Write up- Limestone Storage Silo

Purpose: This write up describes the following equipment and defines the associated control system.

Equipment List:

S. No.	Description	Item No.	Qty
1.	Limestone storage silo	00 HTJ 00 BB 001/002	1w+1s
2.	Limestone storage silo Shut –Off gate	00 HTM 00 AP 001/002	1w+1s
3.	Gravimetric feeder	00 HTM 00 AT 001/002	1w+1s

Operation Write Up:

The limestone is conveyed from the limestone storage silo by using the gravimetric feeder. The limestone flow from silo to gravimetric feeder is controlled by Shut off gate (1 Motorized & 1 Manual). The limestone feeding amount from gravimetric feeder to Wet ball mill is controlled at gravimetric feeder.

Control Write Up:

Interlocks is provided by level in limestone storage silo. Low Level* & High level* switches are provided.

Low level switch:

When the level in silo reaches the low level*, signal is sent to disengage the ball mill clutch, there by stopping ball mill motor**.**

High level switch:

When the level in silo reaches high level*, signal is sent to limestone feed and stops further limestone feed flow.

Level Transmitter:

Provides alarm in DCS when the preset level is reached.

Lime stone slurry storage Tank Level:

When the lime stone slurry storage tank level reaches high level, stop signal is sent to ball mill motor and Gravimetric feeder.

* These details are indicated in the P&ID.

Write up on Limestone grinding system

Purpose: This write up describes the equipment associated with Limestone pulverize and wet ball mill system and defines the associated control system.

Equipment List:

S. No.	Description	Item No.	Qty
1.	Wet Ball Mill	00 HTK 00 AJ 001/002	1W+1S
2.	Mill Hydro cyclone	00 HTK 00 AT 001/002	1W+1S
3.	Mill separator tank	00 HTK 01 BB 001/002	1W+1S
4.	Mill separator tank agitator	00 HTK 00 AM 001/002	1W+1S
5.	Mill circuit Pump	00 HTK 02 AP 001/002	1W+1S

Operation Write Up:

Limestone is sent to Wet Ball Mill through Limestone Intermediate Silo Shut-off Gate, Dosing Bin, Belt Weigh Feeder, Belt Feeder and Crusher. The Limestone Grinding System consists of Wet Ball Mills, Wet Ball Mill oil units, Wet Mill Receiver Tanks, Limestone Suspension Pumps, Mill Hydro cyclones and Distribution boxes.

The Belt Weigh Feeder is installed at Dosing Bin bottom which feeds limestone to the Wet Ball Mill. The limestone feed rate is weighed by the Belt Weigh Feeder. The Wet Ball Mills are the wet horizontal type. Process water is supplied to Wet Ball Mill inlet and Mill separator Tank. Slurry from the Wet Ball Mill flows by gravity to Mill separator Tank and then is pumped up to Mill Hydro cyclone to be classified.

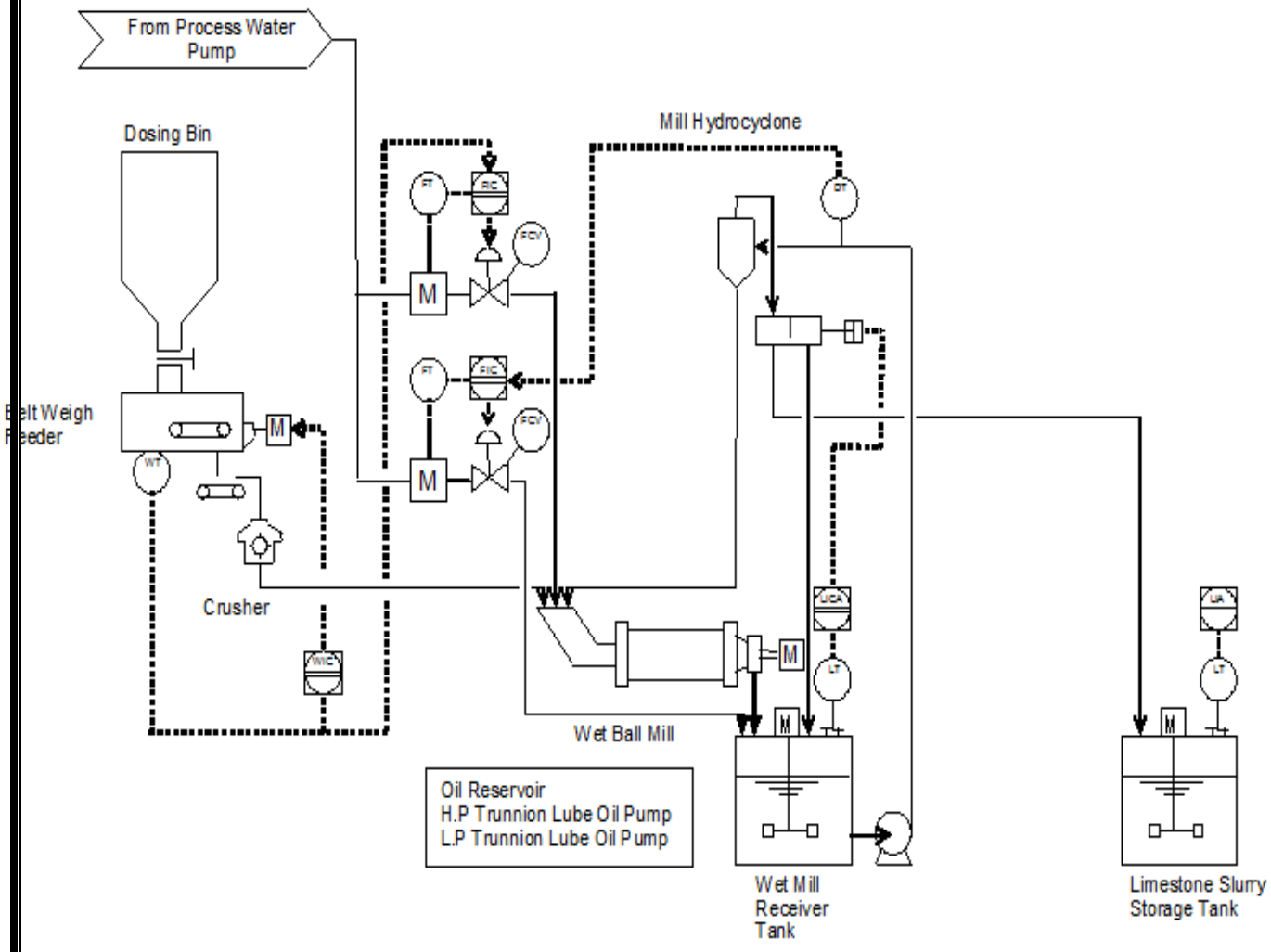
The Mill Hydro cyclone underflow, which contains the oversized Limestone, is recirculated to Wet Ball Mill inlet directly, while the overflow is discharged to Limestone Slurry Storage Tank via Distribution Box as a product of Limestone Grinding System. The limestone slurry is pumped from the Limestone Slurry Storage Tank through a ring line and fed to the absorber tank.

