

IFFCO
KALOL UNIT

P & S SECTION
MAINTENANCE DEPTT.
REPORT NO. 7/1984

REPORT

ON

ANNUAL TURNAROUND 1984

1.1.1984 - 25.1.1984

INDIAN FARMERS FERTILISER COOPERATIVE LIMITED

NAP/24484

INDEX

<u>Subject</u>	<u>Page No.</u>		
		<u>From</u>	<u>To</u>
<u>GENERAL</u>		I	V
<u>AMMONIA</u>			
Mechanical	-	1	25
Inspection	-	26	31
Civil	-	32	33
Instrument	-	34	38
Technical	-	39	-
<u>UREA</u>			
Mechanical	-	40	51
Inspection	-	52	56
Civil	-	57	-
Instrument	-	58	61
Technical	-	62	-
<u>OFFSITES</u>			
Mechanical	-	63	65
Inspection	-	66	67
Civil	-	68	-
Instrument	-	69	71
<u>B & M H</u>			
Mechanical	-	72	77
<u>ELECTRICAL</u>	-	78	79

IFFCO
KALOL UNIT

THE ANNUAL TURNAROUNDS AT A GLANCE

Sr. No.	Year	AMMONIA PLANT			Down time in days	UREA PLANT			REASON IF ANY
		Period From	To	Period From		To	Down time in days		
1.	2.	3.	4.	5.	6.	7.	8.	9.	
1.	1984	1.1.84	25.1.84	25	1.1.84	25.1.84	25	Planned	
2.	1981	12.4.81	10.5.81	29	8.4.81	12.5.81	35	101 B Headers	
3.	1979	21.5.79	12.6.79	23	21.5.79	12.6.79	23	K-1101/2 3rd Stage Cylinder	
4.	1978	21.2.78	15.3.78	23	21.2.78	23.3.78	31	101 3J Breakdown	
5.	1976/ 1977	5.12.76	22.1.77	49	5.12.76	24.1.77	51	101 JT Breakdown	
6.	1976	26.3.76	20.4.76	-	26.3.76	20.4.76	26	Planned	
7.	1975	6.5.75	21.5.75	-	6.5.75	21.5.75	16	Planned	

P/nap.

4

IFFCO
KALOL UNIT

P & S Section
Maint. Department

ANNUAL TURNAROUND - 1984

GENERAL

Sr.No.	Category	Quantity
1.	<u>Equipment utilised</u>	
(A)	<u>IFFCO</u>	
	65 Tonnes H.M. Crane	- 1
	15 Tonnes Coles Crane	- 1
	18 Tonnes Tata Crane	- 1
	3 Tonnes Forklift	- 2
	2 Tonnes Forklift	- 1
	Truck	- 2
	Generator welding set	- 12
	Transformer welding set	- 3
	Diesel Generator	- 1
	Air Compressor Centrifugal portable	- 1
(B)	<u>HIRED</u>	
	2 Tonnes Forklift	- 2

Sr.No.	Category	Quantity
2	(A) <u>IFFCO Departmental</u>	
	a) <u>Mechanical :</u>	
	Engineer	13
	Technician	42
	Rigger	4
	Mazdoor	15
	b) <u>Mechanical Services</u>	
	Engineer	8
	Technician	43
	Rigger	1
	Mazdoor	16
	c) <u>Electrical :</u>	
	Engineer	2
	Technician	26
	Mazdoor	4
	d) <u>Instrumentation :</u>	
	Engineer	6
	Technician	25
	Mazdoor	2
	(B) <u>IFFCO - PHULPUR :</u>	
	Engineer	2
	Technician	1
	(C) <u>HIRED :</u>	
	Welder	4
	Grinder	3
	Fabricator	5
	Rigger	46
	Crane Operator (including 1 from IPCL).	2
	Electrician	1

A special mention about manpower supplemented by trainees available during shutdown is quite relevant. We had 15 Nos of trainees in maintenance, in various trades.

IMPORTANT JOBS EXECUTED DURINGANNUAL TURNAROUND '84

Sr. No.	Name of the party	Job executed
<u>AMMONIA PLANT</u>		
1)	M/s. DeLaval, USA	Overhauling of 101 JT and 103 JBT
2)	M/s. MH Detric Eng. Co. Calcutta	Auxiliary Boiler burner job
3)	M/s. Harbour Eng. Co.	Metal locking of cracked bearing pedestal of 101 JT
4)	M/s. Usha Hydrodynamics Delhi	Hydrojetting of Coolers
5)	M/s. Dandy Valves, A'bad	Valves overhauling
6)	M/s. Radiant Engineers Baroda	Coolers cleaning
7)	M/s. Randhawa Construction Co. Baroda	Coolers cleaning and fabrication job. Testing of kickback control valve
8)	Chief Inspector of Boiler & Smoke Nuisance, A'bad	Waste Heat Boiler Inspection 101 CA/CB and 112-C
9)	M/S MRIDEV GEE Enterprised, BARODA	Changing of catalyst of 101 B & 101 D
10)	M/s. Natwar Parikh, Ahmedabad	Services of fork lifts
<u>UREA PLANT</u>		
1)	M/s. Dandy valves, A'bad	Overhauling of Relief valves
2)	M/s. Usha Hydrodynamics Ltd., Delhi	Coolers cleaning
3)	M/s. Smitha Engineers, Kalol	Fabrication jobs T-1501 crack, vent stack piping etc.
4)	M/s. Randhawa Construction Baroda	Fabrication jobs H-1423 flange H-1205 distributors

Sr.No.	Name of the party	Job executed
5)	M/s. Sandeep Vulcanisers	Belt replacement M 1403
6)	M/s. Jyoti Vulcaniser, Ahmedabad	Belt replacement
7)	Chief Inspector of Boiler & Smoke Nuisance, Ahmedabad	Boiler Inspection V-1501

OFFSITES

1)	M/s. Paharpur Marley Calcutta	Cooling Tower wood work
2)	M/s. Pan Elastomer Ahmedabad	Rubber lined, Cation-III
3)	Chief Inspector of Boiler & Smoke Nuisance, Ahmedabad	Boiler Inspection F-5111 (GT 2068) & F-5101/A (GT 1642)

B & M H Plant

1)	M/s. Jyoti Vulcanizer, Ahmedabad	Belt conveyors replacement
2)	M/s. Smita Engineers, Kalol	Fabrication job, Naptha feed pump strainer & pipe line work

Sr.No.	Name of the party	Job executed
--------	-------------------	--------------

CIVIL

- 1) M/s. MH Detrick (India) Pvt.Ltd., Calcutta Auxiliary Boiler roof Refractory etc.

- 2) M/s. PN Barot Kalol Prill Tower roof Polythylene Lining, expanded metal job with IPS.

- 3) M/s. Raj Constructions Kalol Anion III foundation and surrounding area etc.

TECHNICAL DEPARTMENT

- 1) M/s. Randhava Construction, Baroda Modification jobs

- 2) M/s. Smitha Engineers, Kalol Modification jobs

ANNUAL TURN-AROUND 1984

AMMONIA PLANT

MECHANICAL

Job code	Description
----------	-------------

1.0 AIR COMPRESSOR TURBINE 101-JT

- O1 The Rotor was taken out and sand blasting was done on the blades to remove deposits.
- O2 All the diaphragms from top and bottom casings were removed and thoroughly cleaned by sand blasting.

Diaphragms Modifications :

Normally moisture rings are plug welded with the diaphragms ; On long run plug welds get deteriorated in several instances, and thereby permitting the moisture rings to loosen. In case the moisture rings come out completely from the diaphragms, severe damage can occur to the rotor. To prevent this, extra fastening of the moisture rings was suggested by M/s. De Laval. We have carried out the extra fastening of the moisture rings to the diaphragms (5th, 6th & 7th) as per the procedure given by the representative of M/s. De Laval. (Refer Drawing attached herewith)

N.B. :

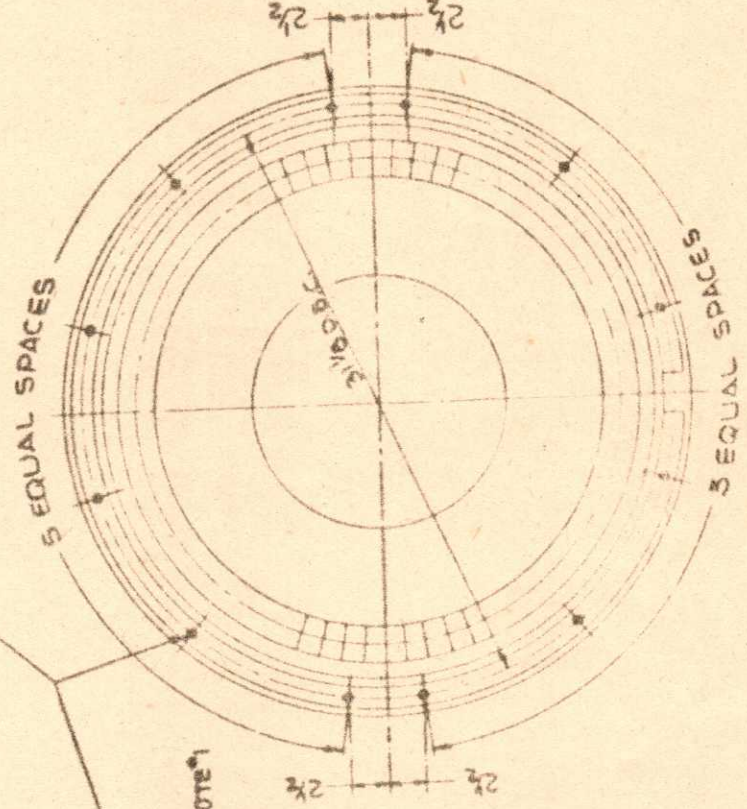
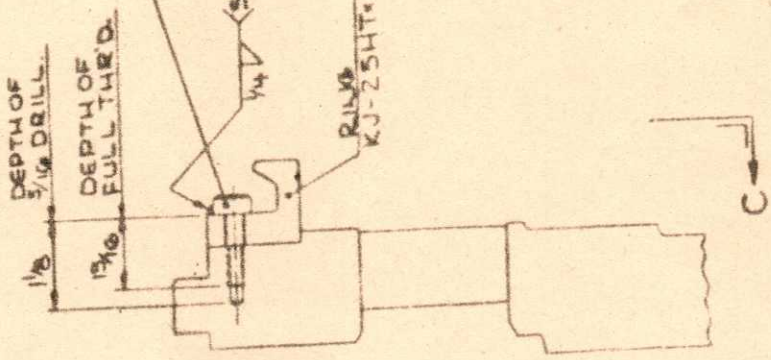
In our turbine, the plug welds of diaphragms were found in good condition, but to have extra precaution, the above modification was done.

O3 Bearing Pedestal Repair/Alignment

The bearing pedestal was taken out after putting 'I' Beam below the bottom casing half of the turbine for support. The bearing pedestal was brought to workshop.

QTY	MAKE FROM	MATL	W. DES. NO./SPEC. FILE	QTY	SYMBOL	DESCRIPTION

DRILLING (TAPPING NOTE IS WITH MOISTURE RING IN PLACE ON DIAPHRAGM.
 $\frac{5}{16}$ DRILL TO DEPTH SHOWN, $\frac{13}{32}$ C-BORE, $\frac{17}{32}$ DEEP, $\frac{3}{8}$ -16 TAP TO DEPTH SHOWN. 6-HOLES IN EACH HALF SPACED AS SHOWN ON $\frac{31}{8}$ D.B.C. TOTAL 12-HOLES.
 12-CAPSCREWS $\frac{3}{8}$ -16 \times $\frac{7}{8}$ LG MATL ASTM A574 (DELAVAL HARDWARE # 003030, MATL. 0404)



VIEW C-C

NOTES:
 1. TACK WELD EACH CAPSCREW IN PLACE USE $\frac{3}{32}$ DIA. ROD, INCO WELD A.

FOR DIAPHRAGMS

- KJ-52 BAE
- KJ-52 BAK
- KJ-52 BBC
- KJ-52 BBK
- KJ-52 DBA
- KJ-52 DBG
- KJ-52 DBH
- KJ-52 DDH
- KJ-52 DDK

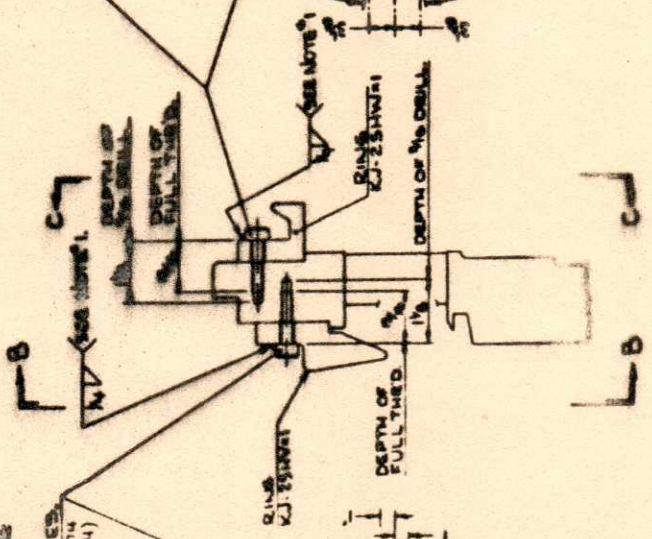
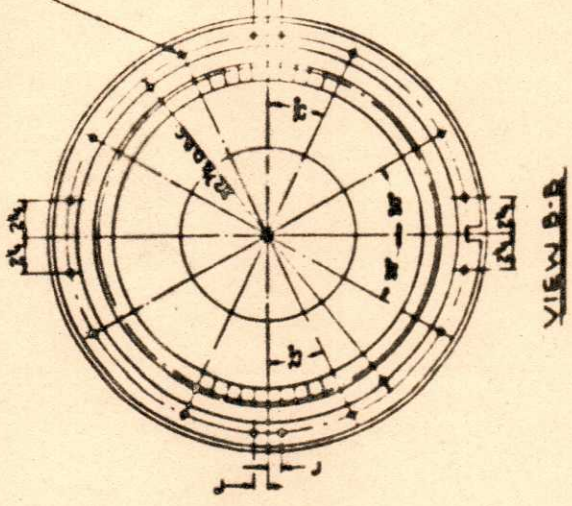
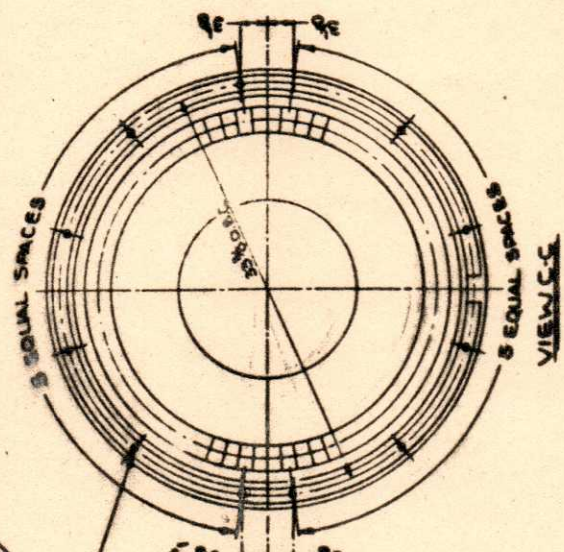
ZONE/CHK	ALTERATION	DATE BY	CHK WBY
STAGE #5			
KELLOGG AIR AMMONIA			
CERTIFIED FOR CONSTRUCTION			
SEE DD-20014 FOR TOL'S ETC NOT SPECIFIED DEPT			
SEE DD-20019 FOR IDENTIFICATION MARKINGS 2.2.1			
		TRENTON, N.J. 08650	
TITLE REWORK OF DIAPHRAGM WITH RING KJ-25HTx1			
SCALE	1:1	1ST ORDER	
DRAWN		CHECKED	
ENG. APP.		ISSUED	
FEDERAL CODE IDENT. NO. 16712		SHEET NO. 1 OF 1	

1079561

REV.	DATE	BY	APP.	DESCRIPTION

DRILLING & TAPPING NOTE IS WITH MOISTURE BINS IN PLACE ON DIAPHRAGM.
 1/8" DRILL TO DEPTH SHOWN, 1/32" C'BOSS 1/8" DEEP, 1/8-16 TAP TO DEPTH SHOWN.
 8 HOLES IN EACH HALF SPACED AS SHOWN ON 3378 D.B.C. TOTAL 16 HOLES.
 18-CAP SCREWS 1/8-16, 1/4" L. MAT'L ASTM A314 (DELAVAL HARDWARE #003030, MAT'L. 0404)

DRILLING & TAPPING NOTE IS WITH MOISTURE BINS IN PLACE ON DIAPHRAGM.
 1/8" DRILL TO DEPTH SHOWN, 1/32" C'BOSS 1/8" DEEP, 1/8-16 TAP TO DEPTH SHOWN.
 8 HOLES IN EACH HALF SPACED AS SHOWN ON 3378 D.B.C. TOTAL 16 HOLES.
 18-CAP SCREWS 1/8-16, 1/4" L. MAT'L ASTM A314 (DELAVAL HARDWARE #003030, MAT'L. 0404)



DATE		BY	

STAGE #6
 KELLOGG AIR AMMONIA

CERTIFIED FOR CONSTRUCTION
 PER RULES SET FORTH IN SPECIFIED PART
 SEE 80-2809 FOR IDENTIFICATION NUMBER 371
 SEE 80-2809 FOR IDENTIFICATION NUMBER 371

Transamerica
 Delaval

TREK: W. R. J. ORAN

TITLE: NETWORK OF DIAPHRAGM WITH RINGS NJ-254614 NJ-254614

SCALE: N.T.S.

