

RESULT OF CHECK / INSPECTION
AND REHABILITATION WORKS

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EQUIPMENT & MACHINERY

GENERAL NOTES:

1. The column "Rehabilitation Work" describes the final action as the result of the first field survey and the check/inspection in the second field survey.

2. Expected life (Estimated as the equipment/machinery are now)

A : 7 9 Years

B : 4 6 Years

C : 2 3 Years

Z : Immediate Replacement

3. Supervisor

"Yes" means that presence of supervisors is recommended for the rehabilitation work.

SECTIONWISE NUMBERS OF EQUIPMENT/MACHINERY TO BE RE-HABILITATED

Section	Complete Replacement	Replacement of Parts	Repair by NCZ	N/R
301	8	14	(1)	8
302	12	12	(2)	10
303	7	12	(2)	6
304-8	10	18	(6)	19
309	3	3	—	4
310	9	11	(3)	10
311	1	15	—	4
401	5	11	(6)	18
501	6	10	(13)	34
601	8	7	(4)	13
602	2	2	—	4
604	2	1	—	1
605	8	1	—	7
Total	81 (24%)	117 (35%)	(37)	138 (41%)
			(Included in)	
			N/R	

N/R : Not to be included in the rehabilitation programme.

GRAND TOTAL 336 ITEMS

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
301-C01 MULTICLONE DUST COLLECTOR	No problem on casing. Internal parts such as Guide Blade are corroded heavily. Rotary valve clearance too big. (To be replaced)	C	Replacement of Parts : 1 set	-
301-C02 WET SCRUBBER WITH EXHAUST FAN	Scrubber shell corroded heavily and repaired by welding patches of stainless sheets. Baffle Plate damaged. Exhaust Fan eroded heavily. Casing partly damaged Motor good.	C	Replacement of Exhaust Fan : 1 set	-
301-C03 MULTICLONE DUST COLLECTOR	Same as 301-C01	C	Replacement of Parts : 1 set	-
301-C04 WET SCRUBBER WITH EXHAUST FAN	Same as 301-C02	C	Replacement of Exhaust Fan : 1 set	-
301-D01 EBRO TYPE ROTARY DRYER	Plain riding ring and support Rollers are not aligned properly and worn unevenly. Thrust Riding Ring and Thrust Rollers the same. No Problem on the Dryer Shell.	C	Replacement of Parts	YES
301-C02 WET COAL BUNKER	NCZ observed blocking and bridging at the bottom in the rain season. Pneumatic knocker recommended.	-	Nil.	-
301-G03 HOT AIR FURNACE	Fire bricks worn. Partly fallen. Heavy erosion around Fired Room.	B	Re-lining of Fire Brick : 1 set	YES

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
301-G05 COMPEB MILL	No problem on the mill shell. Rotating parts worn heavily. (To be replaced). Shell liners to be replaced.	C	Replacement of Parts : 1 set	YES
301-G06 GRINDING MEDIA FOR COMPEB MILL	Almost worn out. Size distribution not satisfactory. All to be checked for size and replaced as required by NCZ.	-	NIL	-
301-G09 CHUTES, DUCTS AND PIPING	No Problem. (Repaired by NCZ).	A	NIL	-
301-G10 INSULATING MATERIAL	No Problem. (Repaired by NCZ).	A	NIL	-
301-K01 ROOTS BLOWER	No Problem.	A	NIL	-
301-K02 A/B COMPRESSOR	Unloaders, Cylinder Valves and oil scraper rings to be replaced.	C	Replacement of Parts : 2 sets	-
301-K03 AIR PURGE BLOWER	Not in Service	-	NIL	-
301-W01 A, B WEIGHING FEEDER	Weighing Mechanism worn out, to be replaced.	C	Complete Replacement	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
301-W02 WEIGHING FEEDER	Weighing Mechanism worn out, to be replaced.	C	Complete Replacement	-
301-W03 WEIGHING FEEDER	-do- (This feeder should be for high temperature service of dried coal).	C	Complete Replacement	-
301-W04 - do -	Weighing Mechanism worn out, to be replaced.	C	Complete Replacement	-
301-Y01 BELT FEEDER	No problem	A	NIL	-
301-Y02 BUCKET ELEVATOR	Casing and Gered Motor : O. K. Chain, Buckets and Driving Wheel are eroded heavily and be replaced.	B	Replacement of Parts : 1 set	-
301-Y03 BELT CONVEYOR	Structure, Frame and Motor : O. K. Conveyor belt, carrying idlers, impact idlers, self aligning unit, sprocket driver etc. to be replaced.	C	Replacement of Parts : 1 set	-
301-Y06 BELT CONVEYOR	-do-	C	Replacement of Parts : 1 set	-
301-Y08 FLOW CONVEYOR	No Problem	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
301 - Y09 SCREW CONVEYOR	Casing, screw, bearing etc. heavily eroded.	C	Complete Replacement : 1 set	-
301 - Y10 BUCKET ELEVATOR	Main chain, buckets, driving and driven wheels etc. heavily worn. Casing repaired by patching in 1981. Geared Motor can be used.	C	Complete Replacement : 1 set	-
301 - Y11 SCREW FEEDER	Casing, screw, bearing, roller chain, reducer etc. heavily worn. Especially, the screw is broken and cannot be repaired.	C	Complete Replacement : 1 set	-
301 - Y12 SCREW CONVEYOR	Casing, screw, bearing, roller chain, reducer, rotary valve etc. heavily worn. Especially, the screw is broken and can not be repaired.	C	Complete Replacement : 1 set	-
301 - Y13 FLOW CONVEYOR	Casing : repaired by NCZ. Driving and driven wheels to be replaced (Both heavily worn) .	B	Replacement of Parts : 1 set	-
301 - Y14 PNEUMATIC CONVEYOR	Cone valve and Feeding valve heavily corroded (To be replaced) . 2-way-valve, Piston valve and Diaphragm valve are damaged heavily. (To be replaced. Shell Thickness 11.4mm (New 12mm)) .		Replacement of Parts : 1 set	-
301 - Z02 AERATION UNIT FOR PULVERIZED COAL BUNKER	Repaired by NCZ frequently. Flexible hoses and canvas clothes to be replaced.	C	Replacement of Parts : 11 sets	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
302-G01 GASIFIER WITH IMMERSION SHAFT	Water leakage noticed because of erosion and deformation by high temperature. Frequent repairs by NCZ. Water cooling jacket material changed to stainless steel by NCZ.	C	Replacement of Parts : 1 set	-
302-G02 GASIFIER OUTLET	Inner shell heavily corroded resulting in water leakage. Repaired by welding many times. Outer shell to be fitted with an expansion joint	C	Complete Replacement : 1 set	-
302-G03 INTERMEDIATE PIECE BETWEEN IMMERSION SHAFT & EXTRACTOR	Inner shell heavily eroded	C	Replacement of Parts : 1 set	-
302-T01 COOLING WASHER	Baffle plates and spray pipes heavily corroded. Brick lining eroded and fallen partly. (Especially at the bottom). Thickness 6.6 / 9.7 (new 7/10). Good.	Vessel : A Others : C	1. Replacement of Baffle plate : 1 set 2. Brick-lining of inlet nozzle : 1 set 3. Replacement of spray pipe : 1 set	-
302-T02 WATER SEPARATOR	Shell and bottom plate corroded heavily (4mm for 8mm when new). Wooden grids broken. Wooden grid supports corroded and deformed : B-Unit has no spray nozzles.	C	Complete Replacement : 2 sets	-
302-E02 TUBULAR BOILER	Channel, Tube Sheet and Tubes eroded heavily. Design to be studied.	C	Replacement of Tube Bundle : 1 set and inner shell	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
302-E04 A, B O ₂ -COOLER	No Problem	A	NIL	-
302-E05 A, B NO. 1 N ₂ COOLER	Two Tubes plugged. Tube Bundles corroded heavily	B	Replacement of Tube Bundle : 2 sets	-
302-E06 NO. 2 N ₂ COOLER	No Problem.	A	NIL	-
302-G06 ASH EXTRACTOR	Original one damaged 1971. One made by NCZ not satisfactory. Replacement with genuine one recommended.	C	Complete Replacement : 1 set	-
302-K01 A, B O ₂ -BLOWER	Discharge check valves to be replaced (2 sets). Metal sleeve and Labyrinth of A-Unit to be replaced. Rotor of B-Unit changed in 1980.	B A	A : Replacement of Parts : 1 set B : NIL	-
302-K02 A, B NO. 1 N ₂ BLOWER	Labyrinth and bearing worn. (To be replaced). By-pass cooler (cooling water side) heavily corroded. (To be replaced).	B	A : Replacement of Parts : 1 set B : Complete Replacement : 1 set	-
302-K03 NO. 2 N ₂ BLOWER	No problem	A	Replacement of Parts : 1 set	-
302-K05 AIR PURGE BLOWER	Not in Service	-	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
302 - NO1 - 1 A, B THEISEN WASHER	Rotors, casings, shafts, shaft-sleeves etc. are corroded/eroded heavily. Materials applied should be further studied.	C	Complete Replacement : 2 sets	-
302 - NO1 - 2 A, B THEISEN WASHER	-do-	C	Complete Replacement : 2 sets	-
302 - P01 A, B WASH WATER PUMP	Impeller is cracked at the inlet. Repaired by welding by NCZ.	B	Replacement of Impellers : 2 sets	-
302 - P02 A, B FEED WATER PUMP	Impeller, shaft, bearing and wearing ring are to be replaced.	B	Replacement of Parts : 2 sets	-
302 - P03 A, B QUENCH WATER PUMP	Same as 302-P02	B	Replacement of Parts : 2 sets	-
302 - P04 A, B LIGHT OIL PUMP	No Problem now. But spare parts required.	A	Complete Replacement : 2 sets	-
302 - P05 FUEL OIL PUMP	The motor is replaced with South African make. No Problem	A	-do-	-
302 - G07 CONNECTING E02 & T01	No Problem	A	NIL	-
302 - G07 - Z1 REFRACTORY BRICKS FOR CONNECT PIPE	Heavy erosion. Partly fallen off.	C	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
302-G08 EXPANSION JOINT	To be replaced by NCZ. Many cracks on the Expansion bellows.	B	NIL	-
302-G08-Z1 REFRACTORY BRICKS FOR EXPANSION JOINT	Same as 302-G07-Z1	C	Complete Replacement : 1 set	-
302-G09-1-4 BURNERS	No Problem All made by NCZ	A	NIL	-
302-Z02 EXPANSION JOINT BETWEEN GASIFIER AND RAD. BOILER	Heavy erosion. Cracks on the weld repair lines.	C	Complete Replacement : 1 set	-
302-G01-Z1 GASIFIER LINING	Heavy erosion. Partly damaged.	C	-do-	-
302-E02-Z3 CLEANING DEVICE FOR TUB. BOILER	No Problem All made by NCZ.	-	NIL	-
302-E02-Z4 CASTABLE & BRICKS FOR BRANCHES	Castable to be repaired, (Partly) NCZ has in stock. To be repaired by NCZ.	A	NIL	-
302-E02-Z5 CONNECTION PARTS BETWEEN E01 & E02	Heavy erosion	C	Replacement of Connection : 1 set Parts	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
302-T02-Z1. STONE WARE RING	No Problem	A	NIL	-
303-E01 SOLUTION HEATER	Five tubes out of 15 plugged. Corrosion heavy. Thickness 5.7 mm (new 6 mm) GOOD. Tubes are blocked with sulfur. Type of heater to be studied.	C	Complete Replacement : 1 set	-
303-E02 EVAPORATOR	Frame heavily corroded. Filling material damaged. Sulfur is blocking filling material. Type of Evaporator to be studied.	C	Complete Replacement : 1 set	-
303-F01 FILTER PRESS	Fixed and movable heads and Oil pressure unit : No problem. Other Parts to be replaced. Driving unit of filter plate removed and automatic filtration system out of service.	B	Replacement of Parts : 1 set	-
303-J01 A-H JET EJECTOR	No Problem	A	NIL	-
303-K01 A, B AIR BLOWER	12-16 cogs of timing gear of B-unit repaired by welding. (To be replaced) NO check valve on discharge line. 1 set of check valve to be installed.	B	Replacement of Rotating Parts : 2 sets	-
303-K02 A, B AIR COMPRESSOR	Removed in 1978. Instrument air is available and this compressor is not required.	-	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
303-P01 NO. 1 ABSORBER FEED PUMP	Impeller corroded and eroded heavily, check valve leaks because of corrosion	B	Replacement of Parts : 1 set	-
303-P02 A, B NO. 2 ABSORBER FEED PUMP	Impeller corroded and eroded heavily, check valve leaks because of corrosion.	B	Replacement of Parts : 2 sets	-
303-P03 REACTION TANK FEED PUMP	Impeller corroded and eroded heavily. Check valve leaks because of corrosion.	B	Replacement of Parts : 1 set	-
303-P04 A, B OXIDIZER FEED PUMP	-do-	B	-do- : 2 sets	-
303-P05 A, B FILTER FEED PUMP	Casing and impeller eroded heavily. common bed corroded.	C	Complete Replacement : 2 sets	-
303-P06 CHEMICAL SOLUTION FEED PUMP	Motor now under repair by NCZ. No Problem	A	NIL	-
303-T01 NO. 1 ABSORBER	Repaired by patching. Tower inside corroded for lower 10 meters, where stainless lining was made by NCZ. Wooden Grids damaged (To be replaced).	C	Complete Replacement : 1 set.	YES

