SI. NO.	PARTICULARS	QUANTITY
	1.2 Electronic cards including power supply modules for scanners	10 nos. of each type
	2. Coal Feeders	
	2.1 Motion monitor	2 nos.
	2.2 Speed pick-up	4 nos.
	2.3 Load Cell	4 nos.
	2.4 Electronic cards & Power Supply cards	2 nos. of each type
	2.5 Limit switch assembly for coal-on-belt, no coal flow, shear pin failure, etc.	4 nos. of each type
	2.6 Coupling (eddy current type etc., VFD as applicable)	2 nos.
	2.7 Relay/Contactor of each type make and model and rating	2 nos.
	3. Electromatic Safety Valves / Electromatic Ball valve Pressure switches and solenoid Valves.	2 nos. of each type
	4. Furnace Temperature Probes Thermocouple	2 nos.
	5. Acoustic Pyrometers (Not Used)	
	6. Furnace and Flame viewing system	LOT
	6.1 Flame Cameras	2 nos.
	6.2 Electronic Modules	2 nos. of each type
	6.3 Filter	40 nos. of each type
	7. Conductivity type level monitoring system (for drip legs)	
	7.1 Electrodes	10 nos.
	7.2 Electronic Cards	2 nos.
	7.3 Mounting chamber/Standpipe	1 no.
	8. Acoustic steam Leak Detection system (ASLD) (if applicable)	LOT
	(i) Processor and Interface modules	5 nos. of each type
	(ii) Sensors and Transceivers	5 nos.
	9. level monitoring system for Coal bunker, fly ash silo and ESP hopper (first field)	
	a) Acoustic 3D Level scanner	2 nos. of each type, make and model
	b) Local indicator	2 nos. per unit
	10. NOGS (Naturally Occurring Gamma Sensor) (If applicable)	2 nos. per unit
	11. Any other instruments (If applicable)	1 no. per unit
	12. Any other control system (If applicable)	1 no. per unit
2.02.00	**MEASURING INSTRUMENTS** (for all systems supplied under this chapter including Auxiliary Boiler, FOPH, Dosing System, ECW, Air compressor system, FGD, Skids)	
a)	Transmitters	
(i)	Transmitters of all type, range and model no. (For the measurement of Pressure, differential pressure flow, level, temperature etc.)	10%- of each type and model whichever is more

SI. NO.	PARTICULARS	QUANTITY
b)	Temperature elements	
(i)	RTD's	10% or 2 nos. of each type and length, whichever is more
(ii)	Thermocouples	10% or 2 nos. of each type and length, whichever is more
(iii)	Thermo well for above applications	10% or 2 nos. of each type and length, whichever is more
c)	Density meter	1 no. of each type and model
2.03.00	**PROCESS CONNECTION PIPING (FOR IMPULSE PIPING/TUBING, SAMPLING PIPING / TUBING AND AIR SUPPLY PIPING AS APPLICABLE**)	LOT
1.	Valves of all types and models	20 Nos. of each type and model
2.	2 way, 3way, 5way valve manifolds	10 Nos. of each type, class, size and model
3.	Fittings	100 Nos. of each type
4.	Purge meters	20 nos. of each type and model
5.	Filter regulators	20 nos. of each type and model
2.04.00	**INSTRUMENTATION CABLE, INTERNAL WIRING & ELECTRICAL FIELD**	
1.	Pre fabricated cable with connector of each type (other than DDCMIS application) (if applicable)	2 nos. of each type
2.	Other cables (Instrumentation and Control cable)	5% or 500 mtrs whichever is more for each type, pair and size of actual supplied quantity
2.05.01	**CONTROL VALVES, ACTUATORS & ACCESSORIES (FOR ALL SERVICES UNDER THIS CHAPTER)**	
1	Pneumatic and electro-hydraulic actuator assembly	1 no. of each type, model and rating
2	Diaphragms, O' rings, seals etc. of all types make etc.	5 nos.
3	Solenoid valves (if applicable)	1 no.
4	Positioner units /smart positioners (complete unit) & accessories (link assembly)	2 nos.
5	Pneumatic air-filter/Regulator of each type, make rating etc.	2 nos. of each type
6	Air lock relays	1 no. of each type, model and rating

SI. NO.	PARTICULARS	QUANTITY
7	Proportional valve , hydraulic solenoids, Pilot valves, Proportional valves, Position feedback transmitter (if applicable)	1 no of each type
8	Hydraulic actuators seals(set), Piston/Stem	1 no of each type
2.05.02	**PNEUMATICALLY OPERATED ISOLATION / BLOCK VALVES, ACTUATORS & ACCESSORIES (FOR ALL SERVICES UNDER THIS CHAPTER)**	
1.	Pneumatic actuator assembly	1 No. of each type, model and rating,
2.	Diaphragms, O' rings, seals etc. of all types make etc.	5 Nos.
3.	Limit switches (complete unit) & accessories (link assembly)	2 nos.
4.	Pneumatic air-filter/Regulator of each type, make rating etc.	2 nos.
2.06.00	**MICROPROCESSOR BASED / PLC BASED /ELECTRONIC BASED CONTROL PANEL (IF APPLICABLE)**	
1.	Fully programmed controllers and electronic module of each type (as applicable)	10% or 1 no. whichever is more
2.	Power supply Module (If applicable)	10% or 1 no. whichever is more
2.07.00	**FGD (SOx)**	
a	Analyzer for SOx, pH	1 no complete instrument of each type and model.
b	Electronic card assembly/ PCBs, moisture/condensate monitor, power supply modules	2 Nos. of each type
c	Set of gaskets/O-rings/ seals	4 Nos. of each type
d	Temp. Sensor	2 Nos. of each type
e	Heater assembly, Cooler assembly	2 Nos. of each type
f	Complete Probe with shield assembly (Not applicable for Insitu- path).	1 no. of each type and model
g	Solenoids	2 nos. of each type, model and rating
h	Filters, light source, sensor, detector, etc.	2 Nos. of each type
i	Calibration gases, Calibration cell and other consumables for calibration: - of all types and ranges	2 Nos. of cylinders of each type of calibration gas
j	Heavy duty blower assembly	1 no. of each type, size and rating.
k	Rota meter/Air flow meter	2 nos. of each type, model and rating
2.08.00	**Electrical Actuators**	

SI. NO.	PARTICULARS	QUANTITY
(i)	Electronic PCB of all types	10% of each type & model
(ii)	Absolute Encoder (Replaceable part)	5% of each type & model
(iii)	Electronic Torque sensor	5% of each type & model
(iv)	Electrical Actuator	1 no. of each type, class, size and model
(v)	Actuators gear box assembly of each type	5% or 1nos whichever max of each type and model
3.00.00	**Elevator**	
A	Goods Elevator	1 Lot (The lot price quoted will apply without any change to the applicable items only (In the list of items specified below) as applicable for the particular vendor finally selected during execution)
1	Friction block	2 of each type
2	Guide roller of each type	1 Lot comprising 20% of total population or 3 nos. of type whichever is higher
3	Contactors of each type and rating	2 Nos
4	Control transformer	1 No. of each type and rating
5	Time device	2 Nos. of each type and rating
6	Rectifiers	2 Nos. of each type and rating
7	Overcurrent relay	3 Nos. of each type and rating
8	Auxiliary relay	3 Nos. of each type and rating
9	Resistor	3 Nos. of each type and rating
10	Fuses of each rating	1 Lot comprising 20% of the total population
11	Limit switches of each type	3 Nos. of each type and rating
12	Push button	Complete set of replacement for one elevator
13	Contact device (if applicable)	3 Nos. of each type
14	Brake motor	3 Nos. of each type and rating
15	Transmitters	2 Nos. of each type and rating
16	Switches of each type and rating	3 Nos
17	Receiver	2 Nos. of each type and rating
18	Bearings of each type & size	2 Nos.
19	Roller of each type	3 Nos.
20	Worm gear spares	
a	'O' rings	3 Sets*
b	Sealing ring of each type	3 Sets*

SI. NO.	PARTICULARS	QUANTITY
21	Spares for brake	
a	Fan	2 Nos. of each type and rating
b	Magnetic coil	3 Nos. of each type and rating
c	Brake disc	2 Sets*
d	Brake pad	2 Sets*
22	Bushing (for door front)	2 Sets*
23	Pinion	2 Sets*
24	Lift Main drive motor	01 no of each type and rating
25	Door opening motor	01 no of each type and rating
26	Landing door complete	01 set*
27	Car door complete	01 set*
28	VFD drive	01 no of each type
B	Passenger Elevator	1 Lot (The lot price quoted will apply without any change to the applicable items only (In the list of items specified below)as applicable for the particular vendor finally selected during execution)
1	Friction block	2 Nos. of each type
2	Guide roller of each type	1 Lot comprising 20% of total population or 3 nos. of type whichever is higher
3	Contactors of each type	2 nos.
4	Control transformer	2 nos. of each type
5	Time device	2 nos. of each type
6	Rectifiers	2 nos. of each type
7	Overcurrent relay	3 nos. of each type
8	Auxiliary relay	3 nos. of each type
9	Resistor (if applicable)	3 nos. of each type
10	Fuses of each rating	1 Lot comprising 20% of the total population
11	Limit switches of each type	3 nos.
12	Push button	Complete set of replacement for one elevator
13	Contact device (if applicable)	3 nos. of each type
14	Brake motor	2 nos. of each type
15	Transmitters	2 nos. of each type
16	Switches of each type	3 nos.

SI. NO.	PARTICULARS	QUANTITY
17	Receiver	2 nos. of each type
18	Bearings of each type & size	2 nos.
19	Roller of each type	3 nos
20	Worm gear spares of each type	
a	'O' rings	4 Sets*
b	Sealing ring of each type	4 Sets*
21	Spares for brake for each type	
a	Fan	2 Nos.
b	Magnetic coil	3 Nos.
c	Brake disc	2 Sets*
d	Brake pad	2 Sets*
22	Bushing (for door front)	2 Sets* of each type
23	Pinion	2 nos. of each type
24	Lift Main drive motor	01 no. of each type
25	Door opening motor	01 no of each type
26	Landing door complete	01 no.
27	Car door complete	01 no.
28	VFD drive	01 no. of each type
	**One set means one complete replacement for a unit.	
	*One set means one complete replacement for an equipment.	
4.00.00	NOT USED	

5.01.00	**Electrostatic precipitator (ESP)**	
1	Support insulator	4 nos. Of each type & rating
2	Shaft insulator	6 Nos. of each type & rating
3	Emitting electrodes (as applicable for the specific design)	
	(a) Helical wire type	5% of the installed quantity in one ESP
	(b) Wire pipe in rigid frame	10% of the installed quantity in one ESP
	(c) Mast type	2 % of the installed quantity in one ESP
4	Collecting electrode	2% of the installed quantity in one ESP
5	Inner arm assembly	20 nos. each for collecting & emitting system.
6	Outer arm assembly	10 nos. each for collecting & emitting system.
7	Plain bearing	20 nos. of each type & size.
8	Shock bar/anvil	20 nos. of each type & size.
9	Shock Bar Guide	100 nos. of each type and size
10	Big Pin Wheel and Small pin wheel	10 nos. each type and size
11	Rappers (As applicable for the specific design)	
	(a) For electric rappers	
	(i) Assembled rapper/drop rods	20 nos. of each type & size.
	(ii) Coil assembly along with sleeve	4 nos.
	(iii) Casing	4 nos.
	(iv) Gaskets & packing	10 nos. of each type & size.

	(b) For tumbling rappers	
	(i) Hammers	20 nos. of each type & size.
	(ii) Bearing components	4 nos.
	(iii) Shafts	4 nos.
	(iv) Gear motors	4 nos. of each type & rating
10	Gaskets (One set means complete replacement for all TR sets, one ESP pass)	1 set*
11	Control system	
	(a) Push buttons for	
	(i) TR set controller	10 nos. Of each type & rating
	(ii) Others	5 nos. Of each type & rating
	(b) Indicator lamps	10 nos. Of each type & rating
	(i) Control fuse	10 nos. Of each type & rating
	(c) Power fuse	10 nos. Of each type & rating
	(d) Thyristor fuse	2 nos. Of each type & rating
	(e) Thyristor of transformer controller rectifier	4 nos. Of each type & rating
12	Ash level indicator for ESP	10 nos. Of each type & rating
13	Opacity monitor	2 Nos.
14	Power supply modules for remote control unit of opacity monitor	2 nos. Of each type, make & model.
15	Transformer rectifier set (Complete)	3 nos. of each type and rating
16	Control system	

	(a) Transformer-rectifier set controller	5 nos.
	(b) Rapper controller complete (if applicable)	2 Nos.
	(c) Communication controller complete (if applicable)	1 no.
	(d) Disconnecting Switch assembly	3 nos.
17	High Frequency/Mid Frequency Transformer Rectifier set (If applicable)	
	a) Complete HFTR/MFTR Set	3 nos.
	b) Gaskets for HFTR sets (One set means complete replacement for all TR sets, one ESP pass)	1 set*
	c) Control system	
	1.) High voltage unit	1 set*
	2.) Power electronic unit	1 set*
	3.) Board for power Electronic Controller Unit	1 no.
	4.) Cooling fans	1 no.
	5.) Measurement module for HV unit	1 no.
	6.) Fuses	1 set*
5.02.00	**Passenger Elevator for ESP Rapper Panel room on Roof (If applicable)**	
	1) Friction block	2 nos. of each type
	2) Guide roller of each type	20 of total population or 3 nos. whichever is higher
	3) Contactors	2 nos. of each type and rating
	4) Bushing (for door front)	2 sets* of each type
	5) Pinion	2 nos. of each type

	6) Worm gear spares of each type	
	7) 'O' rings	4 sets*
	8) Sealing ring of each type	4 sets*
	9) Time device/Timer card (as applicable)	2 nos. of each type and rating
	10) Rectifiers	2 nos. of each type and rating
	11) Resistor (if applicable)	3 nos. of each type and rating
	12) Fuses/MCB/Switches (as applicable)	2 nos. of each type & rating
	13) Limit switches	3 nos. of each type and rating
	14) Push button	Complete replacement of one elevator
	15) Contact device (if applicable)	3 nos. of each type and rating
	16) Brake motor/ magnet (as applicable)	01 no. of each type and rating
	17) Bearings	01 no. of each type & size
	18) Magnetic coil	03 nos.
	19) Floor indicator Display unit	01 no. of each type
	20) Over current relay	03 nos. of each type & size
	21) Control Transducers	01 no. of each type & size
	22) Roller	03 nos. of each type & size
	23) Brake Disk and Pad	01 no. of each type & size
	24) Lift Main drive motor	01 no. of each type
	25) Door opening motor	01 no. of each type

	26) Landing door complete	01 set*
	27) Car door complete	01 set*
	28) VFD drive	01 no. of each type
5.03.00	**Passenger Elevator for ESP Control Room**	
	1) Friction block	2 nos. of each type
	2) Guide roller of each type	20 of total population or 3 nos. whichever is higher
	3) Contactors	2 nos. of each type and rating
	4) Bushing (for door front)	2 sets* of each type
	5) Pinion	2 nos. of each type
	6) Worm gear spares of each type	
	7) 'O' rings	4 sets*
	8) Sealing ring of each type	4 sets*
	9) Time device/Timer card (as applicable)	2 nos. of each type and rating
	10) Rectifiers	2 nos. of each type and rating
	11) Resistor (if applicable)	3 nos. of each type and rating
	12) Fuses/MCB/Switches (as applicable)	2 nos. of each type & rating
	13) Limit switches	3 nos. of each type and rating
	14) Push button	Complete replacement of one elevator
	15) Contact device (if applicable)	3 nos. of each type and rating
	16) Brake motor/ magnet (as applicable)	01 no. of each type and rating

	17)	Bearings	01 nos. of each type & size
	18)	Magnetic coil	03 nos.
	19)	Floor indicator Display unit	01 no. of each type
	20)	Lift Main drive motor	03 nos. of each type & size
	21)	Door opening motor	01 no. of each type & size
	22)	Landing door complete	01 set*
	23)	Car door complete	01 set*
	24)	VFD drive	01 no of each type and rating

* One set means one complete replacement for an equipment

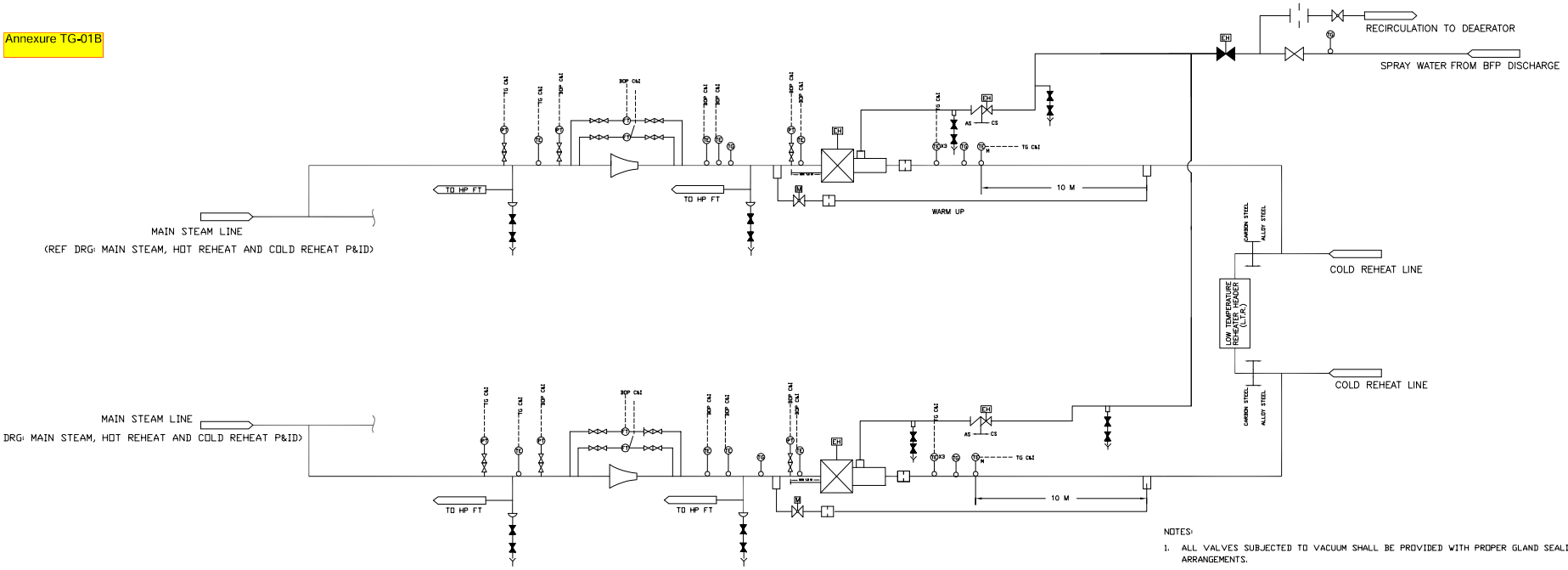
MANDATORY SPARES FOR CHIMNEY ELEVATOR
(Qty. indicated are for one (1) No. Chimney Elevator)

A.	BRAKE ASSEMBLY		Qty.
	1.	Brake Assembly complete	1 No.
B.	GEAR ASSEMBLY		
	2.	Gear Assembly complete	1 No.
C.	DOOR FRONT		
	3.	Bearing	3 Nos.
	4.	Roller	3 Nos.
	5.	Bushing (if applicable)	2 Nos.
D.	LIMIT CAMS		
	6.	Sensor	3 Nos.
	7.	Switch arm	3 Nos.
E.	CAB		
	8.	Guide roller	100% of the total ones installed each type or min. 1 no. whichever is higher
	9.	Switch	3 Nos.
F.	SLIDING DOOR		
	10.	Rollers (if applicable)	4 Nos. each type
G.	MACHINERY		
	11.	Guide roller	2 Nos.
	12.	Pinion	2 Nos.

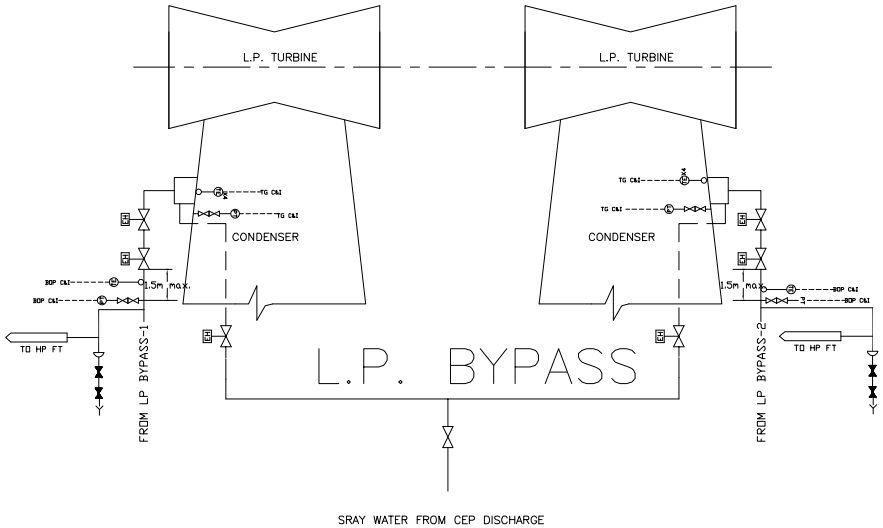
	13.	Rubber inserts (if applicable)	12 Nos.
	14.	Groove ring (if applicable)	6 Nos.
	15.	Brake motor	1 No.
H.		CABLE TROLLEY BEARING (if applicable)	
	16.	Bearing	3 Nos. of each type
I.		ELECTRICAL EQUIPMENTS	
	17.	Contactors	1 No. of each type
	18.	Auxiliary transformer	1 No.
	19.	Relays	1 No. of each type & rating
	20.	Switch	2 Nos. each type
	21.	Rectifier	3 Nos.
	22.	Limit switch	3 Nos. each type
	23.	Transmitter (if applicable)	1 No. if applicable
	24.	Receiver (if applicable)	1 No. if applicable
	25.	Battery charger	1 No.
	26.	Push Buttons	3 Nos. of each type
	27.	Timers	2 Nos. of each type & rating
	28.	Main drive motor with control system	1 Set

Wherever quantity has been specified as percentage (%), it shall mean percentage (%) of the total population of the item in the station (project), unless specified otherwise and the fraction will be rounded off to the next higher whole number.

Annexure TG-01B



H.P. BYPASS



NOTES:

1. ALL VALVES SUBJECTED TO VACUUM SHALL BE PROVIDED WITH PROPER GLAND SEALING ARRANGEMENTS.
2. BIDDER TO PROVIDE MINIMUM TWO NOS. OF LP BYPASS VALVES AND THE OUTLET OF EACH LP BYPASS VALVE SHALL BE CONNECTED TO EACH CONDENSER NOZZLE. IN CASE THE NO. OF LP BY PASS DUMP STEAM INLET NOZZLES ON CONDENSER IS MORE THAN 2, THE NO. OF LP BYPASS VALVES SHALL ALSO TO BE PROVIDED ACCORDINGLY SO AS TO AVOID INTER-CONNECTION/HEADER ARRANGEMENT AT LP BYPASS VALVE DOWN STREAM PIPING.
3. BIDDER TO PROVIDE SUITABLE WARMING ARRANGEMENTS FOR HP & LP BYPASS PIPINGS AND VALVES AS PER ITS STANDARD & PROVEN PRACTICE.
4. ALSO REFER DRG. : MAIN STEAM, HOT REHEAT AND COLD REHEAT P&ID
5. NOZZLE TYPE OF FLOW EEMENT IS SHOWN HERE, HOWEVER ,BIDDER MAY OFFER VENTURI TYPE OF FLOW ELEMENT BASED ON HIS STANDARD PRATICE OR AS PER THE RANGE OF REYNOLDS NO AS MENTIONED IN ISO-5167.
6. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF BIDDER.THE MEASURING INSTRUMENTS INDICATED IN THE TENDER P&ID ARE MINIMUM THAT ARE REQUIRED TO BE PROVIDED BY THE BIDDER.IN CASE ADDITIONAL INSTRUMENTS ARE REQUIRED AS PER THE STANDARD & PROVEN PRACTICE OF BIDDER/SUB-VENDOR, THE SAME SHALL BE SUPPLIED WITHIN THIS CONTRACT.
7. SG-C&I, TG-C&I & BOP-C&I PART OF DDCMIS ARE IN CONTRACTORS SCOPE OF SUPPLY.
8. THE SIZE OF DRAIN LINES SHALL NOT BE LESS THAN 50 NB.

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FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.		APPD.	DATE
B	RELEASED FOR TENDER	VCG	AS	PKD		AA	21.05.24
A	RELEASED FOR TENDER	AS	AS	PKD		AA	06/06/22
					M / C&I		
					CLEARED BY		

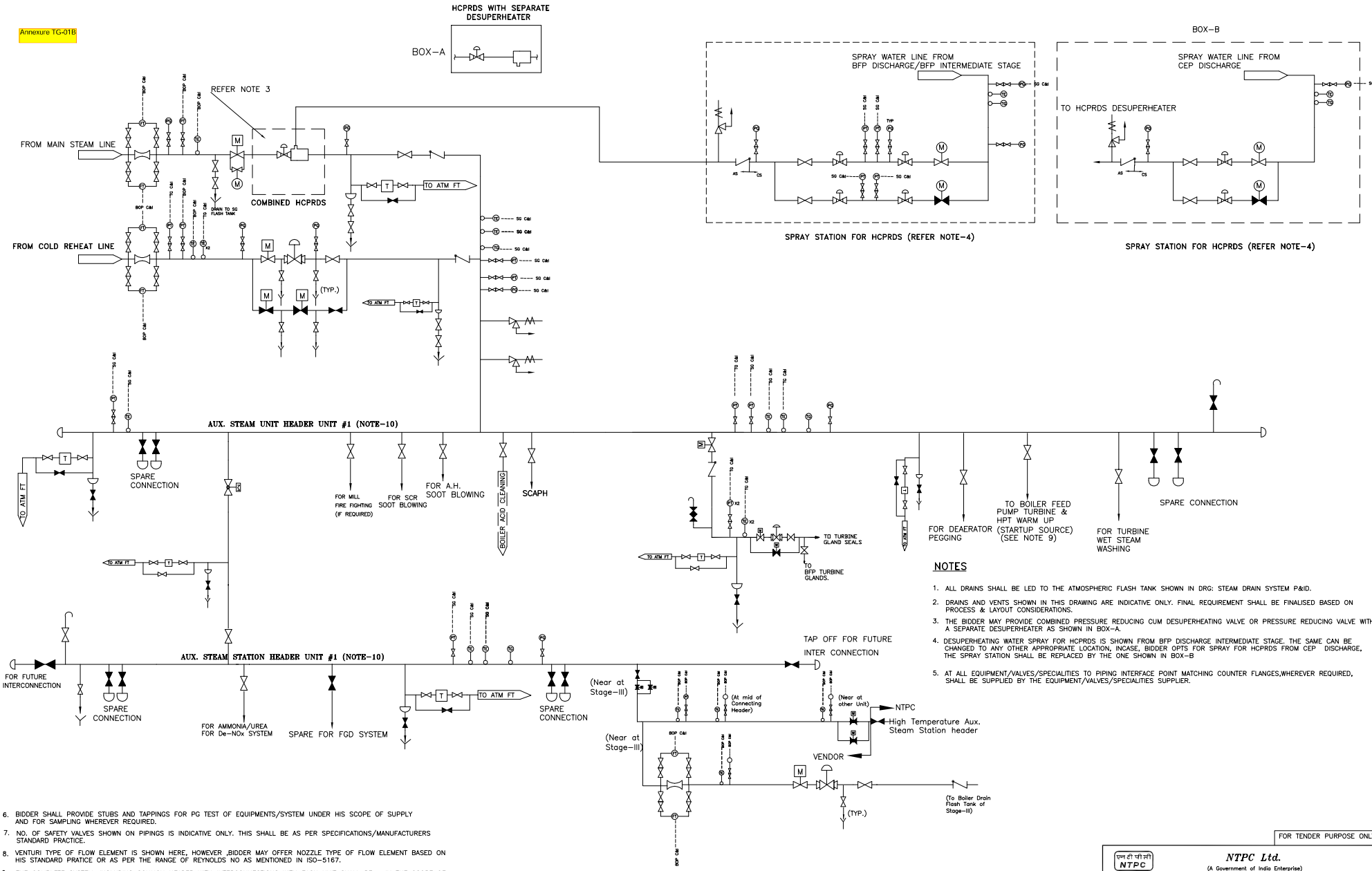
NTPC Ltd.
(A Government of India Enterprise)
ENGINEERING DIVISION

PROJECT: SIPAT STPP STAGE-III (1X800 MW)
(EPC PACKAGE)

TITLE: HP & LP BYPASS SYSTEM P&ID

SIZE	SCALE	DRG NO.	REV. NO.
A-1	NTS	XXXX-999-PDM-A-005	B

Annexure TG-01B



NOTES

1. ALL DRAINS SHALL BE LED TO THE ATMOSPHERIC FLASH TANK SHOWN IN DRG: STEAM DRAIN SYSTEM P&ID.
2. DRAINS AND VENTS SHOWN IN THIS DRAWING ARE INDICATIVE ONLY. FINAL REQUIREMENT SHALL BE FINALISED BASED ON PROCESS & LAYOUT CONSIDERATIONS.
3. THE BIDDER MAY PROVIDE COMBINED PRESSURE REDUCING CUM DESUPERHEATING VALVE OR PRESSURE REDUCING VALVE WITH A SEPARATE DESUPERHEATER AS SHOWN IN BOX–A.
4. DESUPERHEATING WATER SPRAY FOR HCPRDS IS SHOWN FROM BFP DISCHARGE INTERMEDIATE STAGE. THE SAME CAN BE CHANGED TO ANY OTHER APPROPRIATE LOCATION, INCASE, BIDDER OPTS FOR SPRAY FOR HCPRDS FROM CEP DISCHARGE, THE SPRAY STATION SHALL BE REPLACED BY THE ONE SHOWN IN BOX–B
5. AT ALL EQUIPMENT/VALVES/SPECIALITIES TO PIPING INTERFACE POINT MATCHING COUNTER FLANGES,WHEREVER REQUIRED, SHALL BE SUPPLIED BY THE EQUIPMENT/VALVES/SPECIALITIES SUPPLIER.
6. BIDDER SHALL PROVIDE STUBS AND TAPPINGS FOR PG TEST OF EQUIPMENTS/SYSTEM UNDER HIS SCOPE OF SUPPLY AND FOR SAMPLING WHEREVER REQUIRED.
7. NO. OF SAFETY VALVES SHOWN ON PIPINGS IS INDICATIVE ONLY. THIS SHALL BE AS PER SPECIFICATIONS/MANUFACTURERS STANDARD PRACTICE.
8. VENTURI TYPE OF FLOW ELEMENT IS SHOWN HERE, HOWEVER ,BIDDER MAY OFFER NOZZLE TYPE OF FLOW ELEMENT BASED ON HIS STANDARD PRATICE OR AS PER THE RANGE OF REYNOLDS NO AS MENTIONED IN ISO–5167.
9. THE COMPLETE SYSTEM, INCLUDING COMMON HEADER WITH INTERCONNECTIONS WITH EACH UNIT SHALL BE IN THE SCOPE OF VENDOR AND THE SYSTEM SHALL BE DESIGNED SO AS TO ENABLE STARTUP OF ANY UNIT WITH TDBFP BY TAKING MOTIVE STEAM FROM OTHER RUNNING UNITS.
10. #THE OPERATING PRESSURE AND TEMPERATURE OF AUX. STEAM UNIT STATION HEADER SHALL BE OPTIMIZED BY THE BIDDER MAINTAINING A MINIMUM 50C SUPERHEAT AND MINIMUM TEMPERATURE OF 310°C.
11. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF BIDDER.THE MEASURING INSTRUMENTS INDICATED IN THE TENDER P&ID ARE MINIMUM THAT ARE REQUIRED TO BE PROVIDED BY THE BIDDER.IN CASE ADDITIONAL INSTRUMENTS ARE REQUIRED AS PER THE STANDARD & PROVEN PRACTICE OF BIDDER, THE SAME SHALL BE SUPPLIED WITHIN THIS CONTRACT.
12. SG–C&I,TG–C&I AND BOP–C&I PART OF DDCMIS ARE IN THE CONTRACTOR'S SCOPE OF SUPPLY.
13. ALL THE REMOTE INSTRUMENTS TO BE HOOKED UP TO THE SG CONTROL SYSTEM (AUX. PRDS CONTROL SYSTEM) UNLESS INDICATED OTHERWISE.

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD.	DATE
C	REVISED FOR TENDER					31.05.24
B	REVISED FOR TENDER					
A	RELEASED FOR TENDER	VCG	AS	PKD	AA	

CLEARED BY: M C&I

FOR TENDER PURPOSE ONLY

NTPC Ltd.
(A Government of India Enterprise)
ENGINEERING DIVISION

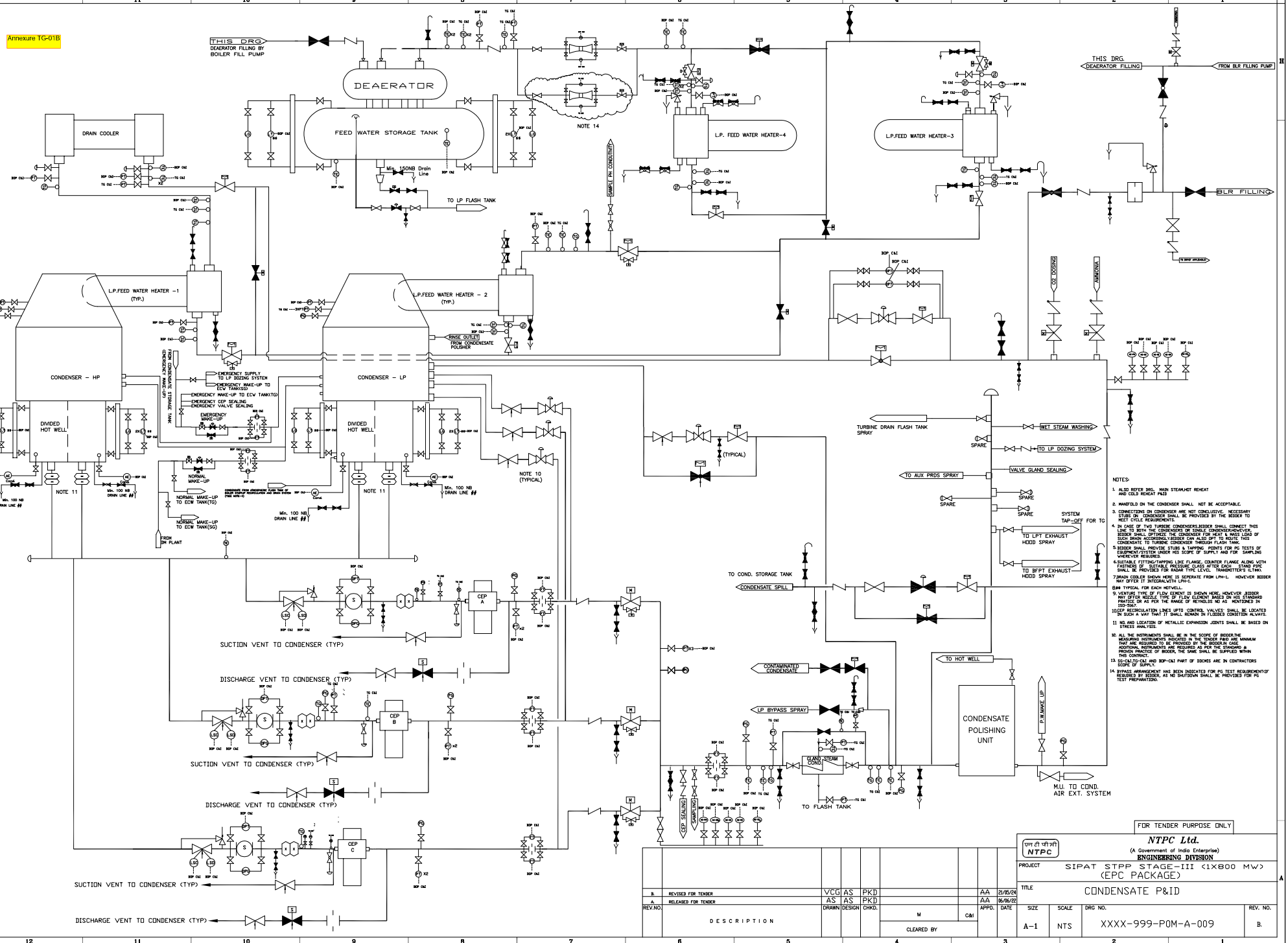
PROJECT: SIPAT STPP STAGE–III (1X800 MW) (EPC PACKAGE)

TITLE: AUXILIARY STEAM SYSTEM P&ID

SIZE	SCALE	DRG NO.	REV. NO.
A–1	NTS	XXXX–999–POM–A–006	C.

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Annexure TG-01B



NOTES:

1. ALSO REFER DRG. MAIN STEAM,HOT REHEAT AND COLD REHEAT P&ID
2. MANIFOLD ON THE CONDENSER SHALL NOT BE ACCEPTABLE.
3. CONNECTIONS IN CONDENSER ARE NOT CONCLUSIVE. NECESSARY STUBS ON CONDENSER SHALL BE PROVIDED BY THE BIDDER TO MEET CYCLE REQUIREMENTS.
4. IN CASE OF TWO TURBINE CONDENSERS,BIDDER SHALL CONNECT THIS LINE TO BOTH THE CONDENSERS OR SINGLE CONDENSER,HOWEVER, BIDDER SHALL OPTIMIZE THE CONDENSER FOR HEAT & MASS LOAD OF SUCH MAIN ACCORDINGLY.BIDDER CAN ALSO OPT TO ROUTE THIS CONDENSATE TO TURBINE CONDENSER THROUGH FLASH TANK.
5. BIDDER SHALL PROVIDE STUBS & TAPPING POINTS FOR PG TESTS OF EQUIPMENT/SYSTEM UNDER HIS SCOPE OF SUPPLY AND FOR SAMPLING WHEREVER REQUIRED.
6. SUITABLE FITTING/TAPPING LIKE FLANGE, COUNTER FLANGE ALONG WITH FASTNERS OF SUITABLE PRESSURE CLASS AFTER EACH STAND PIPE SHALL BE PROVIDED FOR RADAR TYPE LEVEL TRANSMITTER'S (LT##).
7. DRAIN COOLER SHOWN HERE IS SEPERATE FROM LPH-1, HOWEVER BIDDER MAY OFFER IT INTEGRAL WITH LPH-1.
8. ## TYPICAL FOR EACH HOTWELL.
9. VENTURIS TYPE OF FLOW ELEMENT IS SHOWN HERE, HOWEVER ,BIDDER MAY OFFER NOZZLE TYPE OF FLOW ELEMENT BASED ON HIS STANDARD PRATICE OR AS PER THE RANGE OF REYNOLDS NO AS MENTIONED IN ISO-5167.
10. CEP RECIRCULATION LINES UPTO CONTROL VALVES SHALL BE LOCATED IN SUCH A WAY THAT IT SHALL REMAIN IN FLOODED CONDITION ALWAYS.
11. NO. AND LOCATION OF METALLIC EXPANSION JOINTS SHALL BE BASED ON STRESS ANALYSIS.
12. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF BIDDER.THE MEASURING INSTRUMENTS INDICATED IN THE TENDER P&ID ARE MINIMUM THAT ARE REQUIRED TO BE PROVIDED BY THE BIDDER.IN CASE ADDITIONAL INSTRUMENTS ARE REQUIRED AS PER THE STANDARD & PROVEN PRACTICE OF BIDDER, THE SAME SHALL BE SUPPLIED WITHIN THIS CONTRACT.
13. SG-CW,TG-CW1 AND BOP-CW1 PART OF DCMCS ARE IN CONTRACTORS SCOPE OF SUPPLY.
14. BYPASS ARRANGEMENT HAS BEEN INDICATED FOR PG TEST REQUIREMENT(IF REQUIRED BY BIDDER, AS NO SHUTDOWN SHALL BE PROVIDED FOR PG TEST PREPARATION.

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD.	DATE
B.	REVISED FOR TENDER	VCG	AS	PKD	AA	21/05/24
A.	RELEASED FOR TENDER	AS	AS	PKD	AA	06/06/22

CLEARED BY: M C&I

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PROJECT: SIPAT STPP STAGE-III (1X800 MW) (EPC PACKAGE)

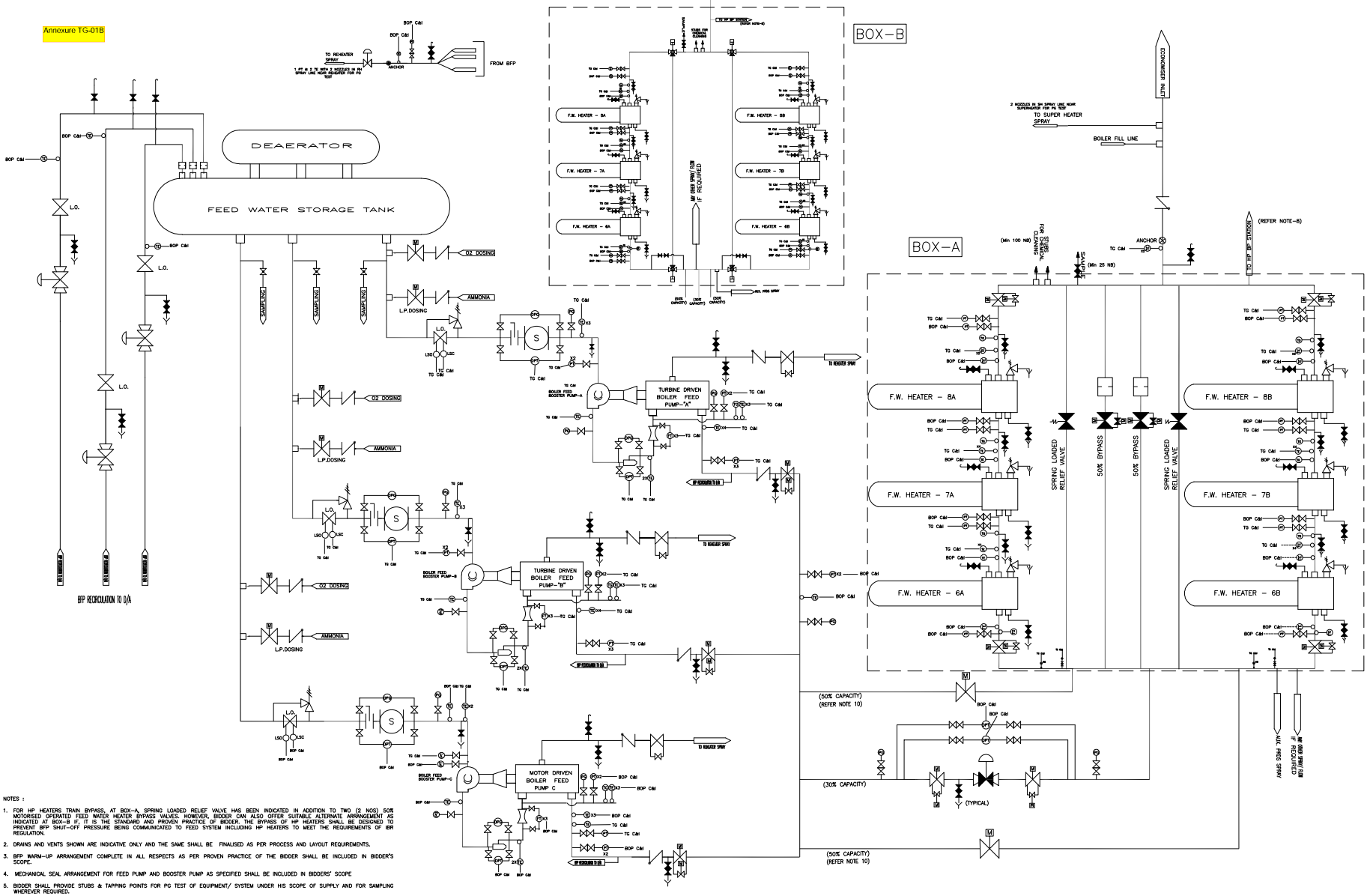
TITLE: CONDENSATE P&ID

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Annexure TG-01B



NOTES :

1. FOR HP HEATERS TRAIN BYPASS, AT BOX-A, SPRING LOADED RELIEF VALVE HAS BEEN INDICATED IN ADDITION TO TWO (2 NOS) 50% MOTORISED OPERATED FEED WATER HEATER BYPASS VALVES. HOWEVER, BIDDER CAN ALSO OFFER SUITABLE ALTERNATE ARRANGEMENT AS INDICATED AT BOX-B IF, IT IS THE STANDARD AND PROVEN PRACTICE OF BIDDER. THE BYPASS OF HP HEATERS SHALL BE DESIGNED TO PREVENT BFP SHUT-OFF PRESSURE BEING COMMUNICATED TO FEED SYSTEM INCLUDING HP HEATERS TO MEET THE REQUIREMENTS OF IBR REGULATION.
2. DRAINS AND VENTS SHOWN ARE INDICATIVE ONLY AND THE SAME SHALL BE FINALISED AS PER PROCESS AND LAYOUT REQUIREMENTS.
3. BFP WARM-UP ARRANGEMENT COMPLETE IN ALL RESPECTS AS PER PROVEN PRACTICE OF THE BIDDER SHALL BE INCLUDED IN BIDDER'S SCOPE.
4. MECHANICAL SEAL ARRANGEMENT FOR FEED PUMP AND BOOSTER PUMP AS SPECIFIED SHALL BE INCLUDED IN BIDDERS' SCOPE
5. BIDDER SHALL PROVIDE STUBS & TAPPING POINTS FOR PG TEST OF EQUIPMENT/ SYSTEM UNDER HIS SCOPE OF SUPPLY AND FOR SAMPLING WHEREVER REQUIRED.
6. 2X50% LINE IS SHOWN HERE ALONG WITH 30% CAPACITY FEED CONTROL VALVE. HOWEVER INSTEAD OF 2X50% LINE ,BIDDER MAY OFFER 1X100% LINE ALONG WITH 30% CAPACITY FEED CONTROL VALVE.
7. VENTURI TYPE OF FLOW ELEMENT IS SHOWN HERE, HOWEVER ,BIDDER MAY OFFER NOZZLE TYPE OF FLOW ELEMENT BASED ON HIS STANDARD PRACTICE OR AS PER THE RANGE OF REYNOLDS NO AS MENTIONED IN ISO-5167.
8. TAPPING FOR HP BYPASS SPRAY HAS BEEN SHOWN DOWNSTREAM OF HP HEATERS. HOWEVER, BIDDER MAY TAKE THIS TAPPING UPSTREAM OF HP HEATER AS PER THEIR STANDARD PRACTICE.
9. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF BIDDER.THE MEASURING INSTRUMENTS INDICATED IN THE TENDER P&ID ARE MINIMUM THAT ARE REQUIRED TO BE PROVIDED BY THE BIDDER.IN CASE ADDITIONAL INSTRUMENTS ARE REQUIRED AS PER THE STANDARD & PROVEN PRACTICE OF BIDDER, THE SAME SHALL BE SUPPLIED WITHIN THIS CONTRACT.
10. SG-C&I,TG-C&I AND BOP-C&I PART OF DDCMIS ARE IN THE CONTRACTOR'S SCOPE OF SUPPLY.
11. THE SIZE OF DRAIN LINES SHALL NOT BE LESS THAN 50 NB.

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PROJECT: SIPAT STPP STAGE-III (1X800 MW)
(EPC PACKAGE)

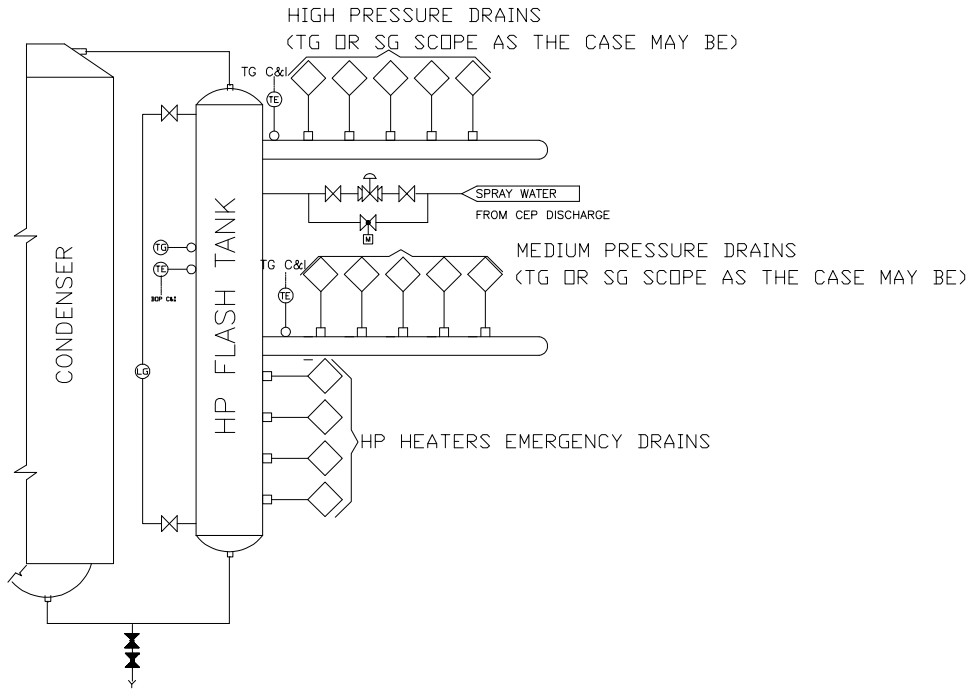
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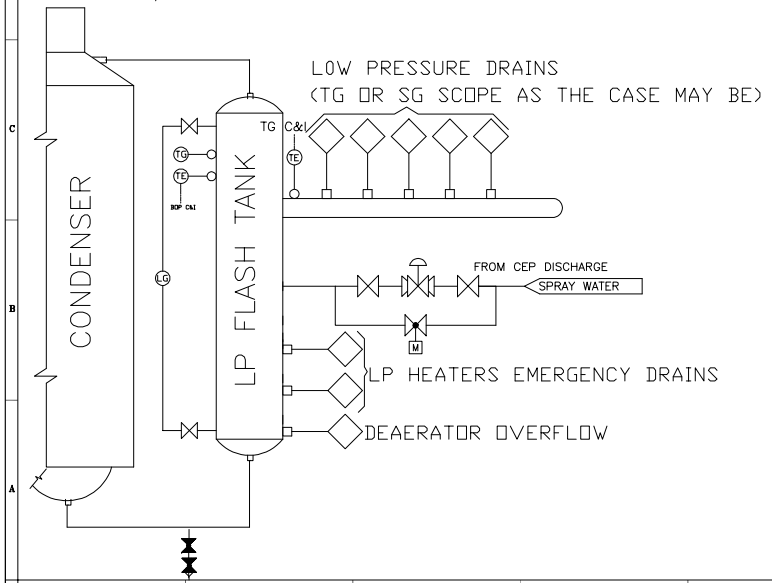
REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD.	DATE
B.	REVISED FOR TENDER	AS	AS	PKD	AA	21/05/24
A.	RELEASED FOR TENDER	AS	AS	PKD	AA	06/06/22

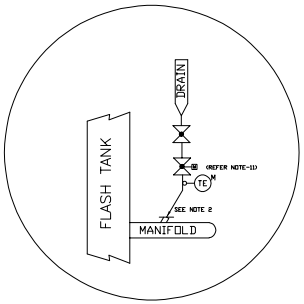
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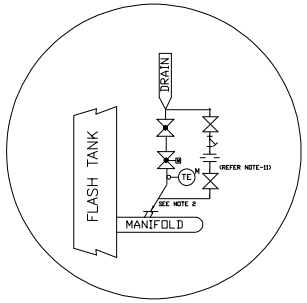
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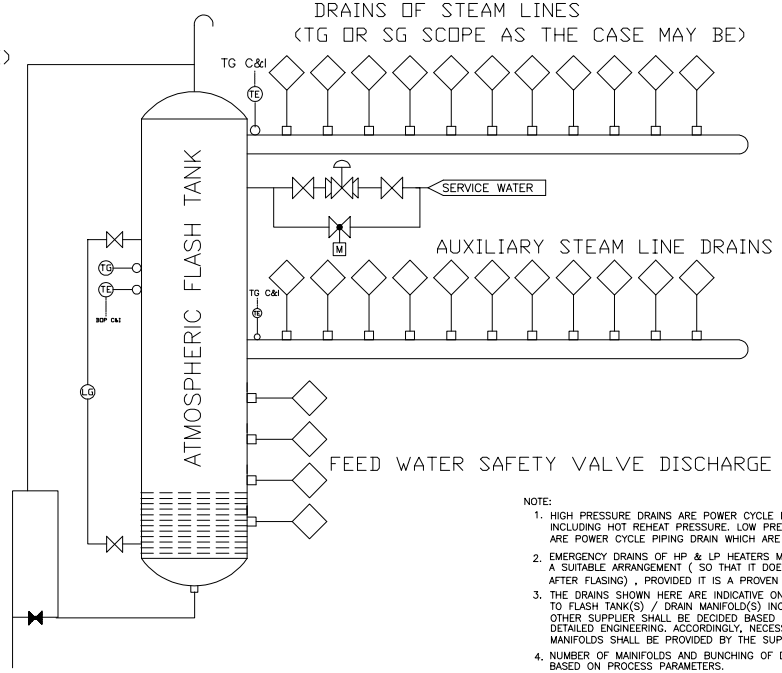
Annexure TG-01B











NOTE:

1. HIGH PRESSURE DRAINS ARE POWER CYCLE DRAINS WHICH ARE AT PRESSURE ABOVE AND INCLUDING HOT REHEAT PRESSURE. LOW PRESSURE DRAINS AND MEDIUM PRESSURE DRAINS ARE POWER CYCLE PIPING DRAIN WHICH ARE AT A PRESSURE BELOW HOT REHEAT PRESSURE.
2. EMERGENCY DRAINS OF HP & LP HEATERS MAY BE LED TO THE CONDENSER THROUGH A SUITABLE ARRANGEMENT (SO THAT IT DOES NOT DAMAGE THE CONDENSER COMPONENTS AFTER FLASING) , PROVIDED IT IS A PROVEN PRACTICE OF THE SUPPLIER.
3. THE DRAINS SHOWN HERE ARE INDICATIVE ONLY. FINAL REQUIREMENT OF DRAIN CONNECTIONS TO FLASH TANK(S) / DRAIN MANIFOLD(S) INCLUDING DRAINS FROM PIPING/EQUIPMENT OF OTHER SUPPLIER SHALL BE DECIDED BASED ON PROCESS/LAYOUT CONSIDERATION DURING DETAILED ENGINEERING. ACCORDINGLY, NECESSARY STUBS ON THE FLASH TANK(S)/DRAIN MANIFOLDS SHALL BE PROVIDED BY THE SUPPLIER.
4. NUMBER OF MAINIFOLDS AND BUNCHING OF DRAINS ON MANIFOLDS MAY BE CHANGED BASED ON PROCESS PARAMETERS.
5. IN ADDITION TO WHAT IS INDICATED IN THIS DRG. ALL THE REQUIREMENTS OF ASME-TDP (LATEST) SHALL BE DULY MET BY THE BIDDER. IN ADDITION, THE SUPPLIER SHALL INCLUDE THE SUPPLIES WHICH ARE AS PER SUPPLIERS STANDARD PRACTICE.
6. MINIMUM TWO NOS. OF STUBS ON EACH MANIFOLD ON EACH FLASH TANK SHALL BE PROVIDED BY THE SUPPLIER AS SPARE , AFTER FINALISATION OF TOTAL REQUIREMENT.
7. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF BIDDER.THE MEASURING INSTRUMENTS INDICATED IN THE TENDER P&ID ARE MINIMUM THAT ARE REQUIRED TO BE PROVIDED BY THE BIDDER.IN CASE ADDITIONAL INSTRUMENTS ARE REQUIRED AS PER THE STANDARD & PROVEN PRACTICE OF BIDDER, THE SAME SHALL BE SUPPLIED WITHIN THIS CONTRACT.
8. ALSO REFER DRG. NO. XXXX-999-POM-A-004 TO XXXX-999-POM-A-011
9. IN LIEU OF HP & LP FLASH TANKS, BIDDER MAY ALSO OFFER FLASH BOXES ATTACHED TO CONDENSER, IF IT IS A STANDARD AND PROVEN PRACTICE OF THE BIDDER. HOWEVER, NUMBER OF FLASH TANKS/ FLASH BOXES SHALL BE AS INDICATED IN THIS TENDER P&ID.
10. TEMPRATURE ELEMENTS TE TO BE PROVIDED AT THE DOWNSTREAM OF ALL REMOTE CONTROLLED ON/OFF DRAIN VALVES. TEMPERATURE ELEMENT IS TO BE CONNECTED TO CONTROL SYSTEM WHEREIN UPSTREAM DRAIN VALVE IS BEING CONNECTED.
11. SG-C&I,TG-C&I AND BOP-C&I PART OF DDCMIS ARE IN CONTRACTORS SCOPE OF SUPPLY.
12. THE MOTORISED VALVE IN DRAIN LINES HAVE BEEN SHOWN IN THIS P&ID. HOWEVER, BIDDER MAY OFFER PNEUMATIC VALVES IN DRAIN LINES, IF IT IS A STANDARD & PROVEN PRACTICE OF THE BIDDER.
13. SIZING OF ATMOSPHERIC FLASH TANK AND SPRAY WATER TO IT, SHALL BE DONE BY THE BIDDER SUCH THAT WASTE WATER,IF DRAINED TO OPEN PIT,ITS TEMPERATURE SHOULD NOT BE MORE THAN 60 DEG C.
14. THE SIZE OF DRAIN LINES SHALL NOT BE LESS THAN 40 NB.