DESIGNED BY: [Signature]
 CHECKED BY: [Signature]
 ENG. APP. [Signature]
 ISSUED BY: [Signature]

1871Z

NOTES:
 1. TACK WELD EACH CAPSCREW IN PLACE
 USE 1/8" DIA. 800, INCO WELD A.

- FOR DIAPHRAGMS**
- NJ-328AF
 - NJ-328AL
 - NJ-328BL
 - NJ-328CL
 - NJ-328DL
 - NJ-328EL
 - NJ-328FL

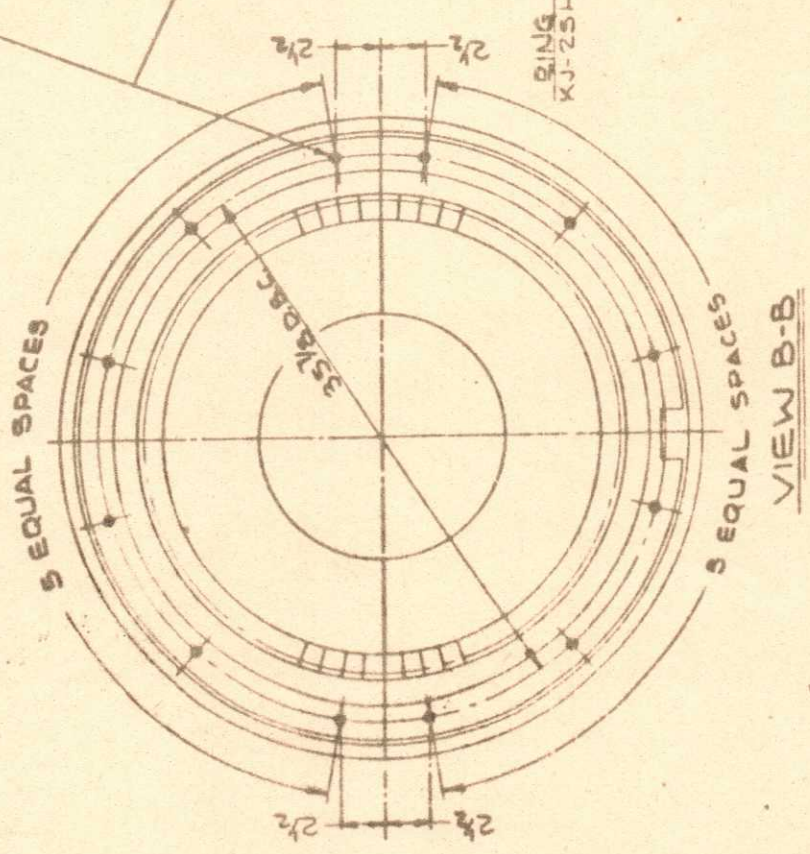
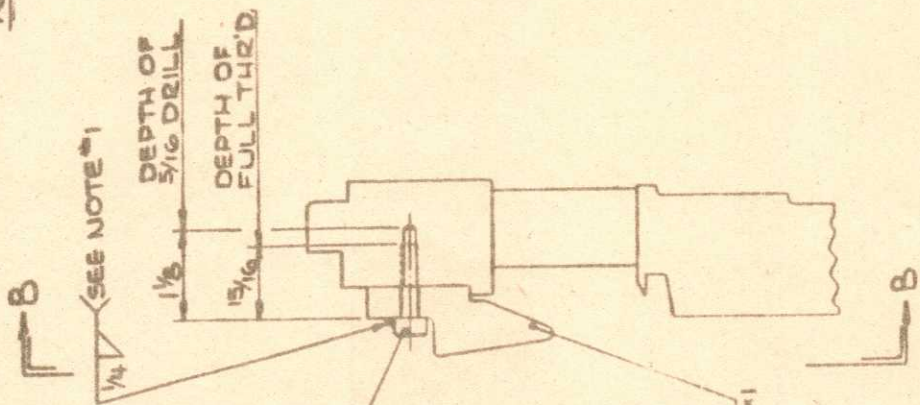
QTY	MAKE FROM	MATL.	BY LIST	SYMBOL	DESCRIPTION	WT
			ROUGH FILE			

DRILLING & TAPPING NOTE IS WITH MOISTURE RING IN PLACE ON DIAPHRAGM.
 5/16 DRILL TO DEPTH SHOWN, 1 1/2" C BORE
 1 7/32 DEEP, 3/8-16 TAP TO DEPTH SHOWN.
 6 HOLES IN EACH HALF SPACED AS SHOWN ON 35 7/8 O.B.C. TOTAL 12 HOLES.
 12 CAPSCREWS 3/8-16 x 7/8 LG. MATL. ASTM A5-4 (DELAVAL HARDWARE #003030, MATL. 0404)

NOTES:

- TACK WELD EACH CAPSCREW IN PLACE, USE 3/32 DIA. ROD. INCO WELD A.

FOR DIAPHRAGMS
 KJ-52 BAG
 KJ-52 BAM
 KJ-52 BBE
 KJ-52 BDM



ZONE/CHG	ALTERATION	DATE BY	CHK	APP
	STAGE 7			
	KELLOGG AIR & AMMONIA			
CERTIFIED FOR CONSTRUCTION				
SEE DO-20014 FOR TOL'S ETC NOT SPECIFIED DEPT				
SEE DO-20019 FOR IDENTIFICATION MARKINGS E21				
TRENTON, N.J. 08650				
TITLE REWORK OF DIAPHRAGM WITH RING KJ-25HZ-1				
SCALE	N.T.S.	1:1	ORDER	
DRAWN	BY	DATE	CHECKED	BY
ENG. APP.	BY	DATE	SHEET NO.	OF
			1	1
ISSUED	DATE	BY	SYMBOL	

FEDERAL CODE IDENT. NO. 16712

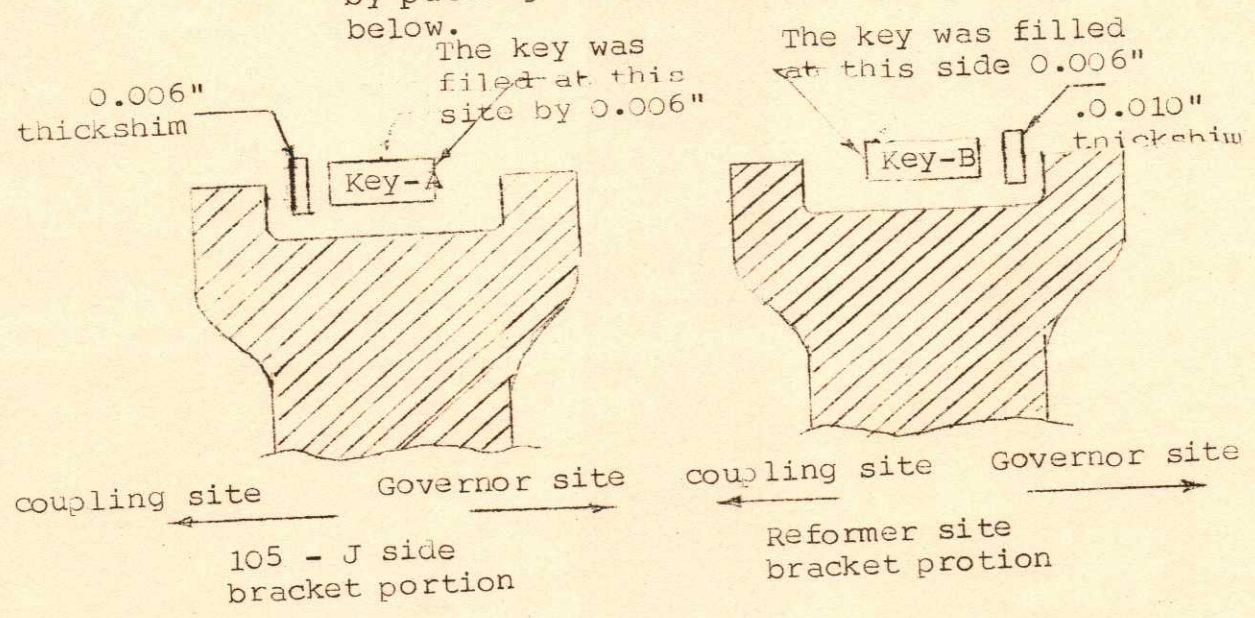
20-79562

Job code	Job description
----------	-----------------

The crack at key portion of bearing pedestal was repaired by metal locking as per following procedure.

- a) Welding was removed by grinding
- b) The cracked piece was knocked off
- c) Faces of cracked portions were ground and thoroughly matched by blue impressions.
- d) Cracked portions were properly clamped with bearing block
- e) Metal locking was then carried out
- f) Also the welding was carried out on the left over portion of metal locking for extra strengthening. The welding was carried out with 680 welding electrodes.

The repaired bearing pedestal was then brought to site and put in position and properly aligned by putting necessary shims as per sketch shown below.

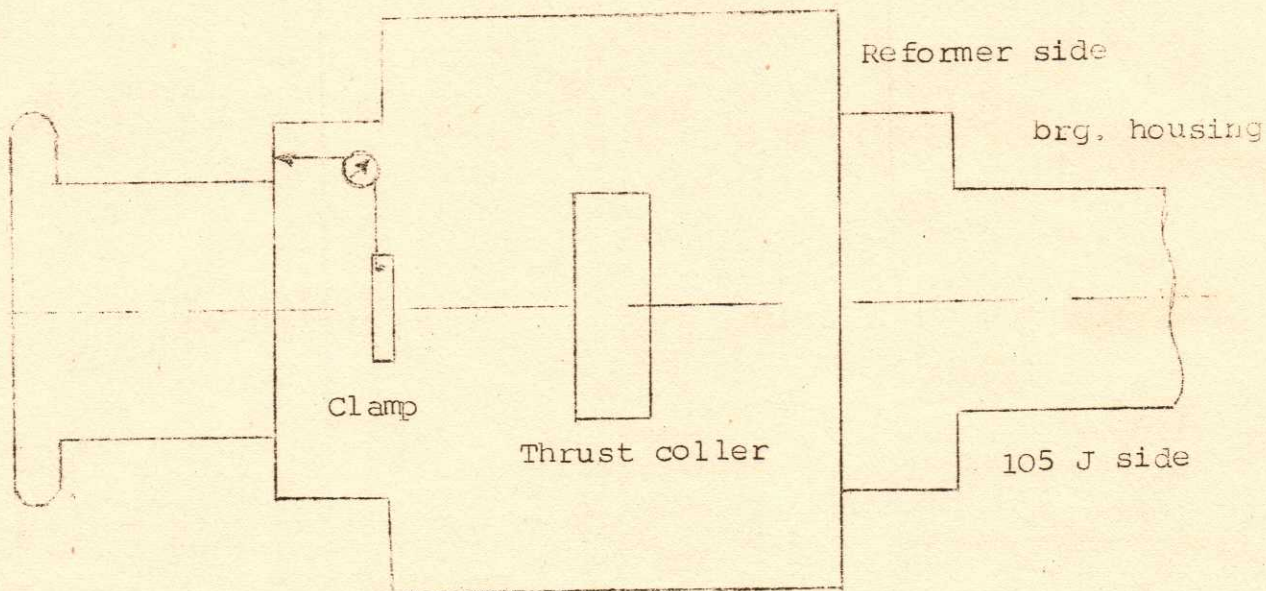


AMMONIA (MECHANICAL)

Job Code

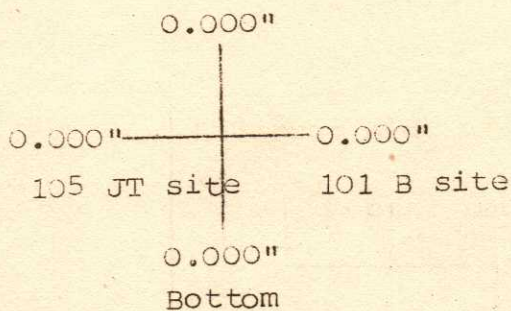
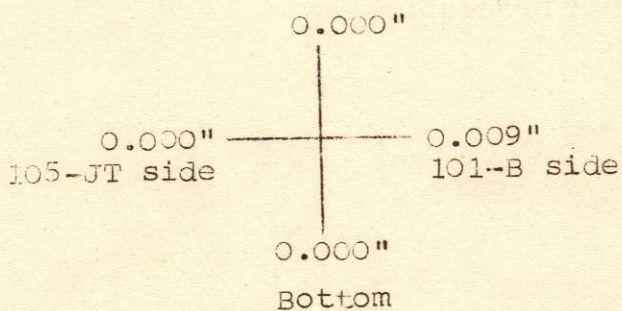
Job Description

Finally alignment readings were taken which are mentioned below.



Top

Top



Before alignment

After alignment

Job code	Job description
04	<u>Assembly of Turbine</u>

- a) The existing Thrust Collar was showing face runout of @ 0.002" + 0.003" on inactive side and non-uniform varying in its thickness. So the same was removed and replaced by old lapped.
- b) Duly modified diaphragms (after sand blasting) put in bottom half casing.
- c) The rotor was put in position and following readings were taken.

- Nozzle Ring clearance with
New thrust collar = 0.009"

To bring above clearance to required value nozzle clearance adjusting shims were corrected as follows.

Inner shim :	<u>Existing</u>	<u>New Corrected</u>
	0.323"	0.274"

Outer shim :	0.547	0.596"
--------------	-------	--------

With above corrected shims, nozzle ring clearance achieved = 0.060".