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
303-T02 NO. 2 ABSORBER	Patched around the middle of the tower. Lower shell and bottom plate were lined with stainless steel. Wooden Grids to be replaced.	TOWER : B OTHERS : C	1. Inside epoxy coating : 1 set 2. Replacement of Wooden Grids : 1 set	YES
303-T03 NO. 3 ABSORBER	Inside corroded Wooden grids to be replaced	B	1. Epoxy Coating of inside : 1 set 2. Replacement of Wooden Grids : 1 set	YES
303-V01 REACTION TANK	NCZ changed the Tank 3 times except the cone, because it was heavily corroded. The one now in service was replaced in 1980 but some leakage noticed at the bottom outlet tube.	B	1. Complete Replacement with Epoxy coating of inside : 1 set	YES
303-V02 OXIDIZER	Shell 6.0mm (New 6mm) GOOD. Epoxy coating recommended. Air Blast pipes are clogged sometimes, inspection of which is difficult without the sight glass.	B	1. Epoxy coating of inside : 1 set 2. Supply of Sight Glasses : 8 sets	YES
303-V03 SLURRY TANK	Top plate and roof plate heavily corroded. (To be replaced by NCZ). Sulfur accumulated inside the Tank.	B	NIL	-
303-V04 BALANCE TANK	Painting peeled off. To be painted. Thickness 6.1mm (New 6mm) . GOOD. Piping from V02 to be replaced by NCZ.	B	NIL	-
303-V05 MIXING TANK	Not in service now	B	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
303 - V06 MIST SEPARATOR	The demister is removed because of clogging of carbon dusts. Shell corroded heavily. Carbon dusts piled inside.	C	Complete Replacement : 1 set	-
303 - V07 WASH WATER TANK	Not in service since 1974, but to be back in service by replacing the automatic valve.	B	Replacement of Automatic Valve : 1 set	-
303 - V09 A, B AUTOCLAVE REMELTER	Vessel : No Problem. Bottom steam trace and the piping from Remelter to Flaker to be replaced. (Heavy Corrosion)	VESSEL : A OTHERS : C	Replacement of Parts : 2 sets	-
303 - D01 FLAKER	Almost all the parts are heavily corroded. To be replaced.	C	Replacement of Parts : 1 set	-
303 SECTION pH CONTROL	Now operated without pH meter. To be installed.	-	Supply pH Analyser : 1 set	-
304 - E01 PRIMARY SHIFT PREHEATER A, B	Shell : Thickness 16.1mm (New 15mm) GOOD. Tube bundle heavily corroded. Tube bundle replaced by NCZ in 1974. No Problem.	B	A : Replacement of Tube Bundle : 1 set B : NIL	-
304 - E02 NO. 1 WATER HEATER	Shell repaired by patching, baffle plates are corroded (material to be changed to S/S). Pitting noticed on the expansion bellows.	C	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
304-H01 PRIMARY SHIFT CONVERTER	No problem, though some pitting is noticed inside the Vessel. Shell : 36.4mm (new 36mm) GOOD. Castable on the 2nd layer repaired by GOOD. Castable on the 2nd layer repaired by NCZ in 1979. Alundum balls damaged.	VESSEL : A OTHERS : C	1. Replacement of Castable : 1 set 2. Replacement of Catalyst : 1 set 3. Replacement of Alundum Balls : 1 set	-
304-P01 A, B WATER PUMP	A-Unit has some wear on the shaft and the wearing ring, but no problem.	B	NIL	-
304-T01 SATURATOR	Vessel 24.9mm (New 25mm) GOOD. Crack and swell noticed on the lower part. S/S lining made by NCZ. Grating heavily corroded. (To be replaced)	VESSEL : A OTHERS : C	1. Replacement of Grating : 2 sets 2. Replacement of Rashing Ring : 1 set 3. Repair of lining : 1 set	YES
304-V02 NO. 1 DESUPERHEATER	Shell 21.4mm (New 21mm) GOOD.	A	NIL	-
304-V03 NO. 2 DESUPERHEATER	Shell 21.5mm (New 21mm) GOOD.	A	NIL	-
PIPING (1) CIRCULATING WATER LINE	Changed partly to S/S in 1970 No Problem	A	NIL	-
PIPING (2) PROCESS LINE	Almost half the piping changed to S/S in 1970. Other half is corroded heavily. (Especially elbows.) NCZ is changing to S/S. (Partly)	B	Replacement of Piping : 1 set Materials	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
305-E01 NO. 1 CARBONATE REBOILER	Five Tubes plugged. Corrosion not heavy. Shell fouled heavily. (To be cleaned periodically.) (Shell 8mm) GOOD. Channel 20.1mm (New 20mm) GOOD.	A	NIL	-
305-E02 NO. 2 CARBONATE REBOILER	15 Tubes plugged. Tube bundle heavily corroded. Shell 6.1mm (New 6mm) GOOD. Shell cracked (150mm long).	C	Complete Replacement : 1 set	-
305-E03 CARBONATE OVER HEAD CONDENSER	Shell 11.0mm (New 12mm) GOOD. Seven tubes plugged. Heavy carbon accumulation on the tube sheet.	B	NIL	-
305-F01 CARBONATE SIDE STREAM FILTER	Not in service since 1974. Filter Plate driving unit and piping corroded. (To be replaced).	C	Complete Replacement : 1 set	-
305-P01 A, B CARBONATE SOLUTION PUMP	First Stage casing corroded, wear ring worn. Shaft, shaft sleeve and wear ring are to be replaced.	C B	A : Complete Replacement : 1 set B : Replacement of Parts : 2 sets	-
305-P02 A, B PEFLUX PUMP	Motor cover is corroded because of the leakage on the carbonate line overhead.	B	A : Complete Replacement : 1 set B : NIL	-
305-P04 A, B WATER INJECTION PUMP	B-Unit changed to British make No Problem A-Unit, Driving unit to be changed by NCZ.	A B	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
305-T01 CARBONATE REGENERATOR	Distribution pipe, Distributor, Grating etc. heavily corroded (To be replaced) Rashig rings dirty, many are damaged. (To be replaced).	VESSEL : A OTHERS : B	Replacement of Parts : 1 set and Raschig Ring	YES
305-T02 CARBONATE ABSORBER	-do- Vessel Thickness 28.2mm (New 31mm) GOOD.	VESSEL : A OTHERS : B	Replacement of Parts : 1 set and Raschig Ring	YES
PIPING (1) CARBONATE SOLUTION LINE	Corrosion heavy, Repaired by patching materials to be studied. Stainless steel lines : No Problem.	A, C	Replacement of piping	-
PIPING (2) CO ₂ GAS LINE	-do- Thickness of the pipe where there is no patching repair was 5mm (New 6mm) GOOD.	C	Replacement of Piping	-
PIPING (3) REBOILER VAPOR LINE	All pipe pieces are changed to rolled weld lines of which have many pinholes and deformed expansion joint to connect 305-E02 removed (To be installed).	C	Replacement of Piping.	-
PIPING (4) REBOILER LIQUID LINE	Pipe Thickness : 250 A Line 3.4mm (New 3.0mm) 200 A Line 3.0mm (New 3.0mm)	A	NIL	-
HOT POTASSIUM CARBONATE SYSTEM		-	Supply of corrosion inhibitor	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
305-P03 CARBONATE SOLUTION SUMP PUMP	No Problem on motor, frame and column Other Parts, such as pump, shaft, intermediate bearing etc. are to be replaced.	A&C	Complete replacement : 1 set	-
306-E01 SECONDARY SHIFT PREHEATER A	Heavy corrosion. The Tubes were replaced with stainless tubes made in Germany in 1973 but used only for three months.	C	Complete Replacement : 1 set	-
306-E02 SECONDARY SHIFT PREHEATER B	Heavy corrosion, especially on tubes many pitting spots noticed. Nine tubes in the lower unit plugged.	C	Complete Replacement : 1 set	-
306-E03 NO. 2 WATER HEATER	The shell is repaired by welding patches. Tubes are corroded heavily. Materials to be studied.	C	Complete Replacement : 1 set	-
306-H01 SECONDARY SHIFT CONVERTER	Vessel thickness 26.4mm (New 27mm) Grating and wire meshes are corroded heavily. The catalyst and Alundum Balls are to be replaced.	VESSEL : A OTHERS : C	1. Replacement of Catalyst : 1 set 2. Replacement of Alundum Balls : 1 set 3. Replacement of grating and wire mesh : 1 set	-
PIPING (1) PROCESS GAS LINE	A part of piping was replaced with stainless pipes in 1970. But other parts are carbon steel, which is repaired by welding.	A, C	Replacement of Piping Materials	-
PIPING (2) HOT WATER LINE	No Problem	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
307-E01 MEA REBOILER	Shell fouled heavily. (To be cleaned periodically) Shell 6.0mm (New 6mm) GOOD.	A	NIL	-
307-E03 MEA OVERHEAD CONDENSER	Two tubes plugged. Some pitting noticed. Carbon steel parts (Baffle plates. Tie rods, spacers etc.) Corroded heavily. Shell 9.3mm (New 9mm) GOOD.	B	Replacement of Tube Bundle : 1 set	-
307-E04 A, B MEA SOLUTION HEAT EXCHANGER	No Problem. Shell dirty, to be cleaned periodically. Shell 9.2mm (New 9mm) GOOD.	A	NIL	-
307-E05 A, B MEA SOLUTION COOLER	Tube sheet and Tubes corroded heavily, shell 8.8mm (New 9mm) GOOD.	C	Replacement of Tube Bundle : 2 sets	-
307-P01 A, B MEA SOLUTION PUMP	Corrosion and erosion noticed on all parts (shaft, shaft sleeve, impeller etc.) except casing.	B	Replacement of Parts : 2 sets	-
307-T01 MEA REGENERATOR	Inside was clean with no heavy corrosion Raschig Rings also were clean. Shell 7.8/12.4/10 (New 8/12/10) GOOD.	A	NIL	-
307-T02 MEA ABSORBER	Thickness : 18.4mm (New 18mm) GOOD. Top and bottom gratings are corroded and to be replaced. (Also Raschig Rings) .	A	1. Replacement of Grating : 2 sets 2. Replacement of Raschig Ring : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
307 - V01 NO. 2 CONDENSATE SEPARATOR	NCZ changed material (C/S to S/S) in 1970. No Problem.	B	NIL	-
PIPING (1) MEA SOLUTION LINE	Material partly changed to stainless steel by NCZ. A part of insulation peeled off (To be repaired).	A	NIL	-
PIPING (2) CO ₂ GAS LINE	NCZ Changed material from carbon steel to stainless steel. No Problem.	A	NIL	-
308 - E02 METHANATOR COOLER	Shell replaced once and Tube bundle 4 times. The present one corroded on shell and tube heavily. Materials to be studied.	C	Complete Replacement : 1 set	-
308 - P01 A, B CAUSTIC SOLUTION PUMP	Leakage noticed through Mechanical Seal for both units. (More for B-Unit). The spare Mechanical Seals available in NCZ Store now.	A	NIL	-
308 - P02 A, B CAUSTIC MAKE-UP PUMP	Slight sound noticed on the worm gear. No Problem.	A	NIL	-
308 - P03 CAUSTIC SUMP PUMP	No Problem on motor, frame and column. Other parts, such as pump, shaft, intermediate shaft etc., to be replaced.	A&C	Replacement of Parts : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
309-E03 WATER COOLED CONDENSER	Tubes corroded heavily. (Pitting all over the tubes) . Shell 6.2mm (New 6mm) GOOD.	C	Replacement of Tube Bundle : 1 set	-
309-E09 AMMONIA CONDENSER	Tubes corroded heavily. Capacity may not be sufficient for the service. (To be studied) .	C	Complete Replacement : 1 set	-
309-E10 LIQUEFIER CONDENSER	Tubes and tube sheet heavily corroded. Capacity may not be sufficient for the service (To be studied) .	C	Complete Replacement : 1 set	-
309-E11 GAS PUPGER	No Problem	B	NIL	-
309-K02-E1 OIL COOLER	Tubes replaced by NCZ in 1974. Slight corrosion noticed on the channel cover but no problem.	B	NIL	-
309-P01 A, B WATER PUMP	A-Unit replaced with Swedish make.	A	Complete Replacement of B-Unit : 1 set	-
309-V04 STEAM DRUM	Corrosion noticed on Demister when opened by NCZ in 1979. (To be replaced) . Thickness 11.5mm (New 12mm) GOOD.	VESSEL : A	Replacement of Demister : 1 set	-
309-H01 SYNTHESIS CONVERTER	NCZ had placed order already.	-	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
309-K01 GAS CIRCULATOR	All parts except the casing to be replaced.	-	Replacement of Parts : 1 set Overhauling : 1 set	YES
310-D01 INSTRUMENT AIR DEHYDRATOR		C	NIL	-
310-K01 RAW GAS COMPRESSOR		A	1. Replacement of 1st stage Casing : 1 set 2. Complete Overhauling	YES
310-K01-E1 1ST STAGE INTERCOOLER	No problem. NCZ changed material of shell and tubes to stainless steel. Periodical cleaning of carbon dusts required.	A	NIL	
310-K01-E2 2ND STAGE INTERCOOLER	-do- Shell 6.6mm (New 6mm) GOOD	A	NIL	
310-K01-E3 3RD STAGE INTERCOOLER	NCZ replaced tube bundle in 1971. No problem. Small pieces of wood found on the tube inlets (about one third of all tubes).	B	NIL	
310-K01-E4 BY-PASS COOLER	Heavy corrosion all over shell and tube bundle. Small pieces of wood found on all the tube inlets. Shell 15.5mm (New 19mm) NO GOOD.	C	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
310-K01-E5 OIL COOLER	Tubes corroded heavily. Visual inspection of the shell : NO PROBLEM	B	Replacement of tube bundle : 1 set	-
310-K01-F1 SUCTION FILTER	Now in service without filter element (To be installed) Mixture of oil and carbon dusts accumulated at the bottom. Modification to be studied.	B	Replacement of parts : 1 set	-
310-K01-P2 A, B NO. 1 SEAL PUMP	Clearance between casing and rotor is too big. To be replaced.	C	Complete Replacement : 2 sets	-
310-K01-P3 A, B NO. 2 SEAL PUMP	Clearance between casing and rotor is too big. To be replaced.	C	Complete Replacement : 2 sets	-
310-K01-V1 1ST STAGE DRAIN SEPARATOR	Mixture of oil and carbon accumulated inside. The design to be studied.	B	Complete Replacement : 1 set	-
310-K01-V2 2ND STAGE DRAIN SEPARATOR	NCZ repaired by patching in June 1979. Shell 3.4mm (New 6mm) To be replaced or repaired immediately.	C	Complete Replacement : 1 set	-
310-K01-V3 3RD STAGE DRAIN SEPARATOR	Shell patched by NCZ in June 1979. Shell thickness (without the patch) . 8.0mm (New 12mm) .	C	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
310-K01-V4 BY-PASS DRAIN PARATOR	Heavily corroded. Shell 7.2mm (New 17.4mm) (Min. thickness required is 6.2mm). To be replaced at once.	C	Complete Replacement : 1 set	-
310-K01-V20 1ST DISCHARGE SILENCER	Mixture of carbon and oil accumulated. Type to be changed to maintain silencing effect and to clean easily.	B	Complete Replacement : 1 set	-
310-K01-V25 2ND DISCHARGE SILENCER	-do-	B	Complete Replacement : 1 set	-
310-K02 NITROGEN GAS COMPRESSOR		A	Complete Overhauling : 1 set	YES
310-K03 SYNTHESIS GAS COMPRESSOR		A	Complete Overhauling : 1 set	YES
310-K03-E1 1ST STAGE COOLER	Thickness 6.4mm (NEW 7mm) GOOD A few pittings (\approx 4mm deep) were noticed on the inlet short pipe (to be replaced immediately by NCZ).	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
310-K03-E2 2ND STAGE COOLER	Thickness 8.3mm (New 8.7mm) GOOD A few pittings (≅ 2.5mm deep) were noticed on the inlet short pipe (to be replaced by NCZ immediately).	A	NIL	-
310-K03-E3 3RD STAGE COOLER	Thickness 13.2mm (New 11mm) GOOD. -do-	A	NIL	-
310-K03-E4 OIL COOLER	No problem Spare made by NCZ in 1980	A	NIL	-
310-K04 AIR COMPRESSOR		A	1. Complete Overhauling : 1 set 2. Replacement of Drain Traps : 4 pcs	YES
310-K04-E1 A-C INTER COOLER	Same as 310-K04-E2 Shell 9.0mm (New 9mm) GOOD	VESSEL : A OTHERS : C	1. Replacement of Tube Bundle : 3 sets 2. Replacement of Drain Trap and Demister : 3 sets	-
310-K04-E2 AFTER COOLER	Tube sheet corroded heavily. Shell 9.4mm (9mm New) GOOD. Demister damaged. (To be replaced). Drain Trap corroded. (To be replaced).	VESSEL : A OTHERS : C	1. Replacement of Tube Bundle : 1 set 2. Replacement of Drain Trap and Demister : 1 set	-
310-K04-E3 OIL COOLER	Tube bundle made by NCZ. No Problem.	B	NIL	-
310-K02-E1 1ST STAGE COOLER	Tube bundle corroded heavily. Shell 6.4mm (New 6mm) GOOD.	SHELL : A BUNDLE : B	Replacement of tube bundle : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
310-K02-E2 2ND STAGE COOLER	Tube bundle corroded heavily. 20 tubes plugged. Shell 6.2mm (New 6mm) GOOD	SHELL : A BUNDLE : C	Replacement of tube bundle : 1 set	-
310-K02-E3 3RD STAGE COOLER	Tube bundle corroded heavily Three tubes plugged Shell 10.8mm (New 11.1mm) GOOD	SHELL : A BUNDLE : B	-do-	-
310-K02-E4 OIL COOLER	Tube sheet and inner corroded. No problem. Shell 8.0mm (New 8.0mm) GOOD Bonnet cover 5.8mm (New 5.6mm) GOOD	A	NIL	-
311-E09 DEFROSTING AIR HEATER	No problem	A	NIL	-
311-E10 DEFROSTING AIR HEATER & COOLER	No problem	A	NIL	-
311-F01 AIR FILTER	Elements (Curtain chain, curtain, sealing material etc.) are to be replaced. Curtain broken down.	VESSEL : A ELEMENT : C	Replacement of Element : 1 set	-
311-F01-B AIR FILTER		-	Installation of Suction : 1 set Air Filter	