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.			APPD.	DATE
B	REVISED FOR TENDER PURPOSE	VCG	AS	PKD			AA	21/05/24
A	RELEASED FOR TENDER PURPOSE							06/06/22
		AS	AS	PKD	M	C&I	AA	
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PROJECT: SIPAT STPP STAGE-III (1X800 MW)
(EPC PACKAGE)

TITLE: STEAM DRAIN SYSTEM P&ID

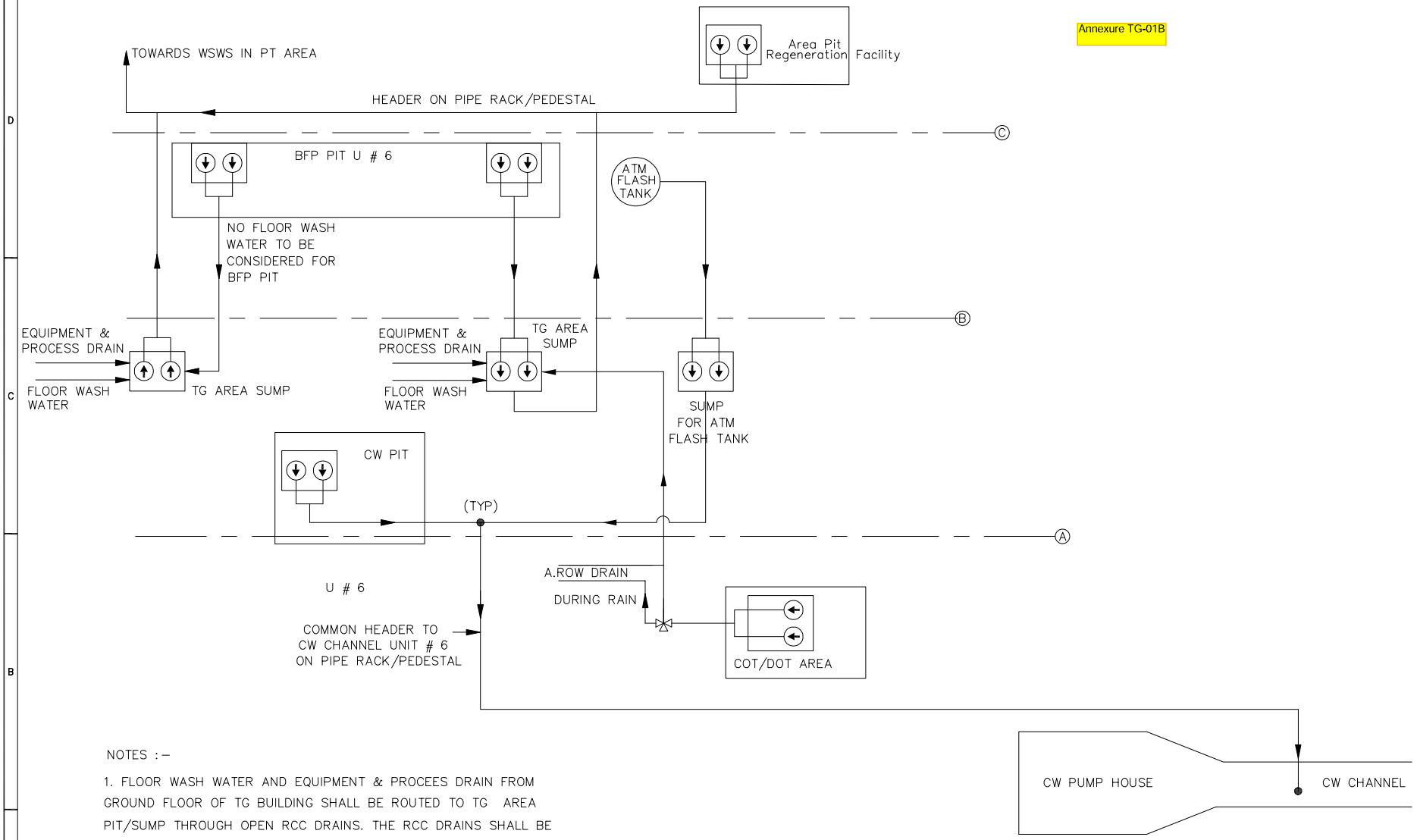
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Annexure TG-01B



NOTES :–

1. FLOOR WASH WATER AND EQUIPMENT & PROCEES DRAIN FROM GROUND FLOOR OF TG BUILDING SHALL BE ROUTED TO TG AREA PIT/SUMP THROUGH OPEN RCC DRAINS. THE RCC DRAINS SHALL BE PROVIDED WITH REMOVABLE GI ELECTROFORGED GRATING COVER.

2. FLOOR WASH WATER AND EQUIPMENT & PROCEES DRAIN FROM VARIOUS UPPER FLOORS OF TG BUILDING SHALL BE ROUTED TO TG AREA PIT/SUMP THROUGH DOWNCOMER ALONG COLUMN.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
B.	REVISED FOR TENDER PURPOSE	VCG	AS	PKD				AA		21.05.24
A.	RELEASED FOR TENDER PURPOSE				P	WS	PL	TG		

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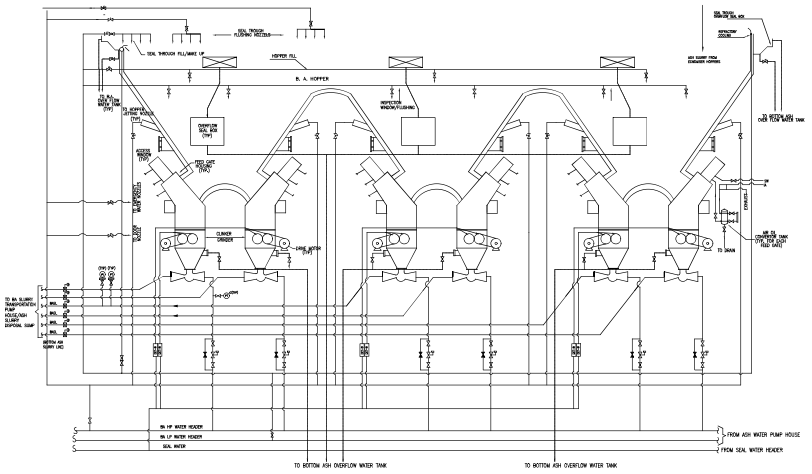
PROJECT: SIPAT STPP STAGE–III (1X800 MW) (EPC PACKAGE)

TITLE: SCHEME FOR PLANT EFFLUENT SEPARATION TG AREA

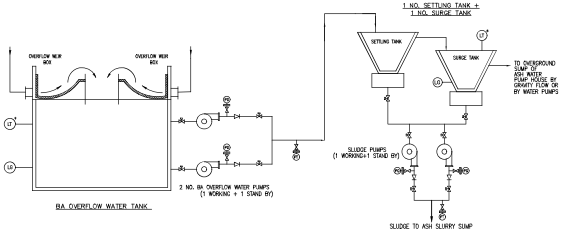
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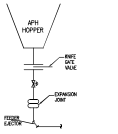
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Annexure MH-03B

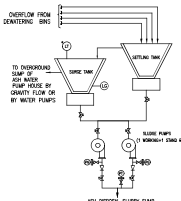


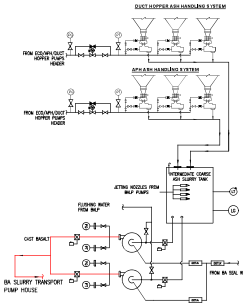
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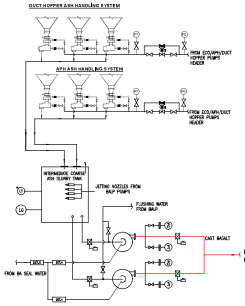




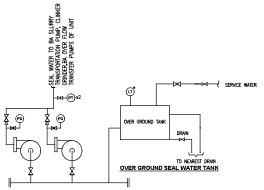
DETAIL-A

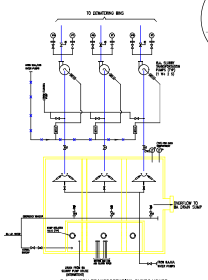


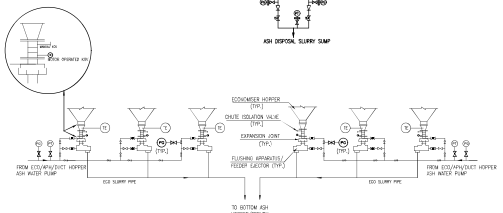


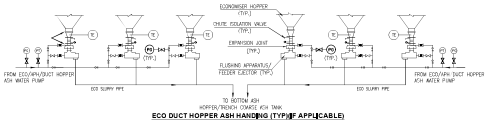


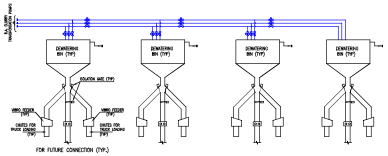
COARSE ASH SLURRY DISPOSAL SYSTEM

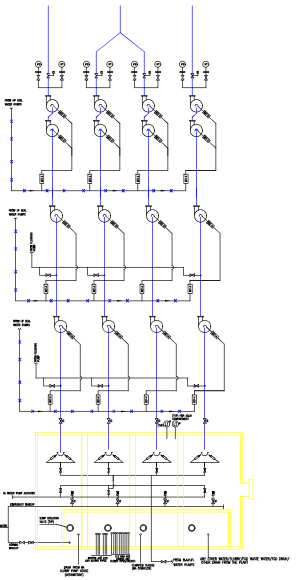








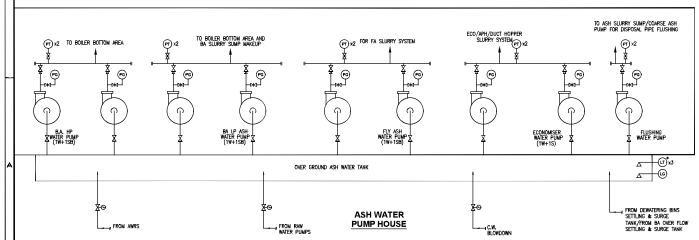


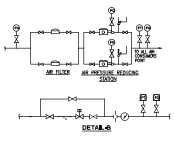


NOTES

1. BOTTOM ASH / ECO ASH / APH ASH / DUCT HOPPER ASH HANDLING SYSTEM SHOWN IS INDICATIVE. COMPLETE ASH HANDLING SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT. THE NOS. OF ECONOMISER, DUCT HOPPERS AND AIR PREHEATER HOPPERS SHALL BE DECIDED BY THE BIDDER.
2. THE SCHEME & NO. OF PUMPS/EQUIPMENT SHALL BE FINALISED BASED ON STIPULATIONS OF TECHNICAL SPECIFICATION & SYSTEM REQUIREMENTS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH TECH.SPECS. AND OTHER TENDER DOCUMENTS. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
4. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS SPECIFIED.
5. THE BOTTOM ASH HOPPER OVERFLOW WATER SHALL BE LED TO AN OVERFLOW TANK. BOTTOM ASH OVERFLOW WATER PUMP SHALL TAKE SUCTION FROM THIS OVERFLOW TANK AND PUMP THE WATER TO THE REQUIRED TREATMENT FACILITIES. SUITABLE CHEMICAL TREATMENT / FILTRATION / CLARIFICATION ETC. SHALL BE PROVIDED SO THAT TSS OF OUTLET WATER AT DISCHARGE OF SETTLING TANK/SURGE TANK SHALL NOT BE MORE THAN 100 PPM BEFORE THE WATER IS BEING DISCHARGED TO THE SUMP OF ASH WATER PUMP HOUSE.
6. OVER FLOW FROM DEWATERING BINS SHALL BE TAKEN TO SETTLING TANK.SUITABLE CHEMICAL TREATMENT/ FILTRATION / CLARIFICATION ETC. SHALL BE PROVIDED SO THAT TSS OF OUTLET WATER AT DISCHARGE OF SETTLING TANK/SURGE TANK SHALL NOT BE MORE THAN 100 PPM BEFORE THE WATER IS BEING DISCHARGED TO THE SUMP OF ASH WATER PUMP HOUSE.
7. THE ASH SLURRY PIPING FROM THE DISCHARGE OF JET PUMP UP TO BA SLURRY TRANSPORTATION SUMP AND ASH SLURRY DISPOSAL SUMP SHALL BE BASALT LINED. ASH SLURRY TRANSPORTATION PIPING WITH IN SLURRY PUMP HOUSE AND UP TO DEWATERING BINS SHALL BE BASALT LINED.
8. FOR MEETING THE FLUSHING APPARATUS WATER REQUIREMENT OF ECO HOPPERS, TWO(2) NOS. (ONE WORKING AND ONE STANDBY) ECONOMISER ASH WATER PUMPS ALONG WITH VALVES, PIPES & FITTINGS SHALL BE PROVIDED FOR ALL UNITS.THESE PUMPS SHALL BE LOCATED IN ASH WATER PUMP HOUSE.
9. FOR SEALING OF BA COOLING WATER OVERFLOW PUMPS, COOLING OF BA OVERFLOW PUMP FLUID COUPLING, SEALING OF CLINKER GRINDERS ETC, BIDDER SHALL PROVIDE TWO (2) NOS. (1 WORKING + 1 STANDBY) SEAL WATER PUMPS.
10. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
11. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBERS SHALL BE INDICATED ON DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
12. FOR SEALING OF BA SLURRY TRANSPORTATION PUMPS, BIDDER SHALL PROVIDE TWO (2) NOS. (1 WORKING + 1 STANDBY) BA SEAL WATER PUMPS. IN CASE, BA SLURRY TRANSPORTATION PUMPS SHALL BE LOCATED INSIDE ASH SLURRY DISPOSAL PUMP HOUSE, HP & LP SEAL WATER PUMPS (AS SPECIFIED ELSEWHERE) FOR SLURRY DISPOSAL PUMP MAY BE PROVIDED FOR BOTH BA SLURRY TRANSPORTATION PUMPS & ASH SLURRY DISPOSAL PUMPS, IF FEASIBLE.
13. RECIRCULATION LINE ALONG WITH VALVES AND INSTRUMENTATION IN ASH WATER PUMPS SHALL BE PROVIDED.
14. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.

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TYPICAL INSTRUMENT AIR CONNECTION

LEGEND :

PLUG VALVE	STRAINER	DIFFERENTIAL PRESSURE GUAGE
GLOBE VALVE	SOLENOID VALVE (PNEUMATICALLY OPERATED)	LEVEL INDICATOR
NON RETURN VALVE	MOTORISED VALVE	DIAPHRAGM SEAL
ISOLATION VALVE	ASH SLURRY VALVE	PNEUMATIC VALVE
ISOLATION VALVE (PNEUMATICALLY OPERATED)	PRESSURE TRANSMITTER	FLOW INDICATOR
RELIEF VALVE	LEVEL TRANSMITTER (ULTRASONIC TYPE)	BAGL BOTTOM ASH SLURRY LINE
PUMP	LEVEL GAUGE	IA INSTRUMENT AIR LINE
PRESSURE SWITCH	INSTRUMENT VALVE	LS LEVEL SWITCH
PRESSURE GUAGE		

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C M E C&M CLEARED BY	APPD.	DATE
C	REISSUED FOR TENDER	HEMEN	ASHISH				17.05.24
B	REISSUED FOR TENDER	HEMEN	ASHUT				24.11.23
A	REISSUED FOR TENDER	HEMEN ASHISH	ASHUT				10.08.23

CONSULTANT: एनटीपीसी NTPC

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ENGINEERING DIVISION

PROJECT: SIPAT THERMAL POWER STATION
STAGE-II (1X800 MW)

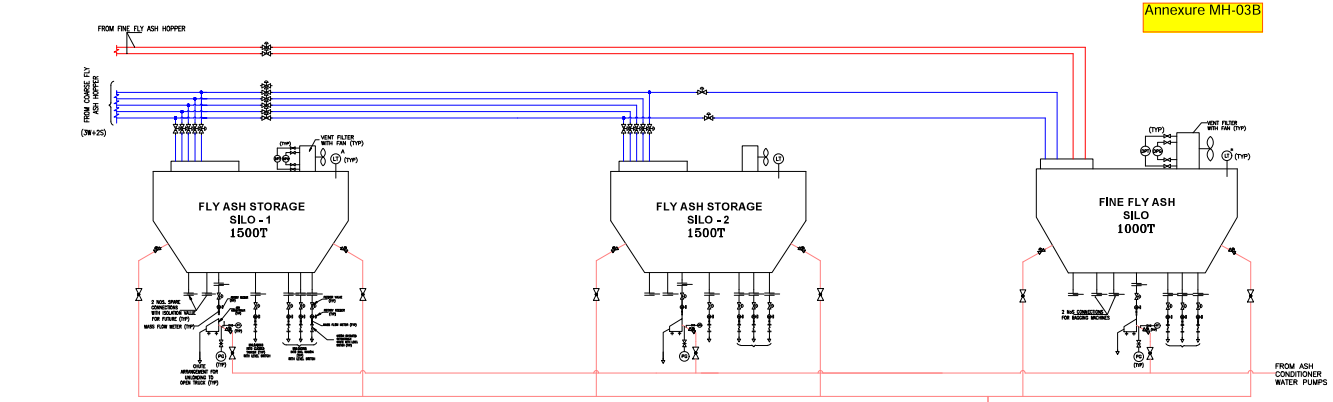
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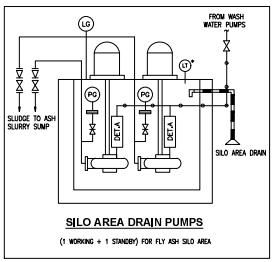
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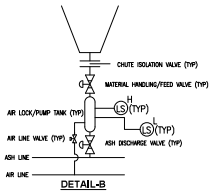
Annexure MH-03B



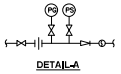


SILO AREA DRAIN PUMPS

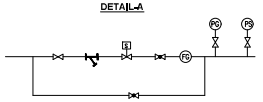
(1 WORKING + 1 STANDBY) FOR FLY ASH SILO AREA



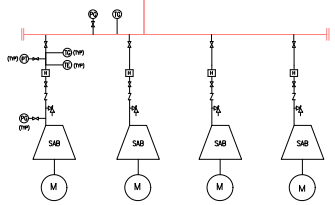
DETAIL-B



DETAIL-A

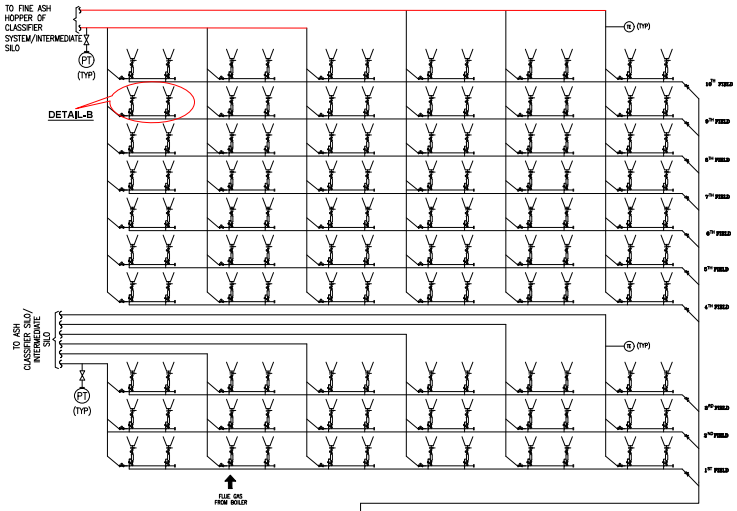


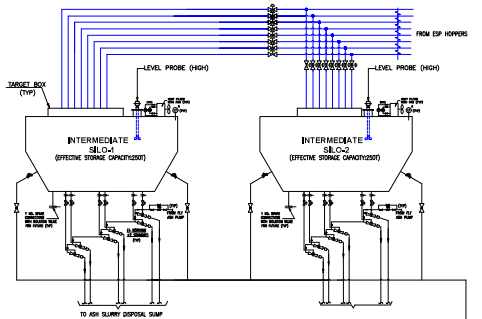
DETAIL-C



FLY ASH SILO-AERATION BLOWERS

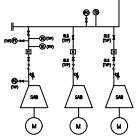
(3 WORKING + 1 COMMON STANDBY)

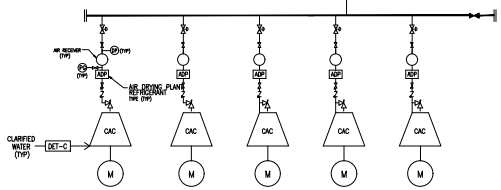




INTERMEDIATE SILOS

(1 WORKING + 1 STANDBY)

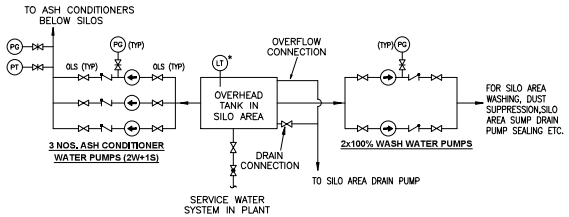




FIVE (5) CONVEYING AIR COMPRESSORS (CAC)

(3 WORKING +2 STANDBY)

TYPICAL INSTRUMENT AIR CONNECTION



WATER SCHEME FOR SILO AREA

LEGEND :

- VACUUM BREAKER
- SOLENOID VALVE
- GLOBE VALVE
- BALL VALVE
- GATE VALVE
- NON RETURN VALVE
- Y-STRAINER
- PRESSURE RELEASE VALVE
- CHECK VALVE
- PNEUMATIC VALVE
- ISOLATION VALVE
- ISOLATION VALVE (CYL. OP.)
- H HEATER
- OLS OPEN LIMIT SWITCH
- DS DUST SENSOR
- FI FLOW INDICATOR
- PT PRESSURE TRANSMITTER
- PS PRESSURE SWITCH
- PG PRESSURE GAUGE
- ST SLURRY FLOW TRANSMITTER
- NDM NUCLEONIC DENSITY METER
- DM DENSITY METER (CORIOUS TYPE)
- M MOTOR
- VFD VARIABLE FREQUENCY DRIVE
- DPT DIFF PRESSURE TRANSMITTER
- DPS DIFF PRESSURE SWITCH
- DPG DIFF PRESSURE GAUGE
- LT* LEVEL TRANSMITTER (ULTRASONIC TYPE)
- LT** LEVEL TRANSMITTER (RADAR TYPE)
- LS LEVEL SWITCH
- LG LEVEL GAUGE
- LI LEVEL INDICATOR
- TE TEMP ELEMENT
- TG TEMP GAUGE
- VT VACUUM TRANSMITTER
- VG VACUUM GAUGE
- DP DEW POINT METER
- LT^ LEVEL TRANSMITTER-ACOUSTIC FREQUENCY BASED
- FT FLOW TRANSMITTER

NOTES:

1. FLY ASH CONVEYING SYSTEM FOR FLY ASH HOPPERS SHOWN IS INDICATIVE AND IS FOR ONE UNIT ONLY AND THE SAME SHALL BE IDENTICAL FOR OTHER UNIT. BIDDER TO PROVIDE FOR SEGREGATION OF COARSE AND FINE ASH FROM ESP HOPPERS. THE NUMBER OF ESP HOPPERS SHALL BE DECIDED BY BIDDER.
2. MATERIAL OF SEAL USED IN MATERIAL HANDLING VALVE SHALL BE SUITABLE FOR CONTINUOUS OPERATING TEMPERATURE AND ALSO SUITABLE FOR OCCASIONAL EXPOSURE TO MAXIMUM TEMPERATURE. BIDDER SHALL ALSO PROVIDE SUITABLE ARRANGEMENT TO TAKE CARE OF HOT AIR COMING OUT OF BUFFER HOPPER. BAG FILTERS SHALL BE SELECTED SUITABLE FOR TEMPERATURE SUITABLE UPTO 50°C MORE THAN THE PREDICTED TEMPERATURE AT BUFFER HOPPERS/MAIN STORAGE.
3. CONVEYING AIR COMPRESSORS, TRANSPORT AIR COMPRESSOR & INSTRUMENT AIR COMPRESSORS SHOWN ARE TYPICAL.
4. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECH. SPEC. AND OTHER TENDER DOCUMENTS.
5. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS AS SPECIFIED.
6. INSTRUMENT AIR PIPING IS NOT SHOWN IN THE DRG. IT SHALL BE ROUTED TO DIFFERENT VALVES, BAG FILTERS ETC. IN FLY ASH HANDLING SYSTEM AS PER SYSTEM DESIGN AND REQUIREMENTS.
7. SUITABLE DUST SUPPRESSION FACILITIES SHALL BE PROVIDED IN SILO AREA. RING HEADER WITH SUITABLE FOGGING NOZZLES (PLAIN WATER) ALONG THE PERIPHERY OF EACH SILO SHALL BE PROVIDED.
8. EACH TRANSPORT AIR COMPRESSOR AND CONVEYING AIR COMPRESSOR SHALL BE PROVIDED WITH INDEPENDENT AIR DRYING PLANT (REFRIGERANT TYPE, IF APPLICABLE) AND AIR RECEIVER AS PER TECH. SPECIFICATION.
9. a).EACH SILO AERATION BLOWER & BUFFER HOPPER AERATION BLOWER SHALL BE PROVIDED WITH INDEPENDENT AIR HEATERS AND ACCESSORIES AS PER TECH. SPEC.
   b) HOT AIR LINE FROM DISCHARGE OF HEATER (HEATER IF APPLICABLE) OF SILO AERATION BLOWER UP TO SILOS SHALL BE INSULATED.
10. NECESSARY HEAD ROOM (6.8M. MIN.) TO BE PROVIDED BELOW SILOS FOR TRUCK/RAIL WAGON MOVEMENT. THE SILO UNLOADING FACILITY SHALL BE SUITABLE FOR OPEN TRUCK/CLOSED TANKER/RAIL WAGON LOADING. HOWEVER, BIDDER SHALL ENSURE THAT THE CLEARANCE OF ASH SILOS OVER THE RAILWAY TRACKS SHALL BE AS PER RAILWAYS/RDSO GUIDELINES. THE SCOPE ALSO INCLUDES GETTING APPROVALS FROM RAILWAYS.
11. BOTH SILO AERATION AND BUFFER HOPPER AERATION BLOWERS SHALL BE AIR COOLED.
12. ALL DEVICES REQUIRING INSTRUMENT AIR SHALL BE PROVIDED WITH MANUAL ISOLATION VALVE IN IA LINE. THIS IS APPLICABLE FOR ENTIRE ASH HANDLING SYSTEM.
13. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
14. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBER SHALL BE INDICATED ON ALL DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
15. PRESSURE MEASUREMENT (TRANSMITTER) TO BE PROVIDED FOR INSTRUMENT AIR HEADER PRESSURE MEASUREMENT IN SILO AREA.
16. ONE NO. PT AND ONE NO. PG SHALL BE PROVIDED IN PULSE JETTING INSTRUMENT AIR HEADER/MANIFOLD OF SILO VENT FILTER.
17. BIDDER TO FURNISH ALL INSTRUMENTS/CONTROLS AS PER SYSTEM REQUIREMENT. INSTRUMENT AND CONTROLS FOR AUTOMATIC OPERATION OF PUMPS & EQUIPMENTS ARE NOT SHOWN FOR CLARITY IN THIS DRG. THE SAME SHALL BE PROVIDED AS PER SYSTEM REQUIREMENT AND AS SPECIFIED IN TECH. SPECIFICATION.
18. TWO (2) NOS. (ONE AT ENTRY & ONE AT EXIT) PITLESS TYPE WEIGH BRIDGE SHALL BE PROVIDED AT MAIN FLY ASH SILO AREA COMPLETE WITH ALL ELECTRICAL, CONTROLS, CIVIL AND STRUCTURAL WORKS FOR WEIGHMENT OF TRUCKS/TANKER FILLED FROM SILOS, ONE (1) NO. WEIGH BRIDGE FOR RAIL LOADING BELOW EACH MAIN FLY ASH SILO COMPLETE WITH ALL ELECTRICAL, CONTROLS, CIVIL AND STRUCTURAL WORKS. FOR WEIGHMENT FROM SILOS. MASS FLOW METER /SOLID FLOW METER FOR ONLINE WEIGHMENT OF TOTAL LOADED ASH OF WAGON/TRUCK, DURING LOADING SHALL BE PROVIDED FOR EACH MAIN FLY ASH SILO, AS SPECIFIED.
19. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
C	RELEASED FOR TENDER	NAKEN	ASHISH							17-05-22
B	RELEASED FOR TENDER	NAKEN	ABHIJIT							28-11-20
A	RELEASED FOR TENDER	NAKEN	ABHIJIT							31-05-20

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NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-III (1x800MW)

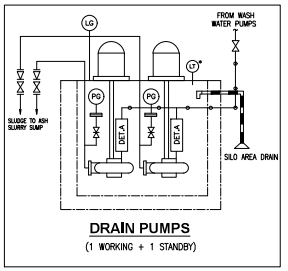
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SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM)

SIZE: A0 | SCALE: -- | DRG.NO.: XXXX-001-POM-A-028 | REV.: C

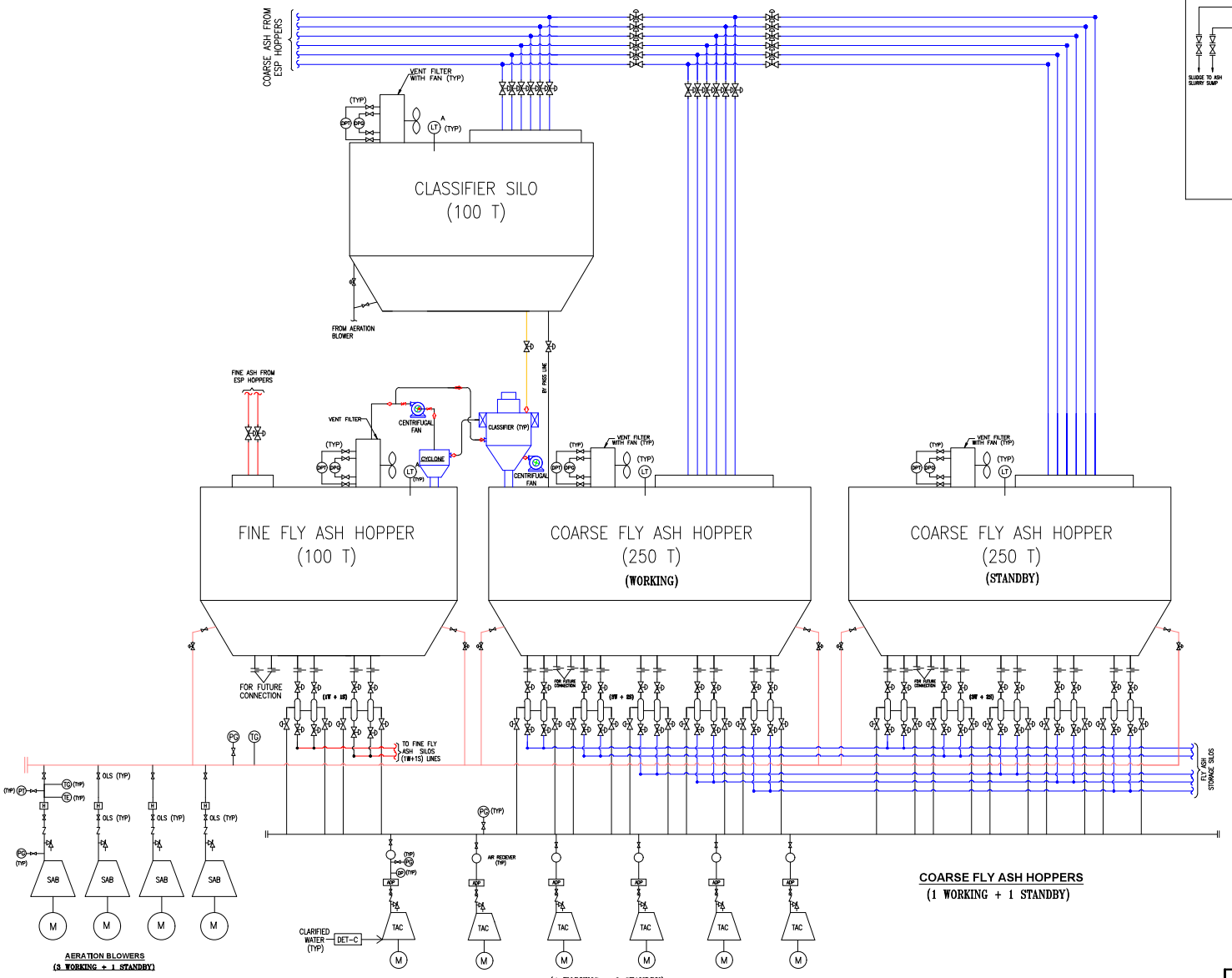
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Annexure MH-03B



DRAIN PUMPS
(1 WORKING + 1 STANDBY)



COARSE FLY ASH HOPPERS
(1 WORKING + 1 STANDBY)

NOTES

1. ASH CLASSIFIER SYSTEM SHOWN IS INDICATIVE ONLY. ASH CLASSIFIER SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT. ASH CLASSIFIER SYSTEM SHALL BE COMPLETE WITH ALL EQUIPMENT & ACCESSORIES LIKE AIR SLIDE/SCREW CONVEYOR/BLOWER/WEIGHING BIN/FLOW CONTROL VALVE/FAN/VALVES ETC AS APPLICABLE.
2. THE SCHEME & NO. OF EQUIPMENT SHALL BE FINALISED BASED ON STIPULATIONS OF TECHNICAL SPECIFICATION & SYSTEM REQUIREMENTS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH TECH.SPECS. AND OTHER TENDER DOCUMENTS. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
4. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS SPECIFIED.
5. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
6. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBERS SHALL BE INDICATED ON DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
7. THIS OPTION IS APPLICABLE FOR SYSTEM WHERE ESP BUFFER HOPPER IS NOT ENVISAGED. OUT OF TWO NUMBERS COARSE ASH HOPPERS, ONE WILL BE WORKING AND ONE WILL BE STANDBY.
8. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
9. QUANTITY, NUMBER OF LINES & CAPACITY OF EQUIPMENTS, AS INDICATED ARE MINIMUM.

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B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							29.11.23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							01.06.23

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PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-III (1x800MW)

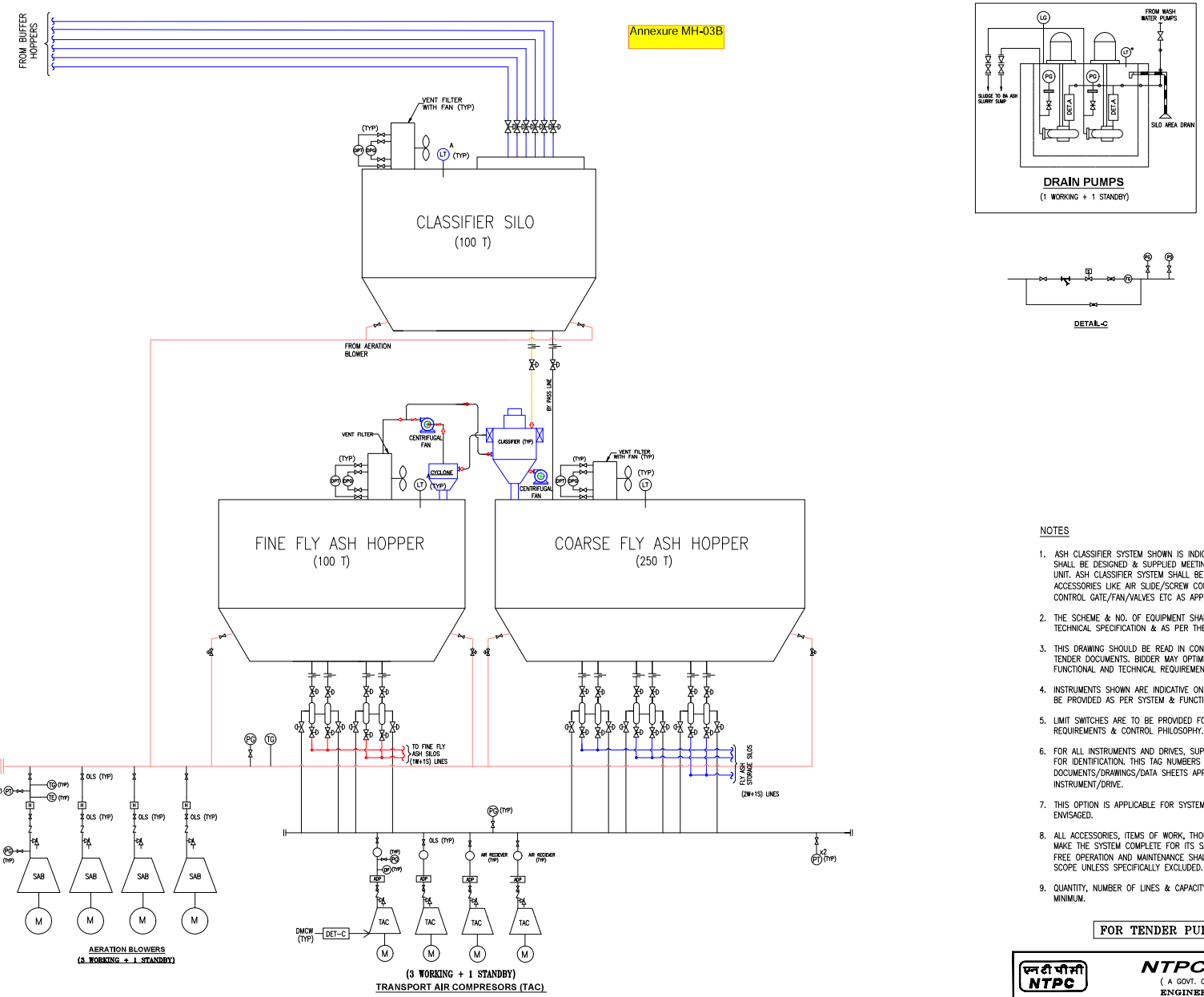
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SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM)

SIZE	SCALE	DRG.NO.	REV.
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CAD FILE NAME : XXXX-001-POM-A-029.dwg

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Annexure MH-03B



NOTES

1. ASH CLASSIFIER SYSTEM SHOWN IS INDICATIVE ONLY. ASH CLASSIFIER SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT. ASH CLASSIFIER SYSTEM SHALL BE COMPLETE WITH ALL EQUIPMENT & ACCESSORIES LIKE AIR SLIDE/SCREW CONVEYOR/BLOWER/WEIGHING BIN/FLOW CONTROL GATE/FAN/VALVES ETC AS APPLICABLE.
2. THE SCHEME & NO. OF EQUIPMENT SHALL BE FINALIZED IN CONJUNCTION WITH TECHNICAL SPECIFICATION & AS PER THE SYSTEM REQUIREMENTS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH TECH.SPECS. AND OTHER TENDER DOCUMENTS. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
4. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS SPECIFIED.
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7. THIS OPTION IS APPLICABLE FOR SYSTEM WHERE ESP BUFFER HOPPER IS ENVISAGED.
8. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
9. QUANTITY, NUMBER OF LINES & CAPACITY OF EQUIPMENTS, AS INDICATED ARE MINIMUM.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
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B	RELEASED FOR TENDER	NAVEEN	RAJESH							
A	RELEASED FOR TENDER	NAVEEN	RAJESH							

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NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: SIPAT THERMAL POWER STATION
STAGE-III (1x800MW)
EPC PACKAGE

TITLE: SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (FOR VACUUM CONVEYING SYSTEM)

SIZE	SCALE	DRG.NO.	REV.
A1	--	XXXX-001(R)-POM-A-029	C

CAD FILE NAME : XXXX-001(R)-POM-A-029.dwg

Amendment-4B to Technical Specifications (Section VI) of SIPAT-III (1X800 MW) EPC Package

S. NO.	SPECIFICATION REFERENCE				EXISTING	Read as
	SEC/ PART	SUB-SEC.	PAGE NO.	CLAUSE NO.		
GEN-2B	Amendment Sl. No. GEN-1B of Amend-ment-01B to Technical Specifications (Section VI) of Sipat-III EPC Package				New Chapter added for Scope of Work for “Limited Notice to Proceed” (LNTP). Bidder to refer Annexure-C of Errata 01 to Commercial Amendment No. 05 to Bidding Document No: CS-9551/8003-001-2	New Chapter added for Scope of Work for “Limited Notice to Proceed” (LNTP). Bidder to refer Annexure-C of **Errata No 02 to Amend-ment No. 05** to Commercial portion of Bidding Document No: CS-9551/8003-001-2

1.0 Add the following new provisions regarding Limited Notice to Proceed (LNTP):

1.1 Section II: Instructions to Bidders

Modify the existing provision of ITB as under:

(i) Add the following Para at the end of ITB sub clause 13.1 (Period of Validity of Bid):

In case the Employer decides to proceed with the award of contract for Limited Notice to Proceed (LNTP) before awarding the Contract for the complete scope of work pursuant to ITB clause 32.0 (Notification of Award), the successful bidder shall be required to extend the validity of its bid such that it is valid for Two hundred ten (210) days from the date of award of LNTP.

(ii) Add the following Para at the end of ITB sub clause 30.1 (Award Criteria):

Alternatively, the Employer may initially grant Limited Notice to Proceed (LNTP) to such successful bidder for completing the Main plant basic engineering work and other works, if any, as detailed in the Technical Specification before awarding the Contract for the complete scope of work pursuant to ITB clause 32.0 (Notification of Award).

(iii) Add the following new sub clause 30.5 under ITB clause 30 (Award Criteria):

In case the Employer decides to proceed with the award of contract for Limited Notice to Proceed (LNTP) before awarding the Contract for the complete scope of work pursuant to ITB clause 32.0 (Notification of Award), the successful bidder shall be initially awarded a LNTP Contract for the Main plant basic engineering activities related to Equipment design/ Civil Construction design / drawing and other works, if any, as defined in Technical Specification at a price equivalent to 0.15% of FOB/Ex-Works Price component of Main Equipment in Bid Price.

In such an event, the successful bidder shall be required to furnish within ten (10) days from the date of award of LNTP the extension of bid security valid for a period of 45 days beyond the extended bid validity pursuant to clause 13.1 (Period of Validity of Bid).

(iv) The ITB sub clause 32.1 (Notification of Award) shall be modified as under:

Upon the successful Bidder’s furnishing of the performance securities of all the contracts or the performance security of LNTP whichever is earlier, pursuant to ITB clause 34, EMPLOYER will promptly notify each unsuccessful Bidder and will discharge its bid security, pursuant to ITB Sub-Clause 12.5.

(v) Add the following Para at the end of ITB sub clause 34.1 (Performance Security):

In the event the Employer awards the Contract for LNTP to the successful Bidder pursuant to ITB Clause 30.5 (Award Criteria), the successful bidder shall be required to furnish within Fifteen (15) days from the date of award of LNTP the performance security for ten percent (10%) of Contract Price of LNTP as per the format enclosed with the bidding documents.

Performance Security shall be released after placement of NOA or foreclosure/closure of LNTP.

(vi) Add the following Para at the end of ITB sub clause 36 (Time Schedule):

Work Schedule & Deliverables of LNTP

(a) The LNTP activities shall be carried out in following three phases:

The bidder shall execute the main plant basic engineering of the equipment design/ Civil Construction design/drawing and other works, if any in Technical Specification and furnish the deliverables in three phases as detailed hereunder:

Phase-I – Finalization of drawing/documents and other works, if any, as defined in Technical Specification within 60 days from the date of issue of LNTP.

Phase-II – Finalization of drawing/documents and other works, if any, as defined in Technical Specification within 120 days from the date of issue of LNTP.

Phase-III:- Finalization of drawing/documents and other works, if any, as defined in Technical Specification within 180 days from the date of issue of LNTP.

(b) The Time for Completion of Facilities for each Unit identified in the Main Contract for the complete scope of work pursuant to ITB clause 36 (Time Schedule) shall be reduced by the period of work executed under LNTP, subject to maximum reduction of 4 months.

(c) The Time of Completion of the Facilities shall be determined from the date of Notification of Award.

1.2 Section V: Special Conditions of Contract

Add new provision of LNTP in Section V: Special Conditions of Contract as under:

1.2.1 The work under LNTP shall be executed in accordance with the terms & conditions specified hereunder:

(i) **Contract price of LNTP**

The Contract Price of LNTP shall be as specified in the LNTP and payment shall be made in the currencies mentioned therein.

(ii) T**he Terms of Payment of LNTP contract shall be as under:**

The contract price for LNTP shall be released upon phase wise completion of work for the main plant basic engineering activities related to Equipment design/Construction design/drawing and other work as defined in Technical Specification (Section-VI-Part-A) and subject to certification by the Engineer-in Charge in accordance with following terms and conditions:

a) 30% of LNTP price shall be paid upon successful completion of scope of work identified under Phase-I.

b) 30% of LNTP price shall be paid upon successful completion of scope of work identified under Phase-II.

c) 40% of LNTP price shall be paid upon successful completion of scope of work identified under Phase-III.

The payment for Phase-I shall be released only after receipt of performance security for LNTP & requisite bid security extension. Further, in the event LNTP is terminated by the Employer prior to its completion, the contractor shall not be eligible for any payment of any uncompleted portion of work.

The payments already made during LNTP shall be reduced from Initial Advance amount payment for FOB/Ex-Works Price Component after issuance of NOA.

(iii) **Performance Security for LNTP**

The Contractor shall, within fifteen (15) days of issuance of LNTP, provide security for the due performance of work for ten percent (10%) of the Contract Price of LNTP, with an initial validity upto ninety (90) days beyond the end of scheduled Completion of Work of LNTP.

The performance security shall be denominated in the currency or currencies of the LNTP Contract, or in a freely convertible currency acceptable to the Employer, and shall be in the form of unconditional bank guarantee provided in Section-VII (Forms and Procedures)-Form of Performance Security of the bidding documents.

Performance Security shall be released after placement of NOA or foreclosure/closure of LNTP.

The Bank Guarantee for LNTP shall be submitted from any of the banks as being acceptable for other performance securities in the bidding documents.

(iv) **Time for Commencement and Completion of LNTP**

The entire scope of work covered under LNTP shall be completed within 180 days from the date of LNTP.

Further, the Time for Completion of Facilities for each Unit identified in the Contract for the complete scope of work pursuant to GCC clause 8 (Time for Commencement and Completion) shall be reduced by the period of work executed under LNTP, subject to maximum reduction of 4 months.

In case NOA is issued to the successful Bidder within 6 months' period of issuance of LNTP, Payments already made shall be adjusted from Initial Advance against Ex works/CIF Supply and work schedule shall be proportionately adjusted commensurate with completed work during LNTP period.

However, in case NOA could not be placed beyond 6 months after LNTP, Employer and Contractor may mutually agree for NOA date and price bid validity extension and subsequent adjustment in Work Schedule.

(v) **Taxes and Duties on LTNP**

Taxes and duties shall be governed by GCC clause 14.

(vi) **Termination of LNTP**

In addition to the GCC sub clause 42.1.1 to 42.1.3 (Termination for Employer's Convenience), the LNTP contract shall automatically stand terminated (short closed) upon issuance of NOA by NTPC and furnishing the performance securities for ten percent (10%) of Contract Price for all the contracts as per GCC clause 13.3 by the Contractor. In such case, balance work shall be subsumed in scope of work defined in NOA.

Employer reserves its right not to issue NOA during or after LNTP and may terminate the Contract. In such a case, Employer shall be liable only for payments for completed work under scope of LNTP as certified by Engineer-in-Charge. No payment for balance work under LNTP shall be made and LNTP contract will be terminated.

(vi) The provisions of GCC which are relevant and not contrary to the provisions mentioned herein above, shall apply during the execution of work under LNTP. In case of any conflict, the provisions of LNTP mentioned herein above shall prevail over the GCC provisions.

1.3 **Section-VII: Forms & Procedures**

1.3.1 **Section-VII-2 of 3 (Bid Form-Price Bid)**

Add the following new clause in the Bid Form (Price Bid)

"In case you decide to proceed with Limited Notice to Proceed (LNTP) before placement of Notification of Award (NOA) on us, our Envelop-II (Price) Bid including Envelop-I (Techno- Commercial) Bid shall remain valid for Two hundred ten(210) days from the date of LNTP and it shall remain binding upon us."

1.3.2 **Section-VII-3 of 3 (Forms & Procedures)**

(i) **Appendix-1 (Terms and Procedures of Payment)**

Add the following Notes in S.No. A1 (FOB Price Component) and S.No. B1 (Ex-Works price component)

"The initial advance payment for FOB/Ex-Works Price Component (as applicable) shall be reduced by the payment made/due to the extent of work executed under LNTP contract. Accordingly Initial Advance payment Security shall also be reduced."

(ii) Add new Form as '**FORM OF 'LIMITED NOTICE TO PROCEED**' enclosed at **Annexure-A**.

(iii) Add new Form as **'Performance Security Form for LNTP'** enclosed at **Annexure-B**.

***Note:** The Scope of Work during the LNTP is attached as **Annexure-C.**

Annexure-A

FORM OF 'LIMITED NOTICE TO PROCEED'

NOTE : INSTRUCTIONS INDICATED IN ITALICS IN THIS LIMITED NOTICE TO PROCEED ARE TO BE TAKEN CARE OF BY THE ISSUING AUTHORITY.

Ref. No. :

Date :

..(Contractor's Name & Address)...

Attn : Mr...

Sub : Limited Notice to Proceed (LNTP) for... .....*(Package Name)* ..... as per Bid Document No.....

Dear Sir,

1.0 This has reference to the following :

(i) Our Invitation for Bids (IFB) No. .. ..dated……..

(ii) Bidding Documents for the subject package comprising the following: ……..***(List out all the Sections/Volumes of the Bidding Documents along with Tender Drawings etc. as issued to the bidder)……....*** Errata/Amendment No..... ... to.....***(Name of Section/Volume of the Bidding Documents to which Errata/ Amendment pertains)...*** issued.

