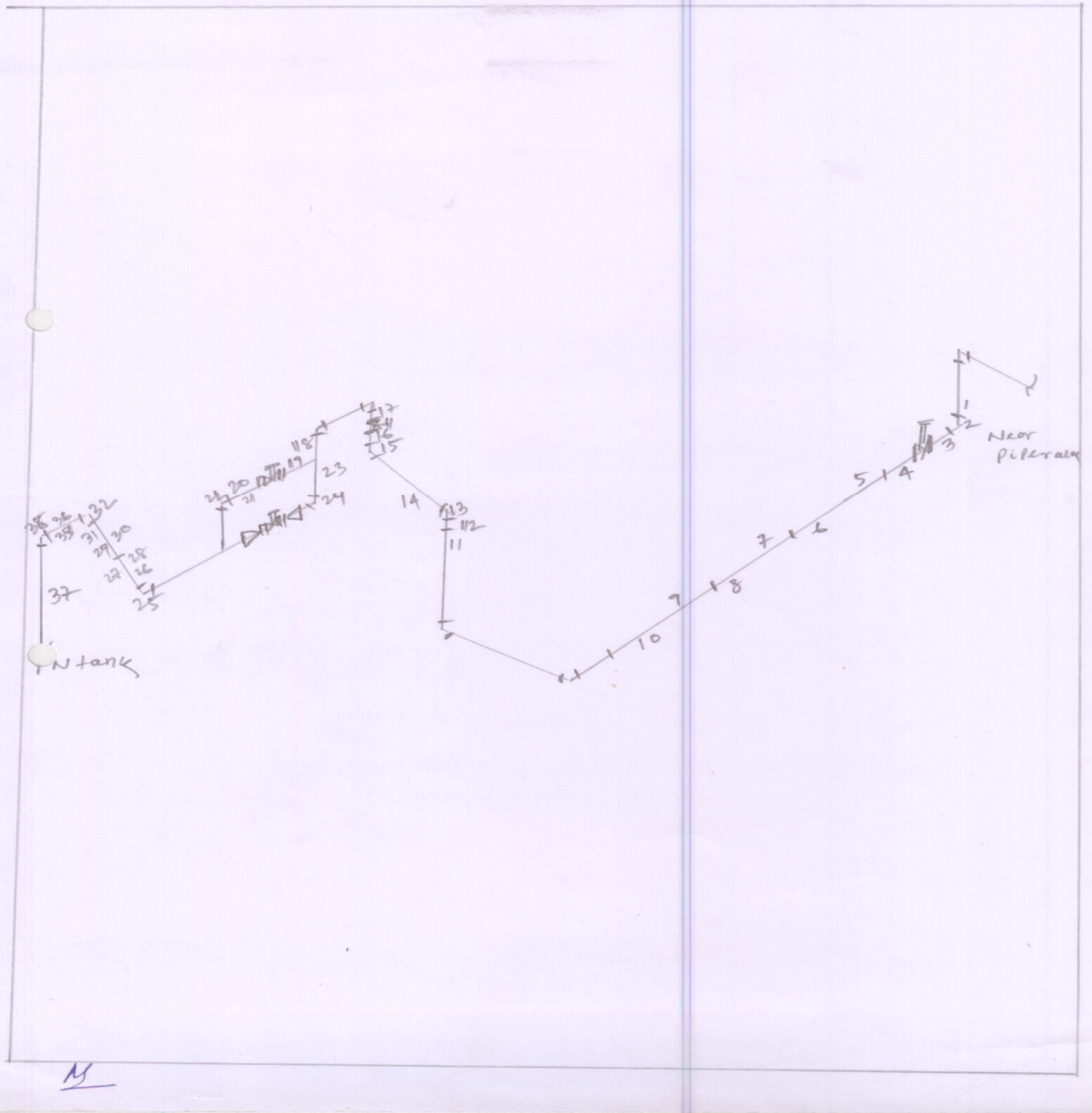
MWR no. & Date :	Plant : DAP TR # A	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 02
Equipment / Line no description :- 4" NB SULPHURIC ACID LINE FROM DAP TR#A PIPE RACK TO PN TANK		Date of testing : 22.03.2021
Design thickness : 4" NB SCH-40 (6.02MM)		
Reference Sketch :		

Measured thickness in mm								
SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
23	4" B	5.45	5.84	5.88				
24	B			5.21	5.39			5.52
25								
26		6.51	4.82	4.92	4.75			
27		4.75	4.62	4.44	4.7			
28		4.7	4.42	4.42	5.51			
29		5.76	5.81	5.78	5.97			
30		5.96	5.82	5.75	5.9			
31		5.71	5.58	5.54	5.56			
32	B				5.57	5.58		5.07
33		5.19	5.97			5.78	5.12	
34		6.11	6.12			5.95	6.02	
35		6.15	6.31			6	6.02	
36	B	6.2	6.15					5.26
37				5.88	6.11	6.5	5.97	

Remarks :-		
Reported By Nirmal sahuo	Reviewed By D Umapathi	Approved By Manoj Kumar



4" NB H₂SO₄ Line from DAP TR#A Pipe rack to
DAP TR#A PN tank

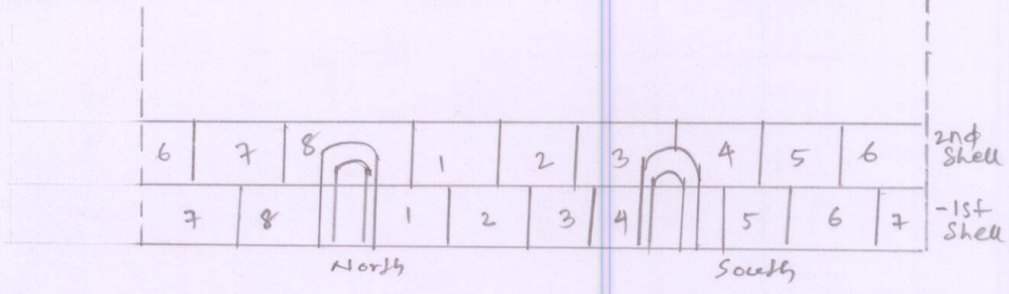


MAXIMUM THICKNESS OBSERVED 6.95 MM & MINIMUM THICKNESS IS 4.41 MM

**THICKNESS MEASUREMENT OF 904L STRONG ACID TANK SHELL-UP TO
MAN HEIGHT (INCLUDED 1ST SHELL & 2ND SHELL FROM GROUND LEVEL)**

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
 PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date : _____ Plant : DAP TR # A Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no :- 01
 Equipment / Line no description :- DAP TR#A 904L STRONG ACID TANK SHELL (UP TO MAN HIGHT) Date of testing : 13.03.2021
 Design thickness : 8.00 MM
 Reference Sketch :



Measured thickness in mm

1ST SHELL											
PLATE -1	8.25	8.53	8.16	8.39	8.21	8.51	8.39	8.22	8.26		
PLATE -2	8.23	8.53	8.04	8.23	8.21	8.26	8.32	8.39	8.11	8.22	
PLATE -3	8.47	8.23	8.33	8.28	8.28	8.22	8.26	8.29	8.24	8.22	8.22
PLATE -4	8.42	8.28	8.32	8.33	8.28	8.21	8.37	8.35	8.46	8.37	
PLATE -5	8.69	8.2	8.24	8.08	8.3	8.33	8.37	8.42			
PLATE -6	8.21	8.44	8.33	8.11	8.33	8.01	8.11	8.25			
PLATE -7	8.32	8.32	8.38	8.57	8.32	8.38	8.44	8.37	8.31	8.15	
PLATE -8	8.33	8.26	8.27	8.23	8.21	8.28	8.2	8.18	8.39	8.4	8.23

2ND SHELL											
PLATE-1	8.28	8.27	8.22	8.26	8.36	8.17	8.26	8.24			
PLATE-2	8.28	8.27	7.76	8.54	8.28	8.54	8.49	8.33			
PLATE-3	8.42	8.41	8.45	8.26	8.39	8.2					
PLATE-4	8.2	8.28	8.36	8.25	8.3	8.21	8.41				
PLATE-5	8.21	8.2	8.66	8.34	8.29	8.25	8.17				
PLATE-6	8.47	8.12	8.29	8.32	8.19						
PLATE-7	8.28	8.27	8.22	8.29	8.39	8.37	8.32	8.22			
PLATE-8	8.33	8.26	8.28	8.31	8.4						

Remarks :-

Reported By

 Nirmal saho

Reviewed By

 D Umapathi

Approved By

 Manoj Kumar

**MAXIMUM THICKNESS OBSERVED 8.54 MM & MINIMUM THICKNESS IS 7.76 MM
 AGAINST DESIGN THICKNESS 8.00 MM.**

THICKNESS MEASUREMENT OF PRE SEPERATOR VESSELES

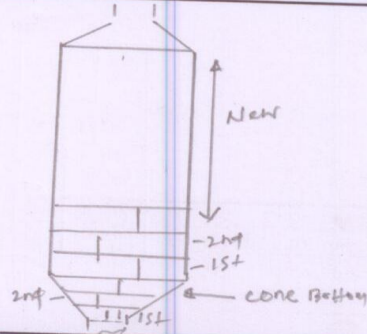


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INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date : _____ Plant : DAP TR # A Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no 1
 Equipment / Line no description :- PRE SEPARATOR DAP TR#A Date of testing : 02.04.2021
 Design thickness _____

Reference Sketch :



Measured thickness in mm

CONE									
1ST	10.62	10.45	10.62	10.24	10.55	10.62	10.8	10.2	
2ND	11.1	10.96	10.82	10.81	10.69	10.33	10.41	10.38	
SHELL									
1ST SHELL	12.88	12.89	12.52	12.91	13.17	12.62	12.84	13.26	12.96
2ND SHELL	12.91	13.05	12.92	12.73	12.94	12.96	12.94	12.34	12.96

Remarks :- Maximum thickness 13.26 mm & minimum thickness 10.20 mm

Reported By

Nirmal sahoo

Reviewed By

D Umaphathi

Approved By

Manoj Kumar

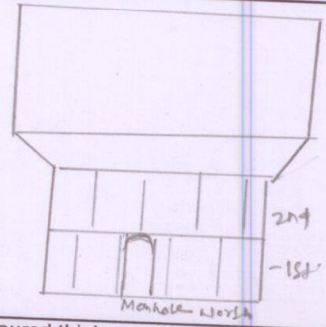
MAXIMUM THICKNESS OBSERVED 13.26 MM & MINIMUM THICKNESS IS 10.20 MM IN SHELL & MAXIMUM THICKNESS OBSERVED 11.1 MM & MINIMUM THICKNESS IS 10.2 MM IN CONICAL PORTION

THICKNESS MEASUREMENT OF PN TANK IN DAP TR # A -UP TO MAN HEIGHT (INCLUDED 1ST SHELL & 2ND SHELL FROM GROUND LEVEL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date : _____ Plant : DAP TR # A Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no 1
 Equipment / Line no description :- PN TANK DAP TR#A Date of testing :02.04.2021
 Design thickness _____
 Reference Sketch :



Measured thickness in mm

1ST SHEEL					
NORTH	8.38	8.45	8.28	8.42	
SOUTH	8.36	8.29	8.19	8.47	
EAST	7.54	8.25	8.26	8.24	
WEST	8.38	8.49	8.45	8.38	8.38

2ND SHEEL					
NORTH	FAC				
SOUTH	7.71	8.2	8.39	8.42	
EAST	8.36	8.29	8.36	8.29	
WEST	8.16	8.41	8.25	8.29	
NORTH	8.41	8.5	8.36	8.47	

Remarks :- Maximum thickness 8.49 mm & minimum thickness 7.54 mm

Reported By

 Nirmal sahoo

Reviewed By

 D Umabathi

Approved By

 Manoj Kumar

MAXIMUM THICKNESS OBSERVED 8.5 MM & MINIMUM THICKNESS IS 7.54 MM

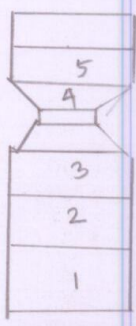
THICKNESS MEASUREMENT OF DUST & FUME VENTURE TOWER IN DAP TR #

A




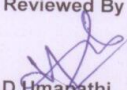
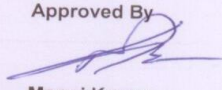
INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date : _____ Plant : DAP TR # A Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no 1
 Equipment / Line no description :- DUST & FUME VENTURE DAP TR#A Date of testing :02.04.2021
 Design thickness _____
 Reference Sketch :



Measured thickness in mm											
1ST SHELL	4.34	4.38	4.52	4.44	5.4	4.6	4.68				
2ND SHELL	4.02	4.08	4.21	4.14	4.81	4.49	4.47				
3RD SHELL	4.82	4.98	4.61	4.72	4.69	4.22	4.85	5.12			
4TH SHELL	4.6	4.8	4.79	4.45	4.55	4.68	4.2	4.3	4.56	4.38	
5TH SHELL	5.19	5.31	5.35	5.22	5.19	4.9	5.09	5.15	5.3	4.98	

Remarks :- Maximum thickness 5.35 mm & minimum thickness 4.02 mm

Reported By  Nirmal sahuo	Reviewed By  D Umamathi	Approved By  Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 5.35 MM & MINIMUM THICKNESS IS 4.02 MM
THICKNESS MEASUREMENT OF DRYER SCRUBBER SEPARATOR IN DAP TR # A
(INCLUDED 1ST SHELL TO 8TH SHELL)

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PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

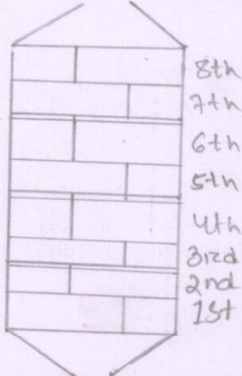
MWR no. & Date : _____ Plant : DAP TR # A Department : Maintenance

Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no 1

Equipment / Line no description :- DRYER SCRUBBER SEPARATOR DAP TR#A Date of testing :01.04.2021

Design thickness _____

Reference Sketch :



Measured thickness in mm

1ST SHELL	5.55	5.46	6.35	6.11	6.55	5.23	5.33	5.48	4.48	4.89	
2ND SHELL	6.02	6.04	6.12	6.1	5.89	6.42	6.24	6.24	5.39	4.82	4.72
3RD SHELL	6.22	6.27	6.16	6.27	6.88	6.31	6.24	6.92	6.15		
4TH SHELL	6.21	6.21	6.15	6.18	6.2	6.39	6.45	6.18	6.17		
5TH SHELL	6.18	6.26	6.3	6.21	6.25	6.2	6.31	6.21	6.34		
6TH SHELL	5.94	6.38	5.92	6.01	6	6.2	6.07	6.07	5.93	6.21	
7TH SHELL	6.42	7.22	6.11	5.94	6.37	6.26	6.04	6.12	6.62	6.5	
8TH SHELL	6.22	5.87	6.07	6.02	6.07	5.89	5.82	6.68	7.5	6.97	

Remarks :- _____

Reported By N Nirmal sahuo

Reviewed By D D Umipathi

Approved By M Manoj Kumar

MAXIMUM THICKNESS OBSERVED 6.88 MM & MINIMUM THICKNESS IS 4.48 MM
THICKNESS MEASUREMENT OF DUST & FUME SCRUBBER SEPARATOR IN DAP TR # A
(INCLUDED 1ST SHELL TO 5TH SHELL & 6TH, 7TH & 8TH SHELL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.											
PARADEEP UNIT-INSPECTION SECTION											
THICKNESS MEASUREMENT REPORT											
MWR no. & Date :			Plant : DAP TR # A			Department : Maintenance					
Testing equipment details:			UTG 10 Thickness meter			Accuracy : +/-0.01 mm			Page no :- 01		
Equipment / Line no description :- DUST & FUME SCRUBBER SEPARATOR						Date of testing :02.04.2021					
Design thickness											
Reference Sketch :											
Measured thickness in mm											
1ST SHELL	5.34	5.29	5.19	6.15	6.33	4.89	5.15	5.4	5.61	5.98	5.57
	5.85										
2ND SHELL	5.95	4.95	5.21	5.67	5.79	5.41	5.09	5.12	5.92	5.91	5.57
	5.75										
3RD SHELL											
4TH SHELL	6.24	6.3	6.49	6.31	6.45	6.22	6.29	6.35	6.4	6.22	6.36
	6.38	6.42	6.5	6.4							
5TH SHELL	6.22	6.35	6.42	6.4	6.23	6.19	6	6.09	6.2	6.19	6.3
6TH SHELL	NA										
7TH SHELL	10.3	10.24	10.34	10.25	10.73	10.17	10.27	10.26	10.3	10.37	10.45
	10.26	10.3									
8TH SHELL	10.26	10.18	10.22	10.3	10.27	10.18	10.27	10.18	10.25	10.2	10.27
	10.3	10.64	10.55								
9TH SHELL	NA										
Remarks :-											
Reported By Nirmal sahuo				Reviewed By D Umabathi				Approved By Manoj Kumar			

MAXIMUM THICKNESS OBSERVED 6.49 MM & MINIMUM THICKNESS IS 4.89 MM (UP TO 5TH SHELL)

MAXIMUM THICKNESS OBSERVED 10.64 MM & MINIMUM THICKNESS IS 10.2 MM (SHELL 7TH & 8TH)

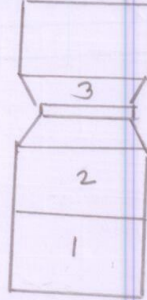
THICKNESS MEASUREMENT OF DRYER VENTURE TOWER IN DAP TR # A
(INCLUDED 1ST SHELL TO 3RD SHELL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
 PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date : _____ Plant : DAP TR # A Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no 1
 Equipment / Line no description :- DRYER VENTURE TR#A Date of testing :02.04.2021
 Design thickness 6.00 MM

Reference Sketch :



	Measured thickness in mm									
1ST SHELL	4.25	4.26	4.39	4.2	4.25	4.34	4.34	4.15		
2ND SHELL	5.17	4.9	5.03	4.99	5.03	5.02	4.95	4.88	5.12	
3RD SHELL	6.21	6.23	6.71	6.88	6.91	6.17	6.16	6.52		

Remarks :-

Reported By

 Nirmal sahoo

Reviewed By

 D Umabathi

Approved By

 Manoj Kumar

MAXIMUM THICKNESS OBSERVED 6.91 MM & MINIMUM THICKNESS IS 4.15 MM

THICKNESS MEASUREMENT OF TAIL GAS SCRUBBER -SHELL IN DAP TR # A
(INCLUDED 1ST, 3RD & 4TH SHELL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date: _____ Plant : DAP TR # A Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no 1
 Equipment / Line no description :- DAP TR#A TG SCRUBBER TANK SHELL Date of testing :01.04.2021
 Design thickness _____
 Reference Sketch :

Measured thickness in mm

1ST SHELL							
NORTH	27.11	27.28	26.88	27.51	27.52		
SOUTH	27.91	27.75	27.78	27.82	27.83		
EAST	27.18	27.86	27.82	27.63	27.31		
WEST	27.63	27.42	27.84	27.85	28.02		

2ND SHELL NA PATCH PLATE							
3RD SHELL							
NORTH	NA						
SOUTH	15.83	15.13	15.61	15.54	15.68	15.47	
EAST	15.87	15.82	15.83	15.58	15.88	15.81	
WEST	15.82	16.08	15.91	15.73	15.44	16.21	

4TH SHELL							
NORTH	NA						
SOUTH	15.82	15.4	15.07	15.74	15.82	15.24	
EAST	15.88	16.11	15.45	15.49	15.45	15.11	15.25
WEST	15.47	16.13	15.84	15.95	15.98	15.84	16.29

Remarks :- _____

Reported By: *Ns*
Nirmal sahuo

Reviewed By: *[Signature]*
D Umabathi

Approved By: *[Signature]*
Manoj Kumar

MAXIMUM THICKNESS OBSERVED 28.02 MM & MINIMUM THICKNESS IS 26.88 MM (1ST SHELL)
MAXIMUM THICKNESS OBSERVED 16.21 MM & MINIMUM THICKNESS IS 15.11 MM (SHELL 3RD & 4TH)

THICKNESS MEASUREMENT OF TAIL GAS SCRUBBER -DUCT IN DAP TR # A



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INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.											
PARADEEP UNIT-INSPECTION SECTION											
THICKNESS MEASUREMENT REPORT											
MWR no. & Date :			Plant : DAP TR # A			Department : Maintenance					
Testing equipment details:			UTG 10 Thickness meter			Accuracy : +/-0.01 mm			Page no 1		
Equipment / Line no description :- DAP TR#A TG SCRUBBER DUCT						Date of testing 01.04.2021					
Design thickness			6.00 MM								
Reference Sketch :											
Measured thickness in mm											
TOP	NA										
BOTTOM	6.12	6.27	6.51	6.22	6.31	6.31	6.29	6.51	6.22	6.31	6.11
	6.14	6.4	6.28	6.51	6.21						
EAST	6.14	5.19	5.99	5.92	5.85	6.21	6.85	5.98	5.79	6.05	5.97
	5.78	6.12	6.16								
WEST	6.28	5.92	5.66	5.98	6.02	5.52	6.08	5.82	6.11	5.99	5.89
	5.84	5.76	6.62	6.22	5.94						
Remarks :- Maximum thickness 6.85 mm & minimum thickness 5.19 mm in ss line Reduction %											
Reported By				Reviewed By				Approved By			
 Nirmal sahu				 D Umamathi				 Manoj Kumar			

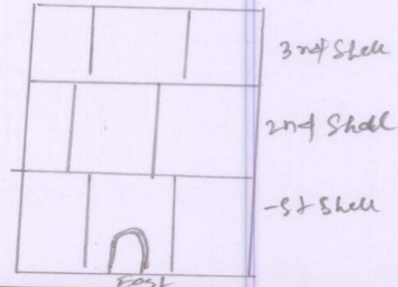
**MAXIMUM THICKNESS OBSERVED 6.85 MM & MINIMUM THICKNESS IS 5.19 MM
AGAINST DESIGN THICKNESS 6.00 MM.**

**THICKNESS MEASUREMENT OF PRIMARY SCRUBBER TANK IN DAP TR # A
(INCLUDED 1ST & 2ND SHELL ONLY)**

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
 PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date : _____ Plant : DAP TR # A Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no 1
 Equipment / Line no description :- PRIMERY SCRUBBER TANK DAP TR#A Date of testing 02.04.2021
 Design thickness 6.00 MM

Reference Sketch :



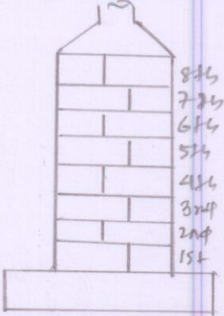


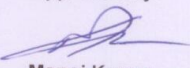
Measured thickness in mm										
1ST SHELL	6.17	6.38	6.41	6.21	6.38	6.25	6.39	6.38	6.42	6.4
2ND SHELL	6.37	6.28	6.41	6.47	6.39	6.17	6.32	6.41	6.39	6.42

Remarks :- Maximum thickness 6.47 mm & minimum thickness 6.17 mm

Reported By: Nirmal sahoo
 Reviewed By: D Umapathi
 Approved By: Manoj Kumar

**MAXIMUM THICKNESS OBSERVED 6.42 MM & MINIMUM THICKNESS IS 6.17 MM
 AGAINST DESIGN THICKNESS 6.00 MM.**

THICKNESS MEASUREMENT OF PRE TOWER IN DAP TR # A
(INCLUDED 1ST TO 6TH SHELL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.											
PARADEEP UNIT-INSPECTION SECTION											
THICKNESS MEASUREMENT REPORT											
MWR no. & Date			Plant : DAP TR # A			Department : Maintenance					
Testing equipment details:			UTG 10 Thickness meter			Accuracy : +/-0.01 mm		Page no		1	
Equipment / Line no description :- PRE TOWER DAP TR#A						Date of testing :02.04.2021					
Design thickness 8.00 MM											
Reference Sketch :											
											
Measured thickness in mm											
1ST SHELL	8.62	8.42	8.53	8.57	8.44	8.57	8.49	8.46	8.53	8.45	
2ND SHELL	8.42	8.59	8.68	8.77	8.58	8.68	8.44	8.82	8.62		
3RD SHELL	8.57	8.38	8.28	8.29	8.44	8.35	8.54	8.76	8.72	8.21	
4TH SHELL	8.72	8.36	8.41	8.42	8.35	8.53	8.42	8.32	8.35	8.28	8.62
5TH SHELL	8.57	8.41	8.4	8.41	8.48	8.31	8.43	8.53	8.21		
6TH SHELL	8.34	8.44	8.33	8.39	8.35	8.3	8.32	8.27	8.29	8.33	8.31
Remarks :- Maximum thickness 8.82 mm & minimum thickness 8.21 mm											
Reported By  Nirmal sahoo			Reviewed By  D Umagathi			Approved By  Manoj Kumar					

**MAXIMUM THICKNESS OBSERVED 8.82 MM & MINIMUM THICKNESS IS 8.21 MM
AGAINST DESIGN THICKNESS 8.00 MM.**

**THICKNESS MEASUREMENT OF PRE SCRUBBER TANK IN DAP TR # A
(INCLUDED 1ST & 2ND SHELL ONLY)**



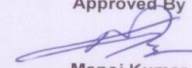
INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # A	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- PREE SCRUBBER TANK DAP TR#A	Date of testing : 02.04.2021	
Design thickness :	Reference Sketch :	



Measured thickness in mm											
SHELL-01	8.25	8.26	8.47	8.21	8.28	8.14	8.24	8.36	8.2	8.38	8.41
SHELL02	8.47	8.32	8.79	8.21	8.36	8.24	8.48	8.37	8.29	8.45	
BOTTOM	COTTING										

Remarks :- Maximum thickness 8.79 mm & minimum thickness 8.14 mm

Reported By  Nirmal sahoo	Reviewed By  D. Umupathi	Approved By  Manoj Kumar
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**MAXIMUM THICKNESS OBSERVED 8.47 MM & MINIMUM THICKNESS IS 8.14 MM
AGAINST DESIGN THICKNESS 8.00 MM.**

SHUTDOWN REPORT


INSPECTION

DAP_B

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PLANT – DAP TR # B		
1	THICKNESS MEASUREMENT OF AMMONIA LINE MAIN HEADER IN DAP TR B IN TG AREA	
2	THICKNESS MEASUREMENT OF 4" x 3" NB LIQUID AMMONIA LINE IN DAP TR # B	
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10	THICKNESS MEASUREMENT OF PRE SCRUBBER TANK IN DAP TR # B	
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15	THICKNESS MEASUREMENT OF TG SCRUBBER DUCT IN DAP TR # B	
16	THICKNESS MEASUREMENT OF TG SCRUBBER IN DAP TR # B	

THICKNESS MEASUREMENT OF AMMONIA LINE MAIN HEADER IN DAP TR B IN TG AREA





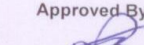
पूरुणऱ सहकारि सऱमिऱव
Wholly owned by Cooperatives
Paradeep Unit

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- AMMONIA LINE MAIN HEADER DAP TR# B TG AREA		Date of testing : 29.03.2021
Design thickness :		
Reference Sketch :		

Measured thickness in mm								
SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
1				7.22	7.38	7.62	7.51	
2				7.26	7.29	7.82	7.42	
3	B	6.83	6.98					6.71
4		7.08	7.62			7.3	7.32	
5		7.52	7.38			7.42	7.38	
6	SS	6.68	6.15			6.11	6.37	
7	SS	6.83	6.95			6.82	6.41	
8	R 6x4"	6.37	8.94			6.47	8.38	
9		6.21	6.46			6.38	6.37	
10	R4x6"	8.84	8.05			6.56	8.39	
11		7.11	7.07			7.8	7.56	
12		7.26	7.32			7.52	7.39	
13		7.51	7.41			7.42	7.51	
14		7.36	7.45			7.38	7.39	
15		7.41	7.52			7.45	7.52	
16		7.57	7.48			7.26	7.52	
17		7.2	7.36			7.58	7.36	
18		6.12	7.12			7.36	7.04	
19		7.23	7.18			7.51	7.54	
20		7.36	7.45			7.28	7.39	
21		7.29	7.33			7.34	7.47	
22		7.5	7.31			6.83	7.02	