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
311 - F02 A, B FILTER BEFORE TURBINE	Not opened this time.	-	Overhauling	YES
311 - F03 A, B LIQUID AIR FILTER	-do-	-	Overhauling	YES
311 - K01 A, B EXPANSION TURBINE		A	Complete Overhauling : 2 sets	YES
311 - K01 - E, A, B OIL COOLER	Not opened this time.		Overhauling : 2 sets	-
311 - K01 - F1 A, B PRIMARY FILTER	Filter Element to be replaced.	VESSEL : A ELEMENT : C	Overhauling : 2 sets Replacement of Element : 2 sets	-
311 - K01 - F2 A, B SECONDARY FILTER	Filter Element to be replaced.	VESSEL : A ELEMENT : C	Overhauling : 2 sets Replacement of Element : 2 sets	-
311 - K01 - P A, B LUBRICATION OIL PUMP	Not opened this time.	-	Overhauling : 2 sets	-
311 - K01 - V1 A, B PRESSURIZED OIL RECEIVER	-do-	-	Overhauling : 2 sets	-
311 - K01 - V2 A, B OIL TANK	Not opened this time.		Overhauling : 2 sets	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
311-K01-V4 SILENCER	No problem	A	NIL	
311-V02 CHECK VALVE BOX (O ₂ SIDE)	Not opened this time.	-	Overhauling : 1 set	YES
311-V03 CHECK VALVE BOX (O ₂ SIDE)	-do-	-	Overhauling : 1 set	YES
311-V04 CHECK VALVE BOX (N ₂ SIDE)	Not opened this time.	-	Overhauling : 1 set	YES
311-V05 CHECK VALVE BOX (N ₂ SIDE)	Not opened this time.	-	Overhauling : 1 set	YES
311-V07 SILENCER	No problem	A	NIL	-
401-B01 MIXER	Visual check : GOOD Thickness 3.8mm (New 4mm) GOOD	A	NIL	
401-E01 AMMONIA EVAPORATOR	22 tubes plugged. Thickness 16.8mm (New 16mm) : GOOD Crack on the channel separator to be welded.	C	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
401-E03 GAS COOLER	57 lower tubes are plugged with cement. Bottom of the channel corroded. Reinforcement plate on the inlet nozzle repaired by welding.	C	Replacement of Channel : 1 set and channel cover	YES
401-E04 TAIL GAS HEATER	Shell flange bottom corroded heavily (For about 300mm). Immediately repair or replacement strongly recommended.	C	Complete Replacement : 1 set	YES
401-E05 ECONOMIZER	NCZ had already placed an order for a replacement unit.	C	NIL	-
401-E06 CONDENSER	Thickness : Shell 5.9mm (New 6mm) : GOOD Bottom channel 6.4mm (New 6mm) : GOOD Corrosion to be repaired on the legs and the top cover.	B	NIL	-
401-E07 PRODUCED ACID COOLER	Skirt can be replaced by NCZ. Drain piping and concrete foundation can also be repaired by NCZ. Thickness 4.8mm (New 5mm) GOOD	B	NIL	-
401-E08 WEAK ACID COOLER	As above Thickness 4.2mm (New 4mm) GOOD	B	NIL	-
401-F02 AMMONIA FILTER	Filter element to be installed by NCZ. Thickness : 9.8mm (New 9mm) : GOOD	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
401-H01 BURNER	Lower Part corroded heavily. Gauze support deformed and quartz tubes broken. Upper shell flange deformed. Only 32 out of 60 tightening bolts are tightly fitted.	C	1. Replacement of Lower Part : 1 set 2. Replacement of Gauze Support : 1 set 3. Replacement of Quartz Tubes : 1 set 4. Replacement of Upper Shell Flange : 1 set	-
401-K01 AIR COMPRESSOR		A	Complete Overhauling : 1 set	YES
401-K01-F1 AIR FILTER	Filter Element to be cleaned by NCZ.	A	NIL	-
401-K01-P1 LUBRICATION OIL PUMP			Complete Overhauling : 1 set	-
401-K01-R1 SPEED UP GEAR UNIT			Complete Overhauling : 1 set	YES
401-K02 RECOVERY GAS TURBINE			Complete Overhauling : 1 set	YES
401-P01 A, B FEED WATER PUMP	Both casing and impeller are corroded and eroded. One spare (not installed but stored) is recommended.	C	Complete Replacement : 1 set	-
401-P02 A, B WEAK ACID PUMP	Replaced with the units of English make by NCZ. No problem	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
401-P03 A, B DEMINERALIZED WATER PUMP	No problem	A	NIL	-
401-P04 A, B RECYCLE ACID PUMP	Replaced by NCZ with the units of English make. No problem.	A	NIL	-
401-P05 A, B ACID PUMP	Replaced by NCZ with the units of English make. No problem.	A	NIL	-
401-P06 A, B PRODUCT FEED PUMP	-do-	A	NIL	-
401-P07 A, B COOLING WATER PUMP	No problem	A	NIL	-
401-P08 A, B LIQUID AMMONIA PUMP	No problem One additional pump was installed by NCZ	A	NIL	-
401-P09 A, B COOLING WATER RECYCLE PUMP	No problem	A	NIL	-
401-T01 OXIDATION AND BLEACHING TOWER	Lower part corroded heavily and repaired by NCZ. (Patches welded). The first stage of the trays fallen and all trays corroded. Concrete Foundation to be repaired by NCZ (Acid resistant mortar recommended.)	C	Replacement of lower part of Tower with trays : 1 set	YES

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
401-T02 A, B NO. 1 OXIDATION TOWER	Lower part (specially on the skirt) corroded heavily. A trough provided by NCZ for leakage. Shell thickness : 8.4/5.4 (NEW 8/5) GOOD	B	Replacement of lower parts of Towers : 2 sets	YES
401-T03 A, B NO. 2 OXIDATION TOWER	-do- Shell thickness 8.4/- (New 8/5) GOOD	B	Replacement of lower parts of Towers : 2 sets	YES
401-T04 NO. 1 ABSORPTION TOWER	An umbrella-shaped-guard-plate to be provided on the skirt by NCZ. Pneumatic pressure test on all the cooling coils recommended. Thickness : 7.2/8.6/11.3 (New 7/9/11) GOOD	Tower : A Cooling Coils : C	Replacement of Cooling Coils : 6 sets	YES
401-T05 NO. 2 ABSORPTION TOWER	Bottom Head plate slightly corroded, to be repaired by NCZ. Thickness : 7.1/9.0/11.0 (New 7/9/11) GOOD	A	NIL	-
401-V03 SEPARATOR	Repaired by welding (1 point longitudinally 3 points radially). Colour penetration check : GOOD. Thickness : 3.8mm (New 4.0mm) GOOD	B	NIL	-
401-V06 MIST SEPARATOR	Thickness : 4.0mm (New 4.0mm) GOOD	A	NIL	-
401-EXJ-01 EXPANSION JOINT	Heavily corroded. The companion flange shall be SUS-304 (stainless steel)	C	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
401-EXJ-03 EXPANSION JOINT	One repaired by NCZ on the top head weld line. Weld line on the flange lining pitted and the gasket surface not flat.	B	Complete Replacement : 1 set	
PIPING (1) BETWEEN E06 AND T05	Many patches welded to repair.	B	Replacement of piping : 1 set	-
401-CV53F, CV53H CHECK VALVE	No (Nitrogen monoxide) gas returns to compressor sometimes in an emergency shutdown.	C	Complete Replacement : 2 sets	-
501-A02 ANBA VIBRATING SCREEN NO. 1	Damaged and deformed all over. To be replaced by NCZ (order placed already)	C	NIL	-
501-A03 ANBA VIBRATING SCREEN NO. 2	-do-	C	NIL	-
501-A06 AIR WASHER FOR ANBA DRYER	Upper Head Plate corroded ; to be repaired by NCZ. Concrete Foundation also is to be repaired by NCZ.	B	NIL	-
501-A08 AIR WASHER FOR ANBA COOLER	Bolts and Nuts of the shell flange are all corroded. (To be replaced by NCZ). Cracks and corrosion on the concrete foundation. (To be repaired by NCZ).	B	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
501-A09 FERTILIZER VIBRATING SCREEN	Same as A02 and A03	C	NIL	-
501-D01 ANBA DRYER	Inlet and Outlet Hoods deformed. (To be repaired by NCZ). Heating coils to be pneumatically pressure tested. Crack on the inlet distributor already repaired by NCZ.	A	NIL	-
501-D02 ANBA COOLER	Inlet and Outlet Hoods are deformed Inlet Hood cracked. (To be repaired by NCZ).	A	NIL	-
501-D03 ANBA COATING DRUM	Ring gear, Pinion Gear, thrust and plane Riding Ring, and Trunnion Roller heavily worn.	C	Replacement of parts : 1 set	YES
501-D04 FERTILIZER COOLER	Inlet and Outlet Hoods deformed and cracked at many points. (To be repaired by NCZ.)	B	NIL	-
501-D05 FERTILIZER COATING DRUM	Same as 501-D03	C	Replacement of parts : 1 set	YES
501-E01 AMMONIUM EVAPOR- ATOR BY STEAM	One U-tube plugged. Internal surface of all the lower side tubes looks like sponge because of heavy corrosion. Bonnet the same. Shell thickness : 12.8mm (New 12mm) GOOD	C	Replacement of Tube Bundle : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
501-E02 AMMONIUM EVAPORATOR BY AIR	Inlet casing slightly corroded (to be repaired by NCZ.)	A	NIL	-
501-E03 AMMONIUM HEATER	Shell internal to be cleaned. Many tubes are repaired by welding. Thickness : : Shell : 5.6mm (New 4.5mm) GOOD Channel : 7.5mm (New 6mm) GOOD	C	Replacement of Tube Bundle : 1 set	-
501-E05 AIR HEATER FOR ANBA DRYER	Heavily corroded. Just going to be out of service. Cracks on the inlet casing. NCZ had placed an order for new unit already.	Z	NIL	-
501-E06 AIR HEATER FOR ANBA COOLER	Heavily corroded. Just going to be out of service. NCZ had placed an order for new unit already.	Z	NIL	-
501-E07 AIR HEATER FOR FERTILIZER COOLER	Out of service now. NCZ had placed an order for new unit already.	-	NIL	-
501-F01 AMMONIUM NITRATE SOLUTION FILTER	Out of service now. Design to be studied for reliable service	-	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
501-F02 A, B 96% AMMONIUM NITRATE STRAINER	Out of service now. Design to be studied for reliable service.	-	Complete Replacement : 2 sets	-
501-F03 A, B 99% AMMONIUM NITRATE STRAINER	Removed now. Design to be studied for reliable service.	-	Complete Replacement : 2 sets	-
501-F04 RECOVERY SOLUTION FILTER	-do-	-	Complete Replacement : 1 set	-
501-J01-1, 2 EJECTOR	Rust on the body, but no problem	A	NIL	-
501-P02, A, B NEUTRALIZER CIRCULATION PUMP	No problem	A	NIL	-
501-P03 A, B AMMONIUM NITRATE SOLUTION PUMP	A-unit : replaced with an English make unit. B-unit : original one No problem	A	NIL	-
501-P04 A, B PR. EVAPORATOR FEED PUMP	-do-	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
501-P05 A, B PR. EVAPORATOR CIRCULATION PUMP	One unit is storage spare now.	A	NIL	-
501-P06 A, B ANBA PRILLING TOWER FEED PUMP	Both units were replaced with English make units. No problem	A	NIL	-
501-P09 A, B FERTILIZER PRILLING TOWER PUMP	A-unit : replaced with English make B-unit : original one No problem.	A	NIL	-
501-P11 RECOVERY PUMP	The removed unit of 501 P06 is installed as spare (501-P11B) , because the unit 501 P11 was too small. No problem.	A	NIL	-
501-P13 A, B RECOVERY FEED PUMP	A-unit : replaced with English make unit B-unit : original one No problem	A	NIL	-
501-T01 NEUTRALIZER	Air inlet nozzle deformed because of hammering. (To be replaced by NCZ) Stack corroded heavily with some cracks. Concrete Foundation corroded. (To be repaired by NCZ). Thickness : 5.9/4.6/3.6 (New 6/5/4mm)	B	Replacement of Demister : 1 set	-
501-T02 ANBA PRILLING TOWER	Heavily deformed by hammering. Cracks on the fillet welding of the prilling nozzles.	B	Replacement of Top Piping : 1 set and Prilling Nozzles.	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPER-VISOR
501-T03 FERTILIZER PRILLING TOWER	Heavily deformed by hammering. Cracks on the fillet welding of the prilling nozzles.	B	Replacement of Top Piping : 1 set and Prilling Nozzles.	-
501-V03-B1 ADJUSTER TANK	Thickness : Tank 7.4mm (New 6mm) GOOD Heating Pipes : 3.0mm (New 2.8mm) GOOD	A	NIL	-
501-V04 AMMONIUM NITRATE SOLUTION TANK	Thickness : Tank 7.1mm (New 6mm) GOOD Heating Pipes : 3.1mm (New 2.8mm) GOOD	A	NIL	-
501-V05 PR. EVAPORATOR WITH DEMISTER	Demister to be cleaned. Thickness : 8.1mm (New 8mm) GOOD	A	NIL	-
501-V09 ANBA HOPPER	Deformed heavily by hammering.	B	Replacement of Bottom Cone : 1 set Install Vibrator : 1 set	YES
501-V13 FERTILIZER HOPPER	Deformed heavily by hammering.	B	Replacement of Bottom Cone : 1 set Install Vibrator : 1 set	YES
501-V25 RECOVERY TANK	Installed in a deep pit and floats when the pit is filled with water, which bends and twists the connecting pipes. This tank firmly to be fixed.	A	NIL	-
501-V29 AIR DEMISTER	Demister to be cleaned. Thickness 6.1mm (New 6mm) GOOD	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
501-Y03 ANBA BUCKET ELEVATOR NO. 1	Lower casing deformed. (To be replaced by NCZ.)	B	NIL	-
501-Y04 ANBA BUCKET ELEVATOR NO. 2	-do-	B	NIL	-
501-Y06 FERTILIZER BUCKET ELEVATOR	-do-	B	NIL	-
501-Y07 NUFLO-10 TABLE FEEDER FOR ANBA	No problem	A	NIL	-
501-Y09 NUFLO-10 TABLE FEEDER FOR FERTILIZER	-do-	A	NIL	-
501-Y11 BUCKET ELEVATOR FOR NUFLO-10	No problem	A	NIL	-
501-E09 SURFACE CONDENSER	Circumferential welding on the bottom channel has some pin holes. (To be repaired by NCZ) . Shell thickness : 5.4mm (New 5mm) GOOD.	A	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
501-E10 FALLING FILM EVAPORATOR	No problem	A	NIL	-
501-SECTION PRILLING TOWER CONCRETE SURFACE	Repaired lining has cracks and swells. (To be repaired by NCZ.)	B	Epoxy Resin coating to : 1 set concrete surface.	-
601-C01 PRECIPITATOR	Back-wash line : already replaced	A	NIL	-
601-C01-B1 MIXER FOR PRECIPITATOR	Bottom bearing seal modified already and running satisfactorily.	B	NIL	-
601-C01-R1 REDUCER FOR PRECIPITATOR	No problem	B	NIL	-
601-F01 AUTOMATIC VALE LESS FILTER	Repair under way by NCZ	B	Replacement of Strainer : 1 set	-
601-K01 BLOWER FOR DEGASIFIER		B	Complete Replacement : 1 set	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
601-K02 A, B FAN FOR COOLING TOWER	No problem	A	NIL	—
601-P01 A, B COAGULANT AND ALKALI FEED PUMP	Plunger and V-Packing to be replaced	B C	A : Replacement of Parts : 2 sets B : Complete Replacement : 1 set	—
601-P04 A, B FILTRATED WATER PUMP.	Wearing Ring and Bearing to be replaced by NCZ.	A	NIL	—
601-P05 A, B PROCESS WATER PUMP	P05B is out of service	—	Complete Replacement of P05B : 1 set	—
601-P06 A, B TRANSFER PUMP	Impeller to be replaced No problem.	C B	A : Replacement of Parts : 1 set B : Nil	—
601-P07 A, B DEMNERALIZED WATER PUMP	No problem	A	NIL	—
601-P09 A, B, C COLD WATER PUMP	No problem, but expansion joints to be replaced.	A	Replacement of suction side Expansion Joint : 3 sets	—
601-T01 CATION EXCHANGER	Outer surface : corroded heavily. Internal rubber lining : Repaired by NCZ by patching. (1980)	C	Complete Replacement : 1 set	—

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
601-T03 ANION EXCHANGER	No problem.	A	NIL	-
601-T04 COOLING TOWER	Small pieces of wood found in cooling water are fallen off cooling tower filling material.	B	Replacement of Drift : 1 set Eliminator and Filling Mataterials	YES
601-V01 A, B COAGULANT FEEDER	To be repaired by NCZ	B	NIL	-
601-V01 A, B-BI AGITATOR FOR COAGULANT FEEDER	To be replaced by NCZ (not included in the rehabilitation items).	Z	NIL	-
601-V04 DEGASIFIED WATER TANK	No problem.	A	NIL	-
601-V05 ACID STORAGE TANK	NCZ replaced	C	NIL	-
601-SECTION COOLING WATER- (1)	Newly installed as a rehabilitation item	-	Installation of Algacide : 1 set Agent Unit Installation of Strainer : 1 set	-
601-SECTION COOLING WATER- (2)	-do-	-	Installation of Oil Fence : 1 set in the Hot Water Pond	-
601-SECTION PIPING- (1)	-do-	-	Installation of Overhead : 1 set Piping System from 601 Sec. to 605 Sec.	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
601-SECTION PIPING- (2)	To be changed to a dilution tank and a water ejector.	-	Replacement of Piping for : 1 set Regenerant	-
601-SECTION DRAIN TRENCH		-	Resin coating to surface of : 1 set Drain Trench	-
602-K01 PRIMARY FORCED DRAFT FAN	No problem	A	NIL	-
602-K02 SECONDARY FORCED DRAFT FAN	Not in service, because secondary air is supplied by the coal pulverizer together with pulverized coal.	-	NIL	-
602-K03 INDUCED DRAFT FAN	NCZ is using the casing and the impeller of their own make. Materials to be studied.	-	Complete Replacement : 1 set	-
602-P01 A, B FEED WATER PUMP	B unit was replaced with the German make, and thus one set of replacement is required (NCZ has spares for German make).	B	Replacement of Impeller : 1 set	-
602-P02 A, B FEED WATER PUMP		B	Replacement of Impeller : 2 sets	-
602-P03 CONDENSATE PUMP	Not in service, because the flow line was changed.	-	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
602 SECTION ASH HANDLING	Coal ash is removed from the bottom of the boiler combustion chamber by water circulation. Ash handling facility is to be installed on the settling pond. (Now it is done manually by labourers).		Installation of Ash Handling : 1 set facility	-
603 SECTION 110V BATTERY SET		C	Complete Replacement : 2 sets	-
604-P01 A-C WATER INTAKE PUMP		B	Replacement of Impeller and Wearing Rings : 3 sets	-
604-P02 VACUUM PUMP		C	Complete Replacement : 1 set	-
604-P03 DRAIN PUMP	Out of order now.	C	Complete Replacement with larger capacity : 1 set	-
605-B09 NEUTRALIZER MIXER	The agitator for B-effluent pond is used now, but the shaft is too short to have satisfactory mixing.	-	Complete Replacement : 1 set	-
605-C08 BALANCE TANK	No problem	A	NIL	-
605-C09 C-EFFLUENT POND	Heavy corrosion, especially at the inlet. To be re-lined by NCZ.	B	NIL	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
605-C10 A, B D-EFFLUENT POND	-do-	B	NIL	-
605-C11 NEUTRALIZER	The long lime feed line is clogged frequently because of its length. 605-V04 (No. 1 milk tank) and 605-Y01 (No. 1 Lime Feeder) are to be shifted next to this Neutralizer.	B	Complete Replacement of : 1 set Automatic Lime Feeding System	-
605-K01 MIXING BLOWER	Now out of order and removed.	-	Complete Replacement : 1 set	-
605-K02 MIXING BLOWER	-do-	-	Complete Replacement : 1 set	-
605-K03 MIXING BLOWER	-do-	-	Complete Replacement : 1 set	-
605-P04 ACID PUMP	-do-	-	Complete Replacement : 1 set	-
605-P05 NO. 1 MILK PUMP	Not required, if the system is changed as suggested in the 605-C11 column.	-	NIL	-
605-P09 A, B C-EFFLUENT PUMP	A part of rubber lining peeled off. The suction nozzle on the casing is fixed by welding.	C	Complete Replacement : 2 sets	-