- Total Rotor axial float = 0.178"
- Total axial thrust = 0.011" (Thrust shim thickness 0.115")
(after changing thrust shoes)

AMMONIA (MECHANICAL)

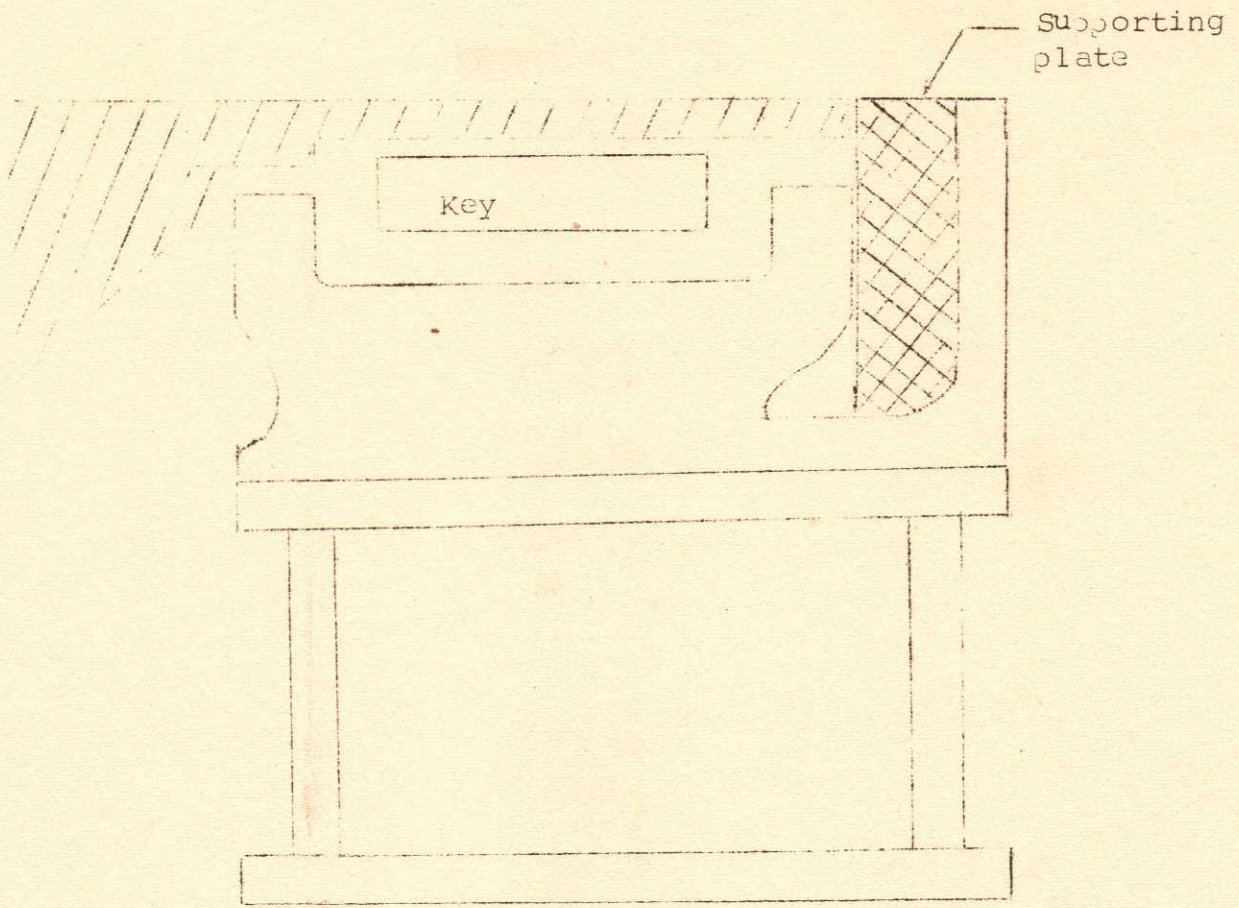
Job Code		Job Description				
Shroud	Blade Platform	Labyrinth Rings	Labyrinth rings	Blade Platform	Shroud	
Rotor Setting 0.058" Off Nozzle						
0.060"	0.055"	0.008"	STEAM FLOW	0.005"	0.058"	0.065"
0.062"	0.060"	0.004"		0.005"	0.060"	0.067"
0.055"	0.055"	0.004"		0.007"	0.058"	0.060"
0.065"	0.065"	0.009"		0.007"	0.065"	0.077"
0.060"	0.060"	0.010"		0.009"	0.060"	0.060"
0.120"	0.117"	0.010"		0.008"	0.117"	0.125"
0.122"	0.120"	0.008"		0.009"	0.118"	0.120"
0.127"	0.125"	0.009"		0.007"	0.120"	0.125"

Labyrinth ring clearance of Packing Box

THRUST END		COUPLING END	
0.008"	STEAM FLOW	0.005"	STEAM FLOW
0.004"		0.010"	
0.004"		0.005"	
0.009"		0.005"	
0.010"		0.005"	
0.005"	0.007"	0.004"	
0.007"	0.007"	0.007"	
0.009"	0.009"	0.009"	
0.009"	0.009"	0.009"	

- Oil Guard Clearance (Governor End) = 0.007"
- " " " (Coupling End) = 0.009"
- Journal bearing clearance (Thrust End) = 0.008"
- " " " (Coupling End) = 0.0085"
- Trip Cap Set at = 0.125"
- Overspeed tripped at = 7850 rpm (twice)

A solid supporting M.S. plate was kept adjacent to the bearing pedestal (see the sketch attached) for additional extra support.



AMMONIA (MECHANICAL)

Job Code	Job Description
----------	-----------------

Following spares are used.

- (1) Thrust Collar (Reconditioned spare) 1 No.
- (2) Thrust Shoes PM1026 1 Set
- (3) Base Ring PM1026C 1 No.
- (4) Ring KJ141BHx4 2 Nos.
- (5) " HJ141AFx7 3 Nos.
- (6) " KJ141BKx2 1 No.
- (7) Springs VGJ235 (for Labyrinths) 48 Nos.
- (8) Guard HJ588AV U/L 1 No.
(Oil Guard)

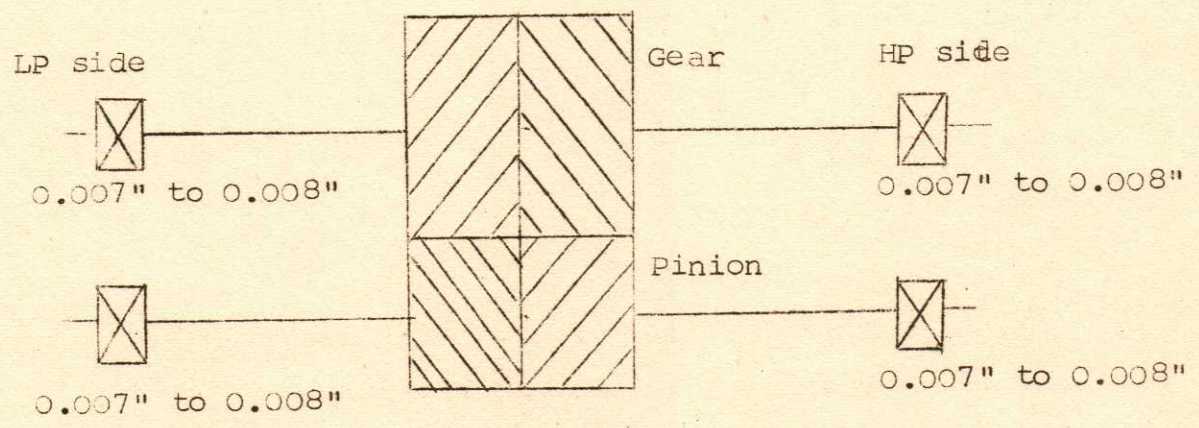
2.0

AIR COMPRESSOR - 101-J

01 GEAR BOX 101-JR

Bearing conditions were checked - found Okay.

Gear teeth condition - found Okay.



AMMONIA (MECHANICAL)

Job Code	Job Description								
	<u>Axial float: 0.013"</u> <table border="0" style="margin-left: 20px;"> <tr> <td>Y Allowable clearance of Bearing</td> <td>Y</td> </tr> <tr> <td>* Gear : 0.008" to 0.010"</td> <td>*</td> </tr> <tr> <td>* Pinion : 0.009" to 0.011"</td> <td>*</td> </tr> <tr> <td>* Endplay: 0.014" to 0.024"</td> <td>*</td> </tr> </table>	Y Allowable clearance of Bearing	Y	* Gear : 0.008" to 0.010"	*	* Pinion : 0.009" to 0.011"	*	* Endplay: 0.014" to 0.024"	*
Y Allowable clearance of Bearing	Y								
* Gear : 0.008" to 0.010"	*								
* Pinion : 0.009" to 0.011"	*								
* Endplay: 0.014" to 0.024"	*								

02 Axial float of "101-J HP Case
 Checked and found to be = 0.013"
 (Allowable = 0.008" to 0.012")

03 Axial float of "101-J LP Case
 Checked and found to be = 0.012"
 (Allowable = 0.011" to 0.015")

3.0 TURBINE FOR SYNTHESIS GAS COMPRESSOR -103 JBT

- casing.
- 01 The Rotor removal from / Deposits were found on the blades, so the sand blasting was done to remove deposits.
 - 02 All the diaphragms from top and bottom casings were removed. Sand blasting of all the diaphragms was carried out to remove deposits.
 Plug welding of moisture rings on all the diaphragms was found in good condition. So the representative of M/s. DeLaval suggested not to make modification on the diaphragms.
 - 03 Assembly of turbine
 - (a) The diaphragms were positioned, in bottom casing half.
 - (b) Then the rotor was put in position and following readings were taken.
 - Nozzle Ring clearance = 0.060"
 - Axial thrust before opening = 0.010"
 - Total Rotor axial float with cover on = 0.185"

AMMONIA (MECHANICAL)

Job Code	Job Description					
Shroud	Blade Platform	Labyrinth rings	Labyrinth Rings	Blade Platform	Shroud	
Rotor Setting 0.055" Off Nozzle						
0.060"	0.060"	0.008"	STEAM FLOW ↓	0.006"	0.060"	0.060"
0.065"	0.062"	0.006"		0.007"	0.062"	0.065"
0.064"	0.060"	0.007"		0.007"	0.060"	0.066"
0.060"	0.060"	0.008"		0.008"	0.062"	0.062"
0.055"	0.055"	0.007"		0.008"	0.055"	0.058"
0.065"	0.065"	0.009"		0.009"	0.064"	0.062"

LABYRINTH CLEARANCES OF PACKING BOX

THRUST END		COUPLING END	
0.007"	0.010"	0.010"	0.004"
0.007"	0.007"	0.005"	0.007"
0.007"	0.007"	0.005"	0.009"
0.005"	0.007"	0.005"	0.009"
0.005"	0.008"		

- Journal bearing clearance (Thrust End) = 0.010"
- " " " (Coupling End) = 0.010"
- Thrust End play = 0.010"

- While carrying out overspeed Trip test, it was not being tripped because the Overspeed Trip Valve (1/4" Three way Valve Vair model 34.046.16) was not operating freely.

The overspeed trip valve was dismantled and found its 'O' Rings were damaged. Also one of the "port valve" (out of 3 Nos.) was found broken.

- The three port valve was made in our workshop from brass material.

AMMONIA (MECHANICAL)

Job Code	Job Description
----------	-----------------

- The spare 'O' Rings were not available. So the 'O' Ring were made from local party after confirming the proper size.

+0.000"

Size of 'O' Ring 0.732-0.002" ID x 1.125" \varnothing O/D.

The overspeed trip valve was assembled and again it was tried to trip the turbine, but no improvement. It was then decided to increase the spring tension by placing the washer below the spring.

Thus a washer of 1/8" thk was put and again the trial was taken. Finally the turbine overspeed tripped at 11980 rpm.

- Overspeed trip : 11980 rpm (twice).

Following spares were used.

FOR TURBINE

- | | | |
|-----|----------------|---------|
| (1) | Ring GJ141AGx1 | 3 Nos. |
| (2) | Ring GJ141AJx1 | 1 No. |
| (3) | Spring VGJ235 | 32 Nos. |

F.R GOVERNOR DRIVE

- | | | |
|-----|------------------------|--------|
| (1) | Coupling S1020AS | 1 No. |
| (2) | Coupling Hub S1020ARx8 | 2 Nos. |
| (3) | Bearing M.263Z | 1 No. |

- 'O' Ring for Coupling Guard between 103-JAT to 103-J LP Case replaced.

Also Grafoil Tape was inserted between the horizontal split surface of the same Guard, to prevent oil leakage.

Ammonia (Mech.)

Job code	Job description
----------	-----------------

4.0 REFRIGERENT COMPRESSOR 105-J HP CASE

01 As a preventive measure axial thrust clearance was measured which was found to be 0.015" (Recommended axial thrust clearance = 0.009" to 0.013").

Thrust bearing was dismantled.

Dimensions of outer and inner shims are

Outer Shim :	$\frac{OD}{7.410''}$	$\frac{ID}{6.000''}$	$\frac{THK}{0.363}$
--------------	----------------------	----------------------	---------------------

Inner Shim :	-do-	-do-	-do-
--------------	------	------	------

A new outer shim of 0.368" thickness was made and finally thrust bearing with new Inner shim (0.373" thickness) ; Outer shim (0.368" thickness) thrust shoes and base ring was assembled and thrust found to be = 0.015".

Journal bearing clearance 0.008" (Okay)
(Recommended : 0.004" to 0.007")

Following spares were used

Thrust Shoes Collar (PM 1076 B)	1 set
Base Ring	

02 105-J LP Case

Preventive Check :

Thrust clearance : 0.010" (Recommended 0.011" to 0.015")

Journal Bearing = 0.0105" (Recommended 0.006" to 0.008")

5.0 THRIBINE FOR REFRIGERENT COMPRESSOR 105-JT

Preventive Check

Thrust Clearance = 0.014" (Recommended : 0.008" to 0.012")

AMMONIA (MECHANICAL)

Job Code	Job Description
----------	-----------------

6.0	<u>TURBINE BFW PUMP - 104-JT (ERRY TURBINE)</u>
-----	---

01 Following jobs were carried out as a preventive measure.

clearance
 Axial Thrust/Measured = 0.016" (Okay)
 (Recommended 0.011" to 0.016")

Journal Bearing Clearance = 0.009" - Okay
 (Governor End side)

Journal Bearing Clearance = 0.007" - Okay
 (Coupling Side)

Carbon Ring Clearance = 0.025" to 0.035"

It was decided to replace the Carbon Rings.
 The Carbon Rings along with quarter springs
 replaced and clearance found to be = 0.020"
 (Recommended: 0.020" to 0.025" diametrical)

02 Lube oil of pump and turbine console was flushed out and charged with fresh oil.

Spare used

(1) Carbon Ring (53821)	2 Sets (16 Nos.)
(2) Springs for Carbon Ring (42044)	2 Sets (16 Nos.)

7.0	<u>I.D. FAN TRAIN 101BJ and 101BJT</u>
-----	--

Following jobs were carried out as a preventive measure.

Bearings of complete train were checked.

01 FAN:

Bearing clearance (G.B. Side) = 0.012"
 Bearing clearance (Cooling Tower side) = 0.012"

The complete oil of G.B. was flushed and charged with fresh oil.

AMMONIA (MECHANICAL)

Job Code Job Description

03 TURBINE

Bearing Clearance (G.B. Side) = 0.011"
Bearing Clearance (Governor End Side) = 0.011"

8.0

HEAT EXCHANGERS

01 MEA Solution Cooler - 108C

All the four coolers were brought down and tube bundles were pulled out for cleaning. The tube bundles were thoroughly cleaned by hydrojetting. After cleaning the tube bundles, hydrotest was carried out.

Shell side at 7kg/cm²
Tube side at 6kg/cm² ~~and~~ testing joint between 108 C and 101 E also tested.

one tube was plugged in 108-C-1/ A (Top Cooler - 101E side)
5th Row 1 tube (Reformer side)

02 MEA Solution Exchanger - 109C

Bottom two coolers:

The tube bundles were pulled out in position and thoroughly cleaned by hydrojetting.

After cleaning tube bundles, hydrotest was carried out.

Tube side - 30 kg/cm²

Partition plate and rich MEA outlet nozzle of both the bottom channel cover had corroded, which were built up with SS310 electrode and machined.

03 Methanator Effluent Cooler - 115C

Tube bundle was pulled out and thoroughly cleaned by hydrojetting and finally hydrotested.

Shell side at 10 kg/cm²

AMMONIA (MECHANICAL)

Job Code Job Description

04 Synthesis Gas Compressor Interstage Cooler - 116C

Tube bundle was pulled out and thoroughly cleaned by hydrojetting and finally hydrotested.

Shell side at 10 kg/cm²

05 Synthesis Gas Compressor After Cooler - 124C

The shell was pulled out on the rail. Heavy deposits were found on the tubes. The tube bundle was thoroughly cleaned by hydrojetting. While hydrotesting at 15kg/cm² on shell side, pressure was not holding. To rectify this, the diaphragm was removed by Matra m/c. Again the shell was pressurised and found following tubes leaking which were plugged and welded.

	<u>Row No.</u>	<u>Tube No.</u>	(counting from Converter side)
From	4th	2,5	
Centre	5th	5	
to top	9th	3	
		<hr/>	
	Total:	4 tubes	plugged and welded

06 Air Compr. Interstage Cooler No.3 - 131JC

The tube bundle was pulled out. The condition of baffle plate and tierods were found very bad. The tube bundle was thoroughly cleaned by hydrojetting and finally hydrotested at 15kg/cm².