(Applicable only if any Errata/Amendment to the Bidding Documents has been issued subsequently)

(iii) Clarifications furnished to you on the Bidding Documents vide Clarification No…….. based on the query raised by **you/ one of the prospective bidders.** ***(Use as applicable)***

(Applicable only if any clarification to the Bidding Documents has been issued subsequently)

(INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO THE BIDDER AFTER ISSUANCE OF BIDDING DOCUMENTS UP TO THE DATE OF BID OPENING)

(iv) Your Proposal for the subject package submitted vide Proposal ref No.... dated…..

(v) Our Fax message/letter No. .....dated.....regarding extension of validity of bid and that of the Bank Guarantee towards Bid Security.

(Applicable only if any extension has been sought subsequently)

(INCLUDE AS FURTHER SUB-PARAGRAPHS ANY OTHER CORRESPONDENCE MADE TO OR BY THE BIDDER AFTER BID OPENING)

(vi) Our Fax message/letter No. .. .. dated.....inviting you for post bid discussions.

(vii) Post bid discussions and meetings we had with you from……..... to …….. resulting into the following Minutes of Meeting :

(a) Minutes of Meeting regarding Commercial issues (APPENDIX-….)

(b) Minutes of Meeting on Technical issues (APPENDIX - ….. .)

(c) Minutes of Meeting regarding Work Schedule (APPENDIX - ….....)

(d) Minutes of Meeting regarding Quality Assurance Aspects (APPENDIX-…)

2.0 Based on your proposal submitted vide Proposal ref no. ……dated ….read in conjunction with all the specifications, terms & conditions of the Bidding Documents, **Your subsequent letters*(Use if relevant)*** and agreed Minutes of Meeting referred to in para 1.0 above, we hereby award on you the Limited Notice to Proceed to commence the basic engineering activities ***..*** of***... (Name of Package)*** ... .for ***(Name of project)***.. .. as per Bid Document No. :……. (hereinafter referred to as the 'LNTP').

3.0 **PRICE**

The total consideration for the entire scope of work covered under this LNTP shall be …(specify the amount and currency)……. as per the following break-up:

S.No.	Particulars	Amount
(i)	**Price for LNTP for basic engineering activities related to Equipment design/ Civil Construction design/ drawing and other works as defined in Technical Specification**	

4.0 You shall furnish performance security for ten percent (10%) of the Contract Price of LNTP within ten (10) days from the date of award of LNTP as per the format provided in the bidding documents.

5.0 Within ten (10) days from the date of award of LNTP, you shall also furnish extension of bid security valid till 255 days from the date of award of LNTP.

6.0 This LNTP is being issued to you in duplicate. We request you to return its duplicate copy duly signed and stamped on each page including all the enclosed Appendices, by the authorised signatory of your company as a proof of your acknowledgement and confirmation.

Please take the necessary action to commence the work and confirm action.

Yours faithfully,
for and on behalf of
..***(Name of the Employer)...***

(Authorised Signatory)

Encl. : As above.

Annexure-B

Performance Security Form for LNTP

(To be stamped in accordance with the Stamp Act, if any, of the Country of the issuing Bank) :

Bank Guarantee No...

Date...

To,
[Employer's Name & Address]

Dear Sirs,

In consideration of the ... .*[Employer's Name]*... (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors, administrators and assigns) having awarded to M/s .....*[Contractor's Name]*... with its Registered /Head Office at .....(hereinafter referred to as the 'Contractor', which expression shall unless repugnant to the context or meaning thereof, include its successors administrators, executors and assigns), a Contract by issue of Employer's Limited Notice to Proceed No. ..... dated……valued at ……..[LNTP Contract Price]……....for….....[Name of the Package & Project]…….(hereinafter referred to as the 'Contract') and the same having been unequivocally accepted by the contractor, and the Contractor having agreed to provide a Performance Guarantee for the faithful performance of the entire Contract equivalent to ……(*).....% (……percent) of the said value of the Contract to the Employer.

We .....*[Name & Address of the Bank]*... .....having its Head Office at..... ...(hereinafter referred to as the 'Bank', which expression shall, unless repugnant to the context or meaning thereof, include its successors, administrators, executors and assigns) do hereby guarantee and undertake to pay the Employer, on demand any and all monies payable by the Contractor to the extent of ... ...(*)..... as aforesaid at any time upto ... .(@)... *[days/month/year]* without any demur, reservation, contest, recourse or protest and/or without any reference to the Contractor. Any such demand made by the Employer on the Bank shall be conclusive and binding notwithstanding any difference between the Employer and the Contractor or any dispute pending before any Court, Tribunal, Arbitrator or any other authority. The Bank undertakes not to revoke this guarantee during its currency without previous consent of the Employer and further agrees that the guarantee herein contained shall be enforceable till ninety (90) days after expiry of its validity.

The Employer shall have the fullest liberty, without affecting in any way the liability of the Bank under this guarantee, from time to time to extend the time for performance of the Contract by the Contractor. The Employer shall have the fullest liberty, without affecting this guarantee, to postpone from time to time the exercise of any powers vested in them or of any right which they might have against the Contractor, and to exercise the same at any time in any manner, and either to enforce or to forbear to enforce any covenants, contained or implied, in the Contract between the Employer and the Contractor or any

other course or remedy or security available to the Employer. The Bank shall not be released of its obligations under these presents by any exercise by the Employer of its liberty with reference to the matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on the part of the Employer or any other indulgence shown by the Employer or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving the Bank.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Contractor and notwithstanding any security or other guarantee that the Employer may have in relation to the Contractor's liabilities.

Notwithstanding anything contained hereinabove our liability under this guarantee is restricted to..... .(*)... ..... and it shall remain in force upto and including ...(@)..... and shall be extended from time to time for such period, as may be desired by M/s... .. ..*[Contractor's Name}*..... on whose behalf this guarantee has been given.

Dated this .... day of ..... 20..... at...

WITNESS

(Signature)...

(Signature)

(Name)...

(Name)

(Official Address)

(Designation with Bank Stamp)

Authorised Vide Power of Attorney No...
Dated...

Notes :1. (*) This sum shall be 10% of the LNTP Contract price.

(@) This date will be ninety (90) days after the schedule period of completion of work under LNTP.

2. The Bank Guarantee shall be from a Bank as per provisions of Section-V (SCC) of the bidding documents.

3. The stamp papers of appropriate value shall be purchased in the name of guarantee issuing Bank or the Party on whose behalf the BG is being issued. The Bank Guarantee shall be issued on a stamp paper of value as applicable in the State of India from where BG has been issued or the State of India from where the BG shall be operated, whichever is higher.

4. While getting the Bank Guarantee issued, the contractor is required to ensure compliance to the points mentioned in Form 16-Form of Bank Guarantee Verification Check List enclosed with the bidding documents. Further, the Contractor is required to fill up this Form 16 and enclose the same along with the Bank Guarantee.

[This scope of work is a part of Technical Specification (Section-VI-Part-A)]

The contractor shall be required to carry out basic engineering of the main plant systems/equipments in line with requirements stipulated in tender documents and subsequently adhere to the same while carrying out the detail engineering of the plant.

In case of Vendor finalization for sub-QR items identified below, contractor shall complete all necessary activities during LNTP period to be ready for award including opening of Price Bid.

The scope of works under LNTP shall include but not limited to the following:

Basic Engineering of Main plant area i.e. SG and STG including civil works, finalization of sub-vendors

Basic engineering of Main Plant area consisting of SG, TG and Civil works shall be included in scope of LNTP. Broad scope under basic engineering is divided under three phases and will cover the following:

A. **Phase-I** – Submission/Review of following drawings/documents within 60 days from the date of issue of letter of award for LNTP:

i) General layout plan
ii) BTG layout from transformer yard to centerline of stack
iii) Heat Balance Diagrams
iv) Water balance diagram
v) Boiler Predicted Performance Data at different loads & firing with different coals
vi) Boiler and turbine start-up curve
vii) Sizing Calculations – Boiler area (Furnace, Heat Duty, Boiler Efficiency, Air & gas weight, Circulation, Burner sizing , NOx, Buckstay, Ducts, Pressure Parts), Mills, APH, SCAPH, Fans, Boiler circulation pump, Safety valve, ESP, FGD, Fuel oil system, TG Hall EOT Crane capacity selection, HP & LP Heaters, GSC, Deaerator, BFP, CEP, Drip Pump, Condenser, Critical piping including HP/LP Bypass piping, Coal bunkers.
viii) Finalization of System P&IDs –Main steam, CRH, HRH and Feed water.
ix) Design basis for support structures for Boiler/ESP/FGD

Details submitted in the phase-I as mentioned above during LNTP period shall be updated and re-submitted within 10 days, taking into accounts observations /comments furnished by NTPC on the 1st submission. Completion of scope of Phase-I shall be considered when minimum 70% of drawings/documents identified under Phase-I are approved in Cat-I/IV and no drawings/documents will be in Cat-III.

B. **Phase-II** – Submission of following drawings/documents within next 60 days (after submission of Phase–I drawings/documents) i.e. within 120 days from the date of issue of letter of award for LNTP:

i) Power house equipment layouts i.e. layout arrangement drawings for Turbine hall (all floors) bays, Boiler area and ESP up to Chimney drawings indicating unit pitch, column spacing, passages and maintenance bays/spaces etc.
ii) Crane clearance diagram
iii) Finalization of System P&IDs – Boiler (Steam & water, Air & flue gas, APH, Fuel oil), Steam Drain system, Condenser & air extraction system, condensate system, HP & LP Bypass system, Extraction steam for HP & LP Heaters, CW System (as applicable), Heaters/Deaerator Drain & vents, Auxiliary steam, etc.
iv) Critical piping layout
v) General Arrangement Drawings for Boiler, Mill bay, Turbine, Generator and Coal bunkers.

[This scope of work is a part of Technical Specification (Section-VI-Part-A)]

vi) Pressure parts arrangement, Pressure parts expansion movement diagram, fuel piping arrangement & loading plan
vii) Submission of loading data for Boiler and A/B/C column of TG building.
viii) Sizing calculation: CW pump (as applicable), HP-LP Bypass.
ix) Sub-vendor finalization for critical equipment i.e. EOT crane, FGD, major transformers like Generator Transformer, Unit Transformer, Station transformer.
x) Plant Electrical System design calculations and equipment sizing like- Generator, Power Transformers, MV transformers and MV switchgear sizing calculations, short circuit calculations.
xi) Submission of Key Single Line Diagrams for main plant & off-site.
xii) Plan & Sections for site levelling works
xiii) Layout, design and cross section details of Roads, drains and culverts
xiv) Boundary wall layout, details and calculations.
xv) Standard details and General notes for Structural, Civil works.
xvi) Design and drawings of Safety Control room
xvii) Design and drawings of Safety Park building
xviii) Design and drawings of Sheds for Construction workers and O&M Workers.
xix) Geotechnical investigation & report and recommendations and Topography work & report

Details submitted in the phase-II as mentioned above during LNTP period shall be updated and re-submitted within 10 days, taking into accounts observations /comments furnished by NTPC on the 1st Submission. Completion of scope of Phase-II shall be considered when minimum 70% of drawings/documents identified under Phase-II are approved in Cat-I/IV and no drawings/documents will be in Cat-III.

C. **Phase-III** :- Submission of following drawings/documents within next 60 days (after submission of Phase –II drawings/documents) i.e. within 180 days from the date of issue of letter of award for LNTP:

i. Civil construction drawings for foundation of following including foundation load details, base plate & anchor bolt arrangement:
   a. Main TG Building and column
   b. TG foundation
   c. Main boiler
   d. Mill bay building and Mills
ii. Switchyard single line diagram and Protection SLD.
iii. Sub-vendor finalization for ACC/WCC (as applicable), IDCT (as applicable), Construction Power, Civil Enabling Works (as identified in Phase-II).
iv. Scheme/scope drawings for Main TG building
v. Switchyard Earth mat design and battery sizing.

Details submitted in the phase III as mentioned above during LNTP period shall be updated and re-submitted within 14 days, taking into accounts observations /comments furnished by NTPC on the 1st submission. Completion of scope of Phase-III shall be considered when minimum 70% of drawings/documents identified under Phase-III are approved in Cat-I/IV and no drawings/documents will be in Cat-III.

NOTE –

1. For the payment purpose billing break-up shall be submitted by the contractor.
2. List of drawings/documents is attached at **Appendix-I** and shall be part of LNTP scope.
3. The LNTP scope will include both (scope as well as drawings/documents.

APPENDIX-I

DRAWINGS/DOCUMENTS FOR LNTP SCOPE

			Area	Phase-I	Phase-II	Phase-III
S. NO.	**NTPC_DRG_NO**	**DRG_TITLE**				
1	XXXX-110-110-PVM-U-032	HEAT BALANCE DIAGRAMS	TG	I		
2	XXXX-110-110-PVM-N-004	TURBINE START UP CURVES	TG	I		
3	XXXX-110-110-PVM-U-021	BFP SIZING INCLUDING NPSH CALCULATION	TG	I		
4	XXXX-110-110-PVM-U-010	CEP & DRIP PUMP SIZING INCLUDING NPSH CALCULATION	TG	I		
5	XXXX-110-110-PVM-B-064A	HP & LP Bypass sizing	TG		II	
6	XXXX-110-110-PVM-U-014B	THERMAL & HYDRAULIC DESIGN CALCULATIONS FOR LP HEATERS, HP HEATERS AND EXTERNAL DE-SUPERHEATERS	TG			
7	XXXX-001-110-PVM-U-015	THERMAL and HYDRAULIC DESIGN CALCULATIONS FOR GSC	TG	I		
8	XXXX-110-110-PVM-U-018A	THERMAL AND HYDRAULIC DESIGN CALCULATIONS OF DEAERATOR	TG	I		
9	XXXX-110-110-PVM-U-028	TG HALL EOT CRANE CAPACITY SELECTION CALCULATION	TG	I		
10		Load data (Not to exceed) for Main Turbine Hall equipment : BFPs, Heaters and D/A etc	TG	I		
11	XXXX-001-110-PVM-F-026	LEGEND for P& IDs	TG		II	
12	XXXX-001-110-PVM-B-395	CRANE CLEARANCE DIAGRAM OF TG HALL EOT CRANES			II	
13	XXXX-001-110-PVM-B-416	CRANE CLEARANCE DIAGRAM OF BFP HANDLING EOT CRANE	TG		II	
14	XXXX-110-110-PVM-F-027	P & ID CONDENSATE SYSTEM	TG		II	
15	XXXX-110-110-PVM-F-028	P & ID FEED WATER SYSTEM	TG	I		
16	XXXX-110-110-PVM-F-029	P & ID - HP/LP BYPASS SYSTEM	TG		II	
17	XXXX-110-110-PVM-F-030	P & ID EXTRACTION STEAM SYSTEM FOR HP & LP HEATERS	TG		II	
18	XXXX-110-110-PVM-F-031	P & ID HEATER DRAINS & VENT SYSTEM	TG		II	
19	XXXX-110-110-PVM-F-033	P & ID STEAM DRAINS SYSTEM	TG		II	
20	XXXX-110-110-PVM-F-035	P&ID OF MS, CRH & HRH	TG	I		
21	XXXX-110-110-PVM-F-036	P & ID AND WRITE-UP FOR AUXILIARY STEAM SYSTEM	TG		II	
22	XXXX-110-110-PVM-B-110	GA, CROSS SECTION ARRANGEMENT DRAWING OF STEAM TURBINE & TURBINE CLEARANCE DIAGRAM	TG		II	
23	XXXX-110-110-PVM-N-110	CORRECTION CURVES AS PER SPECIFICATION	TG		II	
24	XXXX-001-999-PGM-F-001	Main Plant Equipment Layout at EL(+/-) 0.0M	Layout	I		
25	XXXX-001-110-PVM-H-008	PIPE SCHEDULE FOR POWER CYCLE PIPING WITH DESIGN PARAMETER CALCULATIONS INCLUDING DM & CT SYSTEM	Piping	I		
26	XXXX-001-102-PVM-U-031	PRESSURE DROP CALCULATION FOR MS,CRH AND HRH PIPING.	Piping	I		
27	XXXX-001-110-PVM-H-007	VALVE SCHEDULE FOR POWER CYCLE PIPING INCLUDING DM WATER SYSTEM	Piping	I		
28	XXXX-001-110-PVM-F-053	MAIN PLANT TG HALL CROSS SECTION	Layout		II	
29	XXXX-001-110-PVM-F-049	TG EQUIPMENT LAYOUT DRAWING AT 0 M	Layout		II	
30	XXXX-001-110-PVM-F-050	TG EQUIPMENT LAYOUT DRAWING AT MEZANINE FLOOR 9 M	Layout		II	
31	XXXX-001-110-PVM-F-051	TG EQUIPMENT LAYOUT DRAWING AT OPERATING GLOOR, 18M	Layout		II	
32	XXXX-001-110-PVM-F-052	TG EQUIPMENT PLAN AT UPPER FLOORS IN B-C BAY	Layout		II	
33	XXXX-110-110-PVM-F-0375A	P&ID - Service water System	Piping		II	
34	XXXX-001-110-PVM-P-050	COMPOSITE CRITICAL PIPING LAYOUT	Piping/Layout		II	
35	XXXX-136-PVM-F-017B	WATER BALANCE DIAGRAM	WS	I		
36	XXXX-133-PVM-F-047	P&ID FOR CW PUMPING SYSTEM (if applicable)	WS		II	
37	XXXX-133-PVM-U-049	SIZING CALCULATION OF CW SYSTEM (If applicable)	WS		II	
38	XXXX-001-110-PVE-V-150E	General arrangement drawing of Generator	Elect		II	
39	XXXX-001-299-PVE-U-001	DESIGN PHILOSOPHY FOR ELECTRICAL EQUIPMENT LAYOUT	Elect		II	
40	XXXX-001-299-PVE-U-007	DESIGN MEMORANDUM FOR GROUNDING SYSTEM	Elect		II	
41	XXXX-001-299-PVE-U-003	DESIGN CALCULATIONS FOR MV/LV CABLES SELECTION & SIZING	Elect			III
42	XXXX-001-299-PVE-U-008	DESIGN MEMORANDUM FOR LIGHTNING PROTECTION SYSTEM	Elect			III
43	XXXX-001-299-PVE-U-010	ELECTRICAL SINGLE LINE DIAGRAM FOR AUXILIARY POWER DISTRIBUT	Elect		II	
44	XXXX-001-299-PVE-U-011	DESIGN CALCULATIONS FOR GENERATOR AND MV SYSTEMS	Elect		II	
45	XXXX-001-299-PVE-U-012	DESIGN CALCULATIONS FOR EMERGENCY SUPPLY DG SIZING	Elect		II	
46	XXXX-001-299-PVE-U-013	DESIGN MEMORANDUM FOR 220V/110V DC STSTEM	Elect		II	
47	XXXX-001-299-PVE-U-009	DESIGN MEMORANDUM FOR LIGHTING SYSTEM	Elect			III
48	XXXX-001-572-PVE-P-0002	765kV Single Line Diagram	Switchyard			III
49	XXXX-001-572-PVE-F-0034	765 kV - Earthmat Layout	Switchyard			III
50	XXXX-001-572-PVE-F-0038	765 kV - Equipment Earthing Philosophy & Details	Switchyard			III
51	XXXX-001-572-PVE-P-0011	SLD of AC/DC DB	Switchyard			III
52	XXXX-001-572-PVE-B-1090	BATTERY SIZING CALCULATION FOR 765kV SWITCHYARD	Switchyard			III
53	XXXX-301C-POC-F-001	General Layout of Plant	CIVIL	I		
54	XXXX-301C-POC-C-107	Layout of Roads	CIVIL		II	
55	XXXX-301C-POC-C-108	Cross Section Details of Roads	CIVIL		II	
56	XXXX-301C-POC-C-111	Layout of Drains	CIVIL		II	
57	XXXX-301C-POC-C-112	Cross Section Details of Drains	CIVIL		II	
58	XXXX-301C-POC-U-107	Design Calculation for Road	CIVIL		II	
59	XXXX-301C-POC-C-101	Site Levelling Works - Plan & Sections	CIVIL		II	
60	XXXX-301-PVC-C-00	Geotechnical Investigation Scheme	CIVIL		II	
61	XXXX-301C-POC-C-113	Layout of Culverts	CIVIL		II	
62	XXXX-301C-POC-C-114	Details of Culverts	CIVIL		II	
63	XXXX-301C-POC-U-111	Design Calculation for Drain	CIVIL		II	
64	XXXX-301C-POC-U-114	Design Calculation for Culvert	CIVIL		II	
65	XXXX-001-315-PVC-C-0451B	GENERAL NOTES & STD. DETAILS FOR CIVIL WORKS	CIVIL		II	
66	XXXX-001-315-PVC-C-0089A	GENERAL NOTES FOR STRUCTURAL STEEL WORKS	CIVIL		II	
67	XXXX-001-XXX-XXX-X-XXX	Design and drawings of Safety Control room	CIVIL		II	
68	XXXX-001-XXX-XXX-X-XXX	Design and drawings of Safety Park building	CIVIL		II	
69	XXXX-001-XXX-XXX-X-XXX	Design and drawings of Sheds for Construction workers and O&M Workers	CIVIL		II	
70	XXXX-301-PVC-C-00	Geotechnical Investigation Report and Recommendations	CIVIL			III
71	XXXX-001-315-PVC-C-0003A	MPH BUILDING - LAYOUT & DETAILS OF BASE PLATE UNIT-1	CIVIL			III

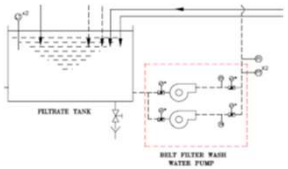
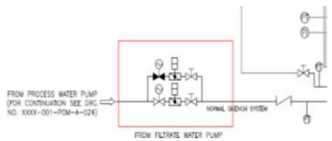
72	XXXX-001-315-PVC-C-0004	MPH BUILDING - STRUCTURAL FRAMING & COLUMN DETAILS ALONG A ROW INCLUDING CONDUCTOR ANCHORAGE & BUS DUCT SUPPORTING STRUCTURE BRACKETS UNIT-1	CIVIL			III
73	XXXX-001-315-PVC-C-0007	MPH BUILDING - STRUCTURAL FRAMING & COLUMN DETAILS ALONG B ROW UNIT-1	CIVIL			III
74	XXXX-001-315-PVC-C-0010	MPH BUILDING - STRUCTURAL FRAMING & COLUMN DETAILS ALONG C ROW UNIT-1	CIVIL			III
75	XXXX-001-315-PVC-C-0454A	MPH BUILDING - G.A. & R.C. OF COLS FDN ON ROW A to F UNIT-1	CIVIL			III
76	XXXX-001-315-PVC-U-0003B	MPH BLDG. - UNIT-1 ANALYSIS AND DESIGN OF MAIN FRAME	CIVIL			III
77	XXXX-001-315-PVC-C-0454D	MPH BUILDING - G.A. & R.C. DTLS OF INTERMEDIATE COLS. (AB BAY) FDN UNIT-1	CIVIL			III
78	XXXX-001-315-PVC-C-0301	T.G. FDN -GA OF RAFT	CIVIL			III
79	XXXX-001-315-PVC-C-0302	R/F DETAIL OF TG RAFT AND COLUMNS	CIVIL			III
80	XXXX-001-315-PVC-U-1680	T.G. FOUNDATION : STATIC ANALYSIS	CIVIL			III
81	XXXX-001-315-PVC-U-1681	T.G. FOUNDATION : DESIGN OF T.G. DECK GIRDERS	CIVIL			III
82	XXXX-001-315-PVC-U-0452A	DESIGN OF INTEGRATED BOILER FOUNDATION - UNIT 1	CIVIL			III
83	XXXX-001-315-PVC-C-0452A	G.A. OF BOILER FOUNDATIONS AND PEDESTALS- UNIT-1	CIVIL			III
84	XXXX-001-315-PVC-C-0452B	R.C. DETAILS OF BOILER FOUNDATIONS AND PEDESTALS - UNIT-1	CIVIL			III
85	XXXX-001-315-PVC-U-0452C	DESIGN OF BUNKER BUILDING FOUNDATIONS AND PEDESTALS - UNIT-1	CIVIL			III
86	XXXX-001-315-PVC-C-0452C	G.A. & R.C. DETAILS OF BUNKER BUILDING FOUNDATIONS AND PEDESTALS - UNIT-1	CIVIL			III
87	XXXX-001-315-PVC-U-0401A	DESIGN OF BOWL MILL FOUNDATION	CIVIL			III
88	XXXX-001-315-PVC-C-0401A	BOWL MILL FOUNDATION - GA DETAILS	CIVIL			III
89	XXXX-001-315-PVC-C-0401B	BOWL MILL FOUNDATION - RCC DETAILS	CIVIL			III
90	XXXX-001-315-PVC-U-0453A	DESIGN OF ESP FOUNDATIONS - UNIT-1	CIVIL			III
91	XXXX-001-315-PVC-C-0453A	G.A. OF ESP FOUNDATIONS - UNIT-1	CIVIL			III
92	XXXX-001-315-PVC-C-0453B	R.C. DETAILS OF ESP FOUNDATIONS - UNIT-1	CIVIL			III
93	XXXX-109-PVC-B-101	FGD Wet Stack-General Arrangement of Wet Stack	CIVIL			III
94	XXXX-109-PVC-B-102	FGD Wet Stack- Foundation Details including shell dowels & duct pedestals	CIVIL			III
95	XXXX-109-PVC-U-102	FGD Wet Stack-Analysis and design of foundation	CIVIL			III
96	XXXX-109-PVC-U-103	FGD Wet Stack-Analysis & design of RCC shell,platforms and extra reinforcement around platform beam recess and other miscellaneous openings	CIVIL			III
97	XXXX-001-102-PVM-U-001	Furnace performance & sizing criteria & calculation	SG	I		
98	XXXX-001-102-PVM-U-002	BOILER HEAT DUTY CALCULATION	SG	I		
99	XXXX-001-102-PVM-U-004	Duct design data & calculation	SG	I		
100	XXXX-001-102-PVM-U-006	Boiler efficiency calculation	SG	I		
101	XXXX-001-102-PVM-U-008	Furnace Residence Time calculation	SG	I		
102	XXXX-001-102-PVM-U-009	NOX CALCULATION	SG	I		
103	XXXX-001-102-PVM-W-010	BOILER PERFORMANCE PARAMETER	SG	I		
104	XXXX-001-102-PVM-W-011	Predicted performance for indigeneous best coal, design coal & worst coal and variable pressure operation for 50,60,80, & 100% TMCR load and 60% BMCR & 100% BMCR load and HP heaters out condition	SG	I		
105	XXXX-001-102-PVM-W-012	Predicted performance for best coal, design coal & worst indigeneous coal blended with best & worst imported coal (individually) for variable pressure operation for 100% and 105% TMCR load and 60% BMCR & 100% BMCR load and HP heaters out condition	SG	I		
106	XXXX-001-102-PVM-U-003	AIR AND GAS WEIGHT CALCULATION	SG	I		
107	XXXX-001-102-PVM-U-005	Circulation calculation	SG	I		
108	XXXX-001-102-PVM-U-010	Buckstay arrangement and sizing calculations	SG	I		
109	XXXX-001-102-PVM-U-015	Coal drying calculations	SG	I		
110	XXXX-001-102-PVM-U-016	Fuel piping sizing data	SG	I		
111	XXXX-001-102-PVM-U-017	Fuel oil system sizing calculations including pressure drop calculations, NPSH, drain oil system etc.	SG	I		
112	XXXX-001-102-PVM-U-018	Mill Sizing Calculation & Performance Curves	SG	I		
113	XXXX-001-102-PVM-U-025	APH sizing calculation	SG	I		
114	XXXX-001-102-PVM-W-010	BOILER PERFORMANCE PARAMETER	SG	I		
115	XXXX-001-102-PVM-U-020	Fan (ID,FD,PA and Seal Air) sizing calculation	SG	I		
116	XXXX-001-102-PVM-U-026	Steam coil Air heater selection data	SG	I		
117	XXXX-001-102-PVM-U-013A	Safety valve and ERV sizing & selection for SH, RH	SG	I		
118	XXXX-001-102-PVM-B-007	GEN. ARRG'T OF BOILER-PLAN-	SG		II	
119	XXXX-001-102-PVM-B-007A	GEN. ARRG'T OF BOILER-PLAN-"C-C'	SG		II	
120	XXXX-001-102-PVM-B-011A	GEN. ARRG'T OF BOILER-FRONT ELEVATION-	SG		II	
121	XXXX-001-102-PVM-B-012	GEN. ARRG'T OF BOILER-FRONT ELEVATION-"G-G"	SG		II	
122		GEN. ARRG'T OF BOILER-SECTIONAL SIDE ELEVATION	SG		II	
123	XXXX-001-102-PVM-B-008	BOILER PLAN AT 0.0M LEVEL	SG		II	
124	XXXX-001-102-PVM-F-010A	GEN. ARRG'T-DUCT LAYOUT-COLD PRI. AIR DUCT TO APH & MILLS	SG		II	
125	XXXX-001-102-PVM-F-010B	GEN. ARRG'T-DUCT LAYOUT-COLD SEC. AIR DUCT TO APH	SG		II	
126	XXXX-001-102-PVM-F-011A	GEN. ARRG'T-DUCT LAYOUT-HOT PRI. AIR DUCT TO MILLS	SG		II	
127	XXXX-001-102-PVM-F-011B	GEN. ARRG'T-DUCT LAYOUT-HOT SEC. AIR DUCT TO WINDBOX CONN. DUCT	SG		II	
128	XXXX-001-102-PVM-F-011C	GEN. ARRG'T-DUCT LAYOUT-HOT SEC. AIR DUCT TO SOFA-	SG		II	
129	XXXX-001-102-PVM-F-012A	GEN. ARRG'T-DUCT LAYOUT-GAS DUCT FROM ECO. DUCT TO APH	SG		II	
130	XXXX-001-102-PVM-F-012B	GEN. ARRG'T-DUCT LAYOUT-GAS DUCT FROM APH TO BOF	SG		II	
131	XXXX-001-102-PVM-F-001	P & I Diagram for Water and steam circuit with valves, Fittings and Instrumentation	SG		II	
132	XXXX-001-102-PVM-F-002	P & I Diagram for flue gas path with instrumentation	SG		II	
133	XXXX-001-102-PVM-F-003	P & I diagram for fuel oil system	SG		II	

134	XXXX-001-102-PVM-L-004	P&ID of fuel oil system in FOPH area from terminal point including write-up/ procedure	SG		II	
135	XXXX-001-102-PVM-L-006	P&ID of Fuel oil system in Boiler front area	SG		II	
136	XXXX-001-102-PVM-L-007	Scheme of Air Heater(s) with instrumentation	SG		II	
137	XXXX-001-102-PVM-L-010	P&ID of pulveriser system	SG		II	
138	XXXX-001-102-PVM-L-022	P&ID High Pressure Boiler Startup and Warmup System	SG		II	
139	XXXX-001-102-PVM-L-025	P&ID Sootblower System	SG		II	
140	XXXX-001-102-PVM-L-036A	P&ID OF Reheater System	SG		II	
141	XXXX-001-102-PVM-L-036C	P&ID OF SuperHeater System	SG		II	
142	XXXX-001-102-PVM-L-036G	P&ID OF Evaparator System	SG		II	
143	XXXX-001-102-PVM-L-036H	P&ID OF Water Separator System	SG		II	
144	XXXX-001-102-PVM-L-036J	P&ID OF Economiser System	SG		II	
145	XXXX-001-102-PVM-L-041	P&ID for Boiler Water Circulation Pump System	SG		II	
146	XXXX-001-102-PVM-L-208	P&ID for Oxygen Dosing System	SG		II	
147	XXXX-001-102-PVM-L-003	Combustion air & Flue gas system along with instrumentation - Write up /Procedure	SG	I		
148	XXXX-001-102-PVM-H-002	Pressure part schedule along with summary of pr drop for SH system, RH system , Eco system, seperator , Circulation system/ evaporator system	SG	I		
149	XXXX-001-102-PVM-B-032	Pressure parts arrangement	SG		II	
150	XXXX-001-102-PVM-W-037	Soot blower selection sheets	SG	I		
151	XXXX-001-102-PVM-Y-001	Oil/Coal Burner data	SG	I		
152	XXXX-001-102-PVM-W-029	Pressure parts expansion movement diagram	SG		II	
153	XXXX-001-104-PVM-U-001	ESP sizing selection data	SG	I		
154	XXXX-001-104-PVM-U-XXX	FGD sizing selection Criteria	SG	I		
155	XXXX-001-XXX-XXX-X-XXX	Sub-Vendor approval for EOT crane for TG Hall		II		
156	XXXX-001-XXX-XXX-X-XXX	Sub-Vendor approval for IDCT (if applicable)			III	
157	XXXX-001-XXX-XXX-X-XXX	Sub-Vendor approval for Air Cooled Condenser (if applicable)			III	
158	XXXX-001-XXX-XXX-X-XXX	Sub-Vendor approval for FGD		II		
159	XXXX-001-XXX-XXX-X-XXX	Sub-Vendor approval for Generator Transformer		II		
160	XXXX-001-XXX-XXX-X-XXX	Sub-Vendor approval for Unit Transformer		II		
161	XXXX-001-XXX-XXX-X-XXX	Sub-Vendor approval for Station transformer		II		

Errata-01B to Amendment to Technical Specifications (Section VI) of Sipat-III EPC Package

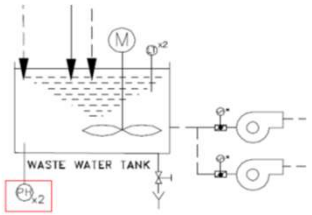
SN	Reference Amendment	Existing	To be read as
Errata-1.	Amendment no. 2B, SN: EE-04B	Section VI, Part A, Sub Section VI (Mandatory Spares), Chapter 01 SG & Auxiliaries, Page 20 of 38, Clause no: 1.22.06 (2) Thyristor bridge leg: 1 set (complete qty for one phase)	Section VI, Part A, Sub Section VI (Mandatory Spares), Chapter 01 SG & Auxiliaries, **Page 24 of 41, Clause no: 1.22.06 A (2)** Thyristor bridge leg: 1 set (complete qty for one phase)

CLARIFICATION 01A FOR Darlipali STPP, Stage-II (1X800 MW) EPC PACKAGE (BULK TENDER)

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	Employer's Response
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
1	VI / A		26 of 44	4.26.1 4.26.2	1. If qualification sought as per clause 4.26.1 then the details of the sub vendor (manufacturer) shall be filled by the bidder in the format A to G. 2. If the qualification sought as per the clause 4.26.2, then the details of JV/Subsidiary Company formed for manufacturing of such equipments in India shall be furnished individually for each equipment by the bidder such as	We are public sector company. We conduct open tender process with NTPC QR condition for procurement of FGD BOI. Therefore, Attachment 3K, which pertains to FGD BOI components such as Agitators, Slurry Recirculation Pumps, etc., will be submitted after the award of the contract. Please accept.	The Attachment 3K for provenness of the identified equipment suppliers is to be submitted as as per the schedule identified in the bidding documents. Bidder to comply with the requirements of the technical specification.
2	VI / A		26 of 44	4.26.1 4.26.2	The Bidder / Bidder's sub-vendor(s) is required to meet the provenness criteria and/or qualification requirement for critical equipment, auxiliaries, system and bought out items as per criteria stipulated below: Slurry Recirculation Pumps, Oxidation Blowers, Wet Limestone Grinding Mills, Slurry Pumps, Agitators & Vacuum Belt Filters for the Wet Limestone based Flue Gas Desulphurisation (FGD) System offered by the Bidder shall be only from such manufacturer(s) who has previously designed (either by itself or under collaboration / licensing agreement), manufactured / got manufactured the respective equipment(s) of the type, application and minimum equipment rating as stipulated below such that the respective equipment(s) should have been in successful operation in at least one (1) plant for a period not less than one(1) year:	**MODIFIED QUALIFICATION REQUIREMENT:** **AGITATOR:** Bidder should have designed, manufactured, tested, supplied / commissioned at least 1 No. of Horizontal or Side Entry Agitator in either for Wet Limestone based Flue Gas Desulphurization (FGD) application or any other industrial / process application such as petrochemicals, metals, mining, sugar, paper, fertilizers etc. and the equipment should have been in successful operation in at least one (1) plant for a period not less than one(1) year reckoned as on the date of consideration for approval but not later than one (1) year to award date of contract". **SLURRY PUMPS:** Bidder should have designed, manufactured, tested, supplied / commissioned at least 1 No. of Slurry pump having Flow 50 m3/hr (min.) with head 30 Meters of Liquid Column (min.) in either for Wet limestone based Flue Gas Desulphurization (FGD) application or Ash Slurry Application or any other industrial / process application and the equipment should have been in successful operation in at least one (1) plant for a period not less than one(1) year reckoned as on the date of consideration for approval but not later than one (1) year to award date of contract.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
3	VI / E	Tender Drawing	26 of 70	-	Tender Drg. No. xxxx-001-POM-A-024 (zone A7) Scheme of Gypsum Dewatering System 	In the tender drawing, it is observed that the belt filter wash water pump is drawing its suction from the filtrate tank. However, the filtrate tank contains slurry with solids, making the filtrate water unsuitable for belt filter washing. Hence, as per our proven practise, process water will be used for Belt filter wasing. Please confirm.	The Bidder may use process water for belt filter wash water. However, equipments like tank, pumps, valves and instrumentation shall be provided as the specification requirememt
4	VI / E	Tender Drawing	24 of 70		Tender Drg. No. xxxx-001-POM-A-022 (zone D8) Scheme of FGD Absorber System 	In tender drawing, normal quench system is shown. Howvever, in tender specification, there is no mentioning of normal quench system. As per our collaborator proven FGD design also, normal quench system is not applicable. Kindly clarify what is the purpose of normal quench system and if it is mandatorily required, kindly provide the specification for the same.	The scheme for the normal quenching system is used for washing the wet-dry duct interface to prevent scaling in the zone. The requirements of the scheme are indicated in the tender P&ID. The same is to be complied with by the Bidder.

5	VI / E	Tender Drawing	24 of 70		Scheme of FGD-Absorber system: Note 6- All instruments in slurry lines shall be provided isolation valves and diaphragm.	Bidder does not recommend valves in the impulse lines of slurry pipes in order to keep the stub length as minimum as possible and to prevent slurry settlement/blockage issues. Bidder request NTPC to review and confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
6	VI / A	IB	14 of 18	4	The above represent limestone quality to be considered for basic sizing and guarantees. Further the bidder is required to collect limestone samples from site for analysing is characteristic including reactivity. Bidder shall indicate in its bid the quantity of limestone required for such testing.	Kindly clarify whether limestone reactivity test is to be carried out after award of contract or before award of contract.	The specification requirement is clear in this regard. The scheduling of the limestone reactivity is based on the assessment by the Bidder of the sensitivity of the Bidder's offered FGD design to the FGD reactivity, design margins required etc. while meeting the requirments of the bidding documents.
7	VI / A	IIA-04	1 of 7	1.02.00	In case of higher pressure /flow requirements are envisaged for instrument & service air and water Contractor shall make its own arrangement.	As per this clause, we understand instrument air & service air will be provided by customer upto certain predefined limit. Kindly specify the ceiling limit for instrument & service air.	BIdder's understanding is not correct. The complete compressed air system for the EPC package is in the scope of the Bidder.
8	VI / A	IIA-04	2 of 7	2.06.00	The waste water from the system shall be collected and neutralized using lime and shall be pumped to FGD waste water treatment plant or in any other area with suitable treatment so as to suit/not disturb the destination fluid quality.	Kindly specify a. type of treament required for FGD waste water and b. quality of waste water required after treament so as to bring uniformity among bidders	Bidder to refer clause 1.03.06 of sub section IIA-10, Part A & clause 3.12.00 of sub section A-14, Part B of Section VI for FGD wastewater treatment system in case of Dry Ash handling system. In other cases, bidder to suitably treat the FGD wastewater for reuse in Ash handling / dust suppression system. The functional requirement of the treatment is already specified. The details of the same shall be finalised based on the location to which the neutralised waster water is sought to be pumped.
9	VI / A	IIA-04	3 of 7	4.01.04	2x100 heaters for absorber outlet gate & **bypass gate**	We understand that FGD bypass gate is not applicable. The reference to the bypass gate in this clause is a typographical error. Please confirm.	The referred specification requirement is not from Darlipali II. Bidder to check.
10	VI / A	IIA-04	3 of 7	4.01.09	Piping from gypsum bleed pumps to gypsum dewatering system, along with recirculation lines (if required) necessary isolation and **control valves**	Control valve is not required in gypsum bleed pump line as per our proven practise. All valves (as per tender P&ID) will be provided for gypsum bleed pump line. Please accept. If control valve is mandatory in gypsum bleed pump line, please inform the purpose of control valve and type of control valve required.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
11	VI / A	IIA-04	5 of 7	7.00.00	PROCESS WATER& COOLING WATER STORAGE & PUMPING SCHEME	This section does not stipulate any specific requirement for cooling water storage. Kindly confirm whether cooling water stoarge is required. If cooling water storage is required, provide specification for cooling water stoarge if required.	Bidder to follow the water storage requirements along with the pumping scheme as detailed in the technical specifications.
12	VI / A	IV	1 of 77	1.00.01	All CAT-1 Performance Guarantee tests shall be conducted along with initial operation except following a) Coal Pulverisor Wear Parts Warranty b) Particulate Emission/ESP Efficiency, **FGD.**	Kindly specify when FGD PG test is to be done. Is it after completion of initial operation?	The PG test of the FGD shall be carried out during the initial operation or soon after the completion of the initial operation. The Contractor shall make the FGD system ready for conducting the functional guarantee tests in line with the requirements laid out in the bidding documents.
13	VI / A	IV	21 of 77	1.01.07.01 note 5	Guaranteed Unit Auxiliary Power Consumption of FGD system shall be taken by considering the additional pressure drop in the FGD system during FGD SO2 removal efficiency test at specified guarantee point conditions. For this purpose, difference of FGD system pressure drop during FGD SO2 removal efficiency test and that at Unit Auxiliary Power Consumption test shall be loaded as additional Auxiliary Power Consumption.	We understand that if booster fan is not provided, difference in ID fan power consumption measured during FGD SO2 removal efficiency test and that measured during Unit Auxiliary Power Consumption Test will be considered for FGD Power Consumption on account of FGD pressure loss. If booster fan is provided, booster fan power consumption only will be considered for FGD power consumption on account of FGD pressure loss. Kindly confirm our understanding is right.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.

14	VI / A	IV	22 of 77	1.01.07.02 c)	c) FGD System i.Not used ii. Vacuum Belt Filter, Vacuum Pump and its integral auxiliaries iii. Booster water pump iv. Waste water pump v. Limestone Slurry Tank Agitators vi. Filtrate Pump(s) vii. Belt Filter Wash Water Pump viii. Hydro-cyclone Waste Water Sump Pump and Waste Water Pump	Wet Ball Mill System and Gypsum Dewatering System along with their associated equipment do not run continuously and are operated in batch mode. As per ASME PTC 40, Bidder calculates duty factors based on running time of equipment at guarantee point conditions and accordingly guaranteed auxiliary power will be furnished. Please accept. Otherwise NTPC is requested to specify duty factors for equipment indicated at sl. no. i to viii.	The formulation of duty factors for limestone grinding system and gypsum dewatering system shall be finalised during detail engineering and shall consider correction of the Auxiliary Power Consumption values measured during the Performance Guarantee Test to the guaranteed conditions.
15	VI / A	IV	22 of 77	1.01.07.02 c)	c) FGD System viii. **Hydro-cyclone Waste Water Sump Pump** and Waste Water Pump	The name of this pump (Hydro-cyclone Waste Water Sump Pump) is ambiguous, and we are unable to understand its intended purpose or service. We kindly request clarification	Bidder to Refer Amendment No. SG7
16	VI / A	IV	31 of 77	1.03.03 iv)	Pressure Drop across FGD The contractor shall demonstrate that the total pressure drop in the gas path across the FGD System shall not exceed the guaranteed values for the range of coal and loads specified in the Technical Specification	FGD pressure drop is directly related to power consumption of ID fan or booster fanas the case may be. There is guarantee for Auxiliary Power Consumption envisaged in the tender. FGD pressure drop is already accounted in auxiliary power cosumption guarantee. Hence, we request NTPC to remove FGD pressure drop guarantee for this project in line with other NTPC tenders.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.
17	VI / A	IV	31 of 77	1.03.03 vii)	The Contractor guarantees that the maximum purge flow rate to waste water treatment system from FGD system for 1x800 MW unit shall be less than **10m3/h** averaged over a 24 hour period for a the range of specified coal(s).	FGD waste water purge flow quantity is arrived to limit chloride content in absorber slurry < 20000 ppm. Source of chloride in absorber slurry is mainly from coal. Kindly provide coal chloride content to check adequacy of FGD waste water purge flow quantity.	For FGD design and guarantee conditions-HCL (ppm) wet-45 & HF (ppm) wet-12 may be considered. Bidder to Refer Amendment No. SG3 and further, Bidder to comply with the specification requirement.
18	VI / A	IV	31 of 77	1.03.03 vii)	The Contractor guarantees that the maximum purge flow rate to waste water treatment system from FGD system for 1x800 MW unit shall be less than **10m3/h** averaged over a 24 hour period for a the range of specified coal(s).	FGD waste water purge flow of 10 m3/hr is too less for 1x800 MW unit. Bidder recommends that atleast 15 m3/hr waste water purge flow per unit otherwise it will result in accumulation of high TDS/chloride content in the recirculated slurry which will impact FGD performance. NTPC is requested to review the clarification and provide necessary amendments.	Bidder's proposal is not acceptable. Bidder to comply technical specification requirement.
19	VI / B	A-01	17 of 88	3 viii)	Pressure drop through FGD System 150mm WC or actual whichever is higher (Alternately, separate booster fans for FGD system may be provided. if pressure drop through FGD system exceeds 150 mm WC. In such case, specified pressure drop through FGD system shall not be considered for sizing of ID fan.)	We understand that separate booster is not mandatory even if FGD pressure drop is more than 150 mmwc. ID fan taking care of FGD pressure drop will be provided. Please confirm our understanding is correct.	Bidder's understanding is correct.
20	VI / B	A-05	7 of 27	iv)	The slurry recirculation pumps shall have motor /pneumatic driven knife gate valve at pump suction.	Based on the proven practices of our collaborators, it is highly advisable to install a pneumatic butterfly valve at the suction point of the slurry recirculation pumps. Knife gate valves have a longer opening and closing time, approximately 5 minutes, in comparison to butterfly valves(15 sec). If a knife gate valve is used at the pump suction, it may cause delays in starting the recirculation pump, as one would have to wait until the suction gate valve is fully open. Please accept pneumatic butterfly valve at the suction point of the slurry recirculation pumps.	Bidder's proposal is not acceptable. Bidder to comply technical specification requirement.
21	VI / B	A-05	9 of 27	5.04.00	Provision shall also be provide in the Gypsum Bleed Pumping system by provision of tap off, valves etc. for pumping the gypsum bleed to alternate source.	We understand that only provision for tap off with isolation valve will be provided in gypsum bleed pump discharge header pipe. Piping from tap off to alternate destination is not in bidder's scope. Please confirm.	Bidder's understanding is correct.
22	VI / B	A-05	4 of 27	2.00.00	The complete installation of liners shall be made under the supervision of the liner supplier as per their guidelines.	Since absorber is made of C276 clad plate, no liner is applicable. Hence, clause related to "supervision of the liner supplier" may be deleted.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement. The referred clause refers to the liners

23	VI / B	A-05	17 of 27	7.07.05	In case Bidder opts to provide additionally Lamella separator before the waste water tank and after the secondary hydro cyclone for removing impurities from the system, the solids con-centration in waste water up to max 10% can be acceptable.	Kindly clarify whether Lamella separator (before the waste water tank and after the secondary hydro cyclone) is mandatory or not.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.
24	VI / B	A-05	17 of 27	7.07.07	A pH monitor shall be provided at the discharge of the pumps for measurement and control.	As per Part B, pH analyser to be provided at discharge of the waste water pump. As per Tender drawing, ph analyser to be provided in waste water tank. Both clauses are contradictory. As per our proven practise, ph analyser will be provided in waste water tank. Please confirm.	Bidder's understanding is correct. Refer to Amendment C-01 in this regard.
25	VI / E	Tender Drawing	26 of 70	-	Tender Drg. No. xxxx-001-POM-A-024 (zone F3) Scheme of Gypsum Dewatering System 		
26	VI / B	A-05	18 of 27	7.08.01	Bidder to provide the portable pumps of suitable capacity to drain the remaining slurry from the tank in max 2 hour into absorber area sump.	As per our proven practise, by opening drain valves in absorber, remaining slurry in absorber will flow automatically by gravity to absorber area sump via trench within 2hrs. Portable pumps to drain absorber tank is therefore not required. Please confirm.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
27	VI / B	A-05	19 of 27	8.04.00	All the slurry pumps shall be provided with motorized suction and discharge valves.	As per Part B, All the slurry pumps to be provided with motorized suction and discharge valves. However, the tender drawings allow for the provision of pneumatic valves based on the proven practices of the bidder for slurry pump suction/discharge. as per our proven practise, we will provide pneumatic valves for slurry pump suction/discharge. Please confirm.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.
28	VI / B	A-05	19 of 27	9.01.00	Contractor shall make arrangements for pumping the drainage water back to the respective system with 2x100% vertical sump pumps.	As per referred clause, 2x100% sump pumps to be provided. However, in tender drawings, only one no. sump pump is shown for each of the respective sumps. Both are contradictory. Kindly clarify.	Bidder to provide 2x100% sump pumps as per the specification requirement in the referred clause
29	VI / B	A-05	20 of 27	10.01.00	Slurry tanks: Replaceable Chlorobutyl/Bromobutyl rubber lining of minimum 5 mm thickness	We interpret that the lining material and lining thickness for slurry tanks, such as the limestone slurry tank, wastewater tank, filtrate tank, and secondary hydrocyclone feed tank, should conform to the specifications provided in their respective sections or headings. The lining material and lining thickness details mentioned in this clause are intended for other slurry tanks for which such specifics are not explicitly stated.	The specification requirement is clear in this regard. Bidder to comply with the specification requirement.
30	VI / B	A-05	20 of 27	10.01.00	Coarse-screen(s) at suction-side of slurry recirculation pumps shall be provided	Both clauses are contradictory. As per our proven practise, Suction screens shall be installed inside the Absorber vessel to protect the Slurry recirculation pumps. Please confirm.	The requirements of the specification are clear. Bidder to provide the screens in the locations as specified in the referred clauses.
31	VI / B	A-05	12 of 27	5.06.22	Suction screens shall be installed inside the Absorber vessel to protect the Slurry recirculation pumps.		
32	VI / B	A-05	23 of 27	14.03.00	An adequately sized manhole with platform (min. 2 sq. m) shall be provided above each spray level	Manhole size (min. 2 sq.m) asked in tender is very large and there is a risk of fall asscoiated with larger manhole. As per our proven practise, manhole of size 600 x 900 mm is adequate and will be provided above spray level. Please accept.	The specification requirement is clear in this regard. The larger size of the manhole provides for easing mobility and, hence, safety. The Bidder is to make necessary system improvements to nullify the risk cited by the Bidder in its clarification. Bidder to comply with the specification requirement.
33	VI / B	A-02	40 of 67	13.01.02 c	For flue gas ducts downstream of ESP, additional fly ash loading on the surface or for one tenth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under	Kindly provide additional fly ash loading for absorber outlet duct upto bypass duct.	The requirement of fly ash loading to be considered for duct design, as specified in the referred clause, is also applicable for absorber inlet and absorber outlet duct sections.

34	VI / B	A-01	20 of 88	1.05.14.01 a 3	Maximum Flue gas velocity from ESP out-let to chimney inlet shall be 15 m/sec.	We understand that maximum Flue gas Velocity for Absorber inlet duct and absorber outlet shall be 15 m/s. Please confirm.	Bidder's understanding is correct.
35	VI / A	IIA-04	3 of 7	3.01.05	On/Off type Diaphragm valves in Limestone circulation lines to be provided instead of pinch control valve.	Similar to limestone recirculation line, on/off type Diaphragm valves shall be provided in gypsum bleed pump recirculation line instead of pinch control valve. Please accept. Note. There is no requirement of control valve in recirulation line as per our proven design.	Bidder's query is not clear. The referred specification requirement as per cl. no. 3.01.05 may be checked. Specification requirement is clear. Bidder to comply with the specification requiremnets..
36	VI / B	A-05	4 of 27	3.01.00	5. Maximum flue gas velocity through the Absorber (M/sec) - Not more than 4 m/s at Design Point Conditions (not applicable for bubbling type absorber)	Gas Velocity inside the Absorber are design specific parameter and as per our DCFS FGD standard design practice, maximum flue gas velocity through the Absorber is maintained at 4.5m/s. Bidder request NTPC to review and kindly accept.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
37	VI / B	A-01	26 of 88	1.05.21.01	7. SO2 Removal Efficiency **Guarantee Point** To be worked out by the Bidder to achieve SO2 emission in the chimney to less than 60 mg/nm3 (6% O2 dry basis) **Design Point** To be worked out by the Bidder to achieve SO2 emission in the chimney to less than 80 mg/Nm3 (6% O2 dry basis)	Bidder proposes the following Outlet SO2 limits 1.Guarantee Point : 80 mg/Nm3 (6% O2 dry basis) 2.Design Point : 90 mg/Nm3 (6% O2 dry basis) The above mentioned SO2 emission limits are below the Emission norms and it will ensure optimized FGD design. Bidder request NTPC to review and kindly accept the proposal.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
38	VI / B	A-05	11 of 29	5.06.11	The complete absorber vessel (absorber oxidation tank, absorber tower & absorber outlet duct upto absorber outlet flange) shall be made of clad sheet of C276 / Alloy 59 (minimum 2 mm thickness) by explosion bonding or hot rolling, having minimum 7 mm thick carbon steel as base material.	Glass flake lining is the preferred material for FGD absorber linings worldwide owing to its inherent advantages. Our collaborator, MHI Japan, widely recommends the use of Glass Flake Resin Lining in absorber, citing its ease of application and maintenance. MHI Japan has successfully executed over 80% of their supplied absorbers with Resin Lined Carbon Steel globally. Glass Flake Resin Lining is a cost-effective alternative to alloy material, providing substantial savings in both material and installation costs. This alternative can significantly reduce the overall project budget. Glass Flake Resin Lining offers exceptional resistance to a wide range of corrosive chemicals and temperature conditions typically found in FGD systems. It can withstand the high corrosive/abrasive environment effectively, ensuring a longer service life for FGD. In view of the above, we request NTPC to review and accept 3 mm thickness vinyl ester based glass flake lining for absorber.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
39	VI / B	A-05	5 of 27	3.02.04	Absorber outlet to bypass duct & duct after by pass damper/gate to chimney inlet shall be made of cladded sheet of minimum 2 mm thickness of either Titanium (Grade 2 as per ASME SB265) or C-276 over 7 mm thick (minimum) mild steel base metal	Glass Flake Resin Lining offers exceptional resistance to a wide range of corrosive chemicals and temperature conditions typically found in absorber outlet duct. It can withstand the high corrosive/abrasive environment effectively, ensuring a longer service life for FGD ducts. In view of the above, we request NTPC to review and accept 2 mm thickness vinyl ester based glass flake lining for absorber outlet duct in line with NTPC Dadri FGD.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
40	SECTION – VI, PART-A BID DOC. NO. CS-9551-001-2	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	5 OF 41	1.05.00 / A.6.3	**ID Fans** Pressure Regulator : 3 nos. of each type	Pressure Regulator is not applicable. We are offering PRV instead of Pressure regulator which is already quoted in 1.05.00/A.6.4. Hence,we request NTPC to amend the item as "**if applicable**".	Bidder to supply the item as specified, based on the bidder's offered type/design of the fan, which shall be discussed during detail engineering. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.