EQUIPMENT	RESULT OF CHECK / INSPECTION	EXPECTED LIFE	REHABILITATION WORK	SUPERVISOR
605-P10 A, B D-EFFLUENT PUMP	Pump casing, common beds and concrete foundations are corroded heavily. The discharge check valves are not operable.	C	Complete Replacement : 2 sets	
605-P12 A, B A-EFFLUENT PUMP	No problem	B	NIL	-
605-V04 NO. 1 MILK TANK	To be shifted next to 605-C11 To be done by NCZ.	A	NIL	-
605-Y01 NO. 1 LIME FEEDER	-do-	A	NIL	-
605-SECTION PIPING	Heavy corrosion. All to be replaced.	-	Complete Replacement of : 1 set 605-P10 Suction and Discharge Piping.	-

INSTRUMENTS

**I. PANEL INSTRUMENTS
CONTROL VALVES**

ABBREVIATION :

A. Check Up Point Column :

MODEL NO.	ITEM	CHECK UP POINT
54	1	Record system
	2	Vessel
	3	Inside mechanism
	4	Control relay
	5	Outside mechanism
	6	Controller
	7	Transmitter
52	8	Element
	9	Control relay
	10	Under mechanism
	11	Inside mechanism
ERB ERE EIE EIH	12	Balance resister
	13	Balance motor
	14	Selector switch
	15	Amplifier
	16	Inside mechanism
	17	Alarm contact
	18	Record system
	19	Others
Control Valve	I	Inner valve
	S	Seat ring
	Ga	Gasket packing
	Pr	Packing ring
	G1	Gland packing
	D	Diaphragm
	V	Teflon V packing
	Re	Reducing valve

x : Bad, to be exchanged or repaired

o : Fair

-- : Not equipped or not checked

B. Rehabilitation Work (R/W) Column :

x̄ : Complete replacement

* : Overhaul

o : Fair, but necessary to be exchanged with New Model

R : Replacement of parts

MODEL 54 (YEW)

SEC. NO.	TAG NO.	SPECIFICATION	TYPE	CHECK UP POINT							RE-HABIL. WORK		
				1	2	3	4	5	6	7			
302	FR-01	2pen 0-10sqx500Nm ² /H	5420F-E	x									
	PRA1-01	300mmAq	5420F-E	x	x	x	o	x					x
	FRA-09	0-10sqx200Nm ² /H	5410F-E	x	o	x	x	o					x
	FRA-10	0-10x200Nm ² /H	5410F-E	x	x	x	o	x					x
	FRA-11	200Nm ² /H	5410F-E	x	o	x	o	o					x
	FRA-12	200Nm ² /H	5410F-E	x	o	x	x	o					x
	FRA-14	2pen 1500Nm ² /H	5420F-E	o					x				
	PRS31	0-10kg/cm ²	5420F-E	o	x	x	x		x				x
	FRA-1T	3pen 400kg/H	5430F-E	x					x				
	FR1-13	0-10x300kg/H	5430F-E	x	x	x	o	x					x
	FR1-30	0-10x1000kg/H	5430F-E	x					x				
	PRA-42	-250~+1.000mm H ₂ O	5420F-E	x	o	x	x	x					x
	PPC-48	-350~+250mmH ₂ O	5412SF-E	o	o	o	o	o	x				o
303	FR-1	0-10x1500Nm ² /H	5410F-E	x	x	x	o	x					x
	FRC-2	2pen 0-10x40m ² /H	5422TS-F-E	x					x				x
	FR-4	0-10x200m ² /H	5422TS-F-E	x	o	o	x	o	o				x
	FR-3	0-10x4m ² /H	5410F-E	x	o	x	x	x					x
	PdR-2	0-100mmH ₂ O	5410F-E	x	o	x	x	o					x
304	FRCSA-2	0-10x800kg/H	5412TSF	x	o	o	o	o	o	x			x
	FRCSA-8	0-10x1200Nm ² /H	5412TSF	x	o	o	o	o	o	x			x
305	PRC-1	0-10kg/cm ²	5412TSF	x	o	o	o	x	o	x			x
306	FRCSA-1	0-10x700kg/H	5412TSF	x	o	o	x	o	x	o			x
307	PRC-1	0-1.0kg/cm ²	5412TSF	x	o	o	o	o	o	o			x
308	FRS-1	0-10x1200m ² /H	5410F-E	x	o	o	o	o					x
	PRC-1	0-50kg/cm ²	5412TSF	x	o	o	x	o	o	o			x
309	FRCS-10	2pen 0-10x100Nm ² /H	5422TSF-E	x	o	o	o	o	o	x			x
	FR-15	0-10x20Nm ² /H	5422TSF-E							x			
	FR-11	0-10x500kg/H	5410F-E	o	o	x	o	x					o

MODEL 54 (YEW)

SEC. NO.	TAG NO.	SPECIFICATION	TYPE	CHECK UP POINT							RE-HABIL. WORK									
				1	2	3	4	5	6	7										
309	LICA-1	0-100%	5403TS	-	o	o	o	o	o	x										o
	LICA-2	0-100%	5403TS	-	o	o	o	o	o	x										o
310	FRCS-1	0-10x400Nm ² /H	5412TS-E	x	o	o	o	o	o	o										x
	PICA-1	0-51kg/cm ²	5403TS	-	o	o	o	o	o	o										o
	PIC-2	0-50kg/cm ²	5403TS	-	o	o	o	o	o	o										o
311	FR-1	0-10x2500Nm ² /H	5410F-E	x	x	x	-	x	-	x										x
	FR-2	^{2pen} 0-10x450Nm ² /H	5420F-E	x	x	x	-	x	-	o										x
	FR-3	0-10x450Nm ² /H	5420F-E	x						o										x
	LIC-1	0-100%	5403TS	-	o	o	o	o	o	o										o
	LIC-2	0-100%	5403TS	-	o	o	o	o	o	o										o
401	FrRC-4	^{2pen} 0-10x3000Nm ² /H	5422PSF-E	x							x									x
	FR-5	0-10x3000Nm ² /H	5422PSF-E	x							x									x
	FR-9	0-10x1500kg/H	5410F-e	x	x	o	-	o	-	x										x
	PRC-9	0-30kg/cm ²	5412TSF-E	x	x	o	x	o	o	x										x
501	FrRCAS-2	0-17x1000kg/H	5412PSF-E	x	o	o	o	o	o	x										x
	FRCA-3	0-100x30Nm ² /H	5412TSF-E	x	x	o	o	o	o	x										x
	FRC-7	0-10x600kg/H	5412TSF-E	x	o	o	o	x	o	x										x
	FR-14	^{2pen} 1500kg/H	5420F-E	x						x										x
	FR-15	15T/H	5420F-E	x	x	o	-	o	-	x										x
601	FR-1	0-10x5Nm ² /H	5410F-E	x	x	x	-	o	-	x										x
602	FR-1	^{2pen} 0-10x	5420F-E	x	o	x	-	o	-	x										x
	FR-2																			

MODEL 52 (YEW)

SEC. NO.	TAG NO.	SPECIFICATION	TYPE	CHECK UP POINT											RE-HABIL. WORK		
				8	9	10	11	7									
304	FICA-1	0-10x8m ³ /H	52A-SM4F	0	0	0	x	0									x
	FIC-7	0-10x0.7m ³ /H	52A-SM4F	0	0	0	0	0									0
305	FICA-1	0-10x35m ³ /H	52A-SM4F	0	0	0	x	0									x
	FICA-2	0-10x500kg/H	52A-SM4F	0	0	0	x	0									x
307	FICA-1	0-10x4m ³ /H	52A-SM4F	0	0	0	0	0									0
309	PICA-4	0-20kg/cm ²	52A-SM4F	0	0	0	0	x									x
	PICA-5	0-40kg/cm ²	52A-SM4	0	0	0	0	x									x
	LICA-4	0-100%	52A-SM4	0	0	0	0	0									0
	LICA-6	0-100%	52A-SM4	0	0	0	0	0									0
	LICA-7	0-100%	52A-SM4	0	0	0	0	0									0
	LICA-8	0-100%	52A-SM4	0	0	0	0	0									0
401	LICA-1	0-100%	52A-SM4	0	0	0	x	x									x
	LICA-2	0-100%	52A-SM4	0	0	0	x	x									x
	LICA-3	0-100%	52A-SM4	0	0	0	0	x									x
	LICA-4	0-100%	52A-SM4	0	0	0	0	x									x
	LICA-5	0-100%	52A-SM4	0	0	0	x	x									x
	LICA-6	0-100%	52A-SM4	0	0	0	0	x									x
	LICA-7	0-100%	52A-SM4	0	0	0	x	x									x
501	FIC-5	0-250kg/cm ²	52A-SM4	0	0	0	x	x									x
	PIC-1	0-6kg/cm ²	52A-SM4	0	0	0	x	x									x
	PIC-4	-1-0kg/cm ²	52A-SM4	0	x	0	x	x									x
	PIC-10	0-100kg/cm ²	52A-SM4	0	0	0	0	x									x
	PIC-14	0-6kg/cm ²	52A-SM4	0	x	0	0	x									x
	TICA-1	-10-40°C	52A-SM5	0	0	0	0	x									x
	TIC-14	0-250°C	52A-SM5	0	0	0	0	x									x
	LIC-2	0-100%	52A-SM4	0	x	0	x	x									x
	LIC-7	600-1300mm	52A-SM4	0	x	0	0	x									x
	LIC-9	0-100%	52A-SM4	0	0	0	0	x									x
602	LIC-1	0-100%	52A-SM4	0	x	0	0	x									x

MODEL 52 (YEW)

SEC. NO.	TAG NO.	SPECIFICATION	TYPE	CHECK UP POINT										RE-HABIL. WORK			
				8	9	10	11	7									
602	LIC-2	1-100%	52A-SM4	o	o	o	o	x									o

TYPE ERB (YEW)

SEC. NO.	TAG NO.	SPECIFICATION	TYPE	CHECK UP POINT								RE-HABIL. WORK		
				12	13	14	15	16	17	18				
302	TR-1	0-150°C 6point	ERB6-30-34	x	o	x	o	x	-	o				x
	TR-2	0-1600°C 3point	ERB3-30-23	x	o	x	o	x	-	o				o
303	TR-1	0-100°C 6point	ERB6-30-34	o	o	o	o			-	o			o
304	TRA-3	0-600°C 12point	ERB12-30K12B-23MU	x	x	x	x	x	o	x				x
305	TR-1	0-200°C 6point	ERB-30-34 3W	x	x	x	x	x	o	x				x
306	TRA-1	0-600°C 12point	ERB12-90K22BZ-23MU											o
309	TRA-1	0-600°C 12point	ERB12-90K22BZ-23MU	x	x	o	x	x	o	o				x
	TRA-2	0-600°C 12point	ERB12-90K22BZ-23MU	x	x	o	x	x	o	o				x
310	WR-1	0-250KW	ERB1-30K22-123	x	x	-	x	x	x	x				x
311	TR-1	-200°C-+50°C 6 point	ERB6-30K22B-34	x	x	x	o	x	-	x				x
	TR-2	-200-+50°C 6 point	ERB6-30K22B-34	x	x	o	x	x	-	x				x
	TR-3	-200-+50°C 6 point	ERB6-30-34	x	x	x	x	x	-	x				
401	TRA-33	2pen 500-1200°C	ERB2P-30K12	x	x	-	x	x	o	x				x
	TRA-34		-23/30K22-23											
601	XRA-1	0-50/0-500ppm	ERB2-90ZML6-194	x	x	-	x	x	o	x				x
602	TR-1	0-400°C	ERB6-30-23	x	x	x	x	x	-	x				x
605	PHR-1	0-14 PH	ERB-30ML6-154	x	o	o	x	x	o	o				x

ERE, EIE (YEW)

SEC. NO.	TAG NO.	SPECIFICATION	TYPE	CHECK UP POINT								RE-HABIL. WORK	
				12	13	14	15	16	17	18			
301	WR-01A	0--10.000kg/H	ERE-10	x	x	o	x	x					x
	WR-01B	0--10.000kg/H	ERE-10	o	x	o	o	x					x
	WR-02	0-10.000kg/H	ERE-10	x	x	x	x	x					x
	WR-03	0-10.000kg/H	ERE-10	o	o	o	o	x					x
	WR-04	0-360kg/H	ERE-10	o	o	o	o	x					x
302	ARCO ₂ -07	0--25% CO ₂	ERE-10	o	x	o	o	o	o				x
	ARAO ₂ -08	0-1% O ₂	ERE-10K	o	x	o	o	o	x				x
304	TRCA-1	0-600°C	EREA-30K-23MU	o	o	o	o	o	o				o
	TRCA-2	0-600°C	EREA-30K-23MU	o	o	o	o	o	o				o
311	ARA-1	99.995-100.000% 0-10mV	ERE-10K	x	x	x	o	x	x				x
	RIA-401	0-35000ppm	EIE-90KZ-123	x	x	x	o	o	-				x
	RIA-402	0-35000ppm	EIE-90KZ-123	x	x	x	o	o	-				x
401	TRCA-32	^{2pen} 0-150°C	ERE5-30WK-34	x	o	x	x	o	x				x
	NH ₃ RA-1	0-15% NH ₃	ERE-30K22-123	o	o	o	o	o	o				
501	PHRCA-1	0-14PH	EREA5-10K	x	x	x	o	o	x				x
601	CRA-1	0-20µ/cm	ERE30K-172	x	x	x	x	o	x				x

EIH & OTHERS (YEW)

SEC. NO.	TAG NO.	SPECIFICATION	TYPE	CHECK UP POINT								RE-HABIL. WORK		
				12	13	14	15	16	17	18				
301	TI-1	0-500°C	EIH-30K22-23	x	x	-	x	o	o	-				x
	TI-2	0-500°C	EIH-30-23	x	o	-	o	x	-	-				x
	TI-3	0-500°C	EIH-30-23	x	o	-	o	o	-	-				x
304	TI-4	0-600°C	EIH-30-23	x	o	-	o	o	-	-				x
		Select switch 20point	STH-11-20	-	-	-	-	-	-	-				x
306	AIA-1	0-1% CO	EIH-30K12-123	o	o	-	o	o	o	-				o
307	AIA-1	0-0.1% CO ₂	EIH-30K12-123	o	o	-	o	o	o	-				o
308	AIA-1	0-100ppm CO ₂	EIH-30K12-123	o	o	-	o	o	o	-				o
309	TI-3	0-200°C	EIHM-30-34	x	x	-	x	x	-	-				x
		Select switch 60point	STB31-60	-	-	-	-	-	-	-				x
311	TI-4	-200-+50°C	EIHM-30-34	o	o	-	o	o	o	-				o
		Select switch 40point	STB-31-40	-	-	-	-	-	-	-				x
	TI-5	0-200°C	EIHM-30-34	x	x	-	x	x	-	-				x
		Select switch 10point	STH-31-10	-	-	-	-	-	-	-				x
401	TI-1	0-100°C	EIHM-30-34	x	x	-	x	o	-	-				x
		Select switch 24point	STC-31-34	-	-	-	-	-	-	-				x
	TI-2	0-300°C	EIHM-30-34	x	x	-	x	o	o	-				x
		Select switch 10point	STH-31-10	-	-	-	-	-	-	-				x
501	TI-4	0-200°C	EIHM-30-34	x	x	-	x	x	-	-				x
		Select switch 32point	STC-31-32	-	-	-	-	-	-	-				x
309	AR-3	0-25% NH ₃ 0-20% CH ₄	ERI-90-G1110	x	x	-	x	x	o	-				x
		0-20% Ar												
		Programmer	RGH-1139	-	-	-	-	-	x	-				x

CONTROL VALVE (301Y14 HITACHI FLOWAC)

