
 * I F F C O *

KALOL UNIT

PLANNING SECTION
 MAINTENANCE DEPARTMENT
 REPORT NO.15/1995

R E P O R T
 O N

R L A N T - T U R N A R O U N D

J A N U A R Y - 1995

INDIAN FARMERS FERTILISER CO-OPERATIVE LIMITED

I N D E X

2

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PLANT - TURNAROUND - JANUARY - 1995GENERAL - DETAILS

SR. NO.	CATEGORY	QUANTITY
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EQUIPMENT UTILISED :

01	IFFCO :	
	55 T HM Crane	01
	15 T Coles Crane	01
	18 T Tata Crane	01
	03 T Forklift	03
	Truck	01

02 IFFCO - MANPOWER :

a)	Mechanical	3	
b)	Mechanical Services	3	Existing
c)	Electrical	3	strength
d)	Instrument	3	
e)	Trainees in various trade		

Hired - CONTRACT MANPOWER

Sr.No.	Category	Mandays
01	Fitter	235
02	Fabricator/Grinder	112
03	Rigger	417
04	Welder NIBR	67
05	Carpenter	10
06	Semi Skilled labour	479
07	Unskilled labour	811
08	Welder IBR	24

Hired - IFFCO LINE OFFICE

Labour unskilled	592 Mandays
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THE PLANT TURNAROUNDS AT A GLANCE

YEAR	AMMONIA - PLANT			UREA - PLANT			REASON IF ANY			
	PERIOD FROM	TO	DOWN TIME DAYS	FROM	TO	DOWN TIME DAYS				
			HRS			HRS				
			====			====				
1	1975	06-05-75	21-05-75	16	-	06-05-75	21-05-75	16	-	Planned
2	1976	26-03-76	20-04-76	26	-	26-03-76	26-03-76	26	-	Planned
3	76-77	05-12-76	22-01-77	49	-	05-12-76	24-02-77	51	-	101-JT B/I
4	1978	21-02-78	15-03-78	23	-	21-02-78	25-03-78	31	-	101-BJ B/I
5	1979	21-05-79	30-06-79	41	-	10-05-79	01-08-79	82	-	K-1101/2, 3rd Stg. Cylinder
6	1981	12-04-81	10-05-81	29	-	08-04-81	12-05-81	35	-	101-B (P) Headers
7	1984	01-01-84	25-01-84	25	-	01-01-84	25-01-84	25	-	Planned
8	1986	19-03-86	03-05-86	45	-	04-03-86	01-05-86	59	-	Reformer Revamp. Scrubber
9	1987	12-04-87	03-05-87	21	-	12-04-87	02-05-87	20	-	Planned
10	1988	18-04-88	14-05-88	27	-	18-04-88	13-05-88	26	-	Planned
11	1990	05-02-90	05-03-90	29	688.67	31-01-90	07-03-90	35	829.0	Planned
12	1991	24-02-91	13-03-91	18	429.08	23-02-91	14-03-91	20	459.25	Planned
13	1992	03-11-92	03-12-92	30.6	734.91	03-11-92	04-12-92	31	744.75	Planned
14	1993	12-09-93	23-10-93	42	986.50	12-09-93	29-10-93	47	1120.58	Revamp
15	1995	14-01-95	27-01-95	14	311.34	11-01-95	26-01-95	16	352.18	Scrub H-120
						31-01-95	05-02-95	06	123.50	HP Strip H-12

P R E F A C E

In Urea Plant, carbamate leakage was noticed from HP scrubber - H-1203 through weep hole near liquid outlet nozzle C-2 on 11.01.95. It was confirmed that the leakage was through the SS liner. The plant was stopped at 23.00 hrs. on 11.01.95. As per our past experience, dismantling, inspection, liner repair, testing and final boxing-up of HP scrubber was expected to take approximately 15 days and accordingly, total plant shutdown was planned. The Ammonia Plant also stopped at 14.00 hrs. on 14.01.95 in order to carry out waste heat boiler inspection to facilitate continuous operation until March 1996. Additionally, following jobs were also undertaken.

AMMONIA PLANT:

1. Inspection of Air Compressor Train - 101-JI, 101-JR, 101-JLP and 101-JHP.

2. Preventive maintenance of NG Compressor and its Drive Turbine - 102-JI and 102-JT.

3. Inspection and coupling inspection of Syn. Gas Compressor Train - 103-JAT, 103-JLP and 103-JHP. Overhauling of 103-JBT Governor.

4. Preventive maintenance of ID Fan Train - 101-BJT, 101-DJR and 101-BJ.

5. Inspection of Refrigeration Compressor Train - 105-J.

6. Eddy current scanning of 156 Nos. of reformer tubes in Primary Reformer.

7. Replacement of 36 Nos. of burner blocks and 30 Nos. of tunnel slabs in Primary Reformer.

8. All the holes of the distributor plate in path of flue gas were enlarged to the largest size to that of existing one in Convection Section of Primary Reformer.

9. The Heat Exchanger 127 CA/CB and 131 JC were cleaned by hydrojetting, tested and boxed up after plugging leaky tubes.

10. Boiler inspection by CIB of Waste Heat Boiler 101 CA/CB and Low Pressure Boiler 112-C.

11. CO₂ strippers (102 EA/EB) were opened for inspection to check high carry over of MEA. In 102 EA, about 31 Nos. of damaged trays were replaced by fabricating new trays in our Workshop. Also dislocated inlet distributor was repaired. In 102 EB, inlet distributor and weir plate were repaired.

12. Inspection of bottom shell of CO₂ Absorber 101-E which was repaired in September 1993 shutdown was carried out and found to be in good condition.

13. Inspection of Secondary Reformer Brick Dome (103-D), steam drum (101-D) and some critical pipe lines were carried out.

UREA PLANT :

HP Scrubber - H-1203 was attended for liner leakage. The collapsed off gas pipe of top dome was replaced by cutting and re-welding a new SS 316L, SCH.80 pipe.

Bearing and coupling inspection of CO2 Centrifugal Compressor and its Drive Turbine - (K-1101-1 & Q-1101-1).

Bearing checking of CO2 Reciprocating Compressor Drive Turbine - Q-1101-2.

Bearing inspection of Prill Tower Fans (K-1401 - 1 to 4).

Complete cleaning and inspection of main lube oil tank (T-1111) of CO2 Reciprocating Compressor.

About 14 Nos. of vessels were opened for internal inspection.

Plate heat exchanger H-1206 was opened, cleaned and boxed-up, after hydrotest.

Boiler inspection by CID of 4 ata Drum (V-1501).

Urea Reactor V-1201 was opened for inspection of bottom hemisphere liner which was replaced by M/s. L & T in September 1993 shutdown. The over all condition was found good. About 60 Nos. of damaged "J" bolts were replaced by new ones between compartment No.7 and 10. Also 01 No. of distorted segment in tray No.10 was rectified.

Top hemisphere and its internals of new HP Condenser - H-1202 supplied by M/s. L & T and installed in September 1993 shutdown were inspected and found to be in good condition.

About 09 Nos. of Heat Exchangers were cleaned by hydrojetting.

RV-1201 A/B/C were tested and installed in position with a new fabricated common header.

M-1403 Conveyor belt was replaced by new one.

OFFSITES PLANT :

Overhauling of BFW pump turbine (Q-5111) and DM Pump was carried out.

Preventive maintenance of CW Pump (P-4402), CW Pump Turbine (Q-4401-A/B), CW Pump (P-4401 A/B) and FD Fan (K5113) was carried out.

BHEL Boiler - RAH Unit Hot End heating elements were replaced.

B & MH PLANT :

Preventive maintenance of Reclaim Machine - M-2116.

Conveyor belts M-2110 and M-2121 were replaced by new ones.

CIVIL JOBS:

Refractory work in Radiant Section of Primary Reformer and Auxiliary Boiler.

Epoxy painting on RCC surface at Prilling Room, lift cabin and Prill tower top structure of Urea Plant was carried out.

Araldite lining on scrapper floor of Urea Plant prill tower was carried out.

Fibre reinforced vinyl ester lining on the side and bottom of weak effluent drain from Cation-V to outlet manhole was carried out.

FRP and HDPE pipe line was laid from Cation-IV to Degasser.

Araldite/Hardner lining in drains and chambers of PMB and SMB areas was carried out.

Wood work repair in cooling tower.

ELECTRICAL JOBS:

Preventive maintenance of transformers, feeder compartments and ACBs of Ammonia, Offsites, Urea and B&MH Plant MCCs.

Overhauling of critical motors of respective plant.

Preventive maintenance of 66 KV, 11 KV OCBs, MCCBs and VCBs.

INSTRUMENTATION JOBS:

Critical control valves of Ammonia, Urea and Offsite Plant were overhauled.

Pressure transmitters were calibrated.

Control Room instruments and field instruments were inspected and thoroughly cleaned.

MAJOR JOBS DONE BY TECHNICAL DEPARTMENT:

Minor modification in Ammonia Plant like Hook-up of Low Temperature Cooling Water supply to 129-JC and 130-JC through 128-JC was carried out.

Installed a Oil Separator on Ammonia line to 128-JC and 129-JC.

Installed 4" NB bye-pass control valve on cooling water return line from H-1352.

Extension of 6" NB Drain/Discharge line for disposal of chromate sludge from existing chromate sump to Malathion Plant sump.

The plant shutdown jobs on account of HP Scrubber were completed and Urea Production was lined up on 26.01.95 at 17.30 hrs. Ammonia production was lined-up on 27.01.95 at 13.30 hrs. However, high levels of ammonia, CO₂ and conductivity were observed in the steam/condensate on shell side of HP Stripper (H-1201) and related loop of Urea Plant. Hence, the Urea Plant was stopped again on 31.01.95 at 20.00 hrs. for inspection of HP Stripper (H-1201) and Re-circulation Heater (H-1204).

HP Stripper (H-1201) top cover and all the ferrules were removed. The leakage through a pin hole on tube to tube sheet seal weld joint of tube No.1712 was noticed at top tube sheet, on pressure test. Thorough inspection of all the tubes and tube sheet seal weld joints and tie-rod seal weld joints was carried out and following was observed which were repaired by welding.

- Tube No. 1712 was found leaking through a pin hole.
- 37 Nos. tubes were found severely eroded on tube to tube sheet seal weld joint.
- 04 Nos. tubes were having pin hole defect on tube to tube sheet seal weld joints.
- 05 Nos. tie-rods were having defect on fillet weld with tube sheet due to pin hole defect.

Finally, hydrotest from shell side was carried out at 35 kg/cm² and no leakage from both the tube sheets was noticed. The stripper was finally boxed-up and Urea production was lined-up on 05.02.95 at 22.45 hrs.

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SHUTDOWN REPORT - JANUARY - 1995

PLANT - AMMONIA

MECHANICAL JOBS

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SR.NO. DESCRIPTION

(1) (A) 101-J / JT / JR AIR COMPRESSOR TRAIN :

(a) 101-JT :

Front end journal bearing was opened. Pads were found in good condition. The clearance was checked and bearing was boxed up.

Thrust bearing was showing high temperature of the order of 120 - 125 Deg.C on panel. Hence thrust bearing was opened. Active side thrust pads were found worn out. In one pad the white metal lining had seemed to have passed through plastic state & flowed outwards. The pads were replaced with new ones and thrust bearing clearance was adjusted. Final clearances were as follows.

- (1) Journal bearing(Front) - 0.008" (0.007" - 0.009" Recommended)
- (2) Thrust bearing - 0.010" (0.009" on panel) (Recommended 0.008" - 0.012")

(b) 101-JLP :

Thrust end (North side) journal bearing was opened for high shaft vibrations. The journal bearing pads were found to be in good condition. The clearance was also within the specified limits. Hence the bearing was boxed up. The axial float of 101-JLP was checked and found to be 0.014" which was within the specified limits. The active and inactive side thrust bearing pads were also in good condition. Final clearances were as follows.

- (1) Thrust end journal bearing - 0.008 (Recommended 0.005" - 0.008")
- (2) Thrust bearing - 0.014" (Recommended 0.011" - 0.015")

(c) 101-JHP :

End play of the 101-JHP case were checked and found to be 0.31 mm which was within the specified limits.

(d) 101-JR :

End play of both low speed and high speed shafts were checked and found as follows.

- (1) L.S.shaft - 0.35 mm
- (2) H.S.shaft - 1.10 mm

SR.NO.	DESCRIPTION
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(e) 101-JLO Coolers :

End covers of all the three lub oil coolers were opened and tube side was cleaned by hydrojetting.

(f) 101-J/105-JLP Pump :

The turbine was decoupled from the pump and coupling greasing was done.

NOTE :-

All the three oil lubricated gear couplings were opened and found to be severely choked with sludge. The couplings were found not to have any float. All the three couplings were cleaned thoroughly and boxed up. The gear teeth condition was found to be good.

(1) (B) 102-J/JT NG COMPRESSOR TRAIN :

(a) 102-JT :

The coupling was opened and cleaned. The gear teeth condition was found to be good. Following jobs were done.

- (1) Turbine axial float was checked and found to be 0.16 mm which was within the specified range (0.16 mm - 0.24 mm).
- (2) Overspeed tester oil seal was leaking which was arrested.
- (3) Oil hose of HP servomotor oil drain was leaking which was replaced with new one.
- (4) Union of the line connected to turbine casing for steam chamber pressure gauge connection was leaking. This leak was arrested by replacing / rerouting the line upto isolation valve.
- (5) Both governor oil filters were replaced with new ones.
- (6) Both suction strainers of lub oil pump were opened, cleaned and boxed up.
- (7) The oil line & orifice of the secondary oil line connected to L.P.I. servomotor was cleaned thoroughly to avoid chocking which causes closing of CP-1 nozzle while in operation.

SR.NO. DESCRIPTION

(b) 102-J :

The thrust bearing pad temperature was showing high temperature on panel (of the order of 114 deg.C / 115 deg.C). The thrust bearing was opened and the active side thrust pads were found worn. The axial clearance was found to be 0.375 mm which was more than the specified. Hence the active side thrust pads were replaced with the new ones. Final axial clearance obtained with new thrust pads was 0.30 mm which was within the specified limits. (0.25 - 0.35 mm). Both the journal bearings were opened and found to be in good condition and the clearances were found to be 0.0045" which was acceptable.

(1) (C) 103-JAT/JBT/J SYN.GAS COMPRESSOR TRAIN :

(1) 103-JAT :

Thrust end journal bearing shaft vibrations were running high (3.7/3.8 mils). Hence the bearing was opened and inspected. The same was found to have little increased clearance (0.013"). The pads were also found to have rubbing marks. All the pads were replaced with new ones and the final clearance obtained was 0.011" which was within the specified (0.010" - 0.012").

The base ring of the thrust end journal bearing was having a shim of 0.003" thickness on it to make it tight within the bearing housing. This shim was removed, the partition plane of the bearing housing was lapped and finally the blue match was checked on the outer surface of the base ring. 100% blue match was obtained and then the bearing was boxed up.

The thrust bearing clearance was checked & found as 0.010" which was on higherside. The active side pads were replaced and new shim was made to maintain a final clearance of 0.009". (Specified range 0.008" - 0.012")

(2) 103-JBT :

The governor was opened for attending the problem of less speed governor oil pressure. The internal bearings, guide plate, seat etc. were found in damaged condition. Following parts were replaced with new one.

Part No.	Item	
86	Guide plate - 1 No	} Ref. IMO Delaval
99	Bushing - 1 No (Made in W/shop)	
102	N.D. Ball bearing - 1 No	} Drg. F-6046-10
107	Seat - 1 No	
115	N.D. Ball bearing - 1 No	} C-62652-1

SR.NO.	DESCRIPTION
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All the orifices in the oil lines were cleaned and again put into respective positions.

The axial float of the turbine rotor was found to be on the higher side (0.016") However the thrust pads were found to be in good condition. New shim was made to adjust the axial clearance of thrust bearing to 0.010" (Specified range 0.008" - 0.012")

The coupling guard between 103-JAT & 103-JBT was not sealing the oil properly. To attend the problem, oil leakage through this coupling guard, both the halves of the coupling guard were removed from their position. The area of the "O" ring was checked thoroughly for any looseness in "O" ring, the "O" ring portion was found to have about 1mm clearance at some places causing the oil leakage. The same was taken to workshop. The I.D of coupling guard in "O" ring area and OD of mating area were machined to have a uniform clearance of 0.014". So the proper "O" ring seating / tightness is ensured. The same was reinstalled after machining.

Yoke of 1 No. hand valves of 103-JBT was found broken which was welded and the valve was made operable.

(3) 103-JLP :

The axial float of the rotor was checked and found to be 0.40 mm which was within the specified range (0.381 mm - 0.559 mm)

(4) 103-JHP :

Prior to shutdown, the axial displacement of the 103-JHP case was noticed as 16/17 mills on panel. To confirm the wear on the thrust pads because of high axial displacement, the thrust bearing was opened. However the thrust pads were found to be in very good condition. The axial float of the rotor was also 0.43 mm which was within the specified limit (0.381 mm - 0.559 mm) Hence the same was boxed up after polishing the thrust pads.

All the three coupling of the 103-J train were decoupled and cleaned. The gear teeth condition of all the couplings were found to be okay. The same were boxed up after cleaning of the teeth.

(5) 103-JLD/SO PUMP :

Motor of the motor driven pump was replaced by Electrical section. The same was aligned with seal oil and lub oil pump.

- Both sets of 103-J lube oil filters were replaced.

- Tube bundles of 103-J lub oil coolers were pulled out and the same were cleaned internally and externally by hydrojetting.

SR. NO. DESCRIPTION

(1) (D) 105-J REFRIGERATION COMPRESSOR TRAIN :

All the couplings of 105-J Train were opened, cleaned and boxed up. The sludge deposition on the gear teeth of the couplings was very hard and all the three couplings were found jammed with sludge. However the gear teeth of all the three couplings were found in good condition.

The axial float of all the three rotors was checked and noted down. The axial float of 105-JHP case rotor was found to be on the higher side (0.015"). The same was adjusted by new shim as thrust pad condition was found to be satisfactory. Final axial floats were recorded as follows.

105-JT	0.010"	(Recommended - 0.008" - 0.012")
105-JLP	0.013"	(Recommended - 0.011" - 0.014")
105-JHP	0.010"	(Recommended - 0.009" - 0.013")

(3) 101-BJ ID FAN :

(01) 101-BJT :

Both the turbine bearings were opened. The condition was found to be okay. However the clearances was found to be 0.012" which was higher than the recommended range of 0.007" - 0.009". Hence both the bearings were replaced with new ones and finally the journal bearings clearance was obtained as 0.009" in both the bearings. The axial float of turbine rotor was checked and found to be 0.014".

(02) 101-BJ :

Both the journal bearings of the fan were inspected and found to be in very good condition. The clearances in both the bearings were found to be 0.013". The axial clearance for the fan was found to be 0.034".

Both the lub oil coolers of the common oil console for 101-BJT and 101-BJ were cleaned thoroughly from tube side by poking and water jetting and boxed up.