41	SECTION – VI, PART-A BID DOC. NO. CS-9551-001-2	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	6 OF 41	1.05.00 / B.4.3	**FD Fans** Pressure Regulator : 4 nos. of each type	Pressure Regulator is not applicable for ID LOS. We are offering PRV instead of Pressure regulator which is already quoted in 1.05.00/A.4.4. Hence ,we request NTPC to amend the item as "**if applicable**".	Bidder to supply the item as specified, based on the bidder's offered type/design of the fan, which shall be discussed during detail engineering. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
42	SECTION – VI, PART-A BID DOC. NO. CS-9551-001-2	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	7 OF 41	1.05.00 / C.6.3	**PA Fans** Pressure Regulator : 4 nos. of each type	Pressure Regulator is not applicable. We are offering PRV instead of Pressure regulator which is already quoted in 1.05.00/A.6.4. Hence,we request NTPC to amend the item as "**if applicable**".	Bidder to supply the item as specified, based on the bidder's offered type/design of the fan, which shall be discussed during detail engineering. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
43	Section-VI, Part A	Sub-Section- II A-01 (SG & Auxiliaries including ESP)	Page 27 of 28	5.00.00	**5.00.00. Provision for CO2 to Methanol in Darlipalli STPP Stage-II 1 x 800 MW Project** …. Provisions shall be given in both the units. The tap-off duct portion shall be provided with necessary isolation gates in each tap-off. These Gates are to be made of Carbon steel with C276 cladding of sheet of minimum thickness 1.6 mm along with 2x100 % Seal Air fans. Also, seals to be made of Alloy C-276 or better material. Blanking plates shall also be provided in each tap-off duct after isolation gates.	We understand that only Inlet tap-off duct with Gate (for CO2 to Methanol system) is required, and Outlet tap-off duct (with Gate) is not required as in recent projects like NTPC Talcher Stage-III (2x660 MW), NTPC Lara Stage-II (2x800 MW), SCCL (1x800 MW). Please confirm.	Bidder's understanding is correct. Further, bidder to comply the specifications requirements for details on tap-off duct.
44	Section-VI, Part B	Sub-Section- A-02 (SG & Auxilia-ries in-cluding ESP)	Page 58 of 67	22.01.02	Leak tightness testing of dampers for each type and size of damper at shop to demonstrate the guaranteed gas tightness efficiency (on flow).	Leak tightness testing will be conducted for 1 number of each type and size of Gate & Biplane Damper, irrespective of Sub-vendor/ Sub-supplier.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
45	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	17 of 77	1.01.05.02	The corrections for the flue gas flow and ESP inlet flue gas temperature in excess of the values for these parameters under guarantee point conditions, shall be allowed only in case and to the extent such variations are caused solely due to changes in specified coal properties and ambient conditions. Further, the corrections for the flue gas flow and temperature lower than the guarantee point values shall be applied based on actually measured test values. Subject to the above, the corrections for the variation in flue gas flow, inlet dust burden and ESP inlet flue gas temp. shall be based on the above computed test values and the procedure indicated in the next para.	The tender indicates that estimating and applying corrections to parameters for their variation to the extent of change in specified coal properties and ambient conditions (during PG test), while assessing ESP performance. It may kindly be noted that ESP is designed for a specified set of parameters and is operated at actual condition. Hence, corrections will be applied for variation on actual test parameters (viz. gas flow, temperature & inlet dust) from guarantee point parameters while assessing ESP performances. This is applicable even for ESPs included in SG package as the change in parameters are not due to ESP. If the measured values are higher and corrected values are lower, corrections for design values will be taken for calculation of ESP efficiency. NTPC to note that corrections are allowed for actual measured values for all direct ESP contracts including recent projects like Mouda, Solapur, etc.	Bidder's query is not clear. However, bidder to note that the scope of EPC Package includes all equipment/systems upstream and downstream of ESP is included in the subject tender. Hence, the factors except for the coal properties and the ambient conditions within the scope/control of the bidder. Accordingly, the referred clause in the technical specifications allows for corrections solely due to changes in specified coal properties and ambient conditions.. Specification requirement is clear in this regard and the bidder to comply with the technical specifications.
46	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	18 of 77	1.01.05.03	Ca.Cb.Cc etc. are Correction factors for flue gas at temperature, moisture content in flue gas, ESP inlet dust loading, sulphur and sodium contents of coal ash based on correction curves furnished by the Bidder and approved by the Owner.	The corrections for variation in flue gas flow, gas temperature, inlet dust concentration, sulphur content will be considered and the same will be submitted during contract stage.	The specification requirement is clear in this regard. Bidder to comply with the specification requirement.

47	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	20 of 77	1.01.07.01	Method of computation of Aux. Power consumption for ESP: The measurement for guaranteed auxiliary power consumption shall be carried out during ESP collection efficiency test. The method for computing the power shall be as described below:- a) Power consumption of ESP will be measured pass wise and for one pass (Say ESPA) at a time with the help of energy meter in ESP MCC. b) Energy meter reading will be taken before starting the collection efficiency test and after completion of collection efficiency test. c) Before starting collection efficiency test, switch off all the TR sets, all hopper heaters, all insulator heaters/pent house fans (if applicable) and rapping systems serving to one pass.....	The method specified involve shutting down of total ESP fields just before start of emission test to measure external loads connected in ESP LTMSB. It is suggested that such switching off of the fields, heaters, rappers shall not be resorted to just before starting emission test. Hence, no external loads shall be connected to ESP LT Switchgear or (if not) this external load can be measured after completion of emission test i.e. ESP can be switched off after the emission test. Hence the power measurement test shall be taken up after completion of emission test.	Bidder's proposal reviewed and not accepted. Bidder to follow the procedure as given in the clause 1.01.07.01 of sub section IV, Part A Section VI.
48	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	2 of 77	1.00.01 (g)	Instruments for PG test and instruments for process control of similar applications are envisaged to be of same make and model having same accuracy level. However, instruments for PG test are also acceptable as per standard and proven practice of the contractor/OEM and in such case, instruments for process control shall be as per requirements specified in Part-B of technical specifications. Instruments to be used for PG test shall be additionally supplied over and above the instruments shown in tender P&IDs. **PG test equipment being supplied, installed and commissioned for each unit, shall be retained by employer after completion of PG test.** Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation. **All PG test process parameters shall be made available in DDCMIS.**	During PG Test of ESP, outlet emission is measured by isokinetic sampling for particulate matter measurement as per EPA standard. The standard requires only portable instruments which does not warrant any erection or commissioning. It is also not possible to record the isokinetic sampling kit parameters in DDCMIS. For ready reference of Particulate emission, Opacity monitors are provided at ESP outlet. Other operating parameters of ESP will be recorded in IOS with interface to DDCMIS.	Bidder understanding is correct. Further bidder to comply to specification requirement.
49	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	60 of 67	2.01.01 (a)	The model study shall also include a gas distribution study in the inlet and outlet duct as well as, the cross over duct to find out the effect of isolation of one stream of the ESP,	As per ICAC code, the gas distribution study will be conducted at ESP inlet duct only and not at ESP outlet ducts.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
50	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	60 of 67	2.01.01 (b)	The model study shall include all connecting duct work from air preheater gas outlets to the induced draft fans inlets, induced draft fan outlet to FGD inlet, FGD outlet to chimney flue inlet and also from the induced draft fan outlet to chimney flue inlet (in FGD bypass condition) including the inlet duct transition piece	The ESP Physical Flow Model will include the design of all connecting duct work from the air preheater gas outlets upto the induced draft fans inlets only. Physical modeling from Induced draft fan outlet, Ducts to/from FGD & chimney flue Inlet (FGD bypass duct) including the inlet duct transition piece is excluded from ESP Physical Flow Model study as we are not measuring air velocities in the Physical Flow Model beyond ESP Casing, as per ICAC standard. Flow correction devices if any, beyond ID fan is not required since this will not have any impact on ESP Flow Model study.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
51	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	62 of 67	8.01.00	Dust hoppers shall be of conical type. ESP hoppers other than that of conical type shall not be acceptable.	Pyramidal hoppers which have similar ash flowability characteristics to conical hoppers, may also be accepted owing to simplicity of construction.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
52	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	63 of 67	8.01.00	Hopper valley angle to the horizontal shall not be less than sixty five (65) degrees.	Hopper valley angle of 60° may be accepted as being followed for other projects of similar capacity.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.

53	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	66 of 67	14.00.00	A comprehensive flowability study of fly ash from ESP hoppers shall be conducted by the contractor to ensure smooth flow of ash under various operating conditions of the plant including Steam Generator, ESP and Fly Ash Removal System. The hoppers are required to promote mass flow without arching and rat holing problems. The main aim of the flowability study is to ensure consistent flow from each hopper to the ash removal system and following requirements shall be met by the contractor in this connection: i) The study could be conducted on scaled down model of ESP hopper prepared by the bidder and at different relevant temperatures.....	Bidder clarifies as below for conductance of the test.: Evaluation of mass flow design parameters under gravity condition i.e valley angle for a given top opening of hopper with specified material of construction and outlet opening dimension by conducting shear test on three ash samples, as provided by NTPC. The test will be conducted at: a) Ambient temperature at test condition b) Maximum 60 deg. C. Bidder may engage an external laboratory to conduct the above test. The report on the above study will be furnished to NTPC by Bidder for information purpose. There shall be no effect on the project work schedule and no hold on the detailed engineering of ESP. No physical modeling is envisaged.	Specification requirement is clear in this regard. Bidder to comply the specifications requirements. Procedure for ash flowability study of ESP hoppers shall be discussed and finalised during detail engineering.
54	VI/B	SUB SECTION- G-04 STANDARD PG TEST PROCEDURE	48 of 185	METHOD OF COMPUTATION OF AUXILIARY POWER CONSUMPTION FOR ESP: -	Electrostatic Precipitator with all TR sets, all hopper heaters.....set point temperature shall be kept 5 degrees Celsius above the Design flue gas temperature/ operating flue gas temp whichever is higher.	Set point temperature will be kept 5 deg above operating flue gas temperature or 125 deg whichever is higher.	The set temperature shall be 5 deg. C above the gas temperature corresponding to the ESP guarantee point or the operating flue gas temperature whichever is higher.
55	VI Part-A	II-B ELECTRICAL SYSTEM / EQUIPMENTS	3 of 17	1.05.02	All Switchgears, Motor Control Centres (MCCs) & AC/DC distribution boards, etc. shall have at least twenty per cent (20%) or minimum two (whichever is higher) fully equipped MCCB/MPCB	Bidder proposes 10% or minimum two feeder spares for the LT Switchboards instead of 20% or minimum two (whichever is higher). Owner may kindly review and comment.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
56	VI Part-B	A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	63 of 67	8.03.00	The dust hoppers shall be electrically heated up to a minimum of lower one third (1/3) of the dust hopper height but not less than 1.5 metre in height by thermostatically controlled curved panel heating elements matching with curved surfaces of conical hopper to prevent ash bridge formation by maintaining the ash temperature above 140 deg C	The panel type heater's curved metallic enclosures are bent to the desired radius/shape at factory and supplied. However, during erection at site, any slight variation in the installation location may result in improper contact of panel heaters with the hopper curved surface, which may affect the desired performance. The vendors for curved panel type heaters are only one or two. In view of the above, bidder request owner/ NTPC to consider blanket type and other heater types that are suited to conical hopper surface heating requirements.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
57	VI Part-B	A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	64 of 67	8.07.00	Acoustic 3D Level Scanner Based Level Monitoring System / NOGS (Naturally Occurring Gamma Sensor) based level monitoring system for each ESP Hopper in the First Three Fields shall be provided complying with requirements indicated in Sub-Section-IIIC-03	The acoustic 3D level scanner / NOGS level scanners is yet to be commissioned and proven for ESP hopper applications. The cost is higher than the cost of conventional Ash level indicators, and the vendor availability is limited. Hence, owner/ NTPC may kindly consider conventional ash level indicators instead of 3D acoustic level scanner/ NOGS based level monitoring for ESP hopper applications. Owner may kindly review and confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
58	VI Part-B	B-0 GENERAL ELECTRICAL SPECIFCIATION	8 of 16	3.06.00 (d)	MCCB shall be provided for all supply feeders of current rating above 16 Amp and including 400A.	For ESP LT Switchgear, MCCB shall be provided up to 630 A, and breaker modules shall be provided for current above 630 A. This is in line with the standard design practise of ESP switchgear for projects. Owner may kindly review and confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.

59	VI Part-B	B-02 MOTORS	1 of 5	3.01.00 (b)	Continuous duty LT motors upto 50 KW Output rating (at 50 deg.C ambient temperature), shall be super Premium Efficiency class-IE4, 50-200 KW shall be of Premium Efficiency class – IE3, conforming to IS 12615, or IEC:60034-30	The ESP geared rapping motor is fractional horse power drive and is operated intermittently for ESP application. Since the ESP rapping motor operation is intermittent , IE4 motors are not provided. Instead IE2 rated motors are provided. This is in-line with other NTPC projects also. Owner may kindly review and confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
60	VI Part-B	B-08 HT ,LT POWER CABLES	5 of 7	4.00.05 (a)	Cables shall be supplied in steel drums of heavy construction.	Bidder proposes wooden drum also in addition to steel drums for the power cables. Owner may kindly review and confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
61	VI Part-B	IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	5 of 36	3.02.00 (1)	Type of RTD: Four wire, Pt-100	Bidder proposes that 3-wire RTD may also be given for temperature measurement of the various equipment (FANS/ Motors etc) as per the bidder's proven design. This is in-line with design provided for various projects. Owner may kindly review and confirm for 3-wire RTD / 4-wire RTD (as per bidder design) for FANs application..	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
62	VI Part-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	5 of 20	1.06.02 (M)	For High torque (> 1000 Nm) electric actuators: Contractor may propose non-intrusive fieldbus electrical actuators without SIL2 certification.	The SIL-2 compliant models include imported actuators and are about 5 times costlier. Considering the initial cost, maintenance as well as spares costs and the import requirements, bidder request NTPC to kindly remove the SIL-2 requirement for the electrical actuators. Owner may review and confirm that, SIL-2 certification is not applicable for the electrical actuators	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
	VI Part-B	IIIC-17 ELECTRICAL ACTUATORS	2 OF 4	4.11.00	SIL Certification:		
63	VI Part-E / Tender SLD	Part-E/Elect_Cnl/ 9551-999-POE-J-002 REV-A Single Line diagram-MAIN PLANT		SLD Notes point (F) .	(F) . Standard LT transformer rating to be used are as follows 2500/2000/1600/1000/630/500/315 KVA.	Bidder understands that use of both LT ONAN and LT DRY type transformers upto 2.5 MVA are allowed as per SLD . However in Sec-B-04-/1.03.01, it is mentioned that ONAN transformers are allowed only till 2.0 MVA. Kindly review and confirm that ONAN LT transformers can be provided till 2.5 MVA. The same is in-line with the other NTPC EPC projects also. Owner may kindly review and confirm.	Bidder proposalis not acceptable. Bidder shall comply to technical specification
64	VI Part-B	SUB SECTION B-06 LT SWITCHGEARS & LT BUSDUCTS	13 of 19	7.00.00	Each motor/heater feeder shall consist of MPCB/MCCB (with S/C release only), Power contactor & intelligent motor controller (IMC) to ensure Type-2 Co-ordination. If the ESP controller and rapping motor are provided in the ESP switchgear, same shall be with IMC having MPCB/MCCB. If separate controller is provided and only supply feeder is envisaged from ESP Switchgear, the requirement of IMC may be excluded.	a) ESP rapping motors are fractional horse power motors. We are offering separate ESP controller which controls the ESP rapping motor . The controllers ensures the best sequence of rapping of various fields and provides better coordination of rapping motors for achieving the desired emission parameters. No control is envisaged from the ESP switchgear. Only supply feeder with OLR and power contactor is provided from ESP switchgear. b) The ESP heaters (hopper/ insulator) are thermostat controlled for maintaining the desired temperature. No control is envisaged from the ESP switchgear. Only supply feeder with contactor is provided from ESP switchgear. Further, IMC not applicable for heater feeders. The ESP motor and heater controls are proven design being offered in all the NTPC contracts. Since no control of rapping and heaters are envisaged from ESP switchgear (only supply feeder with OLR & contactor are provided in ESP switchgear) , bidder proposes ESP switchgear without IMC. Owner may kindly review this requirement based on the implementation of ESP motor and heater controls in the various NTPC projects. Owner may Kindly review and confirm.	Bidder proposal is not acceptable. Bidder shall comply to technical specification

65	VI Part-B	SUB-SECTION-IIIC-17 ELECTRICAL ACTUATORS	1 of 4	3.00.00	These actuators shall be Non-Intrusive type electric actuators. The interface of these actuators with DDCMIS shall be of two types viz. with Hardwired interface and with Fieldbus interface	Bidder proposes that all the actuators for the gates and dampers can be hardwired interface instead of fieldbus interface for the following reasons: a) Providing Uniformity of communication interface for all the actuators b) Some vendors don't have the Profibus based actuators for the complete range Owner may kindly review and confirm for hardwired actuators for gates and dampers instead of fieldbus based actuators.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
66	VI Part-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	2 of 36	2.01.00	Microprocessor based 2 wire loop powered electronic transmitter with 4-20 mA DC HART/ Fieldbus (Foundation Fieldbus /Profibus PA complying to IEC 61158.) output signal shall be provided.	Bidder understands that bidder can provide either HART based / fieldbus based transmitters , as per the tender specification. Hence bidder proposes HART based transmitters for all applications instead of fieldbus based transmitters. This shall provide uniformity. Owner may kindly review and confirm	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
67	NA				General Query - Electrical query	The number of layers of cables in the cable trays is not mentioned. Bidder understands that the maximum cable layer is 2 layers for power cables and 3 layers for control and instrumentation cables. This is based on standard practise being followed for all other NTPC projects also. Owner may kindly review and confirm	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
68	NA				General Query- mandatory spares query	In case mandatory spares are repeated at more than one location, bidder proposes to consider only at one location (the one location where maximun quantity is specified shall be considered). Owner may kindly review and confirm the same. In case mandatory spares are to be considered in all the locations wherever it is specified, same may be clearly indicated to the bidders.	It is clarified that in case Mandatory spares are repeated at more than one location, Bidder to consider item/spare indicated with maximum quantity, unless otherwise specifically stated.
69	Section-VI, Part A	Sub section-II, A-01	15 of 28	2.16.05A	Provision for Future Installation of SCR system	Please confirm whether the APH should be SCR ready or not	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
70	Section-VI, Part B	Sub section-A-02	18 of 67	9.01.03 (4)	Air Heater Seals - The Contractor shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-in-leakage.	The drift in air heater leakage will not exceed 2%, one year after demonstration of guaranteed air-in-leakage	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
71	Section-VI, Part A	Sub section-VI	13 of 41	3.5.1 & 3.5.2	Filter housing Assembly (with changeover lever) -1 No. & Filter Element-4 No's.	Both the filter housing and filter elements must be provided together as a set, rather than separately. So, as a result, 4No's complete filters will be considered instead of individual components.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
72	Section-VI, Part A	Sub section-VI	14 of 41	9.4	Speed Reducer Seals & Gaskets	Gaskets are not Applicable, Seals will be offered.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
73	VI	B-13	12 OF 45	7.00.0 (i)	Redundant Controllers and Operator workstations shall be provided and shall be based on the latest state of the art workstations and servers and technology suitable for industrial applications and switchyard environments.	We understand that the present scope bays are to be integrated with existing Substation Automation system. Kindly confirm the requirement of Controllers/servers as same is not envisaged as per Tender architecture XXXX-999-POE-J-003.	Bidder's understanding is correct. However, the Bidder shall supply any additional equipment needed for the successful completion of the project.

74	VI	B-13	28 OF 45	9.02.12	Bus bar Protection	Kindly provide the following: a. Existing 400KV Busbar Protection scheme. b. Existing 132KV Busbar protection scheme. c. Kindly confirm whether the existing Central Unit for 400KV & 132 KV existing Busbar protection has provision of augmenting Peripheral Units of present scope bays.	a)400kV is not applicable for the project. B)132kV Busbar protection scheme shall be provided during detailed engineering.
75	VI	B-13	29 OF 45	9.02.12	Islanding Scheme	Kindly clarify the following: a. We understand that Islanding scheme for 765KV Switchyard is already existing and only trip relays for new present scope bays are to be provided. Kindly confirm and provide the existing 765 KV Islanding protection schematic drawing. b. Kindly clarify the requirement of Islanding scheme for 132KV Switchyard.	a. Scheme for 765kV and 132kV system shall be provided during detailed engineering.
76	VI	B-13	32 OF 45	10.02.00 (xvi)	A dedicated Metering Master Station (MMS), networked to all the energy meters in contractor's scope shall be provided.	Kindly clarify the requirement as same is not shown in the Substation Automation Architecture XXXX-999-POE-J-003.	Bidder's understanding is correct. However, the Bidder shall supply any additional equipment needed for the successful completion of the project.
77	VI/B	A-25	977	1	Tentative Roof top Solar Plant Capacity will be 500kWp.	Kindly provide following inputs - 1. Please indicate the maximum capacity of cumulative solar systems be allowed for installation. The limit is required for proper estimation. 2. Please confirm that amount alloted for setting up solar installation would be fixed irrespective of installed capacity. This implies that if the installable capacity is less than maximum allowed installation capacity, then there would be no price adjustment in any manner. 3. Please confirm that indicated capacity is DC capacity.	1. Tentative capacity of roof top solar system is 500kWp. Actaul capacity shall be as decided during detailed engineering 2. Bidders understanding is not correct 3. Confirmed
78	VI/B	A-25	978	1.6	During O&M period, the bidder shall be responsible for supply of all spare parts as required from time to time for scheduled and preventive maintenance, major overhauling of the plant, replacement of all equipments in the plant including defective PV Modules, Inverters, Transformers etc and maintaining log sheets for operation detail, deployment of staff for continuous operations and qualified engineer for supervision of O&M work, complaint logging & its attending. All PV modules shall be cleaned regularly and water washed at least once in a week.	Please confirm that 1. we can depute our sub-contractor's staff for O&M activities. Deputing Bidder staff is not obligatory. 2. only 1no qualified & experienced supervisor is sufficent to be permanently deputed during O&M period (for total solar systems). 3. Electrician for periodic checking & labours for periodic cleaning of PV modules are allowed to be arranged locally on as and when basis.	1. Bidders Proposal is accepatble. Eventhough the subcontractors staff deputed at site, but still the resposnibility lies with Bidder only. 2. Bidders understanding is correct. 3. Bidders understanding is correct.
79	VI/B	A-25	978	1.8	Bidder to dispose of the packing material, surplus items, unused materials, waste etc. generated during EPC at location(s) identified by NTPC.	Kindly confirm that area for disposal is within NTPC's premises & no separate approvals/permits need to be secured by the bidder.	Bidders Understanding is correct
80	VI/B	A-25	980	5.1	The cables used in the system should be ISI marked PVC or XLPE insulated FRNC armored Copper/aluminum conductor. Cables of various sizes as per load requirement for connecting all the modules / arrays to Junction Boxes and from Junction Boxes to DC distribution box and from DC distribution box to inverter. Cables shall be armoured type if laid in switchyard area or directly buried	Solar cables on DC side are unarmoured Copper conductor. Further, in rooftop solar systems, DC cables are not laid underground. Therefore, please allow unarmoured copper conductor DC cable up to inverter, irrespective of area/building.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications
81	VI/B	A-25	980	5.3	Suitable industrial Grade B rigid conduits shall be provided for cables connecting Solar PV array with Inverter.	Please allow HDPE pipes as conduit for DC cabling, wherever required.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications

82	VI/B	A-25	981	6.6	Built-in meter at PCU/String Inverter and data logger to monitor plant performance through external computer shall be provided. Customized solar monitoring solutions available with Inverter manufacturer shall be preferred.	1. Please clarify whether separate external computer for monitoring solar systems shall be provided by the bidder. 2. If yes, please indicate the features required in the PC. 3. Please confirm that internet required in data loggers would be provided on respective rooftop through LAN cable. 4. Please confirm that recurring charges of internet data consumed would be borne by NTPC.	1. No separate external computer is not in bidder's scope. 3. Connection upto nearest available owners Lan network shall be in bidders scope. 4. Charges till end of AMC period are in Bidders scope
83	VI/B	A-25	982	7	If the output of the inverter matches to the switchgear voltage and suitable for directly connection to grid without galvanic isolation, the requirement of transformer may be ommited except Main Power House building, Switchyard building and Ash Slurry Pump house.	Please allow omission of requirement of transformer in Main Power House building, Switchyard building and Ash Slurry Pump house also, if the individual rooftop capacity is less than 500kWp.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications
84	VI/B	A-25	985	11	An appropriate Solar PV Module cleaning & water washing system complete GI pipes, valves, hose pipes, wipers, mops etc. shall be provided for regular cleaning and water washing of the rooftop Solar PV modules.	Please allow HDPE pipes instead of GI pipes.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications
85	VI/B	QA-Elec	364	5	Dry Type Transformer	Indicated sub suppliers are approved for HT class. However, dry type transformers used in solar systems are below 1kV class. 1. Kindly clarify that if transformer in solar is required, then referred sub-supplier is applicable for LT class also. 2. If yes, kindly incorporate "TARIL", "Ferromag" & "Servokon" also.	1. Indicated sub supplier list is applicable for LT class also. 2. BIDDER IS TO FOLLOW NTPC TECHNICAL SPECIFICATIOANS AND GTR
86	VI/B	QA-Elec	370	24	SPV module	Kindly incorporate other renowned suppliers like - 1. Saatvik 2. Bluebird 3. Renewsys 4. Panasonic 5. other reputed make as per ALMM list.	BIDDER IS TO FOLLOW NTPC TECHNICAL SPECIFICATIOANS AND GTR
87	VI/B	QA-Elec	371	25	Power Conditioning Unit (PCU)	Kindly incorporate other renowned suppliers of string inverters like - 1. Powerone 2. Delta 3. Kaco 4. Havells 5. other reputed make.	BIDDER IS TO FOLLOW NTPC TECHNICAL SPECIFICATIOANS AND GTR
88	VI/B	QA-Elec	371	25.1	String Monitoring Box (SMB)	Kindly incorporate other renowned suppliers like - 1. RSS India 2. Innova 3.KERNEL Sistemi Srl 4. SRR Energy 5. other reputed make.	BIDDER IS TO FOLLOW NTPC TECHNICAL SPECIFICATIOANS AND GTR
89					DC Cables	Kindly incorporate other renowned suppliers like - 1. KEI 2. RR Kabel 3. Polycab 4. other reputed make.	BIDDER IS TO FOLLOW NTPC TECHNICAL SPECIFICATIOANS AND GTR
90					General	Please confirm that netmetering/gross metering is NOT applicable.	Bidder proposal is not acceptable. Specification cl. no.1.3 Sub - Section A-25 Section-VI, Part-B to be followed.
91					General	Please confirm that solar power termination of individual solar system will be done on respective LT panel of each building.	Bidder Understanding is correct
92					General	Please confirm that no HT work is involved in solar scope.	HT work may be applicable, if bidder opts to feed the roof top generation at 11KV station switchgear
93					General	Please confirm that no separate Lightning Protection is required for solar system, if the respective building is already protected.	Bidder proposal is not accepted. Bidder to provide the lightning protection for solar system as the building lightning protection system shall not cover the solar system

94	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	7 OF 20	2.02.00	For CHP DDCMIS, necessary signal exchange with Employer's existing stage-I CHP DDCMIS system shall also be in Contractor's scope. For this signal exchange, the number of I/Os shall be considered as DI: 32 DO: 16 AI:8 AO:8. The exact scheme shall be finalized during detail engineering. Employer's stage-I CHP DCS/RIO panel shall be the terminal point	Kindly provide the distance between existing Stage-I/ II CHP DDCMIS/RIO panel from the upcoming CHP DDCMIS.	In this regard, Bidder to refer GLP.
95	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	9 OF 20	2.04.05	Wireless Link: For the following system identified below, Bidder shall consider wireless link:	Customer is requested to provide approximate distance between the locations between which wireless connectivity is to be considered.	In this regard, Bidder to refer GLP. Further details required if any shall be provided during detail engg.
96	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	9 OF 20	2.04.04	A redundant station-wide LAN for connecting the unit and other sub systems of DDCMIS, PLCs (as applicable), PC stations etc. as well for connecting to the other off-line services of the Station & connecting to IT LAN. This shall include all cables and accessories required for connecting Contractor's system upto the Employer's systems such as ERP, etc.	Kindly provide the details (purpose, mode of connectivity and distances) regarding employer's system to be connected to the plant station LAN.	Same shall be furnished during detail engg.
97	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	12 OF 20	2.06.00	Contractor to provide 5 nos. Fine pitch LED display (1 for Employer's Admin building gate, 1 for Employer's Main plant gate & 3 for locations to be finalized during detail engineering) for outdoor application and 5 nos. Indoor LED television (locations to be finalized during detail engineering).	Customer is requested to provide the size of Fine pitch LED display for outdoor/indoor application.	Size of Fine pitch LED display can be derived from the resolution and selected pixel pitch.
98	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	12 OF 20	2.05.01	The master clock shall synchronize DDCMIS of all the units and stand-alone common system and other DDCMIS subsystems at suitable intervals to maintain uniform time throughout the power station. The clock system shall be date insensitive.	Request NTPC to exclude time synchronization for employers distant plant DDCMIS from bidder scope.	Specification requirement is clear. Bidder shall comply to technical specification.
99	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	18 of 20	13.02.00	Common IP based network for IP based PA system and IP based CCTV system involving common components viz. network switches, network media and power supplies may be acceptable subject to employer's approval during detail engineering.	Bidder proposes that CCTV and PA system shall be in different indipendent network as there are limited common vendors for both the system. NTPC to provide the clarity on the requirment of Common IP based network and confirm the same during tender stage only, as the same is having considerable impact in Price and Scope.	Specification requirement is clear. Bidder shall comply to technical specification.
100	SECTION – VI, PART-B	ANNEXURE IIIC-02D	3 of 4	6.00.00	Merit order rating calculation for this package shall be provided by the contractor.	As PADO is in Customer's scope same should be taken care in PADO, and hence may please be removed from Contractor's scope ** Merit order Rating is not applicable in single unit configuration.*	PADO is not envisaged in the scope of subject package. Bidder's understanding is correct.
101	SECTION – VI, PART-B	SUB-SECTION - IIIC-02 DDCMIS ANNEXURE IIIC-02F	3 OF 5	1.05.00	Fieldbus Junction boxes made of SS 316 and specially designed for fieldbus application…These Filedbus JBs shall have suitable cover and gasket and shall have protection class of IP-66 or better..	Fieldbus Junction boxes made of SS 316 and specially designed for fieldbus application…These Filedbus JBs shall have suitable cover and gasket and shall have protection class of IP-66 or better.. Sheet Steel JBs with IP65 protection is widely prevalent in use for Profibus. Kindly accept. Cabinet in place of JBs can be used in places where there is wide concentration of signals. NTPC is requested to accept and mention the material and IP clause applicable for Cabinet.	Bidders proposal is not acceptable. Bidder to comply specification requirements of fieldbus JBs. Further requirement of cabinet in place of JB may be decided during detail engineering.
102	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	9 OF 10	2.04.04	This shall include all cables and accessories required for connecting Contractor's system upto the Employer's systems such as ERP, etc.	Kindly provide the details (purpose, mode of connectivity and distances) regarding employer's system to be connected to the plant station LAN.	Same shall be furnished during detail engg.
103	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	15 OF 20	4.00.00, Notes Pt sl no. 4	All necessary hardware and software required at instrument end shall be provided by the Contractor.	Kindly provide the details (purpose, mode of connectivity and distances) regarding employer's system to be connected	Same shall be furnished during detail engg.
104	SECTION-VI PART-A	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	2 OF 3	3.01.00	TBs of employer's instruments and Local Junction boxes for signals which are being interfaced with the Contractor's control system. All required cables from these TBs to contractors control system shall be supplied, laid and terminated by the Contractor	Kindly provide the details regarding employer's system with terminal details.	Bidder to refer Appendix-I, Annexure-C to IIC, Part-A for details of Make up water system and AWRS system. Further termination details shall be furnished during detail engg.

105	SECTION-VI PART-A	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	2 OF 3	3.01.02	For Employer's Fieldbus (FF/Profibus) based Devices:-- a. TBs of Fieldbus positioners and instruments. b. TBs of Fieldbus based non-intrusive actuators for fieldbus cable. All required cables from these TBs to contractors control system shall be supplied, laid and terminated by the Contractor.	Kindly provide the details regarding employer's system with terminal details.	Same shall be furnished during detail engg.
106	SECTION-VI PART-A	E-60 Indicative Vendor List LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL	7 of 25	10	Approved List of Vendor for DDCMIS (refer next subsheet named "VENDOR APPROVAL") Bidder is approved for Max DNA System	Bidder make Valmet DNA based DCS System is offered SG,TG, Station C&I, Vibration monitoring System and most of the BoP /Offsite packages for this project. NTPC is requested to approve Bidder for ValmetDNA based DCS system also. **Reference List for Vamet DCS is enclosed for ready reference.**	Vendor approval is project specific. However bidder proposal shall be discussed and finalised during detail engineering based on relevant supporting documents
107	SECTION-VI PART-A	SUB-SECTION-VI CHAPTER-02	2 OF 30	7	Main oil pump complete assy (Turbine shaft Driven). (If turbine driven MOP is not there then no requirement).	Turbine Shaft driven MOP is Not Applicable. NTPC to record.	Requirement of Technical Specification is clear. Bidder to comply with the provisions of Technical Specification.
108	SECTION-VI PART-A	SUB-SECTION-VI CHAPTER-02	6 OF 30	34	Electro-hydraulic convertor assembly of Main turbine Governing system	Electro-hydraulic convertor (EHC) is Not applicable due to high pressure Governing system. Equivalent item "Servo Valve" of HP/IP/Overload Control Valves Actuator (one no. each) shall be offered.	Requirements of Technical Specification is clear. Bidder to refer General Note no. 3/ Pg. no. 29 of 30 of SUB-SECTION-VI/CHAPTER-02/STEAM TURBINE GENERATOR
109	SECTION-VI PART-A	SUB-SECTION-VI CHAPTER-02	25 OF 30	4.00.00-A-6	Fittings for HPBP, High Pressure LPBP etc.	NTPC may pl. inform the items are to be offered against Fittings for High Pressure LPBP system.	Bidder to refer Amendment C-02 in this regard
110	SECTION-VI PART-A	SUB-SECTION-VI CHAPTER-02	27 OF 30	7.00.00-3	Solenoid valves (if applicable)	Solenoid valves are already covered against clause no **4.00.00-F-(i) at page no. 27 of 30** under same group C&I mandatory spares. Therefore, Solenoid valves against **clause no.7.00.00-3 are not being offered.** NTPC to accept.	Bidder's understanding is not correct. Bidder to comply to the specification requirement.
111	SECTION-VI PART-A	SUB-SECTION-VI CHAPTER-02	27 OF 30	7.00.00-7	Proportional valve , **hydraulic solenoids**, Pilot valves, Proportional valves, Position feedback trasnmitters (if applicable)	Solenoid valves are already covered against clause no **4.00.00-F-(i) at page no. 27 of 30** under same group C&I mandatory spares. Therefore, Solenoid valves against **clause no.7.00.00-3 are not being offered.** NTPC to accept.	Bidder's understanding is not correct. Bidder to comply to the specification requirement.
112	SECTION-VI PART-A	SUB-SECTION-VI CHAPTER-02 STEAM TURBINE GENERATOR	20 PDF page-24	19.2-g	Temperature and Pressure switches	As per design, No Temperature and Pressure switches used in gas system. Hence will not be offered again. NTPC to record.	Bidder to supply the item as specified, based on the bidder's offered type/design, which shall be discussed during detail engineering. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
113	VI/A	I-A	1 of 44	Provenness	For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the LoA date of EPC package unless otherwise specified in the respective clauses.	Experience shall be reckoned from respective equipments tender enquiry date of bidder. Or six months from LOA date.	Bidder proposal is not acceptable. Bidder to comply specification requirement.
114	VI/A	I-A	20 of 44	4.22.3 (provenness)	****with an ACC designer who should have previously designed, engineered, supervised erection and supervised commissioning of at least one SRC (Single Row Condenser) type ACC of 200MW or above Steam Turbine Generator unit which is in successful operation in at least one (1) plant for a period not G17less than one (1) year.7:7	in case, bidder has conducted erection and commisionining of package, ACC designer supervision experience of erection annd commissioing is not required.	Bidder proposal is not acceptable. Bidder to comply specification requirement.

115	VI/A	I-A	3 of 9	2.02.11	** vibration monitoring system…	As per standard practice, vibration montioring systemis not required for ACC. Vibration ttransmitters may be provided for fan vibrations.	Bidder's proposal is not acceptable. Bidder to comply technical specification requirement.
116	VI/B	G-03	13 of 16	Layout philosphy	Equipment operating & maintenance platforms including supporting structures such as grating platform in the oil equipment room, control fluid equipment room, valve room, De-aerator, Gland Steam Condenser------	GSC is installed at floor level. So no maintenance platform required.	Requirements of Technical Specification is clear. Bidder to comply specification requirement.
117	VI/B	A-07	8 of 28	2.01.01 (j)	Condensate collection tank material shall be as per ASTMA-285 Gr.C or equivalent--	Condensate tank drain tank material shall be IS2062 E250BR or equivalent. NTPC is requested to allow for Indian standards.	This is a part of the detailed engineering stage and shall be decided during that stage in case of award. Bidder to comply with the requirements of Technical Specifications.
118	VI/B	A-07	9 of 28	2.01.01 (o-Xv)	Further, the Air-Cooled Condensers shall be interconnected with each other by providing suitable platform and structure.	there is single ACC unit. So clause not applicable	Bidders understanding is correct.
119	VI/B	A-24	1 of 6	1.01.03 (ii)	ii. ACC Goods cum Passenger Elevator – 3000 kgs or, 1.25 times of weight of heaviest ACC component whichever is higher.	Electric hoist is already envisaged for maintenance purpose. NTPC is requested to clarify for what purpose it is required.	Passenger cum goods elevator is required for carrying equipment/component of ACC using Elevator in addition to the envisaged Electric Hoist. Bidder to comply with the requirements of Technical Specification.
120	VI/B	E-8	14 of 26	1.03.02 E	All piping joint shall be tested for 10% RT/UT. IBR code regulations 1950 shall be ensured for IBR piping and relevant original IBR certificates shall be furnished.	since compelet ACC piping is under low pressure. IBR certificates not applicable.	Bidder understanding is not correct as Detailed test requirement is discussed & finalised during detail engg.Bidder to meet specification requirements.
121	VI/B	A-13	1 of 9	1.00.0	Thermal insulation shall also be provided for piping systems where it is expected that occasional rise in fluid temperature during operation exceeds 60 deg.C,	Temperature rise may be higher in ACC Ducts however same shall not be considered as large uninsulated ducts helps in condensation of steam which provides extra margin in heat transfer area. For personal protection, barriacading may be provided with chains and signs.	Bidder's clarifiation is noted.
122	VI/B	G-03	14 of 16	61	in case bidder opts to keep transformers in transformer yard below ACC, bidder shall provide suitable protection as per his proven practice to safeguard the transformers and its components (bushings etc.) against damage due to foreign materials falling from ACC during O&M stage.	Fan Guard shall be provided to avoid falling of any component or foreign material to protect transformer bushings. N any other arrangement shall be provide as the same will effect the airflow to ACC fans.	Bidder's clarification is noted. However, bidder to provide provisions to avoid falling of any component or foreign material to protect transformer bushings during Erection and O&M stage.
123	VI/B	A-07	11 of 28	2.05.00	…vibration levels shall be Zone A of ISO 10816.	Applicable standard for Vibration for Vacuum pump shall be ISO-10816-1. Vibration shall be as per ISO-10816-1 Zone A/B. ISO 10816-3 is not applicable for LRVP.	ISO-10816-3 is also applicable for Vacuum pumps. Bidder to comply with the requirements of Technical Specification.
124	VI/B	G-05	8 of 37	2.02.01	Applicable Codes and Standard: ASTM ISO 10816-3 (VIBRATION)		
125	VI/B	G-07	3 of 84	S.No. 119	DRAWINGS AND DATASHEET OF SHELL SIDE/ TUBE SIDE RELIEF VALVES OF DRAIN COOLER AND LP HEATERS (2,3, 4 & 5)	LPH-1 & 2 shall be in the neck of condenser. Re-quirement of drawing & datasheet for shell side/tube side relief valves for LP Heater-2 is also not applicable.	Master Drawing List (MDL) provided in the Specification is Tentative. MDL shall be finalized after the award of the package.
126	VI/B	A-07	11 of 28	2.02.00 (L)	Type test for performance (Heat transfer coefficient) of tube bundles using scaled down model or full size model of type offered for this project shall be conduct which shall be witnessed by Employer. Procedure shall be submitted by Bidder for Employers approval.	standard tubes which have already been used in earlier projects which are under successful operations shall be used. So there is no need of the type test of tube bundles. NTPC is requested to reconsider the requirement.	Bidder to refer Amendment TG-04A in this regard
127	VI-A	I-A	35 of 44	5.14.2 (A)	**(I) 765kV Circuit Breakers:** a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 715 kV or above class which should have been in successful operation for minimum two(2) years.	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor, who have established manufacturing facilities in India and three phase circuit breaker must have been manufactured in the Indian works & successfully type tested as per the relevant standard are acceptable**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .I. b

128	VI-A	I-A	35 of 44	5.14.2 (A)	II. 765kV INSTRUMENT TRANSFORMERS (Current Transformers / Capacitor Voltage Transformers as Applicable): a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years .	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor should have Manufactured and type tested single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class prior to the supply of equipment to the project.**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .II. b
129	VI-A	I-A	36 of 44	5.14.2 (A)	III. 765 kV DISCONNECTORS : (a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(05) nos. of three phase Disconnectors suitable for Air Insulated Substation/Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor, who have established manufacturing facilities in India and 3 Phase disconnector must have been manufactured in the Indian works & successfully type tested as per the relevant standard are acceptable**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .III. b
130	VI-A	I-A	36 of 44	5.14.2 (A)	IV. 765kV SURGE ARRESTER: a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Surge Arresters suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for a minimum period of two (2) years.	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor, who have established manufacturing facilities in India and Surge Arrestor must have been manufactured in the Indian works & successfully type tested as per the relevant standard are acceptable**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .IV. b
131	VI-A	IIB	8 of 17	1.16.00 ii)	The scope also include modification as required in existing switchyards of 765kV,132kV for addition of bays for stage-II (1X800MW) requirement, any modification / augmentation in existing control room to accommodate the control & protection panels etc of stage-II requirement	1) Bidder understand the existing switchyard is having de-centralised Bus Bar arrangement with Control & protection panels placed in bay AC Kiosk. Please confirm. 2) Bidder understand control & protection panel for the current scope of 01 number 765kV GT bay and 02 Numbers 132kV ST bay will be placed in the switchyard control room building. Please confirm sufficient space is available to accomodate the panels in the switchyard control room building. If sufficient space not available, the panels will be placed in the Bay Kiosk	1. Bidder understanding is correct.
	VI-B	B-13	15 of 45	09.00.00 iv)	All the Bay Control Units and Bay Protection Units at Plant end shall be installed in the AC kiosks in SWITCHYARD.		2. Specification requirement is clear.Bidder to comply technical specification.
132	VI-A	IIB	9 of 17	1.16.04 ii) l)	Dismantling of existing Roads , fencing if required , Foundations, Re-routing of Pipe lines above the ground & below the ground available in the present scope of Bays is also in the scope of Bidder.	Please provide the size of the pipe lines along with tentative length below and above ground withing the switchyard fence which is to be re-routed.	Bidder to re-route the facilities based on the layout developed by the bidder during detail engineering
133				Drg No. 9551-999-POE-J-001	765/132kV Switchyard Single Line Diagram	Bidder understand the following:- 1) For 132kV Bays, bus extention is required only for 01 number bay, for Bay #5, Bus conductoring is already available. Please confirm. 2) For 132kV Bus extention, the existing road to be re-routed to accommodate the new ST#3B Bay. Please confirm. 3) Bidder understand any store/offices which are located within the proposed 765kV and 132kV switchyard extention area to be dismantled. Please confirm. Please provide the following drawings:- 1) Existing Cable trench Layout 2) Existing EHV Equipment Structure Drawings 3) Existing Switchyard Tower and Beam Drawings 4) Existing Earthmat Layout Drawing or existing earthmat spacing 5) Existing Switchyard Layout & Section drawings	1. Bidder understanding is correct.
134				Drg No. 9551-999-POC-F-001 Rev B	General Layoul Plan		
135	VI-B	B-06	12 of 19	3.03.00	All ACDBs, DCDBs and Solenoid Valve DBs shall be of fixed module type		

136	VI-A	IIB	9 of 17	1.16.04 ii) s)	The Bidder shall provide ACDB & DCDB Boards for further distribution of 415V AC supply, 220V DC supply for the requirement of Present scope of Bays and these Boards shall be placed in Existing Darlipali Stage-I SWYD panel room.	1) Bidder understand that the ACDB & DCDB extention boards for the switchyard scope shall be of fixed module type. Please confirm. 2) Bidder understand that the ACDB & DCDB feeder extention boards will cater only to the Auxiliary power reqirements of the 01 no. 765kV GT Bay & 02 No 132kV ST bays.Please confirm. 3) Bidder understand integration of the mentioned LT extention boards with existing SAS system is not envisaged. Please confirm.	1. Bidder understanding is correct. 2. Bidder understanding is correct. 3. Bidder understanding is correct.
	VI-B	B-13	15 of 45	9.00.00 ii)	Dedicated Bay Control units and bay Protection units shall be provided for each bay in the contractor's scope of work. Also, one number BCU shall be provided for the control of SWYD service LT Switchgear (if applicable).		
137	VI-A	IIB	15 & 16 of 17	1.21.00 Table I	Type test	The type test validity is as per the latest CEA guidelines, please confirm.	CEA Guidelines for Type test validity shall be applicable for all switchyard equipments.
138	VI-C	GTR	16 & 17 of 119	8.03.04a(iv)	The complete 3D data (editable model) which shall be utilised for all future detailed engineering related to maintenance, operation, R&M, efficiency improvement of the project etc. Complete 3D model along with as built GADs, layout, isometrics, reports extracted and 3D models for all disciplines , with any other document generated from 3D model and naming conventions with as-built updates along with complete reference databases, component catalogues for all the size range shall be handed over to owner.	Bidder understand since the scope of switchyard pertains to 01 no. 765kV and 02 nos 132kV extention bays only, 3D model will not be applicable for the switchyard scope.Bidder will submit autocad drawings of the extention bays. Please confirm.	Confirmed
139	VI-B	B-17	48 of 98	11.00.00	765KV TRANSMISSION LINES	1) Bidder understand interconnection between 765kV GT#3 and the 765kV GT bay is through gantry structure. 765kV Transmission line is not envisaged, please confirm. 2) If interconnection between 765kV GT#3 and the 765kV GT bay is through transmission line please provide route survey report. 2) Bidder understand store/offices which are located along the path of the interconnection between 765kV GT#3 and the 765kV GT bay are to be dismantled. Please confirm.	1. GT 3 interconnection with 765 kV GT bay shall be routed by bidder through Gantry / Tower as per site suitability. 2. Both options (Gantry/ Tower) are provided to bidder as per site suitability. Any requirement for successful commissioning of the system shall be complied by the bidder. 3. Any facilities (Shed, road etc.) may be dismantled/rerouted if required.
				Drg No. 9551-999-POE-J-001	765/132kV Switchyard Single Line Diagram		
140	VI-A	II-D	1 of 14	1.00.00 .3	Cutting of trees of girth more than 30cm shall be done by the Owner	We understand the clause is applicable for the entire scope of the work. Please confirm.	Bidder's understanding is correct
141	VI-B	B-17	18 of 98	Annexure-I	Requirement of Controlled Switching Device for 400KV Circuit Breaker if applicable	We understand that the specification is applicable for 765kV Circuit Breaker as well. Please confirm.	Confirmed.
142	VI-B	B-17	16 of 98	2.12.01	765kV Class Circuit Breakers (AIS) a) Rated continuous current .- Minimum 3150/2000 A at rated ambient temperature as per the Single line diagram	1)The details are not available in the tender SLD Drg ref 9500-999-POE-J-001. Please provide the continuous current rating. 2) The Specification of 132kV Circuit breaker not available. Please provide	1.Drawing no mentioned by bidder is not correct. Bidder to refer tender drawing No: 9551-999-POE-J-001 2. Bidder to refer amendment.
143	VI-B	B-17	23 of 98	3.07.01	765kV Isolator a) Rated continuous current at 50deg.cen ambient temperature.- Minimum 3150/2000 A at rated ambient temperature as per the Single line diagram 132kV Isolator a) Rated continuous current at 50deg.cen ambient temperature.- Minimum 2000/1250 A at rated ambient temperature as per the Single line diagram	The details are not available in the tender SLD Drg ref 9500-999-POE-J-001 . Please provide the continuous current rating.	Drawing no mentioned by bidder is not correct. Bidder to refer tender drawing No: 9551-999-POE-J-001
144	VI-B	B-17	21 of 98	3.05.01	Isolator shall be gang operated for main blades and earth switches	We understand that the isolators will be electrically gang operated for 765kV and Mechanically gang operated for 132kV. Please confirm.	Bidder understand is correct.