SEC. NO.	TAG NO.	SER. NO.	SIZE	CHECK UP POINT										RE-HABIL. WORK	
				I	S	Ga	Pr	Gl	D	V	Re				
301	301-D1		3B	x	x	x		x	x						x
	301-D2		3B	x	x	x		x	x						x
	301-E1		3B	x	x	x		x	-				PISTON x		x
	301-E2		3B	x	x	x		x	-				PISTON x		x

CONTROL VALVE (MOTOYAMA)

SEC. NO.	TAG NO.	SER. NO.	SIZE	CHECK UP POINT										RE-HABIL. WORK		
				I	S	Ga	Pr	Gl	D	V	Re					
302	HICV-18	91329	10B													
	HICV-19	91330	10B			x										*
	HICV-20	91331	6B			x										*
	HICV-21	91332	6B			x										*
	HICV-22	91333	4B	x	x											x
	HICV-09	91334	4B													x
	PICV-05	91335	2B			x		x								R
	PICV-06	91336	5B			x										R
	PICV-07	91337	5B			x		x								R
	PICV-12	91338	10B			x		x	x							R
	PICV-13	91339	10B			x										R
	XSAV-04	91328	2B					x								*
	LICVA-01	N28386	2 x 1 1/2 B			x		x								*
	XIV-2008	N29397	2B	x	x	x		x								x
	PCV-2023	N29401	250A			x		x								R
	PCV-01	N10476	1 1/2 x 1 1/4	x	x	x		x								x
	PCV-11	N10477	1 1/2 x 1 1/4	x	x	x		x								x
	LCV-1	91341	2 1/2 B			x		x					x		POSITIONER x	x
303	TCV-2	85444	10B			x	x	x					x			R
	TCV-7	85441	4B			x		x					x			R
	TCV-8	85442	4B			x		x					x			R
	TCV-9	85443	2B			x		x					o			R
304	TCV-1	81964	3B					x					o			R
	TCV-2	81965	2 1/2 B					x					o			R
	TCV-7	81966	1 1/2 x 3/4			x		x					x			R
	TCV-8	91984	4B	x	x								o	BODY x		x
	TCV-1	81967	3/4 x 3/8	x	x								x	BODY x		x
	TCV-2	81968	3/4 x 1/4 B										x			R
305	TCV-1	81969	6B	x	x								o	BODY x		x
	TCV-2	81970	5B	x	x								o	BODY x		x
	PCV-1	81971	250A					x					o			*
	LCV-1	81972	1 1/2 B	x	x								o	BODY x		x
	LCV-2	81973	3B			x		x		x			o			R
	LCV-4	81974	1 1/2 B			x		x					o			R
306	FCV-1	81975	3 x 2B		x	x		o					o	BODY x		x

CONTROL VALVE (MOTOYAMA)

SEC. NO.	TAG NO.	SER. NO.	SIZE	CHECK UP POINT										RE-HABIL. WORK	
				I	S	Ca	Pr	Gl	D	V	Re				
307	FCV-1	81976	2-1/2 x 2B			x							o		*
	PCV-1	81977	3B			x							o		*
	PCV-2	81978	2B												x
	LCV-1	81979	1-1/2 B			x		x					o		R
	LCV-2	81980	1B			x							o		*
	LCV-6	81981	1 x 1/2 B			x							o		*
309	PCV-4	85446	3B	x	x	x	x	x					x		x
	PCV-5	85447	1-1/2 B			x		x					o		R
	LCV-7	85452	2B			x		x					o		R
	LCV-8	85453	1/2 B			x		x					o		R
	LCV-9	85454	1/2 B					x					o		*
310	PCV-1	85458	2B			x		x							R
	FCV-1	86768	4 x 3B			x		x	x						R
	PCV-2	85459	1-1/2 B			x		x							R
401	FrCV-4	85426	6B			x		x					o		x
	PCV-9	85431	8B			x		x					o		R
	LCV-1	85423	1B			x		x					o		R
	LCV-2	85430	2B			x		x	x						R
	LCV-3	85433	1-1/2 B			x		x							R
	LCV-4	85435	1B							x				YOKE x	x
	LCV-5	85437	2B											YOKE x	x
	LCV-6	85438	1-1/2 B						x					YOKE x	x
	LCV-7	85439	2B						x					YOKE x	x
	TCV-32	85425	1B										o	YOKE x	x
	HCV-1	85429	300A			x		x					o		R
	HCV-2	85428	3B	x	x	x	x	x							x
	HCV-4	85432	3B			x		x							R
	HCV-48	90087	8B			x		x							R
501	FCV-2	84225	1-1/2 x 1-1/2												x
	FCV-3	84226	2B	x	x	x	x	x	x				x		x
	FCV-5	84227	3/4 B			x		x							R
	FCV-7	84228	4B			x		x					x		R
	PCV-1	84229	2-1/2 B			x		x	x						R
	PCV-4	84230	3/4 x 3/8	x	x	x	x	x							x
	PCV-10	84231	2B	x	x	x	x	x	x						x

CONTROL VALVE (MOTOYAMA)

SEC. NO.	TAG NO.	SER. NO.	SIZE	CHECK UP POINT								RE-HABIL. WORK		
				I	S	Ga	Pr	Gl	D	V	Re			
501	PCV-12	84232	2 $\frac{1}{2}$ B											x
	TICV-1	84234	$\frac{1}{2} \times \frac{1}{4}$										o	x
	TCV-3	84235	1B											x
	TCV-9	84236	1 $\frac{1}{2}$ B											x
	TCV-10	84237	1 $\frac{1}{2}$ B			x	x	x						R
	TCV-11	84238	$\frac{1}{2} \times \frac{3}{8}$											x
	TCV-14	84230	1B											x
	TCV-16	84240	$\frac{3}{4} \times \frac{1}{2}$											x
	LCV-2	84241	1B			x		x						R
	LCV-3	84242	2 $\frac{1}{2}$ B			x		x						R
	LCV-7	84243	2B			x		x						R
	PHCV-1	84245	$\frac{3}{4} \times \frac{1}{2}$	x	x	x	x	x	x					x
	HCV	J81921	1 $\frac{1}{2}$ B			x								*
602	LCV-1	85460	2B			x		x						R
	LCV-2	85461	1 $\frac{1}{2}$ x 1B			x		x	x				x	R
	PCV-1	N10476	1 $\frac{1}{2}$ x 1 $\frac{1}{4}$	x	x	x	x	x	x					x
	PCV-3	85462	3 x 1 $\frac{1}{2}$	x	x								BONNET x BODY x	x
	PCV-11	N10477	1 $\frac{1}{2}$ x 1 $\frac{1}{4}$			x		x						R
201	PCV-1	87097	2 $\frac{1}{2}$ B	x	x	x	x	x	x				BONNET x BODY x	x
	PCV-2	87098	2 $\frac{1}{2}$ B	x	x	x	x	x	x			o	BONNET x BODY x	x
	PCV-3	87099	2 $\frac{1}{2}$ x 1 $\frac{1}{4}$			x		x						R
	PCV-4	87100	1 $\frac{1}{2}$ x 1 $\frac{1}{4}$ B			x		x						R

CONTROL VALVE (NAKAKITA)

SEC. NO.	TAG NO.	SER. NO.	SIZE	CHECK UP POINT								RE-HABIL. WORK			
				I	S	Ga	Pr	Gl	D	V	Re				
311	HCV-1	3A1121	150B			o		o				o		*	
	HCV-2	3A1122	150			o		o				o		*	
	HCV-3	3A1123	40			o		o				o		*	
	HCV-4	3A1124	80			o		o				o	POSITIONER x	*	
	HCV-5	3A1125	BUTTERFLY 200			o		o				o		*	
	HCV-6	3A1126	"			o		o				o		*	
	LCV-1	3A1127	80			o		o				o	POSITIONER x	*	
	LCV-2	3A1128	50			o		o				o		*	
	RCV-1	BJ317	BUTTERFLY 250			o		o						*	
	302	HIC-01	7K192	200A			x		x				-		R
HIC-02		7K192	200A			x		x				-		R	
HIC-03		7K192	200A			x		x				-		R	
HIC-04		7K192	200A			x		x				-		R	
HIC-05		7K193	100A			x		x				-		R	
HIC-06		7K193	100A			x		x				-		R	
HIC-07		7K193	100A			x		x				-		R	
HIC-08		7K193	100A			x		x				-		R	
HIC-10		7K194	65A			x		x				-		R	
HIC-13		7K197	600A			x		x				-		R	
HIC-24		7K198	500A									-		*	

CONTROL VALVE (KITAMURA)

SEC. NO.	TAG NO.	SER. NO.	SIZE	CHECK UP POINT								RE-HABIL. WORK		
				I	S	Ga	Pr	Gl	D	V	Re		O-RING	
601	3"-DVPS-13C	U57222-1	80A	x	x					x			x	
	3"-DVPS-13C	U57222-2	80A	x	x					x			x	
	2½"-DVPS-13C	U57223-1	65A	x	x					x			x	
	2½"-DVPS-13C	U57223-2	65A	x	x					x			x	
	1"-DVPS-13C		25A	x	x					x			x	
	3"-DVPL-13A		80A	x	x					x			x	
	3"-DVP-13A	U57226-1	80A	x	x					x			x	
	3"-DVP-13A	U57226-2	80A	x	x					x			x	
	2½"-DVPSL-13A	U57227-1	65A	x	x					x			x	
	2½"-DVPSL-13A	U57227-2	65A	x	x					x			x	
	2½"-DVPSL-13A	U57227-3	65A	x	x					x			x	
	2½"-DVPS-13A	U57228	65A	x	x					x			x	
	2"-DVPSL-13A	U06745-1	50A	x	x					x			x	
	2"-DVPS-13A	U57230	50A	x	x					x			x	
	1½"-DVPSL-13A		40A	x	x					x			x	
	1"-DVPS-13A	U57232-1	25A	x	x					x			x	
	1"-DVPS-13A	U57232-2	25A	x	x					x			x	
	1"-DVPS-13A	U57232-3	25A	x	x					x			x	
	¾"-DVPS-13A		20A	x	x					x			x	
	¾"-TVP-13A		20A	x	x					x			x	
	1½"-TVPR-13A	T02056	40A	x	x					x			x	
			-											
	4"-DVPS-13A	U11032	100A	x	x					x			x	
	4"-DVPSL-13A	U11033-2	100A	x	x					x			x	

II. PANELS (DIMENSION)

LOCAL INSTRUMENTS

OTHER INSTRUMENTS &
EQUIPMENT

ANALYZERS

TEST INSTRUMENTS &
TOOL SETS

PANELS : Complete Replacement

CONTROL ROOM	PANEL SIZE (mm)
	Height × Width × No. × Depth
301 SECTION	2300 × 1200 × 4 × 800 (with SEMI GRAPHIC)
302	2800 × 1200 × 3 × 800 (with SEMI GRAPHIC)
303-309	2300 × 1200 × 6 × 800
311 (310)	2300 × 1200 × 4 × 800 (with SEMI GRAPHIC)
401	2300 × 1200 × 2 × 800
501	2300 × 1200 × 2 × 800
601	2300 × 1900 × 1 × approx. 1700 (DESK TYPE)
602	2350 × 1100 × 1 × 800
605	2300 × 600 × 1 × 800

LOCAL INSTRUMENTS : Quantity of Replacement

SECTION	LOCAL CONTROL- LER	TRANS- MITTER	POSI- TIONER	AIRSET	THERMO- WELL	THERMO- COUPLE	RESIST- ANCE BULB
302	5	35		19	3	(CA) 3	
303	3	17	4	7			
304		11	6	2			
305		6	5				
306		5	1				
307	1	5	3	1			
308		7	2				
309		25	13	20	3	21 (309TE-1) (309TE-2)	
310		3	3	3			
311		9	9	9			
401	3	19	12	20	2	2	
501	5	24	21	31			28 (501TI-4)
601		3					
602	1	5	2	4			
201	4	1	4	8			
TOTAL	22	175	85	124	8	26	28

OTHER INSTRUMENTS & EQUIPMENT

SECTION	TAG NO.	DESCRIPTION	REHABILITATION WORK
310		Instrument Air Dryer	1 Complete Replacement
301		Local Panel for Hot Air Furnace (YEW)	1 do.
		Pneumatic Conveyor (HITACHI)	1
311	RE401/402	Expansion Turbine Pick Up	2 do.
305	LICT-4	Displacer Level Meter MOTOYAMA SSF-14-5700-20	1 do.
309	LIT-8	Displacer Level Meter TOKYO KEISO FSM-13F	1 do.
		Propeller Type Level Meter BABCOCK-HITACHI SG-6	6 do.
311	31IRS-1	RHE Reversal System (Micro Switch, Relay, ... TATEISHI Timer, Magnetic Valve)	1 do.
310	KO-4	By-Pass Valve NAKAKITA	1 To be opened and checked
311		Resistance Bulbs	30 do.
311	RCV-1	Motor Damper	1 do.
302-309 311, 401,501		Orifice for Flow Meter	All do.

ANALYZERS : Complete Replacement

SECTION	TAG NO.	SPECIFICATION	TYPE	MAKER
302	ARCO ₂ -07	0--25% CO ₂ Analyzer	6140-2070-CO ₂ Rauter	MITAKA
306	AIA-1	0--1% CO Analyzer	EIA-1A Infrared Gas Analyzer	HORIBA
307	AIA-1	0--0.1% CO ₂ Analyzer	do.	HORIBA
308	AIA-1	0--100 ppm CO ₂ Analyzer	do.	HORIBA
309	AI-3	0--25% NH ₃ , 0--20% CH ₄ , 0--20% Ar Gaschromatograph	8111	YEW
	AI-1	60--90% H ₂ Analyzer	Rauter	MITAKA
	AI-2	40--90% H ₂ Analyzer	Rauter	MITAKA
401	NH ₃ RA-1	0--15% NH ₃ Analyzer	Infrared Gas Analyzer	HORIBA
501	PHRCA-1	0--14PH	PH Meter	YEW
605	PHRA-1	0--14PH	PH Meter	YEW
	PHIC-2	0--14PH	PH Meter	YEW
601	XE-1-2	0--50 ppm Turbidity Transmitter	8562	YEW
	XE-1-1	0--500 ppm Turbidity Transmitter	8562	YEW
	CRA-1	0--20 μ V/cm Salinometer	8531	YEW

TEST INSTRUMENTS & TOOL SETS

(Recommended to be owned)

1)	Mechanical Tool Set (Model 6925-1000)	30	sets
2)	Electrical Tool Set (Model 6925-2000)	30	sets
3)	Maintenance Tool Set for Foxboro Instruments (MODEL 6925-6000)	30	sets
4)	Air Connection Set (Model 6922-3000)	10	sets
5)	Transistorized Insulation Testers (Model 3213)	4	sets
6)	Circuit Tester (Type 3201)	2	sets
7)	Portable DC Voltage/Current Standard (Type 2554)	2	sets
8)	Test Connector for 100-Line Instruments (Model 6928)	5	sets
9)	Control Relay Calibration Tool	2	sets
10)	PH Cell Checker (Model 8491)	1	set
11)	Digital Manometers (Type 2654-23)	2	sets
	Digital Manometers (Type 2654-24)	1	set
	Digital Manometers (Type 2654-25)	1	set
12)	Decade Resistance Box (Type 2793-01)	1	set
13)	Digital Multimeter (Type 2502)	1	set

ELECTRICALS

I. HIGH-TENSION PANEL

LOW-TENSION PANEL

TRANSFORMER

LOCAL SWITCH

MOTOR

BATTERY CHARGER & BATTERY

EMERGENCY GENERATOR & DIESEL ENGINE

MOTOR VALVE

ABBREVIATION :

"Rehabilitation Work" Column :

R : Replacement of Parts (Contactor etc.)