Control:

Limestone Feed rate is kept constant by belt weigh feeder. The limestone which is conveyed from the Dosing Bin by using the belt weigh feeder and the process water are supplied into a limestone ball mill system.The flow rate of process water to wet limestone grinding mill is controlled by Limestone feeding amount at belt weigh feeder. The flow rate of process water to wet mill receiver tank is controlled by density signal from mill hydro cyclone feed slurry.

The slurry in wet mill separator tank is fed up to the mill hydro cyclone and separated into small particle slurry and large particle slurry. The underflow slurry (large particle size limestone) is returned to wet ball mill inlet. The overflow slurry of mill hydro cyclone (small particle size limestone) is sent to the limestone slurry storage tank. The mill separator tank level is controlled by the position of the limestone slurry distribution box. If the wet mill receiver tank level is control low, the overflow slurry of mill hydro cyclone is returned to the Mill separator Tank by recirculation position of the limestone slurry distribution box. And if Mill separator Tank level is control high, the overflow slurry of mill hydro cyclone is send to the limestone slurry storage tank discharge position of the limestone slurry distribution box.

Fig.- Limestone Grinding System Control



WRITEUP ON LIMESTONE SLURRY TANK & PUMPS

Purpose:

This write up describes the Limestone Slurry Feed System and defines the associated control system.

Equipment List:

S.No	Description	Item No.	Qty
1.	Limestone Slurry Feed Pump A/B (including both the tanks)	00 HTK 03 AP 001/002	2 Nos
2.	Limestone Slurry Storage Tank A/B	00 HTK 02 BB 001/002	2 Nos
3.	Limestone Slurry Storage tank Agitator A/B	00 HTK 01 AM 001/002	2 Nos

Operation Write Up:

Slurry from the Wet Ball Mill flows by gravity to Wet Mill Receiver Tank and then is pumped up to the Mill Hydro cyclone to be classified.

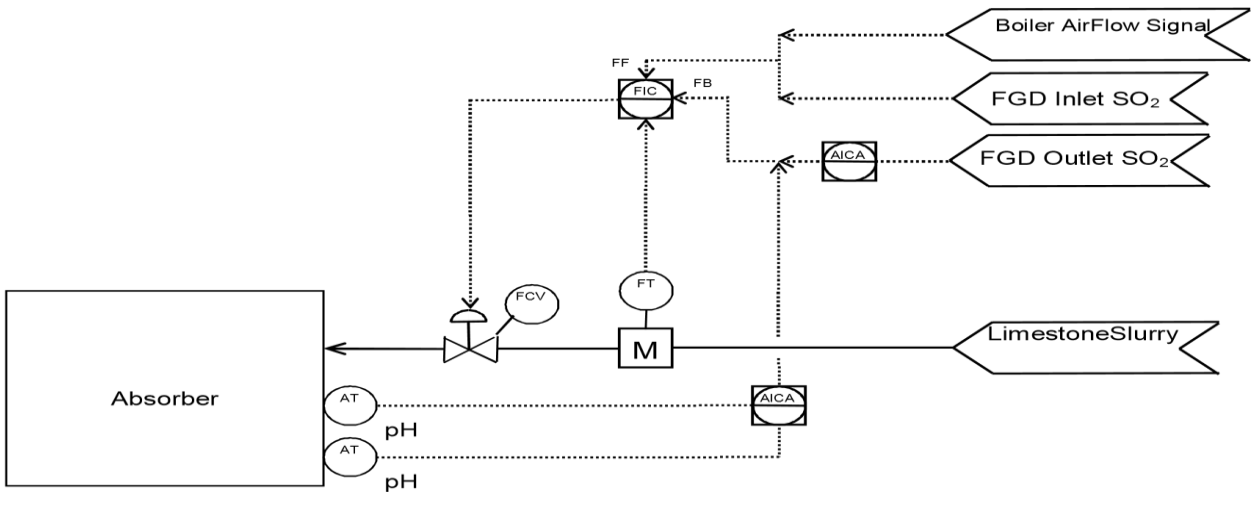
The Mill Hydro cyclone underflow which contains the oversized Limestone is recirculated to Wet Ball Mill Inlet directly, while the overflow is discharged to Limestone Slurry Storage Tank via Distribution Box as a product of Limestone Grinding System.

The limestone slurry is pumped from the Limestone Slurry storage tank and fed to the Absorber tank.

Control Write Up:

Limestone slurry flow rate to absorber is controlled to keep the stable desulfurization efficiency.

The limestone slurry flow rate is estimated corresponding to the boiler air flow and FGD plant inlet SO_2 concentration as a feed-forward signal, and then is adjusted by FGD outlet SO_2 concentration or the absorber tank pH as a feed-back signal. **Absorbent Feed Control**



THIRD ANGLE PROJECTION | No. REQ'D | A3 | DRAWING No.

LINE SYMBOLS

SYMBOLS	NAME
	PIPE LINE
	CAPILLARY TUBING
	ELECTRIC SIGNAL
	SOFTWARE LINK
	PRESSURE LEAD
	DUCT

PIPING VALVE SYMBOLS

SYMBOLS	NAME
	GATE VALVE (NOR.CLOSED)
	GLOBE VALVE (NOR.CLOSED)
	BALL VALVE (NOR.CLOSED)
	BUTTERFLY VALVE (NOR.CLOSED)
	DIAPHRAGM VALVE (NOR.CLOSED)
	PINCH VALVE (NOR.CLOSED)
	NEEDLE VALVE (NOR.CLOSED)
	CHECK VALVE
	CHECK VALVE (WAFER)
	PRESSURE RELIEF VALVE

INSTRUMENT VALVE SYMBOLS

SYMBOLS	NAME
	ACTUATED BY AIR
M	ACTUATED BY MOTOR
	AIR CONTROL VALVE
S	SOLENOID ACTUATOR
	SELF REGURATING VALVE
	SELF REGURATING VALVE

TRENCH SYMBOLS

SYMBOLS	NAME
A	TO ABSORBER AREA DRAIN SUMP
D	TO GYPSUM AREA DRAIN SUMP
L	TO LIMESTONE AREA DRAIN SUMP

SYMBOLS FOR PIPING PARTS & INSTRUMENT PARTS

SYMBOLS	NAME
T	STEAM TRAP
AT	AIR TRAP
	Y-STRAINER
	T-STRAINER
TS	TEMPORARY STRAINER
	REDUCER
	EXPANSION JOINT
	DUCT EXPANSION JOINT
	FLEXIBLE HOSE
	SPOOL PIECE
	VENT
	HOSE CONNECTION
	BLIND FLANGE
	REDUCING FLANGE
	CAP (BW)
	CAP (SCR)
	TRENCH
SG	SIGHT GLASS
	SILENCER
	ORIFICE
	DIAPHRAGM
M	MAGNETIC FLOW METER
	VORTEX FLOW METER
	PH METER
	FILTER
M.H. M.H. M.H.	MANHOLE
	PITOT TUBE
	SAMPLING POT
S	SAMPLING NOZZLE
FI	ROTOMETER TYPE FLOW METER

SYMBOLS FOR VALVE OPERATION

SYMBOLS	NAME
FO	FAILURE OPEN (THE VALVE OPENS WHEN AIR OR ELECTRICITY FOR ACTUATOR FAILS.)
FC	FAILURE CLOSE (THE VALVE CLOSES WHEN AIR OR ELECTRICITY FOR ACTUATOR FAILS.)

