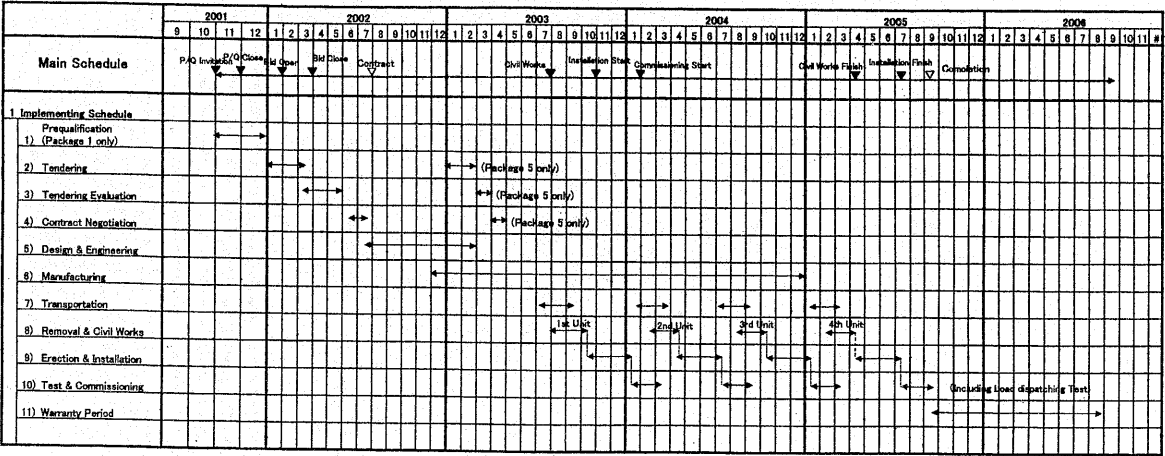


**Attachment - B      Bid Drawings**

1. MON-K-0-01      Implementing Schedule
2. MON-K-0-02      Start-up Dates of Boiler and Turbine/Generator
3. MON-K-0-03      Main Specification of Boiler
4. MON-K-0-04      Main Specification of Pulverized Coal Feed System (#5-#8)
5. MON-K-0-05      Example of Daily Load Distribution Curve during Lower Electric Power Demands (Summer Season)
6. MON-K-0-06      Example of Daily Load Distribution Curve during Higher Electric Power Demands (Winter Season)
7. MON-K-0-07      Connect of Pulverized Coal Pipes from Pulverizers to Burners
8. MON-K-0-08      General Arrangement of Boiler
9. MON-K-0-09      General Layout
10. MON-K-0-10      Boiler-Turbine House : Section
11. MON-K-0-11      Boiler-Turbine Layout
12. MON-K-0-12      Main Feedwater Flow Diagram
13. MON-K-0-13      Main Steam Flow Diagram
14. MON-K-0-14      Supply Limit for Instruments and Cables around the Pulverizer
15. MON-K-2-01      Panel and Control Desk Arrangement in the Existing CCR
16. MON-K-2-02      Typical DCS System Layout for Reference
17. MON-K-2-03      Scope of Supply for Modulating Control System
18. MON-K-2-04      Scope of Supply for Instrumentation
19. MON-K-2-05      Vital I/O Points for the Boiler Modulating Control
20. MON-K-2-06      Flow Diagram around the Superheater
21. MON-K-2-07      Pressure Drop of Steam in the Superheater
22. MON-K-2-08      Typical Instrumentation around the Pulverizer
23. MON-K-2-09      Flow Diagram for Combustion Air and Flue Gas
24. MON-K-2-10      Flow Diagram for Fuel Oil System
25. MON-K-2-11      Metal Temperature Diagram for Drum and Superheater
26. MON-K-2-12      Boiler Plant Inter-lock Diagram
27. MON-K-2-13      Arrangement of Existing Boiler Control Desks
28. MON- K-2-14      Arrangement of Existing Boiler Instrument Panels
29. MON- K-2-15      Sectional Dimension of Existing Desk

# Implementing Schedule



	Unit No.	Capacity	Start-up Date
Boiler	#1	420t/h	30 - 8 - 1983
	#2	420t/h	16 - 1 - 1984
	#3	420t/h	9 - 12 - 1984
	#4	420t/h	25 - 12 - 1985
	#5	420t/h	27 - 12 - 1986
	#6	420t/h	31 - 10 - 1987
	#7	420t/h	7 - 2 - 1990
	#8	420t/h	23 - 12 - 1991
Turbine generator	#1	80 MW	18 - 10 - 1983
	#2	100 MW	26 - 11 - 1984
	#3	100 MW	27 - 12 - 1985
	#4	100 MW	27 - 12 - 1986
	#5	80 MW	17 - 2 - 1990
	#6	80 MW	25 - 12 - 1991

Rehabilitation project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

Start-up Dates of Boiler and  
Turbine/Generator

Dwg. No. MON-K-0-02

August 20 '01

Manufacturer		ex--Soviet Union
Type		Indoor, radiant, single drum, natural circulation type
Unit No.		#1 - #8
Boiler Steam Condition	Boiler capacity	420 t/h(Superheater outlet)
	Steam pressure	140 kgf/cm <sup>2</sup> (14MPa) (Superheater outlet)
	Steam temperature	560 °C(Superheater outlet)
Fuel	Description	Mongolian coal(Baganuur, Shivee-Ovoo)
	Hight calorific value	3,500 kcal/kg--2,600 kcal/kg
Type	Superheater	Pendant type
	Boiler furnace	Single furnace, water wall
	Air heater	Tubular type
	Coal burner(Numbers)	Corner firing(4 × 3 stages)
	ESP	Electrostatic type
	Ash treatment system	Slurry ash with water circulation system
	Coal pulverizer (Numbers)	Vertical bowl mill for #1~4 Boilers Horizontal tube mill for #5~8 Boilers
Pulverized coal firing system	Direct firing type for #1~4 Boiler Semi-direct storage bin type for #5~8 Boiler	
Ventilation system		Balanced draft.

Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

Main Specification of Boiler

Dwg. No. MON-K-0-03

August 20 '01

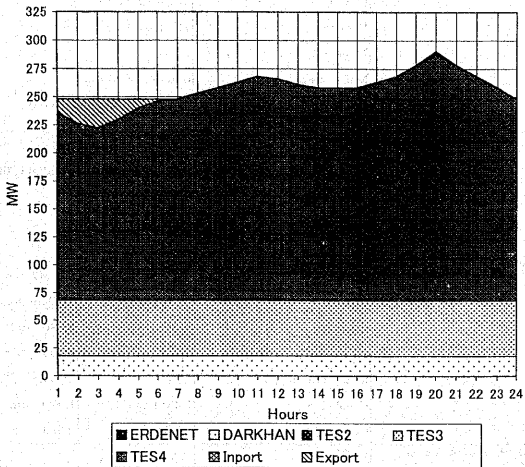
Firing system	Type :	Semi-direct	
1) Primary fan	Type :	Centrifugal	
	Flow rate :	$130 \times 10^3 \text{ m}^3/\text{h}$	
	Pressure :	737 kg/m <sup>2</sup>	
	Temperature :	75 °C	
	Motor output :	630 kW/1500 rpm	
	Concentration of pulverized coal at the outlet :	44 g/m <sup>3</sup> (measured value)	
2) Mill(Coal pulverizer)	Type :	Low-speed horizontal tube mill	
	Flow rate of coal :	Maximum 55 t/h Rated 41. 6t /h	
	Motor output :	1, 600 kW	
	Revolutions :	17. 2 rpm	
	Number :	2/unit	
3) Gas recirculation fan	Unit No. :	#5-#6	#7-#8
	Type :	Centrifugal	Centrifugal
	Flow rate :	2, 500 m <sup>3</sup> /min	1, 900 m <sup>3</sup> /min
	Discharge pressure :	0. 04 kgf/cm <sup>2</sup>	0. 03 kgf/cm <sup>2</sup>
	Motor output :	400 kW	205 kW
	Revolutions :	1, 000 rpm	1, 000 rpm
	Number :	1/unit	2/unit
4) Raw coal feeder	Type :	Volumetric, belt	
	Flow rate of coal :	Max. 80 t/h	
	Motor output :	11. 8 kW	
	Revolutions :	300-1, 500 rpm	
	Windth/Length :	1, 100/7, 000 mm	
	Number :	2/unit	

Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

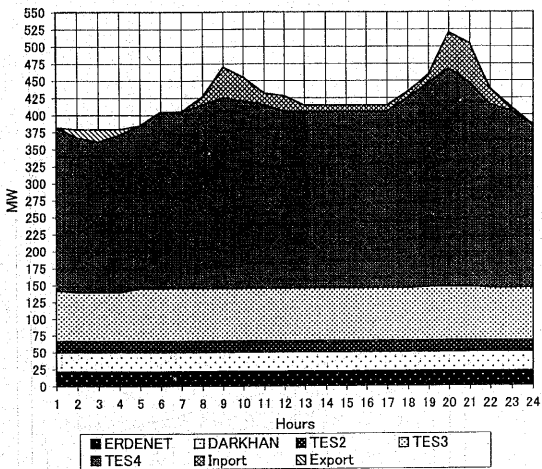
Main Specification of  
Pulverized Coal Feed System (#5-#8)

Dwg. No. MON-K-0-04

August 20 '01



Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)  
Example of Daily Load Distribution Curve during  
Lower Electric Power Demands (Summer season)



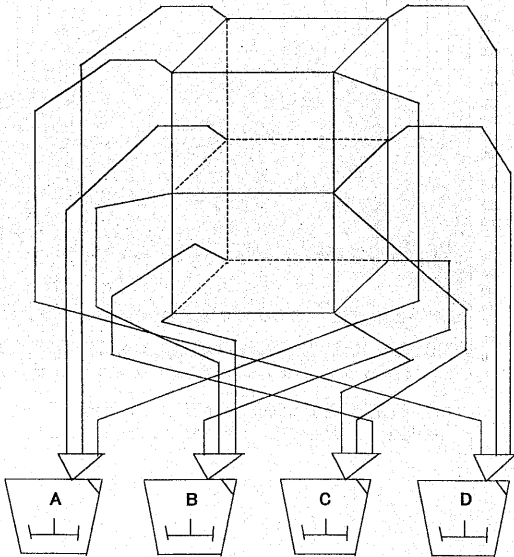
Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (PHASE - II)

Example of Daily Load Distribution Curve during  
Higher Electric Power Demands (Winter season)

Dwg. No. MON-K-0-06

August 20 '01

Furnace



Pulverizers

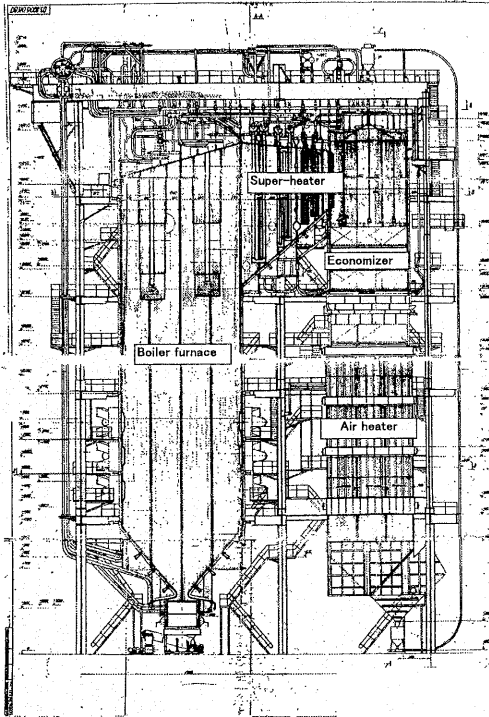
Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase - II)

Connect of Pulverized Coal Pipes  
from Pulverizers to Burners

Dwg. No. MON-K-0-07

August 20 01



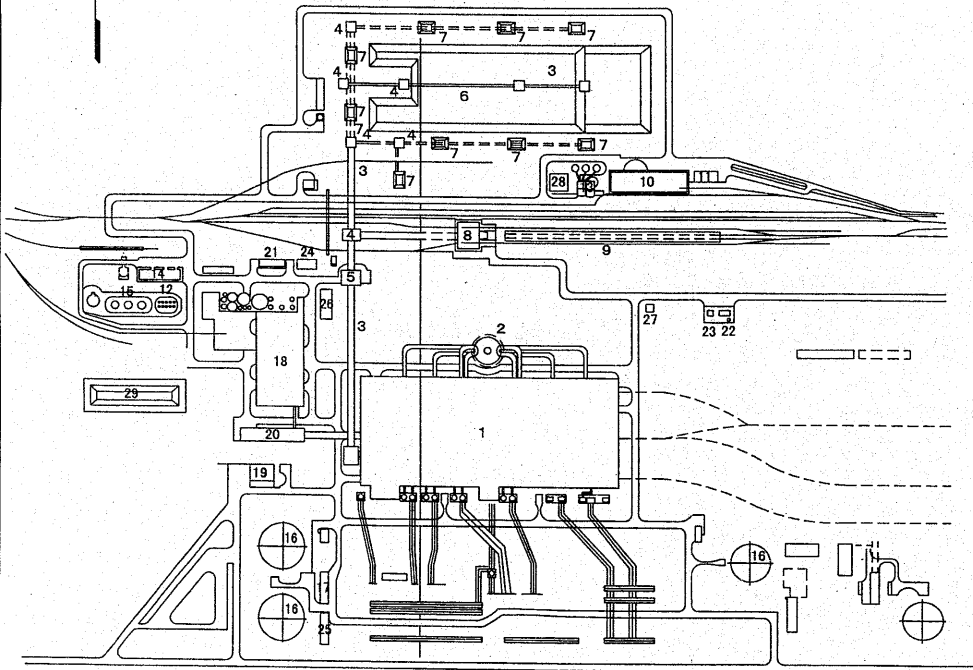
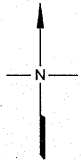


Rehabilitation Project of the 4th Power Plant  
 in ULAANBAATAR, MONGOLIA (Phase - II)

General Arrangement of Boiler

Dwg. No. MON-K-0-08

August 20 '01



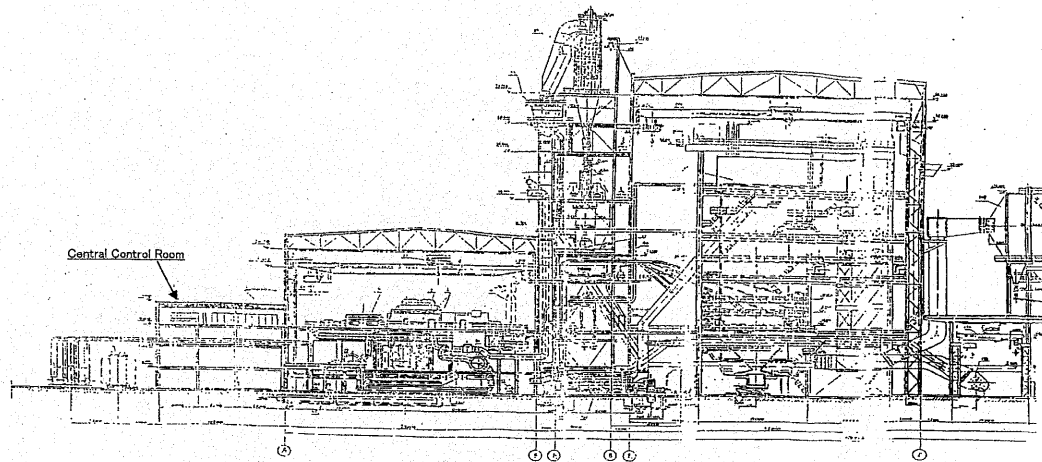
29.	Rain Water Settling Pond
28.	Coal Handling Facility Control Room
27.	Inspection Gate
26.	Ash Pound Water Treatment Facility
25.	Heating Water Distributing Room
24.	Hydrogen Oxygen and Nitrogen Receiver
23.	Carbide Storehouse
22.	Acetylene Storehouse
21.	Oxygen Storehouse
20.	Service Building-Canteen, Locker Room
19.	Engineer's Building
18.	Maintenance Building
17.	Cooling Water Pump Room
16.	Cooling Tower
15.	Heavy Oil Storage Tank
14.	Heavy Oil Pump House
13.	Wagon Inspection Facility
12.	Lubricating Oil Warehouse
11.	Bulldozer and Dust Cleaning Truck House
10.	Repair Shop
9.	Freezed Wagon Warming House
8.	Wagon Tumbling-Down
7.	Underground Coal Hopper
6.	Open Door Coal Storage Yard
5.	Crusher Room
4.	Conveyor Junction House
3.	Coal Conveyor
2.	Stack
1.	Boiler-Turbine House (Power House)
No.	Description

Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA(Phase-II)