145	VI-B	B-17	43 of 98	9.11.05. f) ix	Contractor shall also provide interconnection (two interconnection per Unit) of Switchyard Earth mat with the Plant earth mat	As the current scope include bay extention work,hence the same is not applicable. Please confirm.	Bidder understanding is correct. However, Bidder to provide atleast Two nos. of interconnection with the earthmat of Main plant of Stgae I to earth mat of Main Plant area of Stage II.
146	VI-A	IIB	11 of 20	1.09.00	SITE SUPERVISION OF EQUIPMENTS The contractor shall ensure that, erection, testing and commissioning of, GIS, Circuit Breaker, Isolator, Instrument Transformer, Surge Arrestor, Substation Automation System & protective relays is carried out, under the supervision of manufacturer of respective equipment.	As per the general practice, OEM supervison during erection, testing and commissioning will be provided for Circuit Breakers, Isolators ,Substation Automation System & protective relays. For other equipments, erection, testing and commissioning will be carried out in bidder supervision. Please confirm.	Bidder proposal is not acceptable. Bidder to comply specification requirement.
147	VI-A	II-B	13 of 20	1.16.08.ix	ABT based energy metering system as indicated in protection SLDs/Metering Architecture and dummy panels for mounting owner supplied meters and its integration with existing ABT system	1) We understand that supply of ABT complaint energy meter is in scope of owner, please confirm. 2) Please provide existing make of ABT meters. 3) We understand that Controlled Switching Device is required in the 765kV CB installed in Tie Bay only. Please confirm. 4) Please provide drawings of energy meter panel.	1. Bidder standing is not correct. 2. Make of ABT meter shall be provided during detail engineering. 3. CSD is not envisaged in 765 kV Tie Bay.
				Drg no. XXXX-999-POE-J-005	Protection SLD for GT Bay		
				Drg no. XXXX-999-POE-J-009	Protection SLD for TIE Bay		
148					General	In the current switchyard scope, there is no line bays. We understand that Fiber Optic Tele communication Equipments (FOTE) in not envisaged in the current switchyard scope. Please confirm.	Bidder's understanding is correct
149					General- Quality Assurance	We understand for the Illumination System, there is no specific approval required for the System integrator. The illumination items to be procured as per the Customer Quality Assurance requirement.Please confirm.	BIDDER UNDERSTANDING IS CORRECT. BIDDER IS TO FOLLOW NTPC TECHNICAL SPECIFICATIOANS AND GTR
150	VI-B	B-17	34 of 98	8.04.03	Electromechanical Strength 120kN for 765kV Insulator String	We understand the Electromechanical Strength should be 210kN for 765kV Insulator String, please confirm.	Bidder's understanding is correct
151	VI-B	B-17	52 of 98	11.06.00	Electrical System Data	The system data is given for 400kV, please provide data for 765kV	Both options (Gantry/ Tower) are provided to bidder as per site suitability. Any requirement for successful commissioning of the system shall be complied by the
			57 of 98	12.02.01	The normal ruling span of the line shall be 400 meters for 400 KV towers.		
152	VI-B	B-17	89 of 98	15.07.00	Disc Insulator- Electromechanical Strength 120kN	We understand composite polymer insulators are also accpetable.The Electromechanical Strength should be 210kN for 765kV Insulator String Please confirm.	Polymer insulators are not acceptable. Electromechanical Strength of Disc Insulator should be 210kN for 765kV.
153	VI-B	B-17	7 of 98	1.12.03	Type Test to be conducted on AIS Circuit Breaker	We understand that type test list mentioned as per the Schedule 8-B to be considered. Please confirm.	Bidder's understanding is correct
154	Schedule 8-B			2.A & 2.B	Type Test on Ais Circuit Breaker		
155	VI-B	B-23	2 of 8	3.01.01	The 132kV cable shall consists of single core 800 sq.mm stranded copper compacted circular conductor,	Bidder understand the mentioned size is the minimum requirement Please confirm.	Bidder's understanding is correct
156	VI-B	B-23	2 of 8	3.01.04	The cable shall be suitable for installation in air, in built up concrete trench and/or directly buried in soil	1) Bidder understand 02 Circuits of 132kV Cable for interconnection between Station Transformer and 132kV bay. Additional single phase Spare run is not envisaged. Please confirm. 2) Bidder understand 02 circuits of the cable can be laid vertically with one circuit over other. Please confirm.	1. Bidder's understanding is correct
	VI-A	IIB	5 of 17	1.09.01	**EHV Power cables and accessories** 132 kV cables required to feed the Station Transformers along with cable termination at both end and accessories as indicated in the key single line diagram **(Drg. No 9551-999-POE-J-001).**		2. Bidders understanding is not correct.
157				Drg 215-POE-F-EH1	132kV Cable trench Drawing	1) Please refer Detail B for Road crossing. Bidder understand that number of 200mm dia Pipes for laying of 132kV EHV cable is as per the number of runs of the cable. Spare Pipes are not envisaged . Please confirm. 2) Along 132kV EHV cable route , there is water canal of approx 10 metre width connecting to Cooling tower-1(CT-1) , it is requested to allow crossing of the canal through steel structure bidge arrangement or through cable trestle. Please confirm.	1. Bidder's understanding is not correct 2. Bidder's proposal is acceptable.
158	VI-B	B-23	3 & 4 of 8	1.09.03	METALLIC SHEATH	Corrugated Al sheath is also acceptable, please confirm.	Bidders understanding is correct.
159	VI-B	B-23	5 of 8	1.09.04	FRP TRENCH COVER	In existing yard, the trench covers are RCC type. Please confirm RCC trench covers are also acceptable.	Bidders understanding is not correct.

160	VI-B	B-24	7 of 8	1.09.06	Where cables cross roads/rail tracks underground, the cables shall be laid in HDPE pipes embedded in PCC in ground with a minimum cover of 1 metre. HDPE pipe shall also be provided where cables cross existing HT/LT cable trenches. The HDPE pipes and accessories shall be supplied, laid and encased in PCC. Ends of HDPE pipes shall be sealed properly after laying of cable.	Bidder understand HDPE pipes to be embedded is as per the number of runs of the 132kV EHV cable, additional HDPE pipes are not envisaged. Please confirm.	Bidder's proposal is not acceptable.
161	VI-A	Annexure C to IIC	13 of 25	1.09.07	Contract quantities for CCTV SYSTEM for O&M	We understand for the current scope,CCTV cameras are not envisaged in the 765kV & 132kV Switchyard extentions. Please confirm.	Bidder's understanding is correct.
162	VI-A	IIB	06 of 17	1.09.08	**Station Lighting** Out of the total requirement of lighting mast envisaged for station lighting, at least thirty (30) Lighting Masts (30M height) shall be supplied, erected and commissioned at locations identified by Site Engineer prior to construction phase	Bidder understand lighting mast is not envisaged in the 765kV & 132kV Switchyard extentions. Please confirm.	Bidder's understanding is not correct.
163	VI-B	B-17	35 of 98	08.08.01	The Contractor shall fabricate and install mounting arrangements for the support and installation of all the cables on GI angles / Cable tray supports in the trenches/ above ground.	Bidder understand LT Power & Control cables can be be laid on GI angles in trenches and Cable trays for above ground laying. Please confirm.	Bidder's understanding is not correct.
164	VI-B	B-17	28 of 98	Table -I & II	Core Details of CT & CVT	Please provide core details of 132kV CT and CVT	Bidder to finalise the 132KV CT & CVT core details as per the requirement of Protection & metering purpose in line with the speciication .
165	VI-B	B-13	3 of 45	1.17.00	PLCC panels/communicationpanels of transmission lines etc. shall be housed in AC kiosks in Switchyard	Bidder undertand since there is no line bays, hence PLCC is not applicable. Please confirm.	Bidder's understanding is correct.
166	VI-B	B-17	2 of 98	1.01.14	i)The towers and gantries shall be suitable for a normal conductor tension of minimum 2T/conductor in case of twin moose and 1.5T/conductor in case of quad moose conductor	Bidder understand AAC Bull conductors are strung in the switchyard, please provide normal conductor tension to be considered for bull conductors.	Bidder to comply technical specification requirement.
167					General- Station Lighting	Bidder understand no illumination work is envisaged in the existing switchyard control room building. Please confirm.	Bidder's understanding is correct.
168	VI-A	I-A	40 of 44	7	PROVENNESS CRITERIA FOR CIVIL & STRUCTURAL WORKS	Bidder under that the mentioned Provenness Criteria is not applicable for the Switchyard scope. Please confirm.	Bidder's understanding is not correct. It is applicable to all Civil and Structural Works
169	Section-VIA/Part-B	B-17: SWITCHYARD	471/568	06.04.01	132 kV class Post Insulators	Top & Bottom PCD, Creepage Distance and Height of Insulators are not available in the given tech spec. Kindly furnish the same.	Bidder to design PCD/ Height of insulator. Specific Creepage shall be 31 mm/kV.
170	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	661 0f 966	1.00.01	Steel structures for following facilities as mentioned below shall be fabricated in factory, transported, and erected at site. 1. Technological Structures such as Boiler, ESP including Hopper and Bunker support Structure. Any structure whose design and fabrication drawings are not provided to Owner shall also be considered as technological structure. **2. Main Power House Building including Control Tower.**	Customer is requested to allow bidder to opt for factory fabrication or site fabrication (for all structures including Main Power building structure & Bunker support structure) as per bidder's requirement. NTPC to confirm.	Bidder's proposal is not acceptable
171	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	663 of 966	2.01.00 (f)	Sole responsibility of development and maintenance of above facilities for construction workers hired by the Contractor or his sub-contractors shall rest with the Contractor. **Land, water, electricity for the worker & staff colony shall be arranged by the Contractor as stipulated elsewhere in Technical Specification**.	Customer is requested to identify & provide the land for labour/ worker colony in the proximity of plant area.	Bidder's proposal is not acceptable.
172	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	663 of 966	2.02.00 (1)	**Construction Water** Construction water shall be the responsibility of Bidder during all stages of construction. However, construction water may be provided by Owner at one point on chargeable basis. Bidder shall arrange for further distribution/transportation to required location by their own.	Construction water may be provided by Owner at one point for furher distribution. The location of point & its distance from Plant boundary may please be specified. Further, usage of construction water shall be on free of cost basis	Bidder to refer sl.no. 475 of responce_typical_queries shhet

173	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	664 of 966	2.02.00 (6)	The Bidder shall arrange skilled/semiskilled/unskilled labour (from local source(s) as far as available) and supervisory staff for quality execution of all civil, structural, and architectural works.	Bidder shall be executing works through sub-contractorsas per contract requirement. Skilled/semi-skilled/unskilled labour will normally be sourced by these sub-contractors through their known sources and employing from local sources shall not be binding on Bidder.	Bidder to follow technical specification
174	SECTION - VI - PART -A	SUBSECTION I-A-PROVENNESS	60 of 966	7.1	**PROVENNESS CRITERIA FOR CIVIL & STRUCTURAL WORKS** Bidder or its agency should have executed civil and steel structural works of 500 MW or higher capacity coal based/ Lignite based/Nuclear power plant, Earth work in filling involving mechanical compaction and cutting in rock, piling, Main power house building and Foundation for Turbo-generator.	Bidder have executed civil and steel structural works of 500 MW or higher capacity coal based/ Lignite based/Nuclear power plant, Earth work in filling involving mechanical compaction and cutting in rock, piling, Main power house building and Foundation for Turbo-generator. Hence, it is requested that Bidder shall have its own Technical PQR Criteria for qualifying the Sub-agencies and inform customer before award for all the Civil works.	Bidder to refer cl.7.8 of PROVENNESS CRITERIA FOR CIVIL & STRUCTURAL WORKS
175	SECTION - VI - PART -A	SUBSECTION I-A-PROVENNESS	60 of 966	7.2	In case Bidder or its agency (ies) do not meet the requirements at 7.1 and the Bidder proposes to engage agency (ies) for concrete & steel structural works, the proposed agency (ies) should fulfil the following criteria: a) For concrete works (other than TG Foundation), Bidder or its agency (ies) should have executed concrete works of TG building/Bunker building of 500 MW or higher capacity coal based/Lignite based power plant/ TG Building of Nuclear Power Plant/Steel Melting Shop/ Proportioning Bin Building of Steel Plant. b) For Steel Structural works, Bidder or its agency(ies) should have executed steel structural works of TG building/Bunker building of 500 MW or higher capacity (coal based/Lignite based) power plant/ TG Building of Nuclear Power Plant/ Steel Melting Shop/Proportioning Bin Building of Steel Plant.	NTPC is requested to accept the modification: In case Bidder or its agency (ies) do not meet the requirements at 7.1 and the Bidder proposes to engage agency (ies) for concrete & steel structural works, the proposed agency (ies) should fulfil the following criteria: Sub agencies should have executed any Civil / Structural works of 210 MW or higher capacity Coal / Lignite /Nuclear based power plant or Steel plant	Bidder's proposal is not acceptable.
176	SECTION - VI - PART -A	SUBSECTION I-A-PROVENNESS	61 of 966	7.2	**Note:** In case, Bidder proposes to engage more than one agency for the works mentioned at para 7.2 (a) or 7.2 (b) above, Bidder shall do so on work volume basis. The annual rate of execution in the reference works should not be less than eighty percent (80%) of the asking rate of such works, for which it is being engaged.	Since asking rate for works mentioned at para 7.2 (a) or 7.2 (b) is not available in tender, it will be very difficult to arrive at the rate of execution. Accordingly, Bidder request to delete this clause & allow Bidder to use its own PQR criteria for awarding work to sub-agencies.	Bidder's proposal is not acceptable.
177	SECTION - VI - PART -A	SUBSECTION I-A-PROVENNESS	61 of 966	7.2	c) For Turbo Generator Foundation, Bidder or its agency should have executed at least one (1) TG Foundation of 500MW or higher capacity (coal based/Lignite based) power plant / Nuclear Power Plant.	For Turbo Generator Foundation, sub agencies who have executedany civil work of 21 0MW or higher capacity (coal based/Lignite based) power plant / Nuclear Power Plant may be allowed to be qualified.	Bidder's proposal is not acceptable.
178	SECTION - VI - PART -A	SUBSECTION I-A-PROVENNESS	61 of 966	7.3	For civil & steel structural works of Coal Handling Plant, Bidder or its agency should have executed track hopper or wagon tippler of Coal Handling Plant of 500 MW or higher capacity Coal based/Lignite based power plant.	Sub agencies, who have executed any Civil / Structural works of 210 MW or higher capacity coal based/ Lignite based/Nuclear power plant, may be allowed to be qualified.	Bidder's proposal is not acceptable.
179	SECTION - VI - PART -A	SUBSECTION I-A-PROVENNESS	61 of 966	7.4	For civil & steel structural works of Ash Handling Plant, Bidder or its agency should have executed Ash Handling Plant of 500 MW or higher capacity Coal based/Lignite based power plant.	Sub agencies, who have executed any Civil / Structural works of 210 MW or higher capacity coal based/ Lignite based/Nuclear power plant, may be allowed to be qualified.	Bidder's proposal is not acceptable.
180	SECTION - VI - PART -A	SUBSECTION I-A-PROVENNESS	61 of 966	7.5	For civil & steel structural works DM/PT Plant, Bidder or its agency should have executed DM/PT Plant of Thermal/Nuclear Power plant/ Steel plant.	Sub agencies, who have executed any Civil / Structural works of 210 MW or higher capacity coal based/ Lignite based/Nuclear power plant, may be allowed to be qualified.	Bidder's proposal is not acceptable.
181	VI/B	II-A-02	8 of 67	3.07.00	In addition to local indicators, measurement system (4-20mA Output) for remote indication shall also be provided on all the four furnace walls.	A proven product meeting this specific requirement is not available in the market/online sources. Hence, M/s NTPC is requested to provide type of measurement and detailed specification for furnace thermal expansion measurment system.	Bidder to provide thermal expansion measurement inline with Specification requirement. Same shall be discussed during detailed engg

182	VI/A	II-A-01	24 of 28	2.30.00	6. Flue Gas Ducts to be provided with strain gauge/ ash level meter at sharp bend locations of duct and common duct area after airpreheater.	M/s NTPC is requested to provide type of measurement and detailed specification for flue gas duct ash level meter.	Bidder to provide any type of measuring instrument suitable for monitoring of dust level in the flue gas duct. Further same shall be discussed and finalized during detailed engineering.
183	VI/B	II-A-02	6 of 67	3.02.01	The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable, and vertical wall outlet). These thermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere.	M/s NTPC is requested to provide detailed specification for metal temperature thermocouples to be provided for this purpose.	Specification requirement is clear. Bidder shall comply to technical specification. Same shall be further discussed during detailed engineering.
184	VI	Part C	58 of 119	30.00.00	The equivalent 'A' weighted sound pressure level measured at a height of 1.5 m above floor level in elevation and at a distance of one (1) meter horizontally from the nearest surface of any equipment/machine, furnished and installed under these specifications, expressed in decibels to a reference of 0.0002 microbar, shall not exceed 85 dBA.....	The noise level of Diesel Engine set required for Fire Water Pump will be as per OEM standard. No enclosure will be provided for emergency DE required for Fire water pump set. Customer is requested to confirm the same.	Bidder's undersatnding is not correct. Bidder to comply with specification requirement. Necessary enclosure shall be provided to meet noise level as per specification.
185	VI	Part B--A18	3 of 14	5.04.00	Location of Infrared detectors on coal conveyors	1. One infra red detector shall be located near head of the coal/biomass conveyor. Infra red detector is not considered at the tail end of the conveyor. 2. No infrared detectors are considered for limestone, gypsum, ash and biomass conveyors. Customer may please confirm.	1. Bidder's proposal is acceptable 2. Bidder's understanding is not correct. Bidder shall provide infrared detectors for all biomass conveyors complying to technical specification.
186	VI	Part B--A18	5 of 14	5.08.03	Interface between fire water pumps PLC, Fire Detection & Alarm (FDA) and plant DCS	1. Fire water pumps PLC shall be interface with station wide LAN for two –way transfer of signals for information sharing through dual fibre optic connectivity. 2. Fire detection & alarm system shall be interfaced with Fire water pumps PLC (drives running status) via hardwiring with interface modules. 3. Fire detection & alarm system shall be interfaced with plant DCS (fire alarm and system trouble) via hardwiring with interface modules. Customer may please confirm.	1. Bidder's proposal is not acceptable. Bidder shall comply to specification requirements. 2. Bidder's proposal is not acceptable. Bidder shall comply to specification requirements. 3. Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.
187	VI	Part B--A18	8 of 14	5.15.00	Cabling for Fire Detection & Alarm (FDA)	1. Cable size of 1 Pair x 1.5 sqmm, armoured, shielded shall be used for loop wiring. 2. Cable size of 2C x 2.5 sqmm armoured shall be used for powering various devices in loop and solenoid valves of spray system 3. Inside buildings cables shall be laid directly on the wall with saddle spacers. No conduit shall be used for laying FDA cables. 4. In conveyor areas, cables shall be burried along the conveyor length with HDPE conduits. Customer may please confirm.	1. Bidder's proposal is not acceptable. Bidder shall comply to specification requirments. 2. Noted 3. Bidder's proposal is not acceptable. Bidder shall comply to specification requirements. 4. Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.
188	VI	Part B--A18	10 of 14	5.18.00	Multisensor detector shall be provided for return air ducts of main plant, which shall consist of intake probe, detector housing, and exhaust pipe etc. The detector shall be mounted outside the duct.	Duct detectors are not considered as multisensor detectors shall be provided in the AHU room. Customer may please confirm.	Muti sensor detectors shall be provided inside AHU room and Duct detectors shall be provided inside return air duct.
189	VI	Part B--A18	8 of 14	5.13.00	Power Supply for Fire Alarm Panels & Repeater Alarm Panel	Fire Alarm Panels shall be powered from 1 no. of 230 V AC plant UPS system. Customer may please confirm.	Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.

190	VI/A	II A-01	21 of 28	2.24.01 (2) (V)	One intrascope suitable for inspection of all steam generator pressure parts……	Bidder propose to offer alternative design of video scope, which is advanced and refined version of intra scope. Customer is requested to accept both intra scope & video scope for this application	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
191	VI/A	II A-01	24 of 28	2.30.00	Specific features catering to boiler reliability… 4. Ceramic removal pads insulation to be provided in area requiring frequent insulation removal like Burner panel area and soot blower area.	1. Burner Panel / Wind box will be insulated with Ceramic Fiber Blanket in place of Ceramic Pad type insulation as the application area needs flexible type of insulation material. 2. Soot Blower area is covered with a seal box, which is filled with Castable Refractory of Gr. A and over the seal box Ceramic Blanket insulation will be installed.	The details shall be discussed based on the type of burner/system offered, during detail engineering stage, to have O&M flexibility. Bidder to supply in line with specified requirements.
	VI/B	A-13	8 of 9	2.03.00 (9, b)	Burner panel and Soot Blower area. - Ceramic Pad type insulation		
192	VI/A	II A-01	24 of 28	2.30.00	7. Boiler to be provided with vacuum cleaning system network to ensure proper hygiene. In this context portable system to capture the ash around the boiler peripheral surface shall be provided along with net worked transmission of captured ash to a common location. Following specific elevations of Boiler requiring installation of vacuum cleaning arrangement in Boiler Front, Rear, LHS and RHS are also to be covered other than required areas: 1) Penthouse Floor 2) Gooseneck area floor covering both first pass and backpass. 3) Boiler Scaffolding door floor covering both first pass and backpass 4) Top wall blower tier floor covering both first pass and backpass 5) Top burner top floor covering both first pass and backpass 6) Burner bottom floor covering both first pass and backpass 7) S Panel (approx.8.5 to 9M)	Customer requested to provide more details / reference of this system. Bidder understanding is to provide portable vacuum cleaners (7 Nos.) with de-dusting bin at each location.	Bidder to comply with the installation of vacuum cleaning arrangements as per the specifications requirement.
193	VI/A	II A-01	25 of 28	2.30.00	8. Safety valves and critical valves to be provided with temperature & sound monitoring (may be **IOT based**) to detect early passing and ensure reliability. Temperature point shall be provided on these valves/lines. For control and monitoring purposes the temperature values shall be taken between 50-75 Deg. C and sound value normally less than 75 db as trigger. The necessary provision shall be accordingly provided with alarm signal in the control room. Further, following may be noted w.r.t. above scope for temperature measurement on critical valves for passing a. All valves including drain and vents in critical piping such as M.S.Stop valves and its integral bypass valves, Boiler Startup vent, M.S.Pipe drains and vents, CRH & HRH pipe drain & vents b. All master drains of SH and RH spray station. c. Drains & Vents of circulation system d. Sonic leak detection system installation in Safety valves & ERV: 1) Installation of Sonic leak detection system installation in all SLSV and ERVs of critical piping's such as M.S. Safety Valves & ERV/ EBV, CRH SV, HRH SV & ERV/ EBV.	Safety valves with sound monitoring (IOT based) is not available. Hence safety valves shall be without sound monitoring. Safety valves & ERV with sonic leak detection is not available. Hence safety valves and ERV shall be without Sonic leak detection sys-tem	This shall be discussed during detail engineering in line with specification requirement.

194	VI/A	IV	2 of 77	1.00.01, (g)	Instruments for PG test and instruments for process control of similar applications are envisaged to be of same make and model having same accuracy level. …… Instruments to be used for PG test shall be additionally supplied over and above the instruments shown in tender P&IDs. PG test equipment being supplied, installed and commissioned for each unit, shall be retained by employer after completion of PG test. Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation. All PG test process parameters shall be made available in DDCMIS	Most of the boiler parameters will be recorded through plant instruments only. Flue gas & Air side temperature measurements will be done as per grid based method (In line with Code requirement) and due to corrosive environment, keeping more number of TCs & O2 tapping Probes continuously in the field may leads to failure/chocking of these instruments. Hence, as per specification, additional instruments like TCs and probes required for PG Test will be supplied along with main supply. However, installation of these instruments can be done at site just before the PG test. Calibrated Flue gas analyser will be brought to site for measuring flue gas composition @ ECO outlet / APH Outlet offline.	Specification requirement is clear. Bidder shall comply to technical specification.
195	VI/A	IV	30 of 77	1.03.02 (v)	The contractor shall guarantee the following temperature values pertaining to steam generator water wall tubing: a) Maximum tube to tube temperature differential between any two adjacent tubes. b) The maximum deviation of temperature of any tube w.r.t. to the average temperature of all the tubes. The tube metal temperatures shall be measured at the intermediate header (spiral to vertical / riffled tube wall to vertical plain tube wall changer over), if provided, and outlet of the water walls (end of furnace) at minimum once through load of the steam generator with firing range of coals along with oil firing. The same shall be demonstrated during plant operation by measuring the tube temperatures by affixing thermocouples as specified in sub section A-02 of Part B of the technical specification.	The offered boiler is tangential firing with water wall construction of spiral wall type. Each tube of spiral wall passes through all four walls of furnace while absorbing heat from water wall inlet to spiral wall outlet and also intermediate header is provided enabling uniform temperature entering vertical wall section. This arrangement results in less variation in tube to tube outlet temperatures. Hence thermocouples are not envisaged on each tube of evaporator and demonstration of this variation also not envisaged.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirement.
	VI/B	A-02	6 of 67	3.02.01	The stability of the thermo-hydraulic design of the evaporator shall be demonstrated by the contractor by conducting stability analysis (both static and dynamic) of the finalized evaporator design. As a part of the static stability, interalia, the outlet temperature profile for each tube at the intermediate header inlet (if applicable) and vertical wall outlet header be calculated. The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable, and vertical wall outlet). These thermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere. In case the temperature variance in the evaporator tubing temperature during such demonstration is found to exceed the design considerations necessary modifications to the evaporator flow circuits shall be done by the contractor to control the tube temperatures. The mechanical design of the evaporator shall be carried out considering its primary stresses due to internal pressure as well as secondary stresses due to loads like weight membrane panel, buckstays, ash, and other elements loaded on evaporator, differential stresses restrained thermal expansion between evaporator tubes and the evaporator support elements etc. The calculations in support of the same shall be submitted by the contractor.	Stability analysis (both static and dynamic) and other calculations of the evaporator design are proprietary in nature and the same will not be submitted.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.

196	VI/B	A-01	6 of 88	1.05.02, (d)	The working fluid temperature to be considered for design of pressure part tubes starting from water wallbottom ring header upto and including the water wall outlet headers shall be arrived by adding an additional margin of minimum 40°C to the maximum predicted/expected fluid temperature in these pressure parts. The working fluid temperature to be considered for design of pressure parts starting from downstream of water wall outlet headers upto first stage of superheater attemperation shall be arrived by adding an additional margin of minimum 15 deg C to the maximum predicted/expected fluid temperature in these pressure parts. The margins as per IBR and other codes shall be taken over and above the working fluid temperatures so arrived. For the other pressure parts where no design margin is specified in the IBR and the above specified 40 °C or 15°C margin is not applicable, the working fluid temperature to be considered for design of pressure parts shall be arrived at by adding following margin to the maximum predicted/expected fluid temperature in these pressure parts: i) 5 °C for inlet headers and its connecting tubes, pipes downstream and upstream of attemperators and other pipes in pressure parts. ii) 15°C for outlet headers and their connecting tubes except at final super heater and final reheater outlet. iii) For final super heater and final reheater outlet a margin of 5°C shall be taken.	Pressure parts design temperature will be based on worst case of all operating conditions and over and above adding additional margin will increase the thickness of the pressure part components. For cyclic loading design thickness of components is important and should be as minimum as possible and hence margins will be as specified in the IBR. Customer is requested to remove requirement of additional margins specified in the specification.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
197	VI/B	A-01	7 of 88	1.05.02, (e)	(iv) Upto & including 610 degree Celsius (*) Alloy steel ASME SA- 335/213:P-92/T-92 or approved equivalent. (v) Upto & above 610 degree Celsius Austenitic stainless steel, SA-213 UNS S30432 Shot Peened, or approved equivalent.	Bidder has rich experience in using TP347H material in sub-critical boilers up-to average steam temperature of 568°C and Design metal temperature of about 630°C. There was no exfoliation related issues reported from those units using TP347H. As per our design standrads “TP347H tubing with design metal temperature above 600°C to be shot peened”. However, Bidder follows shot peening as new norm for all austenitic tubing. Therefore, Bidder requested to include “TP347H shot peened” in the material list	The specifications are the minimum requirement. Bidder to comply specification requirement. Further, if the bidder feels to utilize any improved version towards overall reliability and hence the improved boiler performance, then the same should be substantiated with proven references & data.
198	VI/B	A-01	8 of 88	1.05.04, (5)	Means of Temperature Control (b) REHEATERS* Tilting of burners/gas biasing/gas recirculation (gas to be tapped off after ID fans), spray water attemperation (utilising water tapped off from interstage of BFP)	Excess Air will also be used for RH Temperature control as per Bidders practice.	Agreed. However, the bidder has to carfeully select the excess air requirement and within allowable limits as governed by the upstream and downstream equipment sizing (like FD & ID fans) so as not to increase the pressure drops, velocities & power consumption of the equipment/fans handling air & flue gas.
199	VI/B	A-01	9 of 88	1.05.05(vi)	(vi) Maximum depth of tube banks/sections in the direction of gas flow: 2 Meters or maximum soot blowing radius, whichever is lower.	Economiser bank depth may be allowed upto 2.5mtrs to include economizer future area addition with present for optimum design.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
200	VI/B	A-01	20 of 88	1.05.14.01, a,3	The flue gas flow & ash accumulation patterns at such part/low loads shall be studied based on the CFD/Physical model test (PMT) of ducts & ESP as part of this contract. The same along with contractor’s experience of similar cases (boiler/coal& ash type etc.) shall be used for selecting the final gas velocities by the contractor.	Duct sizes are decided based on duct sizing criteria specified in the specification. Duct layout/ routing is based on space available. Equal distribution of gas flow is ensured by maintaining symmetrical arrangement. Physical model test (PMT) of ducts & ESP results as part of this contract is more accurate than CFD analysis. Hence CFD analysis for flue gas ducting is not envisaged.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
	VI/B	A-02	39 of 67	13.01.01	CFD Modeling		
201	VI/B	A-02	40 of 67	13.01.02	(c)For flue gas ducts downstream of ESP, additional fly ash loading on the surface or for one tenth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under all normal, upset or abnormal operating conditions, whichever is higher.	Bidder will consider 1 ft of ash in the duct after ESP, since ash concetration in flue gas after ESP is minimal.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.

202	VI/B	A-02	8 of 67	3.07.00	Provide stainless steel expansion markers/indicator on all the four furnace walls to monitor thermal expansion. Predicted thermal expansion at different levels to be indicated. In addition to local indicators, measurement system (4-20mA Output) for remote indication shall also be provided on all the four furnace walls.	Product meeting this specific requirement is not available with contacted vendors & online sources. No such system can be offered.	Bidder to provide thermal expansion measurement inline with Specification requirement. Same shall be discussed during detailed engg
203	VI/B	A-02	12 of 67	6.04.00	The pump shall be suitable for cyclic operation as specified in part-A-01 of part-B of the technical specifications. The specific features adopted in this regard shall be brought out by the contractor like casing shape & design including its curvature/corner radius, stress concentration areas, no. of pieces/joints for a pump casing, materials adopted, performance monitoring etc. with proper justification. A CFD and FEM analysis to conform to specified cyclic requirements shall be carried out and furnished by the contractor alongwith the pump data sheet. Online monitoring requirements on the pump casing/heat barrier shall be recommended by the OEM like an array of thermocouples to give adequate indication of temperatures. The pump OEM shall share the test/inspection/feedback data of high load cycling power plant cases where the offered pump design has been successfully run.	Boiler recirculation pump is in operation during wet mode/less than minimum once through load only. Cyclic loading requirements are specified for the loads above minimum once through load, where pump will not be in operation. Hence these additional requirements are not required and not considered.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
204	VI/B	A-02	14 of 67	7.01.01, 10	Space Provision Keep provision of space for atleast 20% addition of additional economizer and 10% for the reheater surfaces in future. The surface provisioning shall be flue gas upstream section of the economizer. Structure/hanger de-sign shall be suitable for loads due to these additional surfaces (filled with water) also.	Bidder understands, provision of space requirement mentioned is for the heating surfaces provided in second/back pass (horizontal banks). Customer to confirm.	The space requirements are mentioned for the type of heat transfer surfaces as specified. Bidder to comply with the specifications requirements.
205	VI/B	A-02	15 of 67	7.02.02	For continuous monitoring of temperature variation across the length of the headers six (06) thermocouples shall be provided on each Superheater header and reheater header except the final superheater header. The number of thermocouples for each final superheater header shall be 30. This re-quirement is over and above the require-ments specified in clause no. 7.02.01 above.	Thermocouples will be provided on inlet and outlet headers of Pendant / Horizontal superheater / reheater sections only. Headers of steam cooled Roof / Enclosures are not considered for this requirement. Further in case of split header (i.e. when a header is split to take care of expansion issues), it is considered as a single header for the purpose of thermocouples.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement. Split headers to be considered as separate headers for the purpose of thermocouples.
206	VI/B	A-02	41 of 67	13.01.06. (iii)	Pipe struts, trusses, bracing: ASTM A 53 or equivalent seamless steel pipe. Material conforming to equivalent Indian standard shall also be acceptable.	ERW pipe also may be accepted, since it is confirming to the functional requirement.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirement.
207	VI/B	A-02	40 of 67	13.01.05 (a)	Minimum 8 mm thick steel plates for gas ducts upstream of ESP and minimum 6mm thick steel plates for gas ducts downstream of ESP.	• The duct to absorber inlet tapping is at downstream of ESP ducting. Hence, 6 mm thickness will be provided as per Section VI/Part B, Sub section A-02, page 40 of 67, clause 13.01.05. (a).	Bidder is requested to check referred cl. no. 13.01.05 (a) for minimum thichness requirement. Specification requirement is clear and to be complied with.
	VI/B	A-05	5 of 29	3.02.04	The duct to Absorber inlet shall be made of Carbon steel of minimum 7 mm thickness. The duct from Absorber outlet to bypass duct & duct after by pass damper/gate to chimney inlet shall be made of cladded sheet of minimum 2 mm thickness of either Titanium (Grade 2 as per ASME SB265) or C-276 over 7 mm thick (minimum) mild steel base metal. Cladding shall be done to achieve the required quality as per ASTM B 898-11.		

208	VI/B	A-02	42 of 67	13.01.09 (b)	(2) …Such internal stiffeners for the flue gas duct between boiler and ESP shall be provided with erosion protection shields.	Internal stiffenetrs are provided with sufficient thickness to take care of the flue gas erosion. Separate erosion protection shields are not required.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
209	VI/B	A-02	50 of 67	15.18.00	The furnace should be provided with wall blowers so selected such that cleaning coverage per wall blower should not be more than 2m in radius and there should be no left out portion. One wall blower elevation below the lowest burner elevation shall be provided along with wall blowers located immediately above top elevation coal burners upto the horizontal plane at the furnace nose tip at entry to the radiant superheater…	Bidder does not recommend wall blowers upto the horizontal plane at the furnace nose tip. Wall blowers will be provided in furnace zone below intermediate header (spiral to vertical wall). Bidder Supplied wall blowers/LRSBs have a cleaning radius of 3m and working satisfactorily in all of bidder supplied boilers. Hence coverage of wall blower/LRSBs shall be with 3m cleaning radius.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
	VI/B	A-02	50 of 67	15.21.00	While deciding coverage of LRSBs the maximum coverage of LRSB shall not be con-sidered more than 2m of blowing radius		
210	VI/B	D-1-5	3 of 103	5.02.01	(i)Bidder shall integrate the Mill & Bunker Building with boiler supporting structure.	Boiler will be integrated with Mill building through interconnection platforms at required levels.	Bidder's proposal is acceptable.
211	SECTION – VI, PART-A	SUB SECTION-VI MANDATORY SPARES	2 of 3	4.00.00	All the spares (both recommended and mandatory) shall be manufactured along with the main equipment components as a continuous operation as per same specification and quality plan	For main, grinding rolls are to installed on journal assembly and testing is carried out at shop as per approved Quality plan. However, for Mandatory spares grinding rolls are supplied directly from vendor works to site as per approved Quality plan. Mandatory spares shall be manufactured as per the established process inline with specification and quality plan. We request customer to accept established operation in	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
212	SECTION-VI, PART-A	SUB SECTION-II A-01	12 OF 28	2.15.03 (c)	Proven fire detection and fire extinguishing systems in line with the standard practice of the manufacturer shall be provided.	Fire-detection is carried out by Mill Outlet temperature measurement as per Bidder standard and proven practice.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
213	SECTION-VI PART-B	SUB SECTION-A-01	13 OF 88	1.05.08.03	Minimum Guaranteed Life of Coal Pulverizer Wear Parts ITEM MINIMUM LIFE IN EQUIVALENT HOURS (1) Seals 20000 (2) Grinding elements 8000 [See note (a) below] (Rolls/Balls and Rings/Race) (3) Mill discharge valves 15000 (4) Classifier cone and 25000 other items lined with Ceramic material (as applicable) (5) Classifier vane 25000 (as applicable)	For the offered mill: a) Seals are not applicable for offered mills. d) Classifier Cone not applicable for offered mills. e) Classifier vanes not applicable for offered mills.	The specified life details are for the wear parts as defined elsewhere in the specifications (refer Sub-section-VI, part-A also). Accordingly, the same shall be applicable. Further, the details shall be discussed during detail engineering based on the type of pulverizer offered and their corrseponding specific wear parts in line with the specifications requirements.
214	SECTION – VI, PART-B	SUB SECTION-A-02	25 OF 67	10.05.13 ii & iii	(ii) Grinding Rings/Race - Material with hardness 550 BHN (min.) at surface (with adequate chilled depth). (iii) Grinding balls/rolls - Material with hardness 350 BHN (min.)	Grinding rings/ Race is termed as bull Ring segments as per our of-fered design. Material of construction – Rolls' Inserts & Bull Ring Segments shall be of Sintered carbide. The inserts shall be bound with soft grey iron metal for the Rolls. The hardness difference shall be less than 100 BHN, but would not affect the performance of the same.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
215	SECTION – VI, PART-B	SUB SECTION-A-02	26 OF 67	10.05.17	Provide suitable arrangement for readily determining the oil level in the gear box(es) and all other lubricated parts.	lubrication for gearbox is circulating type lubrication system. Level is monitored in lube oil tank.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
216	VI/B	A-02	58 of 67	22.01.03	Recirculation Pump: Following tests for Steam Generator Startup drain recirculation pump at shop on assemble unit: - Type Test: (i) Tests to establish unit functioning of pump at temp and pressure. (ii) Hot standstill and start up tests.	The pump vendors are reputed and have supplied BCW pumps across the world. The pumps supplied by them in the past for supercritical power stations are running successfully without any issue. These vendors have already substantiated their pump quality and have proven the same in the past. Please note that the Hot type test requirement is significantly impacting the production process and enduring safety issues. In view of the above, these tests shall be exempted.	There is no safety and production process impact for the specified type test. The Bidder has to plan the BCP ordering and supply timelins while considering the specified type tests. Any request for waiver shall be considered in line with the clause no. 22.04.00

217	VI/A	II A-01	22 of 28	2.24.01, (2),(vi)	Four (4) nos. of pneumatic emergency retract drives with matching crank tools for each type of soot blower shall be provided…	Pneumatic emergency retract drives are not envisaged for this project. As per Bidder's standard practice Emergency Hand crank shall be provided, which can be engaged to move the lance manually to the home position. This is functionally equivalent to the specification requirement.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
218	VI/A	IV	30 of 77	1.03.02 (vi)	The contractor shall demonstrate that the average thinning in the water wall tubes in the furnace due to corrosion, erosion etc. does not exceed the specified value as per Sub section-A-02, Part-B (Mechanical), of technical specifications. The same shall be demonstrated by calculating the average thinning in the water wall tubes in the furnace by measuring the tube thicknesses prior to/ during commissioning and next overhauling of unit or 8000 hours, whichever is later at about 1500 locations arranged in a grid around the furnace. The areas to be covered under the grid shall include burner zone extended upto the Separated over fire air nozzle location.	As performance of boiler pressure parts depends on many variables viz. fuel, operating conditions, O&M practices etc. this demonstration of corrosion rate is excluded.	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
219	VI/B	A-02	15 of 67	7.03.00	1.5 m clear cavity height between two sections/banks of horizontal heat transfer surfaces for personnel access.	Customer/consultant to kindly note that 1 m or 1.2 m clear cavity height between two sections/banks of horizontal heat transfer surfaces is sufficient for personnel access. Customer/consultant may please review the cavity requirement.	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
220	VI/B	A-02	16 of 67	8.03.00	Minimum 1.5 m clear cavity height between two sections/banks of the economizer for maintenance access.		
221	VI/B	A-02	16 of 67	8.02.00	Economiser tube :(d) Supported by steam or water cooled hanger tubes forming part of Steam circuit with hanger tubes designed for a minimum of 2 times the calculated load so as not to cause any dislocation/damage to the tube banks/setting. Necessary calculations in support of this shall be furnished by the bidder.	Bidder has provided mechanical ladder type- header support for economiser coils in many earlier OTSC projects and these boilers are in operation currently without any support issue (for Eco. Coils). Hence customer/consultant may please review the requirement for steam/water cooled hanger support for economiser.	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
222	VI/B	A-02	8 of 67	3.05.00	C. Tapping points at five levels for furnace vacuum monitoring (in addition to routine monitoring)	Furnace pressure near to roof and Superheater Platen section inlet will be measured and controlled. Furnace vacuum monitoring at different levels is not required and hence tapping points at different levels are not envisaged	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
223	VI/B	A-02	5 of 67	3.01.04	Furnace Bottom hopper Design of Boiler and its supporting structure shall be considering 50% ash/clinker loading in furnace bottom hopper and corresponding to ash density of 1600 kg/m3. Further minimum sixteen (16) Nos. of load cells shall be installed by Contractor in the furnace roof enclosure to give indication of ash build up in the furnace bottom hopper. The contractor shall provide the design basis for the selection for number of load cells, their distribution and fixing up of alarm set points.	For supercritical boilers with spiral wall construction, the tubes are almost horizontal and ash accumulation is to be avoided to protect the panel tubes from deformation. Boiler should not be operated with ash accumulation in furnace bottom as this is an unsafe condition and boiler should be stopped immediately if accumulation is happening. Hence the 50% ash load will not be considered in Furnace hopper bottom.	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.

224	VI/B	A-01	7 of 88	1.05.02 (e) (ii)	Use of T91/**T92** tubes for the pressure parts in the heated region of the boiler shall be limited to fluid temperature of 530°C.	In line with EPRI report "Guide to grade 91 use temperature limits due to steam oxidation and exfoliation" and as stated in the review report by EPRI, fluid temperature of 560 Deg.C limit for high heat flux zone is envisaged for T91 tubes. Accordingly bidder request to consider to increase the T91/T92 fluid temperaturte limit to 560 Deg.C in the furnace (high heat flux) zone upto Furnace Outlet Plane. Customer/Consultant requested to note that, for low heat flux zone there is no restriction of fluid temperature as per EPRI. For proposed design, T91/T92 tubes are also envisaged, in the backpass (low heat flux) zone, where in this fluid temperature limit (of 530 Deg.C) specified is not envisaged. However, design metal temperatures specified will be followed as per specification. Customer/Consultant requested to consider and accept.	The temperature limits specified are based on Employer's assessment impact of the steam oxidation propensity on the reliability of the steam generator in load cycling duty conditions. Bidder to comply with the specification requirements.
225	VI/B	A-02	15 of 67	7.02.01 (b)	Alarm set point for tube metal temperature shall not exceed the design temperature for respective tube.	Specification criteria of Alarm temperature shall not exceed the design temperature for respective tube will have issues of frequent alarm in operational units, leading to limitations in several operations such as firing rate, burner tilt etc. Hence customer/consultant may kindly review this requirement. Bidder proposes "Alarm set point for tube metal temperature shall not exceed the design temperature limit as per ASME Section-I for respective tube".	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
226	VI/B	A-02	21 OF 67	9.02.02	Condensate from SCAPH, through SCAPH tank, shall lead to atmospheric flash tank in the boiler area.	Bidder propose to take the condensate/drain from SCAPH directly to atmospheric flash tank .	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
227	VI/B	A-08	1 of 19	1.02.00 (a)	Bends used in Piping of BFP-T Exhaust to Condenser should be of Alloy Steel of A 691 Grade 2 – ¼ Cr class 21 / 22 or A – 691 grade 1- ¼ Cr Class 21 / 22.	Material of Bends used in Piping of BFP-T Exhaust to Condenser shall be same as that of parent pipe.	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
228	VI/B	A-08	4 of 19	1.07.00	SPECIFICATION FOR PIPES & FITTINGS: Construction of Alloy steel fittings -Seamless	Construction of alloy steel TEE's may also be allowed from seamless forged components in line with spherical wye piece.	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
229	VI/B	A-08	14 of 19	2.07.00	Each rod of a double rod hanger support shall be designed for the full hydro test load coming on the double rod hanger assembly	Each rod of a double rod hanger support shall be de-signed for operating load coming on the double rod hanger assembly.	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
230	Part - C, SECTION-VIA	General technical requirements	30 of 119	20.03.00	Shop primer for all steel surfaces which will be exposed to operating temp below 95deg. C shall be selected by the contractor.	Following scheme is proposed as clarification for all un-insulated components like miscellaneous sheets, plates other than structural items mentioned above. (Operating temperature up to 95 deg.C) a) Power tool cleaning to SP3. b) One coat of red oxide alkyd based primer as per IS-12744 to the DFT of 30µ/coat. c) two coats of synthetic enamel (long oil alkyd) to IS2932 to the DFT of 20µ/coat. Total DFT = 70 microns.	Bidder's proposal is not acceptable

231	Part B - Book 1 of 5 - Mechanical, SECTION-VIA,	A-12, Surface preparation & painting	4 of 8	1.06.11, A)- Sl. No. 2	Design Temperature above 60 - 200 deg.C a) Power tool cleaning to SP3 b) Two coats of HR Aluminium Paint IS13183 Gr.III Total DFT 40 microns	Since general purpose aluminum paint IS2339 withstands temperature up to 150 deg.C. Following scheme is proposed for fuel pipes having temperature up to 120 deg.C. *a) Power tool cleaning to SP3* *b) Two coats of General purpose Aluminium Paint IS2339. total DFT 40 microns.*	Bidder's proposal not acceptable. Bidder to comply specification requirement.
232	Part B - Book 1 of 5 - Mechanical, SECTION-VIA,	A-12, Surface preparation & painting	6 of 8	B) - Note-1	SG membrane walls and other flue gas swept pressure part surfaces shall be applied with appropriate primer for protection of surfaces during transit, storage and erection.	Following schemes are proposed as CLARIFICATION as there is no specific painting scheme is given in tender specification. For Heat exchanger coils coming in the gas path (like Economizer, SH coils, water platens etc). Power tool cleaning followed by one coat of dip-coat paint –Red-oxide Zinc phosphate primer to Bidder Specification. DFT = 35 microns. For components coming in the gas path like ww panels, headers, loose tubes etc Power tool cleaning followed by 2 coats of Red-oxide Zinc phosphate primer.to IS 12744 DFT = 60 microns	The specific details shall be tied up during the detail engineering inline with the technical specification requirements.
233	Part B - Book 1 of 5 - Mechanical, SECTION-VIA,	A-12, Surface preparation & painting	6 of 8	Point. No. 2	For valves below 65NB and temperature up to and in-cluding 540 DegC, Parkerizing/zinc phosphate corrosion resistant coating as per ASTM F1137 is also acceptable in lieu of Aluminum paint.	Clarification For forged valves, Phosphating to thickness of 1500mg / Sq.ft will be done.	Bidder proposal not acceptable. DFT for all coats to be maintained as per specification requirement only.
234	Part B - Book 1 of 5 - Mechanical, SECTION-VIA,	A-12, Surface preparation & painting	6 of 8	B) SG & Auxiliaries Sl.No.2	All surfaces with temperature above 95°C and which are insulated a) Power tool cleaning to SP3. b) Two coats of HR Aluminium Paint. total DFT 40 microns	Following painting scheme is proposed in line with Bidder Std.Painting Practice for all insulated components like hot ducts, Furnace Casing sheets, Riser tubes, External piping etc., *a) Surface Preparation: St3 by Power tool cleaning.* *b) Primer paint: 2 coats of red-oxide zinc phosphate to IS 12744 to DFT of 30µ/coat* Total DFT = 60µ PRICE IMPLICATION: Rs. 50/Sq.m	Bidder's proposal not acceptable. Bidder to comply specification requirement.
235	Book 4 of 5 - CIVIL WORKS, SECTION-VIA, Part-B	D-1-6 DESIGN CRITERIA	25 of 25	6.04.06	Hand railings & ladders All handrails and ladders shall be galvanized at the rate of 610 gm/ sq.m	Following scheme proposed for handrails, posts, ladders & stairs *a) Power tool cleaning to SP3* *b) One coat of red oxide alkyd based primer as per IS-12744 to the DFT of 30µ/coat* *c) two coats of synthetic enamel (long oil alkyd) to IS2932 to the DFT of 20µ/coat* *Total DFT = 70 microns* Cost of galvanization: Rs. 30,000/ton Cost of above proposed painting: Rs. 100/m2	Bidder's proposal is not acceptable
236	Book 4 of 5 - CIVIL WORKS, SECTION-VIA, Part-B	D-1-6 DESIGN CRITERIA	23 of 25	6.04.02	Painting of steel surfaces embedded in concrete Steel surfaces embedded in Concrete, the surface shall be prepared by Manual Cleaning and provided with Primer Coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron Dry Film Thickness (DFT).	*No painting is required for embedded surfaces, as paint will hinder adhesion.* *Temporary rust preventive fluid can be applied to protect these surfaces until erection.*	Bidder's proposal is not acceptable
237	VI/B	G-01	2 of 4	1.03.00	To make unit capable of continuous two shifting operation, the number of hot start ups shall be increased from 4000 numbers specified elsewhere to 6700 numbers without changing cold and warm start up as well as daily N1 (minimum 13400 cycles in total design life) and N2 (minimum 6700 cycles in total design life) requirements as defined above.	The requirements of 7850 number of starts along with daily 3 load cycling and daily starts & stops are not practical. 7850 starts in 25 yrs means 314 starts in a year i.e. One startup in every 1.16 days. NTPC to reconsider the practicability and clarify the design requirement.	Specification requirements are clear in this regard and based on Flexible and two shift operation of plant. Bidder to comply with the specification requirements.

238	VI/B	G-01	4 of 4	1.06.00	Further, Contractor will share the detailed design documents for establishing the changes done in the design for ensuring continuous operation at 40 % TMCR Load.	Such Design document are proprietor in nature and cannot be shared. NTPC is requested to delete the clause.	40% Technical minimum load operation to be ensured inline with latest CEA Gazette. Bidder may please note that this is mandatory requirement and is to be ensured by owner. Bidder to comply with the specification requirements.
239	VI/B	G-07	3 of 8	2.05.00	Data Sheet: Steam Turbine.	Technical data of Steam Turbine required for operation, maintenance and information purpose shall only be furnished in O&M Manual. Data / information which are proprietary in nature, shall not be furnished.	The data/information sought are not proprietary in nature and these information are provided in past also. Bidder to comply specification requirements.
240	VI/B	A-07	1 of 25	1.04.00 (d)	Critical speed of composite rotor and blade assembly shall not be within - 10% and +15% of rated speed.	Critical speed of composite rotor and blade assembly shall not be within ± 10% of rated speed. This is as per OEM's in house design guidelines	Bidder's proposal is not acceptable. Bidder to comply technical specification requirement.
241	VI/A	IIA-06	9 of 9	15.00.00	16.00.00: Steam Turbine Generator & Auxiliaries and associated systems shall be designed for 40% Technical Minimum Load (TML); for meeting this mandatory requirement and ensuring the design life of Turbine including its auxiliaries, necessary changes in design to be made. Design changes to be considered shall include but not limited to the following. 1. Changes required in LP Turbine last stage and second last stage blades (as applicable) to take care of increased flow separation at 40% TML. 2. Bidder shall consider state of art design with respect to blade metallurgy and effective moisture separation methodology to avoid blade erosion & failures at 40% load continuous operation of Turbine. Bidder shall submit thermal stress analysis report of Turbine components at 40% TML operation. 3. Increased thermal stress in Turbine stages: To enable continuous operation of turbine at 40% load, Bidder shall take care of the increased stresses (due to ventilation) in turbine design and ensure that design life of turbine and its components is not reduced. Further, turbine and auxiliaries shall also be designed for complying the requirements related to flexibilization as mentioned in CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023 in addition to the requirement specified elsewhere.	Machine is capable of running at part load upto 40% TMCR subject to the condition that guidelines of O&M manual are strictly adhered. Further submission of any design analysis / report etc are not envisaged as they are properitory in nature.	As per CEA Gazette Notification dated 25.01.2023, it is mandatory compliance for utilities to have their machines designed for flexibilisation which includes 40% technical minimum load, ramping requirements as specified in tender specifications and also two shift operation as per CEA notification dated 23.12.2022 on technical standards. Utilities may be asked to submit supporting document in this regard regarding design changes carried out in the OEM supplied machines towards compliance of these mandatory requirement. In view of the above, Bidder proposal is not acceptable and Bidder is requested to comply specification requirements.
242	VI/B	G-07	2 of 2		Tentative Master Drawing List	Master Drawing List will be agreed and finalised after order.	Master Drawing List (MDL) provided in the Specification is Tentative. MDL shall be finalized after the award of the package.
243	VI/B	A-02	3 of 67	1.05.00	*Type of Starts:* Hot start (after 8 hours of unit shut down) Warm start (after 36 hours of unit shut down) Cold start (after 72 hours of unit shut down)	For Start up curve preparation, we will consider the following condition as per standrad practice. Hot start (after 8 hours of unit shut down) Warm start (after 48 hours of unit shut down) Cold start (after around 200 hours of unit shut down)	Bidder's proposal is not acceptable. Bidder to comply technical specification requirement
244	VI/B	A-07	3 of 28	1.11.00	TG Protection: Advisory trips by Operator shall be avoided. … Apart from mandatory turbine protection, these protections shall include, but not be limited to following: a. TG Bearing temperature b. TG Shaft/bearing vibration c. Differential Expansion d. Low Main steam temperature e. Any other safety requirement as required	Only alarm on Differential Expansion & Low Main Steam Temp is available. Auto Protection is not envisaged as per OEM standrad practice.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
245	VI/B	A-07	7 of 28	1.19.00	Furnish turbine clearance diagram indicating values for radial & axial clearances and leakage rate from glands.	Submission of leakage rate is not envisaged.	Bidder to comply with the specification requirements.
246	VI/B	A-07	7 of 28	1.20.00	Type Test of Metallic expansion Joints of Steam Turbine	Type Test of Metallic expansion Joints are not envisaged.	Bidder's query with respect to reference clause is not correct, Bidder to comply with the specification
247	VI/B	A-08, A-09			LOW PRESSURE PIPING POWER CYCLE PIPING (HIGH PRESSURE PIPING)	What is the pressure range in bar categorizing low pressure piping? What is the pressure range in bar categorizing power cycle piping (high pressure piping)?	Bidder to note that, Low Pressure Piping & Power Cycle Piping of Part B refers to the systems mentioned in corresponding sub sections / chapters of Part A.
248		I	5 of 8	3.00.00	The tender drawings are enclosed along with the specification as Part-E, Section-VI and shall supplement the requirements specified in these technical specifications. The scope and terminal points of the equipment to be furnished under this EPC package shall be as identified in these drawings read in conjunction with text of the specification.	We understand that tender drawings for Steam Turbine & auxiliaries are only indicative and for information only. These are not binding.	Bidder understanding is not correct. Bidder to comply with the specification requirements.
249	VI / A	IV	1 of 77	1.00.01 (f)	The Contractor shall make the plant ready for the performance guarantee tests before start of Initial Operation. All CAT-1 Performance Guarantee tests shall be conducted along with initial operation	All the efforts will be made to make unit ready for performance guarantee test before start of Initial Operation, however CAT-1 performance guarantee test shall be conducted after stabilization of Unit as per satisfaction of both parties.	Bidder to comply with the specification requirements

250	VI / A	IV	11 of 77	1.01.03.01 (2)	In case any of the above correction curves are not submitted along with price bid , no negative corrections shall be allowed on turbine Heat rate on this account .Positive corrections if required to be applied, the amount shall be de-cided by Employer. Further, no positive corrections shall be allowed on turbine output on this account. Negative corrections if required to be applied, the amount shall be decided by Employer.	Correction Curves shall be generated after approval of Heat Balance Diagrams and shall be submitted to Customer for Approval and inclusion in TG-PG test procedure.	Bidder's proposal is not acceptable. Bidder shall comply to the specification requirements.
251	VI / A	IV	53 of 77	2.02.02	No shutdown shall be allowed for installation of PG test instrument/ flow nozzle etc. Any advanced class instrument system such as those using electronic devices or mass flow technique shall be arranged by the contractor, if required. However, same shall be installed before start of initial operation of unit. For determination of primary flow to the turbine, a calibrated low Beta-ratio throat-tap nozzle assembly shall be installed permanently in condensate line prior to initial operation, same shall be also used for process control. All the instruments including the flow nozzle shall be calibrated by the contractor before initial operation in a reputed international institute. All calibrations reports shall be made available prior to the start of initial operation and calibration certificates in original submitted to Employer. All instruments including flow nozzles as necessary for conductance of PG tests shall be installed prior to the start of initial operation.	PG test instruments are with special accuracy class and shall be calibrated before start of actual PG test and will be in-stalled in running unit. Flow Nozzle shall be installed just before start of TG-PG test to ensure of flow measurement and its reading will be rec-orded in separate data logger.	Bidder's proposal is not acceptable. Bidder shall comply to the specification requirements.
252	VI / A	IV	53 of 77	2.02.03	Corrections to the test results for steam turbine shall be applied as per the correction curves listed in this subsection. All the efforts shall be made to control the unaccounted for leakage to the minimum, when the system is properly isolated for a performance test. It shall be bidder's responsibility to arrest all the cycle leak-ages and valves passing before start of initial op-eration. It will be endeavour of the bidder to keep the unaccounted for leakages below 0.1% of the design throttle flow at that load. In case the value of unaccounted for leakage, is more than 0.1% of design throttle flow at that load, the suitable correction for make-up shall be provided as per approved correction curve.	During initial operation plant leakages are quite high and it not possible to bring leakage of plant within 0.1% of MS flow. In view of above this clause to be deleted.	The correction for make-up (Change in system water storage) is already envisaged in worst scenario in case un-accounted leakage exceeds 0.1% inspite of all possible efforts. Bidder to comply specification requirements.
253	VI / A	IV	53 of 77	2.03.00	The Contractor shall prepare test reports in which the methods followed, instrument readings, graphs, observations, final results obtained online, etc., shall be recorded.	TG-PG test report shall be generated as per standard format and will be submitted to Customer within shortest possibleduration as per agreement during MOM of TG-PG test.	Bidder Proposal is not acceptable. Bidder to refer the clause 1.00.01/(i), sub-section IV, PART-A, SECTION - VI for PG Test report submission schedule. Bidder to comply specification requirements.
254	VI / B	A-07	8 of 28	1.19.00	Furnish thermal kit data for plant performance by DDCMIS	TG-PG test report shall be generated as per standard format and will be submitted to Customer within shortest possible as per agreement during MOM of TG-PG test.	Bidder's proposal is not acceptable. Bidder to comply with specification.
255	VI / B	G-04	9 of 185	3.3	The turbine generator performance test is carried out according to ASME PTC6-2004 or latest revision and technical specification. Uncertainty on the test results is not applicable on account of measuring instruments inaccuracy & Fluctuation of parameters during the conductance of test. Ageing correction is not applicable for TG Cycle Heat Rate & Output test. Test will be conducted during trial operations. No shutdown will be allowed on account of PG Test preparations.	Aging is a physical phenomenon and once steam enters into the cycle the aging of the components starts. Hence the aging period will be considered from the date of first syn-chronization to the conductance of PG test.	PG test shall be conducted along with initial operation. Hence, ageing correction is not applicable. Bidder to comply specification requirements.
256	VI / B	G-04	9 of 185	3.4	Condensate flow nozzle (ASME PTC 6) will be installed by vendor Prior to initial operations.	Flow Nozzle shall be installed just before start of TG-PG test to ensure of flow measurement and its reading will be rec-orded in separate data logger.	Bidder's proposal is not acceptable. Bidder to comply with technical specification requirement.
257	VI / B	G-04	14 of 185	4.7	Duration of test run shall be two hours. One hour as minimum is necessary before the test run to confirm whether the plant is at satisfactory condition for the test.	Duration of test shall be two hours, out of which most stable 1 hour period shall be selected for calculation and reporting.	Test duration is based on Standard PG Test procedure. Bidder to comply the technical specification requirement.
258	VI / B	G-04	16 of 185	5.2	Turbine cycle Heat Rate for Typical Cycle will be calculated using the following equation. (Nomen-clature & Symbols are not mandatory for sample calculation)	Heat Rate calculation methodica will be furnished for ap-proval as per standard practice based on thermal cycle final-ized for project specific design.	The indicated formula is for a typical sample calculation and self explanatory. Bidder understanding is correct.
259	VI / B	G-04	13 of 185	4.2	PERMISSIBLE DEVIATION OF VARIABLES	Allowed permissible deviation in parameters will be as per test code and correction curves shall be generated accordingly.	Bidder to note that permissible deviations specified are as per ASME PTC 6 only.
260	VI / B	G-07	6 of 8	51	Gland leakage coefficients	Such data requested in data sheets is proprietary in nature, hence cannot be furnished.	Bidder to comply technical specification requirement.
261	VI / B	A-07	7 of 28	1.18.01	Any additional heat balances deemed necessary by the Employer shall be furnished. All the heat balances shall show turbine output, mechanical and electrical losses in turbine and generator and input to shaft driven auxiliaries, if any.	Mechanical losses, Generation Efficiency should be given in Guaranteed HBD's as per standard practice.	Bidder to comply technical specification requirement.