Remarks :-

Reported By  Nirmal saho0	Reviewed By  D Umapathi	Approved By  Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 8.84 MM & MINIMUM THICKNESS IS 6.12 MM

THICKNESS MEASUREMENT OF 6" NB AMMONIA LINE MAIN HEADER IN DAP TR B IN TG AREA

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- AMMONIA LINE MAIN HEADER DAP TR# B TO TG AREA		Date of testing : 29.03.2021

Design thickness :
 Reference Sketch :

Measured thickness in mm

SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
23		6.94	7.42			6.52	6.77	
24		7.81	7.36			6.82	7.05	
25		7.1	7.19			7.14	7.02	
26	B	6.91	7.36					6.93
27				7.47	7.82	7.57	7.56	
28	B	7.59	7.87					7.32
29		7.42	7.62	7.12	7.39			
30		7.52	7.29	7.42	7.57			
31	R	23.31	23.89	23.41	23.38			
32	R	23.41	22.81	23.26	23.01			
33		7.31	6.83	7.11	6.94			
34		7.4	7.36	7.52	7.38			
35		7.72	7.59	7.6	7.63			
36		7.69	7.8	7.49	7.7			
37		7.43	7.41	7.36	7.42			
38	B				7.02		7.15	6.9
39		7.61	7.31			7.52	7.37	

Remarks :-

Reported By

 Nirmal sahuo

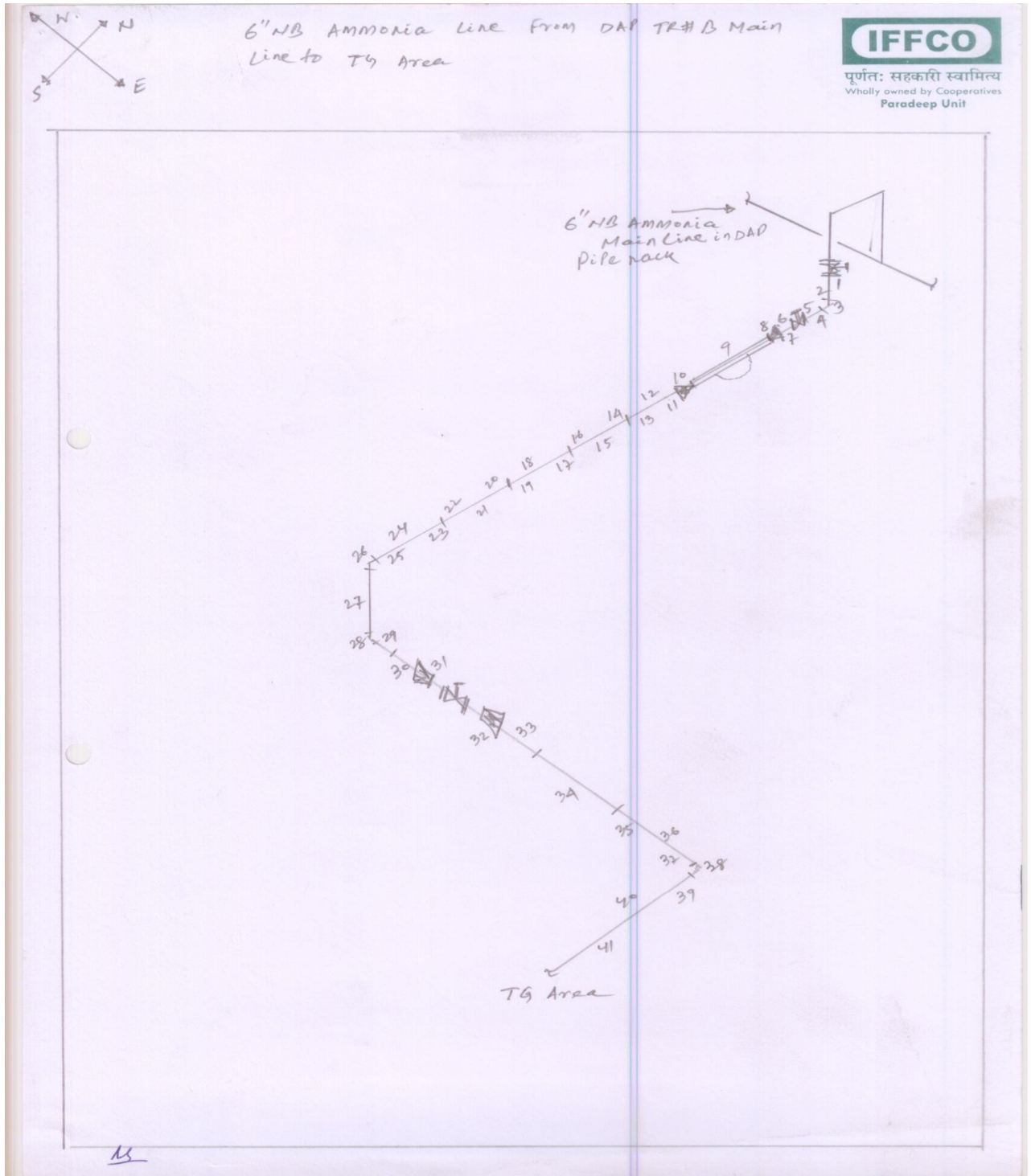
Reviewed By

 D-Umapathi

Approved By

 Manoj Kumar

THICKNESS MEASUREMENT OF 6" NB AMMONIA LINE MAIN HEADER IN DAP TR B IN TG AREA



THICKNESS MEASUREMENT OF 4" x 3" NB LIQUID AMMONIA LINE IN DAP TR # B

DESIGN THICKNESS: 4" NB SCH 40 (6.02 MM) & 3" NB SCH 40 (5.49 MM)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- 4" x3"NB LIQUID AMMONIYA LINE DAP TR# B	Date of testing : 28.03.2021	
Design thickness : 4" sch40-6.02 & 3" nb sch 40- 5.49 mm	Reference Sketch :	

Measured thickness in mm

SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
1	4"X3"			6.31	6.28	6.28	6.24	
2	B	5.44	5.02					5.46
3		6.31	6.24	5.85	6.21			
4	B			5.89			6.07	5.16
5		5.94	5.36			5.11	6.13	
6		6.18	6.11	6.21	6.56			
7	B	5.41	5.28					5
8	R 4"X3"			5.94	5.48	6.07	6.13	
9	3"			5.41	5.76	5.55	5.54	
10	B 3"	5.13	5.31					4.03
11		5.52	5.21			5.36	5.38	
12		5.41	5.29			5.39	5.12	
13	B3"	3.55	3.71					3.52
14				4.28	4.16	4.91	4.62	
15	R 3"X4"			6.07	6.12	6.38	6.11	
16	TE					6.38	6.56	
17	4"			6.31	6.24	6.08	6.5	
18	4"	5.42	5.59			5.42	5.41	
19	R3"X4"	5.54	6.01	5.31	5.48			
20	R4"X3"	4.53	5	5.12	5.31			
21	4"	5.35	5.26	4.78	5.38			
22	4"			5.16	5.31	5.41	5.47	

Remarks :- Maximum thickness 6.56 mm & minimum thickness 3.52 mm 3" NB bend point no 13 Reduction 35.88 %

Reported By Nirmal saho	Reviewed By D Umabathi	Approved by Manoj Kumar
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THICKNESS MEASUREMENT OF 4" x 3" NB LIQUID AMMONIA LINE IN DAP TR # B

DESIGN THICKNESS: 4" NB SCH 40 (6.02 MM) & 3" NB SCH 40 (5.49 MM)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 02
Equipment / Line no description :- 4" x3"NB LIQUID AMMONIA LINE DAP TR# B		Date of testing : 28.03.2021

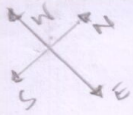
Design thickness :
 Reference Sketch :

Measured thickness in mm								
SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
23	TEE							
24	3"			4.21	4.28	4.36	4.55	
25	B	4.66	5.41					4.9
26		5.02	5.35		5.97	5.38		
27	R	6.91	6.28				7.02	
28	R	7.11	6.8				6.91	
29		7.05	6.08				6.39	
30	B							5.11
31				5.44	6.02	6.11	5.55	
32				5.61	5.68	5.71	5.42	
33	3"	7.25	7.28			7.38	7.11	
34	3"	7.02	7.31			7.29	7.21	
35	B	5.98	6.21					6.02
36		5.43	5.55	5.61	5.38			
37	B	5.38	5.44					5.18
38				5.35	5.42	5.36	5.54	
39				5.83	5.36	5.55	5.49	
40	B	5.48	5.78					5.55
41				5.98	5.47	5.52	5.54	
42	B	5.48	5.38					5.59
43		5.33	5.62			5.96	5.73	

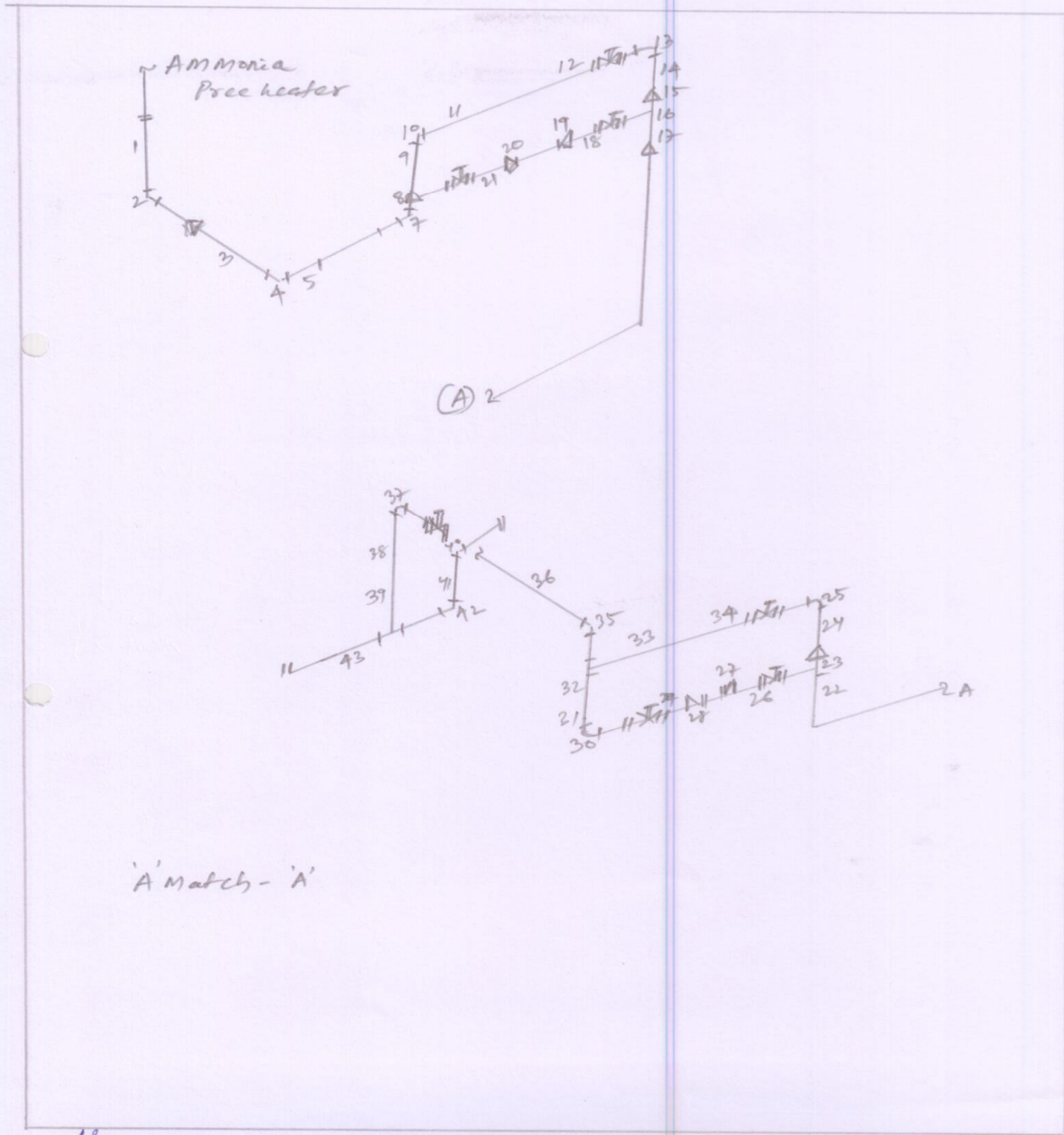
Remarks :-

Reported By Nirmal sahuo	Reviewed By D Umashanti	Approved By Manoj Kumar
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LINE DIAGRAM OF 4" x 3" NB LIQUID AMMONIA LINE IN DAP TR # B



4" NB & 3" NB Liquid Ammonia Line in
DAP TR # B



'A' match - 'A'

THK MEASUREMENT OF 4" NB H₂SO₄ LINE FROM DAP TR # B PIPE RACK TO PN TANK

DESIGN THICKNESS: 4" NB SCH 40 (6.02 MM)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- 4" NB H2 SO4 LINE FROM DAP TR#B PIPE RACK TO PN TANK		Date of testing : 02.04.2021
Design thickness : 4" NB SCH-40 (6.02MM)		
Reference Sketch :		

Measured thickness in mm								
SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
1	4" NB			5.31	5.27	5.18		5.06
2	B	5.44	5.49					5.88
3		5.75	5.97					
4	B				5.49	5.48		5.2
5		5.42	5.38			5.24	5.6	
6		5.11	5.94			5.31	5.8	
7		5.41	5.27			5.55	5.33	
8		5.61	5.79			5.99	5.55	
9		5.47	5.52			5.52	5.21	
10		5.52	5.55			5.38	5.4	
11		5.21	5.37			5.16	5.24	
12		5.21	5.36			5.55	5.39	
13				5.7	5.31	5.68	5.21	
14				5.73	5.55	5.39	5.52	
15	B	5.51	5.53					5.06
16		5.36	5.55	5.61	5.29			
17				6.38	6.14	6.21	6.29	
18				6.31	6.24	6.38	6.04	
19				5.38	5.61	5.56	5.2	
20				5.54	5.56	6.21	5.68	
21				5.43	5.55	5.61	5.54	5.07
22	B	5.48	5.56					

Remarks :- Maximum thickness 6.38 mm & minimum thickness 5.06 mm Reduction 15.94 %

Reported By <i>N</i> Nirmal sahuo	Reviewed By <i>D</i> D Umaphathi	Approved By <i>M</i> Manoj Kumar
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INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 02
Equipment / Line no description :- 4" NB H2 SO4 LINE FROM DAP TR#B PIPE RACK TO PN TANK		Date of testing : 22..03.2021
Design thickness : 4" NB SCH-40 (6.02MM)		

Reference Sketch :

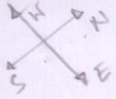
Measured thickness in mm								
SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
23	4" NB	5.48	5.56					5.07
24		5.97	5.52			5.58	5.73	
25		5.5	5.53			5.62	5.55	
26		5.54	5.76			5.51	5.73	
26		5.59	5.42			5.59	5.76	
27	B	5.79	5.44					5.33
28				5.89	5.55	5.62	5.82	
29				5.49	5.73	5.62	5.75	
30	TE				8.79	8.41	8.21	
31				5.58	5.73	5.61	5.16	
32		5.56	5.73	5.49	5.62			
33	B				5.68	5.73		5.47
34		5.44	5.67			5.68	5.73	

Remarks :

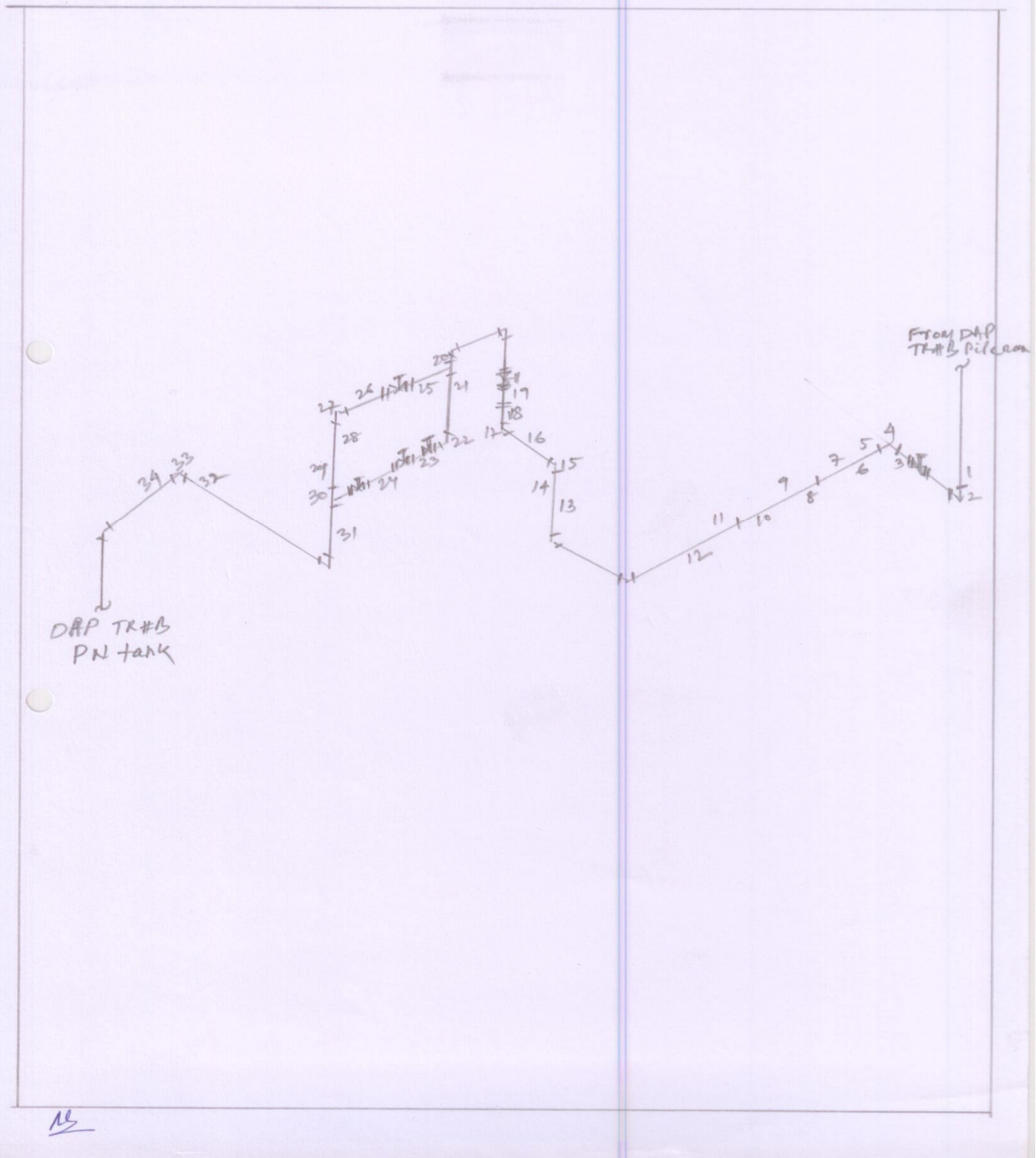
Reported By Nirmal sahuo	Reviewed By D Umagathi	Approved By Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 6.38 MM & MINIMUM THICKNESS IS 5.06 MM

LINE DIAGRAM OF 4" NB H2SO4 LINE FROM DAP TR # B PIPE RACK TO PN TANK



4" NB H₂Soy line from DAP TR#B Pipe rack
to DAP TR#B PN tank

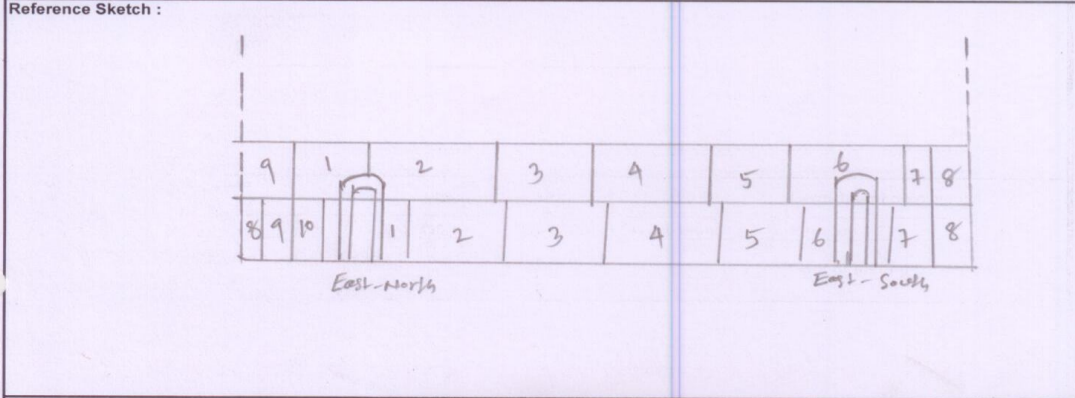


THICKNESS MEASUREMENT OF DAP TR # B WEAK ACID TANK (MOC: SS 904L)
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR#B WEAK ACID TANK (904L)	Date of testing : 01.04.2021	



Measured thickness in mm											
1ST SHELL											
PLATE-01	9.08	9.15	9.14	9.22	9.2	9.15	5.02				
PLATE-02	9.3	9.35	9.14	9.25	9.15	9.27	9.07	9.18	9.08	9.21	
PLATE-03	9.14	9.05	9.15	9.11	9.04	9.07	9.02	9.16	9.05	8.88	9.03
PLATE-04	9	8.91	8.86	8.9							
PLATE-05	9.85	9.02	9.16	9.13	9.16	9.1	9.14	9.17	9.1	9.09	9.09
PLATE-06	9.28	9.16									
PLATE-07	9.26	9.29	9.19	9.36	9.17	9.18	9.11	9.23	8.92		
PLATE-08	9.41	9.11	9.51	9.22	9.22	9.37					
PLATE-09	9.4	8.9	8.56	9.09	9.18	8.81					
PLATE-10	8.4	8.53	8.34	8.52	9.47						
PLATE-11	9.22	9.31	9.05	9.08	9.29						
PLATE-12	9.23	9.4	9.35	9.29	9.38	8.5	8.91	8.71			
2ND SHELL											
PLATE-01	8.64	8.45	8.4	8.77							
PLATE-02	8.5	8.6	8.51	8.66	8.38	8.32					
PLATE-03	8.4	8.36	8.38	8.35	8.39	8.47	8.37	8.34	8.35	8.29	8.36
PLATE-04	8.29										
PLATE-05	8.34	8.3	8.29	8.34	8.37	8.31	8.29	8.28	8.47	8.28	8.34
PLATE-06	8.4	8.27	8.34	8.59	8.46	8.14	8.34	8.29			
PLATE-07	8.47	8.46	8.7	8.77	8.91	8.51	8.29				
PLATE-08	8.54	8.53	8.3	8.2	8.21	8.59	8.36				
PLATE-09	8.44	8.8	8.53	8.61	8.4	8.55					
PLATE-10	8.45	8.66	8.53	8.74	8.68	8.58	8.61	9.2			

Remarks :-

Reported By <i>N</i> Nirmal sahuo	Reviewed By <i>D</i> D Umabathi	Approved By <i>M</i> Manoj Kumar
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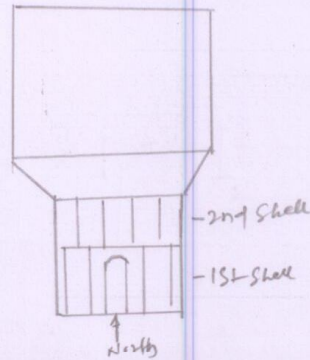
MAXIMUM THICKNESS OBSERVED 9.85 MM & MINIMUM THICKNESS IS 8.2 MM

THICKNESS MEASUREMENT OF DAP TR # B PN TANK SHELL
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR#B PN TANK SHELL		Date of testing : 02.04.2021
Design thickness : 8.00 MM	Reference Sketch :	



Measured thickness in mm

1ST SHELL

NORTH	8.13	8.1	8.48	8.4	8.15	8.23	8.3	8.21	8.19	8.35	
SOUTH	8.47	7.97	8.52	8.25	8.65	7.88	8.15	8.12	8.15	8.25	
EAST	8.12	7.97	8.34	8.13	8.2	8.25	8.45	8.55	8.65	8.21	7.98
WEST	8.55	8.56	8.45	8.28	8.21	8.65	7.97	9.2	8.62	8.31	

2ND SHELL

NORTH	7.92	8.07	7.94	8.34	8.45	8.21	7.88
SOUTH	8.41	8.38	8.45	8.21	8.28		
EAST	8.11	8.22	8.21	7.94	8.31	7.87	8.21
WEST	8.4	8.25	8.17	7.91	8.39	8.48	8.61

Remarks :- Maximum thickness 8.65 mm & minimum thickness 7.87 mm

Reported By <i>N</i> Nirmal sahou	Reviewed By <i>D</i> D Umamathi	Approved By <i>M</i> Manoj Kumar
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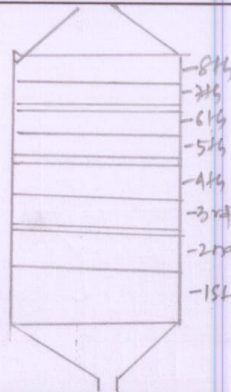
MAXIMUM THICKNESS OBSERVED 8.65 MM & MINIMUM THICKNESS IS 7.87 MM
THICKNESS MEASUREMENT OF DAP TR # B DRYER SCRUBBER SEPARATOR SHELL
(1ST SHELL TO 5TH SHELL & 7TH , 8TH SHELL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR # B DRYER SCRUBBER SEPARATOR SHELL	Date of testing : 31.03.2021	
Design thickness : 8.00 MM		

Reference Sketch :



Measured thickness in mm

	5.29	5.66	5.55	5.86	6.01	5.89	6.12	5.88	5.76	5.92	5.66
1ST SHELL	5.89	6.29									
2ND SHELL	5.92	5.76	5.85	5.96	5.92	6	6.12	5.92	5.88	5.7	5.29
3RD SHELL	5.86										
	6.12	6.29	6.29	6.38	6.24	6.4	6.05	6.29	6.31	6.41	6.29
	6.33										
4TH SHELL	6.05	6.24	6.35	6.32	6.42	6.33	6.41	6.28	6.31	6.41	6.22
5TH SHELL	6.21	6.05	6.28	6.55	6.29	6.28	6.4	6.29	6.33	6.12	6.21
	6.41										
6TH SHELL	NA										
7TH SHELL	6.25	6.25	6.21	6.39	6.48	6.51	6.2	6.55	6.25	6.66	
8TH SHELL	6.28	6.33	6.48	6.52	6.34	6.49	6.55	6.79	6.71	6.62	

Remarks :- Maximum thickness 6.79 mm & minimum thickness 5.29 mm

Reported By

Nirmal sahuo

Reviewed By

D Umraopathi

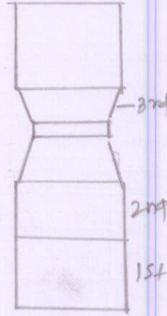
Approved By

Manoj Kumar

MAXIMUM THICKNESS OBSERVED 6.79 MM & MINIMUM THICKNESS IS 5.29 MM
THICKNESS MEASUREMENT OF DAP TR # B DRYER VENTURE
(1ST SHELL TO 3RD SHELL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT


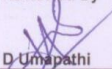
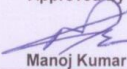
MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DRYER VENTURE DAP TR#B	Date of testing : 31.03.2021	
Design thickness :		
Reference Sketch :		



Measured thickness in mm

1ST SHELL	5.12	5.55	5.29	5.36	5.59	5.82	5.66	5.52	5.29	5.66	5.82
	5.55										
2ND SHEEL	4.96	4.84	5.02	5.12	4.98	4.96	4.86	4.79	5.12	5.23	5.55
3RD SHEEL	5.01	5.01	4.92	5.05	4.5	4.92	5.02	4.52	4.19	4.98	4.92

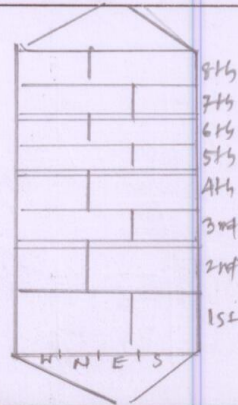
Remarks :- Maximum thickness 5.82 mm & minimum thickness 4.19 mm

Reported By  Nirmal sahu	Reviewed By  D Umabathi	Approved By  Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 5.82 MM & MINIMUM THICKNESS IS 4.19 MM

THICKNESS MEASUREMENT OF DAP TR # B DUST & FUME SCRUBBER SEPARATOR
(1ST SHELL TO 4TH SHELL & 7TH, 8TH SHELL)

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DUST & FUME SCRUBBER SEPARATOR DAP TR#B	Date of testing : 01.04.2021	
Design thickness : 6.00 MM	Reference Sketch :	



Measured thickness in mm											
1ST SHELL	6.45	6.39	4.28	6.12	6.53	6.34	6.44	6.23	6.33	5.8	6.35
	5.28	5.03	4.41	3.74	3.45	3.79					
2ND SHELL	6.54	6.66	6.35	6.22	6.12	6.11	6.37	6.07	6.39	6.01	6.11
	6.18	6.02	6.04	5.58	2.45	2.35	2.43	2.53	2.65	5.45	5.91
3RD SHELL	5.79	5.75	5.74	5.9	5.73	5.45	5.83	5.84	5.86	5.9	5.85
	5.81	5.55	5.85	5.98	5.81	5.83	5.79				
4TH SHELL	5.95	5.81	5.84	5.65	5.85	5.82	5.94	5.9	5.88	5.85	5.91
	5.96	5.8	5.91	5.82	5.85	5.83	5.61	6.05			
5TH SHELL	NA										
6TH SHELL	NA										
7TH SHELL	6.39	6.79	6.2	6.98	6.23	6.29	6.31	6.34	6.05	6.79	6.22
	6.52										
8TH SHELL	6.57	6.81	6.45	6.48	6.68	7.72	7.22	6.4	6.39	6.51	6.88
	6.35	6.87									

Remarks :- Maximum thickness 7.72 mm & minimum thickness 3.45 mm in 1st shell south side

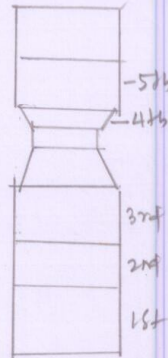
Reported By <i>N</i> Nirmal saho	Reviewed By <i>D</i> D Umopathi	Approved By <i>M</i> Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 7.72 MM & MINIMUM THICKNESS IS 3.45 MM IN 1ST SHELL SOUTH SIDE.