INSULATION SYMBOLS

SYMBOLS	DESCRIPTION
H10	THERMAL INSULATION (100°C & LOWER)
H15	THERMAL INSULATION (101°C ~ 150°C)
H20	THERMAL INSULATION (151°C ~ 200°C)
H25	THERMAL INSULATION (201°C ~ 250°C)
H30	THERMAL INSULATION (251°C ~ 300°C)
H35	THERMAL INSULATION (301°C ~ 350°C)
HF	INSULATION FOR ANTI FREEZING
ET	ELECTRIC TRACE
ST	STEAM TRACE (LOW PRESSURE STEAM)
P10	PERSONAL PROTECTION (100°C & LOWER)
P15	PERSONAL PROTECTION (101°C ~ 150°C)
P20	PERSONAL PROTECTION (151°C ~ 200°C)
P25	PERSONAL PROTECTION (201°C ~ 250°C)
P30	PERSONAL PROTECTION (251°C ~ 300°C)
P35	PERSONAL PROTECTION (350°C ~ 400°C)

DELIVERY LIMITS

SYMBOLS	NAME
	BETWEEN NTPC AND CONTRACTOR
CONTRACTOR | XXX	BETWEEN SUB CONTRACTOR AND VENDOR

SYSTEM

NUMBER	NAME
1	FLUE GAS SYSTEM
2	SO_2 ABSORPTION OXIDATION SYSTEM
3	REHEATING SYSTEM
4	GYPSUM DEWATERING HANDLING SYSTEM
5	LIMESTONE PREPARATION SYSTEM
6	BLANK
7	SUMP SYSTEM
8	UTILITY SYSTEM

FLUID NAME

FLUID SYMBOL	FLUID NAME	FLUID SYMBOL	FLUID NAME
AC	COMPRESSED AIR	WCS	COOLING WATER SUPPLY
AF	FLUIDIZER AIR	WCR	COOLING WATER RETURN
AI	INSTRUMENT AIR	WD	DRINKING WATER
AO	OXIDATION AIR		
AS	SEAL AIR	WP	PROCESS WATER
DD	DUCT DRAIN	WR	RAW WATER
FS	FILTRATE SLURRY	WC	Ca(OH)2 WATER
GS	GYPSUM SLURRY	WW	WASTE WATER
LS	LIMESTONE SLURRY	VG	VACUUM PUMP VENT
		VBG	BELT FILTER VENT GAS
		LD	LIME/LIMESTONE DEDUSTING
		LOL	LUBE OIL (LOW PRESSURE)
		LOH	LUBE OIL (HIGH PRESSURE)
		CW	CLARIFIED WATER

SERVICE CLASS

SERVICE CLASS	MATERIAL	FLUID SYMBOL
AA40	IIR RUBBER LINED PIPING	LS, WP, WC
AA60	IIR RUBBER LINED PIPING	GS,FS,WW,DD
BA01	Gr.304 STAINLESS STEEL PIPING	AI, LOL
BA02	Gr.304 STAINLESS STEEL PIPING	LOH
BA03	Gr.316L STAINLESS STEEL PIPING	WP, AO
CA01	CARBON STEEL GENERAL PIPING	AS,AO,AC,AF,LD
CC01	CARBON STEEL PRESSURE PIPING	WP,WR,WCS,WCR, VG, AA, CW

UNIT CODE

SYMBOLS	UNIT IDENTIFICATION
00	COMMON
10	UNIT-1 FGD SYSTEM AND AUXILIARIES
20	UNIT-2 FGD SYSTEM AND AUXILIARIES

EXPRESSION OF PIPING LINE

10 - 200 - GS - 2 00 1 - AA60 - HF

- 10 — UNIT CODE
- 200 — NOMINAL PIPE SIZE (mm)
- GS — FLUID SYMBOL
- 2 — SYSTEM
- 00 — SERIAL NUMBER
- 1 — SUFFIX NUMBER
- AA60 — PIPING SERVICE CLASS
- HF — INSULATION CLASS

CONFIDENTIAL & PROPRIETARY INFORMATION

CUSTOMER NOS: G211 & G212

CUSTOMER: NTPC LIMITED.
PROJECT: BHILAI (2X250MW)
FGD SYSTEM PACKAGE

	DEPT CODE		NAME (BHEL)	DATE
BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET:632 406.	M	DRN	VIDYA V	02.04.20
		CHD	KABILASH K	02.04.20
		APPD	P.NAVEEN	02.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LEGENDS AND NOTES

SCALE : NTS

NTPC DRG NO: ----

SH 01 of 02

FILE NO B240 – 00100

REV NO 00

THIRD ANGLE PROJECTION	No. REQ'D

A3

DRAWING No.

INSTRUMENT ABBREVIATION

	FIRST–LETTER		SUCCEEDING–LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		BLANK	BLANK	BLANK
C	BLANK			CONTROL	
D	BLANK	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	BLANK		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	BLANK	MOMENTARY			MIDDLE, INTERMEDIATE
N	BLANK		BLANK	BLANK	BLANK
O	BLANK		ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT(TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

INSTRUMENT SYMBOLS

SYMBOLS	NAME
	FIELD MOUNTED
	FOR CONTROL ROOM
	FOR LOCAL CONTROL PANEL
	FOR DCS
	INTERLOCK LOGIC

PNEUMATIC VALVE ACTUATOR

CODE NO.	ACTUATION
FLXXWA–D	DOUBLE SOLENOID NO LIMIT SWITCH
FLXXWA–DL	DOUBLE SOLENOID WITH LIMIT SWITCH
FLXXWA–S	SINGLE SOLENOID NO LIMIT SWITH
FLXXWA–SL	SINGLE SOLENOID WITH LIMIT SWITCH

MACHINARY SYMBOLS

SYMBOLS	NAME
	PUMP
	FAN / BLOWER
	AGITATOR (FLAT BLADE)
	AGITATOR (PROPELLOR)
	ROTARY VALVE
	CRUSHER
	BELT FEEDER
	BELT FILTER
	BALL MILL
	CYCLONE
	MIST ELIMINATOR

EQUIPMENT SYMBOLS

SYMBOLS	NAME
	BAG FILTER
	SILO
	SLIDE GATE
	TANDEM LOUVER DAMPER (MULTIVANE)
	SINGLE STAGE LOUVER DAMPER (MULTIVANE)
	LOUVER DAMPER (SINGLE VANE)
	DISTRIBUTION BOX (3WAY)
	DISTRIBUTION BOX (2WAY)
	SUMP
	HEAT EXCHANGER
	SHELL AND TUBE HEAT EXCHANGER
	AIR DRYER
	FILTER
	SPRAY NOZZLE

DRIVER SYMBOLS

SYMBOLS	NAME
A	AIR MOTOR
M	ELECTRIC MOTOR

OTHER SYMBOLS

SYMBOLS	NAME
	INSERT PIPE / LANCE
	CHUTE
	TRUCK

CONFIDENTIAL & PROPRIETARY INFORMATION

CUSTOMER NOS: G211 & G212

CUSTOMER: NTPC LIMITED.
PROJECT: BHILAI (2X250MW)
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET:632 406.