The couplings between turbine to gear box and gear box to fan were opened, cleaned, regreased and boxed up. The gear teeth condition was found to be okay.

(03) 101-BJR :

The gear box was opened for inspection of internals. The condition of the internals was found to be good. Console oil of the gear box was found blackish and hence changed completely. The oil cooler for gear box was also cleaned from tube side. Following were the clearances found.

SR.NO. DESCRIPTION

Backlash between gear and pinion : 0.013"

Journal bearing clearances of HS & LS shafts of gear box. : 0.0075" to 0.008"

(12) PRIMARY REFORMER :

(1) Reformer Radiant Section :

Eddy current scanning of 1st and 8th row of complete tubes alongwith scanning of 12 tubes in each of remaining rows were carried out by Inspection team of M/s.IFFCO Anila as per the guidance of IFFCO Kalol inspection deptt. and the details are available in Inspection report.

- Header insulation inspection and repair of the damaged portion were also carried out.
- Damaged tunnel slabs were also replaced (approx. 30 Nos)

(2) Reformer Pent House :

On inspection, 82 nos of burner blocks were found to be damaged badly or fallen down. It was decided to replace these damaged ones with available 36 sets of segmental refractory burner blocks. Replacement pattern were as under.

Row No.	Total no of burner block found damaged	Total number of blocks replaced
01	9 Nos (3,4,8,9,10,11,12,13 & 14)	-
02	8 Nos (3,4,5,6,8,11,12 & 13)	-
03	6 Nos (1,2,3,4,5,7,8,9,10,12, 13 & 14)	12 Nos (301,302,303, 304,305,307,308,309, 310,312,313,314)
04	6 Nos (4,7,9,10,11 & 13)	-
05	8 Nos (2,3,4,7,8,9,11 & 12)	3 Nos (502,503,504)
06	12 Nos (1,2,3,4,5,6,8,9,10, 11,12 & 13)	8 Nos (603,606,608, 609,610,611,612,613)
07	11 Nos (1,2,4,6,7,8,10,11, 12,13 & 14)	6 Nos (704,708,710, 711,712,714)
08	10 Nos (2,3,4,5,6,9,10,12, 13 & 14)	5 Nos (803,806,810, 812,814)
09	6 Nos (5,10,11,12,13 & 14)	2 Nos (912,914)

SR.NO. DESCRIPTION

Following naphtha needle valves were replaced.

306,403,404,714,912 and 914

Following atomising steam valves were replaced

306,507,509,607

(3) Convection section : HT & LT

Damaged top wall plate of flue gas outlet from tunnel No.1 was replaced by a new one with proper insulation of LHV.

All the holes of distributor plates in the path of flue gas from Aux.Boiler were made to the largest size as that of the existing. Also structural grid bars existing over L.T.Superheater Coils were removed by cutting.

All the five panels on the C.T.side of L.T.section were removed for cleaning the coils by pressurised air. After cleaning these coils which were laden with thick carbon, provision for steam flowing to BFW coils were made.

Repair of damaged L.H.V. insulation around L.T. & H.T. area were also carried out before boxing up.

(13) HEAT EXCHANGERS :

The following heat exchangers were opened for inspection and suspected leak.

a) 127-CA & CB :

These exchangers end covers were opened and observed to have tubes choked to a great extent from the C.W. inlet side. The debris were removed and both heat exchangers were subjected to hydrojet cleaning at 400 Kg/cm² pressure for approx. 3 1/2 days before hydrotest. Both were hydrotested at 25 Kg/cm² (pressure) and 1 No of tube in 127-CA was found leaking. (3rd tube in fifth row from top from Air Compressor side) The same tube was plugged and boxed up. No leakage was observed 127-CB (CT side) during hydrotest at 25 kg & then boxed up.

b) Air compressor interstage cooler - 131-JC :

This was opened up for cleaning and inspection. During opening the end covers, heavy leakage of tubes were observed and on hydrotest at 7 kg/cm² pressure, 15 nos of tubes were found leaking. Attempt was made to remove 1 no leaky tube and insert new tube as a trial for retubing. But it could not succeed due to tube cracking inside tube sheet while pulling and hence it was decided to cancel retubing programme. So all the leaky tubes were plugged and hydrotest was carried out at 7 kg/cm² pressure and it was found okay. The total no.of tubes plugged so far is 15 + 6 = 21 Nos (6 Nos were already plugged earlier)

 SR.NO. DESCRIPTION

(14) STEAM LEAK JOBS :

Various critical steam leak jobs were also attended as per production department list.

(15) BOILER INSPECTION :

IBR Open inspection of GT-1631 (112-C) as well as GT-1632 (101-F) were carried out on 18/01/95 and on 19/01/95, these were offered for hydrotest and the test pressures were as under.

GT-1631 (112-C) - 15 Kg/cm² (g)

GT-1632 (101-F) - 125 Kg/cm²(g)

R.V.popping of steam drum RVs as well as Superheater R.V.'s were carried out on 20/01/95 and the values are as under.

	North R.V.	Middle R.V.	South R.V.	Superheat R.V.
POP pressure Kg/cm ² (g) (Control room reading)	118	115.5	112.0	112
Reset Pressure Kg/cm ² (g)	114	111.0	110.5	110.5

Note :- Alongwith the IBR inspection of 112-C, the north domecover gasket was also replaced due to leakage problem.

(17) REPLACEMENT OF RV'S :

1) R.V.NO.103-D NRV was having problem of chattering and hence it was opened up for inspection and repair. On opening, it was found to have its flapper pin worn out badly alongwith its square shaped brg. brackets.

New pin were made and brg.bracket were repaired to suit accordingly. NRV was boxed up with new gasket.

2) RV - 104 D2 were also replaced by new tested RV since the original installed one was suspected passing.

(19) VESSEL INSPECTION & REPAIR :**(A) 102-EA & 102-EB CO₂ STRIPPER - INSPECTION & REPAIR :**

Production department were observing operation problem of high MEA carryover in CO₂ from stripper. Hence for inspection purpose, top and bottom manholes of both these strippers were opened up and the following are the observations.

SER. NO. DESCRIPTION

(a) 102-EA Stripper :

- (1) Both the distributor headers alongwith rich MEA inlet pipe line was found dislocated from its positions. Pipe clamps were found dislocated from its position alongwith its bolts.
- (2) Central I-beam support has fallen down after damaging the fastner bolts.
- (3) Supporting plate of distributor header was also found to have craked from old repair joints.
- (4) The centre sieve trays (ie C5 & D5) were found damaged and detached from its fastening position in all the compartments on both the sides (East & West)
- (5) Cracks in some tack welding areas of different trays were observed at different locations.

As a repair measure, all the trays which were fallen down and were reusable were salvaged and reused in proper places. Altogether the following were the details of new trays fabricated in workshop and installed.

Tray No. C-5	--	23 Nos
Tray No. C-3	--	01 No
Tray No. C-4	--	07 Nos

(b) 102-EB Stripper :

This also was opened for inspection and following are the observations.

- (1) One number of partition plate on east side seal pan was damaged from its welding.
- (2) Some fastening bolts of I-beam and distributor header was found loose.
- (3) A crack was observed near inlet nozzle welding on the parent metal of 4" length.
- (4) Demister pad was found in good condition.

The above problems were rectified and the vessel was boxed up.

SR.NO. DESCRIPTION

(B) 101-E CO2 ABSORBER INSPECTION :

Both the top and bottom manholes were opened for inspection of the shell weld repairs and coatings executed in Sept,1993 shutdown. The welded and clad portions were found to be in good condition & hence the vessel was boxed up without any other inspection and checking.

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PLANT - AMMONIA

INSPECTION JOBS

S/R.NO.	DESCRIPTION
41 (A)	<u>PRIMARY REFORMER :</u>
(1)	<u>RADIANT ZONE.</u>
	Visual inspection of bottom header insulations, tunnel slabs, burner blocks and roof insulation was carried out. The findings are as follows:-
	a) <u>Bottom header insulation.</u>
	Bottom header insulation was found damaged at different locations in each row.
	Row No.1 : Insulation was partly damaged at the bottom location between Tube No.21 and Riser tube. Below tube Nos. 27 & 28 and 33 & 34 insulation was partly damaged.
	Row No.2 : Insulation was partly damaged at bottom portion below tube No.4, between tube No. 17 & 18 and between tube No. 34 to 39.
	Row No.3 : Header end plug (south side) insulation was found damaged. Insulation was found to be damaged at bottom portion between tube No. 5 to 13, tube Nos. 22 to 25 and tube No. 28 to 32.
	Row No. 4 : Insulation was partly damaged at bottom locations between tube No. 1 to 15, 19 & 20, 23 to 30. Also bottom header has exposed below tube No.21 to 23.
	Row No.5 : Insulation was found damaged partly at bottom location near tube No. 22 and 23 and also near riser tube. Also insulation was completely damaged and the header was exposed between tube No. 25 to 33.
	Row No. 6 : Insulation was completely damaged and the header had been exposed between tube No. 27 to 32.
	Row No.7 : Insulation was found to be partly damaged at bottom locations near tube No.4,7,,12,13,22,26,27 & 28.

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Row No. 8 : Bottom header had been exposed between tube No.22 to 39. Insulation was partly damaged at bottom location between tube No. 1 to 3 and 16 to 21.

b) Tunnel Slabs.

Most of the Tunnel slabs were found in good condition. Totally 18 Nos. of Slabs were found cracked/damaged in different rows and needed replacement.

c) Burner Blocks :

Top Burner Blocks were found damaged at different locations and the details are as under:-

Burner Row No.	Burner Block Nos.	Qty. (Nos)
1.	3,4,8,9,10,11,12,13,14	9
2.	3,4,5,6,8,11,12,13	8
3.	1,2,3,4,5,7,8,9,10,12,13, 14	12
4.	4,7,9,10,11,13.	6
5.	2,3,4,7,8,9,11,12	8
6.	1,2,3,4,5,6,8,9,10,11,12,13	12
7.	1,2,4,6,7,8,10,11,12,13,14	11
8.	2,3,4,5,6,9,10,12,13 14	10
9.	5,10,11,12,13,14	6
Total :		82 Nos.

d) Roof Insulation:

In general, the condition of roof insulation was found to be good except some minor damage near burner block No.11 & 12 in row No.6.

e) Riser Tube Canister:

Row No. 1 : Bottom ring of the Canister was found to be damaged and insulation had exposed.

Row No. 2 : --- do ---

SR.NO.	DESCRIPTION
Row No. 3	: --- do --
Row No. 4	: -- do ---
Row No. 5	: Found okay.
Row No. 6	: Bottom ring damaged and insulation was exposed and part of the insulation material has detached from its location.
Row No.7	: Found okay.
Row No. 8	: Bottom ring damaged and the insulation material had exposed.

All the above findings were intimated to concerned maint. Engineer and Plant Shift Engineer for necessary repair and rectification.

41 EDDY CURRENT SCANNING OF REFORMER CATALYST TUBES :

After Reformer Revamp in Sept.-Oct 93, the furnace was running continuously without any stoppage. Therefore during this shutdown it was decided to scan the catalyst tubes by eddy current method to reveal any deterioration in the tubes after a continuous service for 1 year and 3 months period approx. The details of tubes scanned are as mentioned below:-

Row No.	Tube Nos. (South to North Side)	No. of Tubes scanned. (Nos.)
1	1 to 42	42
2	1,2,3,15,16,21,22,27,28,40,41,42.	12
3	-do-	12
4	-do-	12
5	-do-	12
6	-do-	12
7	-do-	12
8	1 to 42	42
Total Nos. of Tubes Scanned		: 156 Nos.

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OBSERVATION:

Only 156 Nos. of tubes were scanned out of 336 tubes due to time limitation. Out of 156 Nos. tubes scanned, only 20 tubes embarked some indications of abnormality having the corresponding number of divisions on defect channel plotting along with the location are given as under :-

Tube No.	Div.	Direction	Location
106	13	East	Below weld D
126	12	West	Above weld D
127	15	West	Above Weld C
142	13	West	Below weld D
203	12	West	Above weld D
415	14	West	Below weld C
440	18	West	1.5 feet above weld D
441	13	West	Mid of weld C & D
515	13	East	Above weld C
522	15	East	Above weld C
542	11	East	Above weld C
627	13	East	Above weld D
740	15	East	Mid of weld C & D
804	18	West	Above weld C
812	14	West	Near to Top
819	10	West	Above weld C
834	16	West	Near to Bottom
836	29	East	Just below C
837	11	West	Near to Top
839	15	West	Above weld C

The tube No.440, which had 18 Divisions on Defect channel tracing was inspected by Radiography after the removal catalyst for the severity of defect/damage at 1.5 feet above weld D for 1.25 feet in length. No appreciable flaw was observed in the Radiograph of this particular tube. Creep was also measured on the affected area of tube No.440 and it was found to be less than 1%. No other abnormality was observed on the surface of this tube during visual inspection.

Tube No.836, which had max. division of 29 on defect channel tracing could not be radiographed due to non-availability of time.

In general, defect signal plotting on the recorder were showing more deviation and fluctuations in comparison to the previous scan readings of new tubes.

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On random visual inspection of catalyst tubes it was noticed a hole of 2mm dia and 1.5mm deep on the surface of tube No.333 approx. at 1.25 meters below weld 0. This tube was also scanned by eddy current but no abnormality was recorded in scanning.

CONCLUSION :

Considering the results of Radiography on tube No.440 in conjunction with the results of eddy current testing, it can be concluded that the overall condition of Reformer tube is satisfactory.

3. DPT OF OUTLET MANIFOLD JOINT:

DPT of outlet manifold joint was carried out only on one butt weld joint (i.e. northside butt weld between tube No.27 & 28) on row No.3,5,6 & 8 where the manifold insulations were found damaged completely.

4. Measurement of Bottom Header Clearance from Furnace floor was carried out. The readings were recorded.
5. Outlet manifold drain readings were recorded in cold condition for all the eight rows.
6. Cold reading was recorded for all the spring hangers of catalyst tube.

41 (B) HT & LT CONVECTION ZONES:

HT Convection Zone:

Visual inspection of wall refractories and coil supports were carried out and the observations are as under:-

1. Stainless Steel sheet provided on ceramic fibre blanket insulation had got badly corrugated due to bulging at different locations.
2. One piece of SS sheet of approx. 1 feet X 1.25 feet size had damaged from north wall west side bottom cover causing direct exposure of fibre blanket to flue gases.
3. Greenish blue colouration was observed on the surface of the tubes of the mixed feed coil at the location of the supports.
4. The mixed feed coil appeared to have got shifted towards west side by approx. 2 inch.
5. White powder deposition was observed on the surface of the coil tubes.

SN.NO.	DESCRIPTION
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6. Thermowell pipe Nos. 3,4,6 & 7 were found to be bent.
7. Castable refractory material was peeled off from the west side ceiling roof of compartment between radiant zone and HT convection zone. The area was approx. 3 feet X 2 feet which caused burning of metallic plate of the ceiling.
8. Layers of castable refractory material had come out from various places causing exposure of reinforcement anchors to flue gases.

L.T. CONVECTION ZONE :

Visual inspection of wall refractories and coil supports was carried out, the details of which are as under :-

1. Thick layer of blackish deposit was observed on Offsite BFW coil tubes.
2. Overall condition of the refractory was good.
3. Fins of bottom most row of Ammonia BFW coil were found damaged near west wall on tube No.1 & 2 (counting from south to north).
4. Some debris of refractory material were found lying on the casing bottom of I.D.fan.
5. On BFW coil (Ammonia) second support from east end was found cracked between tube No. 1 to 4 (counting from south to north).
6. Ultrasonic thickness measurement of the coil bends at east side was carried out.

41 (C) SECONDARY REFORMER (103-D):

Visual inspection of bottom dome brick lining of secondary reformer and waste heat boiler inlet nozzles was carried out.

1) BOTTOM DOME BRICK

1. One dome brick was found damaged on 2nd circle from centre due to spalling. The depth of damage was found to be about 3 inch.
2. 9 Nos. of holes were partly choked on dome brick.
3. Minor damage was noticed on dome brick due to spalling between 7th and 8th circle towards south side. Approx. area of damage was 6 inch length X 3 inch width X 1 inch depth.

SR.NO. DESCRIPTION

4. Vertical cracks and minor damage of refractory due to spalling below the skirt liner sleeve and near stub ends of 101CA/CB nozzles was observed.
5. Skirt liner sleeve got buckled towards inside by 2 inch for 18 inch length approx. on north west location.
6. Minor damage of refractory was noticed in the bottom manhole nozzle liner.

(II) INLET NOZZLE OF WASTE HEAT BOILERS :**101 CA**

1. Gas distributor pipe was found cracked along the length at the middle portion (i.e. longitudinal seam) towards west side and bottom half of the liner got buckled towards inside two to three inch approx. at the cracked location. Due to this an opening of 4 inch width approx. has been observed along the cracked portion of distributor pipe.
2. Minor bulging of liner (2nd liner segment from stub end) was noticed at bottom location.
3. Liner stud end got cracked from the welding on 12 inch circumferential length at top location.

101 CB

1. Gas distributor pipe was found cracked along the length at the middle location (i.e. longitudinal seam) on both the sides and bottom half of the liner got buckled towards inside by three inch approx. at the cracked portion. Due to this an opening of 4 inch width approx. was noticed along the cracked portion of the distributor pipe. Extreme corners were found intact for 2 inch length approx.
2. Minor buckling of stub end flange was observed on north side in approx. 10 inch length.
3. One damaged piece of refractory brick was lying in the gas inlet path.

41 (D) STEAM DRUM (101-F)

Visual inspection of steam drum internals and ultrasonic thickness measurement of drum was carried out. The details are listed below.

SR.NO. DESCRIPTION

1. In general colouration was found to be blackish grey. Scattered pittings and mill scale were observed on both the dish ends and also in shell.
2. Holes provided in DFW inlet header pipe were found enlarged to a size of approx. 3/4 inch to 1 inch dia.
3. One bolt with nut was missing on east side first cyclonic scrubber (counting from north side manhole).
4. One bolt with nut was found missing from west side support plate, below 5th cyclonic scrubber and 20th cyclonic scrubber.(counting from north side).
5. On east side support plate, most of the bolts were found loose in 9th & 10th cyclonic scrubber(counting from north end).
6. Ultrasonic thickness measurement report carried out and reading were recorded.

41 (E) CO2 ABSORBER - 101-E:

During revamp-II shutdown i.e in Sept.-Oct. 93 shutdown, repair welding was carried out on shell at the location of severe erosion/pittings between 19th and 20th sieve tray and below 20th tray at 8 locations. The complete shell area below 20th tray and partial area between 19th & 20th tray including all the repair weld areas were coated with titanium putty and brushable ceramic paste to prevent any erosion and corrosion of shell metal.