* : Overhaul

x : Complete Replacement

o : Fair, no rehabilitation work

- : Not equipped

301 SECTION (SIINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
301S-MTC1	Receiving	o	-	-	
	Compeb mill	*	*	o	STARTER *
	Transformer primary	*	-	-	TRANS *
301S-CC1	Control circuit	o	-	-	
	Receiving	R	-	-	
301Y01-M1	Belt feeder	o	o	o	
301Y03-M1	Belt conveyor	o	o	o	
301Y04-M1	Belt conveyor	o	x	x	
301Y05-M1	Belt conveyor	o	x	x	
301W01A-M1	Weighing feeder	o	x	x	
301W01B-M1	Weighing feeder	o	x	*	
301Y06-M1	Belt conveyor	R	x	x	
301Y07-M1	Belt conveyor	R	x	x	
301D01-M1	Rotary dryer	o	x	*	
301G03-M1	Stoker for furnace	o	o	o	
301G03-M2	Blower for furnace	o	o	o	
301C01-M1	Rotary valve	o	o	x	
301C02-M1	Exhaust fan	o	o	x	
301C02-M2	Fuel oil pump	o	x	x	
301Y08-M1	Flow conveyor	o	o	o	
301Y09-M1	Screw conveyor	o	o	o	
301Y10-M1	Bucket elevator	o	x	x	
301W03-M1	Weighing feeder	o	x	x	
301Y02-M1	Bucket elevator	o	o	o	
301W04-M1	Weighing feeder	o	o	o	
301Y11-M1	Screw feeder	R	x	x	
301G05-M2A	Lub-compeb mill	C	o	o	
301G05-M2B	Lub-compeb mill	o	o	o	
301C03-M1	Rotary valve	o	o	o	
301C04-M1	Exhaust fan	o	o	o	
301C04-M2	Sludge ejector	x	x	x	
301Y12-M1	Screw conveyor	o	x	x	
301Y13-M1	Flow conveyor	o	o	o	
301K01-M1	Roots blower	o	o	x	

301 SECTION (SHINKO)

TAG NO.	DUTY	REHABILITATION WORK		
		PANEL	LOCAL SW	MOTOR
301Y14	Pneumatic conveyor	o	x	*
301W02-M1	Weighing feeder	o	o	o
301Y15-M1	Belt conveyor	o	x	x
301Y16-M1	Bucket elevator	o	x	x
	Lighting	o	-	-
	Spare	x	-	-
	Instrument	o	-	-
	Spare	o	-	-
	Auto starter	o	-	-
	Emergency lighting	o	-	-
	Emergency receiving	o	-	-
302P05-M1	Fuel oil pump	o	x	x

302 SECTION (FUJI)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	TRANS
302S-MTC1	Coal gasification high tension	o	-	-	TRANS
302S-LC1	Load center	o	-	-	*
302K01A-M1	O ₂ -Blower	o	x	x	
302K02A-M1	No. 1 N ₂ -Blower	o	x	o	
302K01B-M1	O ₂ -Blower	o	x	o	
302K02B-M1	No. 1 N ₂ -Blower	o	o	o	
302K03-M1	No. 2 N ₂ -Blower	o	o	o	
302Y02-M1	Cleaning winch	o	x	x	
302G06-M1	Ash extractor	o	o	o	
302R01-M1	Double screwing	o	x	x	
302R01-2-M1	Double screwing	o	o	o	
302R01-3-M1	Double screwing	o	x	x	
302K04A-M1	Raw gas blower	o	x	x	
302K04B-M1	Raw gas blower	o	o	o	
302R01-4-M1	Double screwing	o	o	x	
302V05-1-R1-M1	Bunker emergency gauge	o	o	o	
302N01-1A-M1	Theisen washer	o	o	o	
302V05-2-R1-M1	Bunker emergency gauge	o	o	o	
302G04-1-M1	Baily feeder	o	o	x	
302G05-2-M1	Bailey feeder	o	o	x	
302N01-2A-M1	Theisen washer	o	x	o	
302R01-4-R1-M1	D. S. abjusting device	o	o	o	
302F01-1-R1-M1	C. D. F beating mechanism	o	o	o	
302F01-1-K1-M1	Coal dust filter fan	o	o	o	
302N01-1B-M1	Theisen washer	o	x	x	
302F01-1-K2-M1	C. D. F flushing gas fan	o	o	o	
302P01B-M1	Wash water pump	o	x	x	
302N01-2B-M1	Theisen washer	o	o	o	
302F01-1-Y1-M1	C. D. F air lock	o	o	o	
302P01A-M1	Wash water pump	o	x	x	
302R01-1-R1-M1	D. S adjusting device	o	o	o	
302R01-2-R1-M1	D. S adjusting device	o	o	o	
	Slurry pumps main supply	x	-	-	
	Slurry pumps main supply	x	-	-	

302 SECTION (FUJI)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
302T01-Y1-M1	Scraper chain	o	x	x	
302P03A-M1	Quench water pump	o	x	x	
302P03B-M1	Quench water pump	o	o	o	
302P04A-M1	Light oil pump	o	o	x	
302P04B-M1	Light oil pump	o	o	o	
302Y03-M1	Two-way valve	o	o	o	
	Lighting for general	o	o	-	
	302 turbo fan	x	-	x	
	Spare	x	-	-	
	Spare	x	-	-	
	PP settling	x	-	-	
302F01-2-R1-M1	C. D. F beating mechanism	o	x	x	
302F01-2-K1-M1	Coal dust filter fan	o	x	x	
302F01-2-K2-M1	C. D. F flushing gas fan	o	x	x	
302F01-2-Y1-M1	C. D. F air lock	o	o	o	
	Spare	o	-	-	
	Spare	o	-	-	
	Emergency commercial change over switch	o	-	-	
302Z00-M4	HIC-12 Motor valve	R	-	o	
302Z00-M5	HIC-24 Motor valve	R	-	o	
302Z00-M1	HIC-13 Motor valve	R	-	o	
302Z00-M2-1	HIC-01 Motor valve	R	-	o	
302Z00-M2-2	HIC-02 Motor valve	R	-	o	
302Z00-M2-3	HIC-03 Motor valve	R	-	o	
302Z00-M2-4	HIC-04 Motor valve	R	-	o	
302Z00-M3-1	HIC-05 Motor valve	R	-	o	
302Z00-M3-2	HIC-06 Motor valve	R	-	o	
302Z00-M3-3	HIC-07 Motor valve	R	-	o	
302Z00-M3-4	HIC-08 Motor valve	R	-	o	
302-Z00M6	HIC-10 Motor valve	R	-	o	
302Z00-M7	HIC-25 Motor valve	o	-	o	
	Spare	o	-	-	
	Welding outlets	o	-	-	
	Spare	o	-	-	

302 SECTION (FUJI)

TAG NO.	DUTY	REHABILITATION WORK		
		PANEL	LOCAL SW	MOTOR
	Analyser supply	0	-	-
302P02B-M1	Feed water pump	0	x	x
302P02A-M1	Feed water pump	0	x	x
	Spare	-	-	-
	Spare	0	-	-
	Measuring voltage 380/220V , 20A	0	-	-
	"	0	-	-
	Measuring voltage 3 KVATr	0	-	-

303-311 SECTION (FUJI, SHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
	Receiving (H. T)				
309K02-M1	Ammonia refrigerator	*	O	*	
309S-TR1	Transformer	*	-	-	TRANS *
309K01-M1	Gas circulator	*	o	x	
305P01A-M1	NO. 1 carbonate pump	*	o	x	
305P01B-M1	NO. 2 carbonate pump	*	o	x	
310K01-M1	Raw gas comp.	*	o	*	
310K01-M1	Relay panel	*	o	x	
310K02-M1	Nitrogen gas comp.	*	o	*	
310K04-M1	Air comp.	*	o	*	
310K03-M1	Synthesis gas comp.	*	o	*	
310S-TR1	Trnsformer	*	-	-	TRANS *
310K03-M1	Exciter for synchronous motor	*	o	*	
	Load center				
310S-CC1	Load center (CT unit)	o	-	-	
309Y0-M1	Over head crane for 309 sec.	o	x	x	
309Y0-M1	Over head crane for 310 sec.	o	x	*	
	Lighting for gas purification	o	-	-	
	Lighting for synthesis	o	-	-	
	Change over switch	o	-	-	
	Emergency lighting for gas	o	-	-	
	purification & motor temp. meter				
	Lighting for comp. sec.	o	-	-	
310K0-5C-M1	Instrument air comp.	o	-	-	
310K0-5A-M1	Instrument air comp.	o	-	-	
310K0-5B-M1	Instrument air comp.	o	-	-	
310	Battery charger	o	-	-	
	Instrument	o	-	-	
311K03-M1	Impure N ₂ blower	o	o	o	
302P05-M1	Fuel oil pump	o	x	x	
605P12A-M1	A - Effluent pump	o	x	x	
605P12B-M1	A - Effluent pump	o	x	x	
	Instrument air dryer	o	o	o	
309K02-M2	Refrigerator oil pump	o	o	o	

303-311 SECTION (FUJI, SHINKO)

TAG NO.	DUTY	REHABILITATION WORK		
		PANEL	LOCAL SW	MOTOR
309K03-M3	Refrigerator feed pump	o	x	x
309K02-M4	Refrigerator capacity control	o	x	x
309P01A-M1	Boiler feed water pump	o	x	x
309P01B-M1	Boiler feed water pump	o	o	o
309P02-M1	Light fuel oil pump	o	o	o
309P03-M1	SYN gas comp. exciter	R	o	*
308P01A-M1	Caustic solution pump	o	x	x
308P01B-M1	Caustic solution pump	o	x	x
308P02B-M1	Caustic make-up pump	o	x	o
308P03-M1	Caustic sump pump	o	x	o
	310 Turbo fan	o	o	o
308P02A-M1	Caustic make-up pump	o	x	x
307P01A-M1	MEA solution pump	x	x	x
307P01B-M1	MEA solution pump	R	x	x
307P02-M1	MEA sump pump	o	x	x
305P01A-M2	Lub. oil pump for 305P01A-M1	o	x	x
305P01B-M2	Lub. oil pump for 305P01B-M1	o	x	x
305P02A-M1	Carbonate reflux pump	o	x	x
305P02B-M1	Carbonate reflux pump	o	x	o
305P03-M1	Carbonate sump pump	o	x	x
305P04A-M1	Water injection pump	o	x	x
305P04B-M1	Water injection pump	o	x	x
304P01A-M1	Water pump	R	x	x
304P01B-M1	Water pump	R	x	x
304P02A-M1	Hot condensate pump	R	x	x
304P02B-M1	Hot condensate pump	o	x	x
310K03-M2	SYN gas comp. oil pump	o	-	o
310K03-M3	SYN gas comp. oil pump	o	-	o
310K04-M2A	Air comp. oil pump (A)	o	-	o
310K04-M2B	Air comp. oil pump (B)	o	-	o
310K04-M4	Air comp. cool fan filter	o	-	o
310K04-M5	Air comp. filter	o	*	o
310P01-M1	Oil recovery unit	R	-	o
310K01-M3A	RG comp. seal oil pump (A)	o	-	o
310K01-M3B	RG comp. seal oil pump (B)	o	-	o

303-311 SECTION (FUJI, SHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
310K01-M6	RG comp. injection oil pump	o	-	o	
310K01-M4	RG comp. cooling fan	o	o	o	
310K02-M2	N ₂ gas comp. oil pump	o	-	o	
310K04-M3	Air comp. cooling fan	o	o	o	
311K02A-M1	Defrosting air blower (A)	o	o	o	
311K02B-M1	Defrosting air blowre (B)	o	o	o	
310K01-M2A	RG comp. oil pump (A)	o	-	o	
310K01-M2B	RG comp. oil pump (B)	o	-	o	
310K01-M5	RG comp. cool fan filter	o	*	o	
303P06-M1	Chemical solution feed pump	o	x	x	
303D01-M1	Flaker	o	x	x	
303V05-M1	Agitator	o	x	x	
303Z01-M1	Draft fan	o	x	x	
311K01A-M1	EXP turb. pump (A)	o	-	o	
311K01B-M1	EXP turb. pump (B)	o	-	o	
311RCV-1-M1	Motor valve	R	-	o	
303K01A-M1	Air blower	o	x	x	
303K01B-M1	Air blower	o	x	x	
303Y01-M1	NO. 1 belt conveyor	o	x	x	
303Y02-M1	NO. 2 belt conveyor	o	x	x	
303P04A-M1	Oxidizer feed pump	x	x	x	
303P04B-M1	Oxidizer feed pump	x	x	x	
303P08-M1	Condensate pump	x	x	x	
303P02A-M1	NO. 2 absorber feed pump	x	x	x	
303P03-M1	Reaction tank feed pump	x	x	x	
303F01-M1	Filter press	x	x	x	
303P01-M1	NO. 1 absorber feed pump	x	x	x	
303P02B-M1	NO. 2 absorber feed pump	x	x	x	
303E02-M1	Evaporator	o	x	x	
309	Battery charger	x	-	-	
309S-PP-1	Gas circulator	R	-	-	

401 SECTION (SHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
401S-MTC1	Receiving	o	-	-	
	Air comp. (401K01)	*	o	x	
	Transformer primary	o	-	-	TRANS *
401S-CC1	Control circuit	o	-	-	
	Receiving	R	-	-	
401P01A-M1	Feed water pump	o	o	x	
401P01B-M2	Air comp. oil pump	o	o	o	
309K03A-M1	Ammonia liquefier	o	x	*	
309K03B-M1	Ammonia liquefier	o	x	*	
401K01-M3	Air filter	o	-	o	
501P01A-M1	Liquid ammonia pump	o	x	*	
501P01B-M1	Liquid ammonia pump	o	x	*	
401P08A-M1	Liquid ammonia pump	o	x	x	
401P08B-M1	Liquid ammonia pump	o	x	x	
401P07A-M1	Cooling water pump	o	-	x	
401P07B-M1	Cooling water pump	o	-	x	
401P05A-M1	Acid pump	o	x	x	
401P05B-M1	Acid pump	o	x	x	
401P06A-M1	Product acid pump	o	x	x	
401P06B-M1	Product acid pump	o	x	x	
401P09A-M1	Water recycle pump	o	x	x	
401P09B-M1	Water recycle pump	o	x	x	
401P02A-M1	Weak acid pump	o	x	x	
401P02B-M1	Weak acid pump	o	x	x	
401P03A-M1	Demineralized water pump	o	x	x	
401P03B-M1	Demineralized water pump	o	x	x	
401P04A-M1	Recycle acid pump	o	x	x	
401P04B-M1	Recycle acid pump	o	x	x	
401P10-M1	Chemical feeder	o	-	x	

501 SECTION (FUJI, SHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
501S-MTC1	Receiving	o	-	-	
	Transformer primary	o	-	-	
501S-LC1	Load center	o	-	-	
501P02A-M1	No. 1 Neutralizer circulation pump	R	x	x	
501P02B-M1	No. 2 Neutralizer circulation pump	R	x	x	
501P03A-M1	No. 1 Ammonium nitrate solution pump	R	x	x	
501P03B-M1	No.2 Ammonium nitrate solution pump	x	x	x	
501P04A-M1	No. 1 Pre. evaporator feed pump	R	x	x	
501P04B-M1	No. 2 Pre. evaporator feed pump	R	x	x	
501P05-M1	Pre. evaporator circulation pump	R	x	x	
501P11AB-M1	Recovery pump	R	x	x	
501P12A-M1	No. 1 Condensate pump	R	x	x	
501P13A-M1	No. 1 Recovery feed pump	R	x	x	
501P13B-M1	No. 2 Recovery feed pump	R	x	x	
501K01-M1	Cooling air fan	R	x	x	
501K02-M1	Neutralizer air fan	R	x	x	
501V03B1-M1	Adjustor tank agitator	R	x	x	
501P06A-M1	No. 1 ANBA prilling tower feed pump	R	x	x	
501P06B-M1	No. 2 ANBA prilling tower feed pump	R	x	x	
501P10-M1	Washing water pump	R	x	x	
501P07A-M1	No. 1 Hot water	x	x	x	
501P07B-M1	No. 2 Hot water	R	x	x	
501Y01-M1	ANBA belt conveyer	R	x	o	
501Y01-M1	ANBA belt conveyer	R	x	x	
501Y03-M1	No. 1 ANBA bucket elevator	o	x	x	
501Y04-M1	No. 2 ANBA bucket elevator	o	x	x	
501Y07-M1	Diatomaceous earth table feeder	o	x	x	
	for ANBA				
501Y11-M1	Bucket elevator for diatomaceous	o	x	x	
	earth				
501A02-M1	No. 1 ANBA vibrating screen	R	x	x	
501A03-M1	No. 2 ANBA vibrating screen	o	x	x	
501A04-M1	ANBA fixed screen	o	x	x	
501D01-M1	ANBA dryer	o	x	x	
501D02-M1	ANBA cooler	o	x	x	

501 SECTION (FUJI, SHINKO)

TAG NO.	DUTY	REHABILITATION WORK		
		PANEL	LOCAL SW	MOTOR
501D03-M1	ANBA coating drum	o	x	x
501P09A-M1	No. 1 Fertilizer prilling tower	o	x	x
	feed pump			
501P09B-M1	No. 2 Fertilizer prilling tower	R	x	x
	feed pump			
501K03-M1	Exhaust fan ANBA DRYER	R	x	o
501K04-M1	Exhaust fan ANBA cooler	o	x	o
501K05-M1	Forced fan ANBA dryer	o	x	o
501K06-M1	Sec. evaporator fan	o	x	o
501K07-M1	Exhaust fan for fertilizer cooler	o	x	o
501Y05-M1	Fertilizer belt conveyer	o	x	x
501Y06-M1	Fertilizer bucket elevator	R	x	x
501Y09-M1	Diatomaceous earth table feeder	o	x	x
	for fertilizer			
501A09-M1	Fertilizer vibrating screen	o	x	x
501A10-M1	Fertilizer fixed screen	o	x	x
501D04-M1	Fertilizer cooler	o	x	o
501D05-M1	Fertilizer coating drum	o	x	x