DEPT CODE		NAME (BHEL)	DATE
M	DRN	VIDYA V	02.04.20
	CHD	KABILASH K	02.04.20
	APPD	P.NAVEEN	02.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LEGENDS AND NOTES

SCALE : NTS

NTPC DRG NO: ----

SH 02 of 02

FILE NO B240 – 00100

REV NO 00

THIRD ANGLE | No. REQ'D | A3 | DRAWING No.

00-200-LD-5004-CA01

M

00 HTJ 00 AN 001
AIR BLOWER A

00-250-LD-5003-CA01

LIMESTONE STORAGE SILO BAG FILTER A

H PDS

00 HTJ 00 AT 001

00-250-LD-5001-CA01

M

00-250-LD-5002-CA01

00HTJ01CL001

00HTJ01CL002

LT LT

I

LIA

CONVEYOR DRIVE STOP

LIMESTONE CONVEYOR
(ISG SCOPE)

00-25-AI-8187-BA01

INSTRUMENT AIR
B270-10231

00-25-A-8197-BA01

LIMESTONE SUPPLY

00 HTJ 00 BB 001
LIMESTONE STORAGE SILO A

M.H.

00 HTJ 01 BB 001/003

AIR CANNON 00HTJ05AA001

AIR CANNON 00HTJ05AA002

AIR CANNON 00HTJ05AA003

00 HTJ 00 AA 003

00 HTJ 00 AA 001 M

LIMESTONE STORAGE SILO SHUT-OFF GATE A

B240-00521
FROM LIMESTONE SLURRY
STORAGE TANK A

B240-00522
FROM LIMESTONE SLURRY
STORAGE TANK B

WIC

M

00 HTJ 00 AF 001
GRAVIMETRIC FEEDER A

WT 00HTJ05CW001 00 HTJ 00 AA 005 M

B240-00511
9993-109-PVM-F-017
TO WET LIMESTONE GRINDING MILL A
00 HTK 00 AJ 001

B240-00511
9993-109-PVM-F-017
TO FIC OF BALL MILL INLET
MAKE UP WATER

CUSTOMER NOS: G211 & G212

CUSTOMER: NTPC LIMITED.
PROJECT: BHILAI (2X250MW)
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED.
UNIT: BOILER AUXILIARIES PLANT,
RANIPET:632 406.

DEPT CODE		NAME (BHEL)	DATE
M	DRN	V.VIDYA	27.04.20
	CHD	R.YUVARAJ	27.04.20
	APPD	P.NAVEEN	27.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LIMESTONE SILO – A

SCALE : NTS

NTPC DRG NO.9993-109-PVM-F-017 | SH 01 of 06

BHEL DRG NO	FILE NO	REV NO
3-FW-000-00XXX	B240-00501	00

D/Y.T 20070315 (-)

0 1 2 3 4 5 6 7 8 9 10

THIRD ANGLE | No. REQ'D | A3 | DRAWING No.

00-200-LD-5014-CA01

M

00 HTJ 00 AN 002

AIR BLOWER B

00-250-LD-5013-CA01

H PDS

LIMESTONE STORAGE SILO BAG FILTER B

00 HTJ 00 AT 002

00-250-LD-5011-CA01

M

00-250-LD-5012-CA01

I

LIA

00HTJ022CL001

00HTJ022CL002

LT LT

CONVEYOR DRIVE STOP

LIMESTONE CONVEYOR (ISG SCOPE)

00-25-AI-8188-BA01

INSTRUMENT AIR B270-10231

00-25-AI-8198-BA01

LIMESTONE SUPPLY

00 HTJ 00 BB 002

LIMESTONE STORAGE SILO B

M.H.

00 HTJ 01 BB 004/006

AIR CANNON 00HTJ05AA004

AIR CANNON 00HTJ05AA005

AIR CANNON 00HTJ05AA006

00 HTJ 00 AA 004

00 HTJ 00 AA 002 M

LIMESTONE STORAGE SILO SHUT-OFF GATE B

B240-00521

FROM LIMESTONE SLURRY STORAGE TANK A

B240-00522

FROM LIMESTONE SLURRY STORAGE TANK B

WIC

M

00 HTJ 00 AF 002

GRAVIMETRIC FEEDER B

WT 00HTJ05CW002

00 HTJ 00 AA 006 M

B240-00512 9993-109-PVM-F-017

TO WET BALL MILL B 00 HTK 00 AJ 002

B240-00512 9993-109-PVM-F-017

TO FIC OF BALL MILL INLET MAKE UP WATER

CUSTOMER NOS: G211 & G212

CUSTOMER: NTPC LIMITED.

PROJECT: BHILAI (2X250MW)

FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET-632 406.

DEPT CODE		NAME (BHEL)	DATE
M	DRN	V.VIDYA	27.04.20
	CHD	R.YUVARAJ	27.04.20
	APPD	P.NAVEEN	27.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LIMESTONE SILO – B

SCALE : NTS

NTPC DRG NO.9993-109-PVM-F-017 | SH 02 of 06

BHEL DRG NO 3-FW-000-00XXX | FILE NO B240-00502 | REV NO 00

D/Y.T 20070315 (-)

0 1 2 3 4 5 6 7 8 9 10

NOTE
SHALL BE FINALIZED BASED ON VENDOR INFORMATION

NOTE A001
MOTOR PID ARE NOT SHOWN.

NOTE A004
TO PREVENT NONFUNCTIONING OF SLURRY TANK PUMP SUCTION VALVE DUE TO SOLID SEDIMENTATION, THE SHAFT OF BUTTERFLY VALVE SHOULD BE INSTALLED HOLIZONTALLY AND UPPER HALF OF THE DISC SHOULD BE TURN INTO TANK INSIDE. SUCTION VALVES SHALL BE MOUNTED ON NOZZLE DIRECTLY AS LONG AS ACTUATOR DOES NOT COLLIDE WITH TANK CASING.

NOTE A006
DISCHARGE OF DRAIN AND OVERFLOW LINE SHALL HAVE 45 DEG INCLINATION TOWARD FLOW DIRECTION OF TRENCH FOR SMOOTH FLOW.