During this shutdown it was decided to inspect the condition of repair weld and ceramic coating below 20th tray locations by opening the bottom manhole. Inspected the shell surface from inside below 20th tray. Overall condition of repair welding and ceramic coating was found to be good except at few places ceramic coatings was peeled off locally. Other locations between 19th & 20th tray could not be inspected due to non approach conditions since the sieve trays were not removed from top.

41 (F) CO2 STRIPPERS - 102 EA/102 EB:

Visual inspection and ultrasonic thickness measurement was carried out for both the CO2 strippers after the removal of tray segments. The details are as under :-

102 EA

Visual inspection of top compartment was done. Following are the observations.

SR.NO.

DESCRIPTION

1. MEA Inlet pipe flange was found damaged from welding and parent flange metal detached into two segments i.e one segment was intact with two bolts on nozzle flange and the other segment with remaining bolts was found with inlet pipe.
2. Both the distributor headers were dislocated from their clamping positions and shifted towards north side by about 10 inch distance.
3. All the four clamps and their fastening bolts of both the distributor headers were found damaged.
4. Central I-beam support had fallen down after damaging the fastening bolts.
5. North side supporting plate of east side distributor header was found cracked from the old repair welding. Also a crack was noticed in the rib welding of this support plate and this crack had extended to the shell for a length of one inch approx.
6. The centre sieve trays (i.e. C5 and D5) were found damaged and detached from its fastening bolts in all the compartments on both the sides (i.e east and west side)except compartment No. 13, 15, 16 & 17.
7. In first compartment, seal pan trays on west side had got cracked at the edges near partition plate tack welding location.
8. In the second compartment 3 trays including the central tray i.e. D5 were found damaged and detached from its location from east side.
9. In the different compartments, sieve trays adjacent to C5 and D5 were found cracked at the edges.
10. The condition of demister pad was found satisfactory and intact in its position.
11. The shell had assumed blackish coloration all through out.
12. The shell could not be visually inspected due to thick hard and sticky scaling all around inside the vessel.
13. 105CA/111CA nozzles were inspected from inside which were found to be in good condition.
14. Wearing plates were found intact in position at bottom most compartment of the vessel.

SR.NO. DESCRIPTION

15. Bottom dish end and seal pan could not be inspected due to non-availability of approach.
16. Ultrasonic thickness measurement of the shell in all the compartment was carried out and report is attached herewith. (Annexure 6).

Job done after Repair:

MEA Inlet pipeline flange welding and all the remaining repair weldings including sieve trays crack weldings were inspected by DPT.

Total 31 Nos. of sieve trays were fabricated in workshop and installed the same. Tray No. C5 - 23 Nos, C3 - 01 No., & C4 - 7 Nos.

102 EB

1. Distributor header fastening bolts were found loose on west side header.
2. One no. of fastening bolt was found missing from I-beam support plate on east side.
3. On east side distributor header, the south side support plate rib welding was found cracked.
4. Partition plate of seal pan (east side) was damaged from its welding and also the same plate was partly damaged and broken from the repair welding.
5. Demister pad was found to be intact and good condition.
6. In general the condition of sieve trays in all the compartments was found satisfactory and intact in its position.
7. The shell has assumed blackish coloration all through out.
8. Thick sticky and hard scaling was observed all throughout and particularly more in the lower part of the shell.
9. Bottom dish end and seal pan could not be inspected due to non availability of approach.
10. All the repair weldings were inspected by DPT.
11. Ultrasonic thickness measurement was carried out in all the compartments and reading were recorded.

SR.NO. DESCRIPTION

41 (6) MISC. JOBS :

1. During start up of the Plant, a leakage was noticed in the C.W. outlet pipeline (30 inch dia. of 110 CA/C8 (line No. HW-12-30 inch) just above the ground level. After digging surrounding area of the pipeline, it was observed some pinhole leaks at 2 to 3 places (2 to 3 mm dia) of pipe bend.

Thickness measurement was done near the leakage area after thorough cleaning and the Min. thickness was found to be 3 mm. Min. wall thickness on sound area was noticed as 5.0 mm.

It was decided to arrest the leakage by welding a patch plate covering the pinhole area. But the welding of patch plate could not be done due to reduction in wall thickness of parent metal as well as continuous leakage of water. Finally after draining the complete water, welded a pipe piece of 30 inch in length fabricated in two halves (fabricated from 36 inch dia pipe X 6 mm thick) with a circular ring both at the top &

bottom. The inner side of the rings were welded on the parent pipe, such that the leakage area was covered with newly fabricated pipe piece. The complete welds were inspected by DPT. Then this outer pipe along with part of the main pipe was wrapped with Rustech anticorrosion tape.

2. Ultrasonic thickness measurement of following pipelines was carried out.

- a) MS-9-10"
- b) MS-12-8"
- c) MS-13-8"
- d) MS-14-8"
- e) HS-9-8"
- f) HS-12-6"
- g) HS-10-6"
- h) HS-11-6"
- i) PG-14-16"

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CIVIL JOBS

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SR.NO. DESCRIPTION
-----51 (A) AUXILIARY BOILER :

- 1) Dismantling of damaged refractory work on burner phase target wall etc.
- 2) Refractory work by fixing MK-24 insulating bricks near burner No.2,3, & 4.
- 3) Casting of Whythead for repair of burner blocks
- 4) Making target wall
- 5) Repair of manhole

(B) H.T.TRANSITION ZONE :

- 1) Removed damaged insulated casting of ceiling
- 2) Removing of M.S.plate fabricating and welding new M.S.Plate with "V" hold fast.
- 3) Guniting of insulite-11 on ceiling of transition area of HT zone.
- 4) Making curve wall on South corner of H.T.zone.
- 5) Cleaning of H.T. and primary reformer

(C) PRIMARY REFORMER :

- 1) Removing damaged tunnel slabs and fixing new tunnel slabs.
- 2) Crack filling by Cera Wool and Air setting mortar on wall of various location.
- 3) Opening and closing manhole

(D) SECONDARY REFORMER :

- 1) Crack filling , gap filling and troweling refractory plaster on damaged arch brick.

(E) CO2 STRIPPER COOLING WATER OUTLET LINE :

- 1) Dismantling concrete floor
- 2) Excavation & dewatering
- 3) Sand filling in the pit
- 4) Concreting work of flooring

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ELECTRICAL JOBS

SR.NO. DESCRIPTION

- 61 01. Carried out maintenance on transformer 6 for -
- a) Checked and tightened the primary/secondary end terminals of the cables.
 - b) HT Marshalling box was found rusty inside. Oil value was very low. Cleaned and filled with new oil having BDV value of 70 KV.
 - c) Reactivated silicagel in dehydrating breather.
 - d) Checked trip circuits and protection system of transformer.
02. Carried out preventive maintenance of TMG make LT ACBS installed in MCC-5 :
- Replaced defective parts and worn out contacts.
 - Lubricated the mechanism.
 - Checked trip and close timings of CB for uniform closing and opening of breather poles.
 - Checked contact pressure and adjusted as required.
03. Preventive maintenance carried out on MCC-5, 5A/5B :-
- Checked all feeder compartments and replaced defective contactors, contacts, timers, elemex connectors, fuse fittings, isolators etc.
 - Cleaning and tightening of bus bars and cable connections.
04. Overhauled the following motors :
- 103J, 109J, 101 BJT & 102J.
05. Carried out preventive maintenance of all motors operated valves and control panels.
06. Checked terminal boxes of following motors for loose connections, burnt out cable leads and rectified.
- 110J, 113J, 112JA, 112JB, 101/105 CONSOLE OIL PUMP, F1, F2, 101/105J, 106J, 108J, 108JA, 118J, 118JA, 121J, 121JA, 123J, 170J, 170JA, 2004J.

SR.NO. DESCRIPTION

- 07. Provided connection to hydrojetting machines in Ammonia Plant.
- 08. Provided flood light fittings, halogen fittings, hand lamps, welding generator connections, in Reformer, Converter and other places in Ammonia Plant.
- 09. Provided telephone connections and other communication equipments in CO2 absorber and stripper, Reformer etc. in Ammonia Plant.

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INSTRUMENTATION JOBS

SR.NO. DESCRIPTION

71 FOLLOWING INSTRUMENTATION JOBS CARRIED OUT :

- 01 FRCV-2 Gland packing was filled & general maint. of valve, positioner & regulator carried out. Also checked its stroke found ok.
- 02 FRC-1, FRC-2 & FRC-3, general cleaning & maint. of Transmitters, Controllers, Valves, Valve-positioners, regulators & stroke checking were carried out.
- 03 FRCV-12 & FRCV-14 general maint. Air regulator & valve positioner checking, provided clamp/support in FICV-14 so that locknut of yoke should not get loose.
- 04 LIC-1 Leveltrol/Air regulator cleaning & general maint. carried out.
- 05 Eye-eye unit cleaning, general maint. & checking was done, found ground wire and +6 probe wire loose, make it ok.
- 06 FR-95 pitot tube removed for inspection, found ok. Furged with air, also flushed the tapping with water. Shown the pilot tube to production people and fixed back.
- 07 101 J Air Compressor trip power 110V supply dumb switch was not operating, changed its front actuator also 103-J and 105-J dumb switches checked and serviced.
- 08 PRA-8 Tx output reading was not matching with C/R recorder reading. Leakage in tubing traced in field and rectified. After this both local as well as C/R readings are matching and this was shown to production people.
- 09 LICV-14, FICV-15, V-1 & V-5 & TRCV-11 gland packing was done by new packings. Also general maint. of Valves, positioners, regulators carried over. Checked their stroke also.
- 10 As a preventive maint., Air header flushing in C/R and at various locations in field was done. General maint. of Air station filter regulators behind C/R panel was also carried over.
- 11 On PIC-1 transmitter impulse line second isolation valve provided.
- 12 PIC-13A/B control valves/positioner/air regulator general maint, and stroke checking carried out.
- 13 PT-2 (electronics) transmitter impulse line second isolation valve leakage rectified.

SR.NO.	DESCRIPTION
14	N.G. Compressor Annunciator 2 : power supply unit changed with repaired one as original p/s unit was not giving 12-V supply and checked the performance of both annunciators i.e. 1 & 2, found ok.
15	As a preventive maint. following Honeywell recorders were serviced in control room. VR-1, VR-2, VR-3, TR-13, TR-14, TR-15, TR-6, AR-1, AR-7 & ARC-3.
16	PT-7/8/10 (PRI/SEC/REF. DP) (Electronic) Transmitter zero checked after filling head, found ok.
17	TRCV-10, hand jack assembly which was broken on 15/1/95 morning, repaired by changing its two plates with new plates & checked it also for general maint. of Control valve, its positioner & regulator. Checked the stroke of control valve & also shown to P/P. Now it is ok.
18.	It was reported by P/P that following tunnel temp. points were not showing temp. T1-1-69 T1-1-70 T1-1-71 T1-1-73 T1-1-75 We checked and found T/Cs open. Replaced Thermowell & Thermocouple with new for point No. T1-1-69 as they were damaged. For pt. No. T1-1-70, T1-1-71, T1-1-73 & T1-1-75 replaced their Thermocouple elements. Also straightened their thermowells. Assembled these new elements in wells, checked & fixed them back and shown to P/P. Now all points are ok.
19	a) PRCa-12 cylinder unit with lock out relay assembly replaced with repaired, tested and calibrated unit. b) PRCA-12 set point transmitter in C/R changed with repaired & calibrated unit. c) General maint, cleaning & checking of PRCa-12 recorder and controller was also carried over. d) Total operation was checked from C/R & shown to P/P and they were fully satisfied.
20	MIC-23. Governor positioner (103-JT) removed for maint. & to facilitate for mech. work.

S/R.NO. DESCRIPTION

- General maint. cleaning and stroke checking of MIC-23 was done and it was shown to P/P as well as mech. area engineer as they have taken the doubt.
- 21 PRC-9 & 101-J Governor positioners General maint, cleaning & checking was done for both positioners in the field itself.
- 22 101-JT Exhaust pressure gauge impulse line Old SS tubing which was corroded is changed with new SS 1/4" tubing.
- 23 VIBRATION MONITOR SYSTEM JOBS :
- a) 101-JT Pt.No.10 (axial)
Replaced defeated probe and extension cable.
 - b) 101-JT Thrust bearing pads were replaced by Mech people wiring of two Thermocouples 'T' type were done upto junction box and checked them.
 - c) 103-J Pt No.9 (H.P. case axial North Bearing) both probes were replaced by new ones after checking calibration from field to C/R by IK-3.

Old probes were ok.
 - d) 105-J Pt No.8 H (H.P.Case) Probe was replaced by new one . old probe was found damaged.
 - e) To facilitate mech. work on compressors following probes were removed and fixed back.

101-J Pt. No.10,1,2,3,4 & 7.

103-J Pt.No.10,1,3,8,4,8,9 & key 0.
 - f) 102-J (N.B. Compressor) following probes were removed to facilitate mech. work and after completion of mech. work fixed them back and set them.

1. Pt. No.2 compressor axial probe.

2. Pt.No.4 compressor moill bearing radial vib probes.

3. 102-J compressor thrust pads were replaced with new pads by mech. people, so T' type T/C's were soldered to Pt. No.5,6 & 7 of TR-16. Pt. no. 8 & 9 old pads were fixed. Journal bearing T/C Pt. No.10 was also removed to facilitate mechanical work. After completion of their work it was fixed back. All T/C's were checked and wiring from pads to junction box completed.

SR.NO.	DESCRIPTION
24.	Following Boiler Inspection related jobs carried over. a) Two pressure gauges of 0-16 kg/cm ² & 0-250 kg./cm ² (Boiler gauge) calibrated and kept ready. 0-250 kg/cm ² gauge was fixed on steam drum . 0-16 kg/cm ² " " 112-C. b) Provided two calibrated pressure gauges of 0-250 kg/cm ² to mech. people for fixing on reciprocating pump.
25	As a preventive maint. air supply ports were flushed, cleaning of orifices and flapper nozzle was done, also general servicing was done for following instruments. FRCa-5 TRCa-11 TRCa-12 FICa-16 FICa-17 FRCa-9 FRGa-18 PRCa-4 PICA-5 FRC-18
26	As a preventive maint. general cleaning and maintenance and painting of following control valves were carried out. V-1, LCV-13, MICV-10, PICV-17, LCV-27, LCV-8, LCV-10, FICV-202, V-151, LCV-12, LCV-153, PICV-17.
27	Auxiliary Burner panels cleaning & painting work was done. Also leakage in down stream flange of valve was stopped by providing new gasket.
28	Air dryer NRV'S were opened, cleaned & fixed back. Also painting of air dryer and its accessories were done.
29	Trip system of All compressors i.e. 101-J, 105-J, 103-J & 102-J were checked with operation staff before start up, found them ok.
30	105-D metal temp. Pt.No.1 was checked found ok. shown to p/p.
31	LCV-25 & LCV-26 both valves were removed from line on the request of p/p to check foreign material between plug & seat.
32	103-J recycle line pt. no. TA-87, blind thermowell was opened for inspection, it was found that bottom portion below lensc ring of thermowell was broken.

SER. NO. DESCRIPTION

The broken piece of T/W (length approx 8-3/4") was removed on 22.1.95. Thermowell point is plugged.

PGR plant:

- 33 KV-120-3 & KV 120-7 valves. general cleaning and maint. carried over and then stroke checking was shown to p/p.
- 34 Pt. No. 3-TE of 102 C. was opened and make its drawing for procurement.
- 35 Pt. 137 Tx : Response was checked after general maint. of transmitter. It was ok.
- 36 UFSS . Batteries were isolated from charger and measured total battery voltage and individual batteries voltage and recorded. Batteries were discharged on approx. 20 AMP A.C. plants load. After that charger taken in line.

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TECHNICAL DEPARTMENT JOBS

SR.NO.	DESCRIPTION
81	<p>(01) Hook up low temperature cooling water supply to 129-JC and 130-JC through new installed 128-JC and installed oil separator on ammonia line No.NH-39-50 to 129-JC & 128-JC.</p> <p>(02) Installed and hook up new higher capacity moisture separator for instrument air dryer No.F-2005 near 114-F MEA tank.</p> <p>(03) Provided instrument orifice plate for FI on CW inlet to 172-C.</p> <p>(04) Provided instrument orifice plate for FI on steam line to 171-C.</p> <p>(05) Installed and hook up oil separator on ammonia line from 111-F to PGR plant.</p>

PLANT - UREA

MECHANICAL JOBS

SR.NO. DESCRIPTION

(01) PREVENTIVE MAINTENANCE OF ROTARY EQUIPMENTS :

Bearings were inspected of the following rotary equipments.

(a) K-1101-1 & Q-1101-1 Centrifugal compressor and turbine

- Measured clearances by means of lead wire

	<u>Actual</u>	<u>Recommended</u>
<u>Compressor</u>		
Coupling end Radial	0.008"	0.006" to 0.008"
Non coupling end Radial	0.008"	0.006" to 0.008"
Float Axial	0.012"	0.012"
<u>Turbine</u>		
Steam End Radial	0.065"	0.120mm to 0.161mm
Exhaust end radial	0.008"	0.150mm to 0.194mm
Float axial	0.008"	0.008" to 0.012"

Bearings are in good condition. Heavy deposit of oil sludges observed all over the bearing shell. Cleaned and boxed up.

Cleaned starting device of Q-1101-1

(b) Q-1101-2 P.D.Compressor Turbine :

Steam end Radial	0.006"	0.008"	0.008"
Exhaust end Radial	0.010"	0.012"	0.010"
Float axial	0.006"	0.008"	0.008"

(02) P-1202-A Condensate Circulation Pump :

Overhauled for attending Mech.seal leakage.

(03) K-1401 - 1 to 4 ID Fan:

Bearings overhauled , cleaned fan blades & body.

(04) T-1111 MAIN L.O. TANK :

Complete cleaning of main L.O.tank for Q/K-1101 1/2. (Equipment No.T-1111) Removed 53 barrel oil from T-1111 and overhead tank cleaned inside by hydrojetting to remove sludge formation. Thick deposit of sludge was found to be inside tank wall and bottom Refilled the same oil through centrifuge leaving 20% of oil alongwith sludge and mud in each drum. Seventeen drum new oil make up in tank (servoprime - 68)

SR. NO. DESCRIPTION

(13) H-1206 :

Plate heat exchanger opened cleaned and boxed up hydrotested C.W. side and condensate side.