THICKNESS MEASUREMENT OF DAP TR # B DUST & FUME VENTURE TOWER (1ST SHELL TO 5TH SHELL)



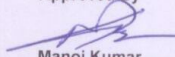
INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
 PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DUST & FUME VENTURE DAP TR#B		Date of testing : 01.04.2021
Design thickness :		
Reference Sketch :		



Measured thickness in mm											
1ST SHELL	6.43	6.22	6.18	6.22	6.35	6.44	6.49	6.24	6.6	6.38	6.42
	6.26	6.26	6.61	6.37	7.06	6.46					
2ND SHELL	6.23	6.28	6.26	6.29	6.43	6.28	6.56	6.43	6.43	6.23	6.29
	6.61	6.36									
3RD SHELL	3.45	3.25	3.68	3.66	3.77	3.84	3.75	3.84	3.63	3.19	3.58
	3.36	3.48	3.69								
4TH SHELL	6.4	7.09	6.2	6.83	6.39	6.59	6.49	6.54	6.68	6.35	6.21
	6.88	6.7	6.55								
5TH SHELL	NA										

Remarks :- Maximum thickness 7.09 mm & minimum thickness 3.19 mm

Reported By  Nirmal sahu	Reviewed By  D Umabathi	Approved By  Manoj Kumar
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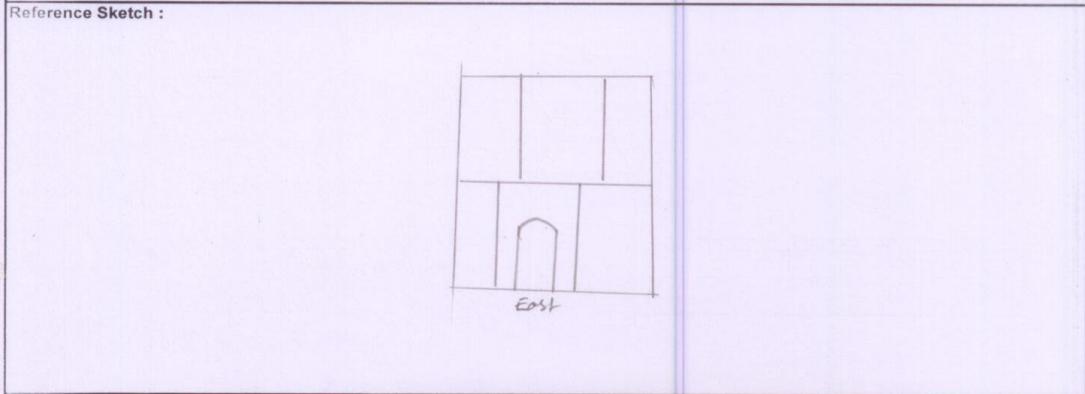
MAXIMUM THICKNESS OBSERVED 7.09 MM & MINIMUM THICKNESS IS 3.19 MM

THICKNESS MEASUREMENT OF DAP TR # B PRE SCRUBBER TANK
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)



**INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT**

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- PREE SCRUBBER TANK DAP TR#B		Date of testing : 01.04.2021
Design thickness : 8.00 MM		



Measured thickness in mm											
1ST SHELL											
NO-01	8.28	8.28	8.4	8.32	8.25	8.23	8.76	8.72	8.26	8.21	8.37
	8.27	8.41	8.26	8.42	8.15	8.29	8.23	8.32	8.33	8.26	8.42
2ND SHELL											
NO-02	8.13	8.21	8.17	8.15	8.1	8.23	8.37	8.21	8.47	8.34	8.4
	8.26	8.27	8.29	8.41							

Remarks :- Maximum thickness 8.76 mm & minimum thickness 8.10 mm

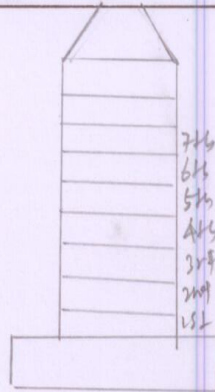
Reported By Nirmal sahoo	Reviewed By D-Umapathi	Approved By Manoj Kumar
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**MAXIMUM THICKNESS OBSERVED 8.76 MM & MINIMUM THICKNESS IS 8.10 MM
AGAINST DESIGN THICKNESS IS 8.00 MM.
THICKNESS MEASUREMENT OF DAP TR # B PRE SCRUBBER TOWER
(1ST SHELL TO 3RD SHELL & 5TH , 6TH SHELL)**



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- PREE TOWER DAP TR#B		Date of testing : 01.04.2021
Design thickness :		
Reference Sketch :		



Measured thickness in mm											
1ST SHELL	8.53	8.58	8.77	8.29	8.58	8.86	9.06	9.01	8.63	8.93	8.38
2ND SHELL	9.52	8.21	8.33	8.28	8.13	8.21	8.39	9.06	9.02	9.08	9.09
	8.8	8.75									
3RD SHELL	8.2	8.34	8.2	8.24	8.5	8.36	8.7	8.21	8.32	8.45	8.25
4TH SHELL	NA										
5TH SHELL	6.52	6.77	6.51	6.52	6.46	6.52	6.63	6.02	5.92	5.77	10.69
	10.8										
6TH SHELL	6.56	6.7	6.62	6.76	6.61	6.51	7.71	6.82	6.36	6.15	5.93
	5.88										

Remarks :-

Reported By <i>N</i> Nirmal sahuo	Reviewed By <i>D</i> D Umashathi	Approved By <i>M</i> Manoj Kumar
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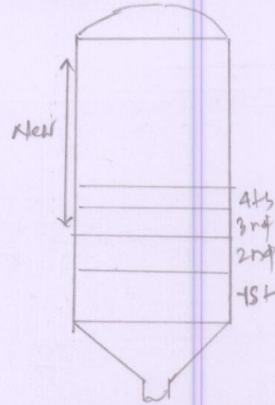
THICKNESS MEASUREMENT OF DAP TR # B PRE SEPARATOR TOWER
(1ST SHELL TO 4TH SHELL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date : Plant : DAP TR # B Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no :- 01
 Equipment / Line no description :- PREE SEPARATOR DAP TR#B Date of testing : 01.04.2021

Design thickness :
 Reference Sketch :



Measured thickness in mm											
1ST SHELL	12.68	12.65	12.75	12.6	12.73	12.81	12.94	12.92	12.17	12.95	12.87
	12.73	8.46	8.6	8.57	8.55	8.54	8.55				
2ND SHELL	12.68	12.8	12.8	12.93	13.05	12.87	12.87	12.96	13.06	8.55	8.48
	8.53	8.63									
3RD SHELL	8.37	8.26	8.4	8.58							
4TH SHELL	8.26	8.31	8.29	8.33	8.29	8.28	8.3	8.3	8.2		

Remarks :-

Reported By: *N*
 Nirmal saho

Reviewed By: *D. Dhanapathi*
 D. Dhanapathi

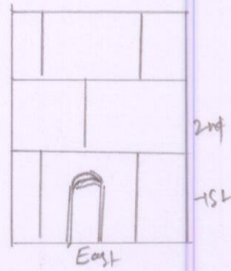
Approved By: *Manoj Kumar*
 Manoj Kumar

THICKNESS MEASUREMENT OF DAP TR # B PRIMARY SCRUBBER TANK
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- PRIMERY SCRUBBER TANK DAP TR#B	Date of testing : 01.04.2021	
Design thickness :		
Reference Sketch :		



Measured thickness in mm

1ST SHELL											
NO-01	6.48	7.89	7.38	7.38	7.44	7.51	7.5	8.12	7.43	8.65	8.45
	7.89	8.63	7.71	7.15	7.86	8.27	7.82	8.17	7.48	9.17	7.24
	9.14	7.77	7.3	7.44	7.56	8.23					
2ND SHELL											
NO-02	8.65	7.45	7.48	7.69	7.77	8.31	8.07	7.86	7.86	7.69	7.17
	7.19	8.32	8.77	7.94	7.65	7.45	7.45	7.78	7.61	7.57	8.08

Remarks :-

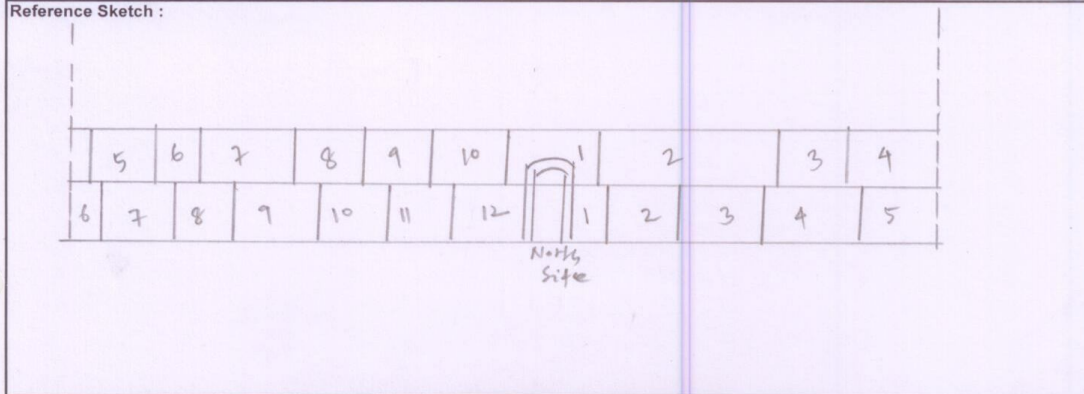
Reported By Nirmal sahuo	Reviewed By D Umabathi	Approved By Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 9.17 MM & MINIMUM THICKNESS IS 6.48 MM
THICKNESS MEASUREMENT OF DAP TR # B STRONG ACID TANK
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR#B STRONG ACID TANK (C.S)		Date of testing : 01.04.2021
Design thickness : 8.00 MM		



Measured thickness in mm										
1ST SHELL										
PLATE-01	9.12	9.9	9.89	9.83	9.72					
PLATE-02	9.95	10.25	10.02	9.97	9.87	9.75	10.07	9.09		
PLATE-03	10.09	10.3	10.28	10.3	10.39	10.34				
PLATE-04	10.16	10.27	10.12	10.77	9.65	9.81	10.19	10.31		
PLATE-05	9.82	9.83	10.05	10.06	10.25					
PLATE-06	10.17	9.99	10.09	9.29	9.86					
PLATE-07	9.26	9.97	10.32							
PLATE-08	11.88	11.49	11.85	8.54						
PLATE-09	10.24	10.01	10							
PLATE-10	9.37	9.64	9.98	9.95	10.07	9.9	9.88			
PLATE-11	9.73	9.85	10.01	10.29	9.96	9.92				
PLATE-12	10.11	9.98	10.05	9.87	9.83	9.92				
2ND SHELL										
PLATE-01	8.19	8.46	8.17	8.19	8.17					
PLATE-02	8.03	8.08	8.17	8.06	8.03	8.11	8.07			
PLATE-03	8.03	8.09	10.58	10.08	8.2	8				
PLATE-04	7.87	8.37	7.86	7.86	7.96					
PLATE-05	7.89	7.91	7.48	7.47	8.21	7.95	8.62	8.69		
PLATE-06	7.96	7.93	7.89	8.02	8.25					
PLATE-07	7.97	7.98	7.93	7.8	8.09					
PLATE-08	7.71	7.82	7.92	7.92	8.02					
PLATE-09	7.95	7.98	7.98	8.02						
PLATE-10	7.95	7.81	7.91	8.82						
PLATE-11	7.9	7.82	7.98	7.89						

Remarks :- Maximum thickness 11.88 mm & minimum thickness 7.47 mm

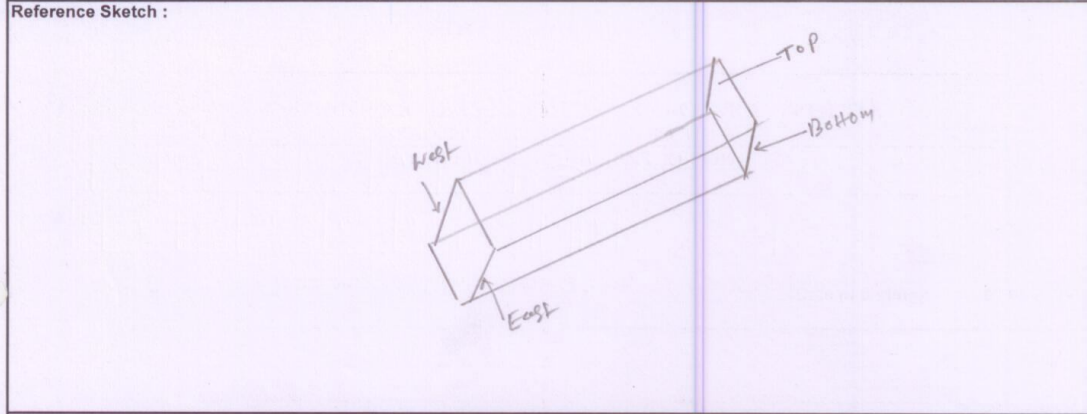
Reported By Nirmal sahoo	Reviewed By D. Unigapathi	Approved By Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 11.88 MM & MINIMUM THICKNESS IS 7.47 MM
THICKNESS MEASUREMENT OF DAP TR # B TG SCRUBBER TANK DUCT

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- TG SCRUBBER TANK DUCT DAP TR#B	Date of testing : 01.04.2021	
Design thickness : 8.00 MM		



Measured thickness in mm											
EAST	8.24	8.52	8.69	8.29	8.49	8.66	8.58	8.91	8.96	8.55	8.66
	8.62	8.92	8.47	8.66	8.55	8.64	8.29	8.62	8.55	8.29	8.55
	8.66	8.38	8.66	8.55	8.12	8.92	8.61	8.55	8.76	8.58	8.66
	8.49	8.8	8.35	8.93							
WEST	8.56	8.66	8.29	8.39	8.38	8.38	8.24	8.45	8.66	8.66	8.49
	8.56	8.29	8.38	8.33	8.4	8.92	8.33	8.29	8.06	8.71	8.38
	8.49	8.55	8.29	8.33	8.42	8.4	8.92	8.52	8.29	8.64	8.55
	8.3	8.42	8.51	8.4							
BATTOM	17.52	17.55	17.62	17.57	17.48	17.52	17.62	17.55	17.49	17.82	17.55
	17.39	17.29	17.84	17.51	17.34	17.44	17.24				

Remarks Maximum thickness 17.84 mm & minimum thickness 8.06 mm in ss line Reduction %

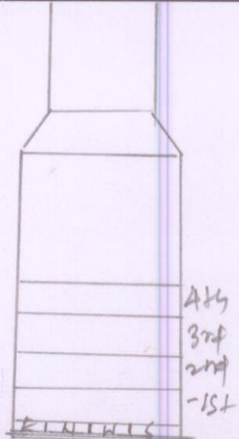
Reported By <i>M</i> Nirmal sahuo	Reviewed By <i>D. Um</i> D. Umjapathi	Approved By <i>Manoj</i> Manoj Kumar
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THICKNESS MEASUREMENT OF DAP TR # B TG SCRUBBER TANK

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # B	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- TG SCRUBBER TANK DAP TR#B		Date of testing : 01.04.2021
Design thickness :		
Reference Sketch :		



Measured thickness in mm											
1ST SHELL	28.72	28.62	28.55	28.72	27.96	28.18	28.55	28.6	28.59	28.32	28.62
2ND SHELL	15.76	16.29	15.78	16.16	15.92	15.84	16.09	15.82	15.52	15.66	15.85
	15.64	16.05	16.92	15.93	15.28	15.44	15.54	15.14	16.05	16.04	15.94
	14.23	16.23									
SOUTH SIDE	(4.31	4.24	4.51	4.22	2.66	2.33	2.31)	9.95	7.85	8.33	9.75
3RD SHELL	9.36	9.87	11.38	13.78	16.14	15.25	16.04	16.29	15.55	16.02	16.45
	16.92	16.05	15.59	15.88	15.66						

Remarks :-

Reported By Nirmal sahuo	Reviewed By D Umabathi	Approved By Manoj Kumar
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**MAXIMUM THICKNESS OBSERVED 16.29 MM & MINIMUM THICKNESS IS 2.31 MM
 IN 2ND SHELL AT SOUTH SIDE**

SHUTDOWN REPORT


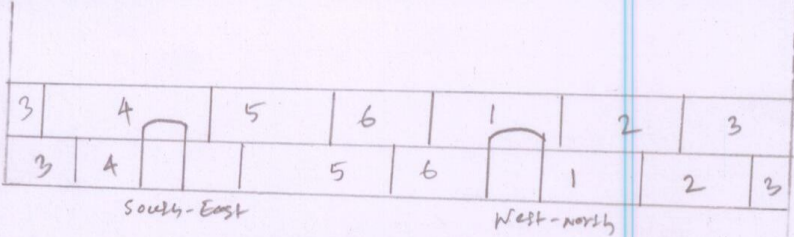

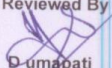
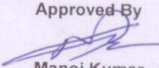
INSPECTION

DAP-C

INDEX


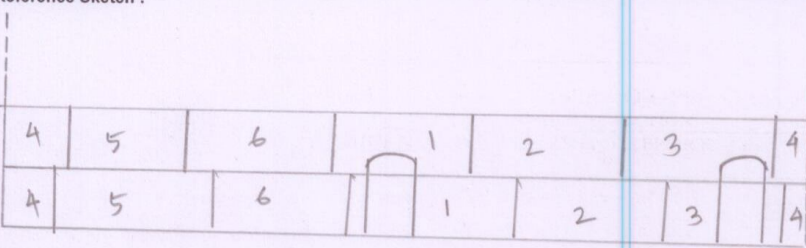

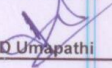
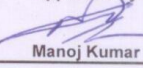
PLANT – DAP TR # C		
1	THICKNESS MEASUREMENT OF STRONG ACID TANK IN DAP TR # C.	
2	THICKNESS MEASUREMENT OF DBN TANK 4 IN DAP TR # C.	
3	THICKNESS MEASUREMENT OF DBN TANK 3 IN DAP TR # C.	
4	THICKNESS MEASUREMENT OF DRYER SCRUBBER SEPARATOR IN DAP TR # C.	
5	THICKNESS MEASUREMENT OF DRYER VENTURE TOWER IN DAP TR # C.	
6	THICKNESS MEASUREMENT OF DUST & FUME VENTURE TOWER IN DAP TR # C.	
7	THICKNESS MEASUREMENT OF PN TANK SHELL & ROOF IN DAP TR # C.	
8	THICKNESS MEASUREMENT OF SURFACE COATING OIL STORAGE TANK IN DAP TR # C.	
9	THICKNESS MEASUREMENT OF TG SCRUBBER COMMON DUCT IN DAP TR # C.	
10	THICKNESS MEASUREMENT OF TG SCRUBBER IN DAP TR # C.	
11	THICKNESS MEASUREMENT OF PRE SEPARATOR TANK BOTTOM CONE IN DAP TR # C.	
12	THICKNESS MEASUREMENT OF PRE SCRUBBER TOWER IN DAP TR # C.	
13	THICKNESS MEASUREMENT OF PRE SCRUBBER TANK WITH BOTTOM PLATE IN DAP TR # C.	
14	THICKNESS MEASUREMENT OF PRIMARY SCRUBBER TANK IN DAP TR # C.	
15	THICKNESS MEASUREMENT OF DUST & FUME SCRUBBER SEPARATOR IN DAP TR # C.	
16	THICKNESS MEASUREMENT OF WEAK ACID TANK IN DAP TR # C.	
16	THICKNESS MEASUREMENT OF 6" NB SULPHURIC ACID LINE FROM DAP TR # C PIPE RACK TO PN TANK IN DAP TR # C.	

THICKNESS MEASUREMENT OF STRONG ACID TANK IN DAP TR # C(MOC : SS 904L).
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD. 										
PARADEEP UNIT-INSPECTION SECTION										
THICKNESS MEASUREMENT REPORT										
MWR no. & Date :					Plant : DAP TR # C			Department : Maintenance		
Testing equipment details: UTG 10 Thickness meter					Accuracy : +/-0.01 mm			Page no :- 01		
Equipment / Line no description :- DAP TR#C 904L STRONG ACID TANK SHELL (UP TO MAN HIGHT)					Date of testing :			25.03.2021		
Design thickness :										
Reference Sketch :										
										
Measured thickness in mm										
1 ST SHELL										
PLATE -1	11.12	11.12	11.13	11.25	11.12	11.51	10.88	11.12		
PLATE -2	11.25	11.37	11.25	10.88	11.13	11.25	11	11.07	11.12	11.37
PLATE -3	11.25	11.12	11.25	11.25	10.87	11.27				
PLATE -4	11.37	11	10.82	11.12	10.88	10.76	11	11.21	11.52	
PLATE -5	12.36	11.37	11.4	11.31	11.37	11.25	11.37	11.62	11.49	11.06
PLATE -6	11.25	11.21	11.12	11.28	11.25	11	11.25	11.12	11.25	11.05
2 ND SHELL										
PLATE-1	11	11.31	11	11.12	11.25	11.37	10.76	10.95		
PLATE-2	10.76	10.76	10.62	10.51	10.71	10.88	10.63	10.76	11	10.76
PLATE-3	10.88	10.76	11.74	10.88	10.76	11.12	10.63	11.12	11.16	
PLATE-4	11	10.88	11.2	10.76	10.88	10.88	11	11.31		
PLATE-5	11.82	12	11.5	11.99	11	12.02	10.88	11.44		
PLATE-6	11.12	11.25	11.31	11.42	11.58	11.36	11.42			
Remarks :-										
Reported By  Nirmal saho			Reviewed By  D. umapati				Approved By  Manoj Kumar			

MAXIMUM THICKNESS OBSERVED 12.36 MM & MINIMUM THICKNESS IS 10.51 MM

THICKNESS MEASUREMENT OF DBN TANK 4 IN DAP TR # C.
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD. PARADEEP UNIT-INSPECTION SECTION THICKNESS MEASUREMENT REPORT										 पूर्णतः सहकारी Wholly owned by Gooperatives Paradeep Unit		
MWR no. & Date :					Plant : DAP TR # C			Department : Maintenance				
Testing equipment details: UTG 10 Thickness meter					Accuracy : +/-0.01 mm			Page no :- 01				
Equipment / Line no description :- DAP TR#C DBN TANK-4 SHELL								Date of testing : 25.03.2021				
Design thickness :												
Reference Sketch :												
												
Measured thickness in mm												
1ST SHELL												
PLATE -1	10.85	10.59	11.06	11	10.65	10.96	11.82					
PLATE -2	10.92	11.08	11.43	11.88	11.58	11.57	11.44	11.52	11.66	11.03	12	
PLATE -3	11.09	11.14	11.16	11.36	11.14	11.01	11.21	11.37	11.31	11.64		
PLATE -4	11.38	11.25	11.38	11.58	11.33	11.14	11.25	11.63	11.45	11.51		
PLATE -5	11.51	11.21	11.51	11.38	11.4	11.21	11.22	11.14	11.09	11.12	11.27	
PLATE -6	11.9	11.51	11.27	11.27	11.08	11.25	11.04	11.6	11.26	11.06	11.04	
2ND SHELL												
PLATE-1	10.86	11.09	11.14	11.08	11.36	11.46	11.14	11.08	11.33			
PLATE-2	10.89	11.33	11.09	11.32	11.17	11.2	11.59	11.06				
PLATE-3	11.4	11.46	11.39	11.01	11.31	11.09	10.83	10.93	10.87	11.21		
PLATE-4	11.64	11.27	11.22	11.25	11.22	11.27	11.28					
PLATE-5	11.07	10.95	10.69	10.9	11	11.52	11.09	11.46	11.7	11.7		
PLATE-6	10.65	11.08	11.01	11.01	11.26	11.21	10.98	10.49	10.7			
Remarks :- Maximum thickness 11.90 mm & minimum thickness 10.49 mm												
Reported By  Nirmal sahu				Reviewed By  D. Umapathi				Approved By  Manoj Kumar				

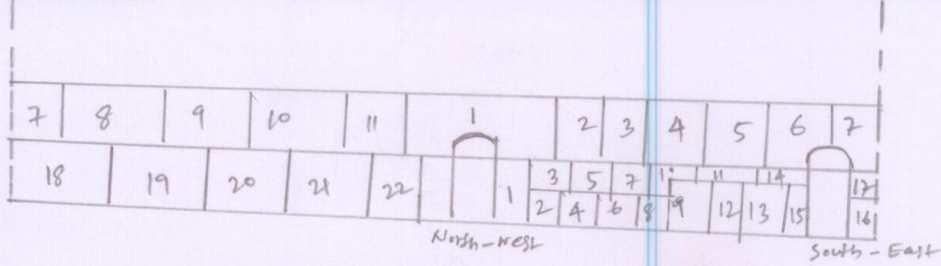
MAXIMUM THICKNESS OBSERVED 11.90 MM & MINIMUM THICKNESS IS 10.46 MM
THICKNESS MEASUREMENT OF DBN TANK 3 IN DAP TR # C.
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	page no :-01
Equipment / Line no description :- DAP TR#C DBN TANK-3		Date of testing : 06.03.2021
Design thickness : CS 1st shell 8.00 mm , cs 2nd shell to 6th shell 6.00 mm		