NOTE A008
TEMPORARY STRAINER SHALL BE INSTALLED AT THE PUMP SUCTION FOR THE TERMS OF PRE-COMMISSIONING.

NOTE A017
STRAIGHT LENGTH IS DESIGNED BY VENDOR.

NOTE B002
OPEN AND CLOSE CONTACT SWITCHES ARE FOR REFERENCE ONLY. IN CASE THAT THERE IS CUSTOMER'S SPECIFICATION, THEY SHOULD BE DECIDED BASED ON IT.

NOTE B005
PIPE SIZE WRITTEN IN THE DRAWING IS TYPICAL. IT SHOULD BE REVIEWED.

NOTE 2
VIBRATION MONITOR (REQUIRED BY END-USER) AND TEMPERATURE MONITOR (IF REQUIRED) FOR MOTOR ARE NOT SHOWN IN THIS P&I , BHEL SHALL FINALIZE THE OPERATION PHILOSOPHY FOR WET BALL MILL AND REFLECT IT TO P&I AND OTHER DRAWINGS SUCH AS INTERLOCK LOGIC DIAGRAM.

THIRD ANGLE PROJECTION

No.	REQ'D

A3

DRAWING No.

PROCESS WATER B270-10431 STRAIGHT
NOTE A017
00HTK01CF011
00HTK01CP511
00HTK05AA037
00HTK05AA038
00HTK05AA039
00HTK01CP512
00HTK05AA034
00HTK05AA031
00HTK05AA032
00-80-WP-8630-CC01

FROM GRAVIMETRIC FEEDER A 00 HTJ 00 AF 001
B270-10431
FIC
*2
B270-10431
00HTK01CP513
00HTK05AA047
00HTK05AA043
00HTK05AA048
00HTK01CP514
00HTK05AA041
00HTK05AA042
00HTK05AA044
00-80-WP-8620-CC01

GRAVIMETRIC FEEDER A
B240-00501
9993-109-PVM-F-017

00 HTK 00 AJ 001
WET LIMESTONE GRINDING MILL A

COOLING WATER SUPPLY
B270-10634
00-50-WCS-8710-CC01
COOLING WATER RETURN
B270-10634
00-50-WCR-8760-CC01
00HTK05AA801
00HTK05AA811
SG-XXXX
25
00HTK05AA821

00-25-LOL-5145-BA01
00-25-LOL-5141-BA01
00-25-LOH-5143-BA02
00-25-LOH-5144-BA02
00-25-LOL-5142-BA01
00-25-LOL-5146-BA01

CLUTCH
FOR DETAIL OF MOTOR SEE VENDOR'S P&I DRAWING
FOR DETAIL OF GEAR SPRAY SYSTEM SEE VENDOR'S P&I DRAWING
FOR DETAIL OF CLUTCH SYSTEM SEE VENDOR'S P&I DRAWING
FOR DETAIL OF TRUNNION BEARING LUBE OIL SYSTEM SEE VENDOR'S P&I DRAWING

REJECTED BALLS

B240-00521
FROM LIMESTONE AREA DRAIN SUMP PUMP 00 HTT 02 AP 001
00-100-LS-7221-AA40
B240-00522
9993-109-PVM-F-017
FROM LIMESTONE SLURRY STRAGE TANK A
B270-10431
FROM LIMESTONE SLURRY STORAGE TANK B

00HTK01CL525
LICA
LT
00HTK01CL526
M.H.
00-100-LS-5131-AA40
00HTK05AA001
NOTE A006
00 HTK 01 BB 001
MILL SEPARATOR TANK A
00 HTK 00 AM 001
MILL SEPARATOR TANK AGITATOR A
NOTE A001
NOTE A004
00HTK05AA011
00HTK05AA111
00HTK05AA013
00HTK05AA113
NOTE B002
00-125-LS-5101-AA40
00-125-LS-5111-AA40

*3
*4

00HTK01CP510
00HTK05 AA061
00HTK05 AA062
OVERFLOW LAUNDER
UNDERFLOW LAUNDER
00 HTK 00 AT 001
MILL HYDRO CYCLONE A
00-150-LS-5122-AA40
00-150-LS-5121-AA40
00-125-LS-5120-AA40
00-150-LS-5125-AA40
ZSL
ZSH
VENT
00HTK05AA076
00-25-AI-8182-BA01
B270-10231
INSTRUMENT AIR
00-150-LS-5123-AA40
B240-00521
9993-109-PVM-F-017
TO LIMESTONE SLURRY STORAGE TANK A
00 HTK 03 BB 001
00-150-LS-5124-AA40
B240-00522
9993-109-PVM-F-017
TO LIMESTONE SLURRY STORAGE TANK B
00 HTK 03 BB 002
*2

00HTK01CP002
PT
PI
MIN.
00HTK01CP503
DT
00HTK01CD051
DICAHL
DENSITY
NOTE B002
00HTK05AA012
00HTK05AA112
00HTK01CP001
00HTK01CP501
00HTK05AA014
50x25
AA60 CC01
00-125-LS-5102-AA40
00HTK01CP003
00HTK01CP502
00HTK05AA114
00-125-LS-5112-AA40
NOTE A008
NOTE A001
00 HTK 02 AP 001
MILL CIRCUIT PUMP A
00 HTK 02 AP 002
MILL CIRCUIT PUMP B
00-25-WP-8640-CC01
PROCESS WATER
B270-10431
*4

NOTE: PIPE SIZES WILL BE FINALIZED BASED ON VENDOR'S DATA

CUSTOMER NOS: G211 & G212

CUSTOMER: NTPC LIMITED.
PROJECT: BHILAI (2X250MW)
FGD SYSTEM PACKAGE

	DEPT CODE		NAME (BHEL)	DATE
BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET-632 406.	M	DRN	V.VIDYA	27.04.20
		CHD	R.YUVARAJ	27.04.20
		APPD	P.NAVEEN	27.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LIMESTONE PULVERIZER WET BALL MILL –A
SCALE : NTS

NTPC DRG NO.9993-109-PVM-F-017
SH 03 of 06

BHEL DRG NO	FILE NO	REV NO
3-FW-000-00XXX	B240-00511	00

0 1 2 3 4 5 6 7 8 9 10

A3

THIRD ANGLE PROJECTION	No. REQ'D

DRAWING No.