07 Following coolers were cleaned by hydrojetting machine.

- a) 127C Hydrotest at 24kg/cm² (shell side)
- b) 130JC -do-
- c) 129JC -do-
- d) 128C -do-
- e) 101JC -do-

AMMONIA (MECHANICAL)

Job Code Job Description

- f) 174C
- g) 175C
- h) 113C
- i) 110CA/CB
- j) Oil Coolers of 101J/105J and 103J consoles
- k) Gland Condensers
- l) Inter after Condensers of old and new 101-JC

Over and above 108C, 109C, 115C, 116C, 124C were also cleaned by hydrojetting.

N.B. For all the coolers, while boxing up whenever required, new gaskets were provided.

REPORT OF INSPECTION BY C.I.B.

01 The boiler inspection by Chief Boiler Inspector was carried out for 112C (GT-1631) and 101CA/CB (GT-1632).

Hydrotest of 101CA/CB at 130kg/cm² - 9.1.84

112C at 12kg/cm² - 9.1.84

Open Inspection of 101F and 112C - 12.1.84

02 C.B.I. Inspection 12kg/cm²
Hydrotest 7kg/cm²

One tube found leaking which was plugged and seal welded.

	<u>Row</u>	<u>Tube</u>	
From	13	4	(From 101D/102 D side)
Top			

For easy entry from gas side and plugging the tube, two flanged joints were made on Gas side elbow.

18" Ø 300 ~~Ø~~ flanged joint was made on both the Gas side elbow.

This enables us to plug leaky tube, without removing the side domes.

AMMONIA (MECHANICAL)

Job Code Job Description

Also deflector type plate was provided on the flange joint to divert the direct entry of gas into control room in case the gasket leaks from the flange joint

Material used for above modification :

- C.S. 18" Ø x 300 ~~W~~ WRF flange 2 Nos.
- C.S. 18" Ø x 300 ~~S~~ SRF flange 2 Nos.

10.0

R.V. POPPING/SETTING OF 101F AND SUPERHEATER

All the three RV's of 101F and one Superheater R.V. were Lapped in position. The popping was done and setting is mentioned below.

	<u>Lifted</u>	<u>Reset</u>
(1) 101F Middle RV	118kg/cm ²	113kg/cm ²
(2) " South RV	113.5kg/cm ²	108kg/cm ²
(3) " North RV	115.5kg/cm ²	111kg/cm ²
(4) Superheater RV	112.0kg/cm ²	107kg/cm ²

11.0

CO₂ ABSORBER - 101E

01 All the three manholes were opened and joint inspection of shell as well as siever trays was carried out with Inspection section. Following was the observation.

TOP DISTRIBUTOR AND DEMISTER PADS

Found in good condition. There was severe corrosion rate observed in the bottom half portion i.e. from 10th tray assembly to 20th tray assembly. There was thinning out of the shell from 1 mm upto max 5 mm in the different localised area especially below the down comers.

AMMONIA (MECHANICAL)

Job Code Job Description

02 Tray Assembly

- a) The last three tray assemblies (20th, 19th & 18th) were corroded badly;
- b) There was thinning of perforated trays which were not broken
- c) The Down Comers were found broken at various places and eaten away completely
- d) From 17th tray assembly upto 11th tray assembly, the corrosion rate was reducing moderately, however the downcomers in all of them were found corroded maximum.

03 Bottom Gas Distributor

It was found corroded and broken very badly. Due to time limit, it was decided to replace bottom 5 trays (i.e. from 20th to 16th). The local party was contacted to fabricate tray within a short time of 4 to 5 days. The fabricated trays arrived in time. Finally all the 5 assembly of trays were positioned in the vessel after cleaning them with caustic solution.

04 The Gas distributor with Header was also replaced by Stainless Steel one as the removed one was found badly damaged. (N.B. The distributor along with the header was fabricated well in advance in our workshop from SS 304 material)

05 The damaged area of shell was repaired by coating them with M.Seal.

06 Material used

- a) Tray assy 16th to 20th along with Sealpan and Hardwares 5 Assy.
Material
- b) Bottom Gas Distributor with Header in SS 304 1 Set

HARMONIA (MECHANICAL)

 Job Code Job Description

12.0 MODIFICATION FOR NAPHTHA DUPLEX STRAINER

The duplex strainer of naphtha fuel line was inoperable. It was already decided to provide another simplex strainer in parallel to the existing one with proper isolation valves etc. For this as far as possible the prefabrication of piping was already done to minimise the site welding job. Also the simplex strainer was fabricated in our workshop. During this shutdown, the same was installed in parallel to existing duplex strainer after making necessary line modification.

The attached drawing shows the arrangement of the modification done.

13.0 PROVIDING OF BLIND FLANGES

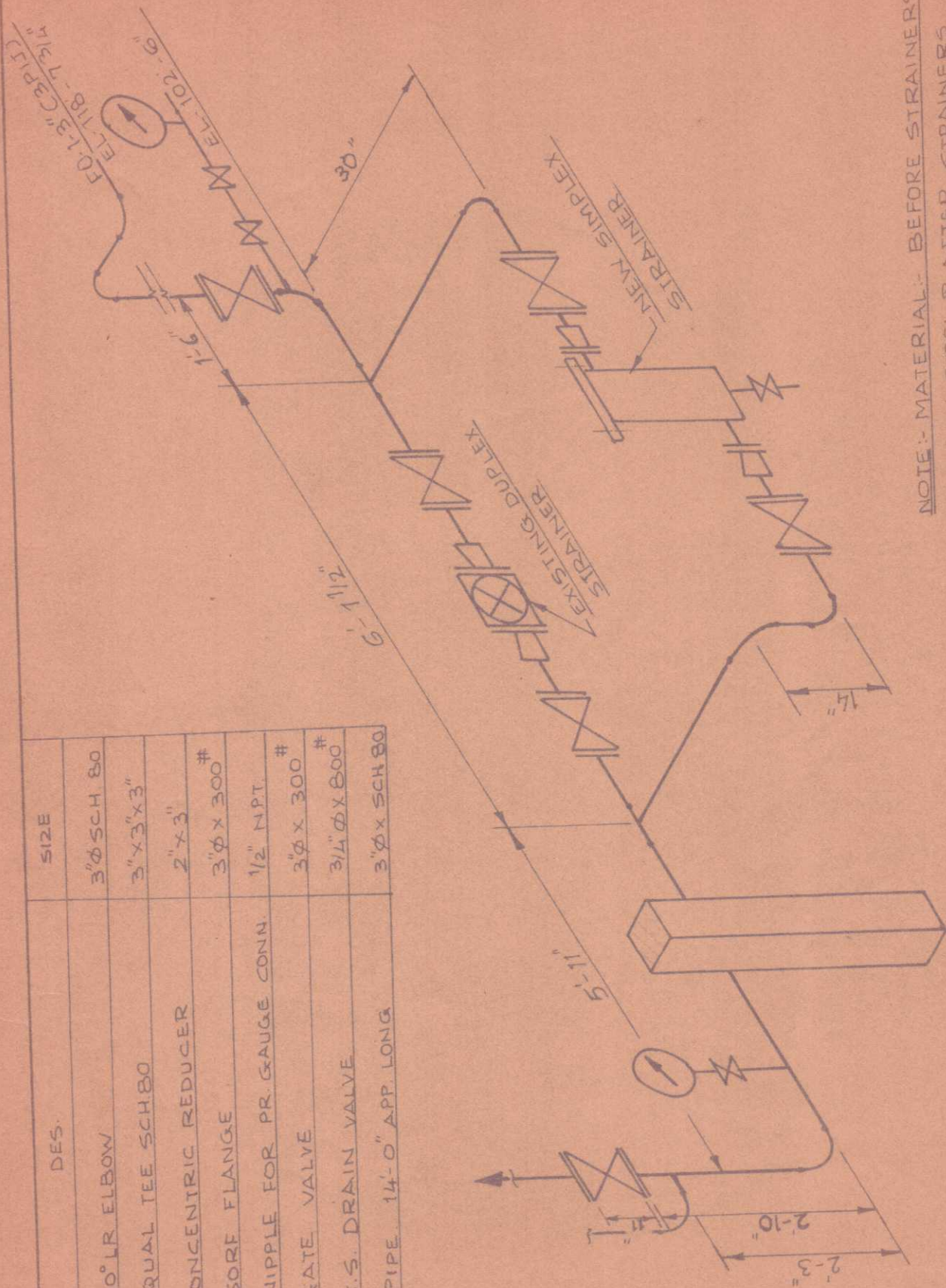
About 70 Binds were provided for carrying out different maintenance jobs and removed the same after maintenance jobs were completed.

14.0 PRIMARY REFORMER - 101B01 Burner Block Replacement

Following damaged burner blocks were replaced by new ones.

<u>Row No.</u>	<u>Burner No.</u>	<u>Total</u>
1	1,3,6,7,8,10,13	7 Nos.
2	5,6,10,11,13,14	6 Nos.
3	1,5,6,7,8,10	6 Nos.
4	3,7,9,14	4 Nos.
5	1,2,3,4,5,10,11,12,13,14	10 Nos.
6	3,5,6,9,10,11	6 Nos.
7	2,3,4,5,6,7,8,10,11	9 Nos.
8	1,2,3,4,5,8,12,13,14	9 Nos.
9	1,5,6,8,9,10,11,13,14	9 Nos.

Total: 66 Nos.



NOTE:- MATERIAL:- BEFORE STRAINERS
 CARBON STEEL & AFTER STRAINERS
 STAINLESS STEEL

INSTALLATION OF NEW BY PASS LINE TO DUPLEX
 STRAINER IN NAPHTHA LINE [FO-1-3(3PIJ)]

S.NO.	QTY.	DES.	SIZE
1.	3.	90° LR ELBOW	3" Ø SCH 80
2.	2.	EQUAL TEE SCH 80	3" x 3" x 3"
3.	2.	CONCENTRIC REDUCER	2" x 3"
4.	10.	SORE FLANGE	3" Ø x 300 #
5.	2.	NIPPLE FOR PR. GAUGE CONN.	1/2" NPT.
6.	4.	GATE VALVE	3" Ø x 300 #
7.	1.	G.S. DRAIN VALVE	3/4" Ø x 800 #
8.	-	PIPE 14'-0" APP. LONG	3" Ø x SCH 80

AMMONIA (MECHANICAL)

Job Code Job Description

02 Pent House Jobs

a) Following atomising steam line welded unions were replaced by new ones.

Row No.	Burner No.	Total
1	5,12	2 Nos.
2	7	1 Nos.
3	6,9,12	3 Nos.
4	2,5	2 Nos.
5	2	1 No.
6	6	1 No.
7	2,4,13	3 Nos.
8	9	1 No.

1/2" Union S.W. Type : -- Total: 14 Nos.

b) Following purging/atomising steam valves were replaced by new ones.

1/2" 800 S.W. Gate Valves

Row No.	Burner No.	Total
2	6	1 No.
3	9	1 No.
6	6	1 No.
7	4,6	2 Nos.
8	1,13	2 Nos.

Total: 7 Nos.

c) Following Naphtha Needle Valves were replaced by new ones.

Row No.	Burner No.	Total
5	14 (1st Isolation Valve)	1 No.
8	14 (1st & 2nd Isolation Valve)	2 Nos.
9	14 (-do-)	2 Nos.

Total: 5 Nos.

AMMONIA (MECHANICAL)

 Job Code Job Description

- d) Following Naphtha needle valves
Handles/Stems replaced

<u>Row No.</u>	<u>Burner No.</u>	
4	11	} Handles replaced
5	6,7	
2	4,13	} Stem replaced

- e) Repacked the Glands of following Naphtha
needle valves.

<u>Row No.</u>	<u>Burner No.</u>	
3	1	(2nd Isolation Valve)
5	2	(1st Isolation Valve)
7	2	} 1st Isolation Valves
8	5,6,11	
9	3,7,8	

- f) All the 126 Nos. Top tube plugs and 8 Nos.
of End Caps of Headers were opened for
Catalyst unloading and boxed up with new
Gaskets after the catalyst loading job was
over. Out of 126 tube plugs, clamps were
provided on 9 (Nine) tube plugs to arrest
the leakage in running plant. During this
catalyst unloading, these 9 (Nine) tube
plugs were repaired before final boxing up.
- g) Replaced one Naphtha Gun Housing of Burner
No.10 in the 9th Row.
- h) Before catalyst unloading, all the spring
Hangers were Locked and readings of the same
were noted. After the catalyst loading, all
the spring hangers were unlocked.
- i) Air resistors of all the rows were roused
wherever it was possible.

Job Code	Job Description
----------	-----------------

03 Radiant Section

Following checks were carried out by Inspection department.

- a) TUBES (1) Random Dye check of butt welds
- (2) Creep measurement upto E level elevation
- (3) Magnetic permeability upto E butt weld elevation
- (4) Random Radiography upto E butt welds.

b) RIBERS (1) Random Dyecheck of weld joints.
 Detailed report is submitted by Inspection dept. On the basis of the above survey it was decided to replace six reformer tubes. Thus following tubes have been replaced by new ones.

<u>Row No.</u>	<u>Tube No.</u>	
1	3, 9, 25, 29	Total 6 Nos.
3	9	
6	29	

c) One tube (Row No.3, tube No.10) showed defective weld joint at B level by Inspection department. It was not possible to replace the tube due to time limit hence the same was plugged. The tube was left hanging on spring hanger support in-side the furnace.

d) Pigtail Replacement

During startup of the plant, two pigtails were found punctured. So third row pigtail tube No.4 and 5 were replaced by new available.

e) Catalyst of Primary Reformer was replaced during this shutdown. C-11-9-02-6.8M³
 C-11-9-03-6.8M³

f) Desulphurisers catalyst 101D was also changed C/8/6 quantity 28.3M³. Herein we had taken the help of hired Fork lift Truck and Temporary Crane Operator.

HARMONIA (MECHANICAL)

Job Code

Job Description

c) Superheater coil and convection coil (LT side):

All the three panels were opened for internal inspection. Removed the damaged distributor plates lying in the convection zone. Out of three removed panel, two were found Okay. One panel was recast by refractory. Finally all the three panels were put back in position.

d) Roused the PRC-23 Damper.

07 Auxiliary Boiler

a) 'Top roof arch' was completely renewed by M/s. Detric Engg.

b) 'C' coil Insulation was remade.

c) Fan mix burner, refractory Cone:

Burner block cone No.1 to 4 were repaired by M/s. HYTE, refractory.

Burner block Cone No.5 was found badly damaged, so the new cone was cast locally in 8 pieces and fixed in position.

d) Baffle wall was remade.

15.0

OTHER JOBS / STEAM LEAK JOBS

01 124C: A Gate Valve of 10" ϕ x 150 $\#$ C.S. flanged type was provided for isolation purpose.

02 113C: Existing 3" ϕ drain valve was modified and changed by providing 1 1/2" ϕ 800 $\#$ S.W. Gate Valve with fire hydrant hose connector.

03 103-DAT Exhaust Gate Valve.
12" ϕ 400 $\#$ size was rehabilitated and fixed in position.

04 118-D. Check Valve was repaired.

05 R.V. M.S99 (38kg/cm²) was replaced by spare reconditioned one.

HUMPHONIA (MECHANICAL)

Job Code	Job Description
06	110CB: Gas outlet nozzle of the vessel had developed a pinhole on shell near the weld joint of the nozzle. A big pad of 10mm thick was welded around the nozzle covering the shell portion of about 10" radius.
07	101L (Roll O Mat Filter) Both Roll O Mat Filters were replaced by new one available.
08	Glends of all the blowdown valves were repacked thoroughly.
09	Following valves were replaced by new one.
	a) FRC-2 Upstream drain valve: C.S. 1" ϕ 800 S.W. Gate Valve
	b) H.S. Header drain valve near 101J: C.S. $\frac{3}{4}$ " ϕ 1500 S.W. Gate Valve
	c) H.S. Header drain valve near 105J: C.S. 1" ϕ 1500 S.W. Gate Valve
	d) 103C drain valve C.S. $\frac{3}{4}$ " ϕ 800 S.W. Gate Valve
	e) I.D. Fan turbine upstream drain valve C.S. $\frac{3}{4}$ " ϕ 800 S.W. Gate Valve
	f) I.D. Fan turbine stream chain valve bypass valve C.S. $\frac{3}{4}$ " ϕ 800 S.W. Gate Valve
	ing
	g) U/S of V-15 drain valve C.S. 1" ϕ 800 S.W. Gate Valve
	h) 104-J TTV Upstream drain valve C.S. $\frac{3}{4}$ " ϕ 800 S.W. Gate Valve
	i) V-1 Upstream drain valve C.S. 1" ϕ 800 S.W. Gate Valve
	j) PIC-13 tapping isolation valve C.S. $\frac{3}{4}$ " ϕ 800 S.W. Globe Valve
	k) TRC-10 Sealing Steam valve (2 Nos.) C.S. $\frac{3}{4}$ " ϕ 800 S.W. Gate Valve
10	104-J (Terry Turbine driven): Minimum flow line downstream of R.O was replaced by welding 2" ϕ Sch.80 SS304 pipe about 4.0 feet length.