### General Layout

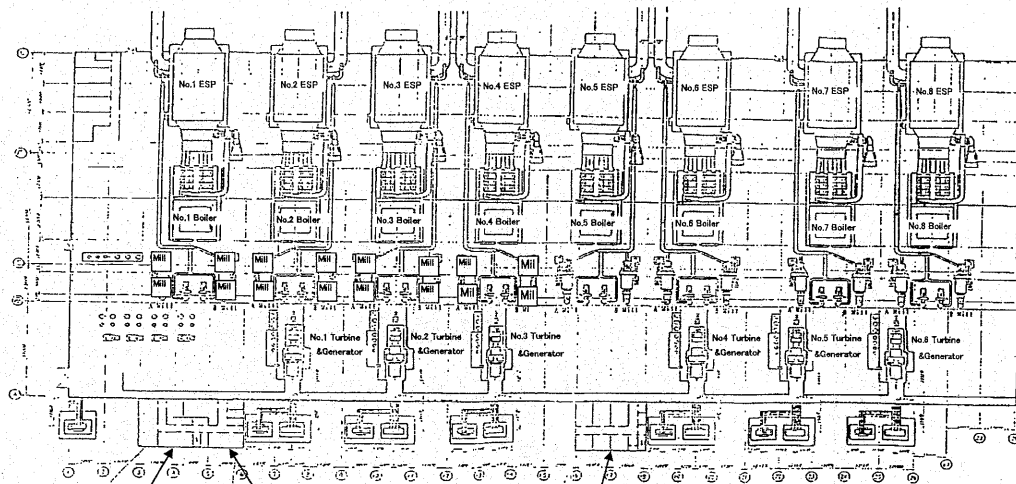
Dwg. No. MON-K-0-09

August 20 '01



- 67: Raw coal Bunker
- 73 Mill
- 54: Primary flue gas fan
- 75: Raw coal feeder
- 76: Pulverized coal feeder
- 77: Cyclone separator
- 78: Classifier

Rehabilitation Project of the 4th Power Plant in ULAANBAATAR, MONGOLIA (Phase-II)	
Boiler-Turbine House : Section	
Dwg. No. MON-K-0-10	August 20 '01



Central Control Room  
for #1~#4 boilers  
for #1~#3 turbines

Control Room  
for electric power supply

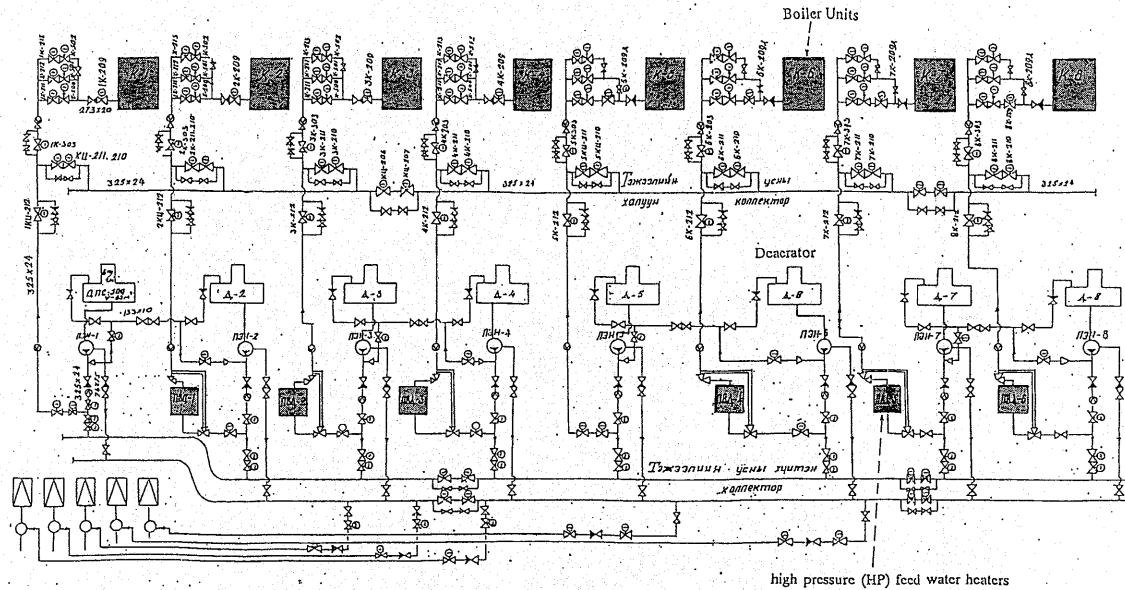
Central Control Room  
for #5~#8 boilers  
for #4~#6 turbines

Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

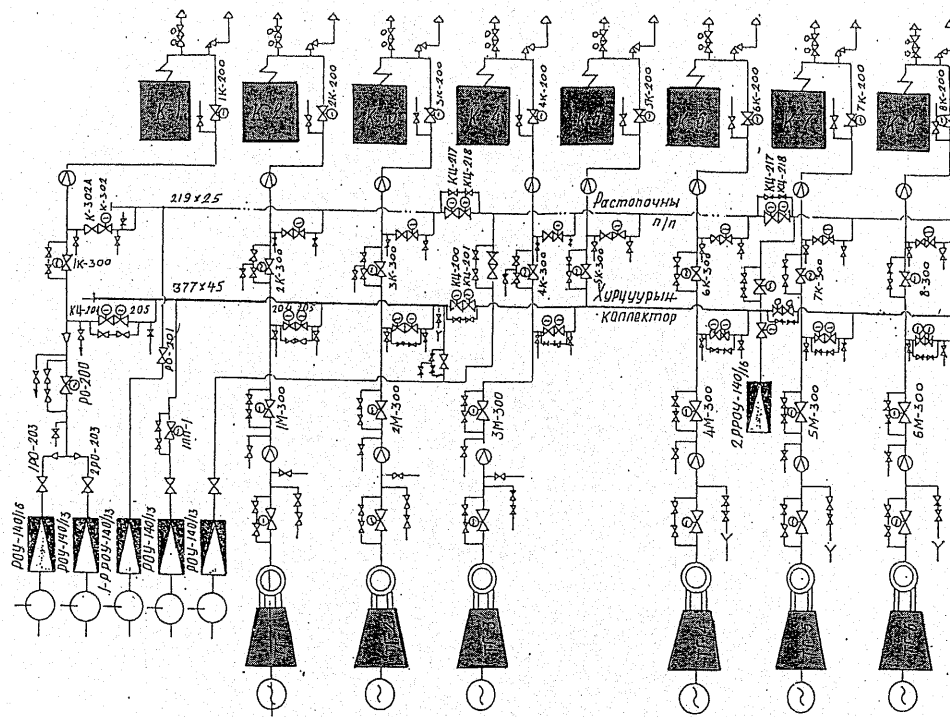
Boiler-Turbine Layout

Dwg. No. MON-K-0-11

August 20 '01

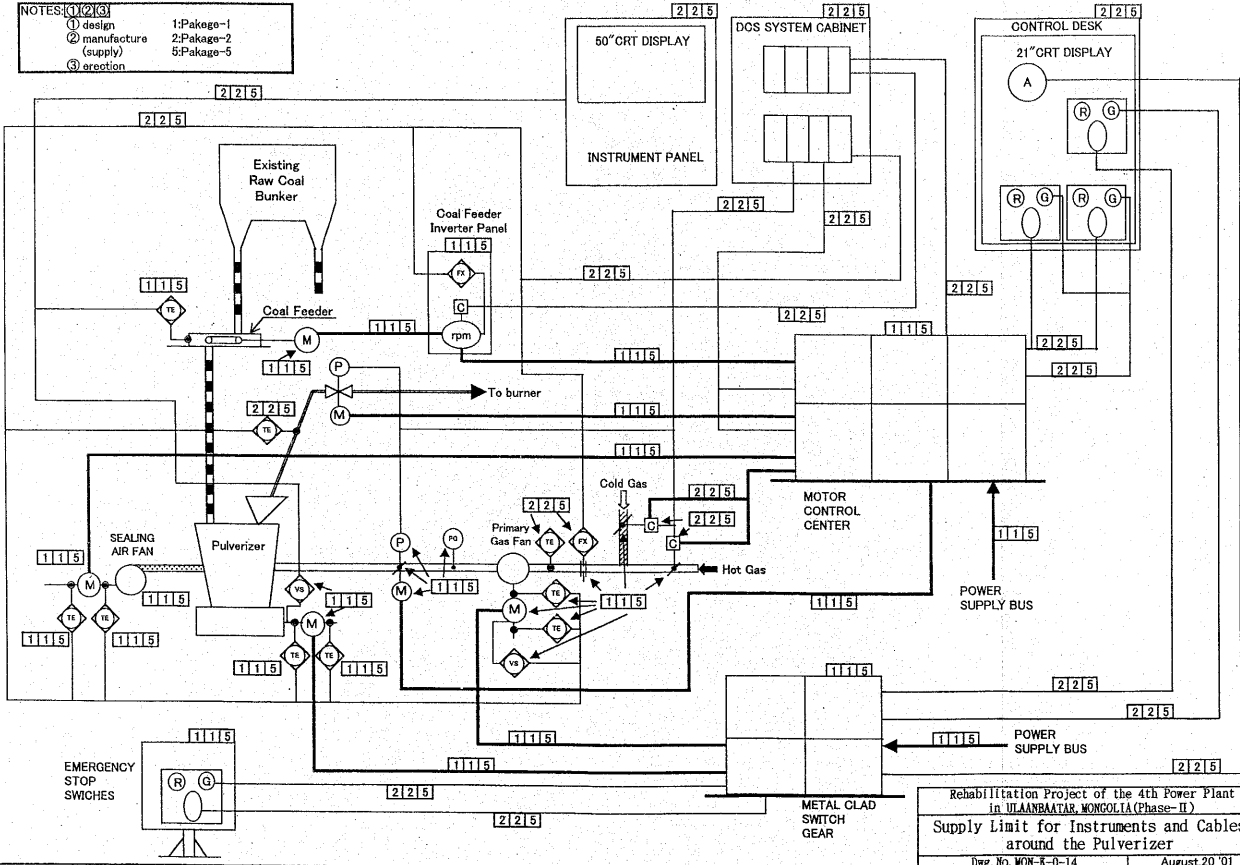


Rehabilitation Project of the 4th Power Plant in ULAANBAATAR, MONGOLIA (Phase - II)	
Main Feedwater Flow Diagram	
Dwg. No. MON-K-0-12	August 20 '01