PROCESS WATER B270-10431 — NOTE A017 — STRAIGHT — 00HTK02CF011 — FT — PI — PT — 00HTK02CP010 — 00HTK05AA135 — 20A

00HTK02CP513 — PI — 00HTK05AA137 — 20A — M — ZSH — 00HTK05AA138 — FCV FC — NC 00HTK05AA139 — 00HTK02CP514 — PI — 00HTK05AA139 — 20A

00HTK05AA131 — FCV FC — NC 00HTK05AA132 — 00-80-WP-8635-CC01

B270-10431 — FIC — FT — FROM GRAVIMETRIC FEEDER B 00 HTJ 00 AF 002 — *2 — B270-10431

00HTK02CP511 — PI — 00HTK05AA147 — 20A — M — ZSH — 00HTK05AA143 — FCV FC — 00HTK05AA148 — 00HTK02CP512 — PI — 00HTK05AA146 — 20A

00HTK05AA141 — FCV FC — 00HTK05AA142 — 00HTK05AA144

00-80-WP-8625-CC01

GRAVIMETRIC FEEDER B — B240-00502 9993-109-PVM-F-017

COOLING WATER SUPPLY — B270-10634 — 00-50-WCS-8715-CC01

COOLING WATER RETURN — B270-10634 — 00-50-WCR-8765-CC01

00HTK05AA802 — 00HTK05AA812 — SG-XXXX (SG) — 25 — 00HTK05AA822

00-25-LOL-5195-BA01 — 00-25-LOL-5191-BA01 — 00-25-LOH-5193-BA02 — 00-25-LOH-5194-BA02 — 00-25-LOL-5192-BA01 — 00-25-LOL-5196-BA01

00 HTK 00 AJ 002 WET LIMESTONE GRINDING MILL B

CLUTCH — FOR DETAIL OF MOTOR SEE VENDOR'S P&I DRAWING — FOR DETAIL OF GEAR SPRAY SYSTEM SEE VENDOR'S P&I DRAWING — FOR DETAIL OF CLUTCH SYSTEM SEE VENDOR'S P&I DRAWING — FOR DETAIL OF TRUNNION BEARING LUBE OIL SYSTEM SEE VENDOR'S P&I DRAWING

REJECTED BALLS

B240-00521 — 00-100-LS-7222-AA40 — FROM LIMESTONE AREA DRAIN SUMP PUMP 00 HTT 02 AP 001

B240-00522 9993-109-PVM-F-017 — FROM LIMESTONE SLURRY STRAGE TANK A

B270-10431 — FROM LIMESTONE SLURRY STRAGE TANK B

00HTK02CL525 — LT — M.H. — LICA — LT — 00HTK02CL526 — NOTE A001 — M — NOTE A004 — 00-100-LS-5181-AA40 — 00HTK05AA101 — NOTE A006

00 HTK 01 BB 002 MILL SEPERATOR TANK B

00 HTK 00 AM 002 MILL SEPERATOR TANK AGITATOR B

00HTK05AA021 — 00HTK05AA121 — 00HTK05AA023 — 00HTK05AA123 — NOTE B002 — NOTE A006

00-125-LS-5301-AA40 — 00-125-LS-5311-AA40

00 HTK 00 AT 002 MILL HYDRO CYCLONE B

00HTK02CP502 — PG — 00HTK05 AA161 — 00HTK05 AA162 — OVERFLOW LAUNDER — UNDERFLOW LAUNDER

00-150-LS-5172-AA40 — ZSL — ZSH — VENT

00-150-LS-5171-AA40 — 00-125-LS-5170-AA40 — 00-150-LS-5175-AA40

00HTK02CP208 — 00HTK02CP210 — MIN. — ZSH — ZSL

*3 — 00-25-AI-8183-BA01 — B270-10231 — INSTRUMENT AIR

00-150-LS-5173-AA40 — B240-00521 9993-109-PVM-F-017 — TO LIMESTONE SLURRY STORAGE TANK A 00 HTK 03 BB 001

00-150-LS-5174-AA40 — B240-00522 9993-109-PVM-F-017 — TO LIMESTONE SLURRY STORAGE TANK B 00 HTK 03 BB 002

*2

00HTK02CP003 — PIA — PT — MIN. — 00HTK02CP510 — PI — MIN. — DICAHL — DT — 00HTK02CD051 — DENSITY

NOTE B002 — ZSL — ZSH — 00HTK05AA022 — 00HTK05AA122 — MIN.

00HTK02CP002 — PI — PT — MIN. — 00HTK02CP501 — PI — MIN. — ZSL — NOTE B002 — 00HTK05AA024 — NC — 50x25 — AA40CC01

00-25-WP-8645-CC01 — PROCESS WATER B270-10431 — *4

00HTK02CP001 — PI — PT — 00HTK02CP503 — PI — NOTE B002 — 00HTK05AA124 — NC — 50x25 — AA40CC01

00-125-LS-5302-AA40 — NOTE A001 — M — 00 HTK 02 AP 003 MILL CIRCUIT PUMP C

00-125-LS-5312-AA40 — NOTE A001 — M — 00 HTK 02 AP 004 MILL CIRCUIT PUMP D

NOTE: PIPE SIZES WILL BE FINALIZED BASED ON VENDOR'S DATA

CUSTOMER NOS: G211 & G212

*3 — *4

00 HTK 00 AM 002 — 00 HTK 01 BB 002 — 00 HTK 02 AP 003/004 — 00 HTK 00 AJ 002 — 00 HTK 00 AT 002

CAUTION: THIS DRAWING IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LTD.,AND IS NOT TO BE REPRODUCED OR USED TO FURNISH ANY INFORMATION FOR MAKING OF DRAWINGS OF APPARATUS EXCEPT WHERE PROVIDED FOR AGREEMENT WITH SAID COMPANY.

CUSTOMER: NTPC LIMITED.
PROJECT: BHILAI (2X250MW)
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET:632 406.

DEPT CODE		NAME (BHEL)	DATE
M	DRN	V.VIDYA	27.04.20
	CHD	R.YUVARAJ	27.04.20
	APPD	P.NAVEEN	27.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LIMESTONE PULVERIZER WET BALL MILL –B — SCALE : NTS

NTPC DRG NO.9993-109-PVM-F-017 — SH 04 of 06

BHEL DRG NO 3-FW-000-00XXX — FILE NO B240-00512 — REV NO 00

0 1 2 3 4 5 6 7 8 9 10

S NO	SECTION	FLOW m3/hr	TEMP (°C)	DENSITY kg/m³
1	Limestone slurry to Absorber	12.79	45	1215
2	Process water line for flushing	3	45	990

THIRD ANGLE PROJECTION

No. REQ'D

A3

DRAWING No.