Reference Sketch :



MEASURED THICKNESS IN (MM)

	1ST SHELL									
PLATE-1	8.39	8.38	8.37	8.55	8.62					
PLATE-2	8.63	8.73								
PLATE-3	8.81	8.26	8.63	8.73	8.68					
PLATE-4	8.33	8.81	8.66							
PLATE-5	8.74	8.31	8.61	8.45	8.81	8.53	8.77			
PLATE-6	8.36	8.94								
PLATE-7	8.37	8.6	8.99	8.98	8.88	8.67				
PLATE-8	8.63	8.58	8.62							
PLATE-9	8.71	8.57	8.52							
PLATE-10	8.67	8.68	8.36							
PLATE-11	8.28	8.53	8.36	8.35						
PLATE-12	8.38	8.32	8.18	8.28						
PLATE-13	8.21	8.28	8.39	8.29						
PLATE-14	8.52	8.31	8.39							
PLATE-15	8.38	8.26	8.82	8.81	8.31					
PLATE-16	8.38	8.52	8.22	8.30	8.60					
PLATE-17	8.29									
PLATE-18	10.15	10.25	10.28	10.29						
PLATE-19	8.31	8.25	8.36	8.29	8.25					
PLATE-20	8.31	7.95	8.31	8.21	8.36	8.38	8.29	8.51		
PLATE-21	8.58	8.38	8.29	8.36	8.39	8.36				
PLATE-22	8.5	8.69	8.38	8.34	8.37	8.29	8.28	8.41	8.52	

Remarks :- Maximum thickness 10.29 mm & Minimum thickness 7.95 mm

Reported By N K Sahoo	Reviewed By D Umopathi	Approved By Manoj Kumar
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INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	page no :-02
Equipment / Line no description :- DAP TR#C DBN TANK-3		Date of testing : 26.03.2021
Design thickness :	CS 1st shell 8.00 mm , cs 2nd shell to 6th shell 6.00 mm	
Reference Sketch :		

MEASURED THICKNESS IN (MM)										
2 ND SHELL										
PLATE-1	7.63	7.75	7.50	7.26	7.57					
PLATE-2	7.1	8.11								
PLATE-3	8.12	8.30	8.19							
PLATE-4	8.38	8.72	8.55	8.36	8.47					
PLATE-5	8.38	8.29	8.82	8.36	8.21					
PLATE-6	7.28	8.29	8.25	8.31	8.36					
PLATE-7	8.14	8.24	8.26	8.28						
PLATE-8	8.21	8.52	8.36	8.22						
PLATE-9	8.21	8.25								
PLATE-10	8.31	8.28								
PLATE-11	8.27	8.31	8.28	8.37	8.25	8.26	8.31	8.27	8.39	8.29

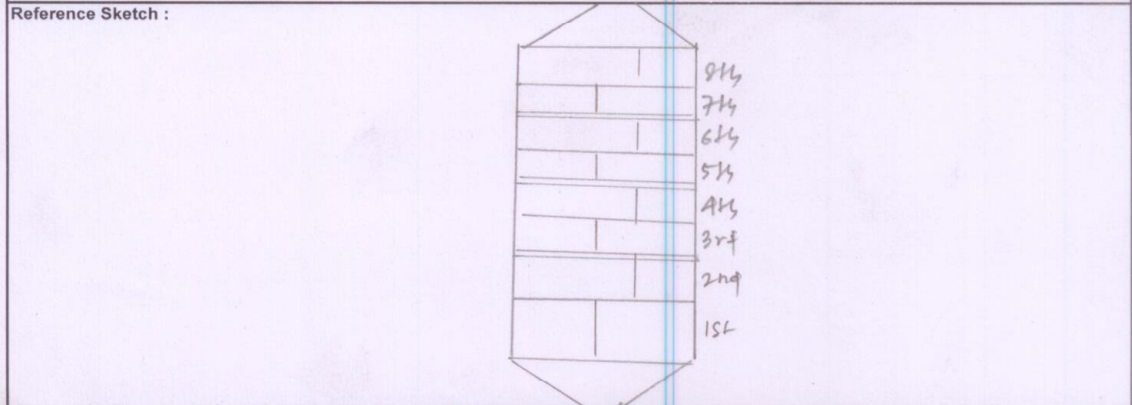
Remarks :-		
Reported By <i>NK</i> N K Sahoo	Reviewed By <i>[Signature]</i> D Dmopathi	Approved By <i>[Signature]</i> Manoj Kumar

**MAXIMUM THICKNESS OBSERVED 10.29 MM & MINIMUM THICKNESS IS 7.95 MM
 AGAINST DESIGN THK OF 1ST SHELL IS 8.00 MM & 2NDSHELL TO 6THSHELL IS 6 MM**

THICKNESS MEASUREMENT OF DRYER SCRUBBER SEPARATOR IN DAP TR # C.
(1ST SHELL TO 5TH SHELL & 7TH , 8TH SHELL)

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DRYER SCRUBBER SEPARATOR DAP TR#C		Date of testing : 25.03.2021
Design thickness : 6.00 MM		




Measured thickness in mm

1ST SHELL	5.89	6.43	6.23	6.22	6.11	6.45	6.88	6.32	6.15	6.18	6.08
	5.9	5.85	6.13								
2ND SHELL	6.09	6.17	6.06	6.47	6.15	6.2	5.9	5.89	5.85	5.8	6
	5.83	5.5	5.33	5.7							
3RD SHELL	6.32	6.41	6.64	6.6	6.72	6.76	6.41	6.39			
4TH SHELL	6.14	6.25	6.42	6.7	6.3	6.21	6.38				
5TH SHELL	6.22	6.75	6.44	6.2	6.52	6.47	6.47				
6TH SHELL	NA										
7TH SHELL	6.35	6.24	6.28	6.52	6.39	6.63	6.53	6.15	6.57	6.48	6.7
	6.46	6.59	6.28								
8TH SHELL	6.55	6.01	6.91	6.61	6.8	6.48	6.65	6.61	6		

Remarks :-

Reported By Nirmal sahu	Reviewed By D Umapati	Approved By Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 6.75 MM & MINIMUM THICKNESS IS 5.33 MM
AGAINST DESIGN THK IS 6.00 MM
THICKNESS MEASUREMENT OF DRYER VENTURE TOWER IN DAP TR # C.
(1ST SHELL TO 3RD SHELL)

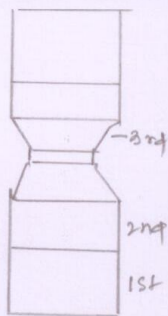


 पूर्णतः सहकारी स्वामित्व में
 Wholly owned by Cooperatives
Paradeep Unit

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT


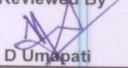
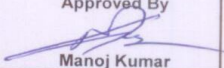
MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DRYER VENTURE TR#C		Date of testing : 25.03.2021
Design thickness : 6.00 MM		

Reference Sketch :



Measured thickness in mm									
1ST SHELL	6.15	5.28	5.41	6.27	5.53	5.16	6.21	6.15	
2ND SHELL	5.16	6.27	6.02	5.9	5.28	5	5.78	6.39	
3RD SHELL	5.9	5.78	6.52	5.69	6.02	6.15	5.54	6.14	

Remarks :-

Reported By  Nirmal sahu	Reviewed By  D Umapati	Approved By  Manoj Kumar
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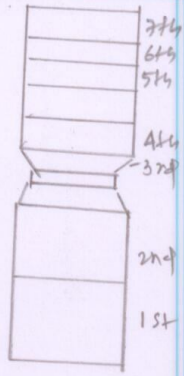
MAXIMUM THICKNESS OBSERVED 6.39 MM & MINIMUM THICKNESS IS 5.00 MM
AGAINST DESIGN THK IS 6.00 MM

THICKNESS MEASUREMENT OF DUST & FUME VENTURE TOWER IN DAP TR # C.
(1ST SHELL TO 4TH SHELL & 6TH , 7TH SHELL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DUST & FUME VENTURE DAP TR#C		Date of testing : 25.03.2021
Design thickness :		
Reference Sketch :		



Measured thickness in mm									
SHELL	SHELL								
1ST SHELL	5.16	6.02	5.16	6.15	6.15	5.47	6.27	5.28	
2ND SHELL	6.64	5.84	6.02	6.15	5.28	5.22	5.78	5.78	
3RD SHELL	6.77	6.02	6.15	5.53	6.39	5.53	5.41	6.27	
4TH SHELL	9.11	8.99	8.12	8.25	9.23	8.25	8.86	9.23	
5TH SHELL	NA								
6TH SHELL	6.89	7.63	6.39	7.01	7.38	6.38	7.49	6.49	
7TH SHELL	6.27	7.13	7.26	6.89	7.26	7.43	7.29	6.39	

Remarks :-

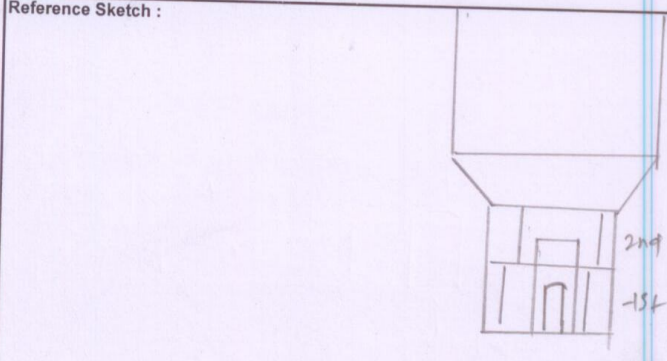
Reported By <i>N</i> Nirmal sahoo	Reviewed By <i>D Umapati</i> D Umapati	Approved By <i>Manoj Kumar</i> Manoj Kumar
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THICKNESS MEASUREMENT OF PN TANK SHELL IN DAP TR # C.
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- PN TANK SHELL		Date of testing : 20.03.2021
Design thickness : 8.00 MM		



Measured thickness in mm											
1ST SHELL											
NORTH	8.8	8.98	8.92	7.12	8.52	9.01	8.82	9.08	8.52	8.92	8.57
SOUTH	8.42	7	7.11	8.86	8.98	8.11	8.97	8.68	8.85	8.68	8.8
EAST	8.84	9.33	9.16	9.23	8.97	9.04	8.8	9.06	8.66	8.26	7.42
WEST	9.02	8.97	8.67	8.73	8.77	8.84	8.85	8.89	8.81	8.82	8.85
	8.86										
2ND SHELL											
NORTH	9.04	8.77	9.09	8.79	10.12	9.29	8.79	8.88	8.79		
SOUTH	8.05	8.69	8.74	8.86	8.8	8.86	8.87	8.98	8.79	8.74	
EAST	8.73	8.78	8.89	8.8	8.88	8.86	8.72	9.16	8.91	8.8	8.54
WEST	8.24	8.65									
	9.03	8.91	9	8.79	9.03	8.56	8.85	8.59	8.88	8.49	8.76
	8.79	8.84	8.92								

Remarks :

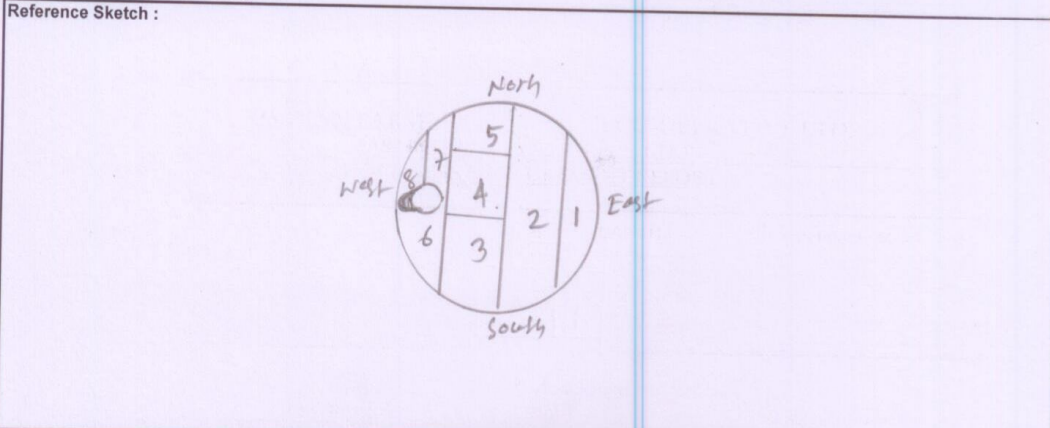
Nirmal sahuo <i>N</i> Reported By	D umapati <i>D</i> Reviewed By	Manoj kumar <i>M</i> Approved By
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THICKNESS MEASUREMENT OF PN TANK ROOF IN DAP TR # C.



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR#B PN TANK ROOF		Date of testing : 20.03.2021
Design thickness : 8.00 MM		



Measured thickness in mm										
PLATE -1	8.76	8.57	8.67	8.94	8.64	8.76				
PLATE -2	8.88	8.25	8	8.29	8.41	8.31	8.52	8.32	8.58	8.47
PLATE -3	8.71	8.52	8.51	8.86	8.52					
PLATE -4	8.38	8.57	8.83	8.62	8.59					
PLATE -5	8.71	8.82	8.73	8.88	8.7	8.82				
PLATE -6	8.31	8.24	8.06	8.19						
PLATE -7	7.88	8.44	8.51	8.36	7.88	8.32	8.64	8.25		
PLATE -8	8.18	8.26	8.35	8.21	8.56					

Remarks :-

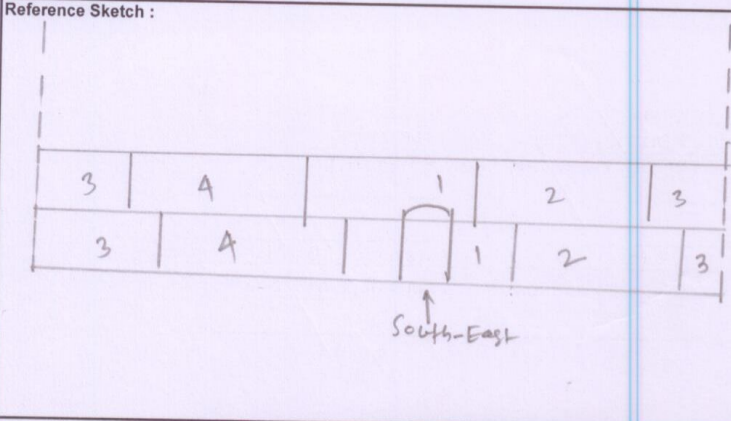
Reported By <i>N</i> Nirmal sahuo	Reviewed By <i>D Umepathi</i> D Umepathi	Approved By <i>Manoj Kumar</i> Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 8.88 MM & MINIMUM THICKNESS IS 7.88 MM
AGAINST DESIGN THK IS 8.00 MM
THICKNESS MEASUREMENT OF SURFACE COATING OIL STORAGE TANK IN DAP TR #
C.
(1ST SHELL & 2ND SHELL FROM GROUND LEVEL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	page no :-01
Equipment / Line no description :-SURFACE COATIG OIL STORAGE TANK	Date of testing : 01.04.2021	
Design thickness :		



MEASURED THICKNESS IN (MM)											
1ST SHELL											
PLATE-1	10.2	10.48	10.43	10.18	10.31	10.37	10.13	10.43	10.19	10.38	10.12
PLATE-2	9.99	9.81	9.99	10.12	10.03	10.24	10.24	10.24	10.06	10.11	10.60
PLATE-3	10.14	10.11	10.18	10.20	10.22	10.23	10.18	10.26	10.11	10.26	11.18
PLATE-4	10.29	10.22	10.16	10.31	10.21	10.92	10.03	10.22	10.18	10.23	10.91
2ND SHELL											
PLATE-1	8.8	8.31	8.00	7.81	8.17	8.18	7.92				
PLATE-2	8.16	7.89	8.04	8.16	8.29	7.91	8.11				
PLATE-3	8.10	7.92	7.88	8.06	7.92	7.82	7.95	8.03			
PLATE-4	8	7.82	7.95	8.18	7.96	8.18	7.94	8.13			

Remarks :

Reported By <i>N K Sahoo</i> N K Sahoo	Reviewed By <i>D Umápathi</i> D Umápathi	Approved By <i>Manoj Kumar</i> Manoj Kumar
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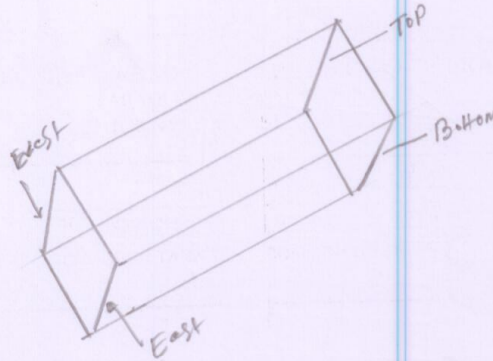
THICKNESS MEASUREMENT OF TG SCRUBBER COMMON DUCT IN DAP TR # C.

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT



MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- TG SCRUBBER TANK TOTG COMMON DUCT		Date of testing : 31.03.2021

Design thickness :
 Reference Sketch :



Measured thickness in mm

TOP	8.29	8.31	8.38	8.4	8.9	9.39	9.47	9.19				
BOTTOM	17.41	17.34	17.42	17.18	17.1	16.09	16	17.48				
EAST	8.27	8.14	8.15	8.25	8.03	8.26						
WEST	7.89	8.38	8.38	8.55	8.47	8.36	8.31	8.22	8.14	8.18	8.03	
	8.08	8.03	8.13									

Remarks :- Maximum thickness 17.42 mm & minimum thickness 7.89 mm in ss line Reduction %

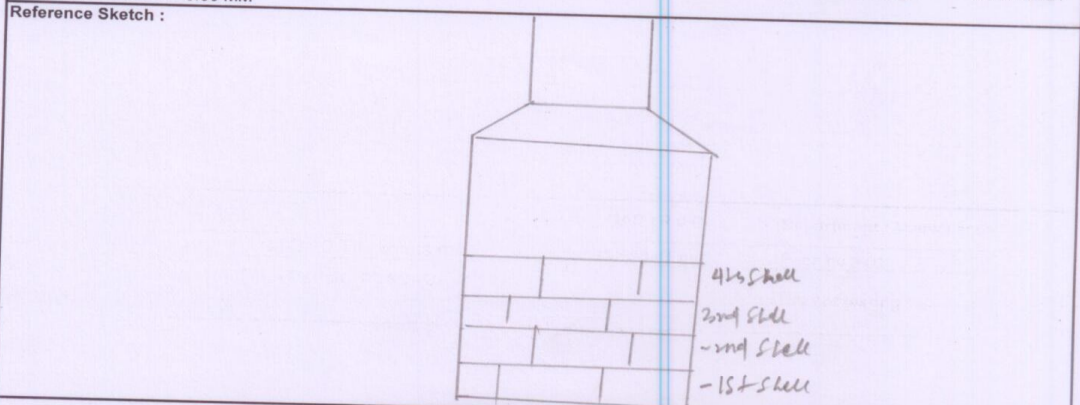
Reported By	Reviewed By	Approved By
Nirmal sahuo	D Umapathi	Manoj Kumar

THICKNESS MEASUREMENT OF TG SCRUBBER IN DAP TR # C.
(1ST SHELL TO 4TH SHELL FROM GROUND LEVEL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date : _____ Plant : DAP TR # C Department : Maintenance
 Testing equipment details: UTG 10 Thickness meter Accuracy : +/-0.01 mm Page no :- 01
 Equipment / Line no description :- DAP #C TG SCRUBBER TANK Date of testing : 30.03.2021
 Design thickness : 8.00 MM



Measured thickness in mm				
1ST SHELL				
NORTH	16.44	14.13	15.38	16.7
SOUTH	16.32	16.35	15.88	16.37
EAST	16.12	15.91	16.13	16.47
WEST	15.57	15.74	15.24	15.25
2ND SHELL				
NORTH	16.55	11.91	15.13	15.85
SOUTH	15.99	16.32	16.35	15.5
EAST	16.93	16.34	16.18	15.75
WEST	16.73	15.62	15.1	15.53
3RD SHELL				
NORTH				
SOUTH	16.82	15.85	16.31	16.45
EAST	16.88	16.02	16.09	15.8
WEST	16.6	15.8	16.3	15.21

Remarks :- Maximum thickness 16.93 mm & minimum thickness 11.91 mm

Reported By Nirmal sahu	Reviewed By D Umapathi	Approved By Manoj Kumar
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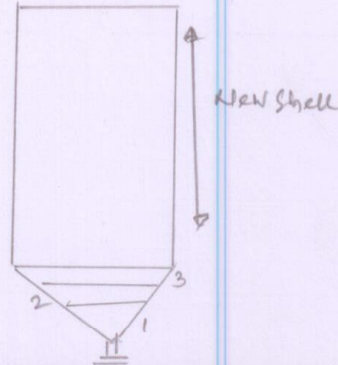
MAXIMUM THICKNESS OBSERVED 16.93 MM & MINIMUM THICKNESS IS 11.91 MM

THICKNESS MEASUREMENT OF PRE SEPARATOR TANK BOTTOM CONE IN DAP TR #

C

INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
 PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP # C PREE SCPARATOR TANK		Date of testing : 31.03.2021
Design thickness :		
Reference Sketch :		



Measured thickness in mm

	Bottom cone								
Shell 1	10.68	10.85	10.73	10.73	10.81	10.94	10.62	10.3	10.74
Shell 2	10.88	10.8	11.03	11.08	10.93	10.8	10.11	10.81	
Shell 3	11.95	12.19	12.2	12.2					

Remarks :-

Reported By <i>N</i> Nirmal sahoo	Reviewed By <i>D</i> D Unispathi	Approved By <i>M</i> Manoj Kumar
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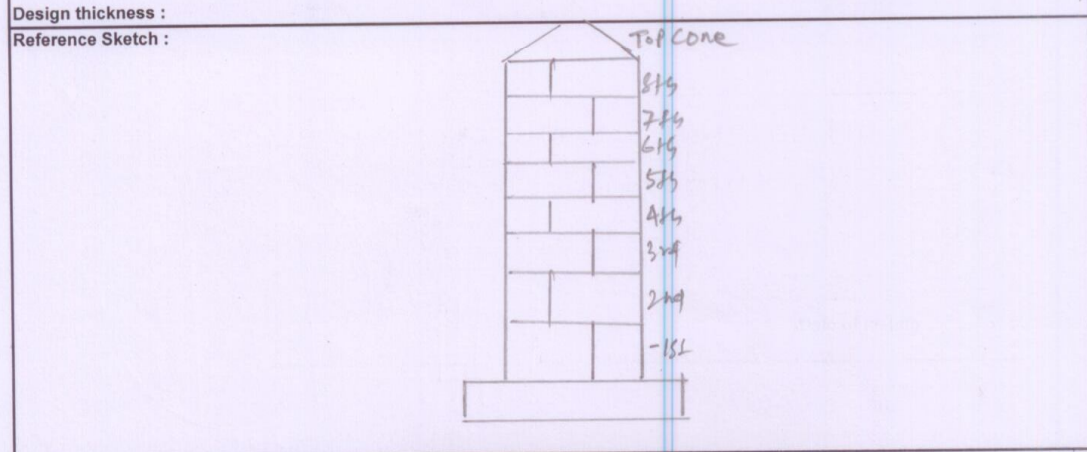
MAXIMUM THICKNESS OBSERVED 12.2 MM & MINIMUM THICKNESS IS 10.11 MM

THICKNESS MEASUREMENT OF PRE SCRUBBER TOWER SHELL&TOP CONE IN DAP TR#C.



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP # C PREE TOWER		Date of testing : 31.03.2021



Measured thickness in mm

Shell 1	8.82	9.1	8.85	8.68	8.89	8.81	8.89				
Shell 2	8.72	8.52	8.84	8.72	8.88	8.89	8.59	9.14			
Shell 3	7.79	8.48	7.68	7.84	8.04	7.7					
Shell 4	7.42	7.66	7.87	7.74							
Shell 5	10.59	1.68	6.84	6.79	6.6	6.67	6.86	6.51	11.22	12.09	
Shell 6	10.69	6.61	6.66	6.74	6.69	6.68					
Shell 7											
Shell 8											

TOP CONE

	5.43	5.67	5.95	5.26	5.45	5.66		
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Remarks :-

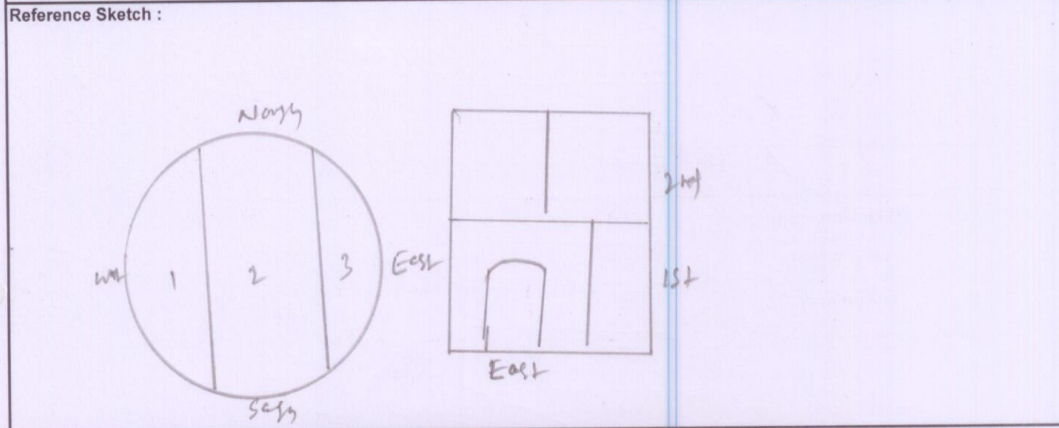
Reported By Nirmal sahu	Reviewed By D Umapathi	Approved By Manoj Kumar
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THK MEASUREMENT OF PRE SCRUBBER TANK WITH BOTTOM PLATE IN DAP TR # C.



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR # C PREE SCRUBBER TANK		Date of testing : 17.03.2021
Design thickness : 8.00 MM		



Measured thickness in mm											
Shell 1	8.34	8.21	8.35	8.22	8.39	8.24	8.4	8.56	8.2	8.19	8.39
	8.45	8.22									
Shell 2	8.47	8.34	8.29	8.35	8.25	8.29					
BOTTOM PLATE											
Plate 1	12.12	12.35	12.5								
Plate 2	13.12	12.27	13.3								
Plate 3	8.6	12.3	12.65	13.1							

Remarks :-

Reported By Nirmal sahuo	Reviewed By D Umápathi	Approved By Manoj Kumar
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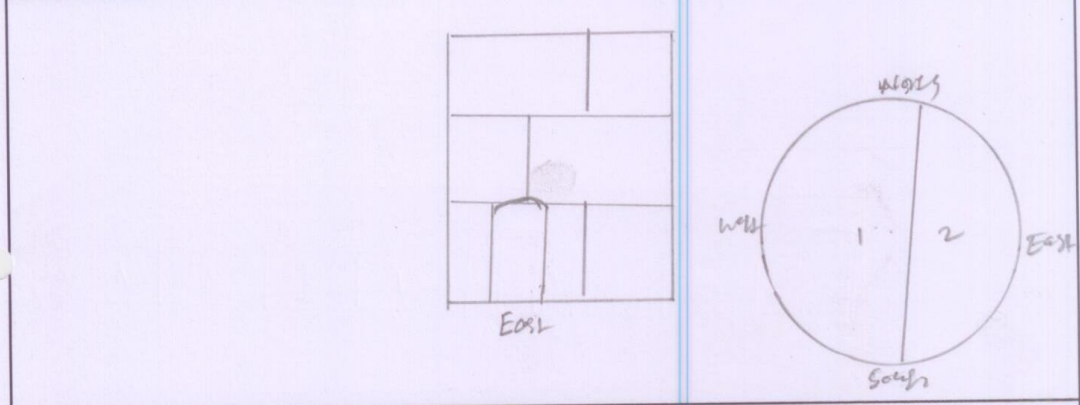
THICKNESS MEASUREMENT OF PRIMARY SCRUBBER TANK IN DAP TR # C.