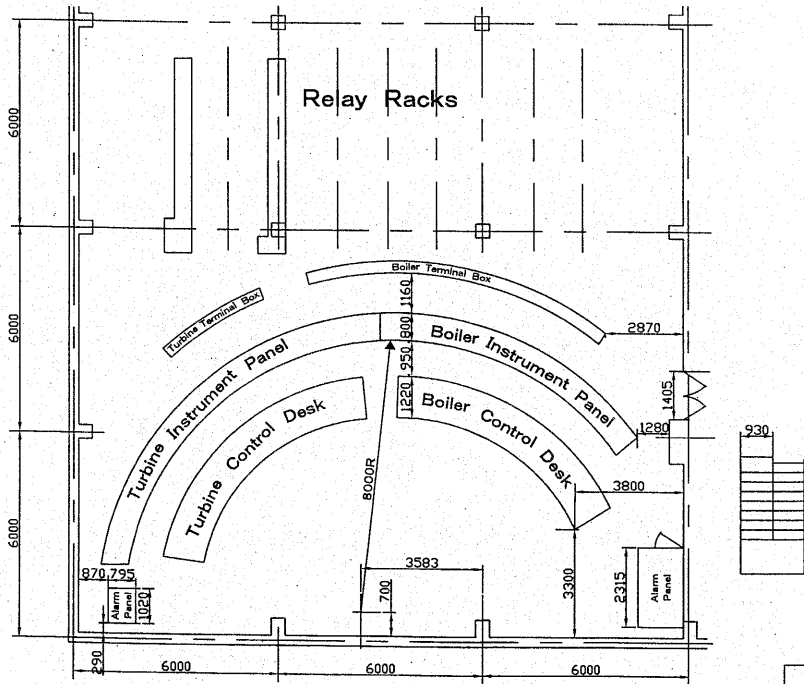


Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)  
Main Steam Flow Diagram  
Dwg. No. MON-K-0-13 August 20 '01

NOTES: 1:2|3  
 ① design 1:Package-1  
 ② manufacture 2:Package-2  
 (supply) 5:Package-5  
 ③ erection



Rehabilitation Project of the 4th Power Plant  
 in ULAANBAATAR, MONGOLIA (Phase-II)  
 Supply Limit for Instruments and Cables  
 around the Pulverizer  
 Draw. No. MON-K-0-14 August 20 '01



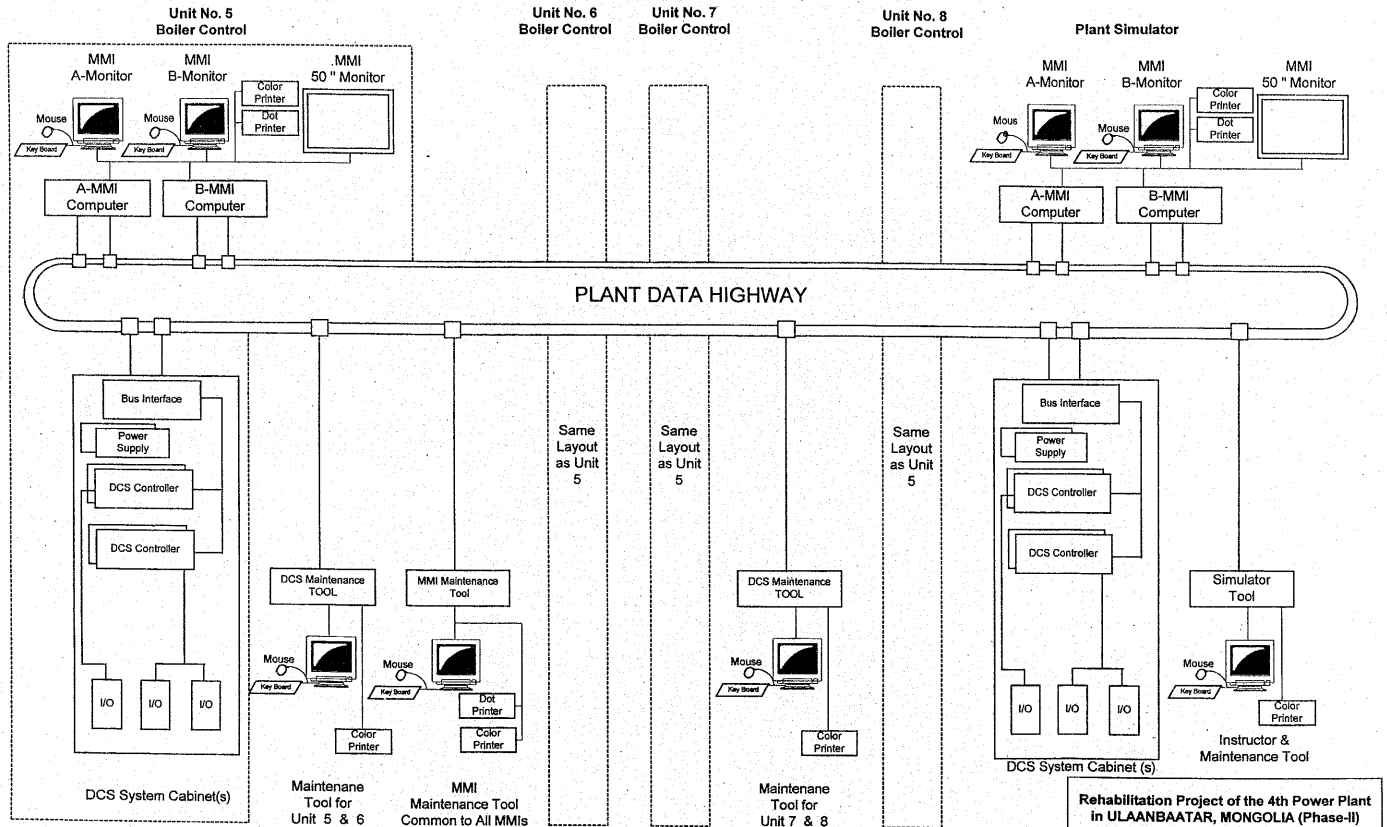
Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase - II)