00HTK05CF201 — 00-80-LS-5225-AM40 — 5D STRAIGHT — 00HTK05AA276 — 00HTK05AA273 — 00HTK05AA270 — 00HTK05AA288 — MIN. 3D STRAIGHT — LIMESTONE SLURRY B240-00200 9993-109-PVM-F-001 FROM ABSORBER UNIT 1 — 00HTK05AA285 — LIMESTONE SLURRY B240-00522 9993-109-PVM-F-017 TO LIMESTONE SLURRY STORAGE TANK B 00 HTK 03 BB 002 — 00-80-LS-5226-AM40 — 00HTK05AA279 — 00HTK05AA282 — 00HTK05AA291

00HTK05CF202 — 00-80-LS-5235-AM40 — 5D STRAIGHT — 00HTK05AA277 — 00HTK05AA274 — 00HTK05AA271 — 00HTK05AA289 — MIN. 3D STRAIGHT — LIMESTONE SLURRY B240-00201 9993-109-PVM-F-001 FROM ABSORBER UNIT 2 — 00HTK05AA286 — LIMESTONE SLURRY B240-00522 9993-109-PVM-F-017 TO LIMESTONE SLURRY STORAGE TANK B 00 HTK 03 BB 002 — 00-80-LS-5236-AM40 — 00HTK05AA280 — 00HTK05AA283 — 00HTK05AA292

NOTE F001

PROCESS WATER B270-10431 — 00-50-WP-8611-CC01

00HTK05CF205 — LIMESTONE SLURRY B240-00200 9561-109-RP-PVM-F-389 SH 01 OF 11 TO ABSORBER 20 HTD 00 BB 001 — 00-100-LS-5222-AM40 — 5D STRAIGHT

00HTK05CF204 — LIMESTONE SLURRY B240-00522 9561-109-RP-PVM-F-392 SH 06 OF 06 TO ABSORBER 10 HTD 00 BB 001 — 5D STRAIGHT

00HTK05AA304 — NOTE A013 — NOTE A012 — 00-100-LS-5214-AM40 — 00-50-WP-8613-CC01 — 00HTK05AA305 — CC01 AM40

00HTK05AA302 — NOTE A013 — NOTE A012 — 00-100-LS-5213-AM40 — 00-50-WP-8612-CC01 — 00HTK05AA301 — CC01 AM40

00HTK05AA253 — 00HTK05AA256 — 00HTK05AA254 — 00HTK05AA257 — 00HTK05AA252 — 00HTK05AA255 — 00HTK05AA243 — 00HTK05AA246 — CC01 AM40

NOTE A006 — 00HTK05CP017 — 00HTK05CP016 — 00HTK05CP047 — 00HTK05CP046 — 00HTK05CP007 — 00HTK05CP006 — 00HTK05CP037 — 00HTK05CP036

00-100-LS-5208-AM40 — 00-100-LS-5207-AM40 — EX-5070

NOTE B006 — EX-5050 — 00 HTK 03 AP 002 LIMESTONE SLURRY FEED PUMP A — NOTE A001

NOTE B006 — EX-5050 — 00 HTK 03 AP 001 LIMESTONE SLURRY FEED PUMP B — NOTE A001

LIMESTONE SLURRY B240-00511 9993-109-PVM-F-017 FROM MILL HYDROCYCLONE A 00 HTK 00 AT 001

LIMESTONE SLURRY B240-00512 9993-109-PVM-F-017 FROM MILL HYDROCYCLONE B 00 HTK 00 AT 002

00-150-LS-5173-AM40 — 00-150-LS-5172-AM40

B240-00501 9993-109-PVM-F-017 TO GRAVIMETRIC FEEDER A

B240-00511 9993-109-PVM-F-017 TO WET BALL MILL A CLUTCH

B240-00502 9993-109-PVM-F-017 TO GRAVIMETRIC FEEDER B

B240-00512 9993-109-PVM-F-017 TO WET BALL MILL B CLUTCH

UCA — 00HTK05CL021 — 00HTK05CL022 — LT — LT — 80 — M — NOTE A001 — M.H. — NOTE A009

00 HTK 01 AM 001 LIMESTONE SLURRY STORAGE TANK AGITATOR A

00 HTK 03 BB 001 LIMESTONE SLURRY STORAGE TANK A — NOTE A004 — NOTE A004

M.H. — 00HTK05AA201 — 200 NC — NOTE A006 — NOTE A004

00-200-LS-5231-AM40

00HTK05AA212 — 00HTK05AA211 — ZSL — ZSH

00-100-LS-5202-AM40 — 00-100-LS-5201-AM40 — NOTE A008

00HTK05AA232 — 00HTK05AA231 — NOTE A006

LIMESTONE SLURRY B240-00522 FROM LIMESTONE SLURRY STORAGE TANK B 00 HTK 02 BB 002 — 00-100-LS-5211-AM40

LIMESTONE SLURRY B240-00522 FROM LIMESTONE SLURRY STORAGE TANK B 00 HTK 02 BB 002 — 00-100-LS-5210-AM40

NOTE A001
MOTOR P/D ARE NOT SHOWN.

NOTE A004
TO PREVENT NONFUNCTIONING OF SLURRY TANK PUMP SUCTION VALVE DUE TO SOLID SEDIMENTATION, THE SHAFT OF BUTTERFLY VALVE SHOULD BE INSTALLED HOLIZONTALLY AND UPPER HALF OF THE DISC SHOULD BE TURN INTO TANK INSIDE. SUCTION VALVES SHALL BE MOUNTED ON NOZZLE DIRECTLY AS LONG AS ACTUATOR DOES NOT COLLIDE WITH TANK CASING.

NOTE A006
DISCHARGE OF DRAIN AND OVERFLOW LINE SHALL HAVE 45 DEG INCLINATION TOWARD FLOW DIRECTION OF TRENCH FOR SMOOTH FLOW.

NOTE A008
TEMPORARY STRAINER SHALL BE INSTALLED AT THE PUMP SUCTION FOR THE TERMS OF PRE-COMMISSIONING.

NOTE A009
THERE SHOULD BE CERTAIN DISTANCE BETWEEN NOZZLES FOR INFLUENT LINE AND PUMP SUCTION NOZZLE AS LONG AS THERE IS NO INSERT PIPE.

NOTE A011
RO SHALL BE INSTALLED IN VERTICAL LINE.

NOTE A012
SAMPLING NOZZLE SHALL BE TAPPED HORIZONTALY.

NOTE A013
OUTLET PIPING OF SAMPLING LINE SHALL BE EXTENDED ABOUT 300MM INTO THE FUNNEL FOR EASY SAMPLING.

NOTE A014
THE DRAIN NOZZLE SHALL BE EMBEDDED IN THE TANK BASE. AND IT SHALL BE DIRRECTED TO TRENCH SO THAT SLURRY IN THE TANK CAN BE DRANED OUT COMPLETELY.

NOTE B002
OPEN AND CLOSE CONTACT SWITCHES ARE FOR REFERENCE ONLY. IN CASE THAT THERE IS CUSTOMER'S SPECIFICATION, THEY SHOULD BE DECIDED BASED ON IT.

NOTE B006
IF PUMP DISCHARGE NOZZLE IS LOCATED JUST ABOVE PUMP CENTER, SLURRY VELOCITY MUST NOT BE EXCESSIVELY HIGH CONCERNING EROSION DUE TO ANTI-UNIFORM FLOW. IN CASE OF HIGH VELOCITY, SOME MEASURE (CERAMIC SPOOL ETC.) SHOULD BE TAKEN. IF PUMP CASING IS MADE OF ALLOY OR CERAMIC, IT IS BETTER TO MAKE DISCHARGE DIFFUSER VENDOR'S SCOPE.

NOTE F001
FLOW METER STRAIGHT DISTANCE IS INDICATIVE. STRAIGHT DISTANCE TO BE PROVIDED AS PER INSTRUMENT VENDOR REQUIREMENT.