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP # C PRAIMARY SCRUBBER TANK		Date of testing : 16.03.2021

Design thickness : 8.00 MM



Measured thickness in mm

Shell 1	8.24	8.52	8.29	8.27	8.31	8.23	8.3	8.26	8.27	8.41	8.29
Shell 2	8.24	8.11	8.24	8.38	8.29	8.55					
	8.32	8.34	8.11	8.35	8.53	8.37	8.29	8.29	8.38	8.31	8.24
	8.47	8.17	8.19	8.29	8.68						
Bottom Plate											
Plate 1	8.08	8.26	8.3	8.21	8.3						
Plate 2	8.26	8.14	8.29	8.16	8.52						

Remarks :-

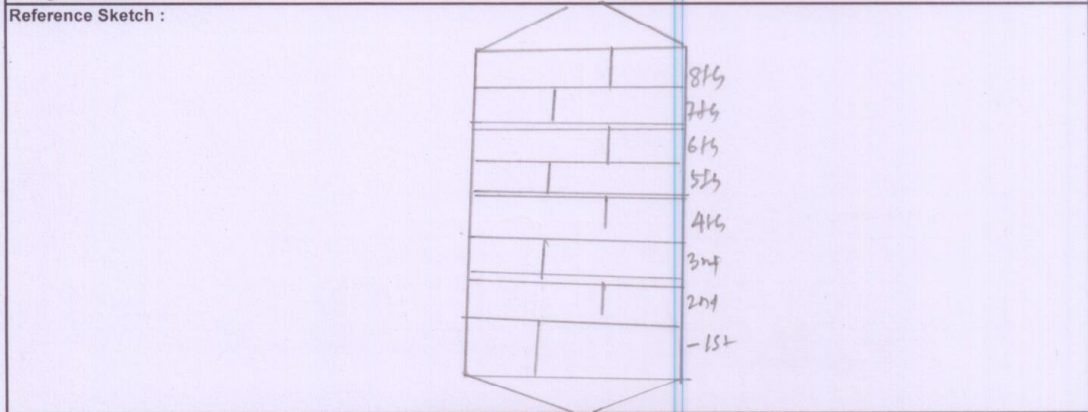
Reported By Nirmal saho	Reviewed By D Umabathi	Approved By Manoj Kumar
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THICKNESS MEASUREMENT OF DUST & FUME SCRUBBER SEPRETOR IN DAP TR #
C.
(1ST SHELL TO 4TH SHELL & 7TH , 8TH SHELL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR# C DUST & FUMES SCRUBBER SEPARATOR		Date of testing : 17.03.2021
Design thickness : 6.00 MM		



Measured thickness in mm											
Shell 1	5.86	5.45	5.95	5.34	6.01	5.8	6.12	6.34	6.14	5.55	5.19
	5.83	5.55	5.54	5.83	5.99						
Shell 2	6.31	5.69	6.53	6.21	6.13	6.09	6	6.25	6.24	6.1	6.26
	6.29	5.93	6.02	6.22							
Shell 3	6.18	6.15	6.22	6.28	6.28	6.28	6.27	6.24	6.22	6.18	6.36
Shell 4	6.17	6.15	6.15	6.12	6.23	6.26	6.2				
	6.25	6.37	6.32	6.26	6.15	6.32	6.22	6.26	6.21	6.19	6.21
	6.3	6.19	6.21	6.2	6.17	6.23	6.21	6.28	6.21	6.16	
Shell 5											
Shell 6											
Shell 7	6.15	6.2	6.25	6.5	6.61	6.8	6.66	6.61	6.2	6.23	6.54
	6.26	6.43	6.36	6.54	6.73	6.57	6.23	6.72	6.45	6.29	6.75
Shell 8	6.26	6.3	6.45	6.68	6.47	6.35	6.48	6.45	6.81	6.08	6.77
	6.08	6.23	6.54	6.68	6.47	6.63					

Remarks :- Maximum thickness 6.81 mm & minimum thickness 5.19 mm in ss line Reduction %

Reported By <i>N</i> Nirmal sahuo	Reviewed By <i>U</i> Umapati	Approved By <i>M</i> Manoj Kumar
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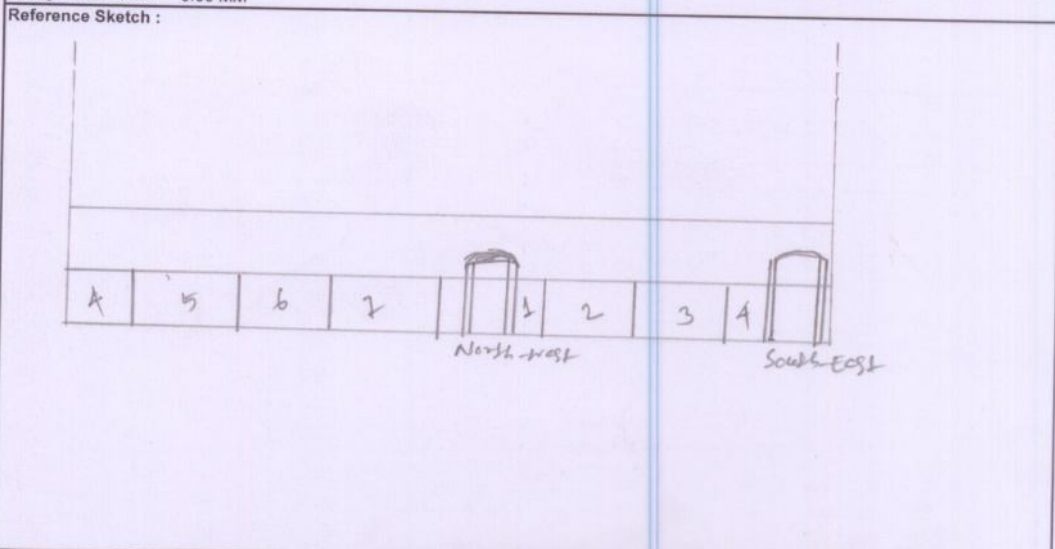
MAXIMUM THICKNESS OBSERVED 6.81 MM & MINIMUM THICKNESS IS 5.19 MM
AGAINST DESIGN THK IS 6.00 MM
THICKNESS MEASUREMENT OF WEAK ACID TANK IN DAP TR # C (1ST SHELL)



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
PARADEEP UNIT-INSPECTION SECTION

THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 01
Equipment / Line no description :- DAP TR#C WEAK ACID TANK SHELL	Date of testing : 15.03.2021	
Design thickness : 8.00 MM		



Measured thickness in mm

1ST SHELL

PLATE -1	10.22	11.23	10.75	10.9	10.98	10.95	10.98	10.48	11.01		
PLATE -2	11	10.88	10.25	10.2	11.01	10.91	11.14	10.76	11.09	11.19	11.01
PLATE -3	11.44	11.27	11.44	11.38	11.3	11.01	11.17	11.22	11.2	11.11	11.28
PLATE -4	11.2	11.05	11.39	11.22	11.15	11.44	11.37	11.32	11.43	11.26	11.5
PLATE -5	11.38	11.63	11.01	11.45	11.26	11.3	11.42	11.76	11.39	11.14	11.6
PLATE -6	11.12	11.26	11.28	11.25	11.28	11.21	11.26	11.51	11.13		
PLATE -7	11.31	11.01	11.19	11	11.14	11.88	11	11.28	11.47	11.38	

Remarks :- Maximum thickness 11.88 mm & minimum thickness 10.20 mm in ss line Reduction %

Reported By <i>N</i> Nirmal sahuo	Reviewed By <i>U</i> Umapathi	Approved By <i>M</i> Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 11.88 MM & MINIMUM THICKNESS IS 10.20 MM

THICKNESS MEASUREMENT OF 6" NB SULPHURIC ACID LINE FROM DAP TR # C PIPE RACK TO PN TANK IN DAP TR # C.



INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
 PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 02
Equipment / Line no description :- 6" NB SULPHURIC ACID LINE FROM DAP TR#A PIPE RACK TO PN TANK		
Design thickness : 6" NB SCH-40 (7.11 MM) , 4" SCH 40 (6.02 MM)		Date of testing : 31.03.2021
Reference Sketch :		

Measured thickness in mm

SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
1		6.4	6.31	6.32	6.11			
2	B				6.13	6.02		5.98
3		6.5	6.31			6.21	6.15	
4		6.02	6.13			6.21	6.15	
5		6.31	6.11			6.15	6.29	
6		6.11	6.04			6.1	6.24	
7		6.21	6.24			6.24	6.31	
8		6.31	6.26			6.14	6.23	
9				6.41	6.13	6.29		
10				6.14	6.05	6.17		
11				6.1	6.11	6.28		
12				6.5	6.6	6.68	6.31	
13	R6"X4"			6.66	6.38	6.45	6.52	
14				5.9	5.98	5.93	5.47	
15				6.81	6.63	6.82	6.39	
16				6.47	6.38	6.45	6.52	
17	B	5.9	5.09					
18	R6"X4"	6.5	6.57				6.28	5.38
19	4"	5.9	5.87				5.91	
20	4"	5.72	5.5				5.49	
21		6.92	6.88				6.25	
22		6.93	6.45				6.8	

Remarks :- Maximum thickness 6.93 mm & minimum thickness 3.92 mm in ss line Reduction 34.88 %

Reported By <i>N</i> Nirmal sahu	Reviewed By <i>D</i> D Umabathi	Approved By <i>M</i> Manoj Kumar
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INDIAN FARMERS FERTILISER CO-OPERATIVE LTD.
 PARADEEP UNIT-INSPECTION SECTION
THICKNESS MEASUREMENT REPORT

पूणतः सहकारी
 Wholly owned by Cooperatives
 Paradeep Unit

MWR no. & Date :	Plant : DAP TR # C	Department : Maintenance
Testing equipment details: UTG 10 Thickness meter	Accuracy : +/-0.01 mm	Page no :- 02
Equipment / Line no description :- 6" NB SULPHURIC ACID LINE FROM DAP TR#A PIPE RACK TO PN TANK		Date of testing : 31.03.2021
Design thickness : 6" NB SCH-40 (7.11 MM)		

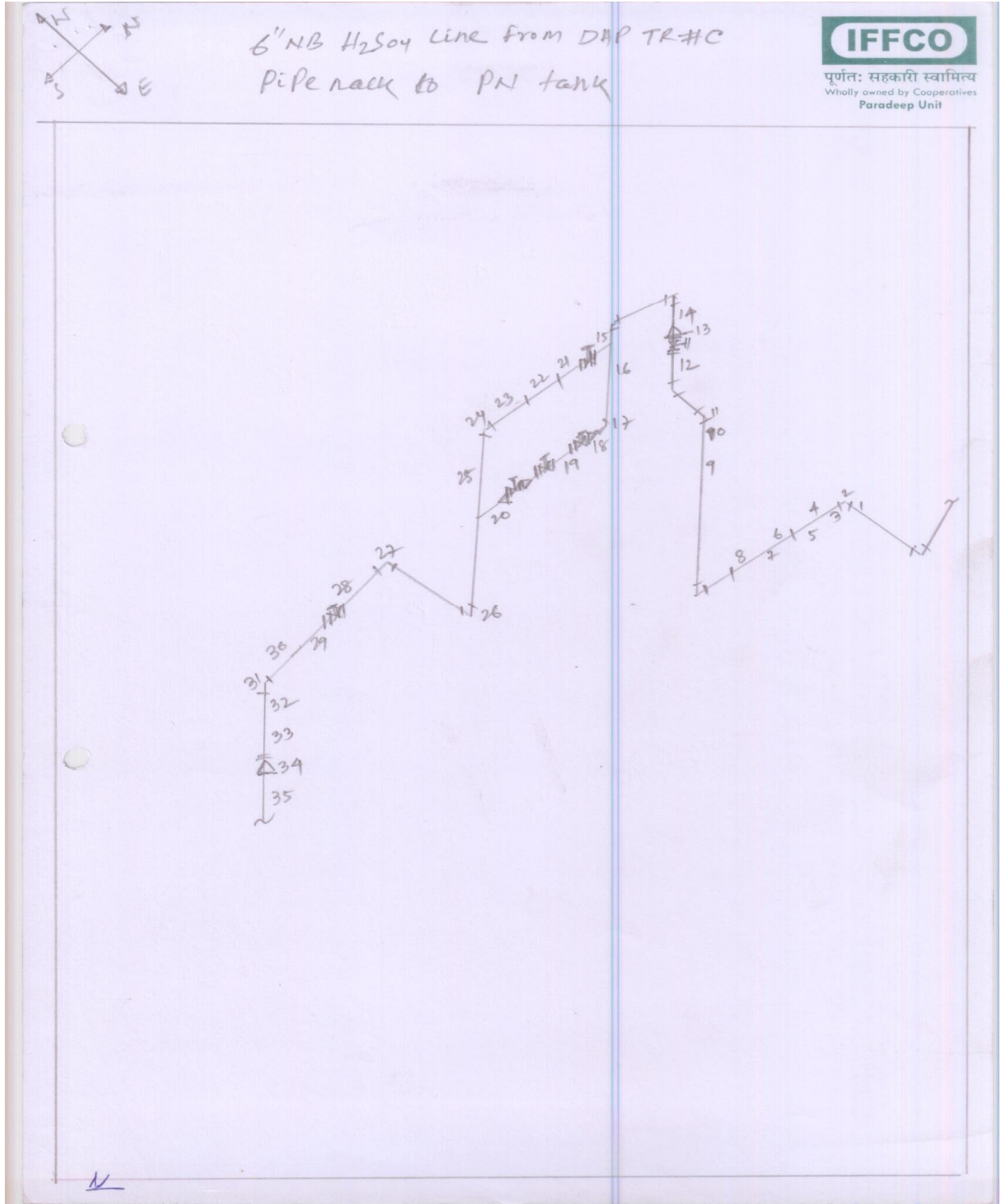
Reference Sketch :

Measured thickness in mm

SL NO	SIZE	TOP	BOTTOM	NORTH	SOUTH	EAST	WEST	MIDDLE
23		6.28	6.91			6.36	6.25	
24	B	6.78	6.91					
25		4						6.25
26				6.16	6.6	6.31	6.52	
27	B			6.04	5.34	5.85	5.9	
28		5.2	5.78		3.92	4.18		3.98
29		5.48	5.32			5.49	5.58	
30		5.56	5.02			5.7	5.56	
31	B	5.06	4.44			4.82	5.02	
32								5.01
33				5.82	5.7	5.88	5.39	
34	R			5.82	5.78	5.59	5.85	
35				5.87	6	5.79	5.87	
				4.95	5.68	5.65	5.13	

Reported By <i>N</i> Nirmal sahuo	Reviewed By <i>D</i> D Umraoathi	Approved By <i>M</i> Manoj Kumar
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MAXIMUM THICKNESS OBSERVED 6.93 MM & MINIMUM THICKNESS IS 3.92 MM ON BEND AT SL NO: 27 (DESIGN THK: 6" NB SCH 40 (7.11 MM) & 4' NB SCH 40 (6.02 MM) LINE DIAGRAM OF 6" NB SULPHURIC ACID LINE FROM DAP TR # C PIPE RACK TO PN TANK IN DAP TR # C.



BALANCING OF THE FOLLOWING ROTORS WAS PERFORMED:
DRYER EXHAUST FAN (DAP TR # B)

**INDIAN FARMERS FERTILISER COOPERATIVE LIMITED
PARADEEP UNIT
INSPECTION SECTION
BALANCING REPORT**

Date: 31-03-2021

PLANT	: DAPP TR # B
EQUIPMENT	: Dryer Exhaust Fan
ROTOR ASSEMBLY WEIGHT	: 1470 KG (With coupling half)
BALANCING GRADE	: G 2.5
TOLERANCE / PLANE	: 35.077 Kgmm.
DIMENSION	: A= 372 mm B= 280 mm C= 1585 mm R1= 1255 mm R2= 1255 mm
Diameter at Pedestal 1	= 160 mm
Diameter at Pedestal 2	= 160mm
Field RPM	= 987
Balancing RPM	= 151

INITIAL UNBALANCE:

STAT
192 g at 151 deg
(6.1 Tol)

FINAL RESIDUAL UNBALANCE LEFT ON THE ROTOR ASSEMBLY:

STAT
13.5 g at 178 deg
(in Tol)

Remarks (If any):

Residual unbalance on the rotor is within tolerable limit as per Grade G 2.5 of ISO 1940.

..

Reported By

J Bhowal

Reviewed By

D Umaphathi

Approved By

Manoj Kumar

COOLING TOWER PUMP IMPELLER (PUMP-B)

**INDIAN FARMERS FERTILISER COOPERATIVE LIMITED
PARADEEP UNIT
INSPECTION SECTION
BALANCING REPORT**

Date: 22-03-2021

PLANT	: U & O
EQUIPMENT	: Cooling Tower Pump Impeller (PUMP-B)
ROTOR ASSEMBLY WEIGHT	: 790 KG
BALANCING GRADE	: G 2.5
TOLERANCE / PLANE	: 25.035 kgmm
DIMENSION	: A= 910 mm B= 190 mm C= 880 mm R1= 380 mm R2= 380 mm
Diameter at Pedestal 1	= 90 mm
Diameter at Pedestal 2	= 130mm
Diameter at Belt Drive	= 160 mm
Field RPM	= 745
Balancing RPM	= 205

INITIAL UNBALANCE:

STAT
128 g at 261 deg
(1.92 Tol)

FINAL RESIDUAL UNBALANCE LEFT ON THE ROTOR ASSEMBLY:

STAT
10.9 g at 186 deg
(in Tol)

Remarks (If any):

Residual unbalance on the rotor is within tolerable limit as per Grade G 2.5 of ISO 1940.

Reported By

J BHOWAL

Reviewed By

D UMAPATHI

Approved By

MANOJ KUMAR

COOLING TOWER PUMP IMPELLER (SPARE)

INDIAN FARMERS FERTILISER COOPERATIVE LIMITED
PARADEEP UNIT
INSPECTION SECTION
BALANCING REPORT

Date: 02.05.2019

PLANT	: U & O
EQUIPMENT	: Cooling Tower Pump Impeller(Spare)
ROTOR ASSEMBLY WEIGHT	: 790 KG
BALANCING GRADE	: G 2.5
TOLERANCE / PLANE	: 25.035 kgmm
DIMENSION	: A= 900 mm
	B= 190 mm
	C= 900 mm
	R1= 400 mm
	R2= 400 mm
Diameter at Pedestal 1	= 90 mm
Diameter at Pedestal 2	= 130mm
Diameter at Belt Drive	= 160 mm
Field RPM	= 745
Balancing RPM	= 205

INITIAL UNBALANCE:

Plane 1
283 g at 317 deg
9.1 tol

Plane 2
239 g at 153 deg
7.7 tol

FINAL RESIDUAL UNBALANCE LEFT ON THE ROTOR ASSEMBLY:

Plane 1
6.05 g at 92 deg
In tol

Plane 2
13.2 g at 26 deg
In tol

Remarks (If any):

Residual unbalance on the rotor is within tolerable limit as per Grade G 2.5 of ISO 1940.

Reported By

Reviewed By

Approved By

J BHOWAL

D UMAPATHI

MANOJ KUMAR

COOLING TOWER PUMP IMPELLER (SPARE)

INDIAN FARMERS FERTILISER COOPERATIVE LIMITED
PARADEEP UNIT
INSPECTION SECTION
BALANCING REPORT

Date: 20-03-2021

PLANT	: U & O
EQUIPMENT	: Cooling Tower Pump Impeller (Spare)
ROTOR ASSEMBLY WEIGHT	: 760 KG
BALANCING GRADE	: G 2.5
TOLERANCE / PLANE	: 25.035 kgmm
DIMENSION	: A= 900 mm
	B= 190 mm
	C= 900 mm
	R1= 400 mm
	R2= 400 mm
Diameter at Pedestal 1	= 90 mm
Diameter at Pedestal 2	= 130mm
Diameter at Belt Drive	= 160 mm
Field RPM	= 745
Balancing RPM	= 201

INITIAL UNBALANCE:

STAT
107 g at 222 deg
(1.6 Tol)

FINAL RESIDUAL UNBALANCE LEFT ON THE ROTOR ASSEMBLY:

STAT
3.35 g at 25 deg
(in Tol)

Remarks (If any):

Residual unbalance on the rotor is within tolerable limit as per Grade G 2.5 of ISO 1940.

Reported By

J BHOWAL

Reviewed By

D UMAPATHI

Approved By

MANOJ KUMAR

Radiography of the following joints was carried out during shutdown at DAP TR # C.

- 01) 8 "NB AMMONIA LINE IN DAP TR # C JOINT -01.
- 02) 6" NB AMMONIA VAPOR OUTLET LINE IN DAP TR # C –JOINT 06 NOS.

- 03) 4" NB AMMONIA VAPOR OUTLET LINE IN DAP TR # C –JOINT 02 NOS.
- 04) 6" NB AMMONIA VAPOR INLET LINE IN DAP TR # C –JOINT 07 NOS.
- 05) 4" NB AMMONIA TG VAPOR LINE IN DAP TR # C –JOINT 11 NOS.
- 06) 2" NB AMMONIA TG VAPOR LINE IN DAP TR # C –JOINT 03 NOS.
- 07) 4" NB AMMONIA TG VAPOR INLET LINE IN DAP TR # C –JOINT 26 NOS.
- 08) 3" NB AMMONIA TG VAPOR INLET LINE IN DAP TR # C –JOINT 01 NO.
- 09) 6" NB AMMONIA LINE NEAR BATTERY LIMIT IN DAP TR # C –JOINT 02 NOS.

Radiography of the following joints was carried out during shutdown at DAP TR # B.

- 01) 6" NB AMMONIA TG VAPOR INLET LINE IN DAP TR # B –JOINT 05 NOS.
- 02) 6" NB AMMONIA TG VAPOR OUTLET LINE IN DAP TR # B –JOINT 08 NOS.
- 03) 6" NB AMMONIA LINE NEAR BATTERY LIMIT IN DAP TR # B –JOINT 02 NOS.
- 04) 3" NB AMMONIA TG VAPOR INLET LINE IN DAP TR # B –JOINT 02 NOS.

Radiography of the following joints was carried out during shutdown at DAP TR # A.

- 01) 6" NB AMMONIA HEADER IN DAP TR # A- JOINT 02 NOS.

SAP TRAIN - 1

1. Thickness Measurement of Water wall tubes and Flag Coils

- Thickness Measurement through Top, Middle and Bottom Manhole of WHRB in SAP-1 was carried out consisting of 186 nos. of tubes in each bank.
- Thickness of three banks of flag coils consisting 30 tubes each was also carried out.

Thickness Report of WHRB & Flag Coils				
Area		No. of Tubes	Design Thickness (mm)	Minimum Thickness (mm)
WHRB	Top Manhole	186	5.00	4.17
	Middle Manhole	186	5.00	5.02
	Bottom Manhole	186	5.00	5.03
Top Flag Coils	Panel-2	30	4.00	3.69
	Panel-4	30	4.00	3.64
	Panel-6	30	4.00	3.75
Bottom Flag Coils	Panel-1	30	4.00	3.39
	Panel-3	30	4.00	3.54
	Panel-5	30	4.00	3.67

- Bottom portion (Just above ring header) of 101 nos of membrane tubes, who's buttering was done earlier, were decided to be replaced. The tubes were marked, cut and replaced by new tubes. Bevel DP, Root DP, Radiography test and PAUT was carried out. Repairs were marked and repaired until the joint was cleared.
- The following tubes were marked:

Panel No.	Tube No.	Total nos of tubes to be replaced
1	10, 11, 12, 13, 15, 17, 19	7
2	43, 46, 47, 60	4
3	64 to 92	29
4	95 to 123	29
5	126 to 143 and 146 to 154	27
6	157, 158, 161, 178, 179	5
Total		101

2. Thickness Measurement of Economizer of SAP-2

- Thickness measurement of the three banks of the economizer, headers and straight tubes was carried out, the summary of which is tabulated below.

Area		No. of Rows	No of tubes in each row	Design Thickness	Minimum Measured Thickness
Economizer Top Bank	North Side	8	34	5.10	3.49
	South Side	7	34	5.10	3.80
Economizer Bottom bank	South Side	7	25	4.88	3.54

Location	Design Thickness	Minimum Measured Thickness	No. of straight tubes	Design Thickness	Minimum Measured Thickness
Inlet Header	18.26	17.52	25	4.88	3.49
Intermediate Header-1	18.26	17.39	25	4.88	4.33
Intermediate Header-2	18.26	18.08	34	5.10	4.05
Outlet Header	25.40	24.38	34	5.10	4.10

- It was planned to replace the top three rows of economizer top bank. As a result there were 272 joints for welding and inspection.

<u>Economizer Top Bank (South Side)</u>		<u>Economizer Top Bank (North Side)</u>	
Row no.	No. of joints	Row no.	No of joints
Straight Tubes	2 x 34 = 68	1	2 x 34 = 68
1	2 x 34 = 68	2	2 x 34 = 68
Total	136 in south side	Total	136 in north side

- Bends to be replaced were cut and new bends were fit up. Fit up was checked and root DP was checked after root welding. After fill up and final welding, radiography and Phased Array Ultrasonic Testing was carried out on final welding. The defects were marked and repaired till the joint was cleared.



- DP test of header to straight tube joints, tube to tube sheet joints were also carried out. Repairs were marked and repaired. Drain line was found corroded. It was also replaced.





Header drain line was found corroded and was replaced

3. Thickness measurement of tubes in Superheater-1 & Superheater-2

Thickness Report of tubes in Superheater-1 & Superheater-2					
Area		No. of Rows	No. of bends	Design Thickness (mm)	Minimum Thickness (mm)
SH-1	West Side	4	28	5.50	4.00
SH-2	East Side	9	35	5.50	3.00
	West Side	9	35	5.50	3.05

Location	Minimum Measured Thickness	No. of straight tubes	Design Thickness	Minimum Measured Thickness
SH-1 Inlet Header	24.59	28	5.50	4.23
SH-1 Outlet Header	24.79	28	5.50	5.42
SH-2 Top Bank I/L Header	36.18	35	5.50	5.28
SH-2 Top Bank O/L Header		35	5.50	4.94
SH-2 Bot Bank I/L Header	27.01	35	5.50	5.24
SH-2 Top Bank O/L Header		35	5.50	5.48

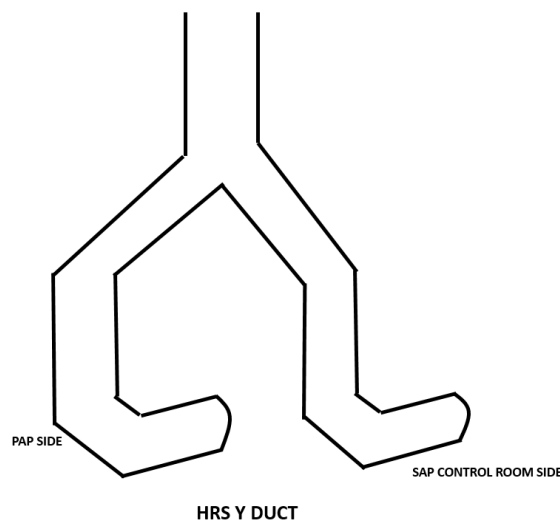
- After thickness survey, 8 bends in East side and 2 bends in West side were found to have thickness less than 3.25 mm. The bends were replaced with new ones. Fit up, Root DP test and radiography of final welding was carried out. The repairs were marked and repaired.

- DP, UT & MPI of header to straight tube joints, straight tubes butt joints, straight tubes to socket joint in Superheater 1 & 2 was carried out.