(14) STEAM LEAKS :

- 1) 23 ata to 4 ata bypass valve heavy gland leak and hard to operate was made operable.
- 2) Q-1101-2 60 ata inlet bypass valve bonnet leakage and gland leak were attended.
- 3) 60 ata to Q-1001, 1st I/V gland leakage attended.
- 4) Q-1201 B Turbine drain (2 Nos) gland leakages -- attended.
- 5) Q-1201 A Two turbine drain valve not operable were made operable.
- 6) Steam tracing to CO2 to H-1203 line condensate outlet line trap direction was changed as required.
- 7) 40 ata steam drain II floor I/V gland leakage attended.
- 8) F-1501 : Vapour outlet gland leak attended.
- 9) T-1501 : 9 ata condensate return line pinhole leak attended.
- 10) 9 ata steam tracing main I/V both side flange leak attended.
- 11) Steam tracing I/V of Autoclave bottom (No.5 and 6) from boiler side gland leak attended.
- 12) V-1201 bottom : Overflow line tracing line pinhole leak (2 Nos) attended.
- 13) H-1202 to V-1201 gas outlet tracing line pin hole leak near V-1201 attended.
- 14) V-1503 : LG leakage and both I/Vs passing attended.
- 15) 23 ata condensate to 9 ata drum I/V hard to operate attended.
- 16) 4 ata drum I/B (PT side) top I/V gland leak attended.
- 17) 9 ata hose connection I/V passing attended.
- 18) 23 ata steam injection I/V at hydrolyser top heavy gland leak attended.

SIR. NO. DESCRIPTION

(15) 4 ATA BOILER V-1501 (BOILER NO. GT-1664) :

Boiler inspection carried out by C.I.B. at 12 kg/cm² on 17.1.95.
Both the RVs of V-1501 A/B tested on test bench in presence of
C.I.B. on 17.1.75.

(16) MISC. JOBS :

- (1) V-1351 Leaky union attended
- (2) T-1501 Top flange attended for leakage

(17) A) VALVE REPAIR REPLACEMENT JOBS :

- (01) Evaporation section I/V gland leak and flange leak rectified.
- (02) Evaporation section DEL valves (HP valves) bonnets replaced.

1/2"	--	4 Nos
1"	--	1 No
1"	--	1 No
1/2"	--	2 Nos
- (03) Syn. section urea reactor V-1201 unloading IInd I/V at ground floor attended for passing.
- (04) Attended for pinhole leakage at d/s of PRCV 1202 and I/V flange leak and by pass valve gland leakage.
- (05) H-1205 direct NH₃ water to LPCC IInd I/V replaced. location P-1201 floor.

HPF JOBS

- (06) Bonnet replaced HPF to NH₃ to autoclave both I/V bonnet assembly replaced alongwith bleeder I/V as they are passing.
- (07) HPF to carbamate common discharge line 1st I/V attended for hard operation.
- (08) Attended carbamate to H-1203 HPF bleeder for hard operation.
- (09) Carbamate to H-1202 bleeder valve attended for hard operation.

AMMONIA SYSTEM

AMMONIA PUMP P-1102/A

- (10) 1st recycle valve is passing changed with overhauled one.
- (11) Changed NH₃ suction vessel RV as it is passing.
- (12) Provided one I/V 2" x 800 # C.S at up stream of RV of NH₃ suction vessel

SR.NO.	DESCRIPTION
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- (13) Changed P-1102/A 2 Nos recycle valves.
(14) CO₂ to H-1201 :- Repacked by pass I/V gland which was passing.

(B) Relief valves testing on test bench at our workshop:

- 4.1 HP System RV 1201 A/B/C Set pr.2350 Psi Reset pr.2250 Psi
4.2 LP system RV 1202 A/B/C
4.3 4 ata steam drum RV 1501/2
4.4 NH₃ suction vessel RV 1102 & cold NH₃ line RVs
4.5 Replaced NH₃ suction vessel RV

(19) (A) H.P.VESSELS : INSPECTION & REPAIR

(1) UREA REACTOR V-1201 :

Opened for inspection mainly bottom hemisphere liner which was replaced during Sept. - Oct 1973 annual turnaround by M/s.L & T, Bombay.

Observation :

Complete visual inspection of shell liner, trays, cleats, bolts etc were under taken. The condition of shell liner and bottom hemisphere disch end liner were found in good condition. The welding of the bottom dish end liner was also found to be in good condition. Ultrasonic thickness survey of shell liner and insert liner reveals the minimum thickness of liner plate is 4.70 mm and that insert liners are between 3.40 mm and 4.20 mm and minimum thickness of bottom dish end liner plate is 6.60 mm. Ferrite measurement reveals nil ferrite. More than 75% of the "L" bolts between the compartment No.7 and 10 were found to have broken at weld and fallen off. Trays in compartment No.7 to 10 were found to have disturbed from their original position and one of the tray was found to be distorted in segment No.1 of compartment No.10. Tray joint bolts were also found loose.

In the bottom dish end compartment on the nozzle welds minor weld defects like porosity and pin holes were observed which were removed by grinding and welded by 19/15 H thermite coated electrode followed by PT and ferrite measurement tests and was found to be ok. All weld repairs were passivated rinsed with DM water. About 30 new "L" bolts and 200 segment joint bolts were fixed after repositoning the segments. Cleaned inside with vacuum cleaner and boxed up the enclosure by means of bolt tensioning device.

(02) H.P.CARBAMATE CONDENSER H-1202 :

The original H.P.Carbmate condenser was replaced by indigenious one by M/s.L & T, Bombay in Sept, - Oct, 93 opened top enclosure for inspection of top hemisphere interior and internal fittings.

SR.NO.	DESCRIPTION
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Observation :

Oxide layer was not visible inside, except at top of hemisphere near opening and few surface on liner near tube sheet. In general the condition at interior and internal fittings found to be good. An under cut of 3 mm long and about 1.5 to 2.0 mm deep on longitudinal seam was observed subsequent to inspection.

It was repaired by welding. The repair was inspected by PT and ferrite measurement and found to be ok. All repaired welds were passivated and rinsed with DM water cleaned with vacuum blower and boxed up the enclosure by means of bolt tensioning device.

(03) H.P.CARBAMATE SCRUBBER H-1203 LINER LEAK :

Plant was shutdown due to HP Scrubber liner leakage Carbamate and vapour leak through weep hole near nozzle C2 and this indicated the S.S.liner is punctured and carbamate solution leaking into the annular space between shell and liner. Leaked carbamate solution was collected and analysed in our laboratory which shown iron content which confirm that carbon steel shell is being eaten by leaking carbamate solution. Plant was shutdown at 23.00 on 11/01/95

Repair was carried out as follows.

(1) Dismantling :

Vessel opening permit received at 21.30 on 12/01/95

- a) Disconnected nozzles gas outlet C3, carbamate solution inlet nozzle C6 gas inlet nozzle C1 and condensate inlet and outlet nozzles.
- b) Removed distance pieces of condensate lines.
- c) Removed steam tracing lines.
- d) Loosened top shell cover bolts by hydraulic tensioning devices.
- e) Lifted top shell and placed on already stacked sleepers and partially loaded by chain blocks.
- f) Air soap solution test was carried out when bottom channel cover bolts were being loosened. Air at 3 psi in annular space between shell and liner and applying soap solution on weld joints of patch plate and basket welding. This test revealed leak at basket plate weld as shown in drawing.

SER. NO.	DESCRIPTION
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- g) After loosening the nuts at bottom channel cover complete tube bundle alongwith channel cover was brought down and supported at 4 long studs tried to open 4 studs equal angle but only 2 studs could be removed at 130 deg. Two 10 tonne chain block supported on "I" beams of scrubber loading structures were hooked to lifting brackets which are already mounted in channel cover where studs are removed. Two more chain blocks of 10 tonne capacity supported on shell trunion and kept ready to be loaded.
- h) Lowered the bundle further so that channel cover comes out of the long studs. Fixed two more lifting brackets and loaded by the 2 chain blocks. Lowered the complete bundle till it is completely away from shell.

Observation and Inspection :

- a) Air, soap solution test was carried out. Again bubbling observed in bucket plate welding to the patch plate installed by 1986 at nozzle C2. Details are shown in the sketch enclosed.
- b) PT test, ultrasonic thickness test on all the longitudinal and circumferential welds, fluorescent, penetrant test, ferrite measurement test and final air soap solution test of the complete liner carried out to confirm no other leakage.
- c) Off gas pipe connecting to C3 nozzle was found collapsed, as shown in the sketch.

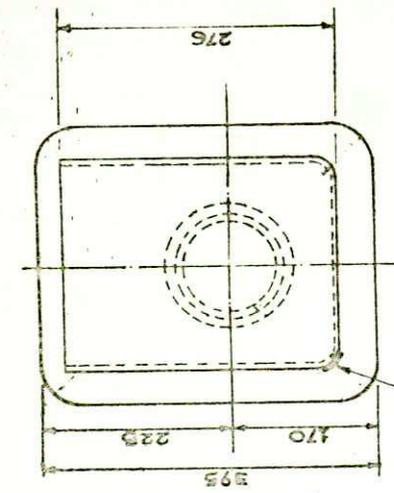
Repair carried out :

- a) Old patch plate along with impingement plate near nozzle C2 was removed by grinding & after thorough inspection new patch plate 16" x 15" was welded using thermite 19/15H filler wire. New patch plate is bigger in dimension so that it cover 30 MM on all sides with respect to old patch plate. Patch plate was welded with nozzle and then bucket plate welded followed with PT test and ferrite measurement test and found to be defect and ferrite free.
- b) Collapsed off gas pipe was replaced by cutting and rewelding a new SS 316L schedule 80 pipe.
- c) Carried out ultrasonic thickness survey of shell outer shell to reveal the extend of corrosion in shell. Minimum thickness found to be 41.07 MM at one point near the nozzle C2 against design thickness of 55 MM. The minimum thickness of the shell near top weep hole was found to be 50 MM as against design thickness of 55 MM.

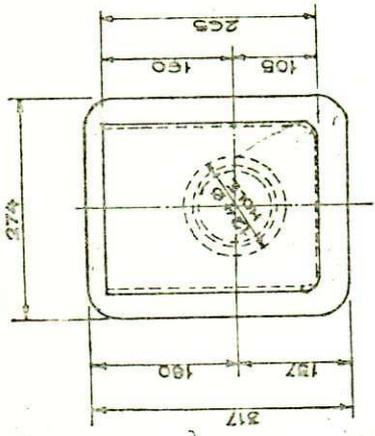
SR.NO.	DESCRIPTION
d)	Boxed up the bundle in to shell with new S.S.gasket. Tightening the bolts with hydraulic tensioning device.
e)	Boxed up top dome partition plate with new teflon wahers and cap nuts.
f)	Boxed up top dome with new S.S.gaskets and tightened bolts with hydraulic tensioning device.
g)	Gas inlet flange nozzle C1 welded from inside as there is no welding at pipe end with flange.
h)	Connected all lines except nozzle C6.
i)	Changed leaky pipe carbamate inlet to scrubber and boxed nozzle C6 flange.
j)	2 Nos support pipe was welded in place of old support.

HP SCRUBBER REPAIR CHRONOLOGY:
(BREAK-DOWN FROM 11.1.95 TO 23.1.95):

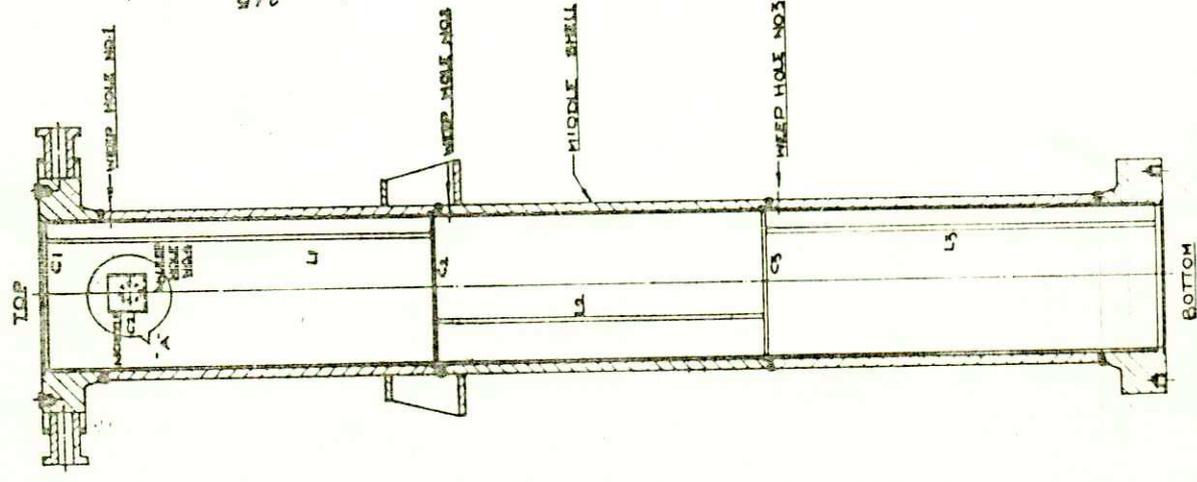
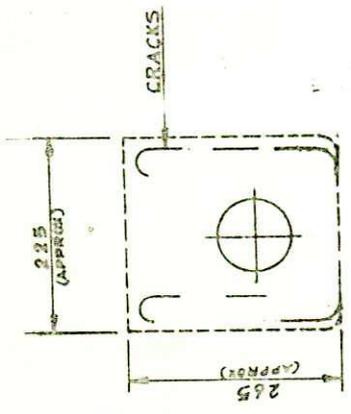
Gr. No.	Activity	Date
01	Job started on	13.1.95
02	Top dome removed	13.1.95
03	Rigging arrangement completed	15.1.95
04	Tube bundle lowered	16.1.95
05	Inspection and repair of liner completed	19.1.95
06	Tube bundle insertion ..	
	a) started	19.1.95
	b) completed	19.1.95
07	Internal repairs of top dome and box up dome.	22.1.95
08	Final box-up including piping etc.	23.1.95



LEAKAGE DETECTED AT THIS LOCATION WITH AIR AND SOAP SOLUTION TEST (13TH JANUARY 1995)

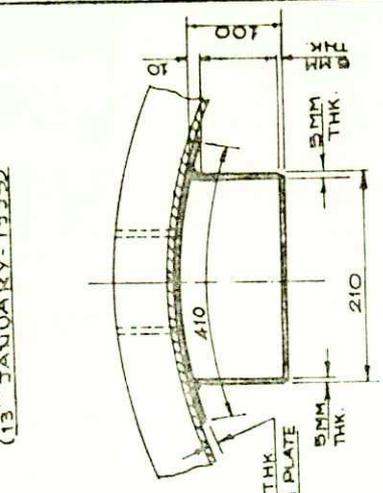


CRACKS DETECTED ON THIS HAZ AREA AFTER GRINDING THE BASKET FLUSHING WITH THE LINER AND CHEMICAL ETCHING (CRACKS ARE NOT THRU & THRU) (APRIL 1986)

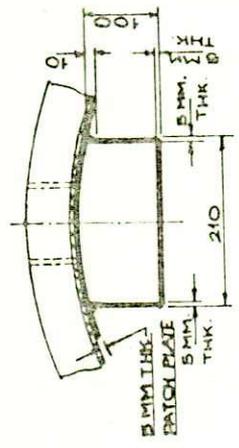


L - LONGITUDINAL WELD SEAM
C - CIRCUMFERENTIAL WELD SEAM

H-1203 SHELL



NEW BASKET AND NEW PATCH PLATE DETAILS FOR NOZZLE - C2 (JANUARY - 1995)

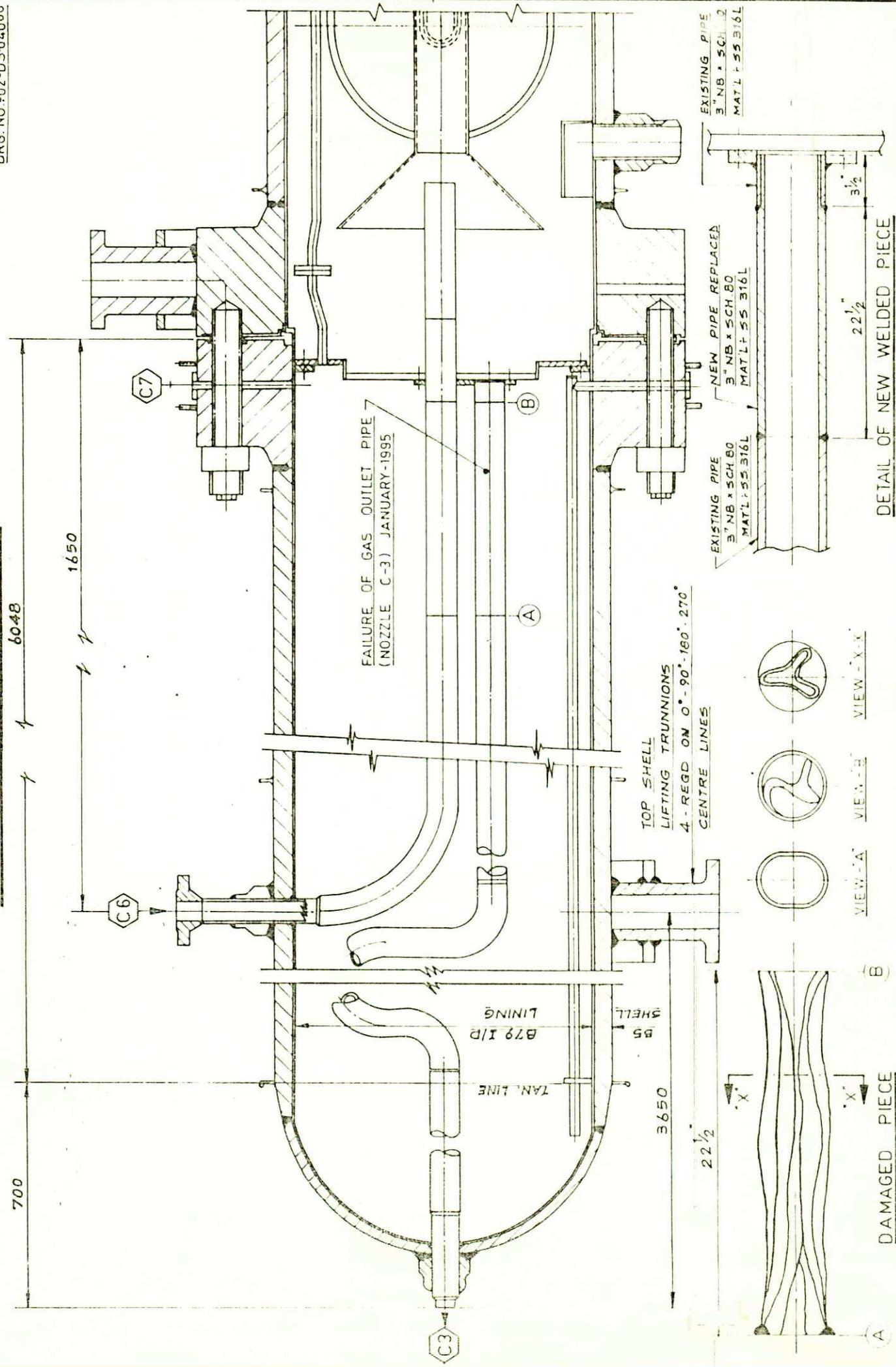


NEW BASKET AND NEW PATCH PLATE DETAILS FOR NOZZLE - C2 (APRIL - 1986)

DETAILS OF LINER LEAKAGE IN HP SCRUBBER (H-1203)
DATE: 23-01-95
DRG. NO. : 02 - DS - 04067

DATE: 23-01-95
DRG. NO.: 02-DS-04066

TOP DOME OF HP SCRUBBER (H-1203)



 SR.NO. DESCRIPTION

(04) H.P.STRIPPER H-1201 SHELL LEAKAGE**(01) Leak in Stripper shell :**

Presence of NH₃ was noticed in 4 ata steam and 9 ata steam on 29/01/95 at 11.30 AM in urea plant steam / condensate sample from HP Condenser, HP Stripper, 4 ata steam drum, 23 ata steam to stripper, Recirculation heater H-1204 1st evaporator H-1422, steam condensate tank T-1501, 9 ata steam saturator V-1503, Surface condenser H-1114 and 60 ata steam header. Steam flow diagram and result of analysis in tabular form is shown in fig - 2 and table 2.1 . It was suspected leakage from tube side to shell side of stripper in view of the result of analysis A typical analysis of H-1201 stripper is as under.