AMMONIA (MECHANICAL)

Job Code	Job Description
11	107-JT (Murrey turbine) Steam Inlet Valve 6"Ø 400# Gate Valve was repaired in position.
12	101-D (Desulphuriser) Catalyst of 101-D was replaced. For this all the arrangement/jobs e.g. binding, portable conveyor positioning etc. were carried out.
13	Plug Valves of fuel lines to auxiliary boiler burners and header were overhauled for easy operation.
14	Plug Valves of fuel line to startup heater were overhauled for easy operation.
15	All minor jobs of steam leak were carried out as per the instructed by Supdt. Ammonia Production.
16	Cold Insulation job was carried out.

ANNUAL TURNAROUND - 1984AMMONIA PLANTINSPECTION

Job Code	Job Description
----------	-----------------

1.0 PRIMARY REFORMER - 101-B

01 CONVECTION SECTION:

The mixed feed coil is suppose to rest on its eight supports, four each on north and south side. However the coil has moved from its bearing supports, the inclination noted towards south. The angle of inclination is about 20 degrees with horizontal plane. The refractory around supports was removed. The supports were thoroughly inspected. The supports are of tongue and groove type. The fillet welds between the supports and column I beam were not properly made and qualify of welding was not satisfactory. The fillets were not completely filled with weld metal.

To put back coil in its original position it must be lifted by means of crane. In time available during turnaround it was not feasible to carry out this job. Hence it was though necessary to prevent any further inclination of the coil. Hence the existing supports were strengthened and modified to prevent any further displacement of the coil. Thus out of eight supports five were modified by welding 10 mm thick SS 310 plates. The details of various supports modification is shown in the attached sketch.

THICKNESS MEASUREMENT:

Random thickness measurement of bends and straight portion of following coils was carried out and thickness recorded.

1. Mixed feed coil
2. Air coil
3. Super heater coil (H.T.)
4. Super heater coil (L.T.)

ALMONIA (INSPECTION)

Job Code	Job Description
----------	-----------------

The refractory was found damaged at number of places. The weak spots were repaired. A panel on east side was recast.

02 Radiant section :

a. Catalyst-Tubes : Following jobs were carried out.

- 1) Random dye check of butt welds.
- 2) Creep measurement upto E level elevation
- 3) Magnetic permeability upto 'E' butt weld elevation
- 4) Random Radiography of butt welds.

The selective spots were chose for radiography at various elevation levels C, D & E. About 61 (Sixty one) butt welds were radiographically checked. Defects/weakness noticed for 12 (twelve) welds, out of which six welds had crack or fissure on the entire circumference. It was decided to remove or retire the tubes having defects/weakness.

Dye penetrant test also revealed a defective weld at level. Attempt was made to reweld these butt welds. However due to aging and severe fissuring in the present metal. Re-welding was not successful. Hence it was decided to plug the tube.

The following tubes were retired from the furnace:

Serial No.	Row No.	Tube No.	Weld position
1	1	3	E
2	1	9	E
3	1	25	E
4	1	29	E
5	3	9	E
6	6	29	E

AMMONIA (INSPECTION)

Job Code	Job Description
----------	-----------------

Statistics of the weld radiographed revealed that the weld at level E is more prone to decay and failure. It could be due to the weld at level E being the vicinity of the top fired burners and flame and heat have adversely affected weld structure.

b. Risers

Dyecheck Random dye check of riser welds was carried out. D.P. test revealed no defects.

2.0

VESSELS :

01 CO₂ ABSORBER 101 E :

The vessel was inspected for the first time after occurrence of explosion in May, '79. The bottom distributor and Seal-pan were found very badly corroded. It had become paper thin. With the distributor developed holes, the gas and MEA solution played havoc with carbon steel sieve trays.

The improper gas distribution led to severe corrosion of trays. Moreover the gas and M.E.A. solution did not inter-mingle as desired for effective absorption. The corrosion was particularly severe on North and North-East direction. The channeling of solution caused deep pitting and corrosion on the shell also. The severity of corrosion on the shell is confined to area between sieve trays 10th to 20th. The condition of sieve trays was as under:-

<u>Sieve tray location</u>	<u>Condition</u>
20 - 15	Extremely bad
15 - 10	Bad
10 - Under	tolerable

The sieve trays between (10 to 1) may last for another two years or so.

ALUMINA (INSPECTION)

Job Code	Job Description
----------	-----------------

The top distributor and demister pad are in good condition.

Following remedial actions were initiated :

- a. A new distributor made of S.S. 304 was installed at the bottom.
- b. The most severely corroded sieve trays were replaced by new available.
- c. The corroded region on the shell between 10th and 20th sieve trays was filled with M-seal.
- d. Attempts were made to seal gaps between newly installed sieve trays and thus prevent short circuiting of solution from intended or desired path.
- e. Unwanted holes in the new installed sieve trays were plugged with M-seal.

Thickness survey was carried in the corroded region. Thickness could not be measured directly on the cratered and channelling groved surfaces. However at many places channel depth is 2.00 mm.

02 STEAM DRUM - 101 F :

The inside of drum is blackish in colour. No evidence of corrosion or erosion is there. Internals are in good condition. One of the cyclone plate had become loose. It was properly fixed up again.

3.0 THICKNESS MEASUREMENT OF PIPE LINES AND PRESSURE VESSELS :

01 CO₂ ABSORBER - 101 E :

An extensive thickness measurement survey was carried out in affected region of the vessels (between 10th and 20th trays).

ALBIONIA (INSPECTION)

Job Code	Job Description
----------	-----------------

Thickness on the corroded surface could not be measured. However pitting and channel is as deep as 2 mm at number of places. Thickness recorded very close to these pitting does not indicate any thinning.

02 Condensate Stripper 104 E :

The design thickness is matching with measured thickness. No evidence of metal thinning.

03 Raw gas separator 102 F :

The design thickness is matching with measured thickness. No evidence of corrosion was observed.

04 CO₂ Reflux Drum Stripper 103 F :

The design thickness is matching with measured thickness. No evidence of corrosion was traceable.

05 Suction Vessel for 103 J - 104 F :

The design thickness is matching with measured thickness. No evidence of corrosion was traceable.

06 Synthesis gas 1st stage separator 105 F :

The design thickness is matching with measured thickness. No evidence of corrosion was traceable.

07 PIPE LINES :

Thickness measurement were carried out of the following pipe lines.

MEA - 1 - 300	MEA - 26AB - 62.5/37
MEA - 2 - 100	MEA - 27AB - 450
MEA - 3 - 100	MEA - 29AB - 300
MEA - 7 - 300	MEA - 12AB - 300
MEA - 10AB - 300	MEA - 15AB - 300
MEA - 11 - 350	MEA - 20 - 300
MEA - 25 - 80	

ANNUAL TURNAROUND 1984

AMMONIA PLANT

CIVIL JOBS

Job code	Job description
----------	-----------------

1.0 AUXILIARY BOILER

Front burner wall alongwith the burner refractory were damaged. Entire front wall is constructed by providing M-23 fire bricks and 2" thick insulation block out of five burners, four were repaired by whytheat and fire-crete super. Fifth burner was prepared by casting new burner blocks in position.

2.0 AUXILIARY BOILER ROOF

Major portion of the roof refractory had fallen down and so prepared new one.

3.0 CASTABLE REFRACTORY CONVECTION ZONE

Castable refractory convection zone was damaged at several places and so was recast with guniting machine. The castable refractory used as per following quantity.

Quantity consumed as under.

- a) Luminite - 12 drums of capacity
- b) Hydite - 21 drums of capacity
- c) Vermiculite-6 drums of capacity

4.0 TUNNELS OF PRIMARY REFORMER

Flue gas tunnel number 2,3 and 8 were broken for replacing tubes and headers. It was reconstructed after completion of machanical job departmentally.

Ammonia (Civil)

Job code	Job description
----------	-----------------

-5.0 TUNNEL BLOCKS

We have cast about 50 Nos of tunnel blocks from fire create super of size 22 cm X 15 cm X 100 cm and the same were replaced in place of broken tunnel blocks. Twelve numbers of old tunnel blocks were replaced where ever damaged blocks found in tunnel section.

ANNUAL TURNAROUND 1984

AMMONIA PLANT

INSTRUMENT JOBS

Job Code Job Description

Control room Jobs:

All 90J series Taylor's recording receivers, Indicating receivers, controllers and set point transmitters were cleaned, overhauled, calibrated and adjusted their zero and span wherever it was required and put back in service.

New cutouts in control room:

Following new cutouts were made in control panel.

- 01 Cutout for NG Comp. lube oil Temp. Recorder
- 02 " " B/N Vibration Recorder
- 03 " " B/N Vibration Monitoring rack
- 04 " " Panalarm Annunciator and its PB.
- 05 " " NG Comp. distick speed indicator
- 06 " " " " Trip power indication bulb and emergency Trip P.B.
- 07 " " NG Comp. Induction Steam flow controller and Vent gas pre. controller
- 08 " " TIA-84 & 85
- 09 " " 101J, 103J & 105J Trip power 'ON' Indicating bulbs.

New Instruments for NG Compressor like Bearing temp. Recorder, Vibration recorder, vibration monitoring rack, Annunciator, push buttons, and suction pressure recorder, vent pressure recorder, Manual loader, speed indicator etc. were mounted with the new cutouts.

AMMONIA (INSTRUMENT)

Job Code	Job Description																
3.0	<p>Following kickback control valves of 103J & 105J were dropped from line for leakage test purposes and they were tested upto their operating pressure.</p> <p>FICV-7, 8, 9, 10 & 11</p> <p>Except FICV-10 all valves were found satisfactory in leakage test. Very minor stem adjustment was required in FICV-9, while FICV-10 C/V was found heavily passing due to some scratches on seat. Sufficient lapping was carried out and it was retested upto 20 Kg/Cm² and found alright.</p> <p>All control valves positioner relays were cleaned. They were fixed back into line with new metallic spiraget gaskets and strokes were checked and calibrated.</p>																
4.0	<p>General cleaning, overhauling and stroke checking of following important control valves were carried out.</p> <table border="0"> <tr> <td>FRCV-1</td> <td>PICV-20</td> <td>PICV-13A/B</td> <td>LICV-19</td> </tr> <tr> <td>FRCV-2</td> <td>PICV-17</td> <td>PRCV-23</td> <td>MICV-12</td> </tr> <tr> <td>FRCV-3</td> <td>PICV-14</td> <td>LICV-16</td> <td>V-102</td> </tr> <tr> <td>PICV-5</td> <td>FRCV-18</td> <td>LICV-18</td> <td></td> </tr> </table>	FRCV-1	PICV-20	PICV-13A/B	LICV-19	FRCV-2	PICV-17	PRCV-23	MICV-12	FRCV-3	PICV-14	LICV-16	V-102	PICV-5	FRCV-18	LICV-18	
FRCV-1	PICV-20	PICV-13A/B	LICV-19														
FRCV-2	PICV-17	PRCV-23	MICV-12														
FRCV-3	PICV-14	LICV-16	V-102														
PICV-5	FRCV-18	LICV-18															
5.0	<p>MICVs from 24 to 32 of pri. Reformer for Naptha flow control valve were opened out from bonnet to inspect their seat and plug etc. Except MICV-24 & 31 rest were found alright. After fixing back their stroke were checked and calibrated. In MICV-24 Actuators diaph. was found punctured. It was replaced by new one. In MICV-31 gland was found jammed and stuckup, all gland packings were replaced by new one.</p>																
6.0	<p>FICV-12-14 MEA Flow Control Valves were opened out from bonnet to inspect their seat and plug. On examining both were found alright. After putting back, their stroke were checked and calibrated.</p>																

AMMONIA (INSTRUMENT)

Job Code	Job Description
7.0	Following control valves were opened out from their bonnet to inspect seat, plug etc.
01	LCV-15 was found passing, lapping was done and made alright.
02	FICV-16--17 found alright
03	PRCV-2 found alright
04	LCV-12: Found alright
05	LCV-14: Seat & plug were found alright but all gland packings were replaced with new ones.
06	LCV-13: Seat and plug both found corroded, replaced with new ones.
07	PICV-7: Found alright
08	PICV-8: Found passing, lapping was done and made alright.
8.0	General cleaning, overhauling, calibration and synchronization of all important 440R Controllers in field were carried out.
9.0	Inst. air dryer: Removed sorbeads from both chambers, sieved it and separated out alumina balls. All alumina balls were replaced by new ones and sorbeads level was topped up in both chambers by new sorbeads. Inlet air pre. regulator PCV-33 was overhauled.
10.0	General cleaning, overhauling and calibration of all important D/P 300 series pressure, flow, level etc. transmitters including air pressure regulators etc. were carried out and calibrated.

AMMONIA (INSTRUMENT)

Job Code	Job Description
11.0	<p style="text-align: center;">controls</p> <p>Following Masoneilan level / were taken for services and following jobs were carried out:</p> <p>01 LC-15: General cleaning and calibration.</p> <p>02 LC-12: General cleaning and calibration.</p> <p>03 LC-18: While calibrating this was found totally out. Calibration was not coming at all. So whole controller unit including torque tube was replaced by new one and calibration was carried out. Found alright.</p> <p>04 LC-16/19: Calibration was done and found alright.</p> <p>05 LLC-1: (Steam drum level transmitter) General cleaning, relay cleaning and calibration was carried out found alright.</p>
12.0	<p>EYE-HYE: Many of the Electrodes were giving problems like discontinuity, leakage, poor insulation etc. These electrodes were replaced by new ones. Also old wirings upto Junction Box were replaced by silicon insulated wire for high Temp. purposes.</p>
13.0	<p>FRCV-2 Control Valve:</p> <p>Bottom flange of this C/V was opened out for inspection purposes. While inspecting following were observed:</p> <p>a) Some scratches were found on bottom seat.</p> <p>b) Plug's bottom guide was found eroded on one side, at one place mini. dia was found 54.22 mm instead of 60 mm while at other place it was found 58.6 mm.</p> <p>c) Bottom flange guide bush was found alright.</p>
14.0	<p>Replaced three valve manifold for PDIA 53 and 55 and replaced necessary tubings and fittings.</p>

AMMONIA (INSTRUMENT)

Job Code	Job Description
15.0	Main power distribution switch board for Ammonia, PGR AND NG Comp. replaced by _____ and necessary wiring was done with independent Isolators.
16.0	Introduced new control loop PIC-27 for absorber vent pressure control. For this loop, installed new control valve, pressure transmitter, laid Input/output tubing from Control Room to field, provided air supply to C/V and transmitter to complete the control loop.
17.0	In PGR plant PIC-114 pressure transmitter replaced by new control loop PIC-178. For this C/V, controller etc. installed, and completed the control loop.
18.0	103J Compressor : Probe No. IV (location: _____) was found broken. New probe was calibrated and replaced, adjusted stand and gap etc.
19.0	Many probes of 101J, 103J & 105J were removed as per the requirement of Mech. Maintenance people. New ferrules were put wherever it was missing, same probes were reinstalled when Mech. people completed their jobs.
20.0	Since the 101J, Pt #10 (Turbine axial point) was showing wrong measurements due to magnetisation of bearing housing, new location was fixed on the coupling side. For the same two 190 series new probes mounted on brass baffle plate and connected thru' New proximitys and the Monitoring is given in the Control Room.