- DP testing of Superheater-1 & 2 shell supports was carried out. Repair marking was done. There are 6 round and 6 rectangular supports in each superheater.
4. DP testing & MPI of buckstays was carried out. There are 54 buckstays. In panel 3 & panel 4 bottom two bottom buckstays are not there because of furnace. In panel 2, 2 buckstays near boiler bypass duct are missing.
- Cracks were observed in 6.1B (Panel 6, Buckstay 1 Bottom) in Tube No. 158, 5.1B (Panel 5, Buckstay 1 Bottom) in Tube No.153 & 5.4T (Panel 5, Buckstay 4 Top) in Tube No.153. The cracked buck stay was cut and inspected if the crack has propagated in the tube but after DP it was observed that tubes were clear.
5. HRS boiler, steam drum, nozzles / risers, HRS tower, Y duct and HRS Boot pump tank thickness as well as DP was carried out.
- HRS Boiler was inspected and random thickness was done on the shell and dish end in south side. Minimum thickness was observed as 18.89 mm in shell and 23.31 mm in dished end against 18 mm and 24 mm design thickness respectively. DP testing of longitudinal joint of dished end and connected circumferential joint of shell was also carried out.

- HRS Steam Drum thickness was carried out from North and South Sides in shell and dish ends. The minimum measured thickness was observed as 8.45 mm in South side and 9.80 mm in North side against design thickness of 12 mm. The minimum measured thickness in dish end was found to be 12.96 mm in North side and 13.12 mm in South side. It was observed that the thickness was less in both sides in bottom portion (5'O Clock to 7'O Clock position). The location and reading were marked.
- HRS Tower thickness was carried out from inside. Tower shell minimum thickness was measured as 13.00 mm and bottom minimum was measured as 19.87 mm.
- HRS Boot Pump thickness was also carried out and minimum thickness measured in shell portion, dished end, neck portion and nozzle was 9.71 mm, 12.00 mm, 9.07 mm and 9.35 mm respectively.
- HRS Y duct thickness was carried out from inside (approachable area) as well as outside.
 Thickness on Y duct from inside was carried out and minimum measured thickness was measured as 7.32 mm and 8.91 mm in west and east side respectively.
 Minimum measured thickness from outside was observed as 7.58 mm on parent metal and 6.3 mm on patch plate in east side(control room side) and 8.36 mm on parent metal and 6.4 mm on patch plate in west side (PAP Side).



- Welding of joint between HRS Y duct and HRS tower from inside was carried out and DP was done. Repairs were marked and repaired.

6. Boiler bypass duct along with bend membrane tubes were replaced with new set of membrane tubes, scalloped plate, duct nozzle and expansion bellow. Old dummy bypass bends were also replaced by straight tubes. Root DP and radiography of final joints of tubes was carried out.
 - Bypass bellow was fit up and root DP was carried out. The repairs were marked and repaired. Visual inspection of final welding was carried out

7. Joint Visual Inspection of converter beds was carried out and the following observations were noted:
 - Bed 1** - Mesh was found to be okay. Cracks were observed at the support plates of central drum around the periphery. Stitch welding was also required at some locations. They were marked and repaired. The cracked portion was marked and repaired.

 - Bed 2** – Mesh was found to be okay. But some deposits were observed on the shell and division plate. Cleaning was recommended.

 - Bed 3** - The mesh was found to be okay. Bed 3 outlet inspection was carried out and it was observed that the bottom plate was eroded at several locations. Hole was also observed from shell. DP test on central drum to bottom plate joint was carried out and found to be okay.

 - Bed 4** – The condition of mesh was found okay. Cleaning was required in some areas. Some deposits were observed and cleaning was recommended.

8. Converter 1 & 2 Nozzles thickness was also carried out and no significant deviation was observed. There are a total of 10 nozzles, 5 in each converter.

9. DT, IAT & FAT Nozzles thickness was also carried out as tabulated below.

Measured thickness in mm										
DT NOZZLE										
NORTH	9.47	9.89	10.05	10.34	9.99	10.22				
SOUTH	7.99	7.89	8.23	8.85	8.62	8.54				
FAT NOZZLE										
NORTH	12.16	12.19	12.32	12.55	12.34	12.22	12.43			
SOUTH	9.2	9.35	9.93	9.65	9.62	10.25	9.98	10.34	10.12	
IAT NOZZLE										
NORTH	13.56	13.43	13.74	13.62	13.73	13.65	13.55	13.63		
SOUTH	13.86	13.62	13.61	13.73	13.56	13.48	13.89	13.99		

- **Cross flow lines thickness from DT to IAT/FAT and IAT to DT/FAT** was carried out from Pump Tanks and the thickness observed is as tabulated below.

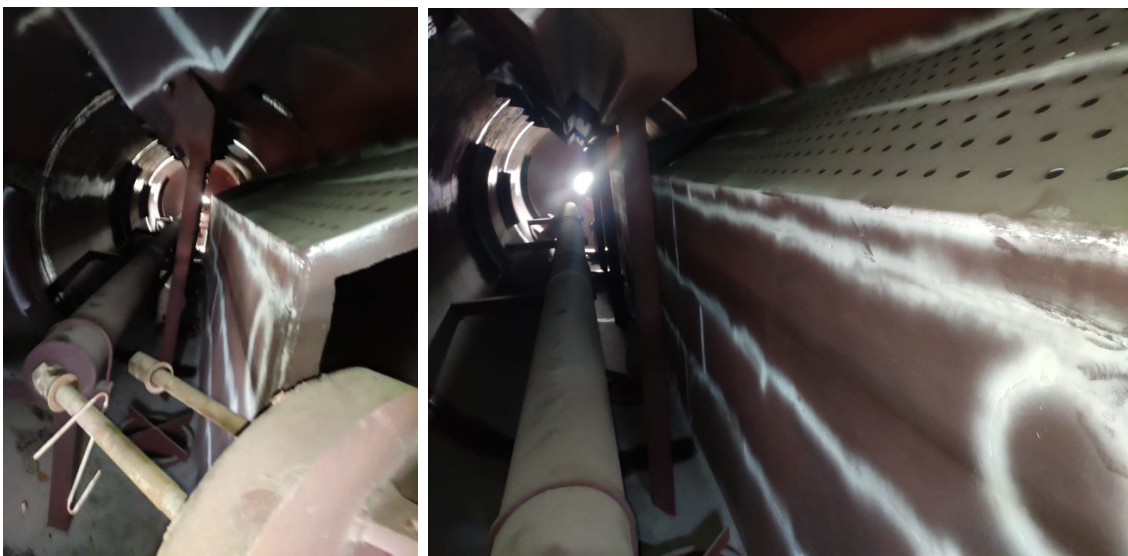
LOCATION	LINE NAME	SECTION	TOP	BOTTOM	EAST	WEST	SOUTH	NORTH	MIDDLE	
FROM DT PUMP TANK	IAT TO DT (10"LINE)	1			4.11	4.12	3.96	4.16		
		2	3.88	3.87					3.54	
		3	4.12	3.71	4.21	4.16				
	4" ACID INTAKE LINE	1				5.88	6.22	6.01	6.02	
		2	5.7	6.82						5.82
		3	6.19	5.79				5.89	6.31	
		4	6.47	6.13				6.35	6.33	
	DT TO IAT/FAT	1	7.19	6.82	6.83	7.82				
		2	6.56	6.56	6.54	6.55				
		3	6.67	6.55	6.57	6.77				
		4	6.52	6.75	6.61	6.69				
		5	6.55	6.50	6.61	6.54				
		6			6.63	6.87	6.75		6.51	
		7			6.45	6.63	6.56		6.63	
		8	6.57						6.69	6.69

LOCATION	LINE NAME	SECTION	TOP	BOTTOM	EAST	WEST	SOUTH	NORTH	MIDDLE	
From IAT Pump Tank	DT to IAT (10"LINE)	1	6.56	6.64	6.55	6.6				
		2	6.28	6.52					6.23	
		3	6.62	6.7			6.55	6.72		
		4	6.53	6.57						6.53
		5			6.65	6.51	6.58	6.25		
	4"NB LINE	1	5.86	5.5				5.73	5.86	
		2	4.39	4.05						3.47
		3			4.45	4.52	4.6	4.69		
		4								
		5								

LOCATION	LINE NAME	SECTION	TOP	BOTTOM	EAST	WEST	SOUTH	NORTH	MIDDLE	
FROM FAT PUMP TANK	IAT TO FAT (6"LINE)	1			4.24	4.05	4.03	4.12		
		2	3.57	4.06					4.19	
		3	4.23	4.15			4.19	4.17		
		4				3.95		4.12	3.59	
		5	4.74	4.23	4.25	4.11				
	DT TO FAT (4"LINE)	1				6.52	6.5	6.84	6.65	
		2	6.6	6.42						6.6
		3	6.53	6.46			6.47	6.51		
		4				6.53		6.42	6.64	
		5	6.44	6.67	6.48	6.43				

- Acid lines where less thickness was observed were marked and shown to the concerned authorities. Most of the marked locations were replaced. Root DP Test was carried out and found okay

10. WHRB Steam Drum thickness was carried out from inside and minimum thickness was measured as 75.03 mm in shell and 75.40 mm in dished end. Approachable and exposed fittings on Steam drum DP test and thickness measurement was carried out. The repairs were marked and repaired.



11. DP testing of ring header to membrane tubes joints in all panels was carried out from outside as well as inside.

12. DP Test and thickness measurement of all the 12 corner tubes (first and last of each panel) of 6 panels was carried out. No significant reduction of thickness was observed. DP test was also found okay.

13. During hydrotest leakage was observed from parent metal in between tube to header joint and newly fabricated joint in Tube no.71 of Panel No.3. It was observed that the portion was pitted and eroded. Buttering was carried out and DP test was done.

Further visual inspection was carried out for all the 186 membrane tubes and 56 nos of tubes were found to be pitted / eroded and recommended for buttering. DP test of all the buttering tubes was carried out. The following tubes were recommended for buttering:

Panel	Tube No.	Panel	Tube No.
Panel 1	7, 9, 10, 11, 12, 17, 23	Panel 4	101, 104, 108, 110, 111, 112, 118
Panel 2	33, 40, 41, 42, 45, 46, 60	Panel 5	136, 137, 141, 148
Panel 3	64, 65, 66, 67, 68, 69, 70, 71, 72, 80, 82, 83, 84, 85, 86, 88, 90, 92	Panel 6	165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177

14. DP , UT and MPI was carried out for Buckstay's joints, ring header distribution lines joints, BFW common header (Mud drum) joints, economizer headers and straight tubes joints, Superheater-1 & 2 header and straight tubes joints etc.

15. Insitu metallography was carried out on various spots of ring header joints, branch joints, membranes tubes, flag coils, economizer header joints, straight tubes, etc.

16. Economizer North side top and bottom bank casing plate DP was carried out. The repairs were marked and repaired.

17. DP Test of Turbo-blower journal bearings was carried out.

18. DP Testing of Hot & Cold Heat Exchanger Manholes, 8 nos Converter manholes, IAT Return duct manhole was carried out. The repairs were marked and attended.

19. Root & final DP Testing of 29 manholes of WHRB was carried out. The cracks/discontinuities were repaired and again DP Testing was carried out till the joint was cleared.

20. DP Testing of manholes of SH-1 & SH-2 was carried out. Repairs were marked and repaired.

21. Root & final DP testing of 8 nos converter manholes was carried out. Repairs were marked and repaired.

22. In melting area, thickness measurement was carried out at various locations.

- Thickness measurement in Condensate tank bottom area was carried out and minimum thickness was measured as 5.23 mm.
- Thickness measurement was carried out in VPT-1 shell and minimum thickness was measured as 7.94 mm.
- Thickness measurement was carried out in VPT-2 shell and minimum thickness was measured as 8.12 mm.
- Thickness measurement was carried out in VPT-3 shell and minimum thickness was measured as 10.00 mm.
- Thickness measurement was carried out in approachable area in cone portion of Melter 130 and minimum thickness was measured as 3.88 mm.
- Thickness measurement was carried out in approachable area in shell portion of Melter 131 and minimum thickness was measured as 11.08 mm.
- Thickness measurement was carried out in approachable area in shell & cone portion of Melter 132 and minimum thickness was measured as 20.06 mm & 9.60 mm of shell and cone portion respectively.

23. After startup, On 25th April 2021 leakage was observed from Tube No. 94 just above header to membrane tube joint. Thickness measurement was carried out and no significant reduction in thickness was observed. After polishing tube

surface DP was carried out and a crack of around 20 mm was observed. It was deep grinded and welded. Moreover buttering was carried out in whole conical portion. DP was carried out after buttering.

- Again on 26th April 202, leakage was again observed from Tube No.124 beneath the box plate. Box plate was cut and DP testing was carried out. A crack of around 75 mm was observed. The crack was deep grinded and welding. Further buttering was carried out and DP testing was done after buttering.

SAP TRAIN - 2

1. Thickness Measurement of Water wall tubes and Flag Coils

- Thickness Measurement through Top, Middle and Bottom Manhole of WHRB in SAP-2 was carried out consisting of 186 nos. of tubes in each bank.
- Thickness of three banks of flag coils consisting 30 tubes each was also carried out.

Thickness Report of WHRB & Flag Coils				
Area		No. of Tubes	Design Thickness (mm)	Minimum Thickness (mm)
WHRB	Top Manhole	186	5.00	5.12
	Middle Manhole	186	5.00	4.60
	Bottom Manhole	186	5.00	4.55
Top Flag Coils	Panel-2	30	4.00	3.72
	Panel-4	30	4.00	3.57
	Panel-6	30	4.00	3.55
Bottom Flag Coils	Panel-1	30	4.00	3.52
	Panel-3	30	4.00	3.29
	Panel-5	30	4.00	3.28

- Bottom portion (Just above ring header) of 96 nos of membrane tubes, where buttering was done earlier, were decided to be replaced. The tubes were marked, cut and replaced by new tubes. Bevel DP, Root DP and 100% radiography test was done.

Panel No.	Tube No.	Total nos of tubes to be replaced
1	2, 7, 11, 16, 17, 21, 22, 23	8
2	37, 38, 39, 42, 44	5
3	64 to 92	29

4	95 to 123	29
5	129 to 142 & 144 to 150	21
6	165, 180, 181, 183	4
Total		96

2. Thickness Measurement of Economizer of SAP-2

- Thickness measurement of the three banks of the economizer, headers and straight tubes was carried out, the summary of which is tabulated below.

Area		No. of Rows	No of tubes in each row	Design Thickness	Minimum Measured Thickness
Economizer Top Bank	North Side	8	34	5.10	3.09
	South Side	7	34	5.10	3.27
Economizer Bottom bank	South Side	7	25	4.88	3.74

Location	Design Thickness	Minimum Measured Thickness	No. of straight tubes	Design Thickness	Minimum Measured Thickness
Inlet Header	18.26	18.30	25	4.88	5.25
Intermediate Header-1	18.26	17.70	25	4.88	4.46
Intermediate Header-2	18.26	17.98	34	5.10	4.02
Outlet Header	25.40	24.59	34	5.10	4.33

- After thickness survey, 24 nos of bends in south side and 89 nos bends in north side were observed having residual wall thickness of less than 3.6 mm. The following bends were found with thickness less than 3.6 mm.

<u>Economizer Top Bank (South Side)</u>		<u>Economizer Top Bank (North Side)</u>	
Row no.	Bend No.	Row no.	Bend No.
1	16, 19, 25, 29, 32, 34	1	16, 19, 20, 22, 25, 27, 29, 30, 31, 32, 33, 34
2	1, 7, 12, 13, 17, 30	2	1, 6, 7, 8, 11, 12, 13, 15, 16, 18, 23, 26, 29, 34
3	9	3	1, 2, 4, 5, 7, 8, 13, 15, 16, 17, 25, 31, 32, 33
4	18, 27, 29	4	3, 4, 5, 6, 7, 8, 11, 14, 17, 18, 20, 22, 30, 31, 33
5	11, 12, 29	5	1, 2, 3, 9, 10, 11, 12, 14, 17, 19, 24, 32
6	12, 17, 33	6	14, 17, 24, 25, 32, 33, 34
7	12, 32	7	2, 3, 8, 10, 12, 14, 17, 18, 28, 33
		8	8, 10, 17, 22, 24

- Bends with less thickness were marked and cut. Thickness of new bends, that were to be fit up, was carried out.

- The DP test of bevel edge was carried out and after DP new bends were fit up and welding was carried out. The filler wire used for welding was 2.0 mm ER 70S2. Root DP was carried out followed by radiography. The defects were marked and repaired and again radiography was done till the defects were rectified.

3. Thickness measurement of tubes in Superheater-1 & Superheater-2

Thickness Report of tubes in Superheater-1 & Superheater-2					
Area		No. of Rows	No. of bends	Design Thickness (mm)	Minimum Thickness (mm)
SH-1	West Side	4	28	5.50	3.92
SH-2	East Side	9	35	5.50	4.22
	West Side	9	35	5.50	4.78

- A crack was observed in 4.8 (Panel 4, Buckstay 8) Top in Tube No. 96. Window cutting was done for further investigation. Tube internal condition was checked using videoscope and no significant observation was noted. DP test of new window was carried out.

4. Crack was observed during visual inspection of bottom plate of WHRB. It was repaired and DP tested and found okay.

5. Joint Visual Inspection of converter beds was carried out and the following observations were noted:

Bed 1 - Mesh was found to be intact but cleaning was required. Bed 1 & Bed 2 division plate random thickness was also carried out entering from outlet and minimum thickness was measured as 7.46 mm.

Bed 2 - 3 nos of cracks were observed from the joint between central drum and division plate. The cracks were repaired and DP test was carried out and found ok. Moreover some deposits were observed on the shell and division plate. Cleaning was recommended.

Bed 3 - The mesh was found to be okay but the mesh supports were found to be corroded. The corroded supports were replaced. Blast cleaning was recommended for more inspection.

Bed 4 – Mesh of Bed 4 was found damaged at several locations. The locations were marked and the damaged area was patched. Moreover brick lining of central drum was found to be damaged. Stitch welding was also required at some locations.

6. Converter 1 & 2 Nozzles thickness was also carried out and no significant deviation was observed. There are 5 nozzles in Converter 1 & 5 nozzles in Converter 2.
7. **Thickness measurement of approachable PHE Outlet & Inlet lines, U-Seals, pump tanks, acid crossflow lines was carried out as summarized below:-**

- **PHE 2420/21 Outlet line** to DT Tower with minimum measured thickness of 4.8 mm against 8.18 mm of 8" pipeline and 11.2 mm against 12.7 mm of 16" pipeline.
- **PHE 2420/21 Inlet Line** from DT Pump Tank with minimum measured thickness of 4.73 mm against 8.18 mm of 8" pipeline, 5.7 mm against 12.7 mm of 16" pipeline and 7.85 mm against 10.31 mm of 12" line.
- **PHE 2422/23 Outlet line** to DT Tower with minimum measured thickness of 5.18 mm against 8.18 mm of 8" pipeline and 7.98 mm against 12.7 mm of 16" pipeline.
- **PHE 2422/23 Inlet Line** from DT Pump Tank with minimum measured thickness of 4.5 mm against 8.18 mm of 8" pipeline, 6.01 mm against 12.7 mm of 16" pipeline and 6.0 mm against 10.31 mm in 12" pipeline.

FAT PHEs Arrangement

- **PHE 2450/51 Outlet line** to FAT Tower with minimum measured thickness of 6.25 mm against 8.18 mm of 8" line and 7.74 mm against 12.7 mm of 16" pipeline.
- **PHE 2450/51 Inlet Line** from FAT Pump Tank with minimum measured thickness of 5.50 mm against 8.18 mm of 8" pipeline, 4.83 mm against 12.7 mm of 16" pipeline and 7.27 mm against 10.31 mm of 12" line.
- **PHE 2452/53 Outlet line** to FAT Tower with minimum measured thickness of 3.93 mm against 8.18 mm of 8" line and 111.67 mm against 12.7 mm of 16" pipeline.
- **PHE 2452/53 Inlet Line** from FAT Pump Tank with minimum measured thickness of 4.5 mm against 8.18 mm of 8" pipeline, 4.96 mm against 12.7 mm of 16" pipeline and 8.21 mm against 10.31 mm of 12" line.
- **Product PHE 2460 line** with minimum measured thickness of 6.09 against 8.18 mm of 8" line and 3.60 against 7.11 mm of 6" line.

IAT Acid Coolers arrangement

- Acid Cooler 2440 and 2441 acid circuit was upgraded from SS316 to Corfre A10 material. All the fabrication as well as erection joints fitup, Root DP and 100 % radiography was carried out. Repairs were marked and repaired till it was found okay.
- Fit up was not found up to the mark and ovality & mismatch were observed in the joints but as per plant requirement the same was accepted and further work was carried out.
- Eddy current testing of all the tubes of both alloy IAT coolers 2440 & 2441 was also carried out. No significant indications were observed.

U-Seal arrangement

- **DT Tower to DT Pump Tank U-Seal** thickness was carried out and the minimum measured thickness were measured as 5.52 mm and 5.66 mm in North and South sides U-Seals respectively.
- **FAT Tower to FAT Pump Tank U-Seal** thickness was carried out and the minimum measured thickness were measured as 6.19 mm and 5.82 mm in North and South sides U-Seals respectively.
- **IAT Tower to IAT Pump Tank U-Seal** thickness was carried out and the minimum measured thickness were measured as 5.75 mm and 5.74 mm in North and South sides U-Seals respectively.

- **DT Pump Tank Shell** thickness was carried out from outside and the minimum measured thickness was measured as 9.05 mm.
- **FAT Pump Tank Shell & Bottom Plate** thickness was carried out and the minimum measured thickness was measured as 6.22 mm and 8.74 mm respectively.
- **IAT Pump Tank Shell & Bottom plate** thickness was carried out and the minimum measured thickness were measured as 5.53 mm and 8.79 mm respectively.
- **Cross flow lines thickness from DT to IAT/FAT and IAT to DT/FAT** was carried out from Pump Tanks and the thickness measured was as follows:

LOCATION	LINE NAME	SECTION	TOP	BOTTOM	EAST	WEST	SOUTH	NORTH	MIDDLE	
FROM DT PUMP TANK	IAT TO DT (10"LINE)	1			3.93	3.47	3.56	3.62		
		2	4.09	3.46	4.04	3.97				
		3				3.62			3.86	3.28
		4	3.89	3.62						3.37
	4" ACID INTAKE LINE	1				5.68	5.8	5.67	5.78	
		2	5.72	5.05						5.01
		3	5.9	5.87				5.73	5.92	
		4	6.7	6.36				5.96	6.48	

LOCATION	LINE NAME	SECTION	TOP	BOTTOM	EAST	WEST	SOUTH	NORTH	MIDDLE	
FROM FAT PUMP TANK	IAT TO FAT (6"LINE)	1			3.96	3.87	3.99	4		
		2			3.96	4.05	3.92	3.94		
		3			4.04	3.92	3.91	3.9		
		4	3.87	3.71					3.32	
		5	4.3	3.86			4.05	4.03		
		6				4.04		4.81	3.99	
		7	4.19	3.8	4.04	4.04				
	DT TO FAT (3"LINE)	1				6.48	6.47	6.5	6.52	
		2	6.67	6.45						6.53
		3	6.53	6.34				6.25	6.36	
		4					6.39		6.2	6.07
		5	6.32	6.18	6.2	6.25				

LOCATION	LINE NAME	SECTION	TOP	BOTTOM	EAST	WEST	SOUTH	NORTH	MIDDLE
From IAT Pump Tank	DT to IAT (10"LINE)	1			6.42	6.31	6.37	6.19	
		2	6.35	6.42					6.23
		3	6.48	6.66			6.56	6.4	
		4				6.42	6.54		6.33
		5	6.47	6.56	6.57	6.5			

8. Steam Drum approachable and exposed fittings DP test and thickness measurement was carried out. The repairs were marked and repaired.
9. DP , UT and MPI was carried out for Buckstay's joints, ring header distribution lines joints, BFW common header (Mud drum) joints, membrane tube joints, economizer headers and straight tubes joints, Superheater-1 & 2 header and straight tubes joints etc.
10. Insitu metallography was carried out on various spots of ring header joints, branch joints, membranes tubes, flag coils, economizer header joints, straight tubes, etc.
11. Phased array ultrasonic testing was also carried out on several welding joints of membrane tubes and economizer tubes.
12. DP testing of Economizer casing plate was carried out. Repairs were marked and attended.
13. DP testing of exposed pipelines joints, drain lines, vents lines, fittings of pressure lines, steam headers, economizer lines etc. was carried out.

14. DP Test of Turbo-blower journal bearings was carried out.

15. Root DP Testing of Hot & Cold Heat Exchanger Manholes was carried out. The repairs were attended.

16. Root & final DP Testing of manholes WHRB was carried out. The cracks/discontinuities were repaired and again DP Testing was carried out till the joint was cleared.

17. DP Testing of manholes of SH-1 & SH-2 was carried out and found okay.

After plant startup, a leakage was observed from Tube No.94 (first tube of Panel No.4) from just above the header to straight tube joint. Thickness measurement was also carried out and no significant reduction in thickness was observed. It was deep grinded and welding was done. DP test was carried o

ATR REPORT OF ELECTRICAL SECTION 2021

	<u>BOILER AND CHP PLANT</u>	Duration/ date	Agency/ Manpower
1.0	6.6 KV Switch gear Maintenance		
1.1	6.6 KV section-1 of BOILER HT switch gear	20/03/2021	Dept.
	Busbar cleaning and applying Red insulated varnish on insulators and space heater replaced. Panel extra holes sealing properly.		
1.2	6.6 KV section-2 of BOILER HT switch gear	23/03/2021	Dept.
	Busbar cleaning and applying Red insulated varnish on insulators and space heater replaced. Panel extra holes sealing properly.		
1.3	6.6 KV SWITCHGEAR OF CHP PLANT	21/03/2021	Dept.
	Busbar cleaning and applying Red insulated varnish on insulators and space heater replaced. Panel extra holes sealing properly.		
2.0	CHP PMCC		
2.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done.	19/03/2021 to 21/03/2021	Dept.
3.0	<u>MCC and PCC</u>		
3.1	Boiler MCC Busbar cleaning and applying Red insulated varnish on insulators and space heater replaced. Panel extra holes sealing properly. motor feeder cleaning, power contactor, relay contact point cleaning and tightness checking	22/03/2021	Dept.
3.2	Boiler Emergency MCC Busbar cleaning and applying Red insulated varnish on insulators and space heater replaced. Panel extra holes sealing properly. motor feeder cleaning, power contactor, relay contact point cleaning and tightness checking	23/03/2021	Dept.
3.3	Boiler-1old & New ESP MCC & TR control panel Busbar cleaning and applying Red insulated varnish on insulators and space heater replaced. Panel extra holes sealing properly. Contact point cleaning and tightness checking and control connection checked.	26/3/2021	Dept.
3.4	Boiler-2old & New ESP MCC & TR control panel Busbar cleaning and applying Red insulated varnish on insulators and space heater replaced. Panel extra holes sealing properly. Contact point cleaning and tightness checking and control connection checked.	25/3/2021 and 26/03/2021	Dept.
3.5	Boiler PCC	28/03/2021	Dept.