601 SECTION (SHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
601S-MTC-1	Receiving	o	-	-	
	No. 1 Cold water pump	*	o	o	
	No. 2 Cold water pump	*	o	o	
	No. 3 Cold water pump	*	o	o	
	Transformer primary	*	-	-	TRANS *
601S-CC1	Receiving	o	-	-	
601P10A-M1	Vacuum pump No. 1	o	-	x	
601P10B-M1	Vacuum pump No. 2	o	-	x	
601P09A-MV-M1	Motor valve No. 1 (Cold water)	o	-	o	
601P09B-MV-M1	Motor valve No. 2 (Cold water)	o	-	o	
601P09C-MV-M1	Motor valve No. 3 (Cold water)	o	-	o	
601P08A-M1	Hot water pump (No. 1)	o	-	o	
601P08A-MV-M1	Motor valve No. 1 (Hot water)	o	-	o	
601P08B-MV-M1	Motor valve No. 2 (Hot water)	o	-	o	
601P08C-MV-M1	Motor valve No. 3 (Hot water)	o	-	o	
601P08B-M1	Hot water pump No. 2	o	-	o	
601P11-M1	Drainage pump	o	x	x	
601V01A-M1	Coagulant feeder No. 1	o	x	x	
601V01B-M1	Coagulant feeder No. 2	o	x	o	
601P08C-M1	Hot water pump No. 3	o	-	o	
601V03A-M1	Aid feeder No. 1	x	-	x	
601V03B-M1	Aid feeder No. 2	x	-	x	
601P01A-M1	Coagulant & alkali feed pump No. 1	o	x	x	
601P01B-M1	Coagulant & alkali feed pump No. 2	o	x	x	
601P02A-M1	Aid feed pump No. 1	o	x	x	
601P02B-M1	Aid feed pump No. 2	o	x	x	
601K02A-M1	Fan No. 1	o	x	x	
601K02B-M1	Fan No. 2	o	x	x	
601P03A-M1	Clear water feed pump No. 1	o	x	x	
601P03B-M1	Clear water feed pump No. 2	o	x	x	
601P05A-M1	Process water pump No. 1	o	x	x	
601P05B-M1	Process water pump No. 2	o	x	x	
601P04A-M1	Filtrated water pump No. 1	o	x	x	
601P04B-M1	Filtrated water pump No. 2	o	x	x	

601 SECTION (SHINKO)

TAG NO.	DUTY	REHABILITATION WORK		
		PANEL	LOCAL SW	MOTOR
601P06A-M1	Transfer pump No. 1	o	x	x
601P06B-M1	Transfer pump No. 2	o	x	x
601K01-M1	Degasifier blower	o	x	x
601V06-M1	Caustic soda agitator	o	x	*
	Acid pump	o	-	x
	Lighting	o	-	-
	Emergency	o	-	-
601V02A-M1	Alkali feeder No. 1	o	-	x
601V02B-M1	Alkali feeder No. 2	o	x	x
601C01-M1	Coagulating precipitator	o	x	x
601P07A-M1	Demineralized water pump No. 1	o	x	x
601P07B-M1	Demineralized water pump No. 2	o	x	x
	Lighting & process water pump	o	-	-
	Instrumentation	o	-	-
	Caustic soda transfer pump	o	-	x

602 SECTION (TOSHIBA, SHINKO)

TAG NO.	DUTY	REHABILITATION WORK		
		PANEL	LOCAL SW	MOTOR
602Z01	Stoker	0	-	x
602K01	Primary F. D fan	0	-	o
	W. H meter	0	-	-
	NFB	0	-	-
602K02	Secondary F. D fan	0	-	o
602K03	I. D fan	0	-	o
602Y02	Chemical pump	0	-	o
602Z05	Chemical pump	0	-	o
602Y04	Secondary ash conveyor	0	o	x
602Y01	Coal conveyor	0	o	x
602Y03	Primary ash conveyor	0	o	x
602P02A	FW pump (No. 1)	0	-	o
602P02B	FW pump (No. 2)	0	-	x
602P03	Condensate pump	0	-	x
	Lighting	0	-	-
	Instrument	0	-	-
	Trans	0	-	-
	Emergency	0	-	-
602P01A	BFW pump (No. 1)	0	-	o
602P01B	BFW pump (No. 2)	0	-	o
	Emergency	0	-	-

603 SECTION (FUJI, SIHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
603S-MTC1	Receiving 1	R	-	-	
	Receiving 2	R	-	-	
	Feeder 1 (310 sec.)	R	-	-	
	Feeder 2 (301 sec.)	R	-	-	
	Feeder 3 (401 sec.)	R	-	-	
	Feeder 4 (302 sec.)	R	-	-	
	Feeder 5 (501 sec.)	R	-	-	
	Feeder 6 (Water treatment 1)	R	-	-	
	Feeder 7 (Water treatment 2)	R	-	-	
	Feeder 8 (701 sec.)	R	-	-	
	Feeder 9 (Lighting)	R	-	-	
603S-TR1	Transformer	-	-	-	TRANS *
603S-DP1	Distribution board No. 1	*	-	-	
603S-CHA1 BTT1	Battery charger & battery	*	-	-	CHARGER x
603S-DP2	Generator panel	*	-	-	
603S-PP1	Control panel	*	-	-	
603S-DPM	Feeder panel	*	-	-	
603S-EE1 EG1	Diesel engine & generator	*	-	-	ENGINE & GE- NERATOR *
603S-CHA2 BTT2	Battery charger & battery	*	-	-	CHARGER x

604, 605 SECTION (SHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
605S-CC2	Control circuit	0	-	-	
	Receiving	0	-	-	
605G02-M1	Hammer crusher	0	0	0	
605k04-m1	Exhaust blower	0	0	0	
605G01-M1	Pulverizer	0	0	0	
605C01-M1	Rotary valve	0	0	0	
604S-	Control circuit	x	-	-	
	Receiving	x	-	-	
604P01A-M1	Water intake pump	x	0	*	
604P01B-M1	Water intake pump	x	0	*	
604P01C-M1	Water intake pump	x	0	*	
604P02-M1	Vacuum pump	x	0	*	
604P03-M1	Drain pump	x	0	*	

605 SECTION (SHINKO)

TAG NO.	DUTY	REHABILITATION WORK			
		PANEL	LOCAL SW	MOTOR	
605S-MCT1	Transformer primary	*	-	-	TRANS *
605-CC1	Control circuit	o	-	-	
	Receiving	o	-	-	
605P01A-M1	Spray pump	x	-	x	
605P01B-M1	Spray pump	o	x	o	
605P02A-M1	Recovery water pump	o	x	x	
605P02B-M1	Recovery water pump	o	x	o	
605P03A-M1	Sulphate pump	o	x	x	
605P03B-M1	Sulphate pump	o	x	x	
605P04-M1	Acid pump	o	x	o	
605P05-M1	No. 1 Milk pump	o	x	x	
605P06-M1	No. 2 Milk pump	o	x	x	
605P07-M1	No. 3 Milk pump	o	x	x	
605P08A-M1	Sludge pump	o	x	x	
605P08B-M1	Sludge pump	o	x	x	
605P09A-M1	C-Effluent pump	o	x	x	
605P09B-M1	C-Effluent pump	o	x	x	
605P10A-M1	D-Effluent pump	o	x	x	
605P10B-M1	D-Effluent pump	o	x	x	
605P11-M1	Water pump	o	x	x	
	Spare	-	-	-	
605P13-M1	Floc. aid pump	o	x	x	
605P14-M1	Drain pump	o	x	x	
605P15A-M1	B-Effluent pump	o	x	x	
605P15B-M1	Air compressor	o	x	x	
605B01-M1	Reaction tank agitator	o	x	x	
605B02A-M1	Sulphate mixer	o	x	x	
605B02B-M1	Sulphate mixer	o	x	x	
605B03-M1	No. 1 Milk mixer	o	x	x	
605B04-M1	No. 2 Milk mixer	o	x	x	
605B05-M1	No. 3 Milk mixer	o	x	x	
605R02-M1	Lake arm	o	x	x	
605B07-M1	No. 1 Decomposition tank	o	x	x	

605 SECTION (SHINKO)

TAG NO.	DUTY	REHABILITATION WORK		
		PANEL	LOCAL SW	MOTOR
605B08-M1	No. 2 Decomposition tank	0	X	X
605B09-M1	Neutralizer mixer	0	0	0
605B10-M1	Floc. acid tank mixer	0	X	X
605B11-M1	Floc. acid dissolving tank mixer	0	X	X
605K01-M1	Mixing blower	0	X	X
605K02-M1	Mixing blower	0	0	0
605Y01-M1	No. 1 Lime feeder	0	0	0
605Y02-M1	No. 2 Lime feeder	0	X	X
605Y03-M1	No. 3 Lime feeder	0	X	X
605Y05-M1	Vibrator	0	X	X
605Y06-M1	Vibrator	0	X	X
605Y07-M1	Vibrator	0	X	X
	Spare	-	-	-
	Spare	-	-	-
	New acid pump	X	-	X
605P16-M1	Acid intake pump			
605K03-M1	Mixing blower	0	X	X
	Lighting	0	-	-
	Spare	-	-	-
	Emergency power receiving	0	-	-
	Lighting	0	-	-
	Instrument	0	-	-

II. OTHERS

OTHERS

SECTION	DESCRIPTION	REHABILITATION WORK
309	Capacity Controller for Ammonia Refrigerator SRM (309K02) FUJI RC91011-1	Complete Replacement
603	Cable Trench	Drainage Work
A11	Cable Trench	Complete Covering

LIST FOR RENEWAL AND
NEWLY INSTALLED EQUIPMENT

301 Section, Coal Handling

W01 A/B	Weighing Feeder	2 sets
W02	Weighing Feeder	1 set
W03	Weighing Feeder	1 set
W04	Weighing Feeder	1 set
Y09	Screw Conveyor	1 set
Y10	Bucket Elevator	1 set
Y11	Screw Feeder	1 set
Y12	Screw Conveyor	1 set

302 Section, Gasification

G02	Gasifier Outlet	1 set
T02 A/B	Water Separator	2 sets
K02 B	No 1 N ₂ Blower	1 set
G06	Ash Extractor	1 set
N01-1A,B	Theisen Washer	2 sets
N01-2A,B	Theisen Washer	2 sets
P04 A/B	Light Oil Pump	2 sets
P05	Fuel Oil Pump	1 set
G07-Z1	Refractory Bricks for Connect Pipe	1 set
G08-Z1	Refractory Bricks for Expansion Joint	1 set
Z02	Expansion Joint between Gasifier and Rad. Boiler	1 set
G01-Z1	Gasifier lining	1 set

303 Section, H₂S Removal

E01	Solution Heater	1 set
E02	Evaporator	1 set
P05 A/B	Filter Feed Pump	2 sets
T01	No 1 Absorber	1 set
V01	Reaction Tank	1 set
V06	Mist Separator	1 set
PH1	pH Analyser	1 set

304 Section, Primary CO Conversion

E02	No 1 Water Heater	1 set
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305 Section, Carbonate CO₂ Removal

E02	No. 2 Carbonate Reboiler	1 set
F01	Carbonate Side Stream Filter	1 set
P01 A	Carbonate Solution Pump	1 set
P02 A	Reflux Pump	1 set
P03	Carbonate Solution Sump Pump	1 set

306 Section, Secondary CO Conversion

E01	Secondary Shift Preheater A	1 set
E02	Secondary Shift Preheater B	1 set
E03	No. 2 Water Heater	1 set

308 Section, MEA CO₂ Removal

E02	Methanator Cooler	1 set
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309 Section, Ammonia Synthesis

E09	Ammonia Condenser	1 set
E10	Liquefier Condenser	1 set
P01 B	Water Pump	1 set

310 Section, Compression

K01-E4	By-pass Cooler	1 set
K01-P2 A/B	No. 1 Seal Pump	2 sets
K01-P3 A/B	No. 2 Seal Pump	2 sets
K01-V1	1st Stage Drain Separator	1 set
K01-V2	2nd Stage Drain Separator	1 set
K01-V3	3rd Stage Drain Separator	1 set
K01-V4	By-pass Drain Separator	1 set
K01-V20	1st Discharge Silencer	1 set
K01-V25	2nd Discharge Silencer	1 set

311 Section, Air Separation

F01-B	Air Filter	1 set
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401 Section, Nitric Acid

E01	Ammonia Evaporator	1 set
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E04	Tail Gas Heater	1 set
P01 A	Feed Water Pump	1 set
EXJ-01, 03	Expansion Joint	2 sets
CV53F, 53H	Check Valve	2 sets
<u>501 Section, Ammonium Nitrate</u>		
F01	Ammonium Nitrate Solution Filter	1 set
F02 A/B	96% Ammonium Nitrate Strainer	2 sets
F03 A/B	99% Ammonium Nitrate Strainer	2 sets
F04	Recovery Solution Filter	1 set
V09	Vibrator for Hopper	1 set
V13	Vibrator for Hopper	6 sets
<u>601 Section, Water Treatment</u>		
K01	Blower for Degasifier	1 set
P01 B	Coagulant and Alkali Feed Pump	1 set
P05 B	Process Water Pump	1 set
T01	Cation Exchanger	1 set
Z01	Algacide Agent Unit	1 set
Z02	Strainer	1 set
Z03	Oil Fence	1 set
Z04	Overhead Piping from 601 to 605 Sec.	1 set
<u>602 Section, Boiler</u>		
K03	Induced Draft Fan	1 set
Z01	Ash Handling Unit	1 set
<u>604 Section, Water Intake</u>		
P02	Vacuum Pump	1 set
P03	Drain Pump	1 set

605 Section, Effluent Treatment

B09	Neutralizer Mixer	1 set
C11	Automatic Lime Feeding System	1 set
K01	Mixing Blower	1 set
K02	Mixing Blower	1 set
K03	Mixing Blower	1 set
P04	Acid Pump	1 set
P09 A/B	C-Effluent Pump	2 sets
P10 A/B	D-Effluent Pump	2 sets

LIST FOR THE PARTS OF
EQUIPMENT TO BE REPLACED

301 Section, Coal Handling

C01 Multiclone Dust Collector

1. Guide Blade	30 pcs.
2. Clean Gas Tube	30 pcs.
3. Converting Cell	30 pcs.
4. Chute	1 set
5. Rotary Valve without Motor	1 set

C02 Wet Scrubber with Exhaust Fan

1. Exhaust Fan without Motor	1 set
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C03 Multiclone Dust Collector

1. Guide Blade	5 pcs.
2. Clean Gas Tube	5 pcs.
3. Converting Cell	5 pcs.
4. Chute	1 set
5. Rotary Valve without Motor	1 set

C04 Wet Scrubber with Exhaust Fan

1. Exhaust Fan without Motor	1 set
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D01 EBRO Type Rotary Dryer

1. Big Ring Gear with Bolt	1 set
2. Pinion with Shaft	1 set
3. Plain Riding Ring with Liner Plate and Retaining Ring	1 set
4. Support Roller with Shaft	4 sets
5. Thrust Roller	2 pcs.
6. Support Roller Bearing Bushing	8 pcs.
7. Thrust Roller Bearing Bushing	2 pcs.
8. Inlet Housing Airseal	1 set
9. Outlet Housing Airseal	1 set

10.	Airseal for Furnace Wall	2 sets
11.	Thrust Riding Ring	1 pc.
12.	Liner Plate and Retaining Ring of Thrust Riding Ring	1 set
13.	Thrust Bearing Housing	2 sets
14.	Support Bearing Housing	8 sets

G03 Hot Air Furnace

Re-lining of Fire Brick

1.	Red Brick	50 ton
2.	SK 30	51 ton
3.	SK 34	33 ton
4.	SK 36	12 ton
5.	SK 39	5 ton

G05 Compeb Mill

1.	Feed End Head with Bolt and Nut	1 set
2.	Feed End Trunnion Liner	1 pc.
	" Retainer	1 pc.
	" Throat Liner	4 pcs.
	" End Liner	12 pcs.
	" Bolt, Nut and Washer	1 set
3.	Division Head Spider	1 pc.
	Division Head Cone	1 pc.
	Grate Section	10 pcs.
	Grate Section Cramping Ring	1 pc.
	Wearing Plate	6 pcs.
	Wearing Plate Outer Segment (1)	16 pcs.
	Wearing Plate Outer Segment (2)	4 pcs.
	Pin and Set Bolt	1 set
	Shim	1 set
4.	Discharge End Trunnion Liner	1 pc.
	Discharge End Cone (1)	2 pcs.