	H-1201 Top Steam inlet	H-1201 Bottom Steam outlet
Ammonia	1930 PPM	3600 PPM
CO ₂	700 PPM	1800 PPM
Conductivity	2904 Micro MHO/CM	6138 Micro MHO/CM
PH	10.2	10.3

Plant was shutdown on 31/01/1995 at 22.00 hrs. The following main activities were carried out to detect the leak and subsequently repair leak.

(01) Opening of bottom enclosures

(02) Hydrotest at 37 Kg/cm² in shell side with DM water

H-7(a)

SR.NO.	DESCRIPTION
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- (03) Removal of ferrules from tube sheet
- (04) NDT inspection, repair
- (05) Hydrotest
- (06) Box up

To detect the leakage and repair, stripper opening was required. Following activities were carried out.

- a) Top and bottom enclosures with all inter connected piping were opened and removed.
- b) Tack welding of all the ferrules to the dummy tube sheet were ground and dummy tube sheet which is made in six segments was taken out.
- c) 2100 ferrule were removed ground and handedover to production deptt. for delta pressure checking.

HYDROTEST FOR LEAK DETECTION IN STRIPPER

Blinded the following nozzles in shell.

- (1) Steam inlet nozzle C5
- (2) Bursting disc nozzle R2
- (3) Vent nozzle C7a
- (4) Vent nozzle C9b (Pressure gauge fitted)
- (5) 23 ata satuator V-1502 condensate inlet
- (6) Up stream flange of LCV 1501

A 3/4" NB line was laid from P-1501 BFW pump discharge connecting drain nozzle C8 of stripper shell for DM water filling in stripper shell. Final pressurising was done by triplex reciprocating pump connected in 3/4" NB line shell was pressurised up to 37 Kg/cm². Continuous dipping of water from bottom side in 5 to 8 tubes were noticed. Mean while started removing of ferrules from top tube sheet. The shell was depressurised after 10 mts. After complete removal of ferrules, the top tube sheet was drained and cleaned. Again pressurised up to 37 Kg/cm². Leakage was found in seal welding of tube No.1712 in top tube sheet overlay. Bottom tube sheet overlay and seal welding with tubes found to be in sound condition.

NDT INSPECTION OF TOP TUBE SHEET OVERLAY AND SEAL WELDING

On visual inspection it was found to be erosion and corrosion of seal welding of tube with overlay in many tubes surroundings of tube No.1712 and require weld deposit. 5 threaded socket weld also eaten away due to erosion and corrosion. D.P.test was carried out in all suspected welds and found to be 6 blind pin holes in seal welds of tube with overlay in top tube sheet.

SR.NO.	DESCRIPTION
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Ferrite check was carried out by using ferrite meter on the overlay welding of tube sheet revealed nil ferrite. Inspection of tube sheet revealed no thickness reduction or crack in tube sheet wherever possible to inspect in top T/S. Leak was repaired by removing the through pin hole by grinding with conical cutter about 4 mm deep grind surface of remaining seal weld. Welded by TIG with 160 mm dia filler wire of sandvik 25 : 22 : 2 LMN and weld single run over seal weld complete. 4 blind pin holes were also repaired in the same way. 37 tubes seal welds were found to be eaten and found almost flat are welded single run all around after grinding, polishing the surfaces. 5 tie-rods threaded sockets seal weld where weld deposit found to be insufficient are also welded single run by TIG with sandvik filler wire 25 : 22 : 2 LMN. All weld repairs were followed with DP test and ferrite check test which revealed nil ferrite and defect in weld and surrounding.

One tie rod was broken while removing. Broken piece was drilled out, cleaned the threads with special jig fabricated at our workshop offered for inspection and found to be okay.

Passivated of weld repair and around the weld by using 5 - 10 % HNO₃ followed by rinsing with DM water. Refer drg. elevation of tubes in drg.No.AO 62769 (H-1201)

Hydrotest at 37 Kg/cm² was carried out in shell side after completion welding jobs. Held the pressure for 10 mts. Visual inspection was done at top and bottom and found to be no leak.

All 2100 ferrules ground at tack welding to clean the surface and offered for pressure checking and found to be 80 to 140 mm. H₂O which is within the limit. Fitted back all ferrules tack welded with dummy tube sheet. Boxed up enclosures with stainless steel gasket.

(19) (B) OPENED INSPECTED & BOXED UP FOLLOWING VESSELS :

- 9.1 Rectifying column V-1202 (Bottom)
- 9.2 Flash tank scrubber V-1421
- 9.3 1st evaporator scrubber V-1423
- 9.4 4 ata steam drum V-1501
- 9.5 23 ata steam drum V-1502
- 9.6 9 ata steam drum V-1503
- 9.7 1st evaporator separator H-1422
- 9.8 2nd evaporator separator H-1424
- 9.9 Urea solution tank T-1401
- 9.10 NH₃ water tank T-1301
- 9.11 Steam condensate tank T-1501
- 9.12 CCS-1 plate type cooler H-1206
- 9.13 2nd Desorber V-1301
- 9.14 Liquid NH₃ preheater H-1102

SR.NO. DESCRIPTION

Condition of the above vessels is good observed Plugged one tube in H-1102 since leaking in hydrotest.

All vessels cleaned and boxed up. See Inspection report for inspection details and observation.

(20) FABRICATION JOBS :

- (1) Urea reactor V-1201 off gas flanges replaced with reconditioned one at urea reactor top platform. 4" x 1500 # SS 316L - 2 Nos. Boxed up with new ring gasket.
- (2) H-1203 HP Scrubber carbamate inlet line near scrubber NRV changed it was leaking. One flange 3" x 1500 # 316L and 3" x 80 Sch. SS 316L pipe 1 1/2 metre long.
- (3) Carbamate pump P-1201 A/B discharge line "T" replacement since it was repaired for leaking. Location at the joint just common line starts at 1st floor.
- (4) P-1201/B discharge dampener fixed in place of idle line.
- (5) V-1501 LCV 1502/A bend near 4 ata drum leak, rectified by changing the spool piece.
- (6) RV 1201 A/B/C header about 2 metre long pipe along with weldolet and flanges changed since thinning of wall thickness.
4" x 80 Sch SS 316L pipe - 2 Mtr
4" x 3" weldolet SS 316L - 3 Nos
3" x 1500 # SS 316L flange - 3 Nos
- (7) Replaced earlier repaired common "T" of P-1201 A/B discharge connecting to common discharge at 1st floor.
- (8) Partial replacement of 1.5 metre pipe in P-1201 A/B carbamate discharge line near inlet nozzle of H-1203 HP scrubber 3" x 80 Sch. SS 316L.
- (9) Provided isolation valve at upstream of ammonia suction vessel RV 2" x 800 # CS gate valve.
- (10) Refixed sliding support in P-1201 A/B discharge line.
- (11) Refixed fire support in P-1201 A/B discharge line near H-1203 HP Scrubber inlet nozzle.

(21) M-1403 :

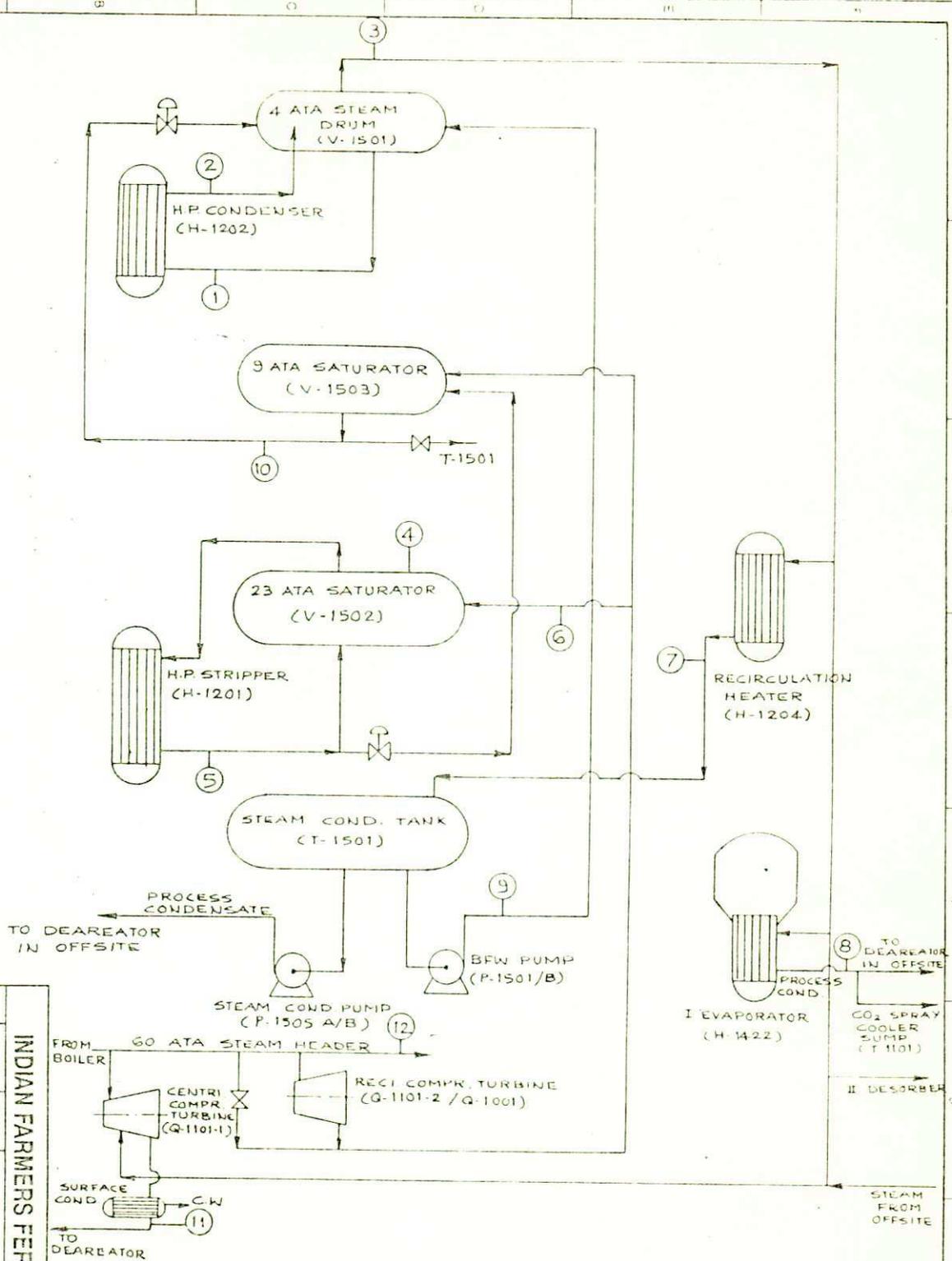
Belt replaced (3 ply nylon belt 800 mm width) Skirt leakage attended.

M-1403, M-1419, M-1423, M-1401 aligned with motor.

SR.NO. DESCRIPTION

(31) HYDROJETTING OF HEAT EXCHANGERS :

- 5.1 H-1114 surface condenser
- 5.2 H-1113 A/B main L.O.cooler
- 5.3 H-1123 crank case L.O.coolers
- 5.4 Main L.O.cooler H-1051 A/D
- 5.5 Flash tank condenser H-1421
- 5.6 1st evaporator/seperator & condenser H-1422 & H-1423
- 5.7 IInd evaporator 1st condenser H-1425
- 5.8 IInd evaporator IInd condenser H-1426
- 5.9 Recirculation heater H-1204 with DM water



INDIAN FARMERS FERTILISER CO-OP. LTD. KALOL		PLANT	NAME	DATE
DRAWING NO.		PLANT	DRN	6.3.95
SCALE: 2/17		FORM	CHD	
PLANT FORM NUMBER		NUMBER	APD	
SHEET OF		REV		
STEAM AND CONDENSATE				
FLOW IN UREA PLANT				
(GENERAL)				
EVR NO				

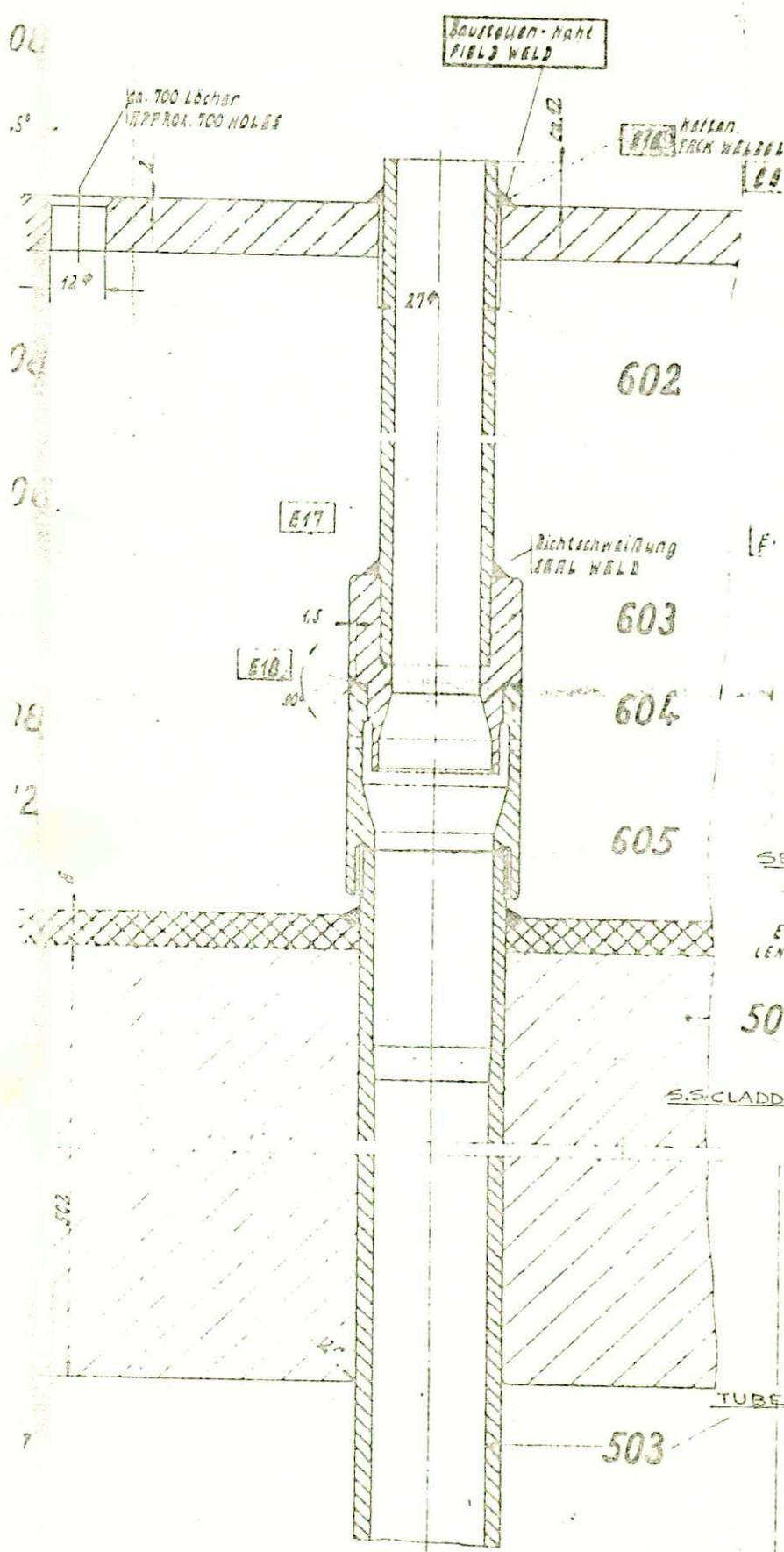
REPORT/7/3

DATE	TIME	(1) H.P.CONDENSER BOTTOM				(2) H.P.CONDENSER TOP				(3) 4 ATA STEAM (V-1501)			
		NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH
29-01/95	11.30									1800		2310	
	04.30	140		158	10.2	354		214	10.55	1900		2508	10.1
30-01/95	07.30	260		2178.8		620	2400	383		2600	1100	4902	
	09.00	260	TRACES	178		620	240	337		3300	1100	5214	
	11.00	220	TRACES	198		1300	TRACES	990		2420	700	3102	
	13.45	120	220	152		1170	170	726		2560	960	3696	
	16.45	170	40	152		900	40	634		1760	630	2508	
	19.00	190		172		380		211		2330		2970	
	21.00												
	21.45	210		172		660		340		2100		2838	
	23.00												
	23.30	190	TRACES	152		830	130	343		2420	720	3036	
	02.00	190	TRACES	152	10.55	1140	50	660	10.6	3600	09	4818	10.3
	04.30	240	TRACES	158	10.75	2480		343	10.9	4560	1400	5742	10.35
31-01/95	06.30	260	40	158	10.75	620	TRACES	304	10.9	3110	1080	4125	10.35
	08.30	280	TRACES	185	10.75	690	90	317	11.1	4940	1840	6270	10.55
	13.15	280	TRACES	208	10.65	660	TRACES	317	10.9	5870	1980	7590	10.3
	16.00	310	TRACES	218	10.7	900	180	452	10.9	3190	1120	4224	10.3