	Busbar cleaning and applying Red insulated varnish on insulators tightness checking		
4.0	Maintenance of VFD of Boiler-1&2		
4.1	De dusting, cleaning and preventive maintenance of VFD	22/03/2021	Dept.
5.0	Transformer maintenance		
5.1	CHP Transformer-1and 2 HT & LT side Terminal checking, cleaning and tightness checking, sealing properly. New earthing strip connected	21/03/2021	Dept.
5.2	Boiler Transformer-1, 2,3,4 HT & LT side Terminal checking, cleaning and tightness checking, sealing properly and oil leakage arresting. HV side Bushing replaced in TR#4.	22/03/2021 to 25/03/2021	Dept. & External Agency
6.0	MOTOR OVERHAULING		
6.1	Following motor cooling tube cleaning and terminal checking completed. BFP A,B,C , ID1A, ID1B ,ID2A ID 2B,FD1A,FD1B,FD2A,FD2B	20/03/2021 TO 28/03/2021	Dept.
6.2	Boiler conveyor motor C5, C6, C7 motor replaced by new spare motor, Boiler PA fan 1B motor replaced by spare new motor.	20/03/2021 to 28/03/2021	Dept.
6.3	DCF MOTORS, PA1A, PA2A, PA 2B Motor terminal checking and cleaning.	28/03/2021 to 30/03/2021	Dept.
7.0	ESP		
7.1	Boiler-1 old ESP 1 st ,2 nd ,3 rd field ESP control panel Replaced and commissioned	19/3/2021 to 28/03/2021	Dept.
7.2	Boiler-1 New and old ESP After busduct and inspection chamber opened, the busbar tightness and cleaning cleaning of insulators and preventive maintenance completed.	25/03/2021	Dept.
7.3	Boiler-2 New and old ESP After busduct and inspection chamber opened , the busbar tightness and cleaning of insulators and preventative maintenance completed	26/03/2021	Dept.
8.0	Maintenance of Actuators of MOV		
8.1	Boiler-1 MSSV -1B actuator commissioning	24/03/2021& 25/03/2021	Dept. & Ext agency

8.2	Boiler-2 MSSV-2B actuator commissioning	24/03/2021& 25/03/2021	Dept. & Ext agency
8.3	Preventive maintenance of actuators of MOV installed at Boiler	21/03/2021 to 30/03/2021	Ext agency
9.0	Battery charger and DCDB MAINTENANCE		
9.1	General cleaning & maintenance done.	28/03/2021	Dept.
10. 0	Maintenance of Magnet control panel, pull chord control panel, Hooter control panel and all safety switches of conveyor	20/03/2021 to 30/03/2021	Dept.
10. 1	Boiler and CHP plant.		
11. 0	TEMPORARY CONNECTIONS :		
11. 1	Temporary connection given for lighting job, extension boards, hand lamp, flood light, welding m/c & belt jointing machine etc. for Boiler and CHP plant.	During ATR	Dept.
12. 0	Replacement of LCS	28/03/2021 to 03/04/2021	Dept.
12. 1	1. LCS replaced of PA fan 1A,1B 2.NBC -2A vibrator motor feeder 3.Old Ash unloader- 1 4.New ash unloader-1		

	<u>ELECTRICAL DAP PLANT</u>	Duration/ date	Agency/ Manpower
1.0	<u>33 kV VCB MAINTENANCE (I/C1 & 2)</u>		
1.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2.5 – G ohm, Ph-Ph- >7G –ohm	18.03.2021 to 30.02.2021	Dept.
2.0	<u>6.6 kV SECTION 1 MAINTENANCE</u>		
2.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2.5 – G ohm, Ph-Ph- >7G –ohm	18.03.2021 to 20.03.2021	Dept.
	<u>6.6 kV SECTION 2 MAINTENANCE</u>		
2.2	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2 – G ohm, Ph-Ph- >6 G –ohm	30.03.2021 to 02.2021	Dept.
3.0	<u>PCC -4 MAINTENANCE</u>		
3.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 600 M –ohm, Ph-Ph- >80 M –ohm	18.03.2021 To 21.03.2021	Dept.
4.0	<u>PCC -5 MAINTENANCE</u>		
4.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 375 M –ohm, Ph-Ph- >95 M –ohm	22.03.2021 To 26.03.2021	Dept.
5.0	<u>MCC MAINTENANCE</u>		
5.1	MCC 31(Siemens MCC) TRAIN-A	26.03.2021	Dept.

	De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 95 M –ohm, Ph-Ph- >45 M –ohm	To 30.03.2021	
5.2	MCC 32(Siemens MCC) TRAIN-B De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 110 M –ohm, Ph-Ph- >30 M –ohm	24.03.2021 to 30.03.2021	Dept.
5.3	MCC 33(Siemens MCC) TRAIN-C De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 80 M –ohm, Ph-Ph- >28 M –ohm	21.03.2021 To 24.03.2021	Dept.
6.0	DBN MCC MAINTENANCE		
6.1	De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 40 M –ohm, Ph-Ph- >75 M –ohm	15.03.2021 to 17.2021	Dept.
7.0	MCC MAINTENANCE		
7.1	CHAIN MILL MCC TRAIN-A De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus Ph- E 95 M –ohm, Ph-Ph- >45 M –ohm	02.03.2021 To 06.3.2021	Dept.
7.2	CHAIN MILL MCC TRAIN-B De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus	13.03.2021 to 18.03.2021	Dept.

	Ph- E 110 M –ohm, Ph-Ph- >30 M –ohm		
7.3	CHAIN MILL MCC TRAIN-C De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus Ph- E 1 G –ohm, Ph-Ph- >1.5 G –ohm	10.03.2021 to 15.03.2021	Dept.
8.0	<u>Maintenance of VFD of Train A B & C</u>		
8.1	De dusting, cleaning and preventive maintenance of VFD of slurry pump, combustion air fan, Pan Vibrator, potash & urea weigh feeder & coating oil pump of all three train.	08.04.2020 & 09.04.2020	Dept.
9.0	<u>Screen Vibrator motor & Panel</u>		
9.1	96 no of motor of screen vibrator is checked along with panel. Also panel is painted.	10.04.2020 & 16.04.2020	Dept.
10.0	<u>Overhauling of HT Motors :-</u>		
10.1	Removal of termination, shifting the motors of train C from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, inspection & cleaning of the bearings as per requirement, Termination & DOR checking	10.03.2021 to 05.04.2021	Deptt. & External agency (M/s Remag)
10.2	Removal of termination, shifting the motors of train B from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, inspection & cleaning of the bearings as per requirement, Termination & DOR checking	16.03.2021 to 06.04.2021	Deptt. & External agency (M/s Remag)
11.0	<u>Overhauling of LT Motors :-</u>		
11.1	Removal of termination, shifting the motors of TR-C from site to Workshop for overhauling, shifting back to site, Termination & DOR checking	12.03.2021 to 05.04.2021	Deptt.
11.2	Removal of termination, shifting the motors of TR-B from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, Termination & DOR checking.	13.03.2021 to 06.04.2021	Deptt.
12.0	<u>SS JB line up</u>		
12.1	FRP JB of Product elevator motor's of train A is replaced with SS make JB.	28.03.2021	Dept.
12.2	FRP JB of chain mill motor's of train A is replaced with SS make JB. Also JB's is relocated from chain mill floor to control room floor.	02.04.2021 to 15.02.2021	Dept.
13.0	<u>Transformer maintenance (9 & 10) , 25MVA</u>		

13.1	Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of damaged connectors inside Marshalling box. Transformer is charged after IR test.	27-03-2019 to 02-04-2020	Dept.
14.0	<u>Train B MCC Incomer ACB retrofitting & Capacity enhancement of dropper busbar</u>		
14.1	MCC shutdown taken & IR value is measured, old vertical dropper busbar from both the incomer is removed along with ACB. New busbar with enhanced capacity is installed along with new 3200 ACB in installed in both the incomers. Again IR is taken and found above 100 M-ohm. ON, OFF & Trip is checked and found ok for both the incomers.	20.03.2021 to 27.03.2021	External agency (M/s The Associate & Co.)
15.0	<u>Train A MCC Incomer ACB retrofitting & Capacity enhancement of dropper busbar</u>		
15.1	MCC shutdown taken & IR value is measured, old vertical dropper busbar from both the incomer is removed along with ACB. New busbar with enhanced capacity is installed along with new 3200 ACB in installed in both the incomers. Again IR is taken and found above 100 M-ohm. ON, OFF & Trip is checked and found ok for both the incomers.	20.03.2021 to 27.03.2021	External agency (M/s The Associate & Co.)
16.0	<u>Replacement of Trough Assembly in DAP Train A & B MCC.</u>		
16.1	Removal of the existing damaged trough assembly from train A & B MCC. New Trough assembly is fitted in place of defective trough assembly. Contact of all feeder trolleys is checked with the dropper bus. Insulation value of MCC is checked after installation and found above 1 M-ohm.	30.03.2021	External agency (M/s The Associate & Co.)
17.0	<u>Overhauling of MOVs :-</u>		
17.1	Overhauling of Auma make actuators installed in Damper of train A & B dust fan, setting the limit switches and lubricating and check its operation.	27.03.2021	External agency (M/s AUMA India)
18.0	<u>Maintenance of Capacitor Bank I & II</u>		
18.1	De-dusting, bus bar checking & tightness of all inductor unit, Capacitor unit & RVT. Two Nos of Licking capacitor units are also replaced	18.03.2021 to 24.03.2021	Dept.
19.0	<u>Maintenance of Battery Charger & Battery Bank</u>		
19.1	De-dusting, tightness, space heater checking, sealing of panels done. Change over scheme of channel 1 & 2 is	28.03.2021	Dept.

	checked. Cleaning of all batteries is done and voltage per cell is measured.		
20.0	<u>Maintenance of Siemens make VCB(33 kV & 6.6 kV)</u>		
20.1	Maintenance along with testing of 2 Nos of 33 kV & 25 Nos. of 6.6 kV VCB.	23.03.2021 to 14.04.2021	External Agency (M/S Siemens)
21.0	<u>Maintenance of Siemens make ACB</u>		
21.1	Maintenance along with testing of all Siemens make ACBs installed in PCC, DBN, Train A, B & C.	11.03.2021 to 02.04.2021	External agency (M/s The Associate & Co.)
22.0	<u>Maintenance of L & T make ACB</u>		
22.1	Maintenance along with testing of 10 Nos. of L & T make ACBs installed in PCC, Chain Mill & PHS conveyer MCC.	21.04.2021 to 02.04.2021	External Agency (M/S L&T)
23.0	<u>Maintenance of Schneider make ACB</u>		
23.1	Maintenance along with testing of 8 Nos. of Schneider make ACBs installed in PCC.	18.03.2021 to 21.3.2021	External Agency (M/S Schneider)
24.0	<u>Retrofitting of P220 relay in place of Siemens 7SJ relay</u>		
24.1	17 Nos. of Schneider make P220 relay is installed in place of obsolete Siemens 7SJ relay in place of 6.6 kV HT motor feeder	03.04.2021 to 09.04.2021	External Agency (M/S Schneider)
	<u>Old & Damaged Cable Removal</u>		
	Old and damaged cable is removed from boot area of Train A, B & C.	13.03.2021 to 15.04.2021	Dept.
19.0	<u>TEMPORARY CONNECTIONS :</u>		
19.1	Temporary connection given for lighting job, extension boards, hand lamp, flood light, welding m/c & belt jointing machine etc. for train A,B & C	10.03.2021 to 15.03.2021	Dept.

Relay Testing



MCC Maintenance



L & T Maintenance



6.6 kV Switchboard Maintenance



33 KV Switchboard & VCB Maintenance



6.6 KV VCB Maintenance



MCC Maintenance



Capacitor Bank Maintenance



Cable Removal from Boot Area



	<u>ELECTRICAL PAP PLANT</u>	Duration/ date	Agency/ Manpower
1.0	<u>33 kV VCB MAINTENANCE (I/C1 & 2)</u>		
	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 42 – G ohm, Ph-Ph- 125 –G ohm	17.03.2021 and 30.03.2021	Dept.
2.0	<u>6.6 KV SWITCH GEAR MAINTENANCE -</u>		
2.1	<u>S/S-5, Bus Section-A:</u> De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2.2 – G ohm, Ph-Ph- >7G –ohm	23/03/2021	Dept.
2.2	<u>S/S-5, Bus Section-B:</u> De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 3.5– G ohm, Ph-Ph- >6 G –ohm	02/04/2021	Dept.
2.3	<u>S/S-6, Bus Section-A:</u> De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 3.5– G ohm, Ph-Ph- >6 G –ohm	23/03/2021	Dept.
2.4	<u>S/S-6, Bus Section-B:</u> De-dusting, bus bar checking & tightness, space heater checking,	20/03/2021	Dept.

	tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2.5– G ohm, Ph-Ph- >6 G –ohm		
2.5	S/S-NCT, Bus Section-A: De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2 – G ohm, Ph-Ph- > 6 G –ohm	05/03/2021	Dept.
2.6	S/S-NCT, Bus Section-B: De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 3.5– G ohm, Ph-Ph- >6 G –ohm	04/03/2021	Dept.
2.7	S/S-OLD CHP, Bus Section-A: De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2.5– G ohm, Ph-Ph- >6 G –ohm	28/03/2021	Dept.
2.8	S/S-OLD CHP, Bus Section-B: De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 2.5– G ohm, Ph-Ph- >6 G –ohm	28/03/2021	Dept.
3.0	<u>PCC -6 MAINTENANCE OF SUBSTATION-5</u>		
3.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing ACBs Jaws along with respective cable	24/03/2021	Dept.

	and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph - E 50 M – ohm, Ph - Ph- > 95 M – ohm		
4.0	PMCC -25 Maintenance of Substation-6		
4.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly. IR value of the bus Ph- E 500 M –ohm, Ph - Ph- >1 G –ohm	01/04/2021	Dept.
5.0	MCC MAINTENANCE		
5.1	BALL MILL MCC – A and B :- De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 200 M –ohm, Ph-Ph- >1 G –ohm	15/03/2021	Dept.
5.2	BALL MILL MCC – C and D De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 100 M –ohm, Ph-Ph- >500M –ohm	16/03/2021	Dept.
5.3	MCC 20 AND 21 De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under	24.03.2021	Dept.

	voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 90 M –ohm, Ph-Ph- > 500 M –ohm		
5.4	MCC 22 AND 23: De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked. IR value of the bus Ph- E 40 M –ohm, Ph-Ph- >75 M –ohm	24/03/2021	
5.5	ACID STORAGE MCC: De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus Ph- E 95 M –ohm, Ph-Ph- >45 M –ohm	27/03/2021	Dept.
5.6	OLD CHP SEIMENS MCC De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus Ph- E 100 M –ohm, Ph-Ph- > 600M –ohm	25/03/2021	Dept.
5.7	Old CHP MCC-50 De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus Ph- E 500M –ohm, Ph-Ph- >1.5 G –ohm	27/03/2021	Dept.
5.8	Old CHP MCC-51 De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable	25/03/2021	Dept.

	and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus Ph- E 200M –ohm, Ph-Ph- >1.5 G –ohm		
5.9	Old CHP MCC-52 De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. IR value of the bus Ph- E 200M –ohm, Ph-Ph- >1.5 G –ohm	25/03/2021	Dept.
6.0	<u>Maintenance of VFD of FILTRATION / BALLMILL AREA/ CONVEYOR</u>		
	De dusting, cleaning and preventive maintenance of VFD of Filter feed pumps / screen feed pumps / product and return pumps/ conveyors weigh feeder.	01/04/2021 to 08/4/2021	Dept.
7.0	<u>Overhauling of HT Motors :-</u>		
	Removal of termination, shifting the motors of reactor / Fumes Scrubber Fans / Hot Well pump / Cold Well pump / Evaporator Circulators / Reactor Circulators from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, inspection & cleaning of the bearings as per requirement, Termination & DOR checking.	04.03.2021 to 27.03.2021	Deptt. & External agency (M/s Remag)
8.0	<u>Overhauling of LT Motors :-</u>		
	Removal of termination, shifting the motors of reactor/evaporator/ball mill/filtration/acid storage ara/conveyors from site to Workshop for overhauling, shifting back to site, Termination & DOR checking	24.02.2021 to 05.04.2021	Deptt.

9.0	<u>Transformer maintenance</u>		
9.1	<u>Transformer (7 & 8) , 25MVA , S/S-5</u> Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of damaged connectors inside Marshalling box. Transformer is charged after IR test.	19/03/2021 to 22/03/2021 and 30/03/2021 to 01/04/2021	Dept.
9.2	<u>Transformer (15 & 16) , 16MVA, NCT S/S</u> Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of damaged connectors inside Marshalling box. Transformer is charged after IR test.	10/03/2021 TO 12/03/2021 and 19/03/2021	Dept.
9.3	<u>Transformer (53 & 54) , 1.6MVA, NCT S/S</u> Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of damaged connectors inside Marshalling box. Transformer is charged after IR test.	06/03/2021 to 07/03/2021	Dept.
9.4	<u>Transformer (17/18/20/21) , 2 MVA, S/S-5</u> Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of damaged	20/03/2021 to 24/03/2021	Dept.

	connectors inside Marshalling box. Transformer is charged after IR test.		
9.5	<u>Transformer (22/23) , 2 MVA, S/S-6</u> Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of damaged connectors inside Marshalling box. Transformer is charged after IR test.	20/01/2021 AND 25/02/2021	Dept.
9.6	<u>Transformer (48/49/47A) , 2 MVA, S/S-OLD</u> <u>CHP</u> Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of damaged connectors inside Marshalling box. Transformer is charged after IR test.	22/03/2021 AND 25/03/2021	Dept.
10.0	<u>Retrofitting and commissioning of 03 Nos, 3200A ACB in PCC-6, Incomer-E AND BUSCOUPLER-CE/AC</u>		
	PCC SECTION A/C/E shutdown taken & IR value is measured, old vertical dropper bus bar from both the incomer and bus coupler are removed along with ACB. New bus bar of same capacity is installed along with new 3200A ACB in both the	30.03.2021 to 03.04.2021	External agency (M/s The Associate & Co.)

	incomer and bus couplers. Again IR is taken and found above 500 M-ohm. ON, OFF & Trip is checked and found ok for both the incomer and bus coupler.		
11.0	<u>Replacement of 05 Nos VFD panel of higher rating in filtration Filter pumps -20-01-136 / 20-01-137 / 20-01-138 / 20-01-232A / 20-01-231B 45KW-02 Nos 75KW-02Nos 125KW-01 Nos</u>		
	Removal of the existing VFD panel after power cable and control cable disconnection. New base frame fabricated and new VFD panel installed on it. Power cable and control cable glanding and termination in motor and panel done. After programming of drives and ID run taken as well as control operation from DCS checked found OK. VFD handed over for operation.	18.03.2021 to 02/04/2021	Dept.
12.0	<u>Overhauling of MOVs :-</u>		
	Overhauling of Auma make actuators installed in New cooling tower pipe line, setting the limit switches and lubricating and check its operation.	10/04/2021	External agency (M/s AUMA India)
13.0	<u>Maintenance of Capacitor Bank I & II</u>		
	De-dusting, bus bar checking & tightness of all inductor unit, Capacitor unit & RVT.	17/03/2021	Dept.
14.0	<u>Maintenance of Battery Charger & Battery Bank</u>		
	De-dusting, tightness, space heater checking, sealing of panels done. Change over scheme of channel 1 & 2 is checked. Cleaning of all batteries is done and voltage per cell is measured.	03/04/2021 to 05/03/2021	Dept.
15.0	<u>Maintenance of Siemens make VCB(33 kV & 6.6 kV)</u>		

	Maintenance along with testing of 1 Nos of 33 kV & 09 Nos. of 6.6 kV VCB.	25.03.2021 to 08.04.2021	External Agency (M/S Siemens)
16.0	<u>Maintenance of Siemens make ACB</u>		
	Maintenance along with testing of all 10 NOS Siemens make ACBs installed in PCC of s/s-5 and Old CHP PMCC.	25.03.2021 to 04.04.2021	External agency (M/s The Associate & Co.)
17.0	<u>Maintenance of L & T make ACB</u>		
	Maintenance along with testing of 32 Nos. of L & T make ACBs installed in S/S-5/6/ACID STORAGE/FILTRATION/OLD CHP	19.03.2021 to 02.04.2021	External Agency (M/S L&T)
18.0	<u>Retrofitting of P220 relay in place of Siemens 7SJ relay</u>		
	15 Nos. of Schneider make P220 relay is installed in place of obsolete Siemens 7SJ relay in place of 6.6 kV HT motor feeder	03.04.2021 to 09.04.2021	External Agency (M/S Schneider)
19.0	<u>RELAY TESTING</u>		
	7SJ ELECTRONIC Relay, Micom relay and other electromechanical relay testing done. Total 50 Nos feeders / incomers/ buscouplers all type relays testing completed.	23/03/2021 to 07/04/2021	External Agency (M/S M/S ADECON,)
20.0	<u>Magnet panel for 104 conveyer</u>		
	New electromagnet panel and magnet installed, power cable layed from panel to magnet, glanding and termination done and trial run	10.03.2021 to 15.04.2021	Dept.

	taken. After process clearance handed over to process.		
21.0	<u>TEMPORARY CONNECTIONS :</u>		
	Temporary connection given for lighting job, extension boards, hand lamp, flood light, welding m/c & belt jointing machine etc.	18.03.2021 to 05.04.2021	Dept.

Relay Testing

25MVA transformer maintenance



25MVA transformer maintenance



25MVA transformer maintenance



16MVA transformer maintenance



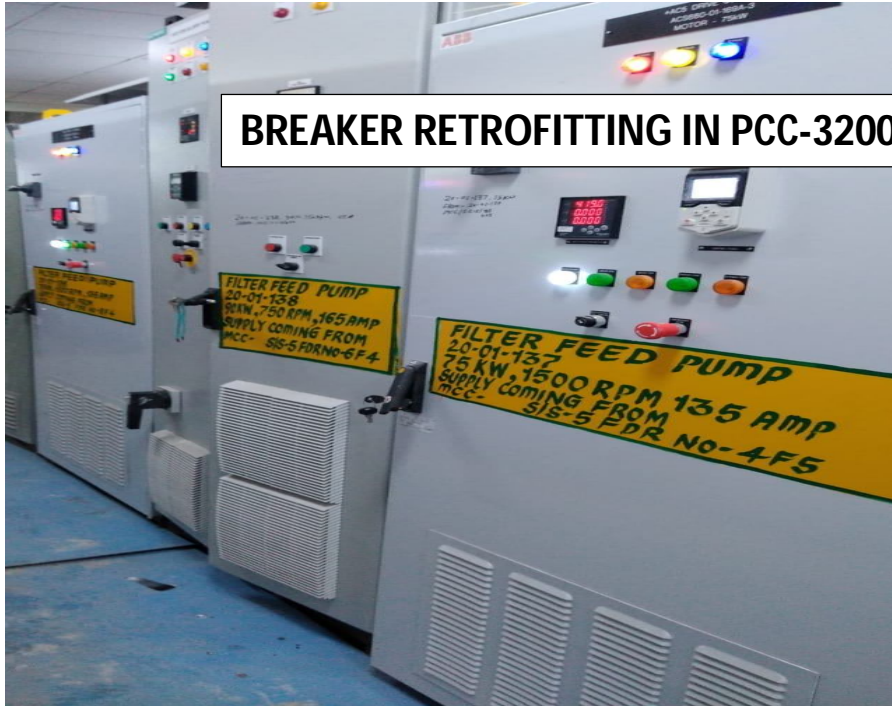
33KV switchgear maintenance



HT MOTOR COOLING TUBE CLEANING



125KW/75KW AND 45KW DRIVE PANEL REPLACEMENT



BREAKER RETROFITTING IN PCC-3200A



BREAKER RETROFITTING IN PCC-3200A



6.6KV BREAKER MAINTENANCE



NGR MAINTENANCE

16 MVA TRANSFORMER MAINTENANCE

CONDITION OF 16 MVA TRANSFORMER BEFORE MAINTENANCE



33KV SWITCHGEAR MAINTENACE



	<u>ELECTRICAL BAGGING PLANT</u>	Duration/ date	Agency
1.0	<u>Bagging MCC Maintenanc</u>		Deptt.
1.1	De-dusting, bus bar checking & tightness, space heater checking, tightness, checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. All feeder trolleys are cleaned by bringing out from the panel. Under voltage tripping of Incomer and all outgoing motor feeders is checked.	19-03-2021	Deptt.
2.0	<u>BAGGING PRODUCT HANDLING MCC MAINTENANCE</u>		Deptt.
2.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly.	28.03.2021	Deptt.
	<u>RECLAIMER MCC-120A/B & 123A/B MAINTENANCE</u>		Deptt.
2.2	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing ACBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly.	20.03.2021 to 21.03.2021	Deptt.
3.0	<u>RECLAIMER VFD-120A/B & 123A/B & MAINTENANCE</u>		Deptt.
3.1	De dusting, cleaning of panels and preventive maintenance of VFD modules. All parameters checked. Panel defective indication lamps are changed & control circuit is checked thoroughly.	20.03.2021 to 21.03.2021	Deptt.
4.0	<u>PDB & MLDB PANEL MAINTENANCE</u>		
4.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing feeders along with respective cable and sealing of panels done. Defective indication lamps are changed.	24.03.2021	Deptt.
5.0	<u>RE-VAMPING OF 130/132 CONVEYOR</u>		
5.1	All power & control cable disconnected from equipment's & removed. New cable trays installed.	15.03.2021	Deptt.& Contr.

	Power & control cable laid. Cable termination done. All equipment's commissioned successfully.	To 06.04.202 1	
6.0	<u>Overhauling of LT Motors :-</u>		
6.1	Removal of termination, shifting the motors of all bagging conveyors from site to Workshop for overhauling, cleaning of cooling ducts, after overhauling, shifting back to site. After installation of motor, power cable termination done & DOR checked.	18.03.202 1 to 30.03.202 1	Deptt.
7.0	Pull chord switch, LCS and ZSS cleaning and maintenance done in all bagging conveyors & slats.	21.03.202 1 To 04.04.202 1	Deptt.