Panel and Control Desk Arrangement  
in the Existing CCR

Dwg. No. MON-K-2-01 | August 20 '01





























# TYPICAL DCS SYSTEM LAYOUT FOR REFERENCE ONLY



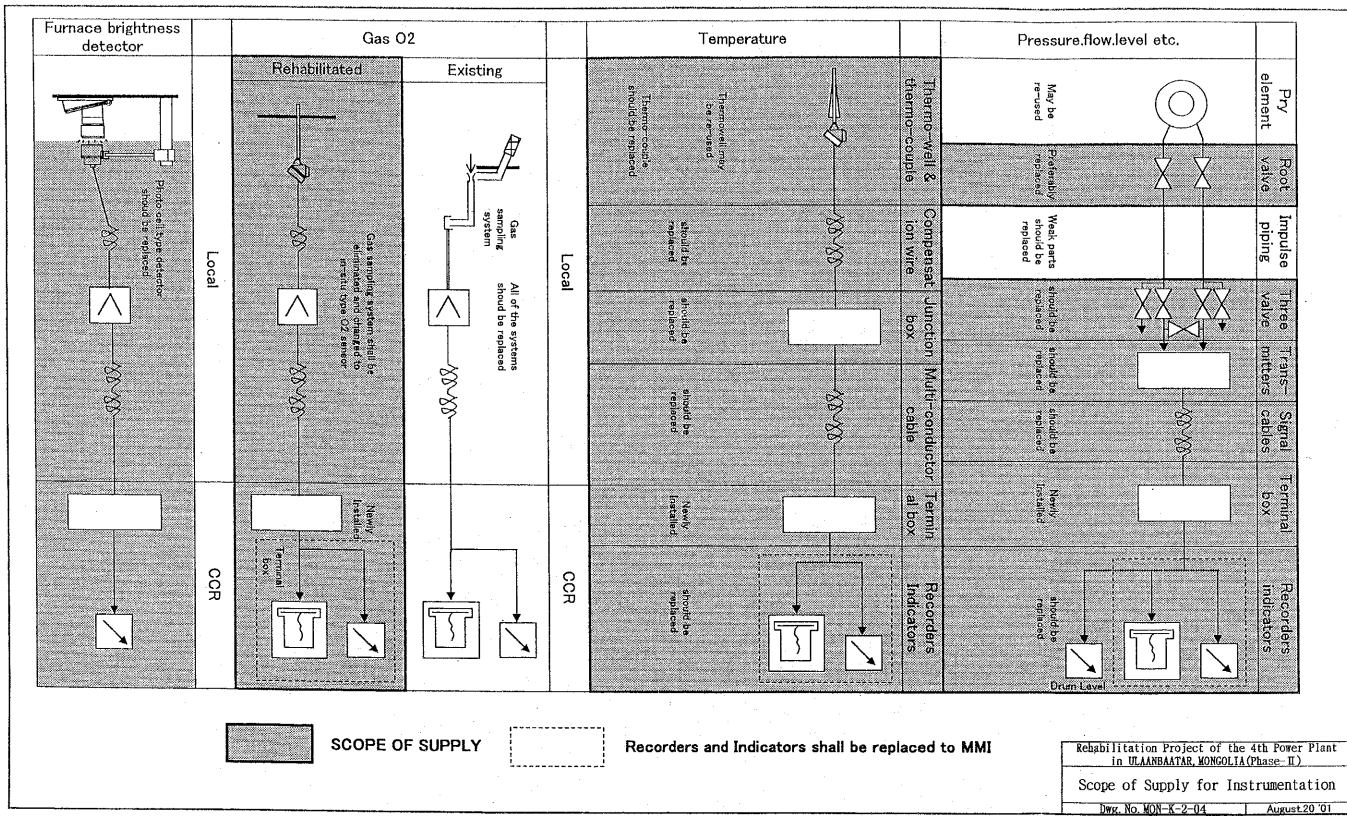
Dotted frame above shows LAYOUT of Unit No. 5 Boiler Control

<b>Rehabilitation Project of the 4th Power Plant in ULAANBAATAR, MONGOLIA (Phase-II)</b>	
<b>Typical DCS System Layout for Reference</b>	
<b>DWG. No. MON-K-2-02</b>	<b>August 20 '01</b>

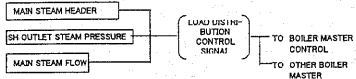
LOCAT.	LOCAL						CCR		LOCAL				
ITEM	Pry element	Root valve	Impulse piping	Three valves	Transmitters	Signal cable	Control modules	H/A station	Control cable	Contactors	Power cables	Control drives	Linkages
EXISTING	 Unknown	 Almost destroyed	 Possibly re-usable for a sound piping	 Almost destroyed	 50% destroyed, rest are just damaged	 Many cables are required at a damaged parts	 should be replaced	 A lot of H/A stations and associated dials are damaged	 Many cables are required	 Frequent maintenance and repair are needed	 Many cables are required at a damaged parts	 shortage of spare parts	 Some are bending and some are misarranged
MEASURES	May be re-used as they are	Preferably replaced	Weak parts should be replaced (especially around the transmitters)	should be replaced	should be replaced	should be replaced	should be replaced	should be replaced	should be replaced	should be replaced	should be replaced	should be replaced	should be replaced
LOCAT.	LOCAL						CCR		LOCAL				
After Rehabilitation							 Terminal box	 DOS with MMI					



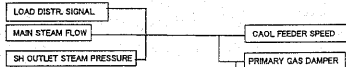
SCOPE OF SUPPLY



LOAD DISTRIBUTION CONTROL



BOILER MASTER CONTROL



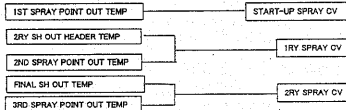
AIR FLOW CONTROL



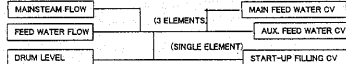
FURNACE DRAFT



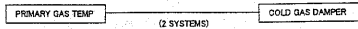
STEAM TEMPERATURE CONTROL



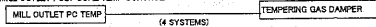
DRUM LEVEL CONTROL



PRIMARY GAS (MILL DRYING GAS) TEMP CONTROL



MILL OUTLET PULV COAL TEMP CONTROL

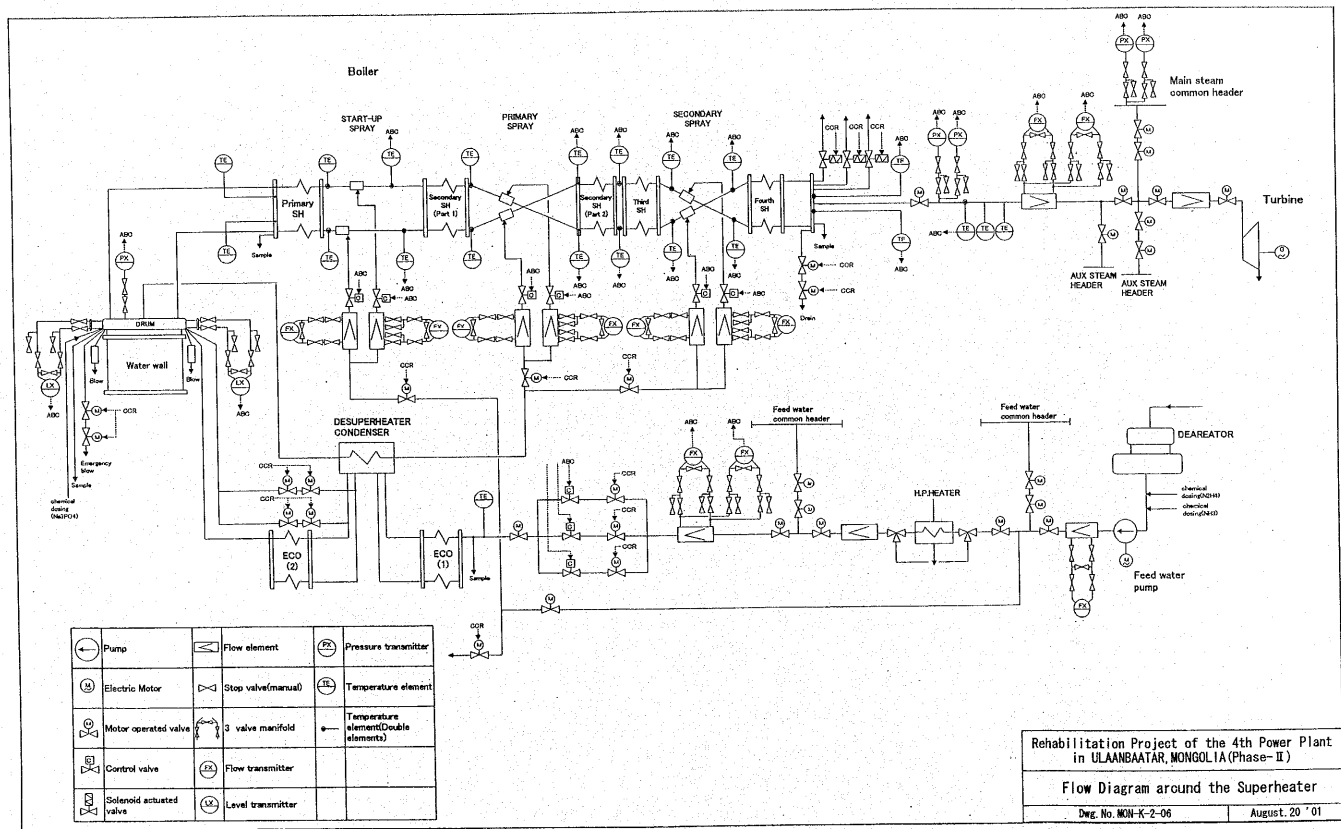


Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

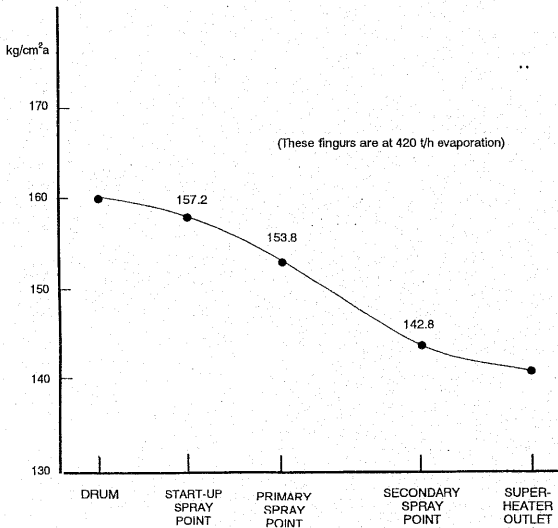
Vital I/O Points for the  
Boiler Modulating Control