ANNUAL TURNAROUND 1984

AMMONIA PLANT

TECHNICAL DEPARTMENT JOBS

Job code	Job description
----------	-----------------

- | | |
|-----|---|
| 1.0 | Hook up of the N G Compressor |
| | 01 Cooling Water line |
| | 02 Gas supply & Return line |
| | 03 Instrument air line |
| 2.0 | Hook up of the N G Compressor
Turbine exhaust and drains with surface condenser |
| 3.0 | Providing control valve on V-27 6" line going to
CO ₂ Absorber (101-E). |
| 4.0 | Installation of control valve PIC V-178 in PGR Plant. |
| 5.0 | Installation of Relief valve on N G Compressor
Separator. |

ANNUAL TURNAROUND

UREA PLANT

MECHANICAL

Job code Job description

1.0 CO₂ CENTRIFUGAL COMPRESSOR TURBINE Q-1101/1
01 Both the journal bearing and thrust bearing inspected. Replaced the rear end journal bearing with new one due to high clearance. Rest found Okay and boxed up.

<u>Bearing clearances observed</u>	<u>Bearing clearance after Overhauling</u>
Rear bearings - .011"	Rear bearing - .008"
Front bearing - .008"	Front bearing - .008"
Thrust bearing - .012"	Thrust bearing - .012"

02 Lot of muck was observed in the gear coupling, cleaned the same and boxed up.

2.0 CO₂ CENTRIFUGAL COMPRESSOR K-1101/1

01 Both the journal bearings inspected, found Okay

<u>Bearing clearances Observed</u>	<u>Bearing clearances after Overhauling</u>
Outboard bearing - .008"	Outboard bearing - .008"
Inboard bearing - .008"	Inboard bearing - .008"
Thrust bearing - .012"	Thrust bearing - .012"

02 Rectified the oil leakage through outboard bearing by enlarging the drain hole of oil labyrinth

Urea (Mech)

Job code	Job description								
3.0	TURBINE FOR CO ₂ RECIPROCATING COMPRESSOR Q-1101/2								
01	Both the journal bearings inspected found okay so boxed up the same.								
	<table border="1"> <thead> <tr> <th><u>Bearing clearances observed</u></th> <th><u>Bearing clearance after overhauling</u></th> </tr> </thead> <tbody> <tr> <td>Front bearing - .006"</td> <td>Front bearing - .006"</td> </tr> <tr> <td>Rear bearing - .006½"</td> <td>Rear bearing - .006½"</td> </tr> <tr> <td>Thrust bearing - .008"</td> <td>Thrust bearing - .008"</td> </tr> </tbody> </table>	<u>Bearing clearances observed</u>	<u>Bearing clearance after overhauling</u>	Front bearing - .006"	Front bearing - .006"	Rear bearing - .006½"	Rear bearing - .006½"	Thrust bearing - .008"	Thrust bearing - .008"
<u>Bearing clearances observed</u>	<u>Bearing clearance after overhauling</u>								
Front bearing - .006"	Front bearing - .006"								
Rear bearing - .006½"	Rear bearing - .006½"								
Thrust bearing - .008"	Thrust bearing - .008"								
4.0	CO ₂ RECIPROCATING COMPRESSOR (PETERBROTHERHOOD) K-1101/2								
01	Replaced the coupling pads 16 nos of 45 shore hardness								
02	Replaced all the suction & discharge valves of all the three stages								
03	Replaced 2nd stage gas packing set with new one as there was heavy gas leakage								
04	Manual lubrication crank case cleaned & charged fresh oil								
05	2nd and 3rd stage separator traps cleaned, also repaired the bypass valves of the same								
5.0	FIRST STAGE SEPARATOR FOR K 1101-2 V-1121								
-	Lot of pin holes observed on the two welding joint of shell all over the periphery. Repaired the same and also provided SS 304 4", width and ¼" thick patch all over both the welding joints.								
-	Springs SS-304, 4" Width and ¼" Thick								
6.0	INTER COOLER SEPARATOR K-1101 V 1111								
01	Opened the top hood								
02	found the demister pads in damaged condition. Replaced the same with new available								
03	Boxed up the covers & piping								

Job code	Job description
----------	-----------------

- 7.0 K 1101-1 AFTER COOLER SEPARATOR V-1112
- 01 Opened the top hood
 - 02 found the demister pads in damaged condition. Replaced the same with new available
 - 03 Boxed up the vessel

8.0 RELIEF VALVES

The following relief valves were removed, overhauled reseb and put back in their respective position.

	<u>Set pressure in gauge</u>
1) T201 A,B,C	161 kg/cm ²
2) 1202 A,B,C	6 kg/cm ²
3) K 1101-1 1st stage discharge	4.5 kg/cm ²
4) K 1101-1 Final stage	1.4 kg/cm ²
5) K 1101-2 1st stage discharge	475 psi.
6) K 1101-2 2nd stg. discharge	1030 psi.
7) K 1101-2 3rd stg. discharge	2260 psi.
8) Ammonia suction vessel	31 kg/cm ²
9) Circulation System II Water cooler	11 kg/cm ²

9.0 COOLERS CLEANING

a) The following lub oils coolers cleaned manually and boxed up

- i) P 1102 A 2 Nos
- ii) P 1102 B 2 Nos
- iii) P 1201 A 2 Nos
- iv) P 1201 B 2 Nos
- v) T 1111 2 Nos
- vi) H 1114

Surface Condenser inspected from Inspection cover. Found Okav

Urea (Mech)

 Job Code Job description

- b) The following coolers were cleaned by Hydrojetting system
- i) Circulation System I Water Cooler H 1206.
After cleaning shell side pressurised to find out any leaky tube. No leakage found. Boxed up the same after pressure testing Cooler water pressure 3 kg/cm².
 - ii) Vent Condenser H 1502

After hydrojetting, tested the condenser for tube leakage. Shell side pressurised to 1 kg/cm².

Tube No.4 (from Ammonia plant side) in 4th row from the top found leaking. Leaking tube plugged and welded.

After repair pressure tested again and boxed up the same.
 - iii) Lub Oil Cooler for K-1101/2 Crank case H 1123
Cleaned by hydrojetting. Started the oil circulation to check any leaky tube. Found no leakage, boxed up the same.

10.0. NON RETURN VALVES

The following N.R.V.'s were removed, checked their seats, lapped seats and repositioned them.

- 1) CO₂ to Stripper
- 2) Ammonia to Autoclave
- 3) Ammonia to HP Condenser
- 4) Carbamate to HP Condenser
- 5) Carbamate to HP Scrubber

Urea (Mech)

 Job Code Job description

11.0 TANKS & VESSELS INSPECTION

The following Vessels & Tanks were opened, inspected and boxed up

- 1) V 1202 Rectifying Column, found Okay.
- 2) V 1101 CO₂ Knock Out Drum, found Okay.
- 3) H 1104 Spray Cooler - found Okay.
- 4) V 1203 L P Scrubber - found Okay.
- 5) H 1422 Ist stage Evaporator - found Okay.
- 6) H 1424 IInd stage Evaporator - found Okay.
- 7) H 1421 Flash Tank Condenser - found Okay.
- 8) T 1401 Urea Solution tank - found Okay
- 9) T 1301 NH₃ / H₂O Tank - found Okay
- 10) T-1501 Steam condensate Tank

Heavy leakage was observed from the saddle support towards Prill Tower. Opened the manhole cover. Found 8" curved crack inside the tank. Repaired it by grinding and welding. Also patch welded 6mm thick C.S. plate size - 12"x12" on the same internally. Also repaired the same crack from outside by grinding and welding. Dye-penetration testing done, found Okay. Boxed up the manhole covers.

11) Desorption column V-1301

Opened the manhole covers. Found the first tray from top was not in its position as well as few bubble caps were missing from trays. Opened total 6 Nos trays from top for checking bubble caps. In 7th tray all the Bubble caps were in position. Boxed up all the trays with 150 Nos. new bubble caps. Boxed up the manhole covers.

Urea (Mech)

Job Code	Job description
12.0	4.5 ATN STEAM DRUM V 1501
	<p>01 Provided total 17 nos. blinds for the hydrotesting of steam drum.</p> <p>02 Opened the manhole covers, inspected the drum from inside, few bolts were missing. Provided the same.</p> <p>03 The drum was inspected by Boiler Inspector on 5th January, 1984</p> <p>04 Boxed up the covers. Pressurised the system to 11 kg/cm² found Okay.</p> <p>05 Hydrotest conducted in presence of Boiler Inspector on 9th Jan. 1984 at 11.0 kg/cm² pressure. Found Okay.</p> <p>06 Removed the blinds and boxed up the lines</p>
13.0	I.D. FAN K 1401/2
	<p>Abnormal sound and vibration was reported</p> <p>01 Checked both the bearings, found the lower bearing damaged. Dismantled the fan assembly.</p> <p>02 Reconditioned fan assembly with new bearings (2 Nos), new bearing sleeves. Also replaced 'V' belt set and labyrinth seal set.</p> <p>03 Repositioned the fan assembly and in trial running found Okay.</p>
14.0	PRILLING EQUIPMENT AND PRILL BUCKET M 1401
	<p>Reported hard to rotate</p> <p>01 Made the rotating device free by cleaning and greasing the same.</p>
15.0	PRILL TOWER SCRAPER M 1402 SCRAPER GEAR BOX
	<p>01 Flushed the oil of gear boxes and charged fresh oil Serve system 533 in all the three gear boxes.</p>

Urea (Mech)

Job Code	Job description
16.0	L.O. PUMP FOR COMPRESSOR P-1113 Mechanical seal leakage 01 Replaced the mechanical seal of pump. 02 Aligned the pump with turbine and coupled the same 03 Trial running performance Okay.
17.0	L.P. CARBAMATE CONDENSER H-1205 Suspected tube leakage. 01 After the modification job done by Contractor, it was essential to perform hydraulic pressure testing of the condenser. 02 Provided blinds as well as test ring for the pressure testing. 03 Pressurised the shell side upto 8 kg/cm^2 , found One tube leak: as well as some of the old plugs were leaking from the welding. Plugged and welded leaking tube and other leaking welds plug were repaired. Orientation of plugged tube : Row No. 4th Counting from Prill Tower side Tube No. 12th counting from Ammonia Plant side 04 Again pressure tested, found Okay. Boxed up the condenser, removed the blinds from lines and boxed up the lines Total tubes plugged - 40 Nos.

Urea (Mech)

Job Code	Job description
19.0	MISCELLANEOUS JOBS
01	Melt Pump P-1408, Casing leakage. Rectified the same by providing new gasket
02	Auto-clave unloading line 1st I.V. Bonnet leak. Replaced the bonnet
03	H 1203 CCS II G/L over HP Scrubber bottom Gland repacked
04	V 1205 Chain drain valves heavy leak - fabricated new globe valve 1½" 150 W SS flanged and provided the same
05	FLCV 1204 U/S flange leakage. So replaced the gasket
06	Ammonia recycle line's valve passing - Replaced the valve each 4" 900 W for P 1102 A/B
07	Discharge valves of Ammonia for P 1102 A/B. Reused as they were hard to operate
08	Ammonia condenser I.V. hard to operate - Replaced the bonnet
09	P 1501/A discharge I.V. bush broken - Replaced the valve
10	T 1401 - Return line to tank-valve gland repacked.
11	T 1401 drain valve hard to operate - Replaced by SS valve 2" gate - SRF flanged valve
12	H 1203 Drain line 2nd I.V. bonnet leakage - Replaced the bonnet with new gasket (1½" BEL valve)
13	Ammonia to Auto-clave 1st I.V. passing - Replaced the bonnet 2nd I.V. spindle broken - Replaced the bonnet
14	Discharge drain of P-1201 B Spindle broken - Replaced the valve bonnet.

Urea (Mech)

Job Code	Job description
15	P 1426 A/B suction valve hard to operate near T 1301 Replaced the complete valve with new one 6" 150 SS SS gate valve
16	P 1506 Thrust bearing damaged - Replaced the bearing with new one and coupled the pump
17	HPF to H 1202 2nd I.V. stem broken, Replaced the complete Japan make valve with new one
18	P 1202 A/B both discharge valves and check valves gland replaced
19	P 1204 cooling water line valves 2 Nos Replaced by new one 1".

19.0

STEAM LEAKS

- 01 Replaced gland of about 50 valves of various sizes and rating.
- 02 16" 150 ~~SS~~ valve of 23 ata steam header-both gasket replaced
- 03 4 ata steam header flange gasket replaced
- 04 About 15 No. S.W. valves of various sizes and ratings replaced.
- 05 Flange gaskets of about 15 Nos. SRF flanged valves were replaced.
- 06 Bonnet gasket of about 20 valves were replaced.

Urea (Mech)

Job Code	Job description
20.0	JOB'S EXECUTED BY OUTSIDE AGENCIES
01	Vent stack 20" C S corroded pipe replaced by SS pipe. Old pipe cut and removed by HM Crane. New pipe welded in position DP check done found Okay
02	1st Stage Evaporator / Condenser H-1423 To rectify corroded flange a) Cut & removed the corroded flange with pipe b) Removed the old cladding c) New cladding done by 1st Philips 309 Mo. electrode and then after Philips RS 316 A. electrode d) Flange machined in workshop, raised face, kept to 4 mm height e) Put the pipe with flange in position, welded DP check done found Okay. Boxed up the flange with new gasket
03	L P Carbamate Condenser H 1205 To provide modified distributor a) Disconnected various pipes and cut the bottom C.S. 18" pipe. b) Cut the dished end by grinding and lowered it. c) Found the old distributor was in damaged condition. Repaired the 18" nozzle by providing SS patch inside the pipe (12"x30" curved length) Welded the same. Also repaired some groves in dished end by welding d) Modified distributor provided with addition stranger support 2 Nos. and made it resting on 6 supports instead of 4 supports. After D.P. check lifted the cover and tacked same with shell.

Urea (Mech)

Job Code	Job description
	<ul style="list-style-type: none"> e) While doing root run of welding, observed number of vertical cracks & fissures on dish end as well as shell and near the weld joint. Repaired the same by grinding and welding cautiously. f) After complete filling of welding DP check done, found Okay. g) Boxed up the bottom flange. Welded the 18" pipe. Connected all the other steam tracing line and other fittings.
04 Prill Tower Conveyor M-1403	Conveyor belt replacement
	<ul style="list-style-type: none"> a) Replaced the damaged portion of the conveyor belt approx. 17.0 Metres length by cold vulcanising. Also replaced return rollers. Skirt rubber readjusted. Greased all the bearings and rollers. b) Cold vulcanising of two joints done.
05 Link Conveyor M-1419	
	<ul style="list-style-type: none"> a) Replaced the damaged conveyor belt, length approx. 17 mtrs. Also replaced the damaged return roller and throughing rollers. Greased all the points. b) Hot vulcanising starflex diamond joint done.
06 The following fabrication jobs were attended.	
	<ul style="list-style-type: none"> a) New pipe line CS from condensate point to P 1202-h discharge end. Size 1" Schedule-40. b) New C S line for flushing from discharge valve of P 1201 to LRCV 1201 drain point by 1" pipe line. Schedule-40. c) Return line on H-1205 size - $\frac{1}{2}$" C.S. pipe. Schedule-40.

Urea (Mech)

Job Code	Job description
d)	Ammonia drain header fabrication from P 1102 A/B to effluent tank 3", 2½" CS line.
e)	Steam tracing CS line repaired on V 1205 and V 1202. Size ½" pipe Schedule-40.
f)	Perouting of 2" CS line for Instrument air and plant air lines in front of control room.
g)	6" 300 W Gate valve (2 Nos) provided before the suction filter of Ammonia.
h)	1" C S line 2 meter length repaired near P-1408 pump
i)	Provided checkrured plate near V 1301 to approach drain valve platform.