NEW CABLE TRAY RE-ROUTING



130/132 Conveyor Gallery lighting arrangement

	<u>ELECTRICAL TOWNSHIP</u>	Duration/ date	Agency/ Manpower
1.0	<u>I/C-A&B, B/C, TR.-A&B, BUS PT, 6.6 kV MAINTENANCE IN ADM. BUILDING SUBSTATION.</u>		
1.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly.	28.03.2021	Dept.
2.0	<u>I/C-A&B, B/C, TR.-A&B, BUS PT, 6.6 kV MAINTENANCE IN NEW STP SUBSTATION.</u>		
2.1	De-dusting, bus bar checking & tightness, space heater checking, tightness checking of all outgoing VCBs Jaws along with respective cable and sealing of panels done. Defective indication lamps are changed & control circuit is checked thoroughly.	28.03.2021	Dept.
3.0	<u>Maintenance of L & T make ACB</u>		
3.1	Maintenance along with testing of 05 Nos. of L & T make ACBs installed in PCC/MCC in Admin building substation. (I/C-A,B&C, B/C-AB&BC)	28.03.2021 to 29.03.2021	External Agency (M/s. L&T)

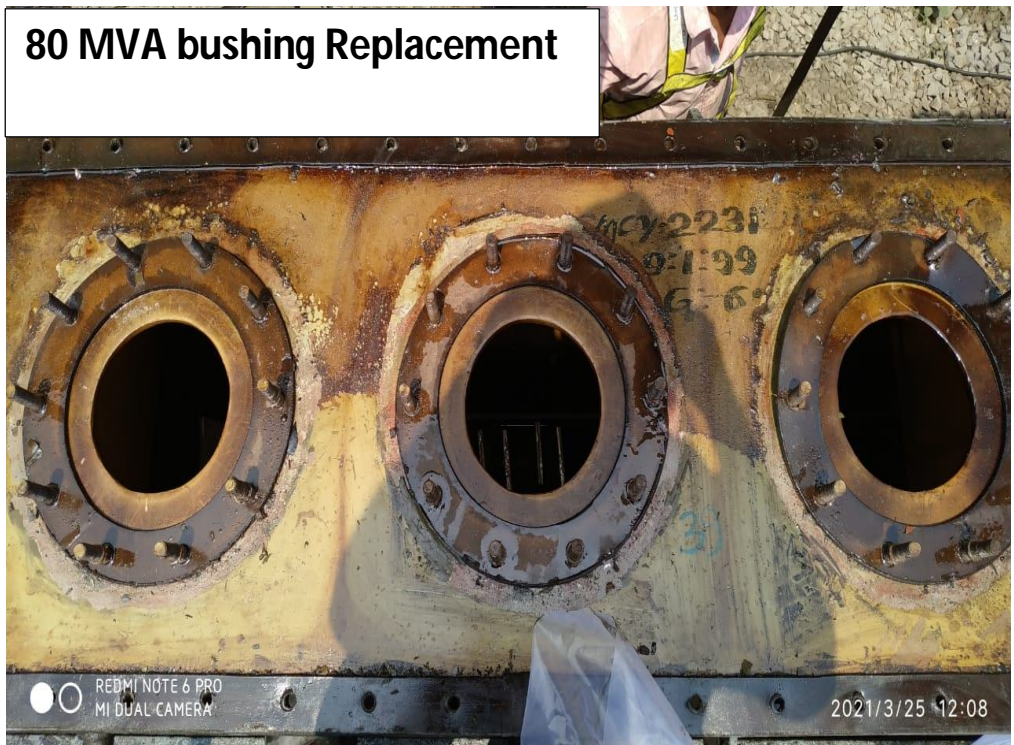
	<u>ELECTRICAL JOB DONE IN ATR 21 AT Energy CENTER PLANT</u>	Duration / date	Agency/ Manpower
1.0	<u>33 kV Sec-A,B MAINTENANCE</u>		
1.1	33 KV Bus Section A&B:VCB cleaning,VCB chamber cleaning, tightness checking, physical checking of CT &PT , control connection checking, space heater checking and replacement ,indication lamp checking and replacement ,33 kV Bus IR value checking and Vacuum Circuit Breakers thorough maintenance (All O/G, Incomers & Bus coupler) Ph- E 75 – G ohm, Ph-Ph- >190 G –ohm	22-03-2021 to 28-03-2021	Dept.
2.0	<u>6.6 kV SECTION A&B MAINTENANCE</u>		
2.1	6.6 KV Bus Section A&B:VCB cleaning,VCB chamber cleaning, tightness checking, physical checking of CT &PT , control connection checking, space heater checking and replacement ,indication lamp checking and replacement ,6.6 kV Bus IR value checking and Vacuum Circuit Breakers thorough maintenance (Incomers & Bus coupler) Ph- E 2.7 – G ohm, Ph-Ph- >4.7G –ohm	25-03-2021 to 30-03-2021	Dept.
3.0	<u>PCC MAINTENANCE</u>		
3.1	Thorough cleaning, checking of all power and control connection for Power Control Centre. Section; A,B & C Ph- E 600 M –ohm, Ph-Ph- >80 M –ohm	28-03-2021 To 28-03-2021	Dept.
4.0	<u>MCC MAINTENANCE</u>		
4.1	Thorough cleaning, checking of all power and control connection and replacement of faulty components. (Contactors, Kits, BMR, Fuses etc.) IR value of the bus Ph- E 95 M –ohm, Ph-Ph- >45 M –ohm	29-03-2021 To 29-03-2021	Dept.
5.0	<u>Generator MAINTENANCE</u>		
5.1	TG-1 PT Cubicle TG-1 PT Cubicle cleaning, tightness done and red varnish applied on insulators.	29-03-2021 To 29-03-2021	Dept.
5.2	TG-1 Air blowering , cleaning and tightness done.	28-03-2021 to 31-03-2021	
5.3	TG-1 C.T Marshalling Box Air blowering , cleaning and tightness done.	31-03-2021 To 31-03-2021	
5.4	TG-1 Exciter Exciter diode assembly cleaning and tightness done	01-04-2021 To	

		01-04-2021	
5.5	TG-1 AVR cleaning and tightness done	02-04-2021 To 02-04-2021	
6.0	Gen-Transformer Maintenance		
6.1	Tr-04, 80 MVA Transformer Oil Drainout,Filteration,Bushing Replacement	26-03-2021 To 02-04-2021	External agency (M/s Voltamp.)
7.0	Transformer maintenance		
7.1	Tr-35 NGR Replacement NGR replacement,Testing and Checking	22-03-2021 & 25-03-2021	Dept.
7.2	Tr-4 & 5 radiator replacement 4nos. In TR-4 and 2nos. In TR-5	29-03-2021 To 31-03-2021	External agency (M/s Voltamp.)
8.0	Battery Bank Installation		
8.1	TG-1&2 , 220V -214 AH Complete Installation and commissioning of 220V-214 AH for TG-1&2	22-03-2021 & 29-03-2021	Dept.
9.0	<u>MOV MAINTENANCE</u>		
9.1	MOV (Make: Rotork,Limitorque, Auma) Limit switch and torque switch adjustment done.	27-03-2021 to 03-04-2021	Deptt. & External agency
10.0	<u>Overhauling of HT/LT Motors :-</u>		
10.1	TG CWS Pump 101-A &C, SAP CWS Pump 102 C Motor overhauling, cooling tube replacement, Fan cover maintenance, Star-point Box maintenance done.	22-03-2021 to 02.04.2021	Deptt.
10.2	TG-1 LOP (main, s/b), TG-1 CEP A Motor overhauling done.	27-03-2021 to 02-04-2021	Deptt.

10.3	TG-1 TCM Motor Motor overhauling done.	01-04-2021 To 03-04-2021	
11.0	<u>Relay Testing</u>		
11.1	REG relay (Generator protection) REG Relay (TG-1, TG-2) testing done. PC for both relays were upgraded along with support software. One new relay (spare) was configured, tested with existing setting file.	31-03-2021 to 03-04-2021	External agency (M/s ABB.)
11.2	Rotor Earth Fault relay Rotor Earth Fault relay (alarm and tripping unit) for both TGs were tested. Out of 4, one alarm unit was found defective.	01-04-2021 To 02-04-2021	External agency (M/s Adecon.)
11.3	132 kV relay panel Micom P341 (2 no), Micom P442 (01 no), Micom P632 (02 no), Micom P127 (03 no) testing done Spare Micom P341 and P442 configuration, testing was done. Modification done in LED configuration.	26-03-2021 to 29-03-2021	External agency (M/s Adecon.)
11.4	Relays in 33 kV panel 7SJ relays in all O/G (33 kV feeders), Micom 642 (E/C1, E/C2 feeders) testing done.	27-03-2021 To 29-03-2021	External agency (M/s Adecon)
11.5	Relays in 6.6 kV panel Micom P220 relays in all motor feeders (6.6 kV) testing done.	29-03-2021 To 30-03-2021	External agency (M/s Adecon)
12.0	Synchronizing panel Annunciator replacement Annunciator panel was replaced and modifications was done in the windows Simulation of all windows with existing drawing was done.	25-03-2021 To 26-03-2021	
13.0	Gen-Cooler Maintenance 4 nos cooler of TG-1 and 2 nos Spare Cooler maintenance done. Removal , shifting to working place, cleaning,checking,gasket replacement,hydro testing , painting etc. including shifting and reinstallation.	24-03-2021 to 02-04-2021	External agency (M/s Eco Ltd)



80 MVA bushing Replacement





Generator cooler Overhauling of TG-1



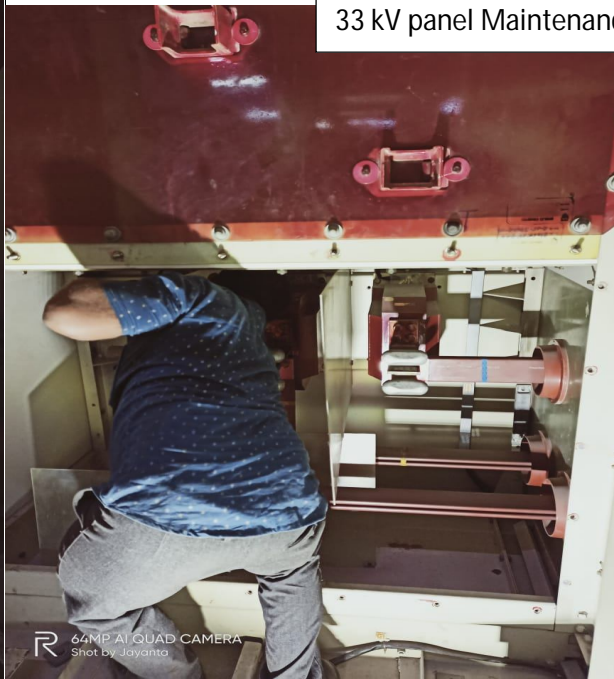
NGR Replacement of TR-35 (25 MVA)



33 kV panel Maintenance



64MP AI QUAD CAMERA
Shot by Jayanta



64MP AI QUAD CAMERA
Shot by Jayanta

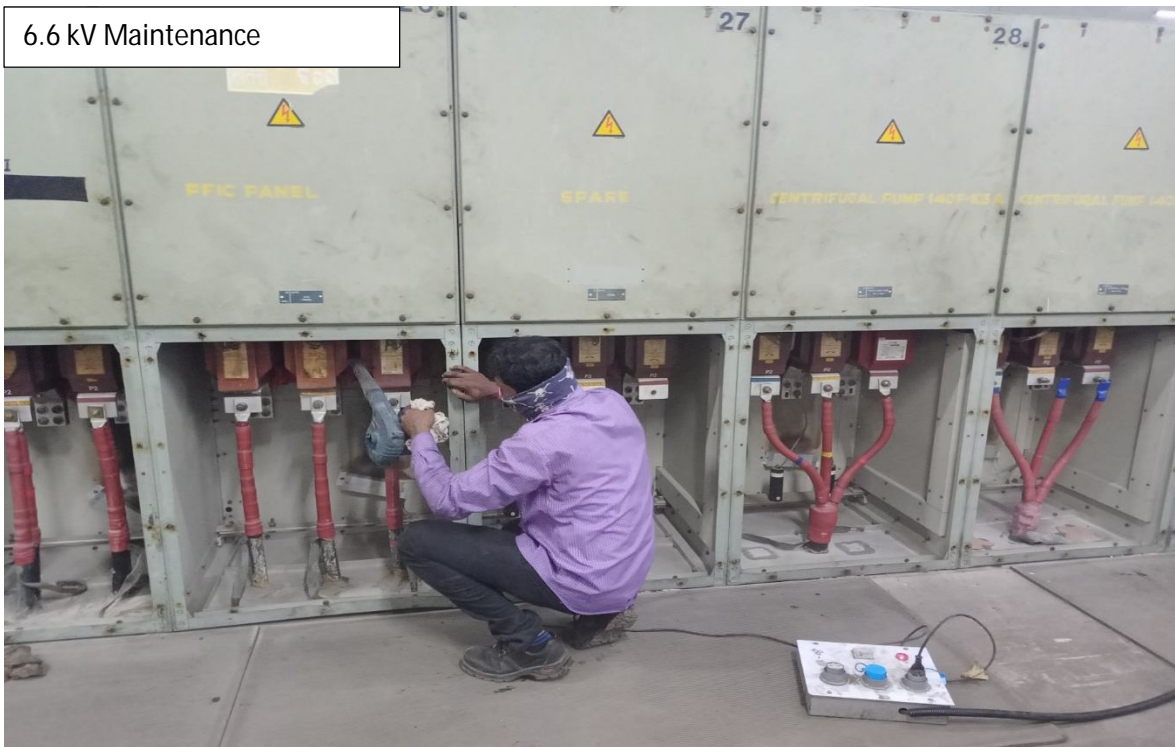


64MP AI QUAD CAMERA
Shot by Jayanta

Battery Bank Maintenance



6.6 kV Maintenance



SAP ELECTRICAL

	<u>Job details</u>	Duration / date	Agency/ Manpower
1.0	<u>SAP MCC-12 MAINTENANCE:-</u>		
1.1	Bus section –A De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 153 M Ohm, Y-E 156 M Ohm, B-E 151 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	20.03.2021 to 22.03.2021	Deptt.
1.2	Bus section –B De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 149 M Ohm, Y-E 144 M Ohm, B-E 147 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	23.03.2021 to 25.03.2021	Deptt.
2.0	<u>SAP MCC-11 MAINTENANCE:-</u>		
2.1	Bus section –A De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 173 M Ohm, Y-E 286 M Ohm, B-E 196 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	29.03.2021 to 31.03.2021	Deptt.
2.2	Bus section –B De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 159 M Ohm, Y-E 138 M Ohm, B-E 197 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	01.04.2021 to 03.04.2021	Deptt.
3.0	<u>33 KV SWITCHGEAR MAINTENANCE:-</u>		
3.1	Bus section –A De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of 33 KV switchgear was R-E 200 M Ohm, Y-E 200 M Ohm, B-E 200 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	24.03.2021	Deptt.
3.2	Bus section –B	27.03.2021	Deptt.

	De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of 33 KV switchgear was R-E 200 M Ohm, Y-E 200 M Ohm, B-E 200 M Ohm & R-Y,Y-B ,R-B >500 M Ohms		
4.0	<u>415 V PCC MAINTENANCE</u>		
4.1	Bus section –A De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 153 M Ohm, Y-E 156 M Ohm, B-E 151 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	28.03.2021	Deptt.
4.2	Bus section –B De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 149 M Ohm, Y-E 144 M Ohm, B-E 147 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	29.03.2021	Deptt.
4.3	Bus section –C De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 196 M Ohm, Y-E 144 M Ohm, B-E 147 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	30.03.2021	Deptt.
4.4	Bus section –D De-dusting, Bus-bar tightness checking, sealing of panels, Module healthiness checking. Interlocking of control circuit checking. Insulation resistance value taken after maintenance. IR value of MCC was R-E 149 M Ohm, Y-E 136 M Ohm, B-E 187 M Ohm & R-Y,Y-B ,R-B >500 M Ohms	31.03.2021	Deptt.
5.0	<u>Maintenance of 33KV/433Volt, 2MVA Transformers (TR # 13, 14, 15, 16) :-</u>		
5.1	Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box, relay & alarm contacts checking, checking of Temp. Indicator. Replacement of broken hinges & damaged connectors inside Marshalling box.	05.04.2021 to 10.04.2021	Deptt.
5.2	Replacement of radiator in TR-16	11.04.2021	External agency (M/s Aay Bee Electricals)

5.3	Oil leakage arresting from TR # 13, 14, 15, 16, replacement of oil seal of LT bushing in Tr#13	13.04.2021 to 17.04.2021	External agency (M/s Aay Bee Electricals)
6.0	<u>Maintenance of Battery Chargers, DCDBs panels & Battery Banks :-</u>		
6.1	Dedusting, checking of Charger & battery bank, checking of relay & alarm contacts.	18.04.2021	Deptt.
6.2	Inspection of healthiness of Battery charger & Battery Bank for smooth operation.	19.04.2021	Deptt.
6.3	Shifting of Battery Bank from back side room to new substation.	19.04.2021	Deptt.
7.0	<u>Installation of smart motorised actuators for Tr.-2 CWP motor discharge valves :-</u>		
7.1	Installation of 4nos. smart motorised actuators for Tr.-2 CWP motor discharge valves, cable laying, termination, OPEN/CLOSE settings & checking of its operation, hook-up with DCS.	01.04.2021 to 09.04.2021	External agency (M/s Electromac)
8.0	<u>Overhauling of HT Motors :-</u>		
8.1	Overhauling the BFW motor-101A at site, cleaning of cooling ducts, inspection & cleaning of the bearings as per requirement.	19.04.2021 to 20.04.2021	Deptt. & External agency (M/s Remag)
8.2	Overhauling the BFW motor-101B at site, cleaning of cooling ducts, inspection & cleaning of the bearings as per requirement.	21.04.2021 to 22.04.2021	Deptt. & External agency (M/s Remag)
9.0	<u>Overhauling of LT Motors :-</u>		
9.1	Removal of termination, shifting the motors of TR-1 from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, Termination & DOR checking	20.03.2021 to 10.04.2021	Deptt.
9.2	Removal of termination, shifting the motors of TR-2 from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, Termination & DOR checking.	20.03.2021 to 10.04.2021	Deptt.
9.3	Removal of termination, shifting the motors from common area from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, Termination & DOR checking.	20.03.2021 to 10.04.2021	Deptt.

10.0	<u>Retrofitting Of Siemens make ACBs in PCC panel (Bus-Coupler BC, Bus-Coupler-BD, Incomer MCC# 10E):-</u>		
10.1	Removal of the existing GE make breaker, removal of old / damaged aluminium bus-bars, modification of existing aluminium bus-bars along with links to match with the new Breaker casing, Fixing of new siemens breaker, Replacing the existing Breaker panel door to suit the new breaker assembly, Making the Control connections, Checking the breaker mechanism, insulation value with IR tester for bus-bars along with breaker, checked and found >500M OHM	11.04.2021 to 18.04.2021	External agency (M/s The Associate & Co.)
11.0	<u>Maintenance of VFD Panels :-</u>		
11.1	De-dusting, tightness checking of Power ckt. , checking & cleaning of VFD cooling fan, All parameters & control ckt. Checking.	10.04.2021 to 12.04.2021	Deptt.
11.2	Inspection & testing the healthiness of all VFDs for smooth operation. Replacement / tuning of any cards/ faulty parts if required.	10.04.2021 to 12.04.2021	Deptt.
12.0	<u>Overhauling and replacement of MOVs :-</u>		
12.1	Overhauling of Auma make actuators, setting the limit switches and lubricating and check its operation. Witness the operation to process deptt.	26.03.2021 to 02.04.2021	External agency (M/s AUMA India)
12.2	Overhauling of Rotork make actuators, setting the limit switches and lubricating and check its operation. Witness the operation to process deptt.	22.03.2021 to 30.03.2021	External agency (M/s Rotork controls)
12.3	Replacement of Secondary air damper of SAP train -1	22.04.2021	Deptt.
12.4	Replacement of superheater bypass damper of SAP train -2	11.04.2021	Deptt.
13.0	<u>Maintenance of 33KV VCBs:-</u>		
13.1	Overhauling of 33kv breakers, Contact resistance inspection, Timing checking for ON/OFF etc.	25.03.2021 to 05.04.2021	External agency (M/s Siemens)





	<u>UTILITY & Offsites</u>	Duration/ date	Agency/ Manpower
1.0	<u>33 kV Switchgear</u>		
	Dedusting and cleaning of 33 kV S/B Bus, Bus bar tightness checking, physical checking of CT & PT, control connection checking, space heater checking and replacement, indication lamp checking and replacement, both section busbar insulation resistance checked between phases and between phase and earth of:		Dept.
1.1	Section-I : Ph-Ph:- 520 G ohm and Ph-Earth :- 450 G-ohm.	18.03.2021	
1.2	Section-II : Ph-Ph:- 550 G ohm and Ph-Earth:- 470 G-ohm.	26.03.2021	
1.3	B/C	28.03.2021	
2.0	<u>Old 6.6 kV Switchgear</u>		
	Dedusting and cleaning of 6.6 kV S/B Bus, Bus bar tightness checking, physical checking of CT & PT, control connection checking, space heater checking and replacement, indication lamp checking and replacement, both section busbar insulation resistance checked between phases and between phase and earth of:		Dept.
2.1	Section-I : Ph-Ph:- 390 G ohm and Ph-Earth :- 320 G-ohm.	23.03.2021	
2.2	Section-II : Ph-Ph:- 370 G ohm and Ph-Earth :- 290 G-ohm.	22.03.2021	
2.3	B/C	28.03.2021	
3.0	<u>New 6.6 kV Gypsum Switchgear</u>		
	Dedusting and cleaning of 6.6 kV S/B Bus, Bus bar tightness checking, physical checking of CT & PT, control connection checking, space heater checking and replacement, indication lamp checking and replacement, both section busbar insulation resistance checked between phases and between phase and earth of: Section-I : Ph-Ph:- 450 G ohm and Ph-Earth :- 480 G-ohm Section-II : Ph-Ph:- 470 G ohm and Ph-Earth :- 520 G-ohm	5/04/2021	Dept.
4.0	<u>PCC MAINTENANCE</u>		
	Cleaning and Dedusting of PCC, Bus bar and Outgoing terminal Tightness checking, maintenance, checking of control connection, inspection of control terminals, CT terminals etc.	28.03.2021	Dept.
5.0	<u>Compressor MCC, Fire MCC, MCC-2A, MCC-2B, MCC-1250 KVA, New DM MCC, DG MCC MAINTENANCE</u>		
	Cleaning and Dedusting of all MCC, Bus bar and Outgoing terminal Tightness checking, maintenance,	30.03.2021 to 06.04.2021	Dept.

	checking of control connection, inspection of control terminals CT terminals etc.		
6.0	<u>Overhauling of HT Motors :-</u>		
	Removal of termination, shifting the motors of R3-2 conveyor from site to Workshop for overhauling, cleaning of cooling ducts, shifting back to site, inspection & cleaning of the bearings as per requirement, Termination & DOR checking.	22.03.2021 to 24.03.2021	Dept. & External agency
7.0	<u>Overhauling of LT Motors :-</u>		
	3 No. of LT motors removal of termination, shifting the motors from site to Workshop for overhauling, shifting back to site, Termination & DOR checking	18.03.2021 to 24.03.2021	Deptt.
8.0	<u>Transformer maintenance</u>		
	Cleaning & TB tightness of marshalling box of 16MVA transformer's Tr- 11 & 12.	19.03.2021 to 25.03.2021	Dept.
9.0	<u>NEW SS NGR INSTALLATION FOR TR-11 & 12</u>		
	Old & rusted NGR's of 16MVA Transformer 11 & 12 were replaced with new NGR's. Resistance was checked after replacement and found same as before. REF stability, CT ratio test, PS class CT magnetization characteristics & polarity test were done and found in line.	19.03.2021 to 25.03.2021	Dept.
10.0	<u>NEW SS BUSDUCT INSTALLATION FOR TR-11</u>		
	Old & rusted MS bus duct of 16 MVA Tr-11 transformer was replaced with new SS Bus duct. Hipot test was done for 15 minutes & found satisfactorily. IR value Ph-Ph & Ph-E was found to be 50 Gohm before Hipot test, and Ph-Ph & Ph-E was found to be 25 Gohm after Hipot test. Phase sequence was verified in 6.6 kV switchboard and found same. After that transformer was charged & load was shared.	30.03.2021 to 03.04.2021	External agency (M/s Elpro & M/s Swagatika)
11.0	<u>Maintenance of Capacitor Bank I & II</u>		
	De-dusting, bus bar checking & tightness of all inductor unit, Capacitor unit & RVT. Two Nos of Licking capacitor units are also replaced	24.03.2021	Dept.
12.0	<u>Maintenance of Battery Charger & Battery Bank</u>		
	De-dusting, tightness, space heater checking, sealing of panels done. Change over scheme of channel 1 & 2 is checked. Cleaning of all batteries is done and voltage per cell is measured.	28.03.2021	Dept.
13.0	<u>Maintenance of DCDB</u>		
	De-dusting, tightness & checking of DCDB 1 & 2 completed.	28.03.2021	Dept.

14. 0	<u>Maintenance of Siemens make VCB(33 kV & 6.6 kV)</u>		
	Maintenance along with testing of 5 Nos of 33 kV & 8 Nos. of 6.6 kV VCB.	24.03.2021 to 17.04.2021	External Agency (M/s Siemens)
15. 0	<u>Maintenance of Siemens make ACB</u>		
	Maintenance along with testing of 14 No. of Siemens make ACBs installed in MCC-2B, Comp MCC & New DM MCC.	29.03.2021 to 30.03.2021	External agency (M/s Siemens)
16. 0	<u>Maintenance of L & T make ACB</u>		
	Maintenance along with testing of 17 Nos. of L & T make ACB installed in MCC-2A, Fire MCC & Emg PCC	24.03.2021 to 02.04.2021	External Agency (M/s L&T)
17. 0	<u>Maintenance of Schneider make ACB</u>		
	Maintenance along with testing of 1 Nos. of Schneider make ACB installed in PCC.	20.03.2021	External Agency (M/s Schneider)
18. 0	<u>Relay testing</u>		
	13 Nos. of relay testing done in 33kV S/B, 6.6kV S/B & PCC	21.03.2021 to 26.03.2021	External Agency (M/s Adecon)
19. 0	<u>TEMPORARY CONNECTIONS :</u>		
	Temporary connection given for lighting job, extension boards, hand lamp, flood light, welding m/c & belt jointing machine etc.	8.03.2021 to 8.04.2021	Dept.

	<u>ELECTRICAL JOB DONE IN ATR 2021 IN AMMONIA</u>	Duration/ date	Agency/ Manpower
1.0	<u>33 kV Switchgear</u>		
	Dedusting and cleaning of 33 KV Bus Section I & II, Bus bar tightness checking, physical checking of CT & PT, control connection checking, space heater checking and replacement, indication lamp checking and replacement, both section busbar insulation resistance checked between phases and between phase and earth.		Dept.
1.1	Section-I : Ph-Ph:- 430 G ohm and Ph-Earth :- 410 G-ohm.	19.03.2021	
1.2	Section-II : Ph-Ph:- 450 G ohm and Ph-Earth:- 420 G-ohm.	26.03.2021	
1.3	B/C	28.03.2021	
2.0	<u>6.6 kV Switchgear Ammonia S/S</u>		
	Dedusting and cleaning of 6.6 KV Bus Section I & II, Bus bar tightness checking, physical checking of CT & PT, control connection checking, space heater checking and replacement, indication lamp checking and replacement, both section busbar insulation resistance checked between phases and between phase and earth.		Dept.
2.1	Section-I : Ph-Ph:- 270 G ohm and Ph-Earth :- 220 G-ohm.	27.03.2021	
2.2	Section-II : Ph-Ph:- 250 G ohm and Ph-Earth :- 270 G-ohm.	25.03.2021	
2.3	B/C	28.03.2021	
3.0	<u>6.6 kV Switchgear P2O5 S/S</u>		
	Dedusting and cleaning of 6.6 KV Bus Section I & II, Bus bar tightness checking, physical checking of CT & PT, control connection checking, space heater checking and replacement, indication lamp checking and replacement, both section busbar insulation resistance checked between phases and between phase and earth. Section-I : Ph-Ph:- 270 G ohm and Ph-Earth :- 220 G-ohm. Section-II : Ph-Ph:- 250 G ohm and Ph-Earth :- 270 G-ohm.	28.03.2021	Dept.
4.0	<u>Siemens MCC, ABB MCC, GYPSUM MCC, P2O5 MCC MAINTENANCE</u>		
	Cleaning and Dedusting of all MCC, Bus bar and Outgoing terminal Tightness checking, maintenance, checking of control connection, inspection of control terminals CT terminals etc.	30.03.2021 to 06.04.2021	Dept.
5.0	<u>Overhauling of LT Motors :-</u>		
	6 No. of LT motors removal of termination, shifting the motors of from site to Workshop for overhauling, shifting back to site, Termination & DOR checking	16.03.2021 to 05.04.2021	Deptt.

6.0	<u>Transformer maintenance</u>		
	Cleaning of transformer body, Inspection of HT & LT chamber, checking of bushing, arrest of oil leakage, sealing of terminal box & marshalling box of 17MVA & 1250kVA Transformers.	23-03-2021	Dept.
7.0	<u>NEW SS NGR INSTALLATION FOR TR-70 & 71</u>		
	Old & rusted NGR's of 17MVA Transformer 70 & 71 were replaced with new NGR's. Resistance was checked after replacement and found same as before.	20.03.2021 to 26.03.2021	Dept.
8.0	<u>Maintenance of Battery Charger & Battery Bank</u>		
	De-dusting, tightness, space heater checking, sealing of panels done. Change over scheme of channel 1 & 2 is checked. Cleaning of all batteries is done and voltage per cell is measured.	05.04.2021	Dept.
9.0	<u>Maintenance of Siemens make ACB</u>		
	Maintenance along with testing of 7 No. of Siemens make ACB's installed in new Siemens MCC.	31.03.2021	External agency (M/s Siemens)
10.0	<u>Maintenance of L & T make ACB</u>		
	Maintenance along with testing of 8 Nos. of L & T make ACBs installed in Gypsum & P2O5 MCC.	25.03.2021 to 30.03.2021	External Agency (M/s L&T)
11.0	<u>Relay testing</u>		
	11 Nos. of relays installed in 6.6 kV S/B, Gypsum MCC & Siemens MCC were tested.	05.04.2021 to 07.04.2021	External Agency (M/s Adecon)
12.0	<u>TEMPORARY CONNECTIONS :</u>		
	Temporary connection given for lighting job, extension boards, hand lamp, flood light, welding m/c & belt jointing machine etc.	8.03.2021 to 8.04.2021	Dept.