Dwg. No. MOR-K-2-05

August 20 '01



**Rehabilitation Project of the 4th Power Plant**  
**in ULAANBAATAR, MONGOLIA (Phase-II)**  
**Flow Diagram around the Superheater**  
 Dwg. No. MW-K-2-06      August 20 '01

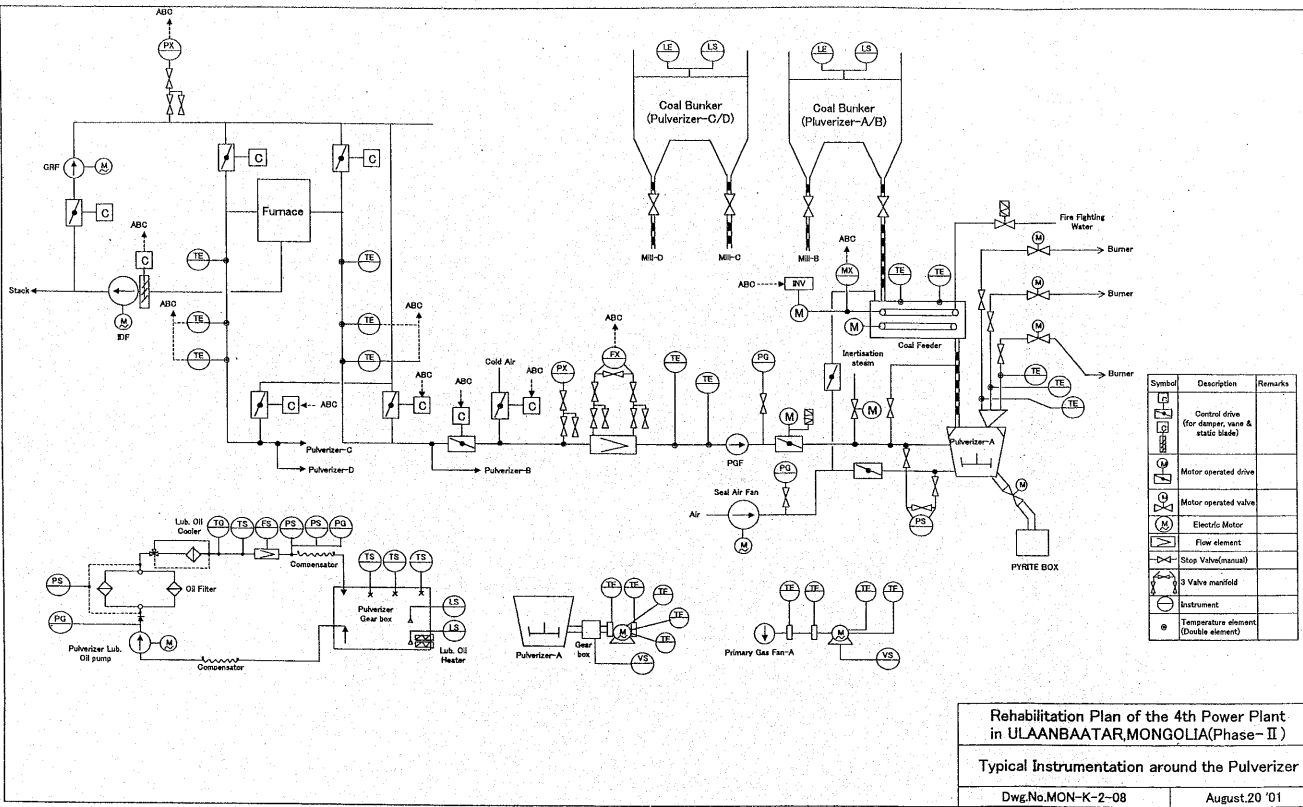


Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

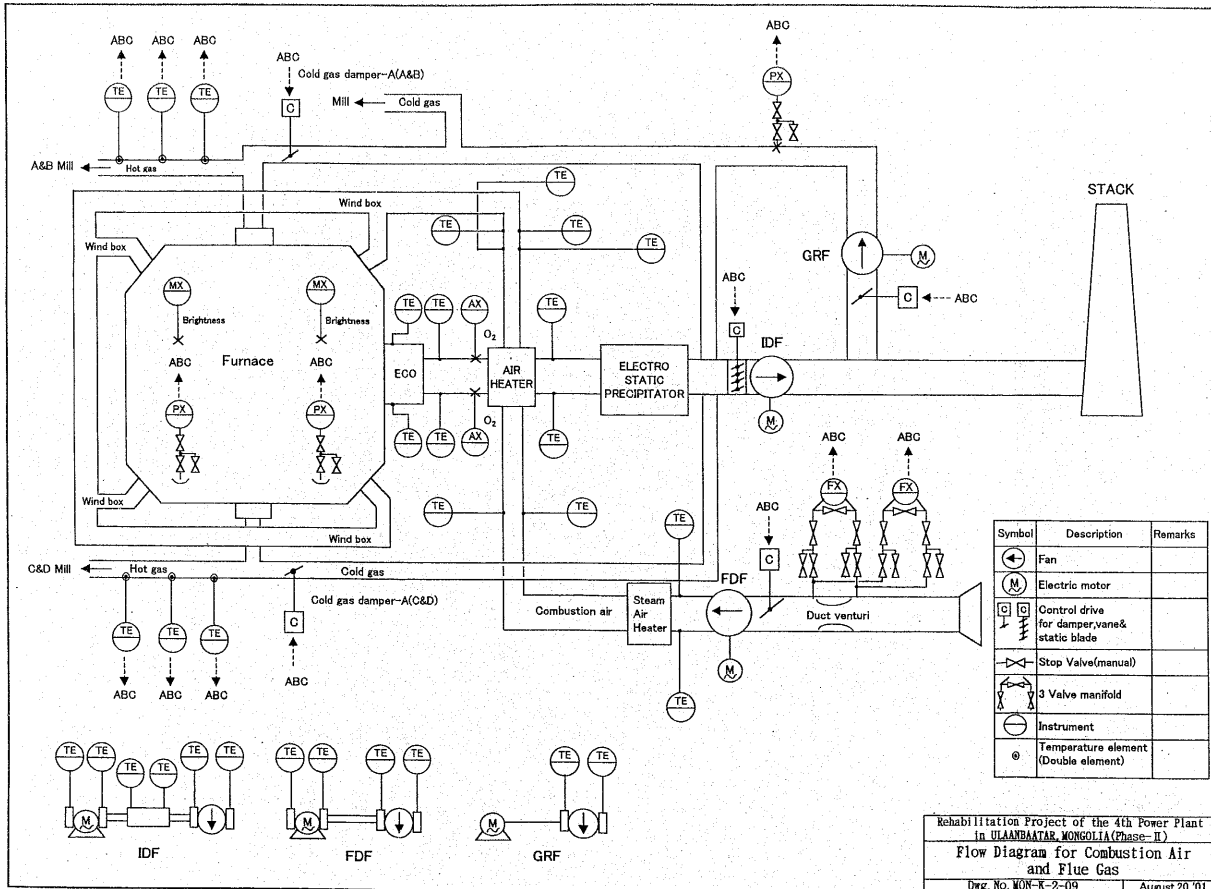
Pressure Drop of Steam  
in the Superheater