262	VI / B	B-02 (Motors)	1 of 5	3.01.00 b).	Continuous duty LT motors upto 50KW Output rating (at 50 Deg. C ambient temperature), shall be super Premium Efficiency class-IE4, 50-200 KW shall be of Premium efficiency class-IE3 conforming to IS 12615 or IEC 60034-30.	Clause to be updated as "Continuous duty LT motors upto 200KW Output rating (at 50 Deg. C ambient temperature), shall be of Premium efficiency class-IE3 conforming to IS 12615 or IEC 60034-30."	Bidder Proposal not acceptable. Bidder to comply specification
263	VI/B	A-07	3 OF 28	1.11.00 (b)	TG Protection c. differential expansion d. Low main steam temperature	The TG protections are provided as per OEM standard and proven practice. The reasons for not providing Auto Tripping in Differential expansion and Main steam low Protection are listed below; Differential expansion - Thermal expansion is already considered during all static and transient operations in the design stage. The differential expansion is limited by monitoring various temperature measurements through turbine stress controller (TSC). Moreover, due to the inherent design of OEM (push rod mechanism), turbine tripping due to differential expansion is not experienced in any of the Bidder machines. Only manual tripping is recommended to increase plant availablility. Hence, Automatic tripping is not envisaged. This is in line with OEM proven practice and followed in all supercritical NTPC projects supplied by Bidder. Main steam low- As per OEM philosophy, The main steam and hot reheat steam temperature is typically subject to change during startup / shutdown and in steady-state operation. During startup the temperature is regulated via X-criterias and stress margins. In steady state operation the temperature should remain steady unless major transient (for example load rejection, issues in boiler). In either case the temperature is not expected to violate the limit value. Limit violation is regulated within limits as per IEC-45 which includes control behavior and the thermal inertia of the steam generator and the operating conditions which normally occur in power plants and taken care in SG/BoP systems. Hence main steam low protection is not envisaged in TG functional group. This is in line with OEM proven practice and followed in all supercritical NTPC projects supplied by Bidder.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
264	VI/C	GENERAL TECHNICAL REQUIREMENTS	PAGE 34 OF 119	22.17.00	The Contractor shall list out all major items/ equipment/ components to be manufactured in house as well as procured from sub-contractors (BOI).	The Contractor shall list out all major items/ equipment/ components to be manufactured in house as well as procured from sub-contractors (BOI). For the items not appearing in the sub vendor list (Section-VI, Part-B , Indicative sub-vendor list.) final acceptance by NTPC shall be on the basis of certificate of conformance (COC) by main contractor. Item/component mounted on the skid of the main item or supplied as a integral part of the main item, to be supplied as per proven practice of the manufacturer meeting the Customer technical specification. No vendor approval will be sought from NTPC for such cases.	Bidder's understanding is not correct.Bidder to follow the technical specification requirements.
265	VI/C	GENERAL TECHNICAL REQUIREMENTS	PAGE 34 OF 119	22.17.00	The contractor’s proposal for any new sub vendor for any of the items identified in indicative sub-vendor list shall necessarily be furnished in the sub vendor questionnaire & main Contractor Evaluation report format attached as Annexure- VII with all relevant documents and main contractor's own physical assessment report(physical for domestic manufacturers and physical/document review as applicable for foreign manufacturer) assessed as per their quality management system for NTPC review and acceptance.	The contractor’s proposal for any new sub vendor for any of the items identified in indicative sub-vendor list shall necessarily be furnished in the sub vendor questionnaire & main Contractor Evaluation report format attached as Annexure- VII with all relevant documents and main contractor's own physical assessment report(physical/document review as applicable for domestic manufacturers and ~~physical/~~document review ~~as applicable~~ for foreign manufacturer) assessed as per their quality management system for NTPC review and acceptance. In case of physical assessment (for domestic vendor) is alreday done by main contractor then reassessment by main contractor is not required.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.

266	VI/B	SUB-SECTION- E28 GENERATOR AND AUXILIARIES REV- 13	PAGE 4 OF 9	PROCESS CHECK FOR ROTOR AND ASSEMBLY (GENERATOR/EXCITOR)	**Rotor wedges, damper Wedges.-** Ultrasonic test/RT (at suppliers work and after preliminary machining)	Ultrasonic test/RT is applicable for Rotor Slot wedges only.	BIDDER IS TO FOLLOW NTPC TECHNICAL SPECIFICATIOANS AND GTR
267	VI/B	SUB-SECTION-E-8 STEAM TURBINE & INTEGRAL AUXILIARIE	PAGE 1 OF 26, 2 of 26	1.01.01 (1) a,b,c,d 1.01.03 (2) a,b,c,d 1.01.04 (b) 1.01.06 (a)I,ii,iii	Creep requirements: a) Steels chosen for design metal temperatures less than 400°C are exempt from creep /stress rupture testing. b) Steels chosen for design metal temperatures between 400°C to 540°C AND having less than 3% chromium, shall require 5 years performance feed back experience in the absence of which, creep rupture test will be required to be carried out for minimum test duration of 1000 hrs/mutually agreed parameters for NTPC approval. c) Steels chosen for design metal temperatures above 540°C AND/OR having more than 3% chromium, shall require 10 years performance feed back experience OR adequate stress rupture data, in the absence of which, creep rupture test will be required to be carried out for minimum test duration of 1000 hrs/mutually agreed parameters for NTPC approval. d) Unspecified alloying elements shall be controlled as per the applicable standard.	Bidder understanding that the creep requirement is applicable for steel chosen for design metal temperatures above 400°C and not for vendor qualification. If the mentioned creep requirement is applicable for vendor qualification then the NTPC approved vendor's are exempted from the creep requirements.	Bidder undertstanding is not correct. Bidder to meet technical specification requirement .
268	VI/C	GENERAL TECHNICAL REQUIREMENTS	PAGE 40 OF 119	25.03.00	The Contractor shall give the Project Manager/Inspector (15 days for domestic) / (45 days for foreign) written notice of any material being ready for testing. Such tests shall be to the Contractor's account except for the expenses of the Inspector's. The Project Manager/Inspector, unless the witnessing of the tests is virtually waived and confirmed in writing, will attend such tests within (15 days for domestic) / (45 days for foreign) of the date on which the equipment is noticed as being ready for test/inspection failing which the contractor may proceed with test which shall be deemed to have been made in the inspector's presence and he shall forthwith forward to the inspector duly certified copies of test reports in two (2) copies.	The Contractor shall give the Project Manager/Inspector (~~15~~ 7 days for domestic) / (45 days for foreign) written notice of any material being ready for testing. Such tests shall be to the Contractor's account except for the expenses of the Inspector's. The Project Manager/Inspector, unless the witnessing of the tests is virtually waived and confirmed in writing, will attend such tests within (~~15~~ 7 days for domestic) / (45 days for foreign) of the date on which the equipment is noticed as being ready for test/inspection failing which the contractor may proceed with test which shall be deemed to have been made in the inspector's presence and he shall forthwith forward to the inspector duly certified copies of test reports in two (2) copies.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
269	VI/C	GENERAL TECHNICAL REQUIREMENTS	PAGE 40 OF 119	25.04.00	The Project Manager or Inspector shall within 15 days from the date of inspection as defined herein give notice in writing to the Contractor, or any objection to any drawings and all or any equipment and workmanship which is in his opinion not in accordance with the contract.	The Project Manager or Inspector shall within ~~15~~ 7 days from the date of inspection as defined herein give notice in writing to the Contractor, or any objection to any drawings and all or any equipment and workmanship which is in his opinion not in accordance with the contract.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
270	VI/C	GENERAL TECHNICAL REQUIREMENTS	PAGE 40 OF 119	25.05.00	When the factory tests have been completed at the Contractor's or subcontractor's works, the Project Manager /Inspector shall issue a certificate to this effect fifteen (15) days after completion of tests but if the tests are not witnessed by the Project Manager /Inspectors, the certificate shall be issued within fifteen (15) days of the receipt of the Contractor's test certificate by the Project Manager /Inspector	When the factory tests have been completed at the Contractor's or subcontractor's works, the Project Manager /Inspector shall issue a certificate to this with immediate effect ~~fifteen (15)~~ days after completion of tests but if the tests are not witnessed by the Project Manager /Inspectors, the certificate shall be issued within ~~fifteen (15)~~ seven (7) days of the receipt of the Contractor's test certificate by the Project Manager /Inspector	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
271	Sec-VI, Part-A	IIA-06	6 of 9	6.03.00	Two (2) steam turbine drives for the turbine driven boiler feed pump for the unit complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers.	As per Bidder pre-commissioning/initial operation activities of Steam Blowing, the strainer is removed from the line and blanking fixture is used to isolate the steam turbine from steam supply . After steam blowing, the removed strainer is placed in the line again. Hence, temporary strainer for initial operation is not required.	Specification requirement is clear in this regard. Bidder to comply specification requirement.
272	Sec-VI, Part-A	VI/CHAPTER-02	8 of 30	V. 7	One set of Journal bearings and Thrust bearing (complete assembly) with carrier, Collar (if applicable) and pads	Complete thrust bearing assembly considered, however Carrier is not applicable. Separate Collar is not applicable as it is integral to turbine rotor as per Bidder Design. pads are part of Thrust Bearing Assembly . Hence separate pads are not envisaged.	Thrust Bearing complete assembly to be provided including pads. Specification requirement is clear in this regard. Bidder to comply specification requirement.

273	Sec-VI, Part-A	VI/CHAPTER-02	9 of 30	V. 10	Electrohydraulic assembly for governing system of TDBFP's	Electrohydraulic assemblies in governing systems are generally employed in high pressure governing systems. where the control oil pressure is at 160 bar and above. The governing system valve actuator assemblies used in the TDBFPs are low pressure (8 bar) hydraulic actuators which receive only hydraulic signals generated by the IH (current to hydraulic signal) converters mounted in the console. Hence, the Electro hydraulic assembly is not applicable for TDBFPs. However, One number spare of I/H converter which is functionally equivalent to electrohydraulic system is quoted under C&I .	Bidder to refer General note 3 in page-30 of 30 of Part- A/Sub-Section-VI, Chapter-02/Section- VI regarding not applicable item.
274	Sec-VI, Part-A	VI/CHAPTER-02	17 of 30	C.15.1	One set of emergency over speed governor assembly	Electronic over speed protections 2 out of 3 voting are used for emergency overspeed protection in line with latest practice followed in power industries. Mechanical over speed protection system is obsolete and same is not envisaged with BFP Drive Turbine. Hence one set of emergency speed governor assembly is not applicable.	Bidder to refer General note 3 in page-30 of 30 of Part- A/Sub-Section-VI, Chapter-02/Section- VI regarding not applicable item.
275	Sec-VI, Part-B	VI-A07	17 of 28	6.05.04 (a)	Stop Valves to be provided with removable stainless steel steam strainer for normal operation and one additional strainer element shall be provided for initial operation.	As per Bidder pre-commissioning/initial operation activities of Steam Blowing, the strainer is removed from the line and blanking fixture is used to isolate the steam turbine from steam supply . After steam blowing, the removed strainer is placed in the ESV again. steam blowing fixture shall be provided by Bidder. Hence, temporary strainer for initial operation is not required. Spare strainer is quoted under mandatory spares Clause C. 16.1 page 18 of 30	As per NTPC operating experience it is observerd that after steam blowing loose dirt particle may enter in turbine and may choke the strainer, So additional strainer is specified for initial operation.Bidder to comply specification requirement.
276	Sec-VI, Part-B	VI-A07	18 of 28	6.05.06 (c)	Particle size impurities test and moisture test as detailed out for Main Turbine, is to be carried out on one oil purification system of BFP drive turbine.	The capacity of oil purifier is 2400 LPH. For this capacity the approved vendors (Alfa Laval and GEA Westfalia) have type tested for particle size and the test was approved in previously executed projects and test certificates of same shall be furnished, Hence this test is not envisaged.	Bidder to refer clause no 12.00.00 Sub-section A-07 Part-B, Section-VI w.r.t. Type test equirement. Bidder to comply technical specification requirement.
277	Sec-VI, Part-B	VI-A07	18 & 19 of 28	6.05.09 (b) & (d)	steam from alternate source, from the same unit i.e. CRH, shall be admitted through a separate set of stop and control valves. Both sets of control valve to be controlled by electro hydraulic governing system. & In case bidder offer extraction steam to BFPT arrangement as per BOX-B of tender P&ID of extraction steam to BFPT then the pressure regulating valves in the CRH and Auxiliary steam line shall necessarily be electro hydraulically operated.	CRH steam line , auxiliary steam source to BFPDT will be provided with pipe mounted pneumatic pressure control valve.	The requirement of EHC based control system is based on operating experience and requirement of quick response Bidder proposal is not accepted and bidder to comply the specifications requirement.
278	API 612- 6th edition			10.5	Unless otherwise specified, condensing turbines shall be provided with at least two grounding brushes on the same end of the shaft.	Only one number grounding brush will be provided due to space constraint in the turbine bearing housing.	Bidder to comply specification requirements.
279	Sec-VI, Part-A	IIC	2 OF 20	1.06.00	In this package fieldbus-based controls and conventional controls (hardwired 4-20mA/DI/DO) are envisaged.	Bidder is considering conventional i.e. 4-20 mA / (HART) based actuators along with 4-20 mA(HART) based electronic transmitters for all BFPDT (TDBFP) related actuators and Transmitters except for Transmitters which are envisaged only for monitoring/ display on HMI purpose. For monitoring/ display on HMI purpose Transmitters, Bidder will supply fieldbus/profibus based instruments.	Specification requirement is clear. Bidder to comply technical specification. Further bidder to refer Clause 2.02.01, Annexure C to IIC Contract quantity, Part-A of tech specification
280	Sec-VI, Part-A	IIC	2 OF 20	1.06.01	Close Loop controls:		
281	Sec-VI, Part-A	IIC	3 OF 20	1.06.02	Open loop controls:		
282	Sec-VI, Part-B	E-12	2 of 4	1(a)	Performance Tests on each Boiler Feed Pump to determine the characteristic curve (Head, Capacity, Efficiency & Power) at Design Speed and to ensure compliance with design requirements specified in the specification.	Performance test on BFP will be conducted at reduced speed and power and the results will be extrapolated to the specified conditions as per HIS, since it is not feasible to conduct full load, full speed tests at works.	Bidder understanding is not correct as Detailed test requirement is discussed & finalised during detail engg.Bidder to meet specification requirements.
283	Sec-VI, Part-B	E-12	2 of 4	1(a) &1(b)	Measurement shall be carried out at 10%, 25%, 50%, 65%,80%, 100% & 125% of Design Flow with loop water at design temperature. Performance Test at other specified Conditions shall be carried	Performance test measurement shall be carried out at 25%, 50%, 65%, 80%, 100% & 125% of design flow. Performance test measurement at 10% of design flow is not envisaged. Since, the BFP is a very high energy pump and hence running the pump nearer to closed valve condition is not recommended.	Bidder understanding is not correct as Detailed test requirement is discussed & finalised during detail engg.Bidder to meet specification requirements.

284	Sec-VI, Part-B	E-12	2 of 4	3(a) &3(b)	Vibration & Noise level	Vibration & Noise Level readings taken during the shop tests for all pumps and its Auxiliaries are for informative purpose only. These levels may be higher than the specified values in view of the presence of valves located in the test pit piping with-in close proximity of the pump due to layout constraints and the temporary foundation arrangement of the test set up.	Bidder understanding is not correct as Detailed test requirement is discussed & finalised during detail engg.Bidder to meet specification requirements.
285	Sec-VI, Part-B	A-07	25 of 28	12.01.03	Contractor shall submit the reports of the type tests listed in the "TYPE TEST(S) TO BE CONDUCTED" and carried out within last five years from the date of bid opening	Bidder request waiver for Type tests on TDBFP, TDBP, MDBFP, MDBP & CEP for which special tests mentioned were successfully demonstrated on the equipment same (model/type/size /rating) supplied for previously executed 800 MW projects. Type test are conducted for design validation and earlier conducted reports are valid for identical pumps as there is no change in the design. Hence the type test results and reports of tests conducted earlier on the identical pumps will be furnished during contract stage	Specification requirement is clear in this regard. Bidder to comply specification requirement.
286	Sec-VI, Part-A	IIA-06	5 of 9	5.01.00	One set of test kit for measuring oxygen content at deaerator outlet shall also be provided for the station.	Online oxygen measuring provision is being provided by Bidder. Hence, Offline test kit for measuring oxygen content at deaerator outlet is not required. Customer is requested to accept above.	Specification requirement is clear in this regard. Bidder to comply specification requirement
287	Sec-VI,Part-B	A-01	37 OF 88	2.03.07	Maximum oxygen content shall be 0.005 cc/lit at deaerator outlet measured as per ASTM-D-5543-09 or Indigo carmine method at all operating condition.	All super critical units operated in oxygenated treatment mode and hence guarantee for maximum oxygen content in feed water system is not applicable for super critical sets.	Sometimes there may be requirement of AVT operation during unit running also. In case of oxygenated treatment mode oxygen content may be more but when unit will run in AVT mode this should be less than 0.005 cc/lit. So dearator should be capable for maintaining maximum oxygen content of 0.005 cc/lit at deaerator outlet.Bidder to comply specification requirement.
288	Sec-VI,Part-B	G-07	1 OF 2	1.00.00	Tentative Master Drawing list :	Only GA drawing of Heat Exchangers shall be submitted to customer at contract stage for review and approval. Submission of any type of calculation/Crossectional drawing (being proprietary in nature) is not envisaged.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
289	Sec-VI,Part-B	A-01	37 OF 88	2.03.07	Deaerator capacity below low-low level (BFP tripping point) shall have minimum value of 80m3 (Without dished end volume)	Deaerator Low-Low level shall be 500mm from the bottom of the tank as per Bidder standard practice.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
290	Sec-VI,Part-B	A-07	13 OF 28 & 15 OF 28	5.01.00 & 5.03.00	Low Pressure Heaters and Drain Cooler : Horizontal and U-tube type with integral drain cooler. HIGH PRESSURE HEATERS HP Heaters with de-superheating, condensing and Drain cooling section.	Heaters will be provided with Desuperheating, Condensing and Drain cooling zone as per design Code requirements (HEI).	Specification requirement is clear in this regard. Bidder to comply with the specification requirements.
291	Sec-VI,Part-B	A-07	13 OF 28 & 15 OF 28	5.01.00 & 5.03.00	Tube shall be expanded hydraulically in tube sheet.	Tube to tube sheet shall be roller expanded.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
292	Sec-VI,Part-B	A-07	14 OF 28	5.02.00 (e)	Hardened 400 series stainless steel impingement plates for flashed drain inlet from HP heaters, BFP recirculation, boiler startup drains etc.	As per bidder's experience of super critical plants, Hardened 304 series stainless steel impingement plates are also suitable for this purpose. Customer is requested to amend the clause as " Hardened 400 series or 304 series stainless steel impingement plates"	Hardened 400 series stainless steel is better material for specified requirements.Bidder proposal is not acceptable.Bidder to comply specification requirement.
293	Sec-VI,Part-B	A-07	14 OF 28	5.02.00 (f)	All water spray valves, splash plates, trays, vent condenser and other elements in contact with undeaerated water or non-condensable gases shall be of SS-304 or SS-410	Customer is requested to modify the clause as follows Elements in contact with undeaerated water or non-condensable gases shall be of SS304 material / SS304 lining material. This is in line with the Deaerators supplied for all 500 MW and above projects.	Hardened 400 series stainless steel is better material for specified requirements.Bidder proposal is not acceptable.Bidder to comply specification requirement.
294	Sec-VI, Part-A	VI/CHAPTER-02	7 OF 30	B.II.3	Thrust Bearing of CEP	Thrust bearing of CEP is already covered under sl no-B.II.1 "Complete Bearing assembly including bearing housing, **thrust bearing**, carrier, journal bearing, cooling coil & thrust collar, etc.)". Hence not quoted against this clause.	Specification requirement is clear in this regard. Bidder to comply specification requirement.
295	Sec-VI, Part-A	VI/CHAPTER-02	7 OF 30	B.III.1.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.III.1.1 " Complete Thrust bearing assembly with housing, carrier & thrust collar & Thrust Pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
296	Sec-VI, Part-A	VI/CHAPTER-02	7 OF 30	B.III.2.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.III.2.1 " Complete Thrust bearing assembly with housing, carrier & thrust collar & Thrust Pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
297	Sec-VI, Part-A	VI/CHAPTER-02	8 OF 30	B.IV.1.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.IV.1.1 " Thrust bearing with housing, carrier & thrust collar & pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.

298	Sec-VI, Part-A	VI/CHAPTER-02	8 OF 30	B.IV.2.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.IV.2.1 " Thrust bearing with Housing, carrier & thrust collar & pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
299	Sec-VI, Part-A	VI/CHAPTER-02	9 OF 30	B.VI.1	Complete drip pump assembly with coupling sets (Without Motor)	We understand that Canister is not required as part of spares	Cannister is not required, however coupling requirement is clear and shall be provided.
300	Sec-VI, Part-A	VI/CHAPTER-02	9 OF 30	B.VIII.4	Input and output shaft with gears	Customer is requested to clarify whether the runners are required or not?	Runners to be provided if the same is integral to the Input and/or output shaft of MD BFP Hydraulic coupling.
301	SECTION-VI/ PART-A	SUB-SECTION-I-A PROVENNESS	PAGE 34 OF 44	5.12.1	AUXILIARY OIL FILLED TRANSFORMERS	Provenness criteria of only 16MVA, 11KV and above transformer is mentioned. For any Aux transformer up to 2500KVA/11KV or 3.3KV (Dry or oil type), standard provenness criteria of Bidder shall be used. Please confirm	Bidder understanding is not correct. Specification cl.no. 5.12.1.Sub-Section I-A Section-VI, Part-A to be followed.
302	SECTION-VI/ PART-A	SUB-SECTION-I-A PROVENNESS	PAGE 34 OF 44	5.12.1.2	Bidder/Sub-Vendor should have his own facilities for conducting all routine and type tests as per IS: 2026 (except short circuit test).	All Type tests if required for Auxiliary transformer up to 2500KVA-11KV/3.3KV, 11KV/415V and 3.3KV/415V shall be conducted in NABL accredited labs like CPRI/ERDA etc. Please confirm	Bidder proposal is not acceptable. Specification cl.no. 5.12.1 Sub - Section I-A Section-VI, Part-A to be followed.
303	General				Make of components for HT/LT/Control/Instrumentation cables including make of XLPE cable	Make of components shall be as per vendor preferred including XLPE material. Special encouragement shall be given for made in India components as per government guidelines. Please accept	Bidder proposal isn't acceptable. BOI make controls shall be finalized during MQP approval.
304	SECTION-VI/ PART-A	SUB-SECTION-I-A PROVENNESS	26 of 35	5.10.0	HT power cables .The bidder/Sub-vendor should have manufactured and supplied following cables	Customer may please specify the time line (eg. For the last ten years or so)	Time line is not applicable for HT power cable proveness criterion . Specification cl.no. 5.10.0 Sub -Section I-A Section-VI, Part-A to be followed.
305	SECTION – VI/ PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	PAGE 3 OF 17	1.05.02	Local Motor Starters -for ventilation fans (up to 5.5 KW)	Local starter panel (with grouping) for Track hopper complex/tunnel/dozer shed & any other isolated location in CHP/AHP/BMS shall be permitted as the cable length and qty to individual fans will be huge and will be cumbersome to maintain. Local Motor Starters -for ventilation fans (up to 7.5 KW) Customer to kindly accept	1)Local Motor starter shall be applicable upto 5.5 KW. Bidder to comply specification 2) Local starter panel to feede grp fans can be used in Track hopper/Tunnel/dozer etc. BUt any Fans more thatn 5.5 KW needs to be fed from Swgr directly.
306	Section-VI/Part-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	15 OF 20	1.19.00	EMPLOYER'S REQUIREMENT In addition to above, following items required for Employer's use are also included in bidder's scope. These equipment's shall conform to technical specification requirements as stipulated in Part B for respective equipment's. 1. 415V switchgear feeders as indicated below for feeding owner's loads shall be provided (at suitable location to be decided during detailed engineering). (a) 4 Nos. MCCB–125A (b) 4 Nos. MCCB–250A (c) 4 Nos. MCCB-400 A (d) Total 6 Nos. ACB outgoing – 1000 A feeders in unit emergency switchgear and station service switchgear.	It is understood that the employer feeder requirement is not applicable for CHP GHP AHP BMHP . Customer may please confirm If feeders are required in CHP AHP area , Customer shall furnish employer load requirement in each switchgear room of CHP/AHP/GHP to avoid any change in transformer sizing and MCC design during Detailed Engg.	Employer requirement for feeders shall be provided as per cl no 1.19.00 Sub-section IIB, part A. However employer's feeder shall be considered for transformer sizing
307	Section-VI/Part-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	PAGE 7 OF 20	2.02.00	For CHP DDCMIS, necessary signal exchange with Employer's existing stage-I CHP DDCMIS system shall also be in Contractor's scope. For this signal exchange, the number of I/Os shall be considered as DI: 32 DO: 16 AI:8 AO:8. The exact scheme shall be finalized during detail engineering. Employer's stage-I CHP DCS/RIO panel shall be the terminal point. All necessary hardware/ logic modifications/ upgradation, as required at Employer's existing system shall be in Employer's scope	Cabling from CHP DDCMIS to employer's existing stage-I CHP DDCMIS is not considered in Bidder scope, only provision shall be made available in CHP stage I CR as per the IO list shared in the contract.	Specification cl.no. 1.19.00 Sub -Section IIB Section-VI, Part-A.
308	Section-VI/Part-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	PAGE 9 OF 20	2.04.05	Wireless link	Wireless communication to CHP DDCMIS not considered for the following area 1. Paddle feeder 2. Coal/Lime sampling PLC	However, employer feeder requirement shall not be considered for

309	SECTION-VI/ PART B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 8 OF 16	3.06.00 f)	f) For protection of motors below 30kW, MPCB (only Short-circuit release) and Intelligent motor controller(IMC) with current sensing module shall be provided and for motors from 30kW and below 90kW, MCCB and Intelligent motor controller(IMC) with current & voltage sensing module shall be provided. Motor feeders below 90kW (up to 160kW for CHP conveyor motors) shall be contactor controlled. Contactors shall be of 250% of motor FLC for fan and compressor application and 200% of motor FLC for other application. The motor feeders for 90kW & above shall be Air Circuit Breaker controlled. All moving and fixed contacts of each draw-out modules must be of rating more than 150% of MCCB/MPCB mounted inside the module. Each phase of vertical bus bars shall be separated by phase barrier.	Motors for DE or DSS system of CHP area with motor rating up to 160KW are considered with contactor controlled similar to CHP conveyor motor. Kindly confirm	Bidder proposal is not acceptable. Specification cl. no.3.06.00 (f) Sub -Section B-0 Section-VI, part-B to be followed.
310	SECTION-VI/ PART B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 8 OF 16	3.06.00 h)	Sizing of LT boards i) Power factor 415 V Uni-Directional drives is taken as 0.8 and efficiency as 0.85 Power factor of 415 V bidirectional drive loads is taken as 0.65 and efficiency as 0.8	Efficiency shall be as per IEC standard . Kindly accept	Bidder poposal is not acceptable. The mentioned clause is for finalisizing the sizing of Transformer under worst condtion. Specification cl. no. 3.06.00 h) Sub -Section B-0 section-VI, part-B.Sizing of LT boards to be followed.
311	SECTION-VI/ PART B	SUB SECTION-II-B-02 MOTORS	PAGE 1 OF 5	3.01.00	Continuous duty LT motors upto 50 KW Output rating (at 50 deg.C ambient temperature), shall be super Premium Efficiency **class-IE4**	Kindly accept IE3 Efficiency class for LT motors upto 50kW	Bidder Proposal is not acceptable.
312	SECTION –VI/ PART-B	SUB SECTION B-06 LT SWITCH-GEARS & LT BUSDUCTS	11 of 18	3.01.00	For breaker controlled motor feeders, an aux. relay shall be provided for taking Local push button station(EPB) "normally open (NO)" contact input from field and provide potential free output to DDCMIS to avoid probable mixing of switchgear control voltage with DDCMIS 24V DC voltage. This aux. relay shall have 2NO+2NC contacts.	EPB shall be wired directly as a DI to IMC and then communication established to DDCMIS through Profibus communication. No separate H/W is con-sidered between LT switchgear and DDCMIS panels.	The mentioned clause is applicable for DM type feeders. For IMC feeders(<90KW) bidder proposal may be acceptable.
313	SECTION-VI/ PART B	SUBSECTION-B-08 HT LT & CONTROL CABLES	PAGE 3 OF 7	2.010.00	For LT cables, Same cable sizes to be used for same type & rating of motor i.e if there are three drives for one application, all three-drive motor should be provided with same cables sizes. However due to layout constraints no of runs of same size cable may be increased.	This clause will make cable sizes over designed; viz for CHP/AHP applications where cable lengths are on higher end. Further this may also require PJB's on the motor/panel ends to meet the no. of runs requirement The above is accepted in Koderma phase II tender (Corr. 10/ Tech. Clarification No 2/Sl no 406). Request Customer to accept in this tender also	Bidder understanding is correct
314	SECTION-VI/ PART B	SUB-SECTION B-09 DG SETS	Page 10 of 13	9.00.00.ix	Six numbers of Duplex type or 12 nos. Simplex type Resistance element Temperature Detectors (RTDs) shall be suitably distributed at locations where highest temperatures may be expected in stator windings and one (1) element in each bearing.	No of RTD per phase will be as per OEM(Alternator) standard .	Bidder proposal is not acceptable. Specification cl.no. 9.00.00 Sub -Section B-09 Section-VI, Part-B to be followed.
315	SECTION-VI/ PART B	SUB-SECTION B-10 CABLING, EARTHING AND LIGHTNING PROTECTION	PAGE 4 OF 22	3.02.05	FOR COAL HANDLING PLANT/FGD PLANT/ ESP AREA THE FOLLOWING SHALL ALSO BE APPLICABLE: a) All overhead cable routes shall be along the route of the conveyor gallery on separate supporting structures and cables shall be laid in vertical trays. The bottom of the steel shall be such that the existing facilities, movement of trucks/human beings etc. does not get affected. The cable trestle shall have a minimum 600mm clear walk way and shall have maintenance platforms as required. The bottom of the steel sup-porting structure shall be generally at 3.0M above the grade level except for rail/road crossings where it shall be at 8.0M above grade level. Tap offs from the overhead cable trestle can be through shallow trenches with pri-or approval of the Employer. Directly buried cable, if essential, shall not have concentration of more than 4 cables on one route. b) Cable trenches shall be provided only in Switch-gear/MCC rooms. c) Cables shall not be routed through the conveyor galleries except for the equipment located in the conveyor galleries for a particular conveyor i.e. protection switches, receptacles etc.	a) Horizontal tray arrangements is considered in cable rack/pipe rack for AHP area. Please confirm. c) Cable will be routed through conveyor gallery specifically for Bunker TP to Bunker floor and inside the tunnel area where overhead cable rack connectivity is not possible. Kindly accept.	Bidder proposal is not acceptable. Specification cl.no.3.02.05 Sub -Section B-10 Section-VI, part-B to be followed.
316	SECTION VI/ PART-B	SUBSECTION-B-11 STATION LIGHTING	7&8 of 18	4.00.00 .10	(h) Each lighting panel (LP-3) shall be fed from a 415V/42V, 3 phase-4 wire, 3 KVA transformer.	LP-3 Type Lighting Panel not considered for CHP, AHP, LHP & GHP areas. Requested customer to confirm.	Bidder understanding is correct.
317	SECTION VI/ PART-B	SUBSECTION-B-11 STATION LIGHTING	9 OF 18	4.00.00 .13	20 A, SP24 V AC(Industrial) Socket	20 A, SP24 V AC(Industrial) Type Socket not considered for CHP, AHP, LHP & GHP areas. Requested customer to confirm.	Bidder understanding is correct.
318	SECTION VI/ PART-B	SUBSECTION-B-11 STATION LIGHTING	15 of 18	Annexure-A Sl No-k	Avg lux level of 50 with Industrial type LED Luminaire for Cable galleries/vault	For overhead cable rack, Pipe cum cable rack illumination is not considered. Kindly confirm	CONFIRMED
319	SECTION - VIA-part-B	SUB-SECTION-D-1-6	page 6 of 25	6.02.07	Temperature Load	The site data for maximum and minimum ambient temperature during hottest and coldest month of the year is not available. Kindly specify.	The data has been provided in form of Climatological table as part of Project Information.(Part-A , Sub Section -I-B)

320	SECTION – VI, PART-B	SUB-SECTION-D-1-5	PAGE 83 OF 103	5.23.04	**Transfer Houses :** Vertical bracings shall be provided only on four sides along the periphery.	Bidder understands that vertical bracings shall be avoided in the working floor area. In other areas as per design requirement vertical bracings can be provided . Kindly confirm.	Bidder's understanding is correct
321	SECTION - VIA/PART – B	D-1-5	PAGE 1 OF 103	5.01.00 (e)	The roof to be designed considering solar module mounted structure and its supporting foundation resting on the roof without any connection with the roof	Bidder understands that a)foundation for the solar module shall not have monolithic connection with the roof. b)solar module to be provided on flat roofs only. Solar module is not required to be provided for the roof having truss and metal sheeting system	a) Bidder's understanding is correct
	SECTION – VI, PART-B	SUB-SECTION-D-1-5	PAGE 83 OF 103	5.23.04	The roof of Transfer points shall be provided with pre-fabricated insulated metal sandwich panels. Pre-Fabricated Insulated Metal Sandwich Panel for Roofing shall be laid to specified slope. Composition of Insulated Metal Sandwich Panels shall be as described in relevant section of Technical Specification. Adequate slope shall be provided for quick drainage of rain water.		(b) Bidder's understanding is correct w.r.t Coal Transfer Points
322	SECTION – VI, PART-B	SUB-SECTION-D-1-9	PAGE 26 OF 32	9.17.00	a) Operating/Maintenance areas/MCC room/Switchgear Room: Cement concrete with Metallic hardener topping	Epoxy coating is mentioned in Electrical specs but the same is not available in Civil specs, kindly clarify if coating has to be provided.	Bidder to follow specification requirement.
	SECTION - VIA/PART – B	SUB-SECTION-B – 0	PAGE 15 OF 16	13.00.00	Dielectric epoxy based coating covering entire finished floor and checkered plates shall be provided in all MV switchgear (11/3.3 KV) rooms and also in switchgear rooms having both MV and LV switchgears		Bidder to follow specification requirement
323	SECTION - VIA/PART – B	D-1-5	PAGE 97 OF 103	5.23.25.6	Warranty All waterproofing systems shall be warranted for a minimum period of ten (10) years from the date of Commercial operation Declaration (COD) of respective units. The warranties shall cover the whole of the waterproofing systems and shall be given jointly and severally by the Vendor	In general leakages in underground structures are attended by chemical injection grouting till handing over of the structures. We understand that bidder has to attend the leakages if any during 10 years period.	Bidder's understanding is correct
	SECTION - VIA	SUB-SECTION–IV	PAGE 46 OF 77	1.03.23	(iii) Performance Guarantee on water proofing system for Wagon tipper/Track hopper, reclaim hopper and tunnel. The contractor shall furnish a performance guarantee for the water proofing system in CHP underground structures, as specified in detailed technical specification, for a minimum period of ten (10) years from the date of Commercial operation Declaration (COD) of respective units.		
324	SECTION – VI, PART-B	SUB-SECTION-D-1-5	PAGE 91 OF 103	5.23.20.2	All buildings (including Wagon Tippler/track hopper and machinery hatches, truck hopper, penthouse, MCC rooms, pump houses, transfer houses and crusher house) and ground conveyors shall be provided with 750 mm wide plinth protection all around. It consists of 50 mm thick P.C.C. M-25 grade with 12 mm maximum size aggregate over 200 mm thick stone soling using 40 mm nominal size rammed, consolidated and grouted with fine sand.	Grade of PCC in these 3 clauses are varying. PCC grade in plinth protection may please be confirmed.	Bidder to follow :- "All facility/buildings shall be provided with 750 mm wide plinth protection all around. It consists of 50 mm thick P.C.C. M-20 grade with 12 mm maximum size aggregate over 200 mm thick stone soling using 40 mm nominal size rammed, consolidated and grouted with fine sand." for plinth protection.Please refer to amendment being issued for the same.
	SECTION – VI, PART-B	SUB-SECTION-D-1-8	PAGE 3 OF 23	8.01.02.17	750mm wide x 100 mm thick plinth protection in PCC (M-15) shall be provided around all buildings, pits / sumps, clarifiers, tanks, etc.		
	SECTION – VI, PART-B	SUB-SECTION-D-1-5	PAGE 44 OF 103	5.06.05	All facility/buildings shall be provided with 750 mm wide plinth protection all around. It consists of 50 mm thick P.C.C. M-20 grade with 12 mm maximum size aggregate over 200 mm thick stone soling using 40 mm nominal size rammed, consolidated and grouted with fine sand.		
325	SECTION – VI, PART-B	SUB-SECTION-D-1-5	PAGE 90 OF 103	5.23.19	1000 mm high and minimum 100 mm thick RCC parapet wall shall be provided over roofs of all buildings. However, for mummty, 600mm high parapet wall shall be provided. Parapet wall shall have suitable coping.	Parapet Height in these two clauses are varying. Parapet Height may please be confirmed.	Biddder to comply the technical specification.Clause 5.23.19 is for buildings/facilities associated with Coal, Biomass, and Gypsum handling area
	SECTION – VI, PART-B	SUB-SECTION-D-1-9	1 of 32	9.02.01(f)	RCC Parapet , of 900 mm high form Finished floor level of roof for accessible roof and of 600 mm high from Finished floor level of roof for Non accessible roof ,		Biddder to comply this technical specification.Clause 9.02.01(f) is general guideline for all other buildings/facilities.
326	SECTION – VI, PART-B	SUB-SECTION-D-1-5	PAGE 10 OF 103	5.02.08	**Pipe & Cable Galleries :** The Caged structural steel ladder shall be provided at an interval of 200m for access to the Pipe-Cable Gallery Walkway.	As per Cl. 5.23.14 of sub section D-1-5, ladders shall be provided from ground to cable galleries at maximum 100 m interval. Kindly specify the interval of ladders to be provided.	Interval of cage ladder 200m is specified for pipe cable gallery routed through ground. Cl. 5.23.14 of sub section D-1-5 is for Coal handling Plant cable gallery
327	SECTION – VI, PART-B	SUB-SECTION-D-1-5	PAGE 71 OF 103	5.19.01.18	Minimum tensile Reinforcement in each direction for all foundation slabs / rafts shall be 0.2 % of cross sectional area.	As per IS-456 clause 26.5.2.1, min. 0.12% is required, kindly review.	Bidder to follow technical specification
328	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.00 Pressure parts	All Plates above 40mm & all bar stock / forgings above 40mm dia shall be ultrasonically tested. For pressure parts, plates of thickness equal to or above 25mm shall be ultrasonically tested.	UT for bar stock & forgings >50mm will be carried out; For plates UT will be done for thickness >40mm only.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.

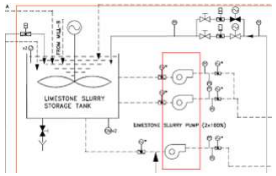
329	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(a) Drums/ Separator/Storage Tank	Each plate will be subjected to a 100% normalized and shear ultrasonic at the mill to meet the minimum requirements of EN 10160:1999 / equivalent ASTM standards. Elevated temperature tensile tests will also be carried out on plate material for each heat.	It is clarified that the Separator is made of seamless pipes and not plate formed pipes. It is understood that the requirement is applicable for PFP.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
330	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(b) Drums/ Separator/Storage Tank	After cutting to size and removal of cuts, the plates will be subjected to magnetic particle test along the edges of the plate and areas adjacent to the cut outs.	It is clarified that the Separator is made of seamless pipes and not plate formed pipes. It is understood that the requirement is applicable for PFP.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
331	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(c) Drums/ Separator/Storage Tank	All forging connections shall be examined 100% by UT before machining	Raw material will be procured with UT for bar stock & forgings >40mm	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
332	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(d) Drums/ Separator/Storage Tank	**Separator**-Fully machined connecting pieces of internal diameter 100mm and above, will be subjected to Magnetic Particle examination.	Since all pipes are UT tested ,MPI after machining is not envisaged.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
333	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(e) Drums/ Separator/Storage Tank	**Separator-**Mechanical tests will be carried out on specimens prepared from the production controlled Test plates for Longitudinal welds	It is clarified that the Separator is made of seamless pipes and not plate formed pipes. It is understood that the requirement is applicable for PFP.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
334	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(f) Drums/ Separator/Storage Tank	**Separator-**Mechanical tests will be conducted on the specimens from manhole cut outs of dished ends.	No tensile test is envisaged on manhole cut outs since forming is done using well established procedures.	Bidder to follow the technical specification requirements.Further same Shall be discussed during detailed engineering
335	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(h) Drums/ Separator/Storage Tank	**Separator-**All butt welds will be subjected to 100% Ultrasonic and Magnetic particle examination after stress relief.	For Gr 91/92- RT/UT and MPI will be done after Stress relief(SR). For other than Gr 91/92- Only RT will be done before SR. MPI on butt joints is not envisaged.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
336	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(i) Drums/ Separator/Storage Tank; 1.01.00(f) Drums	**Separator**-All full penetration welds will be subjected to Ultrasonic examination after stress relief.	Only full penetration nozzle welds will be subjected to UT. Also UT will be done after SR for Gr91/92 materials and before SR for materials other than Gr91/92.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
337	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.01(j) Drums/ Separator/Storage Tank; 1.01.00(g) Drums	After stress relieving (SR) all welds, internal and external shall be examined by MPI methods depending on size and accessibility and all butt welds shall be subjected to 100% radiography.	RT is done before PWHT for Butt welds of materials other than Gr91/92. After PWHT, RT/UT & MPI done on all Butt welds of Gr91/92. MPI is done on all other welds.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
338	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.02 (b) Headers	**Headers-**All butt welds shall be subjected to RT examination. Also MPI after SR.	RT will be done on butt welds before SR for other than P91 /P92. RT+MPI will be done only on high alloy steels like P91 after SR. No MPI for other materials.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
339	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.02 (c) Headers	**Headers-**All full penetration nozzle and attachment welds will be subjected to UT prior to stress relieving.	Prior to PWHT, UT is done on full penetration welds of carbon and low alloy steels. However, UT will be done on Gr 91/92 full penetration welds after PWHT. On all attachment welds only MPI will be done.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
340	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.02 (g) Headers	**Headers-**All weld joints in alloy steel headers of P91, X20 & X22 and other material of P15E group and above shall be checked for hardness. 3% hardness check on welds shall be carried out on other alloy steel headers	Hardness check will be done only for P91 butt joints.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
341	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (b) Tubes & Tube Elements	All bent tubes/stubs shall be checked for ovality and thinning by ultrasonic method on first off and random checks on subsequent pieces. Critical bends, where PWHT is required after bending, shall be subjected to LPI/MPI.	First of trial (FOT) will be done for new sizes of tube bends as per established procedure. LPI/MPI will not be carried out on tube bends as the quantum is very high and their quality is established through FOTs.	Bidder proposal is not acceptable.Bidder to follow the technical specification requirements.
342	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (c) Tubes & Tube Elements; 1.02.00(c) Tubes& Tube Elements	All tubes/stubs/panels/coils shall be checked for clearance by steel ball test and for cleanliness by sponge passage.	Flash butt-welded, Straight Tube butt-welded Tubes and Fusion welded panels will be checked by Steel ball test. Fin welded panels are inspected only with sponge. These are not applicable for stubs.	Bidder to follow the technical specification requirements.Further in case of any specific practical difficulty, same Shall be discussed during detailed engineering
343	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (d) Tubes & Tube Elements;	Finished butt welds shall be subjected to RT or UT. Wherever the code/standard/process specifies random sampling, the same shall be minimum 20%.	All Finished butt welds are subjected to RT/FT or UT prior to SR where SR is applicable, except Butt welds made of Flash Butts. Flash butt Welds are not amenable for NDE and hence tested by Destructive test on first of shift sample and visual examination.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
344	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (e) Tubes & Tube Elements;	Minimum 10 % of the fillet joints shall be subjected to MPI/ LPI. However Fillet welds of material grades P 15E and above or any other new material grade subject to the acceptance by OWNER shall be subjected to 100 % MPI/ LPI.	10% MPI/LPI is done on attachment welds other than fin welded panel welds.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
345	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (f) Tubes & Tube Elements;	Tubes and fabricated panels/ coils will be subjected to hydraulic pressure test including water wall panels ,burner panels, reheaters, super-heaters & economizers.	Hydro test is done at Shop on 100% of the coils, spiral wall panels, SOFA Panels, Burner panels. For other panels: 100% for tube thickness ≤ 5.5mm; 20% for thickness > 5.5 mm and < 7 mm; NIL if thickness ≥ 7 mm. However, all items are covered under site hydro test after erection.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
346	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (g) Tubes & Tube Elements	10% hardness survey on butt welds of P15E material group and above. 100% Hardness checks shall also be carried out on welds of T23 material grade.100% Hardness checks shall also be carried out on welds of T22 material grade used in water wall panels & 3% hardness check on T22 material grade used in coils.	Hardness check will be done only for 10% of T23 & T91 butt joints.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.

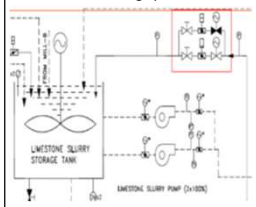
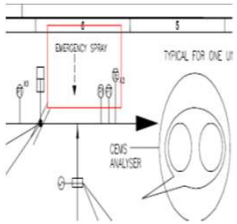
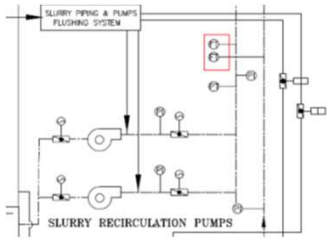
347	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (h) Tubes & Tube Elements	In case of RT of tube welds with DWDI (elliptical view) number of exposure shall be as per relevant code / plant standard and will not be less than two exposures for each weld wherever there is no limitation in carrying out two RT shots.	Since more than 75% of the total butt joints in a boiler are scanned with 360 degrees' exposure and remaining joints are RT/UT tested amounting to 100%, which is much more than the requirement (20% min.) as specified in technical specification, Bidder proposes to carry out RT of butt joints with single exposure. Also there were no adverse site feedback reported on account of shop joint failures.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
348	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.03 (i) Tubes & Tube Elements	Austenitic Stainless-Steel tubes & coils shall be Solution Heat Treated, Stored, preserved and handled so as to avoid Stress Corrosion Cracking due to Chloride contamination	Any Longitudinal welds on Austenitic Stainless-Steel tubes & coils shall be Solution Heat Treated.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
349	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.04 (c) Boiler Piping;	All bent pipes shall be checked for ovality and thinning by UT on first off lot & on random samples for subsequent pieces. Outer surface of bends shall be subjected to MPI/LPI.	MPI will be done on outer surface of bends only if there are any abnormalities.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
350	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.04 (d) Boiler Piping	The edge preparation for shop and Site welds in stainless steel/ alloy steel shall be subjected to dye penetrant check. Non-destructive examination of welds shall be carried out after post weld heat treatment, if any.	The edge preparation for shop and Site welds will be dye penetrant checked for P91 only.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
351	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.04 (e) Boiler Piping;	All butt welds in alloy steel piping of P91, X20 & X22 shall be checked for RT/UT and MPI after SR. UT shall be of Digital Recordable Type.	Butt welds in alloy steel piping of P91, X20 & X22 checked for RT/UT and MPI after SR. UT of digital recordable type not available.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
352	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.04 (f) Boiler Piping;	All weld joints in alloy steel piping of P92, P 91, X20 and X22 will be checked for hardness. 3% hardness check will be carried out on other alloy steel piping	Hardness test is envisaged on Gr91/92 butt weld only.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
353	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.04 (h) Boiler piping; 1.01.04 (i)Boiler piping;	Non-destructive examination of welds shall be carried out in accordance with the relevant design/manufacturing codes. However, as a minimum, the following requirements shall be met. Further statutory requirement, wherever applicable shall also be complied with. (1) Temperature > 400 Deg, C and/or pressure exceeding 71 bar. (i) 100% RT/UT on butt welds and full penetration branch welds. (ii) 100% MPE. (2) Temperature > 175 Deg, C up to 400 Deg. C and/or pressure exceeding 17 bar and up to 71 bar. (i) 100% RT/UT on butt welds and full penetration branch welds for pipe dia more than 100 NB. (ii) 10% RT/UT on butt welds and full penetration branch for pipe dia up to 100NB. (iii) 100% MPE. (3) For all other pipes not covered above, shall be subjected 100% MPE/ DPT in case of under ground pipes and 10% MPE/DPT in case of piping above the ground. Further, 10% of butt welds of underground piping shall be subjected to RT. (i) Wherever SR/PWHT is envisaged for alloy steel, above NDTs shall be after SR/PWHT.	In line with IBR and other international standards, the Bidder practice of NDE for piping is as follows; All NDE is before SR: For Boiler Piping ID ≤ 102mm: 5% RT 102 < ID ≤ 178 mm: 10% RT ID > 178mm : 100% RT For External Piping (RT) Cl I: 10 % for ID≤ 102 & 100% for ID > 102 Cl II: 10 % RT for all dia. For alloy steels (other than Gr 91/92), RT/UT for butt welds will be done before SR/PWHT and MPI for other welds after SR/PWHT. For Gr 91/92, RT/UT for butt welds and MPI for other welds will be done after SR/PWHT.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
354	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.05 (b) Fittings;	Fittings shall be subjected to suitable NDT as per applicable standards. However following minimum NDE requirement shall also be applicable/met. (i) For fittings X20, P-91 and material group P15E & above -100% MPI & -10% hardness check & -For fittings of 200 NB & above 100% UT/RT (ii) 100% UT/RT for fittings of 200 NB & above for boiler feed discharge, re-circulation and spray piping of boiler feed system. (iii) 100% UT/RT for fittings of all other piping of size OD508mm & above.	Raw material pipes for fittings are UT tested. For Carbon and Low alloy steel fittings, UT & MPI at parting lines will be done only for Dia > 508 mm.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.