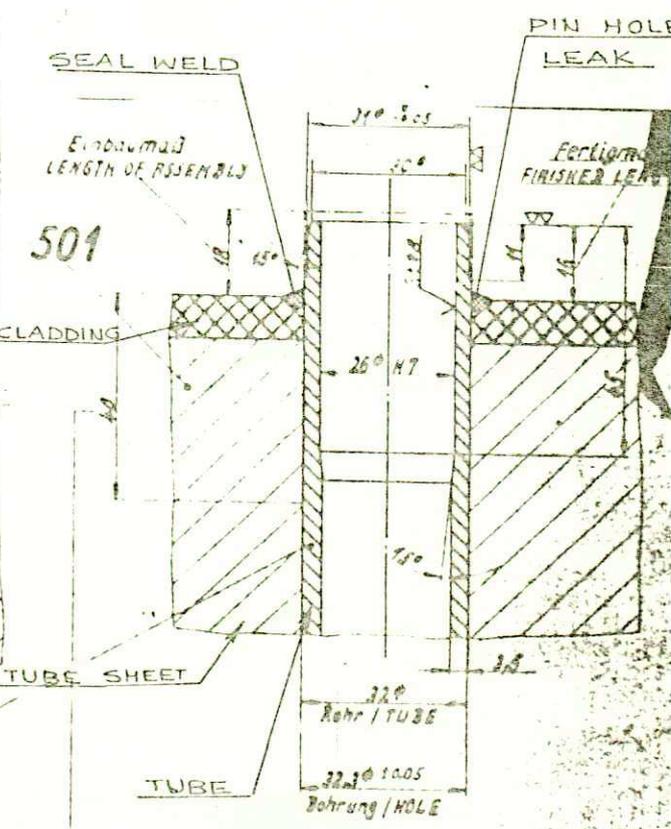
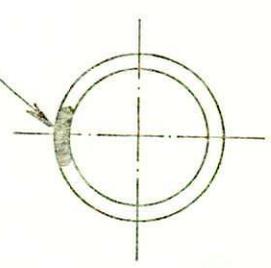
DATE	TIME	(4) H-1201 TOP				(5) H-1201 BOTTOM				(6) 23 ATA STEAM TO V-1502			
		23 ATA STEAM TO HP STRIPPER				23 ATA STEAM COND. FROM H-1201							
		NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH
129-01-95	11.30												
	04.30												
130-01-95	07.30												
	09.00												
	11.00												
	13.45	660	480	1386		3820	1700	6534					
	16.45	700	360	891		2610	990	3894					
	19.00	690		924		2920		4620					
	21.00												
	21.45	2070		2970		2380		3894		1.8		2574	
	23.00	720	730	792		2520	990	4198					
	23.30									1.43	TRACES	12	
	02.00	640	780		10.2	4200	1810	6600	10.15	1.29	TRACES	8.6	8.25
	04.30	1930	700	2904	10.2	3600	1800	6138	10.30	1.5	TRACES	17.82	9.3
131-01-95	06.30	1380	490	1848	10.3	5060	1840	6534	10.45				
	08.30	1450	670	2145	10.3	4210	1890	6600	10.35	0.8	TRACES	8.0	8.9
	13.15	350	TRACES	231	10.6	2790	540	2876	10.55	1.63 PPM	TRACES	46.86	6.85
	16.00	380	130	218	10.7	3590	1800	6237	10.1				

DATE	TIME	(7) (H-1204)				(8) (H-1422)				(9)			
		COND. FROM RECIRCULATION HEATER				COND. FROM 1ST EVAPORATOR				STEAM COND. TANK (T-1501)			
		NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH
29-01-95	11.30	742		924		3000		9240		690		1320	
	04.30	733		1122	9.95	3100		8910	9.6	1200		2541	9.75
30-01-95	07.30	1080	300	1508		2700	3000	8580		2190	1000	3828	
	09.00	2300	300	2508						1300	660	2308	
	11.00	1900	400	1815							470	1518	
	13.45	2800	2200	6000		590	350	1122		930	350	1254	
	16.45	10310	7560	22440						900	310	1188	
	19.00	8700		10560		930		924		770		1056	
	21.00	7040	2070	7920									
	21.45	9320	3280	10560		1280		1386		830		1089	
	23.00	9980	4860	15510									
	23.30					1660	1750	5874		1240	490	1881	
	02.00	13160	6660	20790	10.25	1930		4950	9.75	1570	540	2145	10.2
	04.30	14100	8370	25740	10.15	1590	1000	3696	9.8	1550	600	2310	10.1
31-01-95	06.30	14850	7920	23100	10.3	2000	1400	4686	9.9	1710	630	2376	10.25
	08.30	22400	4900		10.55	1830	1710	5346	9.8	1590	580	2145	10.3
	13.15	2420	580	2442	10.4	2210	1710	5142	9.75	1930	720	2706	10.25
	TO												
	14.25												
	16.00	2520	540	2277	10.55	1400	360	1452	10.4	1930	540	2640	10.25

DATE	TIME	(10) FROM V-1503 9 ATA TO 4 ATA COND. TO V-1501				(11) SURFACE COND.(H-1114)				(12) 60 ATA STEAM HEADER			
		NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH	NH3	CO2	Cond.	PH
		29-01-95	11.30	266		614							
	04.30	950		693	10.4	TRACES		1.1		99		119	10.2
30-01-95	07.30	1900	260	1122		1.28		19					
	09.00	2300	300	1782									
	11.00	1510	300	1056		170	TRACES	155					
	13.45	1450	260	1056									
	16.45	1350	270	858		1.2	9.9	9.9					
	19.00	1570		924		1.31		9.2					
	21.00												
	21.45	1590		1023		1.1		10.6					
	23.00												
	23.30	1620	90	1023		3.79	TRACES						
	02.00	1620		891	10.7	1.19	TRACES	6.6	8.55				
	04.30	1720	90	1188	10.5	1.3	TRACES	8.0	9.25				
31-01-95	06.30	1780	TRACES	1056	10.75	1.7	TRACES	11.0	9.55				
	08.30	2040	220	1254	10.85	0.8	TRACES	8.6	9.4				
	13.15	1970	310	1254	10.70	1.03	TRACES	10.23	9.3				
	16.00	2280	360	1320	10.8	0.7	TRACES	7.6	9.2				



TUBE NO. 1712
 PIN HOLE WAS NOTICED IN
 THIS OVERLAY WELDING AREA
 THIS PORTION WAS GROUNDED
 AND REPAIRED BY WELDING
 ELECTRODE USED SANDVIK
 25; 22; 2 LWN.



H-120 TUBE REPAIR DETAIL

Vor dem Einschnitten leicht anwalzen.
 LIGHTLY EXPANDED BEFORE WELDING.

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PLANT - UREAINSPECTION JOBS

SR.NO. DESCRIPTION

41 (A) INSPECTION OF HP SCRUBBER H-1203 :

Carbamate leakage was found from top weep hole of shell of HP scrubber. There are three weep holes provided on the shell. In order to avoid choking of annular space between the liner and shell with carbamate, care was taken to keep the shell heated during depressurising the system. After depressurising the system, steam at 3 PSI was introduced in top two weep holes and the bottom weep hole was kept open to clear the blockage, if any.

The following inspection activities were carried out on the shell and liner of HP Scrubber while lowering of the tube bundle was in progress.

(I) Visual Inspection :

Visual inspection of the liner was performed simultaneously when the tube bundle lowering was in progress. After complete removal of tube bundle assembly, thorough visual inspection of the liner was carried out again. Following observations were made.

- a) Below top circular seam, D-1 & above liquid out let nozzle location, on the liner parent metal two nos pin holes of approximately 0.2 mm depth x 0.3 mm dia were noticed at north west location.
- b) One strike arc of 0.2 mm depth x 2.00 mm dia was noticed at north side, 6" above the basket pad plate welding.
- c) Another strike arc of 0.3 mm depth x 2.00 mm dia. was noticed on west side at approximately 10" away from the pad plate welding.
- d) Scoring marks were seen at various locations on liner due to lowering of tube bundle. These were shallow scratches, which were attended by surface grinding.

(II) AIR AND SOAP SOLUTION TEST :

The annular space between shell and liner as well as of liquid outlet nozzle liner was evacuated with the help of vacuum pump. Evacuation was carried out for four to five times to remove entrapped process gases from the annular space. Gradually air was admitted at 3 psi pressure through all the three weep holes of shell and

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one weep hole of liquid outlet nozzle. Necessary connections of instrument tubes, regulators etc. were kept ready when tube bundle lowering was in progress. In order to check the basket welding and other approachable weld joints of the tip 1 metre area of liner, air and soap solution test was performed. Following observations were made :-

- a) Soap bubbles indicated air leakage at the bottom corner of the basket to patch plate welding on West side bottom corner. A crack of approx. 12 mm length was noticed during the test.
- b) Initially circular seam C-1 liner and other approachable areas of liner in the top 1 metre portion were inspected by applying soap solution. No other leakage was noticed. Soap solution test was also carried out after complete removal of tube bundle to ensure that there is no other leakage spot on the liner. No other defect was found in air and soap solution test.

III) D.P. TEST :

Dye penetrant test of all the weld joints was carried out. Defects (crack indications) on the basket to pad weld joint as well as pad to liner weld joints were noticed in addition to crack revealed during air and soap solution test. It was therefore decided to completely remove the basket alongwith the pad plate. After removal of the basket and pad plate, DP test was again carried out in the approx. 12" area all around the nozzle C-2 (liquid outlet nozzle) Crack indications were observed in all the four corners of pad plate weld joints.

Fluorescent D.P. Test was performed on all the weld joints of liner and clit welds. Pin hole defects observed on L-1 (Longitudinal weld seam No.1 from top) at one place on C-3 at one place and on C-4 (bottom most circular seam) at two places were repaired by grinding and welding.

IV) REPAIRS CARRIED OUT :

- a) It was decided to replace the basket with new one. The size of the basket patch plate was increased by approx. 30 mm on all the sides to cover the welded zone of the previous basket which was removed from liner by grinding.

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Initially, a patch plate was welded on the liner followed by basket welding with the patch plate. First run of welding was made by TIG welding followed by SMAW using Thermanit 19/15 H electrode of 2.5 mm dia. D.P. test and Ferrite measurement were performed before welding; after first run and after completion of final welding. No ferrite was found. Defects observed in D.P. test were repaired by grinding and welding.

- b) Defects marked for repairs during D.P. test and visual inspection such as pin holes and strike arcs were also repaired by grinding and welding. Ferrite measurement and D.P. test on repaired areas were performed. No ferrite observed. No defects were found on repaired areas.
- c) Newly fabricated patch plate, basket and the nozzle weld joints, and repair welds were passivated after completion of inspection using the following chemical etching solution.

HNO₃ (65%) -- One part
H₂O₂ (30%) -- One part
Methyl Alcohol -- Two parts

V) **CONFIRMATORY AIR TEST :**

After completion of the repairs, air test was performed again to counter check the soundness of the repairs done as well as of the liner. Complete liner surface was checked with soap solution. No leakage was observed.

VI) **CONFIRMATORY AMMONIA LEAK TEST :**

The annular space between the shell and liner as well as nozzle and nozzle liner was evacuated and then purged with nitrogen to remove air. After purging the annular space for 30 minutes, evacuation followed by entry of Ammonia gas at 3 Psi pressure was made. Ammonia sensitive paper was applied on all the weld joints of liner including basket joints, slit joint etc. After giving an exposure time of 12 hours, Ammonia sensitive paper was removed. No traces of leakage were observed on the paper. It was confirmed that there is no leakage spot retained on the liner after repairs.

- VII) Ultrasonic thickness measurement was carried out on the liner. Report is attached herewith. No reduction in thickness was observed.

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VIII) Visual inspection of the internals of the top dome/upper shell was carried out. Followings are the observations.

- 1) Off-gas outlet pipe (C-3) 3" size was found to have got pinched in a length of 22.5 inches from the bottom end. This pipe piece was replaced with 3" NB sch.80 SS 316L.
- 2) One no. nut each was missing from the flange bolts of carbamate line (coming from nozzle C-6 of top dome) and off-gas outlet pipe flange.
- 3) Erosion cavities were observed on the weld joint between liner and partition flange annular ring plate.
- 4) The overall condition of the liner was found satisfactory. Close inspection of weld joints of liner could not be done as the same was inaccessible.
- 5) D.P.test and ferrite measurement followed by passivation with HNO₃ of the newly fabricated pipe piece weld joints was carried out.
- 6) Ultrasonic thickness measurement of approachable liner portion, carbamate inlet pipe from nozzle C-6 and damaged gas outlet pipe was carried out.

IX) **ULTRASONIC FLAW DETECTION :**

Insulation was removed to expose the middle shell between top flange and skirt. Thorough cleaning of the shell surface was carried out to remove the loose scales and insulation material from the shell surface.

In order to assess the condition of the carbon steel shell, Ultrasonic flaw detection in this area was carried out. Reduction in thickness of the shell in approx. 40" x 2" area on the East side of C2 nozzle was revealed showing 42 to 46 mm thickness. This area was further checked with digital Ultrasonic thickness tester. Minimum thickness was found to be 41.07 mm at one spot in this area.

X) **H.P.SCRUBBER TUBE BUNDLE WAS ALSO VISUALLY INSPECTED. THE FOLLOWING OBSERVATIONS WERE MADE :**

- 1) The tubes as visible were found free from any corrosion / erosion effect.

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- 2) Deep blue inky spots were observed almost throughout the length of tube bundle. The same were getting wiped off by wiping with cloth.
- 3) Third baffle from top was found with a longitudinal crack at the position of tie rod at South East corner.
- 4) The spacer tube of baffle which were tied up previously by wire found intact in position.
- 5) Some of the spacers were found bent.
- 6) Tie rod nuts were found loose.
- 7) The tunnel at top was found in good condition.

41 (B) INSPECTION OF OTHER H.P.VESSELS :

(1) H-1202 H.P.CONDENSER :

After installation of new H.P.C.C. in Oct, 93 top cover was opened first time to check the condition of top compartment internals. The observations are as under.

- 1) All the weld joints visually inspected, no sign of corrosion / erosion was noticed.
- 2) A longitudinal weld seam of liner plate was found to have about 4 mm long x 1.5 mm deep under cut. The same was repaired by welding. D.P.T. and Ferrite measurement done on the repair weld found okay.
- 3) Erosion of about 0.5 mm deep was noticed on west side of gas impement plate.
- 4) Five nos tubes were found with overheating mark / excess penetration on the inside of tube at tube to tube sheet weld joint. The same were checked by OPT, no defect observed.
- 5) Thickness measurement of liner plate was carried out (Report is attached Annexure - 3)
- 6) Ferrite measurement on weld joints and liner plate revealed nil ferrite.

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(II) V-1201 (AUTOCLAVE) :

As the bottom dished end liner was replaced during Oct, 73 shutdown, the vessel was opened to inspect the condition of internals. Various inspection activities were performed viz. Visual inspection ferrite measurement on bottom nozzles weld and on parent metal, Ultrasonic thickness measurement, and DPT on all the nozzle welds at bottom dished end and clit weldings of 10th and 9th tray, the observations were as follows.

- 1) The coloration of top dished end was found to be blackish grey.
- 2) Cravities/cavities have been observed on HAZ junction of insert liner plate weld seams and insert liner plates. These were corroded. To find out the extent of corrosion, thickness measurement of insert liner plates was carried out.
- 3) Undercut and pinhole defects were observed on longitudinal and circumferential weld joints of the liners at different locations.
- 4) Scording mark of about 1 feet long and 6" wide was observed on liner plate just above 10th tray, the same was removed by just superficial grinding. The same was inspected by DPT and found defect free. Finally the area was passivated and rinsed with D.M.water.
- 5) D.P.T. of all the five nozzle welds on bottom dished end revealed surface porosities on the welds of nozzles C1 B2 C1 A and C4. All these were ground out, welded and checked by DPT for its soundness. Ferrite measurement of the same after repairing revealed nil ferrite. Finally the area of repair weld passivated and rinsed with D.M.water.
- 6) Ultrasonic thickness measurement of liner plate and insert liners was carried out. The readings were recorded.

(III) H-1201 H.P.STRIPPER :

After completion of shutdown activities, production was lined up on 26/01/95. However, high levels of Ammonia, CO₂ and conductivity were observed on the steam/condensate on shell side of H.P.stripplier and related loop. The plant was shutdown on 31/1/95 at 20.00 hrs. for inspection of H.P.stripplier and recirculation heater H-1204. Following inspection activities were performed in H.P.stripplier.

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- 1) H.P.stripplier shell was pressurised gradually upto 32 Kg/cm², after opening the bottom cover. All the tubes were critically watched for any water leakage from bottom tube sheet. No major leakage was noticed from any tube. Water droplets were observed coming out from some tubes which were due to the water level out from some tubes which were due to the water level above the stub ends of tubes at the top tube sheet.
- 2) After opening the top cover and subsequent removal of all the ferrules, leakage through a pin hole on tube to tubesheet seal weld of tube No.1712 was noticed at the top tube sheet. The pressure on shell side was 2.9 Kg/cm², when the leakage was observed.

The pinhole defect on seal weld was repaired by grinding and welding. Complete seal welding was strengthened by putting up additional layer of weld deposit. The repaired seal weld was inspected by D.P.test and Ferrite check after first run as well as after final run.
- 3) Visual inspection of all the tubes and their seal welds at top and bottom tube sheets, top and bottom compartments liner and cladding, liquid inlet nozzle etc. was carried out. In the south east area of the top tube sheet, it was noticed that the seal welds of approx. 200 tubes got considerably eroded / corroded. Out of these , 37 tubes were marked for strengthening the seal welds as these were found to have badly corroded. One layer of weld deposit was put on these seal welds by TIG welding using 25-22-2 filler wire after removing the chromom oxide layer.
- 4) Seal welds of all the tie rods were D.P.tested. Five nos. tie rods seal welds on top tubesheet were found to have pinholes. These were repaired by SMTV Philips 316 KCR welding electrodes after necessary grinding.
- 5) Random D.P.test of tube to tube sheet seal welds in addition to those marked to have defects by visual inspection was carried out. Four nos tubes No.152,1820,1949 and 2036 were also found to have pin holes in seal welds confirmed by D.P.test. These were also repaired by putting one layer of welding on the complete seal weld.

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- 6) Ultrasonic scanning of the tube sheet, surrounding the tube No.1712 (leaky seal weld) was carried out to assess the extent of corrosion in the carbon steel portion of the tube sheet. Due to non availability of space and proper surface finish, area between the tubes could not be scanned by ultrasonic flaw detector. However, tube sheet area out side the peripheral tubes could be scanned which indicated absence of corrosion in tube sheet in that area. Thickness of cladding was also measured in this area using permascope. No reduction in thickness of SS overlay welding was observed.
- 7) Thickness chromium oxide layer was noticed on the cladding of the top compartment and manway cover. The sealing weld of the liner of gas outlet pipe and overlay welding of bottom face of manway cover was badly eroded. The chromium oxide layer on this weld was found perforated and detached from many places. This was repaired by grinding and welding.
- 8) Before boxing up the stripper ferrules, Hydrotest from shell side was again carried out at 35 Kg/cm² pressure. Both the tube sheets were minutely inspected for sweating leakings. No leakage was observed.
- 9) All the new weld joints, repaired welds were passivated using 10% HNO₃ solution followed by washing with D.M.water.
- 10) No defects were observed on the seal welds of bottom tube sheet to tubes as well as on cladding. The condition of vortex breaker and gas distributor was found to be good.

41 (C) INSPECTION OF VESSELS :

The following vessels and tanks were opened and offered for inspection. Visual inspection and thickness measurement etc. were carried out. The observations are given below :

1) V-1202 (Rectifying Colum)

- a) The colouration of the shell inside surface was observed to be bronwish black.