Dwg. No. MON-K-2-07

August, 20 '01

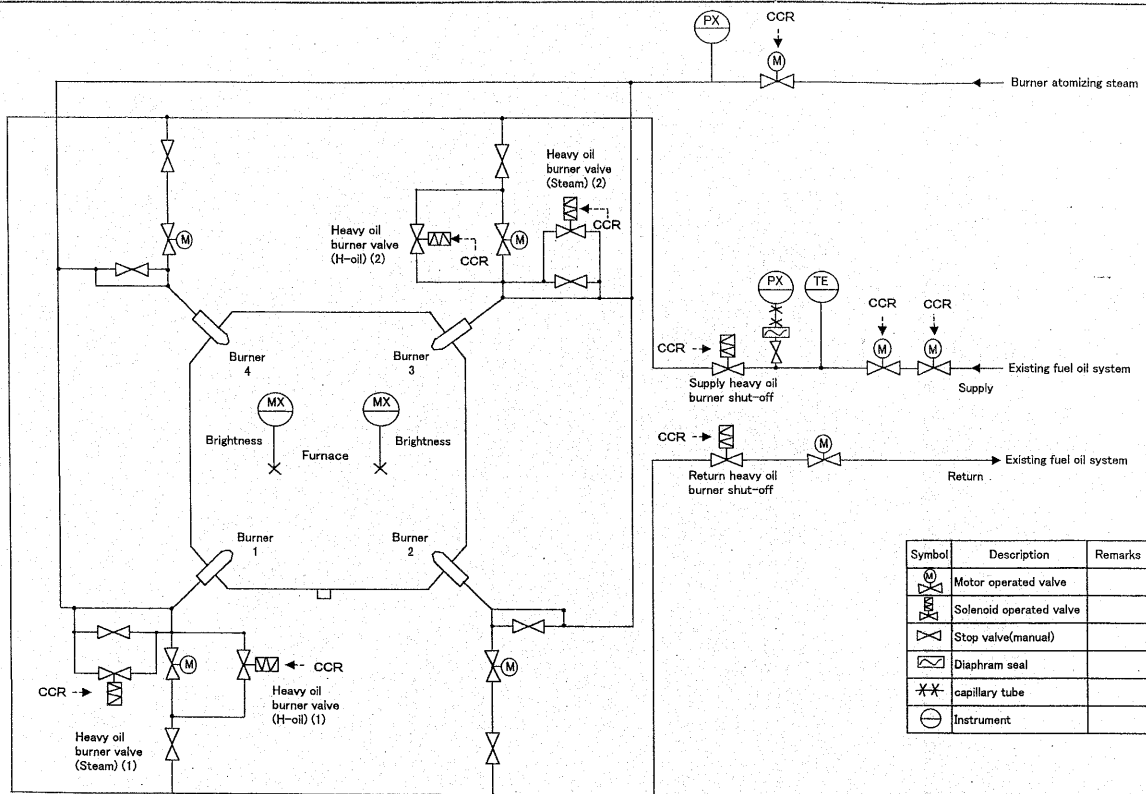


Symbol	Description	Remarks
	Control drive (for damper, valve & static blade)	
	Motor operated drive	
	Motor operated valve	
	Electric Motor	
	Flow element	
	Step Valve (Manual)	
	3 Valve manifold	
	Instrument	
	Temperature element (Double element)	



Rehabilitation Project of the 4th Power Plant  
 in ULAANBAATAR, MONGOLIA (Phase-II)  
**Flow Diagram for Combustion Air  
 and Flue Gas**  
 Dwg. No. MON-K-2-09 August 20 '01

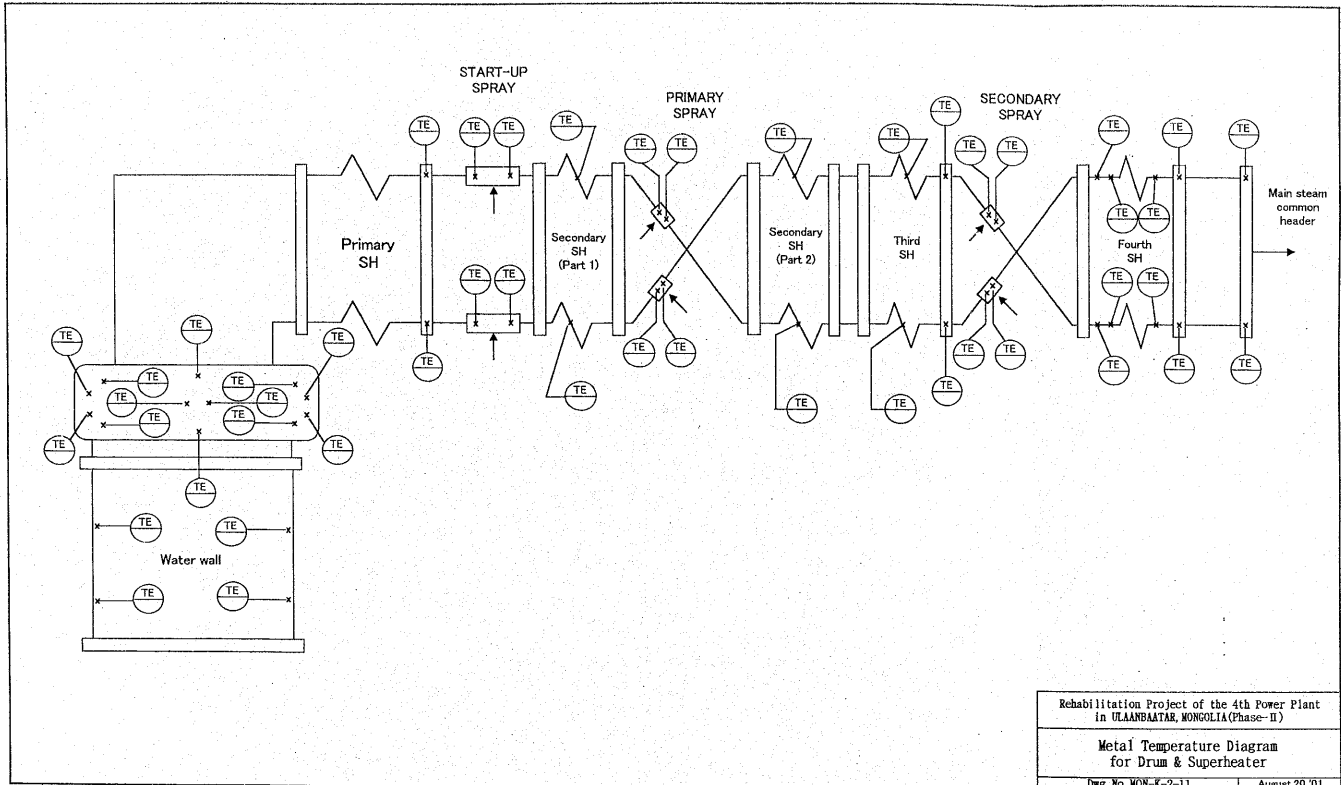




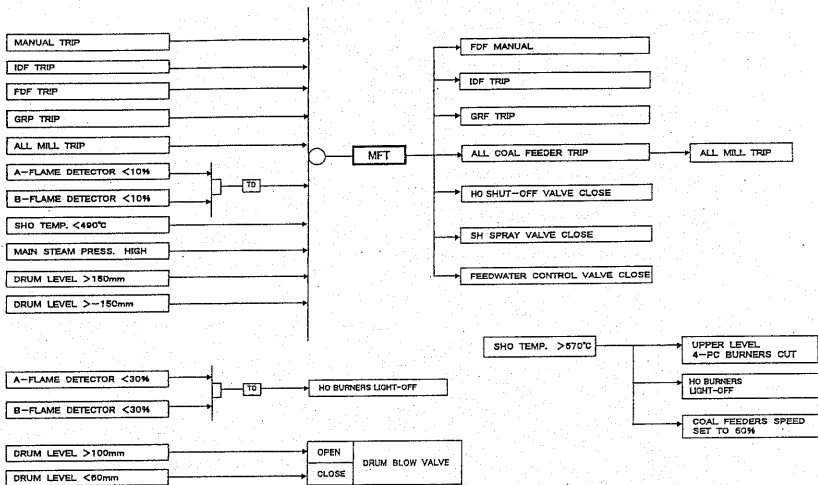
↑  
FRONT

Symbol	Description	Remarks
	Motor operated valve	
	Solenoid operated valve	
	Stop valve (manual)	
	Diaphragm seal	
	capillary tube	
	Instrument	

Rehabilitation Project of the 4th Power Plant  
in ULANBAATAR (Phase- II)  
Flow Diagram for Fuel Oil System  
Dwg. No. MON-K-2-10 August 20 '01



Rehabilitation Project of the 4th Power Plant in ULAANBAATAR, MONGOLIA (Phase-II)	
Metal Temperature Diagram for Drum & Superheater	
Draw. No. MON-K-2-11	August 20 '01