Discharge End Cone (2)		6 pcs.
Grate Section		6 pcs.
Ring Liner		2 pcs.
Discharge End Filler Ring		6 pcs.
Bolt, Nut and Washer		1 set
5. Discharge End Head		1 pc.
6. Main Bearing		2 sets
Piston Ring		4 pcs.
Oil Seal		8 pcs.
7. Pinion		1 pc.
8. Shell Liner Plate	A2 type	78 pcs.
	B1 "	6 pcs.
	B2 "	8 pcs.
	C2 "	1 pc.
	D2 "	1 pc.
	H2 "	1 pc.
	J2 "	1 pc.
	K2 "	1 pc.
	G2 "	2 pcs.
9. Bolt, Nut, and Washer for 2nd Compartment Shell Liners		1 set
10. Trommel		1 pc.
11. Dust Seal for Gear Cover		2 sets
" for Outlet Gasing		1 set
" for Bearing		4 sets

K02A/B Compressor

1. Unloader	2 sets
2. Cylinder Valve	2 sets
3. Oil Scraper Ring	2 sets

Y02 Bucket Elevator

1. Bucket with Bolt and Nut	119 pcs.
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2. Main Chain	238 links
3. Sprocket	2 pcs.
4. Roller Chain	1 set

Y03 Belt Conveyor

1. Carrying Idlers (troughing type)	54 sets
2. Impact Idlers	4 sets
3. Self-aligning Idlers (carrying side)	6 sets
4. Return Idlers	20 sets
5. Self-aligning Idlers (return side)	4 sets
6. Sprocket for Drive set Motor	1 set
7. Sprocket for Pulley	1 set

Y06 Belt Conveyor

1. Carrying Idlers (troughing type)	32 sets
2. Impact Idlers	13 sets
3. Self-aligning Idlers (carrying side)	4 sets
4. Return Idlers	15 sets
5. Self-aligning Idlers (return side)	2 sets
6. Sprocket for Drive Motor	1 set
7. Sprocket for Pulley	1 set

Y13 Flow Conveyor

Replacement of Parts 1 set

except ;

1. Casing
2. Intermediate Support
3. Discharge End Support
4. Feed and Discharge Chute
5. Drive Motor
6. Foundation Bolt and Nut

Y14 Pneumatic Conveyor

1. Cone Valve	2 sets
2. Valve Seat	2 sets
3. Valve Stopper Plate	2 sets
4. Valve Install	2 sets
5. Valve Install Base	2 sets
6. Diaphragm Valve	2 sets
7. Level Indicator 400mm long	4 sets
500mm long	2 sets
8. Feeding Valve	1 set

Z02 Aeration Unit for Pulverized Coal Bunker

1. Canvas Cloth	11 sets
2. Flexible Hose	11 sets

302 Section, Gasification

G01 Gasifier with Immersion Shaft

1. Inner Shell (material)	1 set
2. Inner Head Plate	2 pcs.
3. Inner End Plate (bellows type)	1 pc.

G03 Intermediate Piece between Immersion

Shaft and Extractor

1. Inner Shell	1 set
----------------	-------

T01 Cooling Washer

1. Baffle Plate	
Hood	1 set
Bell	4 sets
2. Brick Re-lining of Inlet Nozzle	
Acid and Heat Proof Brick	880 kg
Acid Proof Cement	150 kg

Fire Brick and Cement	1450	kg
3. Spray Pipe		
Part No 63	4	sets
64	1	set
30	1	set
31 (A type)	3	sets
31 (B type)	1	set
32	2	sets
33	1	set
34	1	set
 E02 Tubular Boiler		
1. Tube Bundle	1	set
2. Inner Shell	1	set
 E05A/B No 1 N ₂ Cooler		
1. Tube Bundle	2	sets
 K01A O ₂ Blower		
1. Metal Sleeve	1	set
2. Labyrinth	1	set
3. Discharge Check Valve	2	pcs.
 K02A No 1 N ₂ Blower		
1. Bearing	1	set
2. Labyrinth	1	set
 K03 No 2 N ₂ Blower		
1. Bearing	1	set
2. Labyrinth	1	set

P01A/B Wash Water Pump

1. Impeller 2 sets

P02A/B Feed Water Pump

1. Impeller 2 sets
2. Shaft 2 sets
3. Bearing Metal 2 sets
4. Wearing Ring 2 sets

P03A/B Quench Water Pump

1. Impeller 2 sets
2. Shaft 2 sets
3. Bearing Metal 2 sets
4. Wearing Ring 2 sets

E02-Z5 Connection Parts between E01 and E02

1. Upper Cup 1 set
2. Bottom Cup 1 set
3. Side Cup 1 set
4. Wedge 1 set
5. Transverse Baffle 1 set

303 Section, H₂S Removal

F01 Filter Press

1. Filter Plate	40 pcs.
2. Filter Cloth	2 sets
3. Conveyor Chain for Shifting Filter Plate	1 set
4. Drip Pan	1 set
5. Cake Pan with Drive Unit	1 set
6. Cover for Guide Rail	1 set
7. Drive Unit of Filter Plate	1 set
8. Filter Cloth Suspension Device	1 set
9. Local Control Panel	1 set
10. Jet Cleaner	1 set

K01A/B Air Blower

1. Timing Gear	4 pcs.
2. Discharge Check Valve	1 pc.

P01 No 1 Absorber Feed Pump

1. Impeller	1 pc.
2. Discharge Check Valve	1 pc.

P02A/B No 2 Absorber Feed Pump

1. Impeller	2 pcs.
2. Discharge Check Valve	2 pcs.

P03 Reaction Tank Feed Pump

1. Impeller	1 pc.
2. Discharge Check Valve	1 pc.

P04A/B Oxidizer Feed Pump

1. Impeller	2 pcs.
2. Discharge Check Valve	2 pcs.

T02 No 2 Absorber

1. Epoxy Coating of inside 1 set
2. Wooden Grids 1 set

T03 No 3 Absorber

1. Epoxy Coating of inside 1 set
2. Wooden Grids 1 set

V02 Oxidizer

1. Epoxy Coating of inside 1 set
2. Sight Glass 8 pcs.

V07 Wash Water Tank

1. Automatic Valve 1 set

V09A/B Autoclave Remelter

1. Bottom Steam Trace 2 sets
2. Thermal Insulation Material 1 lot
(for 2 vessels and piping)
3. Piping Materials from Remelter to Flaker 1 lot
(including valve and gasket)

D01 Flaker

1. Flake Drum 1 set
2. Cooling Water Pipe 1 set
3. Gland Packing 2 sets
4. Cryindrical Shaft (A) 1 set
5. Inner Drum 1 set
6. Flake Drum Cover 2 sets
7. Cylindrical Shaft (B) 1 set
8. Main Bearing 2 sets
9. Main Scraper 1 set

304 Section, Primary CO Conversion

E01 Primary Shift Preheater A

1 Tube Bundle 1 set

H01 Primary Shift Converter

1. Castable 1 set

2. Catalyst 1 set

3. Alundum Ball 1 set

T01 Saturator

1. Grating with Clip 2 sets

2. Raschig Ring 1 set

3. Lining Material 1 set

Piping Material

1. Process Line 1 set

305 Section, Carbonate CO₂ Removal

P01B Carbonate Solution Pump

- | | |
|-----------------|--------|
| 1. Shaft | 2 sets |
| 2. Shaft Sleeve | 2 sets |
| 3. Wearing Ring | 2 sets |

T01 Carbonate Regenerator

- | | |
|----------------------|--------|
| 1. Distribution Pipe | 1 set |
| 2. Distributor | 1 set |
| 3. Redistributor | 1 set |
| 4. Grating | 4 sets |
| 5. Raschig Ring | 1 set |

T02 Carbonate Absorber

- | | |
|----------------------|--------|
| 1. Distribution Pipe | 1 set |
| 2. Redistributor | 1 set |
| 3. Grating | 3 sets |
| 4. Raschig Ring | 1 set |

Piping Materials

- | | |
|-----------------------------|-------|
| 1. Carbonate Solution Line | 1 lot |
| 2. CO ₂ Gas Line | 1 lot |
| 3. Reboiler Vapor Line | 1 lot |

Hot Potassium Carbonate System

- | | |
|------------------------|-------|
| 1. Corrosion Inhibitor | 1 lot |
|------------------------|-------|

306 Section, Secondary CO Conversion

H01 Secondary Shift Converter

- | | |
|---------------------------|-------|
| 1. Catalyst | 1 set |
| 2. Alundum Ball | 1 set |
| 3. Grating with Wire Mesh | 1 set |

Piping Materials

- | | |
|---------------------|-------|
| 1. Process Gas Line | 1 lot |
|---------------------|-------|

307 Section, MEA CO₂ Removal

E03 MEA Overhead Condenser

- | | |
|----------------|-------|
| 1. Tube Bundle | 1 set |
|----------------|-------|

E05 MEA Solution Cooler

- | | |
|----------------|--------|
| 1. Tube Bundle | 2 sets |
|----------------|--------|

P01A/B MEA Solution Pump

- | | |
|--------------------|--------|
| 1. Shaft | 2 sets |
| 2. Impeller | 2 sets |
| 3. Shaft Sleeve | 2 sets |
| 4. Wearing Ring | 2 sets |
| 5. Mechanical Seal | 2 sets |
| 6. Bearing | 2 sets |
| 7. Gasket | 2 sets |

T02 MEA Absorber

- | | |
|----------------------|--------|
| 1. Grating with Clip | 2 sets |
| 2. Raschig Ring | 1 set |

308 Section, CO removal

P03 Caustic Sump Pump

- | | |
|------------------|-------|
| 1. Casing | 1 set |
| 2. Impeller | 1 set |
| 3. Shaft | 1 set |
| 4. Wearing Ring | 1 set |
| 5. Bearing Metal | 1 set |
| 6. Case Gasket | 1 set |

309 Section, Ammonia Synthesis

E03 Water Cooled Condenser

- | | |
|----------------|-------|
| 1. Tube Bundle | 1 set |
|----------------|-------|

V04 Steam Drum

- | | |
|-------------|-------|
| 1. Demister | 1 set |
|-------------|-------|

K01 Gas Circulator

- | | |
|--------------------------|-------|
| 1. Parts for Overhauling | 1 set |
|--------------------------|-------|

310 Section, Compression

K01 Raw Gas Compressor

1. 1st Stage Casing 1 set
2. Parts for Overhauling 1 set

K01-E5 Oil Cooler

1. Tube Bundle 1 set

K01-F1 Suction Filter

1. Filter Element 1 set

K02 Nitrogen Gas Compressor

1. Parts for Overhauling 1 set

K02-E1 1st Stage Cooler

1. Tube Bundle 1 set

K02-E2 2nd Stage Cooler

1. Tube Bundle 1 set

K02-E3 3rd Stage Cooler

1. Tube Bundle 1 set

K03 Synthesis Gas Compressor

1. Parts for Overhauling 1 set

K04 Air Compressor

1. Parts for Overhauling 1 set
2. Drain Trap 4 sets

K04-E1 A~C Inter Cooler

1. Tube Bundle	3 sets
2. Drain Trap	3 sets
3. Demister	3 sets

K04-E2 After Cooler

1. Tube Bundle	1 set
2. Drain Trap	1 set
3. Demister	1 set

311 Section, Air separation

F01 Air Filter

- | | |
|---------------------|----------|
| 1. Filter Element | 164 pcs. |
| 2. Curtain Chain | 4 pcs. |
| 3. Tool | 1 set |
| 4. Sealing Material | 1 set |

K01 Expansion Turbine

- | | |
|--------------------------|-------|
| 1. Parts for Overhauling | 1 set |
|--------------------------|-------|

K01-F1A/B Primary Filter

- | | |
|-------------------|--------|
| 1. Filter Element | 2 sets |
|-------------------|--------|

K01-F2A/B Secondary Filter

- | | |
|-------------------|--------|
| 1. Filter Element | 2 sets |
|-------------------|--------|

Parts required for overhaul of equipment
in the cold box

1. Replacement of Silica-gel

1) D01 A/B Defrosting Air Dryer

a) Silica-gel "R" 2 sets

b) Silica-gel "W" 2 sets

2) F03 A/B Liquid Air Filter

a) Silica-gel "R" 2 sets

b) Silica-gel "W" 2 sets

2. K02 A/B Defrosting Air Blower

a) Bearing 1 set

b) Oil Seal 1 set

	c) V-Belt	1 set
	d) O-Ring	1 set
	e) Gland Packing	1 set
3.	Blind Flange for Check Valve Box (used for the leakage test of Reversing Heat Exchanger)	1 set
4.	Perlite for replenishment	150 m ³
5.	Rock-Wool for replenishment	3 m ³
6.	Cleaning agent for the equipment a) Carbon tetrachloride	9 m ³
7.	Replacement of A1 Piping	1 lot
8.	Boss and Fittings for instrument on the replaced A1 piping	1 lot
9.	For test/inspection of Valve a) Gland Packing	1 lot
	b) Drain Trap	3 pcs.
	c) Steam Trap	3 pcs.
	d) Strainer	3 pcs.
10.	Replacement of Parts a) Bolt and Nut	1 lot
	b) Gasket for equipment	1 lot
	c) Gasket for piping	1 lot
11.	Stop Valve for instrument	10 pcs.

401 Section, Nitric Acid

E03 Gas Cooler

- | | | |
|----|---------------|-------|
| 1. | Channel | 1 set |
| 2. | Channel Cover | 1 set |

H01 Burner

- | | | |
|----|--------------------|-------|
| 1. | Lower Part | 1 set |
| 2. | Gauze Support | 1 set |
| 3. | Quartz Tube | 1 set |
| 4. | Upper Shell Flange | 1 set |
| 5. | Stud Bolt and Nut | 1 set |

K01 Air Compressor

- | | | |
|----|-----------------------|-------|
| 1. | Parts for Overhauling | 1 set |
|----|-----------------------|-------|

K01-R1 Speed Up Gear Unit

- | | | |
|----|-----------------------|-------|
| 1. | Parts for Overhauling | 1 set |
|----|-----------------------|-------|

K01-P1 Lubrication Oil Pump

- | | | |
|----|-----------------------|-------|
| 1. | Parts for Overhauling | 1 set |
|----|-----------------------|-------|

K02 Recovery Gas Turbine

- | | | |
|----|-----------------------|-------|
| 1. | Parts for Overhauling | 1 set |
|----|-----------------------|-------|

T01 Oxidation and Bleaching Tower

- | | | |
|----|---------------------|--------|
| 1. | Lower Part of Tower | 1 set |
| 2. | Tray | 5 sets |

T02A/B No 1 Oxidation Tower

- | | | |
|----|---------------------|--------|
| 1. | Lower Part of Tower | 2 sets |
|----|---------------------|--------|

T03A/B No 2 Oxidation Tower

1. Lower Part of Tower 2 sets

T04 No 1 Absorption Tower

1. Cooling Coil, B-type 1 set
2. Cooling Coil, C-type 4 sets
3. Cooling Coil, D-type 1 set

Piping Material

1. Between E06 and T05 1 set

501 Section, Ammonium Nitrate

D03 ANBA Coating Drum

1.	Tire	2 pcs.
2.	Roller	4 pcs.
3.	Gear	1 pc.
4.	Pinion	1 pc.
5.	Shaft and Bearing unit for Roller	4 sets

D05 Fertilizer Coating Drum

1.	Tire	2 pcs.
2.	Roller	4 pcs.
3.	Gear	1 pc.
4.	Pinion	1 pc.
5.	Shaft and Bearing Bearing unit for Roller	4 sets
6.	Shaft and Bearing unit for Pinion	1 set

E01 Ammonia Evaporator by Steam

1.	Tube Bundle	1 set
----	-------------	-------

E03 Ammonia Heater

1.	Tube Bundle	1 set
----	-------------	-------

T01 Neutralizer

1.	Demister	1 set
----	----------	-------

T02 ANBA Prilling Tower

1.	Nozzle Plate Assembly	3 sets
2.	Upper Tube	6 sets
3.	Top Piping	1 set
4.	Head Tank	2 sets
5.	Ball Valve	6 sets
6.	Ball Valve Repair Kit	20 sets

7. Thermal Insulation Material 1 lot

T03 Fertilizer Prilling Tower

1. Nozzle Plate Assembly 6 sets
2. Upper Tube 12 sets
3. Top Piping 1 set
4. Head Tank 2 sets
5. Ball Valve 12 sets
6. Ball Valve Repair Kit 20 sets
7. Thermal Insulation Material 1 lot

V09 ANBA Hopper

1. Bottom Cone 1 set

V13 Fertilizer Hopper

1. Bottom Cone 1 set

Prilling Tower Concrete Surface

1. Epoxide Resin 1 lot
2. Quartz Sand 1 lot

601 Section, Water Treatment

F01 Automatic Valveless Filter

- | | | |
|----|----------|-------|
| 1. | Strainer | 1 set |
| 2. | T-Bolt | 1 set |

P01A Coagulant and Alkali Feed Pump

- | | | |
|----|-----------|--------|
| 1. | Plunger | 2 sets |
| 2. | V-Packing | 2 sets |

P06A Transfer Pump

- | | | |
|----|----------|-------|
| 1. | Impeller | 1 set |
|----|----------|-------|

P09A~C Cold Water Pump

- | | | |
|----|------------------------------|--------|
| 1. | Suction Side Expansion Joint | 3 sets |
|----|------------------------------|--------|

T04 Cooling Tower

- | | | |
|----|------------------|--------|
| 1. | Drift Eliminator | 1 set |
| 2. | Filling Material | 1 set |
| 3. | Wooden Support | 1 set |
| 4. | Exhaust Duct | 2 sets |
| 5. | Distributor | 1 set |

Piping Materials

- | | | |
|----|-----------------|-------|
| 1. | Regenerant Line | 1 set |
|----|-----------------|-------|

Drain Trench

- | | | |
|----|---------------|-------|
| 1. | Resin Coating | |
| | | 1 lot |

602 Section, Boiler

P01A Feed Water Pump

1. Impeller 1 set

P02A/B Feed Water Pump

1. Impeller 2 sets

604 Section, Water Intake

P01A~C Water Intake Pump

1. Impeller 3 sets
2. Wearing Ring 3 sets

605 Section, Effluent Treatment

Piping Materials

1. Suction and Discharge Piping of Pump (P10) 1 set