355	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.06 Valves;	(a) Pressure retaining parts of valves shall be subjected to (min.) NDT as per Table 1. Valve Size NB in mm ANSI Class up to 300 ANSI Class above 300 up to 600 ANSI Class above 600 below 900 ANSI Class 900 & above & below 4500 Less than 50 Visual Visual Visual MPI 50 & above but below100 Visual Visual MPI MPI & RT (on 10%of valves on 100% area) 100 & above but less than 300 Visual MPI MPI & RT (on 10% of valves on change of section& weld ends) MPI & RT (on 100% area) 300 and above MPI MPI MPI & RT (on change of sections & weld ends) MPI, RT on 100% area)	(a) NDT is as follows: 1. For Class 600 and above all sizes of Casting (body, bonnet) are 100% RT tested. 2. Vendors are developed to produce RT quality casting for valves less than Class 600. Hence, MPI is not done. 3. In case of forged valves, UT is done for bar diameter above 40mm used for forging and MPI done for finished forgings for all classes.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
356	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.07 Non Pressure Bearing Attachments	Load bearing welds shall be subjected to examination by ultrasonic testing (UT) and magnetic particle inspection (MPI) techniques after stress relief (SR). No load bearing welds shall be subjected to MPI after stress relief. The toes of the welds adjoining the drum shall be ground smooth prior to stress relieving before carrying out this examination.	Load bearing attachment welds to be ultrasonic tested (UT) before stress relief (SR) and magnetic particle tested (MPI) after stress relief (SR).	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
357	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.09 (a) Soot Blowers	Butt weld between nozzle and lance tube shall be subjected to 20% radiography tests.	Since it is a low-pressure line, MPI/LPI will be done on butt welds.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
358	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.10 (b) Steam Generator Startup Drain Recirculation Pump	All forging and castings shall be subjected to 100% UT/RT and MPI/DP check.	All forging and castings (except impeller) shall be subjected to 100% UT/RT. Impeller will be DP tested.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
359	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.10 (g) Steam Generator Startup Drain Recirculation Pump	Following test shall be carried out on assembled units: - Type Test: i) Tests to establish unit functioning of pump at temp and pressure. (ii) Hot standstill and start up tests.	Type tests, if already done for the similar design/size/capacity of 800 MW supercritical boilers then, reports will be shown and tests will not be repeated. Else, tests will be done.	Type Test: Refer to NTPC Engineering Specification, as applicable.
360	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.10 (h) Steam Generator Startup Drain Recirculation Pump	For heat exchanger for these pumps, butt welds on pressure parts shall be tested with RT/UT and all other welds shall be tested with MPI/LPI.	Butt welds of heat exchanger are non-critical and will be tested with MPI/LPI only.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
361	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.01.12 (a) Hydraulic Test	Hydraulic Test: All components which are to be subjected to fluid pressure shall be tested to minimum of 150% of the design pressure. In determining the value of the maximum attainable pressure for any component the contractor shall take in to account all relevant factors (e.g. safety valve blow off pressure, fluid surges, etc.) which may cause an elevation in the pressure.	All pressure parts & valves shall be hydrotested at shop as per mutually agreed quality plans. However, all pressure parts and valves will be hydrotested at site after erection and assembly.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
362	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.05 (a) Coal Feeders	Any welds in the casing/ pulley fabrication will be checked with MT.	100% air leak test will be done in place of MPI to ensure weld soundness.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
363	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.05 (b) Coal Feeders	Type tests including degree of protection and routine tests shall be done as per relevant Indian Standards or equivalent International Standards.	Tests if already done for the similar design/size/capacity of 800 MW supercritical boilers then, reports will be shown and tests will not be repeated. Else, tests will be done.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
364	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.05 (d) Coal Feeders	Leak tightness test shall be done on individual feeder casing. Functional test for load cell shall be carried out.	These are type tests. If already done for the same design/size, it will not be repeated. Reports will be offered for review.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
365	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.05 (e) Coal Feeders	Test for weighing accuracy, calibration and repeatability will be carried out at various speeds by a coal flow on one feeder.	Test for weighing accuracy, calibration and repeatability test at various speeds can be conducted as below. Accuracy: Accuracy test is done with actual coal flow at various feedrate. It is a type test. Calibration : Calibration will be done in all feeders using test weight. Repeatability: Repeatability test is done with test weight at various feedrate. It is a type test. Report of type test conducted as above will be submitted.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
366	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.06 (c) Fuel Oil Pumps	All pumps including spare cartridges shall be subjected to performance test at the manufacturer's works under as near site conditions as possible and strip down examination after the test.	All pumps will be performance tested with test motors & oil available at the shop. However, performance curves will be extrapolated as per VDMA 24284 to show compliance to the required parameters.	strip test shall be performed in case of any abnormal sound during performance test of pump
367	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.07 (3.01) EOT CRANES	The plates of thickness 25mm and above shall be ultrasonically tested.	UT will be done for Plates of thickness > 40 mm.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
368	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.11 (a) Steel Structure of Boiler, Mill Bunker building including Coal bunkers, Coal transfer points. Coal conveyor galleries and supporting trestles, Ducts, Hoppers, etc	Only material, which has been identified against mill, sheet or test certificates shall be used for construction. All plates above 40mm thickness shall be 100% UT tested	Materials of t>40mm will be identified with TC and for others traceability will be from specification and grade only.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.

369	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.11 (d) Steel Structure of Boiler, Mill Bunker building including Coal bunkers, Coal transfer points. Coal conveyor galleries and supporting trestles, Ducts, Hoppers, etc. / 1.08.04 Structure, Ducts, hoppers;	(Edge for field weld shall be examined by MPI for plate thickness > 32mm. Edge for field weld for ceiling girders shall be examined by UT for 100mm from the edge).	UT will be done for Rolled sections/plates of thickness > 40 mm as per ASTM A435 or ASTM A578 (Acceptance Level A or B)	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
370	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.11 (d) Steel Structure of Boiler, Mill Bunker building including Coal bunkers, Coal transfer points. Coal conveyor galleries and supporting trestles, Ducts, Hoppers, etc. / 1.08.04 Structure, Ducts, hoppers;	Production test coupons for Butt and Fillet welds of main columns and Ceiling girders shall be carried out.	All butt and fillet welds shall be carried out as per Pre -Qualified WPS, and hence production test coupons is not envisaged	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
371	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.13 (a) Hangers & Supports	All raw materials used shall have co-related mill test certificate meeting mandatory checks of material specification.	Materials are procured with TCs meeting mandatory checks of material spec and issued to manufacture with correlation to Material specn. (Certified materials) used.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
372	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.13 (c) Hangers & Supports	Butt Welds shall be tested for UT and fillet welds shall be tested for MPI.	Butt Welds of size >32mm will be tested for UT. Fillet welds will be tested with MPI.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
373	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.13 (d) Hangers & Supports	Turn buckle/ pipe clamps/ Hangers of thickness > 25mm shall be checked by MPI/DPT on bent portion.	For Turn buckle & Pipe clamps – MPI 10% will be carried out on machined areas of dia ≥ 25mm.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
374	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.15 (a) Metallic expansion Joint for piping (if applicable);	Hydraulic pressure test shall be carried out on each pipe and expansion bellow.	Hydraulic pressure test are conducted at Site.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
375	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.15 (c) Metallic expansion Joint for piping (if applicable);	All welds shall be subjected to 100% magnetic particle/dye penetrant check and butt welds shall be subjected to 100% radiographic testing.	All butt welds will be subjected to 10% magnetic particle/dye penetrant tested.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
376	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.15 (e) Metallic expansion Joint for piping (if applicable);	The bellows shall be subjected to movement test to establish suitability to perform satisfactorily in site conditions. During this test spring rate shall also be measured.	This test is not envisaged.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
377	Sec-VI/ Part-B Sub-Sec-E-01 SG & AUX; Sub-Sec-E-01,			1.02.15 (f) Metallic expansion Joint for piping (if applicable);	The testing of MEJ shall be as per Expansion joint Manufacturer Association (EJMA) standard.	Life cycle test (type test) if already done for the similar design/size/capacity of 800 MW supercritical boilers then, reports will be shown. Other tests are not envisaged.	Bidder proposal is not acceptable. Bidder to follow the technical specification requirements.
378	Sec-VI/ Part-B Sub-Sec-D-01 CIVIL WORKS			10.04.01 (a) Mild Steel	Rolled sections shall be of grade designation E250, Quality A/BR, Semikilled/killed conforming to IS 2062. All steel plates shall be of Grade designation E250, Quality BR (fully killed), conforming to IS 2062 and shall be tested for impact resistance at room temperature. Plates beyond 12mm thickness and up to 40mm thickness shall be normalized rolled. Plates beyond 40mm thickness shall be vacuum degassed & furnace normalised and shall also be 100% ultrasonically tested as per ASTM –A578 level B-S2.	Rolled sections/plates will be procured as per IS 2062 as per their applicability for semikilled/ killed, impact testing, etc. Also, plates of ASTM A36 & BS EN 10025-3 S420N will also be used for structural steel applications. Rolled sections/plates of thickness ≤ 20mm will be supplied in rolled condition and those > 20mm shall be Normalized/ Normalized rolled condition without vacuum degassing. UT will be done for Rolled sections/plates of thickness > 40 mm as per ASTM A435 or ASTM A578 (Acceptance Level A or B). Vaccum degassed condition is not envisaged for structural purpose and applicable only for pressure vesssel components. Normalised rolled inlieu of furnace normalised as referred in ASTM and IS2062 standards will be followed. UT will be tested as per ASTM A 435.	Bidder's proposal is not acceptable.
379	Sec-VI/ Part-B Sub-Sec-D-01 CIVIL WORKS			10.04.02 Medium and High Tensile Steel	Rolled Sections and plates shall be of grade designation E350 or higher, Quality B0 (Fully killed), conforming to IS: 2062. Plates beyond 12mm thickness and up to 40mm thickness shall be normalized rolled. Plates beyond 40mm thickness shall be vacuum degassed & furnace normalised and shall also be 100% ultrasonically tested as per ASTM –A578 level B-S2.	Rolled sections/plates will be procured as per IS 2062 as per their applicability for semikilled/ killed, impact testing, etc. Also, plates of ASTM A36 & BS EN 10025-3 S420N will also be used for structural steel applications. Rolled sections/plates of thickness ≤ 20mm will be supplied in rolled condition and those > 20mm shall be Normalized/ Normalized rolled condition without vacuum degassing. UT will be done for Rolled sections/plates of thickness > 40 mm as per ASTM A435 or ASTM A578 (Acceptance Level A or B). Vaccum degassed condition is not envisaged for structural purpose and applicable only for pressure vesssel components. Normalised rolled inlieu of furnace normalised as referred in ASTM and IS2062 standards will be followed. UT will be tested as per ASTM A 435.	Bidder's proposal is not acceptable.
380	Sec-VI/ Part-B Sub-Sec-E-59 CIVIL WORKS			4.0.b ,PURCHASE AND SERVICE	If any new Steel Producer/s are proposed by the main contractor during execution of contract, the same may be considered for acceptance subject to meeting the following qualifying requirements: i) The proposed supplier should be a Steel Producer, having a minimum production capacity of one million tons per annum (MTPA). ii) The proposed supplier should be a regular manufacturer of Steel Plates and / or Rolled Sections and / or Reinforcement Steel for the last two years as on date of submission of proposal. iii) The proposed supplier should also be a registered licensee with Bureau of Indian Standards for BIS: 1786/2062 at the time of submission of proposal.	Ministry of Steel had abolished the classification in Steel Producers and also except few big steel mills, no mill in India is having one million tons per annum capacity for long products (Angles, Channels, Beams). The clause is very restrictive as per Ministry of Steel guidelines and hence meeting the requirements are per Clause 4.0.b is not feasible. Bidder approved BIS certified sources will be used for procurement of Rolled sections for Structural steel since rolled sections are non load carrying members.	Bidder to follow tech specifications

381	Sec-VI/ Part-B Sub-Sec-E-59 CIVIL WORKS			4.0.b ,PURCHASE AND SERVICE	Steel tubes conforming to IS:1161 and Hollow (square and rectangular) steel sections conforming to IS: 4923 shall be sourced from BIS approved sources having valid BIS license subject to complying and ensuring the following conditions by Main contractor.	Structural steel IS2062 ((Angles, Channels, Beams) shall also be included in Clause for sourcing BIS approved sources with the approval conditions speciified.	Bidder to follow tech specifications
382	-			-	-	With respect to alloy steel tubes as per SA 213 mentioned in the tender, it has been experienced from the past projects that since the material standard (SA 213) does not specify the acceptance level of surface imperfections in a quantified manner (workmanlike finish), often there are cases of tubes being not accepted/ subject to grinding operations even for superficial surface imperfections. To avoid this situation it is proposed to follow the guidelines given in EN 10216-2, which gives the acceptance level of such defects as 0.3 mm.	Bidder proposal is not acceptable, surface of tubes shall be free from any surface imperfections.
383	Section-VI, Part-A	IIA-15	1 of 6	1.1.03	There shall be one (1) no. track hopper for handling of coal received in Indian railways BOBR rakes. The track hopper shall be 220 m long (length excluding machinery hatches) and of 4500 MT coal capacity with machinery hatches at both ends.	We are considering track hopper of 220 m long (length excluding machinery hatches) and of 4500 MT coal capacity with machinery hatches at both ends. **Please confirm.**	Bidder's understanding is correct
384	Section-VI, Part-A	IIA-15	1 of 6	1.7.00	Gypsum from storage shed shall be loaded to user's trucks directly from discharge chute or using front end loader/ pay loader.	Front end loader / payloader is not in bidder scope. **Please confirm.**	Bidder's understanding is correct
385	Section-VI, Part-A	IIA-15	5 of 6	2.12.00	Suitable modification in the conveyor gallery of existing conveyor-12A/B for feeding biomass on to the existing conveyor.	1.We are considering one to one feeding arrangement of biomass on existing Coal conveyor BCN-12A/B i.e. BMC-1 will feed to BCN-12A & BMC-2 will feed to BCN-12B. **Please confirm**	Bidder's understanding is correct
386	Section-VI/Part-A	IIA-15	1 to 6 of 6	1.scope of supply & Services	"Suitable no of equipments" is mentioned in scope of supply & Services	Bidder is considering BOQ & Capacity of CHP & BMHP equipments as per coal handling flow diagram drg no. XXXX-001-POM-A-032 Rev-0. Please confirm	Bidder's understanding is correct
387	Section-VI, Part-A	IIA-15	3 of 6	1.26.00	Suitable numbers of belt vulcanizing machine for each belt type (Steel Chord/Nylon etc.)	We wish to clarify that same belt vulcanizing machine can be used for both NN and steel cord belts (if applicable). Therefore, we are considering only 1 no. common belt-vulcanizing machine in total (common belt vulcanizing machine for CHP, BHP, and GHP) and which will be suitable for all types and ratings of conveyor belts in CHP, BMHP.	Bidder's understanding is correct
	Section-VI, Part-A	IIA-14	1 of 2	1.13.00	Alternately, the bidder may give a common belt vulcanizing machine for CHP, BHP, and GHP.	Kindly confirm.	Bidder's understanding is correct
388	Section-VI, Part-A	IIA-15	4 of 6	2.4.00	Biomass Bucket Elevator along with its supporting structures, Buckets, chain/Belt	We under stand that belt-type bucket elevator is also acceptable	
	Section-VI/Part-B, Mech	A-20	27 of 93	4.20.01	The type (Centrifugal/Continuous) of the Bucket Elevator (Chain type) shall be chosen by Bidder for the material and conditions specified	**Please confirm**	This shall be finalised during detailed engg
389	Section-VI/Part-A	IIA-14	1 to 2 of 2	1.scope of supply & Services	"Suitable no of equipments" is mentioned in scope of supply & Services	Bidder is considering BOQ & Capacity of GHP equipments as per Gypsum flow diagram drg no. XXXX-001-POM-A-031 Rev-0 Please confirm	Bidder's understanding is correct
390	SECTION-VI PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	33 of 77	1.03.7.02.1	Gypsum flow path IV Further for the purpose of Guarantee tests all left out Conveyors/bucket elevators not appearing above along with all associated equipments shall also be considered.	Request customer to delete referred clause as same is not applicable for 1X800MW stage-II project	The referred clause is common for CHP & Gypsum handling plant. However, for GHP flow path, bidder to refer Clause no-1.03.7.02.1 (v) statement- "Gypsum conveyor taking feed from gypsum dewatering unit and feeding to gypsum storage shed through travelling tripper provided on last conveyor."
391	Part-E, Mech	Flow Diagram		XXXX-001-POM-A-032	Existing TP-11	Clarify the scope of FG-11 & FG-12. We understand that bidder scope starts after flap gate FG-11 & FG-12.	Bidder's understanding is correct
392	SECTION-VI PART-A	SUB-SECTION-IV	33 OF 77	1.03.7.02.1 (v)	Capacity in T/Hr (equivalent to 100% of rated) of conveyor system including the intermediate equipments for each of the two parallel conveyor streams separately or any combination thereof to be tested in the following flow path operations. (v) Gypsum flow path IV: Gypsum conveyor taking feed from gypsum dewatering unit and feeding to gypsum storage shed through travelling tripper provided on last conveyor. Further for the purpose of Guarantee tests all left out Conveyors/bucket elevators not appearing above along with all associated equipments shall also be considered.	As per specification , gypsum conveyor shall be designed as per contract . However, PG parameter shall be same as output capacity of vacuum belt feeder. **Please confirm**	This shall be finalised during detailed engineering
393	Part-B, Mech	G-03 LAYOUT PHILOSOPHY	16 of 16	1.7.00	In addition to above, layout requirements regarding Coal handling plant, Ash Handling Plant, Gypsum handling, Limestone handling, Water Treatment Plant and Fuel Oil Handling area buildings, specified elsewhere in the specification shall also be followed.	As per Layout & Flow diagram/Scope of work, Lime handling plant is not in bidder scope. Please confirm	Bidder's understanding is correct
394	VI/B	D-1-12(D)	2 of 2	D-1-12(D)	Vb= 39 metres/second The risk coefficient "K1" =1.06 Category of terrain= Category-2	Topography Factor (K3) & Importance factor (K4) shall be provided for wind pressure calculation	Bidder to follow technical specification & IS code 875.
						For Boiler and Auxiliaries area, the minimum thickness of all	

395	VI/B	D-1-7	101 of 25	8.6.00	All gratings shall be electroforged types. Minimum thickness of the grating shall be 40 mm	For Boiler and Auxiliaries area, the minimum thickness of all Gratings will be 32 mm as being followed for all supercritical boiler designed & supplied by Bidder.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
396	VI/B	D-1-9	1 of 32	9.02.01 (a)	Minimum 1000 mm high (from floor/ roof level) hand railing shall be provided around all floor/roof openings, projections/balconies, walkways, platforms, steel stairs, etc., wherever the height of the building is more than 12m, railing height shall be 1.2m	For all buildings, two handrails with top rail at 1050 mm and bottom rail at 600 mm above platform level will be provided as per Bidder's regular practice being followed for all supercritical boiler design.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
397	VI/A	II D	9 of 14	1.00.01	Steel structures for following facilities as mentioned below shall be fabricated in factory, transported, and erected at site. 1. Technological Structures such as Boiler, ESP including Hopper and Bunker support Structure. Any structure whose design and fabrication drawings are not provided to Owner shall also be considered as technological structure. 2. Main Power House Building including Control Tower. All factory-fabricated structures shall have bolted field connections	For SG Bidder agrees to provide the type of bolts mentioned in this clause for field connections Field Structural Connections shall be as follows, 1) Main Columns : Fully Bolted Connections 2) Column to Beam : Connecting Cleat is welded with Column and bolted with Beams 3) Column to Vertical bracings : Gusset is Welded with Column and Bolted with Bracings. 4) Ceiling Structures : Connecting Cleat is bolted with girder and welded with beams 5) Horizontal truss and mid landings : Fully Welded Connections 6) Platforms : Fully Welded Connections	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
398	VI/B	D-1-8	10 of 23	8.7.00	Steel structures which are to be fabricated in factory shall have bolted field connection.	7) ID system structure : Fully Welded Connections	Bidder's Proposal is not acceptable. Bidder to comply with the Technical specification requirement.
399	VI / A	IB	11 of 18	Annexure-IV-2	DOMESTIC COAL CHARACTERISTICS	Kindly provide chloride/fluoride value in coal or HCL/HF conc. in absorber inlet flue gas for FGD design.	For FGD design and guarantee conditions-HCL (ppm) wet-45 & HF (ppm) wet-12 may be considered. Bidder to refer to Amendment to technical specification Sl. No. SG.3
400	VI / A	IB	3 of 18	13.2.00	**CW system blow down water shall be used for** plant service water requirement, dust suppression system of coal handling plant fire water tanks, **FGD (process water)** facilities, sealing of Vacuum pumps (if applicable) of Ash Handling plant. **Make-up to** AHS Cooling system, HVAC System & **FGD system** shall be met from PT plant of CW system (PT-CW).	Source of FGD process water/make up water mentioned in two clauses are contradictory to each other. Kindly confirm whether source of FGD process water/make up water is from CW blowdown or from PT plant of CW system.	Bidder's query is not clear. The referred specification requirement is not from Darlipali II. Bidder to check.
401	VI / B	A-05	22 of 27	13.1.00	Two (2) Process water Storage tanks (each tank catering to the requirements of 1 x 800 MW units) along with two numbers of 2x100 % Booster water pumps, if required, (Each pump catering to the process water requirements of 1 x 800 MW units) along with all necessary piping, valves, control & instrumentation **to feed the clarified water shall be provided by the Contractor**..... The **tank shall receive clarified water.**	As per referred clause, FGD process water storage tank will receive clarified water. However, in another section of the tender specifications(VI/A-IB-13.02.00), source of FGD process water is indicated as CW blowdown water. Kindly clarify and confirm the source of FGD process water.	Bidder's query is not clear. The referred specification requirement is not from Darlipali II. Bidder to check.
402	VI / E	Tender Drawing	26 of 70		Tender Drg. No. xxxx-001-POM-A-024 (zone E1) Scheme of Gypsum Dewatering System	Source of FGD process water is indicated as CW Blow down water in referred tender drawing.However, in another section of the tender specifications(VI/A-IB-13.02.00), Source of FGD process water is indicated as Clarified Water. Kindly clarify and confirm the source of FGD process water.	Clarified Water for FGD process water will be supplied from WTP in place of CW Blowdown.
403	VI / E	Tender Drawing	25 of 70		Tender Drg. No. xxxx-001-POM-A-023 (zone G3)  Scheme of FGD Milling System	In the tender drawing, it is depicted that there are 3 nos. of limestone slurry pumps for each limestone slurry storage tank. However, under Sec VI-A, Sub Sec IIA-04, clause 3.01.04, the tender specification says total 2 nos. of limestone slurry pumps for 1x800 MW to be provided. Kindly confirm the correct number of pumps to be provided.	Bidder is requested to refer Cl. No. 3.01.00, Sub Sec-IIA-04, Part-A Sec-VI & Cl. No. 6.00.00 & its sub clauses, Sub Section-A05, Part-B, Sec-VI .

404	VI / E	Tender Drawing	25 of 70		Tender Drg. No. xxxx-001-POM-A-023 (zone H2) Scheme of FGD Milling System 	In the tender drawing, it is shown that process water is added to the limestone slurry tank via control station. Adding process water to limestone slurry tank will dilute the limestone slurry contained in the tank. Hence, it is not recommend to add process water to limestone slurry tank. Please accept.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of the technical specification. Regarding Limeslurry storage tank, Bidder to Refer Amendment No. SG5.
405	VI / E	Tender Drawing	24 of 70 & 26 of 70		Scheme of FGD-Absorber system & Scheme of Gypsum Dewatering system	At the common dischage line of Filtrate water pumps, Valve station and instruments are repeatedly indicated in both the schemes of absorber system and Gypsum dewatering system. Bidder understand that one set of instruments and a valve station are only to be provided. Bidder request NTPC to review and confirm.	Bidder to Refer Amendment No. SG6.
406	VI / E	Tender Drawing	24 of 70		Tender Drg. No. xxxx-001-POM-A-022 (zone H6) Scheme of FGD Absorber System 	Emergency Spray is indicated in the FGD bypass duct to chimney in zone H6 of tender drawing. Kindly clarify whether this Emergency Spray is required since this is not called for elsewhere in the tender specification. Please note that, for other NTPC tenders also, NTPC clarified that Emergency spray is not required vide pre bid replies.	Bidder to refer Amendment No. SG4
407	VI / E	Tender Drawing	24 of 91		Tender Drg. No. xxxx-001-POM-A-022 (zone E2) Scheme of FGD Absorber System 	In tender drawing, Flow Transmitter is shown on the RC pump discharge header. Magenetic type flow transmitter is applicable for slurry and magetic flow transmitter required minimum 5D/2D straight distance upstream and downstream of flow meter. RC pump header size is typically around 1.8 m. ~13 m Straight distance required for magentic flow meter. As per RC pump piping layout, it is not possible to provide this much straight distance and hence it is not technically possible to provide flow meter in RC pump discharge header. Hence, kindly delete flow meter.	Bidder to refer Amendment No. SG4
408	VI / A	IV	31 of 77	1.03.03 vi)	The contractor shall demonstrate that the purity of the gypsum produced shall not be less than 90%, chloride content shall not be more than 100ppm and the moisture content shall not be more than 10% for the range of specified coal(s) and based on CaO content of 51% in limestone.	As per sub section IV, limestone purity to be considered for Gypsum purity guarantee is CaO 51% =>**CaCO3 91%** As per Sub section IB, limestone purity to be considered for Gypsum purity guarantee is **CaCO3 89%** Both clauses are contradictory. Kindly clarify.	Bidder's query is not clear. The referred specification requirement as per cl. no. 1.03.03 vi) may be checked. Specification requirement is clear. Bidder to comply with the specification requiremnets.
409	VI / A	IB	14 of 18	Notes. 1	Guaranteed parameters (guarantee on limestone consumption, auxiliary power consumption & gypsum purity) shall be based on available (reactive) CaCO3 content of 89%.		
410	VI / A	IV	31 of 77	1.03.03 vii)	The Contractor guarantees that the maximum purge flow rate to **waste water treatment system** from FGD system for 1x800 MW unit shall be less than 10m3/h	As per this clause, we understand that waste water from FGD system is sent to waste water treatment system. However, We could not find requirement of FGD waste water treatment system in other sections of tender	Bidder to refer clause 1.03.06 of sub section IIA-10, Part A & clause 3.12.00 of sub section A-14, Part B of Section VI for FGD wastewater treatment system in case of Dry Ash handling

					averaged over a 24 hour period for a the range of specified coal(s).	specification. Kindly clarify the requirement or details of FGD waste water system.	system. In other cases, bidder to suitably treat the FGD wastewater for reuse in Ash handling / dust suppression
411	VI / B	A-05	20 of 27	10.1.00	Slurry tanks: Replaceable Chlorobutyl/Bromobutyl rubber lining of minimum 5 mm thickness	We interpret that the lining material and lining thickness for slurry tanks, such as the limestone slurry tank, wastewater tank, filtrate tank, and secondary hydrocyclone feed tank, should conform to the specifications provided in their respective sections or headings. The lining material and lining thickness details mentioned in this clause are intended for other slurry tanks for which such specifics are not explicitly stated.	The specification requirement is clear in this regard. Bidder to comply with the specification requirement.
412	VI / A	IIA-04	3 of 7	3.1.05	On/Off type Diaphragm valves in Limestone circulation lines to be provided instead of pinch control valve.	Similar to limestone recirculation line, on/off type Diaphragm valves shall be provided in gypsum bleed pump recirculation line instead of pinch control valve. Please accept. Note. There is no requirement of control valve in recirulation line as per our proven design.	Bidder's query is not clear. The referred specification requirement as per cl. no. 3.01.05 may be checked. Specification requirement is clear. Bidder to comply with the specification requiremnets..
413	Part-E (Tender Drawings - Mechanical), Section-VI	Scheme of FGD- Absorber System (Drg. No: 9551-001-POM-A-022 Rev. No. A)	-	-	For FGD Inlet Guillotine Gate's Seal Air System, Temperature Transmitter (TT), Flow Switch (FS), Temperature Switch (TS), and Pressure Transmitter (PT) are shown in the Scheme of FGD- Absorber System drawing.	Please note that FGD Inlet Guillotine Gate does not require any Seal Air Heaters (as per technical specification). Temperature Transmitter (TT), Temperature Switch (TS) and Flow Switch (FS) are applicable only when Seal Air Heater is applicable (as in the case of FGD Outlet Guillotine Gate & FGD Bypass Damper). However, for FGD Inlet Guillotine Gate, seal air heater is not applicable and hence, Temperature Transmitter (TT), Temperature Switch (TS) and Flow Switch (FS) are not applicable. Only Pressure Transmitter (PT) is applicable for FGD Inlet Guillotine Gate (similar to ID Fan Outlet Guillotine Gates). Please confirm our understanding. **This same point was already agreed for NTPC Talcher Stage-III (2x660 MW), NTPC Lara Stage-II (2x800 MW) project also.**	Bidder to refer Amendment No. SG4
414	VI/B	Sub-Section -A-13 THERMAL INSULATION	6 OF 9	2.02.00A (g)	**APPLICATION OF METAL CLADDING** An asphalt and craft paper moisture barrier or PSMR (Polysurlin Moisture retardant) coating shall be provided to the aluminium cladding for ESP	Bidder clarified that An asphalt and craft paper moisture barrier or PSMR (Polysurlin Moisture retardant) coating is not required for ESP application. Plain Aluminium Cladding is sufficient for our application and same is followed for all our regular projects and NTPC projects inluding Supercritical Thermal projects also.Kindly	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
415	VI	B			LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL- Note 3 Main contractor approved sub vendors are acceptable those are evaluated / assesesed as per Main contractor Quality Management System for vendor approval. Main contractor to inform the finaly selected vendor to NTPC as soon as PO is placed for these items. In case of sub-QR Note-1 is also applicable	1) Bidder understand the sub-supplier meeting the sub-qr requirement(if applicable) are accepted to employer subject to meeting bidder's own quality assessment. Please confirm. 2) Submission of duly filled Main contractor's proposal cum evaluation report & Sub-vendor Questionnaire to employer for vendor approval is not required. Please confirm.	Bidder understanding is not correct. Sub-supplier approval is project specific. Bidder to follow NTPC Tecnical Spec and GTR
	VI	C	GTR	Annexure-VII	Main contractor's proposal cum evaluation report. Sub-vendor Questionnaire	3) Bidder understand sub-supplier already approved in other Eployer's EPC projects and meets sub-qr (provenness) requirement (if applicable) are acceptable for the current project as well. Please confirm.	
416	VI/A	II-A-03	1 of 2		Further, the related special monitoring & analytical instruments on account of bio-mass co-firing towards satisfactorily performance of the boiler & auxiliaries are also included.	For Bio-mass cofiring, automated mill inerting system and coal pipe temperture monitoring is envisaged. Apart from these, additional special monitoring & analytical instruments are not required for Biomass co-firing. Ms NTPC to confirm	Bidder to consider all required Monitoring & analytical instruments as per system/process requirements as specified in the specification.
417	VI / B	D-1-5	25 of 69	5.6.01	The civil works for fgd system shall comprise of civil, structural and architectural works below and above ground level of ball mill building, ball mill foundations, fgd control room building, **slurry re-circulating pumps & oxidation blowers building**	The referred clauses are contradictory. Bidder understands & considers that Slurry re-circulating slurry pumps & Oxidation blowers shall be installed in a shed only as per Section-VI, Part-A Sub-section-IIA-04 page 4 of 7 clause 4.01.12 and inline with all ongoing NTPC FGD contracts. Bidder request NTPC to review and confirm.	Bidder to refer sl.no. 145 of response_typical_queries sheet
418	VI / A	IIA-04	4 of 7	4.1.12	All Slurry re-circulating slurry pumps & Oxidation blowers shall be installed in a shed provided with roof sheeting to be provided by the Contractor as per specifications specified elsewhere.		

419	VI/A	VI, chapter 02	9 of 30	Group B, VII-1	Complete fan and hub assembly matched and balanced (including shafts, blades, bearings, hub, couplings, support, gearbox etc.)	following shall include- Fan blades, hub, LSS coupling, Gearbox. Shaft is part of gearbox only. so separately not required. NTPC to record. Support is not understood. NTPC to clarify.	Requirements of Technical Specification is clear. Bidder to comply with the provisions of Technical Specification.
420	VI/A	I-A	21 of 44	4.22A (Provenness)	The Bidder/ its sub vendor shall follow the Government of India guidelines under 'Make in India' for setting up manufacturing and testing facilities at its works as per Collaborator/ associate/ technology provider/ licensor's design, manufacturing and quality control system for ACC duly certified by the Collaborator/ associate/ technology provider/licensor.	procurement of tube bundles form NTPC approved vendor may be allowed to meet project timelines.	Provisions of Technical Specification are clear for the procurement of items/components from NTPC approved sources. Bidder to follow requirements of Technical Specification mentioned in SUB SECTION– E-60/INDICATIVE VENDOR LIST/Part-B and Part-C/GTR of Section-VI Technical Specification. Further, Bidder/Sub-vendor to also refer guidelines issued by Government of India / DPIIT under Make In India Policy.
421	VI/A	IV	11 of 77	1.01.03.01, 2-ii	correction applicable for condenser pressure- (a) Variation in ambient temperature (b) Variation in wind velocity. (c) Variation in Heat Load The above list of correction curves is conclusive & curves in addition to above shall not be applied	As per spec. PG test shall be done inline with PTC 30.1, all correction curves as per PTC 30.1 only shall be applicable. NTPC is requested to consider the same.	Bidder proposal is not acceptable. Bidder to comply specification requirement.
422	VI/B	A-07	9 of 28	2.01.01 (n)	Following characteristic curves of ACC shall be provided: i. Heat Load Vs ACC Back Pressure for entire range of ambient temperature. ii. Heat Load Vs ACC Back pressure under different operating conditions (VWO, TMCR, HP-LP Bypass operation, House load operation etc.)----	characteristic curve shall be in between Steam flow and ACC back pressure . Same is the industry standard. It is also inline with PTC standard. NTPC is requested to consider the same.	Bidder to refer Amendment TG-01A in this regard.
423	VI/B	A-07	9 of 28	2.01.01 (n)	ACC Back pressure Vs Fan power under design Heat Load at different ambient air temperature.	As VFD is envisaged in the sppecification,NTPC is requested to clarify how these curves will be plotted. There may be ambiguity in this curves. NTPC is requested to review.	Bidder to refer Amendment TG-01A in this regard.
424	VI/B	A-07	9 of 28	2.01.01 (o-vii)	Variable speed fans with variable frequency drive to take care of variation in load and ambient conditions	This ACC will have higher number of fans which will provide ample opportunity for back pressure control. In view of this,	Bidder proposal is not acceptable. Bidder to comply specification requirement.
425	VI/B	A-07	9 of 28	2.01.01 (o-viii)	Fin tube cleaning system of semi-automatic type as per HEI is to be provided.----	Semi automatic type uses spray nozzle trolly movable with electric motor. Howver, it may be noted that the cleaning is done one or twice in a year. So usually motors gets jammed due to non operation for long time. to avoid this kind of issue, it is proposed to use spray ladder with nozzles covering entire length ofbundles. in such design, there will be no requirement of motors. NTPC is reuested to consider the same in the specification.	Bidder proposal is not acceptable. Bidder to comply specification requirement.
426	VI/B	A-07	9 of 28	2.01.01 (o-Xiii)	*------with inspection platforms, stairways, ladders for access to all instruments, drives, valves, expansion joints/bellows and to operation, maintenance and inspection locations (e.g. duct manholes-----	Maintenance platforms are provided for items which requires regular maintenance. once tested and installed, there is no regular maintenance required for ACC bellow/expansion joints.It may aslo be noted that expnasion joint are designed and type tested for 10,000 cycles. So maintence platform for bellows are not required.NTPC is requested to review the requirement.. No cage ladder from ground to fan deck level shall be provided due to safety ocncerns	Bidder proposal is not acceptable. Bidder to comply specification requirements.

							Cage ladder is not envisaged from the ground to fan deck level for safety reasons. Further, Bidder to refer Amendment TG-03A in this regard.
427	VI/B	A-07	10 of 28	2.02.00 (k-ii)	Design rating of the gear box shall be arrived at after considering a service factor of minimum 3.0.---	the service factor 3 is much higher which will result in bigger size of gearbox . As per HEI, the service factor requiredment for VFD application is lesse than single speed motors which is >=1.75 only. NTPC is requested to review the same. further, the gearbox rating 125% of mtor name plate rating will alos increase gearbox size. which can effect airflow aroung it. It will also increase the	Bidder proposal is not acceptable. Bidder to comply specification requirement. Further, bidder to refer Amendment TG-02A.
428	VI/B	A-07	11 of 28	2.02.00 (k-vi)	Offered gearbox (one no.) shall be tested at full load at manufacturer's own or any third-party testing facility to demonstrate its thermal performance.	NTPC has asked for gearbox thermal rating as125% of motor name plate rating. Does Full load mentined in clause means testing gearbox thermal rating at 100% motor rating or testing at 125% of motor rating.	Testing of gearbox shall be conducted at the thermal rating at 125% of motor rating.
429	VI/B	A-07	8 of 28	2.01.01 e	Max. oxygen content of condensate leaving the condenser shall be 0.015 CC per litre over the entire load range.	Max. oxygen content of condensate leaving the condenser shall be 0.015 CC per litre over 50% and above load range.	Bidder proposal is not acceptable. Bidder to comply specification requirement.
430	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	7 of 17	1.15.00	The Employer shall provide Two Number (2no) 11kV feeders in Existing Employer 11kV FGD Tie switchgear of Sipat Stage-1 to meet the construction power requirements along with Employer's requirements as indicated under Clause 1.19.00…… The charges for the actual energy consumed by the bidder (Energy Charges Only) shall be recovered by the Employer based on prevalent rate of DISCOM and type of connection used	Power for the purpose of construction and commisssioning may please be provided by Owner free of all charges at 415 V. Also customer may provide supply point of electricity at major construction sites i.e. SG,TG area for both units Further to note that incase construction power is not provided by the customer free of all charges, we understand that only Energy charges shall be recovered from contractor and all the fixed charges shall be borne by Owner. Kindly confirm.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 474 of Clarification 02.
431	SECTION – VI, PART-A SECTION – VI, PART-D	SUB-SECTION-IID CIVIL WORKs ERECTION CONDITIONS OF CONTRACT	11 of 14 10 of 64	2.02.00 28.09.00	Construction water shall be the responsibility of Bidder during all stages of construction. However, construction water may be provided by Owner at one point on chargeable basis. Bidder shall arrange for further distribution/transportation to required location by their own Contractor shall make all arrangements himself for the supply of construction water as well as potable water for labour and other personnel at the worksite/colony. However, drawal of construction/potable water from bore-well shall be permitted if found suitable. Any statutory clearance required shall be obtained by the contractor. Assistance, if required shall be provided by the owner.	1) Water for construction purposes may please be provided by customer on free of all charges. 2) Customer shall provide a supply point of water at construction sites i.e SG/ TG area for both units. If owner is not able to provide construction water free of all charges, may kindly confirm same shall be Provided by customer on chargeable basis and charges for construction water may also be provided in bid document. If above mentioned proposal is not acceptable and bidder has to inevitably arrange construcion water at their own, Employer may please confirm construction of borewell is permitted in plant premises or not.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 475 of Clarification 02

432	SECTION – VI, PART-A, SUB-SECTION-I INTENT OF SPECIFICATION	5 OF 8	4.02.00	Pre-commissioning and commissioning activities	The Employer shall issue the following quantities of Fuel oil and Coal per unit for firing up to successful completion of "Initial Operation" (as defined in General Technical Requirements, Part-C, Section-VI of Technical Specification) for each unit free of charge. Fuel Oil -11200 kL Coal- 3.8 lakh MT Fuel oil and coal required for the successful completion of the "Initial Operation", more than the above-specified quantity limits, would be issued by the Employer. However, the Employer shall charge the Contractor the cost of these as per the prevailing landed rates at the site at that time.	Bidder requests NTPC to delete this clause. Coal & fuel oil should be provided free of all charges during Pre-commissioning and commissioning activities. If consumption of Coal & Fuel oil Qty. goes beyond the specified quantity same has to be borne by NTPC and no penalty/recovery shall be imposed on bidder. May please confirm the same.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 681 of the same with Errata to Section VI (technical specifications) SN SG.54.
433	VI-A	I	Page 7 of 8	4.09.00	The Contractor shall be responsible to undertake some activities related to its Corporate Social Responsibility (CSR) in the immediate vicinity of the project. The Contractor shall undertake such activities after prior consultations with the Employer to ensure that the efforts of the Employer and Contractor are complemented. The share of CSR expenditure to be incurred by the vendor / contractor for this project in the total CSR expenditure incurred by the vendor/contractor as a company will be in the same proportion as the turnover of the project concerned to the total company turnover. This will be certified by the charted accountant once every fiscal year. Such activities will be undertaken by the contractor / vendor in consultation with the Employer.	Please refer specification requirements regarding share of CSR expenditure to be incurred by the vendor / contractor for this project. This does not provide the level playing field to all the bidders. We request NTPC to indicate expenditure to be incurred for carrying out the CSR activities in the immediate vicinity of the project as stated.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 683 of Clarification 02.
434	VI-D & VII Book 3 of 3 PART-1A		9 of 64	27.00.00 Appendix-6 to Contract Agreement	Facilities to be provided by the Employer	We request NTPC to physically hand over the clear encroachment free land immediately after award of Contract i.e. within one month of issuance of NOA.Only Employer shall be responsible for coordinating and resolving all issues with Central & State Government, local bodies and local authority w.r.t land acquisition.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 684 of Clarification 02.
435	VI-A	I	Page 7 of 8	4.10.00	The vendor / contractor shall visit the site to ascertain the position of land acquisition etc.		
436	VI	C	47 of 119	28.00.00	Training of Employer's Personnel	We request that the number of man-months training shall be mutually agreed after Award. All the expenditure towards travel (internal & external), boarding and lodging and living expenses of Employer's personnel shall be borne by the Employer for all types of trainings. Any kind of training shall only be provided by BIdder's personnel experts at Bidder works / project site only. However if training is not availed by employer during the contract period no rebate on this account shall be admissible in contract price. NTPC to confirm	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 639 of Clarification 02.
437	VI-A	VI			Mandatory Spare List	Wherever, Bidder quotes lot price for a clause/system in the list of mandatory spares, the offered price will remain same regardless of the deletion / change of items / quantity corrections etc as applicable to the particular design/vendor selected during execution. This should not be a point of contention during execution of the order. NTPC to confirm the same.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 640 of Clarification 02
438	VI-A	VI	3 of 3	13.00.00	Mandatory Spare List	considering applicable items (for the offered design) under that heading. In such scenario, there should not be a question of rebate (for not applicable items in the lot) during execution/closing of the Contract. The offered price will remain same regardless of the deletion / change of items / quantity corrections etc as applicable to the particular design/vendor selected during execution. b. In case there is no equiv. spare technically for a specified spare, there should not be a question of rebate during execution/closing of the Contract. Kindly confirm the above understanding	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 645 of Clarification 02.

439	VI-A	II-B & II-C	Page 3 of 17 Page 20 of 20	1.05.03 25.00.00	Switchgear /Numerical Relay Networking Annual Maintenance Services (AMS)	Annual Maintenance Contract/ Services(AMC) As per technical specification requirements, AMC/AMS to be provided for certain C&I / Instruments for 03 years. We understand that on successful completion of facilities and completion of defect liability period, NTPC will release the contractor's Bank Guarantees, applicable payments and close the contract. Therefore, providing AMC beyond defect liability period is not envisaged.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 643 of Clarification 02.
440	VI-B	E-59	2 of 6	4.0 b)	Structural steel (plates and rolled sections i.e. channels, beams & angles) conforming to IS 2062 and Reinforcement steel conforming to IS 1786 supply if in the scope of the contractor shall be procured from Steel Producers (Refer NOTE below). Currently, Steel Producers acceptable.....	Steel products are only to be procured from Steel producers indicated in the NTPC specification. Subsequently NTPC has indicated that-" if any new Steel Producer/s are proposed by the main contractor during execution of contract, the same may be considered for acceptance subject to meeting the	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 644 of Clarification 02.
441	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	1 of 8	1.01.00 (d)	Compliance with statutory requirements and obtaining clearances from statutory authorities, wherever required	Bidder request Owner to obtain the necessary statutory approval and clearances. However, bidder may assist the Owner for the obtaining the same. Owner is requested to provide an exhaustive list of statutory approval to be obtained by NTPC for Darlipali EPC project.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 646 of Clarificartion 02.
442	General				Access to & Possession of site	Employer shall ensure the site is approachable from state & national highways for material movement. If there is any obstruction or local issues pertaining to movement of goods the Employer shall be responsible for resolving same, the Contractor shall be entitled to suspend the work till such site issues are resolved.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 686 of Clarification 02.
443	General				Dismantling of existing structures/substructures/facilities, as per specifications.	Bidder request NTPC to dismantle the super-structure / sub-structure of various facilities/buildings specified in bidding documents prior to award, and provide the encumbrance free land for complete facilities under the scope of bidder as on date of NOA. NTPC to confirm and issue suitable amendment.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 647 of Clarification 02 with Errata to Section VI (technical specifications) section SN D1-27.
444	General				Movement of ODC consignment in Material Storage Yard wherein existing overhead transmission line is present	Bidder request NTPC to arrange any type of clearance/ liasoning/ associated fees etc. with state authority for shutting down the transmission line for movement of materails and any delay in arranging the permission shall be attributable to NTPC.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 648 of Clarification 02
445	General				Approach to site/Material Storage Yard	Bidder request NTPC proper entry to site 7 Stogare yard/lay down area. The complete land for Stage-II is in MGR bulb wherein only 02 entry points are available. One is underpass which is very low in height and material/T&P movement is not possible thru it. Second access is above groung, howver, the MRG rail has to be crossed for that and we envisage following difficulties : 1) Each Consignment has to cross MGR crossing with overhead transmission line as height of underass is too low. Due to the transmission line each of the ODC may be stranded at the aforesaid rail crossing. It is most likely that the transmission line has to be removed for few of the ODC consignments. Due to retention of vehicles, contractor will have to pay huge demurrage charges also to its transporter as hydraulic trailers	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 649 of Clarification 02.

446	VI-A	SUB SECTION-VI	3 of 3	13.00.00	Bidder shall not indicate “Not Applicable” against any of the spare (except for those items for which “if applicable” is specified). In case of not applicability, functionally equivalent spare to be ……	a. Generally, lot price is quoted by the bidder for a main system considering applicable items (for the offered design) under that heading. In such scenario, there should not be a question of rebate (for not applicable items in the lot) during execution/closing of the Contract. The offered price will remain same regardless of the deletion / change of items / quantity corrections etc as applicable to the particular design/vendor selected during execution. b. In case there is no equiv. spare technically for a specified spare, there should not be a question of rebate during execution/closing of the Contract. Kindly confirm the above understanding	Reply to this query is already included in the section ‘Employer's response to typical Bidder’s queries on Section VI’ to clarify & avoid similar queries. Bidder is requested to refer SN 645 of Clarification 02.
447	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION G-07 MDL	PAGE 1 OF 2	2.00.00	**Engineering Drawing Review Methodology:** To reduce engineering cycle time and no. of drawings in approval category, following Engineering Drawing Review Methodology shall be adopted: a. Auto-archive of drawings: Contractor shall certify the following statement in all auto archive drawings. “**We confirm that this document meets all the contract requirements including safety and statuary requirements and facilitate ease of operation and maintenance. In case any deviation is found, the Contractor shall carry out all required changes/ modifications without any cost implications to NTPC. In addition, Penalty on account of non-compliance of contract specification as deemed fit by the Employer shall be recovered.** b. Endorsement of drawings: NTPC will select base for endorsement of drawings and submit list of drawings	Bidder adheres with all Contractual requirement like Amendments, Clarifications etc. (incl. Government Guidelines). Changes/Modifications, as envisaged/suggested by Customer being taken care as per tender specs. Also, Contractual provision of LDs (Liquidated Damage) & Defect liability Clauses are already specified in the bidding documents . Hence, separate Penalty Clause is not required & NTPC is requested to Delete the referred Penalty clause.	Bidder's proposal reviewed but not accepted. Bidder to comply with tender specifications.
448	Section VI /Part A	I-A	1 of 44		For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the LoA date of EPC package unless otherwise specified in the respective clauses.	In order to rationalize the Provenness requirement with respect to current date, the following modification is proposed "For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the date of submission of vendor proposal for approval but not later One(01) year from LOA/NOA" Kindly accept.	Bidder's proposal reviewed but not accepted. Bidder to comply with tender specifications.

CLARIFICATION-01B FOR SIPAT-III (1X800 MW) EPC PACKAGE (UNDER BULK TENDER)

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	Employer's Response
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
1	SECTION – VIB, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	08 of 20	1.15.00	The Employer shall provide Two Number (2no) 11kV feeders in Existing Employer 11kV FGD Tie switchgear of Sipat Stage-1 to meet the construction power requirements along with Employer's requirements as indicated under Clause 1.19.00……. The charges for the actual energy consumed by the bidder (Energy Charges Only) shall be recovered by the Employer based on prevalent rate of DISCOM and type of connection used	Power for the purpose of construction and commisssioning may please be provided by Owner free of all charges at 415 V. Also customer may provide supply point of electricity at major construction sites i.e. SG,TG area for both units Further to note that incase construction power is not provided by the customer free of all charges, we understand that only Energy charges shall be recovered from contractor and all the fixed charges shall be borne by Owner. Kindly confirm.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 474 of Clarification 02.
2	SECTION – VIB, PART-A SECTION – VIB, PART-D	SUB-SECTION-IID CIVIL WORKs ERECTION CONDITIONS OF CONTRACT	07 of 8 11-12 of 70	2.02.00 28.09.00	Construction water shall be the responsibility of Bidder during all stages of construction. However, construction water may be provided by Owner at one point on chargeable basis. Bidder shall arrange for further distribution/transportation to required location by their own Contractor shall make all arrangements himself for the supply of construction water as well as potable water for labour and other personnel at the worksite/colony. However, drawal of construction/potable water from bore-well shall be permitted if found suitable. Any statutory clearance required shall be obtained by the contractor. Assistance, if required shall be provided by the owner.	1) Water for construction purposes may please be provided by customer on free of all charges. 2) Customer shall provide a supply point of water at construction sites i.e SG/ TG area for both units. If owner is not able to provide construction water free of all charges, may kindly confirm same shall be Provided by customer on chargeable basis and charges for construction water may also be provided in bid document. If above mentioned proposal is not acceptable and bidder has to inevitably arrange construcion water at their own, Employer may please confirm construction of borewell is permitted in plant premises or not.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 475 of Clarification 02.
3	SECTION – VI, PART-A, SUB-SECTION-I INTENT OF SPECIFICATION & Errata to tech documents	5 OF 9	4.02.00	Pre-commissioning and commissioning activities	The Employer shall issue the following quantities of Fuel oil and Coal per unit for firing up to successful completion of "Initial Operation" (as defined in General Technical Requirements, Part-C, Section-VI of Technical Specification) for each unit free of charge. Fuel Oil -11200 kL Coal- 3.8 lakh MT Fuel oil and coal required for the successful completion of the "Initial Operation", more than the above-specified quantity limits, would be issued by the Employer. However, the Employer shall charge the Contractor the cost of these as per the prevailing landed rates at the site at that time.	Bidder requests NTPC to delete this clause. Coal & fuel oil should be provided free of all charges during Pre-commissioning and commissioning activities. If consumption of Coal & Fuel oil Qty. goes beyond the specificed quantity same has to be borne by NTPC and no penalty/recovery shall be imposed on bidder. May please confirm the same.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 681 of the same with Errata to Section VI (technical specifications) SN SG.54.
4	VI-A	I	Page 7 of 8	4.09.00	The Contractor shall be responsible to undertake some activities related to its Corporate Social Responsibility (CSR) in the immediate vicinity of the project. The Contractor shall undertake such activities after prior consultations with the Employer to ensure that the efforts of the Employer and Contractor are complemented. The share of CSR expenditure to be incurred by the vendor / contractor for this project in the total CSR expenditure incurred by the vendor/contractor as a company will be in the same proportion as the turnover of the project concerned to the total company turnover. This will be certified by the charted accountant once every fiscal year. Such activities will be undertaken by the contractor / vendor in consultation with the Employer.	Please refer specification requirements regarding share of CSR expenditure to be incurred by the vendor / contractor for this project. This does not provide the level playing field to all the bidders. We request NTPC to indicate expenditure to be incurred for carrying out the CSR activities in the immediate vicinity of the project as stated.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 683 of Clarification 02.
5	VI-D & VII Book 3 of 3		10 of 70	27.00.00 Appendix-6 to Contract Agreement	Facilities to be provided by the Employer	We request NTPC to physically hand over the clear encroachment free land immediately after award of Contract i.e. within one month of issuance of NOA.Only Employer shall be responsible for coordinating and resolving all issues with Central & State Government, local bodies and local authority w.r.t land acquisition.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 684 of Clarification 02.
6	VI-A	I	Page 7 of 8	4.10.00	The vendor / contractor shall visit the site to ascertain the position of land acquisition etc.		
7	VI	C	47 of 119	28.00.00	Training of Employer's Personnel	We request that the number of man-months training shall be mutually agreed after Award. All the expenditure towards travel (internal & external), boarding and lodging and living expenses of Employer's personnel shall be borne by the Employer for all types of trainings. Any kind of training shall only be provided by Bidder's personnel experts at Bidder works / project site only. However if training is not availed by employer during the contract period no rebate on this account shall be admissible in contract price. NTPC to confirm.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 639 of Clarification 02.
8	VI-A	VI			Mandatory Spare List	Wherever, Bidder quotes lot price for a clause/system in the list of mandatory spares, the offered price will remain same regardless of the deletion / change of items / quantity corrections etc as applicable to the particular design/vendor selected during execution. This should not be a point of contention during execution of the order. NTPC to confirm the same.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 640 of Clarification 02.
9	VI-A	SUB SECTION-VI	3 of 3	13.00.00	Bidder shall not indicate "Not Applicable" against any of the spare (except for those items for which "if applicable" is specified). In case of not applicability, functionally equivalent spare to be ……	a. Generally, lot price is quoted by the bidder for a main system considering applicable items (for the offered design) under that heading. In such scenario, there should not be a question of rebate (for not applicable items in the lot) during execution/closing of the Contract. The offered price will remain same regardless of the deletion / change of items / quantity corrections etc as applicable to the particular design/vendor selected during execution. b. In case there is no equiv. spare technically for a specified spare, there should not be a question of rebate during execution/closing of the Contract. Kindly confirm the above understanding	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 645 of Clarification 02.