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- b) The condition of the vortex breaker was good
- c) The weld joints were found free from corrosion /erosion.
- d) Separator cone at top was found to be silver bright in colour with scattered black patches.
- e) Loose thin oxide scales were observed on top half of the shell.
- f) Ultrasonic thickness measurement was done and the readings were recorded.

2) V-1301 (Desorber)

Bottom

- a) The bottom dished end and shell internal had assumed blackish grey colouration.
- b) All the weld joints of the bottom compartment were found satisfactory
- c) Bottom tray and supports were found intact and in good condition.

TOP :

- a) The top dished end and shell internal had assumed blackish grey colouration.
- b) All the weld joints were found in good condition.
- c) The trays at the top were found intact in position.

The ultrasonic thickness measurement carried out. The readings were recorded.

3) V-1421 (Flash Tank Scrubber) :

- a) The vessel internal colouration was found to be brownish.
- b) The deminster pad was found in good condition.
- c) Internal fittings and supports were found intact.

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- 4) **V-1423 (First stage evaporator scrubber)**
 - a) The demister pad segments were found to have displaced at two locations.
 - b) Minor pitting was observed on tray supports weld joints, in scattered area
 - c) On 2nd & 3rd tray 9 Nos of tray segment fixing bolts were missing.
 - d) The shell internals has assumed brownish colouration.
 - e) Ultrasonic thickness measurement carried out. The reading were corded.

- 5) **V-1501 (4 ata steam drum)**
 - a) The colouration of shell was observed to be blackish.
 - b) Condition of deminster pad was good.
 - c) Minor pittings were observed on the dished end.
 - d) Some bolts of riser plates were found missing and informed the same to maint.crew for providing the same.

- 6) **V-1502 (23 ata Steam drum)**
 - a) The vessel internal surface has assumed brownish black colouration.
 - b) The weld joints of the distributor pipes were found in good condition.
 - c) Underflushing was noted on HAZ on circumferential and longitudinal weld seams at few places, otherwise the weld joints were found in good condition.
 - d) A lack of fusion like laminar defect observed, during previous inspection on West side man hole nozzle weld joint was confirmed by DFT and NPT using permanant magnet. No further increase in its length was observed.
 - e) Ultrasonic thickness measurement was carried out. The report is enclosed.

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- 7) V-1503 (9 ata steam drum)
- a) Shell internals has assumed brownish colouration in top half portion and blackish in bottom half.
 - b) All the internal fittings were found intact in position.
 - c) Condition of the weld joints were found satisfactory.
 - d) Scattered pittings were observed on both the dished ends.
 - e) Ultrasonic thickness measurement was carried out. The readings were recorded.
- 8) H-1422 (Ist Stage Evaporator Separator)
- 1) The shell has assumed blackish colouration.
 - 2) The distributor baffles at top nozzle were found in good condition.
 - 3) The centre cone supports and fittings found intact in position.
 - 4) Tube to tube sheet seal welding was found in good condition.
 - 5) Minor scaling was observed on shell surface.
 - 6) Circular weld seam was found to be flush with shell at few locations.
 - 7) Ultrasonic thickness measurement was carried out. The readings were recorded.
- 9) H-1424 (IInd stage Evaporator Separator)
- 1) The shell inside surface was found blackish.
 - 2) Circumferential weld joint of the shell was found flush with parent metal in approx. 4 feet length of south side and 2 1/2 feet length on North side. The same was noticed during previous inspection.
 - 3) Five Nos of tube stub end at top tube sheet ceentre found flushed. The seal welding of same was checked by DPT and found defect free.

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- 4) Ultrasonic thickness measurement was carried out. The readings were recorded.
- 10) T-1301 (Ammonia Water Tank)
- 1) Condition of all the weld joints was found satisfactory.
 - 2) Tank bottom plate was found buckles up-ward by approximately 3/4 inch at the centre. The same was noticed also during the last inspection.
 - 3) Tank top was found greyish in colouration, where as remaining portion has assumed brownish grey colouration.
 - 4) Ultrasonic thickness measurement was carried out. The readings were recorded.
- 11) T-1401 (Urea Solution Tank)
- 1) The colouration of shell inside surface was found brownish.
 - 2) All the weld joints were found free from corrosion / erosion.
 - 3) The tank bottom was found buckled upward at centre by about 1/2" which was also observed in past.
 - 4) Ultrasonic thickness measurement of shell internal was carried out. The readings were re-recorded.
- 12) T-1501 (Condensate Tank)
- 1) Strip support of one of the condensate inlet pipe was found bent and slightly cracked at upper portion. The same has been repaired by welding.
 - 2) Condition of the impingement plate was found satisfactory.
 - 3) The colouration of the shell was found to be brownish black.
 - 4) A 9" long crack was observed on repaired portion of shell North side near second circumferential weld seam counting from west side. This has been repaired by welding followed by D.P. test and found defect free.

SR.NO. DESCRIPTION

5) The ultrasonic thickness measurement was carried out. The readings were recorded.

Pipe line thickness measurement :

Ultrasonic thickness measurement was carried out for the following pipe lines.

- | | |
|---------------|----------------|
| 1) PR-1201-3" | 2) PR-1226-2" |
| 3) PR-1223-4" | 4) PR-1215-16" |
| 5) GA-1202-1" | 6) PR-1214-12" |

MISCELLANEOUS JOBS :

- 1) Carbamate pump discharge line common header "T" was replaced by new one. All the three weld joints of the "T" and one joint of vertical spool piece to "T" were inspected by root and final OP and Ferrite measurement followed by field radiography. Radiography revealed all the four welds acceptable.
- 2) H.P.Scrubber liquid outlet line (from nozzle C2) was replaced by newly fabricated line between NRV to 1st flange. 4 Nos of joints were welded in workshop. These were D.P.tested, checked for ferrite after root run as well as final run. Radiography of these joints was carried out in workshop. Radiography revealed the welds acceptable.
- 3) In order to remove the leakage spot i.e. cracked portion of the liquid outlet line near H.P.scrubber, approximately 1 1/2" metre long pipe segment with flange was replaced with new one. One No.field joint was inspected by D.P.test and ferrite test after root and final run in the field. Radiography of this joint was also carried out.
- 4) RV (1201-A/B/C) header of Urea plant was fabricated in the workshop. All the fillet weld joints (weldolets to header) and weld joints (weldolets to flange) were inspected by D.P.test. Ferrite measurement was also done after root run (first run) and final run. All the three nos butt welds of weldoilet to flange were radiographed. Also, Header to bend on North side and Header to Tee joint on South side were D.P.tested and checked for presence of ferrite after root run as well as final run. Radiography of these two joints was carried out in the field.

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- 5) Two nos. weld joints of Auto clave off gas line were made in the field as leaky flange was replaced by new one as well as spool piece alongwith flange was replaced by newly fabricated one. Both the joints were D.P.test and checked for ferrite after root and final welding. Radiography of these two joints was also carried out. Radiography of spool piece to flange was carried out workshop.

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PLANT -- UREA

CIVIL JOBS

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51 Following Civil jobs were carried out.

1. Epoxy painting on RCC surface at inside outside of prilling room, lift cabin, staircase columns & beams, north side of HF Scrubber, Conveyor gantry of prill tower, CO2 spray cooler T-1101 etc.
2. Aeraldite / Hardner lining repair work on scrapper floor

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PLANT -- UREA

ELECTRICAL JOBS

SR.NO.	DESCRIPTION
01	01. Carried out maintenance of transformers 7A, 7B and 17. <ul style="list-style-type: none">a) Checked and tightened the primary/secondary end terminals of the cables.b) HT & LT marshalling box checked and replaced with new oil.c) Reactivated silicagel in dehydrating breathers.d) Checked tripping circuits and protective system of transformers.
02	02. Carried out preventive maintenance of TMG make ACBs installed in MCC-6 and Siemens ACBs installed at MCC-14. <ul style="list-style-type: none">-- Replaced defective parts and worn out contacts.-- Lubricated the mechanism.-- Checked trip and close timings of CB for uniform closing and opening of breaker poles.
03	03. Preventive maintenance carried out on MCC-6 and MCC-14 : <ul style="list-style-type: none">-- Checked all feeder compartments and replaced defective contactors, contacts, timers, elemex connectors, fuse fittings, isolators, etc.- Cleaning and tightening of bus bars and cable connections.
04	04. Overhauled the following motors -- P-1231/A, P-1231/B, P-1232/A, P-1232/B, M-1403/2, M-1417, M-1421, M-1402/A, M-1402/B & P-1408.
05	05. Checked the terminal boxes of following motors for loose connections, burnt out cable leads and rectified the same. P-1201 A/B, P-1401 A/B, P-1505 A/B, P-1305 A/B, P-1406 A/B, P-1302 A/B, P-1506, P-1501, P-1202 A/B, P-1304/B, P-1102/B, P-1352 A/B, P-1351 A/B, P-1114 A/B, K-1401 1 TO 4, K-1102 A, P-1106/A, M-1122, P-1502, P-1402, K-1701, K-4701, K-4702, K-4703, K-4705/A & K-4705/B.
06	06. Replaced push button stations of FT fans K-1401/1, K-1402/2, K-1401/3 & K-1404/4.

SHUTDOWN REPORT - JANUARY - 1995

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PLANT - UREA

INSTRUMENTATION JOBS

SR.NO.	DESCRIPTION
71	01 PRCV-1201 : Control Valve was removed from line for inspection of plug and seat and found in good condition. After overhauling of actuator and valve positioner valve was fixed back and checked valve stroke.
02	HICV-1201 : Cleaned the valve positioner, position transmitter and regulator and checked the valve stroke.
03	LRCV-1201 : Valve was removed from the line for inspection of plug & seat and found little damaged due to some foreign material. There was no erosion on Plug and seat. Complete actuator was opened for overhauling, replaced diaphragm, gland packings, teflon lined bush, spindle for handjack assy and thrust bearing. After machining of plug & seat valve fixed back in line. Checked the valve stroke. Painted the valve.
04	HICV-1202 : Cleaned the valve positioner, and regulator and checked the stroke.
05	FRC -1-1 : Calibrated the transmitter. Cleaned valve positioner and regulator and checked valve stroke and complete loop.
06	FICV-1102 : Cleaned Valve positioner, Regulator, Handpack assy & automanual switch and checked the stroke.
07	FICV 1103 : Opened the Actuator Dome for air leakage from the bottom Provided the Teflon Gasket and gland packings. Cleaned the valve positioner and auto manual switch and checked the stroke.
08	PICV-1128 : Valve was removed for Plug inspectin and found that the Plug was sheared. Replaced the plug & fixed back the valve and checked the stroke.

S/R,NO.	DESCRIPTION
09	HICV-1222 : A&B Cleaned the valve positioner & Auto Manual Switch and checked the valve stroke.
10	PICV-1201: Cleaned the valve positioner & Auto Manual Switch Handjack Assy., made it free, painted the valve.
11	CO2 COMPR.PRESSURE TRANSMITTER : New Electronic Pressure Transmitter calibrated, installed, DISCH. connected with new impulse line and hooked up with CO2 Flow Computer.
12	PHCO-1133 & PH-1133 : Surface Condenser Vacuum Switches were relocated for PH-1133 for better performance.
13	HICV 1032 & 1132 : Cleaned the valve positioner & checked the valve stroke. Painted the Valve Actuator.
14	CO2 COMP.k-1101-1 & 2 : CO2 Centrifugal Compr, Turbine & P.D. Comp. Turbine Vibration Probes were removed for mechanical jobs and fixed back.
15	6HH Comp.Turbine : Vibration probes were removed for Mechanical jobs and key phaser probe and VE-1056H probe found damaged. Replaced the damaged Probes and fixed back.
16	LL-1102 & LL1 1103 : Ammonia Suction vessel level switches were removed, overhauled and fixed back.
17	LRCV-1421 : Cleaned the valve positioners & Auto Manual Switch. Provided the Gland packings and checked the valve stroke.
18	PICV-1202 : Cleaned the valve & positioner. Replaced the Air turbine and checked valve stroke.

SR.NO. DESCRIPTION

19 LICV-1203 :

Cleaned the valve positioner & checked the stroke. Painted the valve.

20 PHCO-1026 & PH-1026 :

Indicator/Alarm unit was replaced as its indication was not working properly.

21 Rectifier/ Battery Charger :

Rectifier input A.C. power switched off. Battery was discharged for 1 1/2 hours. Cleaned the rectifier cabinet and taken again in line..

UREA PLANT SHORT SHUTDOWN JOBS REPORT (1-2-95 TO 6-2-95)

Following jobs were carried out during Urea Plant Short Shutdown.

01 HICV-1202 :

Valve was removed from the line for inspection of plug & seat and found little damage on plug & seat due to foreign material. Erosion was not there on plug & seat. Opened the valve Actuator for overhauling. Replaced the Diaphragm set of Gland packing, Teflonlined bush and thrust bearing. Assembled the valve actuators and after machining of plug & seat valve was fixed back and checked the stroke. Painted the valve.

02 FICV-1102 :

Valve was opened from Bonnet for checking the inside the valve body for any foreign material. Nothing was found. After finishing cut inside the cage valve actuator was fixed back and checked the stroke.

03 LR-1201 :

Radiac Relay was recalibrated to compensate the decaying of Radioactive source.

04 FI-1354 :

Installed the Local Indicator/Transmitter & Magnetic flow meter. Laid out the power cable, signal output cable, interconnection cables for flow meter & Transmitter in Central Room Flow Indication is given on Yeragawa Recorder 2 pt no.26.

05 MLCV-1352 :

Installed new control valve, I/P converter, & Regulators. I/P converter is connected to Hydroliser MOD-30 instrument. After completing pneumatic tubing, valve stroke was checked.

SR.NO. DESCRIPTION

06 LH-1103 :

level switch was removed as it was not functioning properly. Float Wt was not proper hence it was adjusted by welding small strips and checked its operation and found ok. Fixed back the level switch.

07 LR-1103 :

Ammonia suction vessel level transmitter was not working. Replaced the Transmitter and taken in line after Glycol filling in impulse line.

08 CONTROL ROOM PANEL INSTRUMNTS :

As a preventive measure following controller, flapper, nozzle & orifice were cleaned.

FIC-1203, FIC-1102, PIC-1502, MICV-1101, PIC-1128, PIC-1121, PIC-1301, FIC-1130, PIC 1131, PIC-1129, PRC-1501, LIC-1501, LH-1203, FRC-1102, FRC-1101, PIC-1201, PRC-1201, LRC-1201, PLC-1202, PRC-1504, FIC-1204, TRC-1201, TIC-1201, PRC-1202, PIC-1202, FRC-1421, TRC-1421, PLC-1422, LRC-1421.

SHUTDOWN REPORT -- JANUARY -- 1995

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PLANT -- UREATECHNICAL JOBS

<u>SR.NO.</u>	<u>DESCRIPTION</u>
81	(01) Installed 4" NB bypass control valve on CW return line from H-1352 line No.CWR -- 1351 -- 300 -- B - 13.
	(02) Fabricated and installed reflux temperature control piping with FI on reflux recycle with DFW flushing provision in hydroliser plant.
	(03) Erection & hook up 1" dia blow down piping from shell side drain off HP carbamate condenser (H-1202) to CO2 spray cooler sump (T-1101).
	(04) Provided 3 Nos of 1/2" dia S.S. check valve on condensate inlet line (flushing) to process line and 1" NB SS check valve on CO2 injection line to reflux line in hydroliser plant.

SHUTDOWN REPORT - JANUARY - 1995

23

PLANT - OFFSITEMECHANICAL JOBS

SR.NO.	DESCRIPTION
02 (01)	<u>D.M.PUMP - OVERHAULING :</u> Overhauling done. a) Oil seal portion of the shaft found worn off, replace the shaft. b) Both bearings replaced c) Both oil seal replaced
(02)	<u>B.F.W.PUMP TURBINE Q-5111 :</u> Overhauling. a) Carbon ring found loose, clearance in big rings was found maximum 0.00" & in small rings clearance was 0.00 ". Replaced both the carbon rings. b) The damaged casing dowel pins were replaced by work-shop made with M-16 thread. c) Quick shutoff valve found rusted , cleaned the valve. d) Oil coolers opened and cleaned. Oil sump cleaned and replaced the oil. e) Seal oil leak off line separated from steam tracing line header. f) Over speed trip checked at 4750 rpm on 25/01/95,found okay. g) All oil filters cleaned.
(03)	<u>C.W.PUMP P-4402 - PREVANTIVE MAINTENANCE :</u> a) Inboard and outboard bearings inspected , found in good condition. b) Damaged thrust bearing repaired. c) Bearing oil replaced
(04)	<u>C.W.PUMP TURBINE Q-4401-A :</u> a) Journal bearing inspected, found in good condition. b) MOP & AOP checked found okay. MOP valve body threads found damaged , rethreaded by M-16 size.

84
(OFFSITE)

SR.NO.	DESCRIPTION
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- c) All oil strainers and filters cleaned / replaced.
Oil sump cleaned and replaced oil.

(05) C.W.PUMP TURBINE Q-4401-B :

- a) Journal bearing inspected, found in good condition.
- b) MOP & AOP checked found okay.
- c) All oil strainers and filters cleaned / replaced.
Oil sump cleaned and replaced oil.

(06) C.W PUMPS P-4401-A & B :

- a) Journal bearing clearances checked, found within limit.

03 (01) F.D.FAN K-5113 :

Clutch coupling oil on both side (motor - automatic trasnmission TYA and turbine - Servomesh - 150) flushed and replaced with new oil.

SR.NO. DESCRIPTION

15 BHEL BOILER:

(01) RAH :-

- a) Hot end heating elements (baskets) were found burnt out and damaged. Changed with new one, as they were burned and come out from basket in small pieces.
- b) Hot end basket clearance adjusted of all basket plates
clearance - 4 mm
Cold end basket clearance checked and was found okay
clearance - 4 mm
- c) Balancing of rotor done
- d) Drive gear box coupling checked, found okay

(02) SOOT BLOWERS - K 5401 1 TO 8 :

All soot blowers were taken for preventive maintenance and box up.

SHUTDOWN REPORT - JANUARY - 1975PLANT - OFFSITECIVIL JOBS

SR.NO. DESCRIPTION

51 Following jobs were carried out.

A. WATER TREATMENT PLANT :

- 1) Fibre reinforced vinylester lining on sides and bottom of weak effluent drain from Cation - V to outlet manhole.
- 2) FRP & HDPE pipe line laid from Cation - IV to Degaser for increasing flow from drain and as an alternative line of drain off effluent including dismantling and reconcreting the floor.
- 3) Aeraldite / Hardner lining in drain and chambers of PMB and SMB.
- 4) Concrete block for encasing HDPE pipe line on outlet manhole near boiler feed water & MCC cable trench repairs
- 5) Dismantling RCC floor & reconcreting the same after sand filling in the gaps of floor near Anion - II , III & IV near RCC cooling water make up sump.
- 6) RCC flooring near acid dozzing area.