ANNUAL TURNAROUND - 1984

UREA PLANT

INSPECTION

Job Code	Job Description
----------	-----------------

- 1.0 VESSELS : Thickness survey of following vessels was carried out.
- 01 4.5 ATA STEAM DRUM - V-1501
 The design thickness of the shell was matching with measured thickness. No evidence of the metal thinning.
 - 02 23 ATA STEAM DRUM - V-1502
 The design thickness was matching with measured thickness. No evidence of metal thinning.
 - 03 H.P. HEAT EXCHANGER - H-1201
 Thickness of shell was measured. The design thickness was matching with measured thickness. No evidence of corrosion was traceable.
 - 04 AMMONIA - WATER - T-1301
 The design thickness was matching with measured thickness. No thinning was observed.
 - 05 UREA STORAGE TANK - T-1401
 The design thickness was matching with measured thickness of the shell. No evidence of corrosion was traceable. The inside of tank was brownish in colour and no prominent evidence of corrosion or crater formation visualised.
 - 06 STEAM CONDENSATE TANK - T-1501
 The measured thickness of shell was matching with the design thickness and no evidence of metal thinning. However, an approximately 10" long through crack had developed circumferentially

UREA (INSPECTION)

Job Code

Job Description

in the bottom side parent metal of tank near the Heat affected zone of the north side supports welding. After grinding and welding the crack from outside as well as inside. C.S. plate size 18" x 6" x 5 mm thickness patch welded over the cracked surface from inside, for extra reinforcement. Dye penetration test of welding was carried out and found satisfactory.

07 CO₂ SPRAY COOLER - E-1104

Measured thickness was matching with the design thickness. No evidence of corrosion was traceable.

08 CO₂ K.O. DRUM - V-1101

The design thickness was matching with measured thickness. No evidence of corrosion was traceable.

2.0

PIPE LINES :

Thickness measurements were carried out of the following pipe lines.

FR - 1201 - 8"	PR - 1212 - 4"
FR - 1202 - 10"	PR - 1214 - 12"
FR - 1203 - 8"	PR - 1215 - 16"
FR - 1204 - 8"	PR - 1219 - 8"
FR - 1205 - 6"	PR - 1223 - 4"
FR - 1206 - 6"	PR - 1224 - 3"
FR - 1207 - 14"	PR - 1225 - 3"
FR - 1208 - 4"	PR - 1226 - 2"
	PR - 1230 - 6"
GA - 1112 - 6"	MA - 1106 - 4"
GA - 1201 - 6"	MA - 1201 - 3"
GA - 1202 - 1"	
GA - 1203 - 1"	

P - 1102 A & B discharge line

P - 1102 A & B Suction line.

UREA (INSPECTION)

Job Code	Job Description
----------	-----------------

UREA SOLUTION RETURN LINE (PR - 1427 - 3")

Dye penetrant test of almost entire line was done, which revealed inter granular cracking due to corrosion in the line. At number of places there were big net-works of cracks, though thickness had not reduced to warning range.

The line had developed leak in past also. Hence it is suggested that actions should be initiated to replace the line.

Line No. : LA - 1105 - 6" - C₂ Design value :

Observation : The minimum thickness recorded on Bend No. 12 is 5.7 mm. It means that design thickness has reduced by 20 percent.

Recommendation : This bend has indicated thinning due to erosion / corrosion. It is suggested that this bend should be renewed.

Line No. : PR - 1224 - 3" Design thickness : 8.08mm

Observation : For discharge of carbamate pump A. The recorded thickness at bends No. 3 & 4 varies between 6.5 mm to 7.2mm. This indicates that the design thickness has reduced 11.0 to 20.0 percent.

Recommendation : These bends should be replaced in our long time interests.

FOR PUMP 'B' Design thickness - 8.08 mm

Observation: The recorded thickness at bend No. 3 is 6.9 mm. This indicates that the design thickness has reduced by 15 percent. Two lines have similar layout. Thinning recorded is an identical bends. This could be due to sudden change in gas/fluid velocity.

Recommendation : The present bends shall last for another two years. However in our longtime interests it should be replaced.

UREA (INSPECTION)

Job Code

Job Description

COMMON DISCHARGE HEADER FOR P 1201 A/B

Line No. PR-1224-3"-X4 Design thickness: 8.08 mm

Observation : The minimum thickness recorded on bend No. 2 is 7.3 mm. This indicates that design thickness has reduced by 10 percent.

Recommendation : The bend will last for another 3 to 4 years at existing thickness level. However in our long term interests, steps should be initiated to replace it.

Line No. : PR-1214-12" - X6 Design thickness: 4.57mm

Observation : The minimum thickness recorded on bend No. 5 & 6 varies between 3.9 to 4.0 mm. This indicates that the design thickness has reduced between 13 to 14 percent.

Recommendation : The bends will last for another two years at the existing thickness level. However in our long time interests, plans should made to replace it.

Line No. GA-1202-1" - F₂ Design thickness: 6.3

Observation : The minimum thickness recorded on bend No.5 is 4.00 mm. This indicates that the design thickness has reduced by 36.5 percent.

Recommendation : Immediate action will have to be taken to replace this bend. This bend is prone to leak any time.

Line No. GA-1203 -1" - X₁ Design thickness: 4.5mm

Observation : The minimum thickness recorded on bend No.1 is 3.9. This indicates that the design thickness has reduced by 14 percent.

Recommendation : The bend shall last for another two years at existing thickness level. However in our long term interests, replacement action must be initiated.

URBA (INSPECTION)

Job Code

Job Description

Line No. PR-1212-4" - X1 Design thickness: 10.40 mm

Observation : The minimum thickness recorded on bends No. 1 & 2 varies between 6.90 mm and 7.40 mm. This indicates that the design has reduced between 36.65 and 28.25 percent.

These bends have indicated corrosion / erosion.

Recommendation : Immediate action must be taken to replace these bends. These are prone to leak any time.

Line No. MA-1106-4" - E₂ Design thickness :

It is common discharge line to Ammonia suction vessel. It is sort of recycle line. The line is in service whenever motor driven Ammonia pump is in operation.

Observation : The installed line appears to be of specification 4" Sch. 40. However the pump discharge line to autoclave conform to specification 4" Sch. 80. The lines are subjected to equal discharge pressure when in Operation.

Recommendation : We suggest that the common line to suction vessel should be uprated to specification 4" Sch. 80. This will prevent mishaps and accidents.

ANNUAL TURNAROUND 1984

UREA PLANT

CIVIL JOBS

Job code	Job description
----------	-----------------

1.0 PRILL TOWER : B 1401

Bitumastic lining of top roof prill tower and cabin was badly damaged. The bitumastic lining was removed and flooring was done by providing polythlene lining and expanded metal grill with 50 mm thick IPS.

2.0 SCRAPER FLOOR

The Araldite lining of scraper floor of prill tower was damaged at several places. We have removed the entire lining by chipping and Araldite lining provided in two layers as per suggestion of manufacturers M/s. Ciba Geigy. We have consumed approximately 400 kg of Araldite and job was executed departmentally.

Job code	Job description
----------	-----------------

PRILL TOWER : B 1401

Bitumastic lining of top roof prill tower and cabin was badly damaged. The bitumastic lining was removed and flooring was done by providing polythlene lining and expanded metal grill with 50 mm thick IPS.

Job code

The Araldite lining of scraper floor of prill tower was damaged at several places. We have removed the entire lining by chipping and Araldite lining provided in two layers as per suggestion of manufacturers M/s. Ciba Geigy. We have consumed approximately 400 kg of Araldite and job was executed departmentally.

ANNUAL TURNAROUND 1984

UREA PLANT

INSTRUMENT JOBS

Job Code	Job Description
1.0	Interconnection trip wiring for GHH and CP Turbine for following was completed. 01 Centrifugal Comp. trip to trip GHH Compressor. 02 60ata low Pr. to trip GHH Compressor.
2.0	Dropped LRCV-1201 Control Valve. Replaced plug and seat as old one were badly erroded. Took measurement for erosion record.
3.0	LCV-1502B - Dropped the Control Valve. Took M/c. cut on plug and seat as seating area was damaged. Fixed the Control Valve and checked the stroke.
4.0	Replaced the terminal strips in JBA2.
5.0	Cleaned A/M Switch, Regulator, Stem and checked the stroke of following Control Valves. 01 LCV-1504 02 PRCV-1502 03 FRCV-1201 04 FRCV-1421 05 PRCV-1504
6.0	Cleaning and calibration of following switches, was done. 01 PL-1201 A&B 11 PL-1167 21 PLCO-1102 02 PL-1202 A&B 12 PLCO-1167 22 PL-1105 03 PLCO-1153 13 PLCO-1163 23 PLCO-1103 04 PHCO-1132 14 PLCI-1162 24 PL-1105 05 PLCO-1124 15 PLCI-1151 25 PLCO-1201A&B 06 PH-1140 16 PL-1104B 26 PLCO-1202A&B 07 PH-1124 17 PLCO-1102B 27 PH-1144 08 PLCO-1101 18 PL-1105B 28 PL-1160 09 PH-1133 19 PL-1103B 29 PLCO-1160 10 PHCO-1133 20 PL-1104A 30 PLCO-1145 31 PHA-1101 switch replaced

UREA (INSTRUMENT)

Job Code	Job Description																																										
7.0	Calibration and cleaning of all control room Receiver Recording/Indicating station, SPTX, Output gauges was done.																																										
8.0	Cleaning of F/N of following control room Taylor controller was done.																																										
	<table border="0"> <tr> <td>01</td> <td>LRC-1201</td> <td>07</td> <td>LIC-1202</td> <td>13</td> <td>TRC-1422</td> </tr> <tr> <td>02</td> <td>PRC-1504</td> <td>08</td> <td>TRC-1202</td> <td>14</td> <td>LRC-1421</td> </tr> <tr> <td>03</td> <td>FIC-1204</td> <td>09</td> <td>FRC-1421</td> <td>15</td> <td>FIC-1303</td> </tr> <tr> <td>04</td> <td>TRC-1201</td> <td>10</td> <td>LIC-1201</td> <td>16</td> <td>TIC-1301</td> </tr> <tr> <td>05</td> <td>TIC-1201</td> <td>11</td> <td>TRC-1421</td> <td>17</td> <td>LIC-1203</td> </tr> <tr> <td>06</td> <td>PRC-1202</td> <td>12</td> <td>PIC-1422</td> <td>18</td> <td>PIC-1202</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>19</td> <td>PIC-1301</td> </tr> </table>	01	LRC-1201	07	LIC-1202	13	TRC-1422	02	PRC-1504	08	TRC-1202	14	LRC-1421	03	FIC-1204	09	FRC-1421	15	FIC-1303	04	TRC-1201	10	LIC-1201	16	TIC-1301	05	TIC-1201	11	TRC-1421	17	LIC-1203	06	PRC-1202	12	PIC-1422	18	PIC-1202					19	PIC-1301
01	LRC-1201	07	LIC-1202	13	TRC-1422																																						
02	PRC-1504	08	TRC-1202	14	LRC-1421																																						
03	FIC-1204	09	FRC-1421	15	FIC-1303																																						
04	TRC-1201	10	LIC-1201	16	TIC-1301																																						
05	TIC-1201	11	TRC-1421	17	LIC-1203																																						
06	PRC-1202	12	PIC-1422	18	PIC-1202																																						
				19	PIC-1301																																						
9.0	FRCV-1421 - replaced split body and u/s gaskets.																																										
10.0	Cleaned VP, VPTX, A/R and Stem of following valves.																																										
	<table border="0"> <tr> <td>01</td> <td>HICV-1201</td> <td>04</td> <td>HICV-1204</td> <td>07</td> <td>MICV-1101</td> </tr> <tr> <td>02</td> <td>HICV-1202</td> <td>05</td> <td>PICV-1301</td> <td></td> <td></td> </tr> <tr> <td>03</td> <td>PICV-1202</td> <td>06</td> <td>TRCV-1421</td> <td></td> <td></td> </tr> </table>	01	HICV-1201	04	HICV-1204	07	MICV-1101	02	HICV-1202	05	PICV-1301			03	PICV-1202	06	TRCV-1421																										
01	HICV-1201	04	HICV-1204	07	MICV-1101																																						
02	HICV-1202	05	PICV-1301																																								
03	PICV-1202	06	TRCV-1421																																								
11.0	LICV-1301 - Dropped the valve for inspection. Found lot of corrosion in D/S flange gasket seating area. Metal was filled and machining was done.																																										
12.0	Installed Prill Bucket speed indicator.																																										
13.0	Provision for supplying 24V DC from NELCO Charger No.I, II, III To GHH was made.																																										
14.0	Calibration of LR-1201. Autoclave Radio active level Recorder was done.																																										
15.0	FS-1101 - General checking and lubrication was done.																																										

UREA (INSTRUMENT)

Job Code	Job Description
----------	-----------------

16.0 PRC-1201 - Filled the oil in the impulse line.

17.0 Motor running lights for Urea recovery Pumps was provided in C/R.

18.0 Installed TR-2 Taylor make Temp. recorder in place of Kota recorder.

19.0 Installed Distac Speed indicator for GHH in C/R panel section No. II.

20.0 Calibrated following Transmitters after F/N & Relay etc. cleaning.

01 FRC-1-1	09 PR-1145	17 FLA-1221
02 FR-1101	10 PR-1123	18 LRC-1421
03 FRC-1101	11 PR-1124	19 LRC-1201
04 FR-1201	12 PR-1126	20 LI-1421
05 FRC-1201	13 PR-1127	21 LI-1303
06 LI-1301	14 LIC-1201	22 LC-1504
07 PIC-1128	15 LIC-1202	23 LIC-1301
08 PIC-1129	16 FR-1301	24 PHA-1201

21.0 TR-1170, Q-1101-2 Redial front bearing T/C was replaced.

22.0 Removed following vibration probe as mechanical work was going on the Compressor. Refixed them after calibration of each with their respective channel.

01 VM-1153	06 AX-1151
02 VM-1154	07 VM-1155
03 AX-1152	08 VM-1156
04 VM-1151	09 VM-1157
05 VM-1152	10 AX-1155

UREA (INSTRUMENT)

Job Code	Jc	Description
23.0	FIC-1204	Rotameter was opened. Found internals badly damaged. Replaced the rotameter body.
24.0	PIC-1202	Rectified impulse line 'T' leakage.
25.0	LIC-1203	Replaced the bottom gasket and checked the calibration.
26.0	PRC-1501	Rectified leakage in seal position.

ANNUAL TURNAROUND 1984

UREA PLANT

TECHNICAL DEPARTMENT JOBS

Job code	Job description
1.0	Installation of level control valve for V 1421
2.0	Hook up of the steam line with G.H.H. Compressor
3.0	Removal of orifice from 60 ata line connected to CO ₂ Compressor (GHH) turbine
4.0	Steam blowing of following lines for CO ₂ Compressor (GHH) Turbine
	01 60 ata
	02 40 ata
	03 24 ata
	04 4 ata

ANNUAL TURNAROUND 1984

OFFSITES

MECHANICAL

Job code	Job description
----------	-----------------

1.0 COOLING TOWER AREA

01 M/s. Paharpur Marley staff carried out following works :

Following repair works of Cooling Tower woodwork was carried out

- a) Levelling of hotwater distribution decks was done for all decks
- b) Drift eleminators repaired
- c) Fills & fill grids were repaired
- d) Louvers were repaired/replaced as required

02 Cooling Water return line of Urea Towers

- a) Both lengths from Urea Cooling Tower fan No. 1, 2 and 3 horizontal pipe line were replaced - Pipe dia. 750 mm
Schedule - 40
- b) Three distribution valves were replaced & remaining valves were roused

(valves on Urea side Cooling Water Return line only)

03 Cleaning of blades of Ammonia Cooling Tower fans. All eight (8) fans were attended

04 One rubber expansion bellow on discharge of P-4402 was replaced

05 Oil Coolers & Filters of following Cooling Water Pump Turbines were cleaned

Oil Coolers & Filters of Cooling water pump Turbine Nos Q-4401/ 1 & 2 and Q-4403

Job code	Job description
----------	-----------------

02 Turbine side clutch of FD Fan replaced

03 I.J.T. Boiler No. F-5101/A (GT 1642)

The Boiler was offered for inspection, on 10.1.84 and approved by C.I.B. Steam leaks were rectified

Note :

Most of the Cooling Tower Fans, Pumps, FD Fans their turbine drives have stand-by equipment. These were taken up for overhaul under a programme of pre-shutdown preventive maintenance, and were completed before commencement of shutdown

This was done with a view to curtail down-time and to have better utilization of resources.

The equipments overhauled prior to shutdown are therefore not listed in the Report.