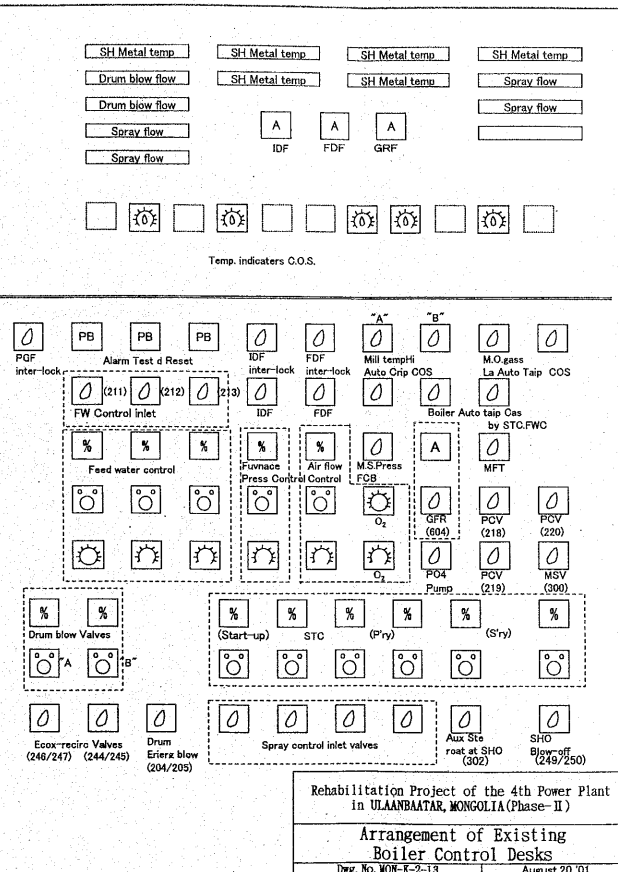
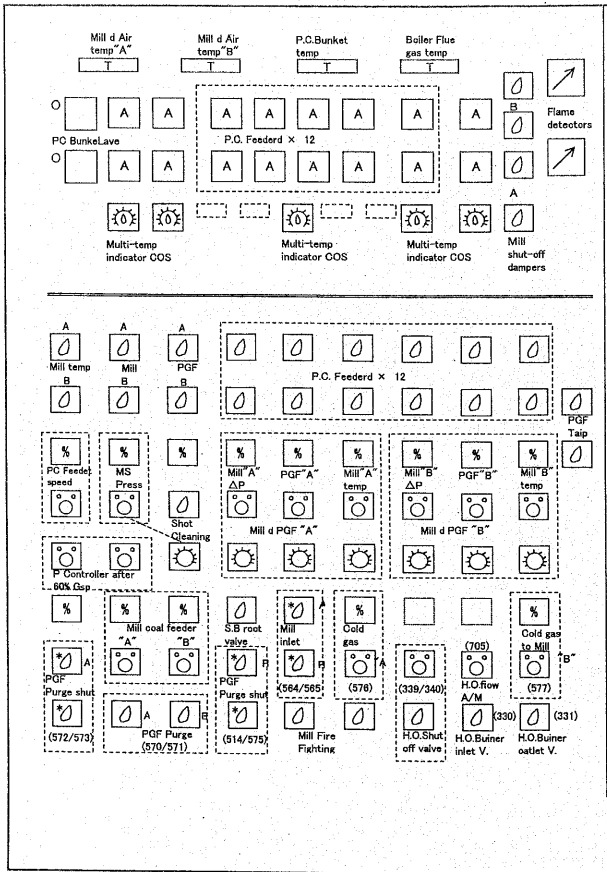


Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

Boiler Plant Inter-Lock Diagram

Dwg. No. MON-X-2-12

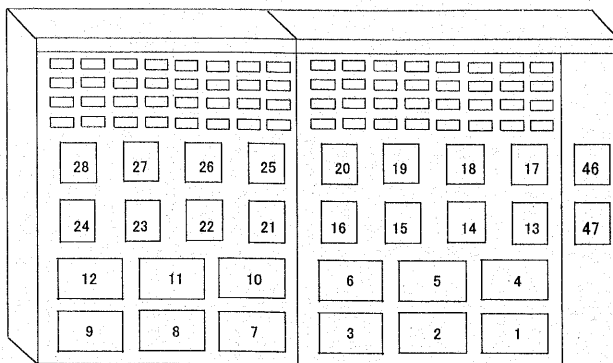
August 20 '01



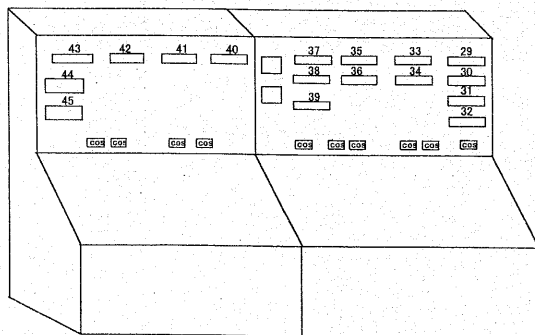
Rehabilitation Project of the 4th Power Plant  
 in ULAANBAATAR, MONGOLIA (Phase-II)

Arrangement of Existing  
 Boiler Control Desks

Dep. No. MOK-K-2-13 August 20 '01



INSTRUNET PANEL



No	Inst.No.	Rori	Measuring Items
1	k-n 125	R	Main steam flow
2	k-n 126	R	Feed water flow
3	k-n 27	R	Mill (A) outlet PC temp
4	k-n 3	R	SHO steam temp
5	k-n 46	R	SHO steam press
6	k-n 145	R	Drum level
7	k-n 26	R	Mill (B) outlet PC temp
8	k-n 33	R	Bearing temp
9	k-n 31	R	Bearing temp
10	k-n 30	R	Bearing temp
11	k-n 161	R	Gas O <sub>2</sub>
12	k-n 160	R	Gas O <sub>2</sub>
13	k-n 47	I	Drum press
14	k-n 86 b	I	Mill (A) diff. Press.
15	k-n 83 b	I	PGF (A) outlet draft
16	k-n 108 b	I	PGF (A) inlet warm-up gas draft
17	k-n 2	I	SHO steam temp
18	k-n 1	I	SHO steam temp
19	k-n 147	I	Drum level
20	k-n 146	I	Drum level
21	k-n 86 a	I	Mill (B) diff. Press.
22	k-n 83 a	I	PGF (B) outlet draft
23	k-n 108 a	I	PGF (B) inlet warm-up gas draft
24	k-n 137	I	Air flow
25	k-n 136	I	PGF (A/B) suction PC flow
26	k-n 88	I	Mill (A/B) inlet gas draft
27	k-n 80	I	Furnace draft
28	k-n 79	I	Furnace draft
29	k-n 130	I	SH Primary spray flow (A)
30	k-n 131	I	SH Primary spray flow (B)
31	k-n 132	I	SH Secondary spray flow (A)
32	k-n 133	I	SH Secondary spray flow (B)
33	k-n 6	I	SH link pipe temp.
34	k-n 12	I	Metal temp
35	k-n 10	I	SH header temp.
36	k-n 11	I	SH spray point outlet steam temp.
37	k-n 5	I	SH link pipe temp.
38	k-n 127	I	Continuous blow flow (A)
39	k-n 128	I	Continuous blow flow (B)
40	k-n 23	I	Econ outlet gas temp. (A/B)
41	k-n 24	I	PC fuel pipe temp. AH outlet gas temp.
42	k-n 28	I	Mill (A/B) outlet PC temp.
43	k-n 25	I	Mill inlet gas temp. AH inlet gas temp.
44	-	I	PC bin level
45	-	I	PC bin level
46	k-n 45 a	I	Mill (A) temp.
47	k-n 45 b	I	Mill (B) temp.

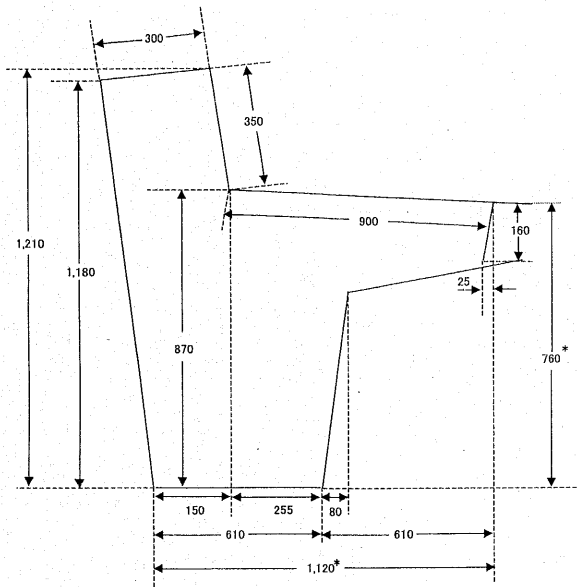
Inst. No. : Instrument numbers now using in the power station  
 R or I : R means recorder and Means indicator  
 (There are another multi-point recorders for boiler metal temp.  
 record installed on the relay rack behind the instrument panel.)

Rehabilitation Project of the 4th Power Plant  
 in ULAANBAATAR, MONGOLIA (Phase-II)

### Arrangement of Existing Boiler Instrument Panels

Desig. No. MON-K-2-14

August 20 '01



Note: Dimensions with asterisk(\*) shall be kept for new desks.

Rehabilitation Project of the 4th Power Plant  
in ULAANBAATAR, MONGOLIA (Phase-II)

Sectional Dimension of Control Desk

Dwg. No. MON-K-2-15

August 20 '01