B. COOLING TOWERS :

- 1) Fixing of wooden plank on side of cooling tower volute chamber to avoid shortcircuit of air.
- 2) Repair of AC sheets louver of Urea & Ammonia side cooling tower on east & west side.
- 3) Opened wooden covering of drain for Urea side and sump No.1 for fixing screen.
- 4) Covering the wooden flooring for the same & repair of damaged flooring of sump area.

C. STEAM GENERATION PLANT :

- 1) Refractory lining on Vatas and side of burners in combustion area and super heater area.
- 2) Fixing of insulating bricks on side of tube super heater area.
- 3) Opening & closing of manholes

SHUTDOWN REPORT - JANUARY - 1995

PLANT - OFFSITE

ELECTRICAL JOBS

SR.NO. DESCRIPTION

61 Following Electrical jobs were carried out during plant shutdown

- 01) Carried out maintenance on transformers 2A, 2B, 3A, 3B, 4A, 4B, 12, 13 and 14.
 - a) Checked and tightened the primary/secondary end termination of the cables.
 - b) Carried out testing of oil in main tank, marshalling boxes of the above transformers.
 - c) Reactivated the silicagel in dehydrating breathers of the above transformers.
 - d) Checked the trip circuits and protection system of all the above transformers.
- 02) Preventive maintenance carried out of 11 KV switch gear (KIRLOSKAR make) installed at MPSS for -
 - a) Checking of main and arcing contacts, mechanism, close and trip operations, lubrication of moving parts.
 - b) Replaced oil in all MCCBs.
- 03) Measured IR values of all current transformers installed at 66 KV Sub/Station.
- 04) Shifting of DC distribution board at 66 KV S/S to avoid drowning during flood water.
- 05) Preventive maintenance carried out of all LT ACBS/TMG/SIEMENS installed in MCCs :
 - Replaced defective parts and worn out contacts.
 - Lubricated the mechanism.
 - Checked the trip and close timings of CBs for uniform closing and opening of breaker poles.
 - Checked contacts pressure and adjusted wherever required.
- 06) Preventive maintenance carried out of following MCCs :

MCC-1	MCC-3	MCC-2A	MCC-2F
MCC-2	MCC-8	MCC-11	

SR.NO.	DESCRIPTION
	<ul style="list-style-type: none">- Checked all feeder compartments and replaced defective contactors, contacts, timers, elemex connectors, fuse fittings, isolators etc.- Cleaning and tightening of bus bars and cable connections.
07)	Overhauled the following motors : H-4402/2 & H-4402/3.
08)	Carried out maintenance of all lighting distribution boards, installed in the plant for replacement of defective switches, burnt out fuse fittings, connectors, cables etc.
09)	Carried out checking of terminal boxes of following motors for loose connections, burnt out cable leads and rectified the same : P-4101 A/B/C, H-4401 1 TO 8, H-4402/1, P-3302 A/B, P-3301 A/B, P-3201 A/B/C, P-3202 A/B, P-3102 A/B, K-3101, K-3001 A/B P-3203, P-4402, P-4401 C/D, K-4202 A/B, K-4203 A/B, P-4203, P-4204 A/B, P-4206 A/B/C, P-4207 A/B, P-4209 A/B, P-4301 A/B, P-4501 2/3, P-4502 A/B/C & P-4511 A/B.
10)	Provided temporary connections of flood lights, handlamps in boiler, water treatment plant, cooling tower etc.

SHUTDOWN REPORT - JANUARY - 1995PLANT - OFFSITEINSTRUMENTATION JOBS

SR.NO.	DESCRIPTION
71	(A) <u>D.M.PLANT</u> :
	1) Cation segregation control valves, cleaning painting greasing done and stroke checking and hand well operation checked.
	2) Cation unit 1 to 5 inlet control valves cleaning and greasing done and stroke checking and handwell operation checked.
	3) Conductivity meter sample line flushed, wiring checked.
	4) PMB C4 V4, PMB2 V2 top and bottom plate assambiys replaced.
	5) Anion-3 V-3, SMB3 V3, SMB2 V1 control valve diaphragms replaced. Also cleaning and greasing done.
	6) DM1 to DMS butterfly valve were serviced, painted and their stroke checked.
	7) Cation / Anion PMB/SMB filed tubing dressing work done.
	8) All level switches , local as well as junction box termination checked.
	9) Control room contactors were cleaned and all terminals tightended.
	10) All soleniod valves terminals were checked and tightened.
	11) All terminal strip connections were tightened.
	12) Provided air supply header for recording control stations.
	(B) <u>COOLING TOWER</u> :
	1) Fourteen Nos of thermowells for cooling water turbines were modified.
	2) Steam valves greasing and stroking done.
	3) Basinelevel transmitter was checked and calibrated.

(OFFSITE)

SR.NO.	DESCRIPTION
(C)	<u>OLD I.G.PLANT :</u> <ol style="list-style-type: none">1) T-1 Timer was not working properly, replaced with an electronic timer. Set the new timer at one minute time delay.2) Attended start up jobs.
(D)	<u>NEW I.G.PLANT :</u> <ol style="list-style-type: none">1) MICV 5501/5502 were overhauled & their operation was checked.2) Attended start up jobs.
(E)	<u>OLD BOILER :</u> <ol style="list-style-type: none">1) Greased and stroking checked of PIC-5151 steam control valve.2) Attended start up jobs.3) BFW flow transmitter impulse line was snapped. It was rectified.
(F)	<u>NEW BOILER :</u> <ol style="list-style-type: none">1) Derator overflow control valve removed and brought to inst. workshop. A fine cut is taken on plug's guide portion was well seating portion. Lapping is done and finally valve is assembled and fixed back. Now there is no passing. Checked it's operation from control room.2) FT-2, FT-21 Transmitters overhauled and calibrated.3) All draft gauges tapping points flushed.4) O2 analyser impulse line flushed.5) Feed water control valve removed for gasket inspection and fixed back again.6) All BTV cleaned and air leakage checked. Also limit switch operation checked. Checked BTV operation from BMS panel.7) HOHIV / HORV cleaned and air leakage checked. Also limit switch operation checked.8) All dampers overhauled and their operation checked.9) Thirteen Nos of batteries replaced. Checked performance of UPSS.10) Oil gun engagement switch overhauled and performance checked.

SR.NO.	DESCRIPTION
11)	Checked stroke of following control valves. <ul style="list-style-type: none">a) 100% BFWb) 30% BFWc) TCV-1 and TCV-2d) PIC-1 and PIC-2e) Soot blowing control valvef) CCV-21 & CCV-22
12)	Drum level - switch operation checked.
13)	Eye-Hye operation checked. One electrone (+6) was replaced.
14)	Ignitor gun assambly checked. Flushed L.P. & H.P.tapping. Sparking from main panel checked. Gas solenoid was replaced.
15)	Flame scanners operation was checked for all flame scanners.
16)	Following 44 or local controllers overhauled and their synchronisaton checked. <ul style="list-style-type: none">a) TCV-1 & TCV-2b) South blowingc) Gas valve controllerd) Deraotr level & pressure controller
17)	Replaced soleniod valve of HOHT valve
18)	Filled glycol in fueloil flow transmitter and day tank level transmitter.
19)	Provided steam tracing in fule oil flow transmitter. Tapping from 14 ata steam headed was taken.
20)	Feed water pump removed pressure gauges for mech.maint. job and were fied back after their job was over.
21)	Relocation of FI for BFW pump was done.
22)	Overhauled control room regulators.
23)	One contactor was replaced in BMS panel (for scavanging valve)
24)	Fule air damper positioner was overhauled and checked it's performance. Also provided aluminium cover with glasswool.
25)	Receiver recorder of BFW flow and drum level and PRC-5 were checked and calibrated. Seal leak also checked.

SR.NO.	DESCRIPTION
26)	Following controller's fillaper nozzle cleaned.
	<ul style="list-style-type: none"> a) Steam pressure controller b) BFW flow controller c) Drum level controller d) Super heater and desuperheater controllers
27)	Dearator level and pressure control valves were overhauled strock checking done.
28)	Covering up filed instrument (PI,II,Transmitters,control valve positioners) was done.
29)	Dearator level & pressure transmitter fillaper nozzle and relay cleaned.
30)	Attneded start up jobs

SHUTDOWN REPORT - JANUARY - 1995PLANT - OFFSITE

TECHNICAL DEPARTMENT JOBS

SR.NO.	DESCRIPTION
81	(01) Provided structural steel frame work in CW sump (Urea side CT sump) for proposed steel screen gate on CW pump inlet (inside sump).
	(02) Provided extension of 6" NB drain / discharge line for disposed of chormate sludge from existing chormate sump to Malathion plant sump.

SHUTDOWN REPORT - JANUARY - 1995

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PLANT - B&MHMECHANICAL JOBS

SR.NO.	DESCRIPTION
01	P-3102/B NH3 LOADING PUMP MECH.SEAL LEAK : Due to leaking of Mechanical seal assembly & pump jamming after thorough checking the decision was taken for replacement / overhauling of defective impeller assembly & mechanical seal. The repaired impeller assembly with shaft and bowls drawn from main stores, which was kept ready for the use and installed in the defective pump. The pump was made available on 3/2/95 for operation after successful trial.
03	M-2116 RECLAIM MACHINE : (A) All coupling rubber bushes replaced (B) All gear box oil replaced (C) Link Conveyor gear box attended for adjustment of bearing play and oil seals problems. (D) Complete greasing done. (E) Replaced the dented/twisted scraper blades.
21	CONVEYOR BELT JOBS : (1) <u>M-2110 CONVEYOR BELT REPLACEMENT :</u> (A) The complete belt of 600 mm width replaced with new one due to cracks developed in the running belt. The total length of this replaced belt is 150 metres. (B) Replaced the both side defective skirt rubber with new one. (C) Reconditioned the defective return rollers and refixed back. (D) Replaced the troughing rollers towards the driven side up to the length of skirt rubber. (E) All the carrier rollers repaired & oiling done in the bearings while belt running. (F) Complete painting done on Conveyor structure. (G) The coupling bushes & oil of gear box replaced.

SR.NO.	DESCRIPTION
(2)	M-2121 CONVEYOR BELT :
(A)	One No.22 meter long fresh conveyor belt of 750 mm width replaced in place of defective belt portion where as existing belt repaired at two places and made the belt available for operation.
(B)	Repair and replaced the return rollers.
(C)	Repair & replaced the carrier rollers and oiling done.
(D)	Both side skirt rubber replaced.
(E)	All troughing rollers reconditioned.
(F)	Complete painting done on Conveyor structure.
(G)	The M.S.door of M-2121 on the way of B&MH side replaced with new.
(H)	Painting on R.C.C. ceiling inside the M-2121 belt gantry done.
(I)	The unwanted dust line of 6" & 4" removed from the vibrating screen side top.
(J)	The cleaning facility in all the dust lines of M-2121 area were made and flaper type shut of doors provided at elbow portions.
(K)	Gear box coupling bushes replaced by new ones.
(L)	Replaced the gear box oil.
(3)	M-2122 CONVEYOR BELT :
(A)	One 20 meter fresh piece of belt replaced in place of defective belt.
(B)	MFG-60 Follard bearings (2 numbers) replaced in tail pully shaft.
(C)	Replaced the skirt rubber.
(D)	Repaired & replaced the carrier roller and return rollers.
(E)	The hopper flapper door operating lever attended for smooth operation and new pin replaced after repairing the holes of shaft and lever.
(F)	Gear box Coupling bush replaced and new oil filled.

SR.NO.	DESCRIPTION
(H)	Tripper attended for preventive maintenance of chain sprocket. Gear box and coupling bushes repaired / replaced.
(I)	Complete painting done on conveyer structure.
(4)	M-2112 CONVEYOR BELT :
(A)	Replaced the gear box oil & coupling bushes.
(B)	Replaced /repaired the return rollers and carrier rollers.
(C)	Oiling done in all the rollers while running of belt.
(D)	Complete painting done on M S structure.
(5)	M-2117 CONVEYOR BELT :
(A)	Replaced the gear box oil & coupling bushes.
(B)	All carrier rollers attended for oiling and repairing of return rollers.
(C)	Complete painting done on M.S.structure.
(6)	M-2137 DUST CONVEYOR :
(A)	Complete belt of 750 mm width & 28 meter length replaced with new one.
(B)	Belt adjustment mechanism attended for overhauling and smooth operation.
(C)	All rollers attended for free operation and replaced some return rollers.
(D)	Painting done on complete structure.
(7)	PACKER SCALES & HOPPERS :
(A)	New doors and shutter plates provided in packer scales.
(B)	Complete painting done in hoppers and packer scales.
(8)	STITCHING MACHINES :
(A)	The V-belt guards repaired with new hinges & made noise less for smooth operation of the stitching machines.
(9)	SLAT CONVEYORS :
(A)	Attended all gear boxes for oil / Coupling bushes replacement.
(B)	2 Nos of MIG-60 / MP6 60 bearing replaced.

SR.NO. DESCRIPTION

OTHER JOBS :

NAPHTHA TANK AREA :

- (A) The fire hydrant lines of foam tank fourers both in A/B tank replaced as per the ultrasonic thickness measurement report from inspection deptt.

TRUCK LOADING ARMS/RAIL TANKERS :

- (A) Both loading arms attended for swival joint repairs and made them free from leakages.
- (B) 1 No loading arm of Rail tankers replaced and spare arm repaired.

PLANT SHUTDOWN -- JANUARY -- 1995

PLANT -- B&MH

CIVIL JOBS

SR.NO. DESCRIPTION

- 51 Following Civil jobs were carried out.
1. Epoxy painting on sides & ceiling of conveyor gantry of M-2110 and M-2121.
 2. Repairing of R.C.C. pre-cast suspender and bracing of gantry No.2112 by recasting the 14 Nos of bracing.

PLANT SHUTDOWN -- JANUARY -- 1995PLANT -- B&MHELECTRICAL JOBS

SR.NO.	DESCRIPTION
01	01. Carried out maintenance on transformer 5A & 5/B for - a) Checked and tightened the primary/secondary end termination cables. b) Carried out testing of oil of Main tank & Marshalling boxes. c) Reactivated the silica gel in dehydrating breathers. d) Checked trip circuits and protective system.
02.	Carried out preventive maintenance of TMB/SIEMENS make LT ACBS installed in MCC-4 and MCC-7 : -- Replaced defective parts and worn out contacts. -- Lubricated the mechanism. -- Checked trip and close timings of CB for uniform closing and opening of breaker poles. -- Checked contact pressure and adjusted as required.
03.	Preventive maintenance carried out of MCC-4, MCC-4A & MCC-7: -- Checked all feeder compartments and replaced defective contactors, contacts, timers, elemex connectors, fuse fittings, isolators etc. -- Cleaning and tightening of bus bars and cable connections.
04.	Overhauled the following motors -- M-2110 and M-2112.
05.	Repaired/Replaced all light fittings installed on conveyors.

PLANT SHUTDOWN - JANUARY - 1975

100

PLANT - BMM

INSTRUMENTATION JOBS

SR. NO. DESCRIPTION

71 (A) COMPRESSOR - B :

- 1) IID-3058 checked level transmitter for loose connection. Also checked calibration of leveltrol. (Interstage cooler) checked high and low alarms. High alarm comes at 80% and resets at 73% low alarm comes at 10% and resets at 12%.
- 2) Checked extra high level trip alarm of interstage cooler. It works perfectly well.
- 3) Painting of control valves was done.

(B) PACKER SCALE JOBS :

- 1) Disconnected both load cells of packer scales 1, 2, 3, 7 and 8 for safety for carrying out welding work by Mech. Maint.
- 2) PS No. 2 one load cell mounting bolt broken in the mounting bracket removed the mounting bolt by extractor. Reconditioned the hand switch mounting support.
- 3) P.S. No. 3 modified load cell junction box. The bottom flapper prox switch wiring was transferred in solenoid valve terminal box provided rubber gasket in solenoid terminal box, prox switch box, tolerance reset box.
- 4) P.S. No. 1, 2, 3 load cells junction box :
Removed old terminal strips and provided new PCB type terminal blocks which provided separate connection of each load cell, pelling is done by PCB.
- 5) P.S. No. 1 support for handswitch mounting was replaced by new and proper one.
- 6) Following jobs were done in all packer scales.
 - a) Cleaned all prox switch junction boxes and changed rusted terminal blocks.
 - b) Overhauled all handswitches.
 - c) Cleaning and adjustment all prox switches.

SER. NO. DESCRIPTION

- d) Cleaning scraping and repainting with epoxy paint of following item in all packer scales.
Load cell boxes, load cell junction boxes, 440 VAC incoming junction boxes, solenoid valve junction boxes, standered weight (5 Kg 10 Nos) box, proxiswitch junction box loadcell cover & handswitch mounting supports.
- e) Internal & external cleaning of all main panels.
- f) Data pond of all packer scale were checked
- g) Blind all unnessour cable entry holes and other holes with N-seal paste to prevent dust entry inside the panel boxes.
- h) Checked all parameters & set up dialings and filed date of all packer scales and checked zero and span calibration with 50 Kg standard weight.
- i) Checkd each and all solenoid valve operation
- j) Provided plastic cover on all junction boxes.
- 7) P.S.No.3 changed remote local selection switch.

(C) LIBRA SCALES :

- 1) Cleaning of weighing platform, indication head & standered weights.
- 2) Calibration for zero & span with standered weights.

(D) BELT WEIGHER :

- 1) Cleaning of indicator & speed sensor, junction box and weighing frams.
- 2) Rerouted the cables propely
- 3) Checked speed sensor for proper mounting
- 4) Provided plastic cover on speed sensor, indicator, and junction box.

(E) Reconditioned and refilled the U tube manometer at Dicer station.

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d) Cleaning scraping and repainting with epoxy paint of following item in all packer scales.

Load cell boxes, load cell junction boxes, 440 VAC incoming junction boxes, solenoid valve junction boxes, standered weight (5 Kg 10 Nos) box, proxiswitch junction box loadcell cover & handswitch mounting supports.

e) Internal & external cleaning of all main panels.

f) Data pond of all packer scale were checked

g) Blind all unnessour cable entry holes and other holes with M-seal paste to prevent dust entry inside the panel boxes.

h) Checked all parameters & set up dialogs and filed date of all packer scales and checked zero and span calibration with 50 Kg standard weight.

i) Checkd each and all solenoid valve operation

j) Provided plastic cover on all junction boxes.

7) P.S.No.3 changed remote local selection switch.

(C) LIBRA SCALES :

1) Cleaning of weighing platform, indication head & standered weights.

2) Calibration for zero & span with standered weights.

(D) BELT WEIGHER :

1) Cleaning of indicator & speed sensor, junction box and weighing frame.

2) Rerouted the cables propely

3) Checked speed sensor for proper mounting

4) Provided plastic cover on speed sensor, indicator, and junction box.

(E) Reconditioned and refilled the U tube manometer at blower station.