ANNUAL TURNAROUND - 1984

OFFSITES

INSPECTION

Job Code	Job Description
----------	-----------------

1.0

VESSELS :

Cation No. 2

Local repair of rubber lining of the Inlet nozzles was carried out. The rubber lined area was tested for soundness by spark testing techniques. No defects were observed. The hardness recorded was below the desired level (40° Shore S)

2.0

PIPE - LINES :

01 The thickness survey of the super-heated steam line upto 60 Ata Steam Header was carried out. The recorded thickness indicates that process of erosion in the Bends has started. The minimum thickness recorded in 9.4 mm. This implies that the design thickness has thinned by 13.6 percent. The condition of straight lengths will be surveyed in the near future.

It is felt that thorough survey on existing metal thickness is essential before suggesting further actions.

Line No. : Super heated steam line from boiler No.1 to 60 Ata Steam Header

Boiler No. 1 F-5101/A

Observation : The Bends No. 1,5,6,8 and 9 have recorded minimum thickness of 9.4 mm. This indicates that the design wall thickness has reduced by 14 percent.

Recommendation : The Bends will last for 3 to 4 years at existing thickness level. However in our long terms interests, a replacement action should be initiated.

OFFLINES (INSPECTION)

Job Code

Job Description

Boiler No. 2 F-5101/B

Observation : The Bends No. 7 & 17 have recorded minimum thickness of 9.4 mm. This indicates that the design wall thickness has reduced by 14 percent.

Recommendation : The bends will last for 3 to 4 years at existing thickness level. However in our long terms interests, replacement action should be initiated.

OFFLINES (INSPECTION)

Job Code

Job Description

Boiler No. 2 F-5101/B

Observation : The Bends No. 7 & 17 have recorded minimum thickness of 9.4 mm. This indicates that the design wall thickness has reduced by 14 percent.

Recommendation : The bends will last for 3 to 4 years at existing thickness level. However in our long terms interests, replacement action should be initiated.

OFFLINES (INSPECTION)

Job Code

Job Description

Boiler No. 2 F-5101/B

Observation : The Bends No. 7 & 17 have recorded minimum thickness of 9.4 mm. This indicates that the design wall thickness has reduced by 14 percent.

Recommendation : The bends will last for 3 to 4 years at existing thickness level. However in our long terms interests, replacement action should be initiated.

ANNUAL TURNAROUND 1984

OFFSITES

CIVIL JOBS

Job code	Job description
----------	-----------------

1.0 COOLING TOWER

Replaced several wooden members, AC Sheet louvers FRP grids, plywood of top shelves etc, during the shutdown. A large gang of carpenters was engaged to complete the job in time.

2.0 BOILER : F 5101/A

Front burner wall of boiler No.1 was repaired with castable refractory.

Material consumed approx. 1.0 M.T. whyeat.

3.0 WATER TREATMENT PLANT

Because of seepage of water through floor the uneven settlement of foundation of Anion III was observed.

The foundation of Anion III was strengthened and flooring of Anion area was recast with cement concrete Grade 1 : 2 : 4.

The old weak effluent channel between Anion and Cation tanks was badly damaged, so it was also reconstructed and modified during the shutdown period.

ANNUAL TURNAROUND 1984OFFSITESINSTRUMENT JOBS

Job Code	Job Description
1.0	(John Thompson) Boiler 1 & 2 5501 AB
	01 Flushing of all impulse lines for draft gauges.
	02 O/H of Air filter and gas press. regulator for ignitor system of Boiler No. 1&2.
2.0	<u>Peabody Panel</u>
	01 O/H of gas ball valves of Boiler No.1
	02 Panel trip system of Boiler No.1
	03 Glycol filling in LSHS impulse line of a) flow transmitter b) Pressure transmitter c) Low press. oil switch of boiler No.1.
3.0	Cooling Tower Area
	01 Replacing of corroded Inst. air header lines by new lines.
	02 O/H of HICV-5153 Control Valve.
	a) Removing from the line
	b) Replacing the plug & seat of the valve by new parts.
	c) Flange surfaces of valve body and the mating flanges were machined after metal filling.
	d) The bonet of HICV-5153 valve is replaced by the bonet of ESDV-5151 valve.
	e) Replacing the gland packing of the bonet.
	f) Defective yoke of the HICV-5153 is replaced by the yoke of ESDV-5151 control valve.

OFFSITES (INSTRUMENT)

Job Code	Job Description
----------	-----------------

- 03 Cooling tower sump level tapping point for level transmitter is rectified.
- 04 Fabrication of MS frame structure for mounting of instruments in operators' room.
- 05 Shifting of following instruments from cooling tower basin to operators' room
 - a) pH meter of Urea Cooling Water
 - b) " " " Ammonia " "
 - c) Digital Temp. indicator of bearing of 1350HP motors
 - d) Laying out multicore cables, mounting junction boxes for Temp. indicators.

4.0 DM Plant

- 01 Fabrication of new Inst. air header lines for replacing the corroded air lines.
- 02 O/H of Hand Jack assembly of the Raw Water Press. Control Valve PICV-4101 and inspection of plug and seat of the valve.

5.0 I.G. Plant

- 01 Providing D/P transmitter with local indicator for level measurement of Ammonia evaporator.

6.0 B H E L BOILER

- 01 F.D. Fan
 - a) All Pr.gauges and a AOP Pr.Switch were re-located to new suitable places.
 - b) New 'Disatac' meter with pick-up was replaced.
 - c) Suction damper: Stroking was checked.
 - d) Defective Temperature points are rectified.

OFFSITES (INSTRUMENT)

Job Code	Job Description
02	Ignitor Assembly a) Provided tapping for Pr.gauge on Gas line b) Circuitory modification was carried out c) Tapping modification was done.
03	Eye-Hye - Defective electrode 2 Nos replaced.
04	Target Flowmeter → Flowmeter was recalibrated. New Sq.root Extractor for this Target meter is provided. Necessary copper tubing modification was carried out on back of panel.
05	De aerator - Over flow level swith - Support is given to level switch manifold and now it is working.
06	Keltron Invertors - SCVS wasrepaired and taken in line.

ANNUAL TURNAROUND 1984

B & M H

MECHANICAL

Job Code	Job description
1.0	<p data-bbox="462 448 1101 481">HOPPER FEED CONVEYOR BELT M-2122</p> <p data-bbox="462 515 1452 649">Old wornout conveyor belt approximately 58 Metres length replaced with new Dunlop, "starflex", nylon fabric, 4 ply. 750mm width belt. Joints vulcanised by hot vulcanising method.</p> <ul style="list-style-type: none"> <li data-bbox="462 683 1412 750">01 Skirt rubber guards of the conveyor were also replaced. <li data-bbox="462 784 1452 918">02 All the return rollers were replaced. Some of the return guide rollers alongwith the some carrying side guide rollers and carrying idlers were replaced by new ones. <li data-bbox="462 952 1428 1019">03 Cleaning of the conveyor structures, including tripper and gear boxes etc. was carried out. <li data-bbox="462 1041 1428 1142">04 Fabricational repair work of the damaged skirt board, portion of skirt structure, and screw take up was carried out. <li data-bbox="462 1176 1508 1243">05 Tripper mainpulley bearing pedestal holes enlarged in order to ease the belt training/centering.
2.0	<p data-bbox="462 1299 1292 1332">BAGGING BUILDING FEED CONVEYOR BELT M-2121</p> <p data-bbox="462 1366 1484 1489">Old damaged belt approx. 240 metres length was replaced with new Dunlop "starflex", 750mm width, 5 ply, Nylon fabric conveyor belt. Joints vulcanised by hot vulcanising method.</p> <ul style="list-style-type: none"> <li data-bbox="462 1523 1412 1590">01 The old skirt rubber of the conveyor was also replaced. <li data-bbox="462 1624 1364 1657">02 30 Nos of old return rollers were replaced. <li data-bbox="462 1680 1388 1747">03 Five numbers of damaged return roller stands were replaced. <li data-bbox="462 1780 1332 1848">04 Thirty five numbers of worn out troughing idlers were replaced.

Job Code	Job description
05	Six numbers of damaged guide rollers replaced on carrying side and returning side.
06	Gravity take up bend pulley shaft bearing surface was observed defective, so bend pulley was replaced. Long standing chronic problem of this conveyor belt rubbing with the steel structure at the return side near the door on the over head walk-way leading to bagging plant was solved by this modification. Now the conveyor belt is not touching any where with steel structure.
07	The conveyor structure and pulley were cleaned by wire brush and water.
08	Four numbers of damaged skirt guards repaired.
09	Eight numbers of holes in bearing pedestal of two bend pulleys were enlarged by gas cutting for adjusting the pulleys in order to train the conveyor belt.
10	The damaged portion of steel structure in the grilled walk way was repaired by welding.

3.0

SILO SHUTTLE CONVEYOR BELT M-2112

LENGTH 455 mtrs.

Conveyor belt of following specification was replaced.

- DUNLOP BELT
- Belt width : 600 mm
- 4 Ply, 3mm top cover, 1.5mm Bottom cover
- 0.794 duck
- Grade: HR
- CONFORMING TO I.S.S. 1891/689
121°C of 803 DUCK MILDEW.

The belt was in two pieces and one piece was of 155 metres EIRW Make belt. Total three numbers of hot vulcanised joints were made.

Job code	Job description
----------	-----------------

Others associated jobs :

- 01 Tail pulley and head end snub pulley were replaced as the bearing position on the shaft got worn out and bearings found damaged.
- 02 The old skirt rubber was replaced by new available.
- 03 Five nos of damaged return roller stands were replaced.
- 04 Seventy nos of worn out return rollers were replaced.
- 05 Self aligning troughing idler stand 3 Nos replaced.
- 06 Fourteen nos of troughing side & six nos of return side guide rollers were replaced.
- 07 Thirty five nos. of old noisy troughing idlers were replaced.
- 08 Complete steel structure of the conveyor including tripper was cleaned by scraping and wire brushing.
- 09 Painting of the steel structure of the conveyor and tripper were arranged.
- 10 Skirt extension :
 - a) Discharge hopper & chute of shuttle conveyor M-2110 was very frequently getting choked and there was considerable spillage of Urea granules from the skirt portion on conveyor belt M-2112. As per debottle necking suggested by General Engineering Section the skirt frame of M-2112 was prefabricated and extension of 2 ft. provided with existing length.
 - b) As a part of the debottle necking the capacity/ volume of the M 2110 discharge hopper was increased by welding extra plate in the hopper below the head end pulley of M 2110 so that even in case of blockage in the discharge chute due to any reason instantaneous everflow of Urea will not take place.

Job Code Job description

- c) Conveyor M-2110 discharging hopper & chute over conveyor M-2121 had frequent chocking trouble; so in view to improve flow of material the deflector plate was cut removed.
- d) Replaced locking ring, spindle of flapper gate of conveyor M-2122. Hand wheel welded on the spindle at drive end discharge chute of conveyor M-2122.

4.0

RECLAIM MACHINE LINK CONVEYOR M-2117

The link Conveyor which is feeding reclaimed Urea to M 2117 torn belt (length 20 mtrs) 800 mm wide, 4 ply Nylon/Cotton fabric, was replaced by Hilton make new conveyor belt by making hot/cold vulcanizing joint.

- 01 Three nos of return rollers were replaced
- 02 Four nos of noisy carrying idlers were replaced
- 03 One carrying rollers stand was replaced
- 04 The steel structure of the conveyor was cleaned by scraping and wire brushing

5.0

Reconditioning of 80 nos of return rollers for 600 mm wide conveyors & 750 mm wide conveyors, by removing old rubber discs and putting back new rubber discs was done for putting them with various conveyors after rejuvenation.

6.0

PREVENTIVE MAINTENANCE

- 01 Cleaning and oil charging in gear boxes of M 2110 M 2112, M 2117, M 2121 and M 2122 was done
- 02 Checking of coupling bushes of all the conveyor gear boxes both high speed and low speed sides including the coupling bushes of tripper on M 2112 and M 2122 was done.

Job Code	Job description
----------	-----------------

- 03 Chain guard oil of both the trippers was changed after cleaning internally.
- 04 Greasing of all the bearing points of M 2110, M 2112, M 2117, M 2116 (Reclaim machine), M 2121 and M 2122.

7.0

SLAT CONVEYORS

- 01 Cleaning of all the slat conveyors with water and wire brushing. Cleaning of the slat conveyors chain and rollers with diesel and lubricated them with light oil.
- 02 Replaced some damaged slats of the slat conveyors.
- 03 Greasing of all the bearing points.
- 04 Cleaning of all the gear boxes of the slat conveyors. Checking, cleaning and replacing of gear oil and chain guard oil also done.

TRIAL RUNS AT NO LOAD AND FINAL RUN ON LOAD OF ALL THE CONVEYORS WERE CARRIED OUT.

8.0

BAGGING GROUND FLOOR

- 01 Redressing and repairing of 12 Nos of truck loading stands for bagging plant were attended.

9.0

HANDLING AREA JOBS :

NAPHTHA FEED PUMPS P-3202 A/B

- 01 In order to install two nos of strainer (vertical simplex/duplex type) in the naptha feed pumps suction lines for easy removal and cleaning of the filter elements, modifications of existing suction line was required. The suction line was removed and suitable modification was done by cutting and welding new flange and bends.

The line was put back in position the new strainers were erected.

Job Code	Job description
----------	-----------------

- 02 For effective proper earthing to avoid static electricity charges, aluminium U clamps were made and provided on each flange of the modified strainers line.
- 03 Mechanical seal of both the naptha feed pumps were leaking, which were replaced by new ones and the pumps were handed over after trial run at minimum flow.

10.0

AMMONIA CIRCULATION PUMP P-3103/B

The pump got seized. The pump was removed from the sump dismantled and inspected. Its top shaft was found to be scored badly at the sealing area. One bearing also was found damaged. Its shaft coupler lock nut and split ring also found unscrewed and dislocated.

The following new spares consumed in assembly of ammonia pump

- Top shaft
- Coupler
- Mech. seal

The pump assembled, installed in position and checked for static pressure resistance of mech. seal.

Trial run of the pump was taken and it was found Okay.

ANNUAL TURNAROUND 1984

ELECTRICAL SECTION

Job code Job description

1.0 Preventive maintenance of following MCCs were done

- 01 MCC-2 Cooling Tower Area
- 02 MCC-2 Compressor House Offsites
- 03 MCC-2B/2E IJT Boiler House
- 04 MCC-3 Handling Area
- 05 MCC-4 B&MH Plant
- 06 MCC-5 Ammonia Plant
- 07 MCC-6 Urea Plant
- 08 MCC-11 BHEL Boiler House

2.0 Preventive maintenance of 'TMG' make L&T. Air circuit break ers installed at the following MCCs were carried out.

- 01 MCC-1 Cooling Towers Area 1600 Amps. 3 Nos
- 02 MCC-2 Compressor House Offsites 1600 " 3 Nos
- 03 MCC-2F K 5301 NE, MCC-5A etc. 2000 " 1 No
- 04 MCC-2A Compressor Area Control power 1101 V etc. 1000 " 2 Nos
- 05 MCC-3 Handling Area 160 " 3 Nos
- 06 MCC-4 B&MH Plant light 1000 " 3 Nos
- 07 MCC-5 Ammonia Plant 1000 " 2 Nos
- 08 MCC-6 Urea Plant 1600 " 3 Nos
- 09 MCC-8 AMF Set 1600 " 1 No

Elect.

Job code	Job description
3.0	Transformer secondary connections and incoming connections at the MCCs of the following transformers were checked up and tightening of connections and cleaning was done.
01	Transformer 2A and 2B
02	Transformer 3A and 3B
03	Transformer 4A and 4B
04	Transformer 5A and 5B
05	Transformer 7A and 7B
4.0	ML/2 connectors of L & T make were replaced by SIEMENS make 3 TB 56 contracts and necessary modification was carried out for the following meters.
01	Raw water pump motor
02	Refrigeration Compressor Motor
5.0	Preventive maintenance of following 11 KV OCB were carried out and oil was replaced.
a)	Capacitor Bank No.1
b)	Capacitor Bank No.2
c)	700 HP motor
d)	MCC-3 Section 'A'
e)	MCC-3 Section 'B'
f)	MCC-6 Section 'A'
6.0	Lighting fixtures installed on all conveyers were attended and defects rectified.