CUSTOMER NOS: G211 & G212

CUSTOMER: NTPC LIMITED.

PROJECT: BHILAI (2X250MW)

FGD SYSTEM PACKAGE

	DEPT CODE		NAME (BHEL)	DATE
BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET:632 406.	M	DRN	V.VIDYA	27.04.20
		CHD	R.YUVARAJ	27.04.20
		APPD	P.NAVEEN	27.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LIMESTONE SLURRY TANK-A

SCALE : NTS

NTPC DRG NO.9993-109-PVM-F-017 — SH 05 of 06

BHEL DRG NO	FILE NO	REV NO
3-FW-000-00XXX	B240-00521	00

0 1 2 3 4 5 6 7 8 9 10

THIRD ANGLE PROJECTION | No. REQ'D | A3 | DRAWING No.

LIMESTONE SLURRY
B240-00511
9993-109-PVM-F-017
FROM MILL HYDROCYCLONE A
00 HTK 00 AT 001

LIMESTONE SLURRY
B240-00512
9993-109-PVM-F-017
FROM MILL HYDROCYCLONE B
00 HTK 00 AT 002

B240-00501
9993-109-PVM-F-017
TO GRAVIMETRIC FEEDER A

B240-00511
9993-109-PVM-F-017
TO WET BALL MILL A CLUTCH

B240-00502
9993-109-PVM-F-017
TO GRAVIMETRIC FEEDER B

B240-00512
9993-109-PVM-F-017
TO WET BALL MILL B CLUTCH

00-150-LS-5174-AA40

00-150-LS-5124-AA40

LICA

00HTK05CL024

00HTK05CL023

LT

LT

80

NOTE A001

M

M.H.

NOTE A009

00 HTK 01 AM 002
LIMESTONE SLURRY STORAGE TANK AGITATOR B

00-200-LS-5232-AA40

00 HTK 03 BB 002
LIMESTONE SLURRY STORAGE TANK B

M.H.

00HTK05AA202

200 NC

NOTE A006

NOTE A004

L

NOTE A004

NOTE A004

ZSL

ZSH

00HTK05AA215

ZSL

ZSH

00HTK05AA214

00-100-LS-5205-AA40

00-100-LS-5204-AA40

NOTE A008

NOTE A008

MIN.

ZSL

NC
50
00HTK05AA235

NOTE A006

L

MIN.

ZSL

NC
50
00HTK05AA234

NOTE A006

L

n

10HTK05CF204

M

5D
STRAIGHT

n

NOTE F001

20HTK05CF204

M

5D
STRAIGHT

00-80-LS-5226-AA40

00-80-LS-5236-AA40

LIMESTONE SLURRY
B240-00521
9993-109-PVM-F-001
FROM UNIT 1 ABSORBER

LIMESTONE SLURRY
B240-00521
9993-109-PVM-F-017
FROM UNIT 2 ABSORBER

LIMESTONE SLURRY
B240-00521
9993-109-PVM-F-017
TO LIMESTONE SLURRY STORAGE TANK A
00 HTK 03 BB 001

LIMESTONE SLURRY
B240-00521
9993-109-PVM-F-017
TO LIMESTONE SLURRY STORAGE TANK A
00 HTK 03 BB 001

00-100-LS-5211-AA40

EX-5070

EX-5050

M

NOTE A001

00 HTK 03 AP 004
LIMESTONE SLURRY FEED PUMP D

00-100-LS-5210-AA40

EX-5070

EX-5050

M

NOTE A001

00 HTK 03 AP 003
LIMESTONE SLURRY FEED PUMP C

NOTE A001
MOTOR PID ARE NOT SHOWN.

NOTE A004
TO PREVENT NONFUNCTIONING OF SLURRY TANK PUMP SUCTION VALVE DUE TO SOLID SEDIMENTATION, THE SHAFT OF BUTTERFLY VALVE SHOULD BE INSTALLED HOLIZONTALLY AND UPPER HALF OF THE DISC SHOULD BE TURN INTO TANK INSIDE. SUCTION VALVES SHALL BE MOUNTED ON NOZZLE DIRECTLY AS LONG AS ACTUATOR DOES NOT COLLIDE WITH TANK CASING.

NOTE A006
DISCHARGE OF DRAIN AND OVERFLOW LINE SHALL HAVE 45 DEG INCLINATION TOWARD FLOW DIRECTION OF TRENCH FOR SMOOTH FLOW.

NOTE A008
TEMPORARY STRAINER SHALL BE INSTALLED AT THE PUMP SUCTION FOR THE TERMS OF PRE-COMMISSIONING.

NOTE A009
THERE SHOULD BE CERTAIN DISTANCE BETWEEN NOZZLES FOR INFLUENT LINE AND PUMP SUCTION NOZZLE AS LONG AS THERE IS NO INSERT PIPE.

NOTE A014
THE DRAIN NOZZLE SHALL BE EMBEDDED IN THE TANK BASE. AND IT SHALL BE DIRRECTED TO TRENCH SO THAT SLURRY IN THE TANK CAN BE DRAINED OUT COMPLETELY.

NOTE B002
OPEN AND CLOSE CONTACT SWITCHES ARE FOR REFERENCE ONLY. IN CASE THAT THERE IS CUSTOMER'S SPECIFICATION, THEY SHOULD BE DECIDED BASED ON IT.

NOTE B006
IF PUMP DISCHARGE NOZZLE IS LOCATED JUST ABOVE PUMP CENTER, SLURRY VELOCITY MUST NOT BE EXCESSIVELY HIGH CONCERNING EROSION DUE TO ANTI-UNIFORM FLOW. IN CASE OF HIGH VELOCITY, SOME MEASURE (CERAMIC SPOOL ETC.) SHOULD BE TAKEN. IF PUMP CASING IS MADE OF ALLOY OR CERAMIC, IT IS BETTER TO MAKE DISCHARGE DIFFUSER VENDOR'S SCOPE.

NOTE F001
FLOW METER STRAIGHT DISTANCE IS INDICATIVE. STRAIGHT DISTANCE TO BE PROVIDED AS PER INSTRUMENT VENDOR REQUIREMENT.

CUSTOMER NOS: G211 & G212

CUSTOMER: NTPC LIMITED.
PROJECT: BHILAI (2X250MW)
FGD SYSTEM PACKAGE

BHARAT HEAVY ELECTRICALS LIMITED, UNIT: BOILER AUXILIARIES PLANT, RANIPET-632 406.

DEPT CODE		NAME (BHEL)	DATE
M	DRN	V.VIDYA	27.04.20
	CHD	R.YUVARAJ	27.04.20
	APPD	P.NAVEEN	27.04.20

MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

TITLE: P & ID – LIMESTONE SLURRY TANK-B

SCALE : NTS

NTPC DRG NO.9993-109-PVM-F-017

SH 06 of 06

BHEL DRG NO	FILE NO	REV NO
3-FW-000-00XXX	B240-00522	00

0 1 2 3 4 5 6 7 8 9 10