10	VI-A	II-B & II-C	Page 3 of 20 Page 18 of 19	1.05.03 25.00.00	Switchgear /Numerical Relay Networking Annual Maintenance Services (AMS)	Annual Maintenance Contract/ Services(AMC) As per technical specification requirements, AMC/AMS to be provided for certain C&I / Instruments for 03 years. We understand that on successful completion of facilities and completion of defect liability period, NTPC will release the contractor's Bank Guarantees, applicable payments and close the contract. Therefore, providing AMC beyond defect liability period is not envisaged.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 643 of Clarification 02.
11	VI-B	E-59	2 of 6	4.0 b)	Structural steel (plates and rolled sections i.e. channels, beams & angles) conforming to IS 2062 and Reinforcement steel conforming to IS 1786 supply if in the scope of the contractor shall be procured from Primary Steel Producers (Refer NOTE below). Currently, Primary Steel Producers acceptable.....	Steel products are only to be procured from Primary Steel producers indicated in the NTPC specification. As per notification/order dated 14.12.16, 09.08.16 and 12.05.16 by the Ministry of Steel, Govt. of India, such classification fo steel producers is disposed off. Such classification will also lead to situation wherein deliveries committed by NTPC specified steel producers are not adhered or these steel producers are not evincing keen interest in supply of certain steel sections to match supply schedule. Request NTPC to amend the specification accordingly in the said clause and at other places wherever such classification is indicated.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 644 of Clarification 02.
12	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	1 of 8	1.01.00 (d)	Compliance with statutory requirements and obtaining clearances from statutory authorities, wherever required	Bidder request Owner to obtain the necessary statutory approval and clearances. However, bidder may assist the Owner for the obtaining the same. Owner is requested to provide an exhaustive list of statutory approval to be obtained by NTPC for Sipat EPC project.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 646 of Clarificartion 02.
13	TECHNICAL SPECIFICATION SECTION – VIB, PART-B BOOK 1 OF 5 – MECHANICAL	SUB-SECTION G-07 MDL	PAGE 1 OF 2	2.00.00	Engineering Drawing Review Methodology: To reduce engineering cycle time and no. of drawings in approval category, following Engineering Drawing Review Methodology shall be adopted: a. Auto-archive of drawings: Contractor shall certify the following statement in all auto archive drawings. "We confirm that this document meets all the contract requirements including safety and statuary requirements and facilitate ease of operation and maintenance. In case any deviation is found, the Contractor shall carry out all required changes/ modifications without any cost implications to NTPC. In addition, Penalty on account of non-compliance of contract specification as deemed fit by the Employer shall be recovered. b. Endorsement of drawings: NTPC will select base for endorsement of drawings and submit list of drawings to Contractor for endorsement. The list shall be finalized after discussion with Contractor. After agreement, the approved drawings shall be taken out from DREAMS for endorsement and stamped applicable for SIPAT STPP STAGE-III.	Bidder adheres with all Contractual requirement like Amendments, Clarifications etc. (incl. Government Guidelines). Changes/Modifications, as envisaged/suggested by Customer being taken care as per tender specs. Also, Contractual provision of LDs (Liquidated Damage) & Defect liability Clauses are already specified in the bidding documents . Hence, separate Penalty Clause is not required & NTPC is requested to Delete the referred Penalty clause.	Bidder's proposal reviewed but not accepted. Bidder to comply with tender specifications.
14	SECTION – VIB, PART-A	SUB-SECTION-IV	Page 7 OF 73	1.01.02	CATEGORY – I GUARANTEE (x) Unit Auxiliary power consumption (xi) Station auxiliary power consumption	SIPAT-St-III being single unit, all station auxiliaries are dedicated for the 1x800 MW unit.This will help in optimization of the cycle. May note that in all earlier contracts NTPC & other utilities have specified single APC guarantee where the specification calls for a single unit. In view of this, NTPC is requested to keep single aux power consumption guarantee instead of separate unit and station aux power guarantees for performance guarantee & LD purpose.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 826 of Clarification 02.
15	Section VI /Part A	I-A	1 of 44		For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the LoA date of EPC package unless otherwise specified in the respective clauses.	In order to rationalize the Provenness requirement with respect to current date, the following modification is proposed "For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the date of submission of vendor proposal for approval but not later One(01) year from LOA/NOA" Kindly accept.	Bidder's proposal reviewed but not accepted. Bidder to comply with tender specifications.
16	General				Dismantling of existing structures/substructures/facilities, as per specifications.	Bidder request NTPC to dismantle the super-structure / sub-structure of various facilities/buildings specified in bidding documents prior to award, and provide the encumbrance free land for complete facilities under the scope of bidder as on date of NOA. NTPC to confirm and issue suitable amendment.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 647 of Clarification 02 with Errata to Section VI (technical specifications) section SN D1-27.
17	General				Movement of ODC consignment in Material Storage Yard wherein existing overhead transmission line is present	Bidder request NTPC to arrange any type of clearance/ liasoning/ associated fees etc. with state authority for shutting down the transmission line for movement of materails and any delay in arranging the permission shall be attributable to NTPC.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 648 of Clarification 02.
18	General				Approach to site/Material Storage Yard	Bidder request NTPC proper entry to site 7 Stogare yard/lay down area. The complete land for Stage-II is in MGR bulb wherein only 02 entry points are available. One is underpass which is very low in height and material/T&P movement is not possible thru it. Second access is above groung, howver, the MRG rail has to be crossed for that and we envisage following difficulties : 1) Each Consignment has to cross MGR crossing with overhead transmission line as height of underass is too low. Due to the transmission line each of the ODC may be stranded at the aforesaid rail crossing. It is most likely that the transmission line has to be removed for few of the ODC consignments. Due to retention of vehicles, contractor will have to pay huge demurrage charges also to its transporter as hydraulic trailers carrying ODC consignment have very high demurrage charges. 2) During Peak erection time, movement of vehicles will be hindered due to Railway crossing and this may lead to long queue of vehicles within existing plant. 3) 20 Acre of laydown area is outside MGR. Movement of erection material/equipment from that area to the erection site is difficult. This has safety issues also. NTPC to provide clear access to the site/storage/laydown are.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 649 of Clarification 02.
19	General				Access to & Possession of site	Employer shall ensure the site is approachable from state & national highways for material movement. If there is any obstruction or local issues pertaining to movement of goods the Employer shall be responsible for resolving same, the Contractor shall be entitled to suspend the work till such site issues are resolved	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 686 of Clarification 02.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	EMPLOYER'S RESPONSE
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
20	VI/B	A-01	7 of 87	1.05.02, (e)	(iv) Upto & including 610 degree Celsius Alloy steel ASME SA- 335/213:P-92/T-92 or approved equivalent. (v) Upto & above 610 degree Celsius Austenitic stainless steel, SA- 213 UNS S30432 Shot Peened, or approved equivalent.	Bidder has rich experience in using TP347H material in sub-critical boilers up-to average steam temperature of 568°C and Design metal temperature of about 630°C. There was no exfoliation related issues reported from those units using TP347H. As per our design standards "TP347H tubing with design metal temperature above 600°C to be shot peened". However, Bidder follows shot peening as new norm for all austenitic tubing. Therefore, Bidder requested to include "TP347H shot peened" in the material list	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 214 of Clarifications 02.
21	VI/B	A-01	7 of 87	1.05.02, (e),	Note: ii) Use of T91/**T92** tubes for the pressure parts in the heated region of the boiler shall be limited to fluid temperature of 530°C.	In line with EPRI report "Guide to grade 91 use temperature limits due to steam oxidation and exfoliation" and as stated in the review report by EPRI, fluid temperature of 560 Deg.C limit for high heat flux zone is envisaged for T91 tubes. Accordingly bidder request to consider to increase the T91/T92 fluid temperature limit to 560 Deg.C in the furnace (high heat flux) zone upto Furnace Outlet Plane. NTPC is requested to note that, for low heat flux zone there is no restriction of fluid temperature as per EPRI. For proposed design, T91/T92 tubes are also envisaged, in the backpass (low heat flux) zone, where in this fluid temperature limit (of 530 Deg.C) specified is not envisaged. However, design metal temperatures specified will be followed as per specification. NTPC is requested to consider and accept.	The temperature limits specified are based on Employer's assessment impact of the steam oxidation propensity on the reliability of the steam generator in load cycling duty conditions. Bidder to comply with the specification requirements.
22	VI/B	A-02	15 of 67	7.02.01, b	Alarm set point for tube metal temperature shall not exceed the design temperature for respective tube.	Alarm temperature shall be allowed upto material spec limit as per ASME. Limiting Alarm set point upto metal temp will cause boiler operation restriction.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
23	VI/B	A-02	5 of 67	3.01.04	Furnace Bottom hopper: Design of Boiler and its supporting structure shall be considering 50% ash/clinker loading in furnace bottom hopper and corresponding to ash density of 1600Kg/m3. Further minimum sixteen (16) Nos. of load cells shall be installed by Contractor in the furnace roof enclosure to give indication of ash build up in the furnace bottom hopper. The contractor shall provide the design basis for the selection for number of load cells, their distribution and fixing up of alarm set points.	For supercritical boilers with spiral wall construction, the tubes are almost horizontal and ash accumulation is to be avoided to protect the panel tubes from deformation. Boiler should not be operated with ash accumulation in furnace bottom as this is an unsafe condition and boiler should be stopped immediately if accumulation is happening. Hence the 50% ash load will not be considered in Furnace hopper bottom.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
24	VI/B	A-02	8 of 67	3.05.00	C. Tapping points at five levels for furnace vacuum monitoring (in addition to routine monitoring)	Furnace pressure near to roof and Superheater Platen section inlet will be measured and controlled. Furnace vacuum monitoring at different levels is not required and hence tapping points at different levels are not envisaged	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
25	VI/B	A-02	58 of 67	22.01.03	Recirculation Pump: Following tests for Steam Generator Startup drain recirculation pump at shop on assemble unit: - Type Test: (a) Tests to establish unit functioning of pump at temp and pressure. (b) Hot standstill and start up tests.	The pump vendors are reputed and have supplied BCW pumps across the world. The pumps supplied by them in the past for supercritical power stations are running successfully without any issue. These vendors have already substantiated their pump quality and have proven the same in the past. Please note that the Hot type test requirement is significantly impacting the production process and enduring safety issues. In view of the above, these tests shall be exempted.	There is no safety and production process impact for the specified type test. The Bidder has to plan the BCP ordering and supply timelins while considering the specified type tests. Any request for waiver shall be considered in line with the clause no. 22.04.00
26	VI/A	VI MANDATORY SPARES	2 of 3	4.00.00	All the spares (both recommended and mandatory) shall be manufactured along with the main equipment components as a continuous operation as per same specification and quality plan	For main, grinding rolls are to installed on journal assembly and testing is carried out at shop as per approved Quality plan. However, for Mandatory spares grinding rolls are supplied directly from vendor works to site as per approved Quality plan. Mandatory spares shall be manufactured as per the established process inline with specification and quality plan. We request customer to accept established operation in place of continuous operation.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
27	VI/A	II A-01	13 OF 28	2.15.03 (c)	Proven fire detection and fire extinguishing systems in line with the standard practice of the manufacturer shall be provided.	Fire-detection is carried out by Mill Outlet temperature measurement as per Bidder standard and proven practice.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
28	VI/A	II-A-03	1 of 1		Further, the related special monitoring & analytical instruments on account of bio-mass co-firing towards satisfactorily performance of the boiler & auxiliaries are also included.	For Bio-mass cofiring, automated mill inerting system and coal pipe temperature monitoring is envisaged. Apart from these, additional special monitoring & analytical instruments are not required for Biomass co-firing. Ms NTPC to confirm	Bidder's understanding is not correct. Bidder to consider all required Monitoring & analytical instruments as per system/process requirement inline with the Technical specifications.
29	VI/B	II-A-02	8 of 67	3.07.00	In addition to local indicators, measurement system (4-20mA Output) for remote indication shall also be provided on all the four furnace walls.	A proven product meeting this specific requirement is not available in the market/online sources. Hence, M/s NTPC is requested to provide type of measurement and detailed specification for furnace thermal expansion measurement system.	Bidder to provide measurement inline with Specification requirement. Further same shall be discussed and finalized during detailed engineering.
30	VI/A	II-A-01	24 of 28	2.30.00	6. Flue Gas Ducts to be provided with strain gauge/ ash level meter at sharp bend locations of duct and common duct area after air preheater.	M/s NTPC is requested to provide type of measurement and detailed specification for flue gas duct ash level meter.	Bidder to provide any type of measuring instrument suitable for monitoring of dust level in the flue gas duct. Further same shall be discussed and finalized during detailed engineering.
31	VI/B	II-A-02	6 of 67	3.02.01	The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable, and vertical wall outlet). These thermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere.	M/s NTPC is requested to provide detailed specification for metal temperature thermocouples to be provided for this purpose.	Bidder to note that the detailed specification of metal temperature measuring elements is provided in the Technical Specifications vide clause no. 3.03.00 of Sub-section IIIC-04, Measuring Instruments (Primary & Secondary), Part-B, Section -VI.
32	Book 4 of 5 - CIVIL WORKS, SECTION-VIB, Part-B	D-1-6 DESIGN CRITERIA	21 of 23	6.04.03	Painting of steel surfaces (other than those embedded in concrete),C3 a) Surface preparation: Blast cleaning to Sa 2 1/2 grade b) Primer: One coat of Inorganic Ethyl Zinc Silicate DFT 70µ c) Intermediate Coat: One coat of epoxy Polyamide cured pigmented MIO intermediate paint DFT 100µ d) Finish coat: Aliphatic acrylic polyurethane finish paint DFT 70µ Total DFT = 240µ.	Following painting scheme proposed for steel structural components having operating temp <95 º C, exposed to atmosphere like Columns, Beams, Structures, Boiler supporting structures, Galleries, Bracings, Buck stays etc. *a) Surface Preparation: Blast cleaning to SSPC-SP10.* *b) Primer: One coat of epoxy zinc phosphate primer to IS13238 - DFT of 30µ.* *c) Intermediate: One coat of epoxy based MIO coating to IS16943 - DFT 75µ/coat.* *d) Finish: 1) One coat of epoxy based finish paint to IS14209 DFT of 30µ.* *2) One coat of aliphatic acrylic polyurethane paint to IS13213 DFT of 30µ. Total DFT = 165µ.*	Bidder's proposal was reviewed but not accepted. Bidder to comply with tender requirements.

33	Part - C, SECTION-VIB	General technical requirements	30 of 119	20.03.00	Shop primer for all steel surfaces which will be exposed to operating temp below 95deg. C shall be selected by the contractor.	Following scheme is proposed as clarification for all un-insulated components like miscellaneous sheets, plates other than structural items mentioned above. (Operating temperature up to 95 deg.C) a) Power tool cleaning to SP3. b) One coat of red oxide alkyd based primer as per IS-12744 to the DFT of 30µ/coat. c) two coats of synthetic enamel (long oil alkyd) to IS2932 to the DFT of 20µ/coat. Total DFT = 70 microns.	Technical specifications are clear in this regard, bidder to comply.
34	Book 1 of 5 - Mechanical, SECTION-VIB,	A-12, Surface preparation & painting	4 of 8	1.06.11, Sl. No. 2	Design Temperature above 60 - 200 deg.C a) Power tool cleaning to SP3 b) Two coats of HR Aluminium Paint IS13183 Gr.III Total DFT 40 microns	Since general purpose aluminium paint IS2339 withstands temperature up to 150 deg.C. Following scheme is proposed for fuel pipes having temperature up to 120 deg.C. *a) Power tool cleaning to SP3* *b) Two coats of General purpose Aluminium Paint IS2339. total DFT 40 microns.*	Bidder's proposal not acceptable. Bidder to comply specification requirement.
35	Book 1 of 5 - Mechanical, SECTION-VIB,	A-12, Surface preparation & painting	6 of 8	Note-1	SG membrane walls and other flue gas swept pressure part surfaces shall be applied with appropriate primer for protection of surfaces during transit, storage and erection.	Following schemes are proposed as CLARIFICATION as there is no specific painting scheme is given in tender specification. For Heat exchanger coils coming in the gas path (like Economizer, SH coils, water platens etc). Power tool cleaning followed by one coat of dip-coat paint –Red-oxide Zinc phosphate primer to Bidder Specification. DFT = 35 microns. For components coming in the gas path like ww panels, headers, loose tubes etc Power tool cleaning followed by 2 coats of Red-oxide Zinc phosphate primer.to IS 12744 DFT = 60 microns	The specific details shall be tied up during the detail engineering inline with the technical specification requirements.
36	Book 1 of 5 - Mechanical, SECTION-VIB,	A-12, Surface preparation & painting	6 of 8	Point. No. 2	For valves below 65NB and temperature up to and in-cluding 540 DegC, Parkerizing/zinc phosphate corrosion resistant coating as per ASTM F1137 is also acceptable in lieu of Aluminium paint.	For forged valves, Phosphating to thickness of 1500mg / Sq.ft will be done.	Bidder's proposal was reviewed but not accepted. Bidder to comply with tender requirements.
37	Book 1 of 5 - Mechanical, SECTION-VIB,	A-12, Surface preparation & painting	6 of 8	B) SG & Auxiliaries Sl.No.2	All surfaces with temperature above 95℃ and which are insulated a) Power tool cleaning to SP3. b) Two coats of HR Aluminium Paint. total DFT 40 microns	Following painting scheme is proposed in line with Bidder Std.Painting Practice for all insulated components like hot ducts, Furnace Casing sheets, Riser tubes, External piping etc., a) Surface Preparation: St3 by Power tool cleaning. b) Primer paint: 2 coat of red-oxide zinc phosphate to IS 12744 to DFT of 30µ/coat Total DFT = 60µ	Bidder's proposal not acceptable. Bidder to comply specification requirement.
38	Book 4 of 5 - CIVIL WORKS, SECTION-VIB, Part-B	D-1-6 DESIGN CRITERIA	23 of 23	6.04.06	Hand railings & ladders All handrails and ladders shall be galvanized at the rate of 610 gm/ sq.m	Following scheme proposed for handrails, posts, ladders & stairs *a) Power tool cleaning to SP3* *b) One coat of red oxide alkyd based primer as per IS-12744 to the DFT of 30µ/coat* *c) two coats of synthetic enamel (long oil alkyd) to IS2932 to the DFT of 20µ/coat* *Total DFT = 70 microns*	Bidder's proposal was reviewed but not accepted. Bidder to comply with tender requirements.
39	Book 4 of 5 - CIVIL WORKS, SECTION-VIB, Part-B	D-1-6 DESIGN CRITERIA	20 of 23	6.04.02	Painting of steel surfaces embedded in concrete Steel surfaces embedded in Concrete, the surface shall be prepared by Manual Cleaning and provided with Primer Coat of Chlorinated Rubber based Zinc Phosphate Primer of Minimum 50 Micron Dry Film Thickness (DFT).	*No painting is required for embedded surfaces, as paint will hinder adhesion.* *Temporary rust preventive fluid can be applied to protect these surfaces until erection.*	Bidder's proposal was reviewed but not accepted. Bidder to comply with tender requirements.
40	Section-VI, Part A	Sub section-II, A-01	16 of 28	2.16.05A	Provision for Future Installation of SCR system	Please confirm whether the APH should be SCR ready or not	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 539 of Clarifications 02.
41	Section-VI, Part B	Sub section-II, A-02	18 of 67	9.01.03	Air Heater Seals - The Contractor shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-in-leakage.	The drift in air heater leakage will not exceed 2%, one year after demonstration of guaranteed air-in-leakage	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 540 of Clarifications 02.
42	Section-VI, Part F	Sub section-VI, CH 01	11 of 38	1.10.00 (B) 9.3	Speed reducer seals & gaskets	Gaskets are not applicable. Seal will be offered.	The technical specification requirement is clear. Bidder to comply with the same.
43	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	17 of 73	1.01.05.02	The corrections for the flue gas flow and ESP inlet flue gas temperature in excess of the values for these parameters under guarantee point conditions, shall be allowed only in case and to the extent such variations are caused solely due to changes in specified coal properties and ambient conditions. Further, the corrections for the flue gas flow and temperature lower than the guarantee point values shall be applied based on actually measured test values. Subject to the above, the corrections for the variation in flue gas flow, inlet dust burden and ESP inlet flue gas temp. shall be based on the above computed test values and the procedure indicated in the next para.	The tender indicates that estimating and applying corrections to parameters for their variation to the extent of change in specified coal properties and ambient conditions (during PG test), while assessing ESP performance. It may kindly be noted that ESP is designed for a specified set of parameters and is operated at actual condition. Hence, corrections will be applied for variation on actual test parameters (viz. gas flow, temperature & inlet dust) from guarantee point parameters while assessing ESP performances. This is applicable even for ESPs included in SG package as the change in parameters are not due to ESP. If the measured values are higher and corrected values are lower, corrections for design values will be taken for calculation of ESP efficiency. NTPC to note that corrections are allowed for actual measured values for all direct ESP contracts including recent projects like Mouda, Solapur, etc.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 567 of Clarifications 02.
44	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	17 of 73	1.01.05.03	Ca.Cb.Cc etc. are Correction factors for flue gas at temperature, moisture content in flue gas, ESP inlet dust loading, sulphur and sodium contents of coal ash based on correction curves furnished by the Bidder and approved by the Owner.	The corrections for variation in flue gas flow, gas temperature, inlet dust concentration, sulphur content will be considered and the same will be submitted during contract stage.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 568 of Clarifications 02.

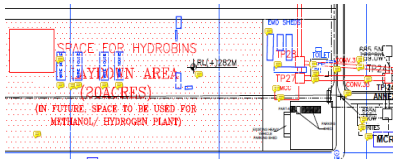
45	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	20 of 73	1.01.07.01	Method of computation of Aux. Power consumption for ESP: The measurement for guaranteed auxiliary power consumption shall be carried out during ESP collection efficiency test. The method for computing the power shall be as described below:- a) Power consumption of ESP will be measured pass wise and for one pass (Say ESPA) at a time with the help of energy meter in ESP MCC. b) Energy meter reading will be taken before starting the collection efficiency test and after completion of collection efficiency test. c) Before starting collection efficiency test, switch off all the TR sets, all hopper heaters, all insulator heaters/pent house fans (if applicable) and rapping systems serving to one pass……	The method specified involve shutting down of total ESP fields just before start of emission test to measure external loads connected in ESP LTMSB. It is suggested that such switching off of the fields, heaters, rappers shall not be resorted to just before starting emission test. Hence, no external loads shall be connected to ESP LT Switchgear or (if not) this external load can be measured after completion of emission test i.e. ESP can be switched off after the emission test. Hence the power measurement test shall be taken up after completion of emission test.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 569 of Clarifications 02.
46	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	2 of 73	1.00.01 (g)	Instruments for PG test and instruments for process control of similar applications are envisaged to be of same make and model having same accuracy level. However, instruments for PG test are also acceptable as per standard and proven practice of the contractor/OEM and in such case, instruments for process control shall be as per requirements specified in Part-B of technical specifications. Instruments to be used for PG test shall be additionally supplied over and above the instruments shown in tender P&IDs. **PG test equipment being supplied, installed and commissioned for each unit, shall be retained by employer after completion of PG test.** Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation. **All PG test process parameters shall be made available in DDCMIS.**	During PG Test of ESP, outlet emission is measured by isokinetic sampling for particulate matter measurement as per EPA standard. The standard requires only portable instruments which does not warrant any erection or commissioning. It is also not possible to record the isokinetic sampling kit parameters in DDCMIS. For ready reference of Particulate emission, Opacity monitors are provided at ESP outlet. Other operating parameters of ESP will be recorded in IOS with interface to DDCMIS.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 570 of Clarifications 02.
47	VI/A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	31 of 38	5.01.00	3) Emitting Electrodes	Helical wire type emitting electrodes will be envisaged as per bidder's proven design & hence other types of emitting electrodes are not applicable. Customer is requested to suitably amend the specification title with "as applicable for the specific design"	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 571 of Clarifications 02.
48	VI/A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	31 of 38	5.01.00	11) Rappers	Tumbling hammers will be envisaged as per bidder's proven design & hence electric rappers are not applicable. Customer is requested to suitably amend the specification title with "as applicable for the specific design"	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 572 of Clarifications 02.
49	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	60 of 67	2.01.01 (a)	The model study shall also include a gas distribution study in the inlet and outlet duct as well as, the cross over duct to find out the effect of isolation of one stream of the ESP,	As per ICAC code, the gas distribution study will be conducted at ESP inlet duct only and not at ESP outlet ducts.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 573 of Clarifications 02.
50	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	60 of 67	2.01.01 (b)	The model study shall include all connecting duct work from air preheater gas outlets to the induced draft fans inlets, induced draft fan outlet to FGD inlet, FGD outlet to chimney flue inlet and also from the induced draft fan outlet to chimney flue inlet (in FGD bypass condition) including the inlet duct transition piece	The ESP Physical Flow Model will include the design of all connecting duct work from the air preheater gas outlets upto the induced draft fans inlets only. Physical modelling from Induced draft fan outlet, Ducts to/from FGD & chimney flue Inlet (FGD bypass duct) including the inlet duct transition piece is excluded from ESP Physical Flow Model study as we are not measuring air velocities in the Physical Flow Model beyond ESP Casing, as per ICAC standard. Flow correction devices if any, beyond ID fan is not required since this will not have any impact on ESP Flow Model study.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 574 of Clarifications 02.
51	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	62 of 67	8.01.00	Dust hoppers shall be of conical type. ESP hoppers other than that of conical type shall not be acceptable.	Pyramidal hoppers which have similar ash flowability characteristics to conical hoppers, may also be accepted owing to simplicity of construction.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 575 of Clarifications 02.
52	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	63 of 67	8.01.00	Hopper valley angle to the horizontal shall not be less than sixty five (65) degrees.	Hopper valley angle of 60° may be accepted as being followed for other projects of similar capacity.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 576 of Clarifications 02.
53	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	66 of 67	14.00.00	A comprehensive flowability study of fly ash from ESP hoppers shall be conducted by the contractor to ensure smooth flow of ash under various operating conditions of the plant including Steam Generator, ESP and Fly Ash Removal System. The hoppers are required to promote mass flow without arching and rat holing problems. The main aim of the flowability study is to ensure consistent flow from each hopper to the ash removal system and following requirements shall be met by the contractor in this connection: i) The study could be conducted on scaled down model of ESP hopper prepared by the bidder and at different relevant temperatures……	Bidder clarifies as below for conductance of the test.: Evaluation of mass flow design parameters under gravity condition i.e. valley angle for a given top opening of hopper with specified material of construction and outlet opening dimension by conducting shear test on three ash samples, as provided by NTPC. The test will be conducted at: a) Ambient temperature at test condition b) Maximum 60 deg. C. Bidder may engage an external laboratory to conduct the above test. The report on the above study will be furnished to NTPC by Bidder for information purpose. There shall be no effect on the project work schedule and no hold on the detailed engineering of ESP. No physical modelling is envisaged.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 577 of Clarifications 02.

54	VI/B	SUB SECTION- G-04 STANDARD PG TEST PROCEDURE	58 of 227	METHOD OF COMPUTATION OF AUXILIARY POWER CONSUMPTION FOR ESP: -	Electrostatic Precipitator with all TR sets, all hopper heaters.....set point temperature shall be kept 5 degrees Celsius above the Design flue gas temperature/ operating flue gas temp whichever is higher.	Set point temperature will be kept 5 deg above operating flue gas temperature or 125 deg whichever is higher.	The set temperature shall be 5 deg. C above the gas temperature corresponding to the ESP guarantee point or the operating flue gas temperature whichever is higher.
55	Section VI /Part A	I-A	9 of 35	4.5	Air Conditioning System The Bidder/ its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number of Air conditioning system having a total installed capacity of 300TR or more including stand-by chiller unit (if any), which should have included at least one chilling unit with a minimum capacity of 60TR. The system should have been in successful operation for at least one (1) year. **In addition, the chiller unit(s) proposed to be supplied for this package shall be sourced from the manufacturer(s) who have manufactured and supplied at least one (1) number of similar type of chiller unit having a capacity of not less than 150 TR, which should have been in successful operation for at least one (1) year.**	Bidder/ its sub-vendor are supplying chiller from customer approved makes. Incorporating additional criteria for Sub QR of chiller delays the finalisation of chiller because of taking approval for Sub QR during detail engineering. Considering the above, the 2nd paragraph of the provenness "In addition, the chiller unit(s) proposed to be supplied for this package shall be sourced from the manufacturer(s) who have manufactured and supplied at least one (1) number of similar type of chiller unit having a capacity of not less than 150 TR, which should have been in successful operation for at least one (1) year" may please be deleted. Kindly accept.	Vendor approval and Provenness compliance are two different things. Bidder to comply with specification requirement.
56	Section VI /Part A	I-A	9 of 35	4.6	Ventilation System The Bidder/its sub-vendor should have designed, supplied, erected, and commissioned at least one (1) number ventilation system including **similar** air washer unit having individual fan capacity of 80,000 Cum./Hr. or more. The system should have been in successful operation for at least one (1) year.	It is observed that there are some experienced and reputed Ventilation system vendors having performance certificate with different type of Air washer with capacity in line with PQR. Accordingly the clause may be re-phrased as ""The Bidder/its sub-vendor should have designed, supplied, erected, and commissioned at least one (1) number ventilation system including air washer unit having individual fan capacity of 80,000 Cum./Hr. or more. The system should have been in successful operation for at least one (1) year."" Kindly accept."	Provenness is required for similar type of air washer units envisaged for the project. Bidder to comply with specification requirement.
57	Section VI /Part A	I-A	11 of 35	4.15	Turbine Hall EOT crane The Bidder/ its sub-vendor should have designed, manufactured, erected and commissioned EOT cranes of capacity 100T or more with minimum crane span of 28 meters, which is in successful operation in at least one (1) station for a minimum period of one (1) year	As a general philosophy of Pre-qualification requirements, the qualifying parameter of an equipment is limited to approximately 70 - 80% of equipment parameter proposed for the project. For TG Hall EOT crane, the qualifying minimum span of 28m is mentioned, it is since 500 MW plants wherein width of AB Bay was 36.0m. Here, in 800 MW plants, AB bay width is approximately 30m, it is prudent to relax the qualifying span of TG hall EOT crane from 28m to 24. Irrespective of type of industry, generally the design standard of Cranes is same. Considering the above, The provenness clause may be re-phrased as below: "The Bidder/ its sub-vendor should have designed, manufactured, erected and commissioned EOT cranes of capacity 100T or more with minimum crane span of 24 meters, which is in successful operation in at least one (1) station (power plant/ refineries/ shipyard/ workshop or any other industry) for a minimum period of one (1) year. " In addition to the above clause, main bidder may be qualified to manufacture EOT crane in collaboration with the crane supplier who can meet the above mentioned criteria. " Kindly accept.	Bidders proposal is not acceptable. Bidder to comply with the Specification Requirements.
58	Section VI /Part A	I-A	20 of 35	4.26.1 (e)	**Agitator:** Application = Wet Limestone based FGD application in Coal fired power plant. Eqp rating = Agitator rating not less than that supplied for 500 MW or higher size unit for similar application.	Presently only one Indian OEM (Remi Process Plant & Machinery Ltd) meets the provenness criteria. In order to increase vendor base following modification in Provenness clause is requested. "**Application** = Bidder/Sub-vendor should have designed/got designed, supplied, erected and commissioned at least one (1) number agitator for FGD or other process industries like petrol-chemical or metals and mining industry etc. successfully running for a period of at least one (1) year. **Equipment Rating:** Bidder/Sub-vendor shall supply only the type of the Agitators (vertical and horizontal) for which the bidder is qualified. Motor rating should be minimum 50% of rated power of largest power consuming agitator."	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 195 of Clarifications 01.
59	Sipat_Errata_Technical_Specs	Amendment 08 to Technical Specifications (Section VI)	646 of 700	Sl No. SG.59	**Vacuum Belt filters** Application: Wet Limestone based FGD application in Coal fired power plant or in any other process application Equipment rating = **19 T/hr (minimum).**	**In addition to sl. no. SG 59 of Amendment 08 to Technical Specifications (Section VI) Customer is requested to consider the following clause for any Bidder/Sub-vendor quoting in partnership with Technology Provider / Qualified OEM not resulting into JV/Subsidiary:** In case, the Bidder or the proposed sub-vendor is not a manufacturer of proven Vacuum Belt Filters as per clause 4.26.1 (f) above, the Bidder or the proposed sub-vendor shall also be considered qualified for manufacturing and supply of the Vacuum Belt Filters, provided that it has valid partnership agreement for design, engineering, manufacturing, supply of such Vacuum Belt Filters with such manufacturer who meets the requirements stipulated at clause 4.26.1 (f). In addition, the Bidder shall be required to furnish a letter of support from Technology provider along with the agreed scope matrix for successful performance of the equipment valid up to the end of defect liability period of the contract as per the format enclosed in the bidding documents, at the time of placement of order on the approved sub-vendor. Kindly accept.	Bidders proposal is not acceptable. Bidder to comply with technical specification requirements.
60	VI-A	SUB SECTION-I-A	11 of 35	4.16	The Bidder/ its sub-vendor should have designed, manufactured, erected and commissioned COLTCS with ball collecting strainer having diameter of not less than 2100 mm, which is in successful operation in at least one (1) station for a minimum period of one (1) year.	It is to be noted that COLTCS is a supply package and its supplier is responsible only for the design, manufacturing, and commissioning of COLTCS and Erection is done by bidder through separate Erection agency. Therefore, kindly remove the word "Erection" from the Provenness Criteria.	Bidders proposal is not acceptable. Bidder to comply with technical specification requirements.

61	VI-A	SUB SECTION-IV	6 of 73	1.01.02 (iv)	For deficiency in Average Condenser Pressure in mm Hg(abs) measured at 300mm above top row of condenser tube at 840 MW, 0% makeup, design CW temperature and design CW flow - Not more than 65 mmHg (abs)	A. NTPC specification has envisaged excessive margins in the Condenser Cooling Water system, which has increased the cost of Cooling tower, CW Pumps, CW Pump house, CW Piping, its electrical system etc along with exorbitant increase in the Auxiliary power consumption of CW Pumps and Cooling tower (IDCT). i.The HBD's are to be designed and guaranteed for Condenser back pressure of 77 mmHg (abs) at 33 degC (refer Cl no - 2.01.02 (vii), Sub sec A-01, Sec VI, part B page 31 of 87) ii.However, the Condenser is specified to be designed for 65 mmHg back pressure at 33 degC (Refer Cl no - 2.02.03 (vi), Sub sec A-01, Sec VI, part- B, page 35 of 87). The above two clauses ensures that huge margin is built into the Condenser cooling water system as elaborated further: •The Condenser CW flow required for 77 mmHg back pressure at 33 degC CWT is approx. 56000 Cubm/hr. for 800 MW TPP •Whereas, the Condenser CW flow required for 65 mmHg back pressure at 33 deg C is 81000 Cubm/hr. for 800 MW TPP Due to higher CW flowrate the CW pumps as well as Cooling tower auxiliary power increases by approx. 2.5 MW (2 MW in CW Pumps and 0.5 MW in IDCT). For a nominal Auxiliary power evaluation factor of 2 lacs/KW, this corresponds to 50 Crores additional running cost to NTPC, which is exorbitant and more so for the sake of only building margin. In addition, due to higher CW flowrate, all the equipment (i.e. – Condenser, CW Pump, CW Pump motor, CW piping, all large diameter valves of CW system, Cooling Tower, COLTCS, etc.) in CW system are much larger than required. This has increased the capital cost of entire CW system. Please note the margin specified is so excessive that, when CW inlet temperature to Condenser is 36.3 degC then only the Condenser will be operating at 77 mmHg back pressure. Also, if three (3) CW pumps are provided, then only two CW Pumps are required to operate to achieve 77 mmHg backpressure in the Condenser at 33 degC. The above margins as specified in NTPC specification can be rationalised and the net generation of plant can be increased by 1 MW by selecting Condenser design back pressure as 70 mmHg at 33 degC instead of 65 mmHg at 33 degC. B.Following margins are further specified for the design of Cooling tower, which has increased the Cooling tower cost further: i.The Condenser is designed for 33 degC CW inlet temp. (refer Cl no - 2.02.03 (ii), Sub sec A-01, Sec VI, part B page 35 of 87) but the Cooling tower is designed for 32.5 degC cold water outlet temp. (refer Cl no - 3.02.00 (g), Sub sec A-01, Sec VI, part B page 46 of 87). Due to above, the Cooling tower size is increased by approx. 24% (because Cooling tower approach w.r.t to design inlet wet bulb temperature (27.5 degC) is reduced to 4.5 degC instead of 5 degC.) ii.Design Range across cooling tower is specified as - Temperature rise across condenser + 1 deg C. (refer Cl no - 3.02.00 (f), Sub sec A-01, Sec VI, part B page 46 of 87). Further margin is considered in the design heat load of Cooling tower. iii.It is further specified that the Cooling tower are to be provided with 4 nos. spare cells (refer Cl no - 3.03.00, Sub sec A-15 CW System, Sec VI, part B page 10 of 40), which amounts to additional 10% margin. iv.It is further specified that fan for each cooling tower cell shall be sized (fan design point at test block) to have at least 5% margin on flow and min 10% margin on total head over and above the maximum cooling tower fan air flow and total head required (cooling tower fan duty point) (refer Cl no – 4.15.5, Sub sec A-15 CW System, Sec VI, part B page 20 of 40). This amounts to further margin of 15% for each fan and its associated electrical and mechanical equipment. C.In the NTPC specification, total Head of the CW pump at rated flow is specified as Sum of static lift from minimum water level in CW pump house sump to top of hot water distribution header at Cooling Tower + 110% of friction drop in the entire CW system + pressure drop across Condenser with 2 MWC margin (minimum) (refer Cl no - 3.01.00 (e), Sub sec A-01, Sec VI, part B page 45 of 87). This 2 MWC additional margin corresponds to approx. 20% margin on entire friction drop. i.e., total margin on friction drop is increased to 30%. The above margins as specified in NTPC specification leads to exorbitant increase in cooling tower size, auxiliary power consumption and cost. The combined margins envisaged by NTPC are exceeding 50%, which is sheer wastage. The Cooling Tower cost can be reduced by 20% and the net generation of plant can be increased by 2 MW if these excessive margins are rationalised as below: •The condenser design back pressure is selected as 70 mmHg at 33 degC instead of 65 mmHg at 33 degC •The design cold water temperature at cooling tower outlet is revised to 33 degC instead of 32 degC. •The extra 2 MWC margin for CW Pump head is removed.	Bidders proposal reviewed and is not acceptable. Bidder to comply with technical specification requirements.
	VI-A	SUB SECTION-IV	4 of 73	1.01.01 (iii)	TG Output: Continuous TG output of 840 MW unit load (i.e. 105% of rated load) under rated steam conditions at 77 mm Hg (abs) condenser pressure with zero make-up.		
	VI-B	SUB SECTION-A-01	35 of 87	2.02.03 (vi)	(vi) Guarantee Condenser pressure - To be optimised by bidder but not exceeding 65 mmHg (abs).		

62	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	PAGE 17 OF 29	7.04.02	The filter cloth shall be polyester or polypropylene as per the proven design of the supplier and shall be guaranteed for a minimum life of not less than 7000 hrs.	No GDS supplier provides guarantee for operational life as it depends upon the usage conditions. The guaranteed life of 7000 hours is not being provided by the OEMs for filter cloth. Therefore, guaranteed life of filter cloth shall be as provided by OEM. **Please accept.**	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 91 of Clarifications 01.
63	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	Page 17 of 29	7.04.04	The sealing belt shall have minimum life of not less than 7000 hrs.	No GDS supplier provides guarantee for operational life as it depends upon the usage conditions. The guaranteed life of 7000 hours is not being provided by the OEMs for sealing belt. Therefore, minimum life of sealing belt shall be as provided by OEM. **Please accept.**	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 92 of Clarifications 01.
64	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	Page 18 of 29	7.05.06	Each vacuum receiver tank(s) shall be provided with slide plate type pneumatic vacuum breaker. The plate shall be stainless steel with a min. thickness of 3 mm.	Bidder shall provide as per the proven design of the OEM meeting the system requirement. **Please accept.**	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 93 of Clarifications 01.
65	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	Page 18 of 29	7.04.10	A 2 m (min.) wide platform shall be provided around each belt filter.	Bidder shall provide a common platform between the belt filters of adequate width between the belt filters. **Please accept.**	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 94 of Clarifications 01.
66	SECTION-VI, PART-B	SUB-SECTION-E-4 (FGD)	Page 3 of 5	1.09.00	Vacuum Belt Filter System - QUALITY ASSURANCE PLAN	The Quality Plan shall be submitted by the bidder indicating the applicable details of tests and inspections during contract stage providing necessary technical justifications as per previous experience with similar application. **Please accept.**	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 95 of Clarification 01.
67	SECTION-VI, PART-F	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	PAGE 22 OF 38	1.22.12	Mandatory Spares- Belt (if applicable): 1 Set	For spare belt, bidder shall supply wear belt or sealing belt. We are not considering the mother / drainage belt in mandatory spares. **Kindly confirm.**	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 531 of Clarifications 02.
68	VI/B	D-1-5	1 of 69	5.01.00 i)	All the buildings and site development including landscaping shall be designed to take care of rain water harvesting & ground water recharging. Development of rainwater harvesting scheme for the project and obtaining approval of the scheme from Central Ground water board is in bidder's scope	As the site is having rocky strata at shallow depth, bidder understands that ground water recharging is not possible. In this case, roof water from buildings will be collected in rain water harvesting earthen ponds through separate RCC drains. Surplus water from pond will be discharged to existing customer's drain through overflow RCC drain. Please confirm this methodology for rain water harvesting system and confirm the location, numbers and capacity of earthen pond.	Bidder's proposal reviewed but not accepted. Bidder to refer Sl. no. 22 of Clarifications 01 under "Employer's response to typical Bidder's queries on Section VI technical Specifications".
	EMPLOYERS RESPONSE TO TYPICAL BIDDER'S QUERIES ON SECTION VI TECHNICAL SPECIFICATIONS		4 of 147	S. No. 22	Bidder's query: Please provide the detailed specification, scheme and requirement of water storage pond/capacity for the rain water harvesting in main plant area and other buildings/facilities/structures. NTPC reply: Development of rainwater harvesting scheme for the project and obtaining approval of the scheme from Central Ground water board is in bidder's scope		
69	IV (GCC)		56 OF 90	24.4	As soon as all works in respect of Pre-commissioning are completed and, in the opinion of the Contractor, the Facilities or any part thereof is ready for Commissioning, the Contractor shall commence Commissioning as per procedures stipulated in Technical Specifications, and as soon as Commissioning is satisfactorily completed, the Contractor shall so notify the Project Manager in writing.	For balance of plant (BOP) packages, it is observed that owing to pending minor and non material activities, BOP suppliers face difficulties in obtaining completion certificates. This unnecessarily squeeze their resources. It is requested that for BOP packages completion certificate may be issued by project manager if the Facilities or any part thereof has reached completion even some **minor activities not materially affecting the operation or safety of the Facilities are balance.** Please accept.	Bidder's proposal was reviewed but not accepted. Bidder to comply with tender requirements.
	IV (GCC)		56 OF 90	24.5	The Project Manager shall, within fourteen (14) days after receipt of the Contractor's notice under GCC Sub-Clause 24.4, either issue a Completion Certificate in the form specified in the Forms and Procedures section in the bidding documents, stating that the Facilities or that part thereof have reached Completion as at the date of the Contractor's notice under GCC Sub-Clause 24.4, or notify the Contractor in writing of any defects and/or deficiencies.		
70	VA & VB (SCC)		2 OF 11	2	Definitions GCC 1 Add the following at the end of Clause: For the purpose of GCC clause 24 (Completion of the Facilities), GCC clause 25 (Commissioning, Guarantee Tests and Operational Acceptance), GCC clause 26 (Completion Time Guarantee) and GCC clause 27 (Defect Liability), part of facilities shall mean each one unit of **800 MW.**	Bidder understand that for BoP (Balance of Plant) packages, like - Air Conditioning System, Ventilation system, Fuel Oil pump House, Mill Reject System, FGD -Vacuum Belt Filter & Agitators, EOT Crane, Compressed Air System, Elevators etc. completion, commissioning, Guarantee tests and operational acceptance certificate shall be issued package wise, delinking from the overall 800 MW unit. Please confirm.	Technical specifications are clear in this regard, bidder to comply.
71	SECTION – VI, PART-A	IIA-10 WATER TREATMENT PLANT	1 OF 12	1.01.02	Two (2) numbers of reactor type clarifiers of..... for PT-CW system.	Two (2) numbers of reactor type clarifiers is mentioned in Water Pre-Treatment plant(Section VI-Part-A) and equipment sizing criteria(Section VI - Part-B) . In tender P& ID in pictorial representation 2 nos of Clarifier is shown but it is written " PT CW Clarifier **(3 Nos)** ". Pls confirm number of Clarifier to be considered for PT-CW System.	Two (02) numbers reactor type clarifiers for PT-CW system are envisaged.
	SECTION – VI, PART-E	LIST OF TENDER DRAWINGS	XXXX-XXX-POM-A-006	Tender P&ID	Single line flow & instrumentation diagram of Pre-treatment Plant in Tender drawing.		

72	SECTION – VI, PART-B	A-01 EQUIPMENT SIZING	52 OF 87	3.06.00 -C 2)b	Two (2) (2x100%) (1W+1S) numbers of backwash disposal pumps shall be provided.	Two (2) numbers of filter backwash pump is to be provided as per Equipment sizing. In tender P& ID 3 nos of filter backwash pump is shown.. Pls confirm number of filter backwash pump to be considered.	Tender P&ID is indicative. 2x100% filter backwash pump as per clause 3.06.00 C) 2 b) shall be provided.
	SECTION – VI, PART-E	LIST OF TENDER DRAWINGS	XXXX-XXX-POM-A-006	Tender P&ID	Single line flow & instrumentation diagram of Pre-treatment Plant in Tender drawing.		
73	VI	Part C	58 of 119	30.00.00	The equivalent 'A' weighted sound pressure level measured at a height of 1.5 m above floor level in elevation and at a distance of one (1) meter horizontally from the nearest surface of any equipment/machine, furnished and installed under these specifications, expressed in decibels to a reference of 0.0002 microbar, shall not exceed 85 dBA…….	The noise level of Diesel Engine set required for Fire Water Pump will be as per OEM standard. No enclosure will be provided for emergency DE required for Fire water pump set. Customer is requested to confirm the same.	Bidder's undersatnding is not correct. Bidder to comply with specification requirement. Necessary enclosure shall be provided to meet noise level as per specification.
74	VI	Part B--A18	3 of 14	5.04.00	Location of Infrared detectors on coal conveyors	1. One infra red detector shall be located near head of the coal/biomass conveyor. Infra red detector is not considered at the tail end of the conveyor. 2. No infrared detectors are considered for limestone, gypsum, ash and biomass conveyors. Customer may please confirm.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 594 of Clarifications 02.
75	VI	Part B--A18	5 of 14	5.08.03	Interface between fire water pumps PLC, Fire Detection & Alarm (FDA) and plant DCS	1. Fire water pumps PLC shall be interface with station wide LAN for two –way transfer of signals for information sharing through dual fibre optic connectivity. 2. Fire detection & alarm system shall be interfaced with Fire water pumps PLC (drives running status) via hardwiring with interface modules. 3. Fire detection & alarm system shall be interfaced with plant DCS (fire alarm and system trouble) via hardwiring with interface modules. Customer may please confirm.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 595 of Clarifications 02.
76	VI	Part B--A18	8 of 14	5.15.00	Cabling for Fire Detection & Alarm (FDA)	1. Cable size of 1 Pair x 1.5 sqmm, armoured, shielded shall be used for loop wiring. 2. Cable size of 2C x 2.5 sqmm armoured shall be used for powering various devices in loop and solenoid valves of spray system 3. Inside buildings cables shall be laid directly on the wall with saddle spacers. No conduit shall be used for laying FDA cables. 4. In conveyor areas, cables shall be buried along the conveyor length with HDPE conduits. Customer may please confirm.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 596 of Clarifications 02.
77	VI	Part B--A18	10 of 14	5.18.00	Multisensor detector shall be provided for return air ducts of main plant, which shall consist of intake probe, detector housing, and exhaust pipe etc. The detector shall be mounted outside the duct.	Duct detectors are not considered as multisensor detectors shall be provided in the AHU room. Customer may please confirm.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 597 of Clarifications 02.
78	VI	Part B--A18	8 of 14	5.13.00	Power Supply for Fire Alarm Panels & Repeater Alarm Panel	Fire Alarm Panels shall be powered from 1 no. of 230 V AC plant UPS system. Customer may please confirm.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 598 of Clarifications 02.
79	SECTION VI, PART-B	SUBSECTION-B-08 HT LT & CON-TROL CABLES	3 of 7	2.010.00	For LT cables, Same cable sizes to be used for same type & rating of motor i.e., if there are three drives for one application, all three-drive motor should be provided with same cables sizes. However due to layout constraints no of runs of same size cable may be increased.	This clause will make cable sizes over designed; viz for CHP/AHP applications where cable lengths are on higher end. Further this may also require PJB's on the motor/panel ends to meet the no. of runs requirement. The above is accepted in Koderma Phase II tender (Corr. 10/ Tech. Clarification No 2/Sl no 406). Request Customer to accept in this tender also.	Bidder's proposal is not acceptable. Same type & rating of motors at same location area like CT fan motors etc., shall have same cable size. Bidder is requested to comply clause no. 2.010.00 of the technical sepcifications.
80	General	-	-	-		For cable laying up to proposed Biomass area from CHP area, it is requested to use existing cable rack to fix 2X600mm width cable tray. Kindly confirm Further if required existing cable trays shall be allowed for proposed system	Bidder's proposal has been reviewed but not accepted. Bidder to comply with tender requirements
81	SECTION-VI/ PART B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 8 OF 15	3.06.00 h)	Sizing of LT boards A)Power factor 415 V Uni-Directional drives is taken as 0.8 and efficiency as 0.85 Power factor of 415 V bidirectional drive loads is taken as 0.65 and efficiency as 0.8 for motor rating less than 15 kW. For motor ratings of 15 kW and above the corresponding values are 0.75 and 0.8.	Efficiency shall be as per IEC standard . Kindly accept	Bidder is requested to comply clause no. 3.06.00 h) of the technical sepcifications.
82	SECTION-VI/ PART B	SUB SECTION-II-B-02 MOTORS	PAGE 1 OF 4	3.01.00	Continuous duty LT motors upto 50 KW Output rating (at 50 deg.C ambient temperature), shall be super Premium Efficiency class-IE4	Kindly accept IE3 Efficiency class for LT motors upto 50kW	Bidder is requested to comply clause. no.3.01.00 (b) of the technical specification.
83	SECTION – VI/ PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	PAGE 3 OF 20	1.05.02	Local Motor Starters -for ventilation fans (up to 5.5 KW)	Local starter panel (with grouping) for Track hopper complex/tunnel/dozer shed & any other isolated location in CHP/AHP/BMS shall be permitted as the cable length and qty to individual fans will be huge and will be cumbersome to maintain. Local Motor Starters -for ventilation fans (up to 7.5 KW) Customer to kindly accept	Bidder is requested to comply clause. no. 1.05.02 of the technical specification.

84	SECTION-VI/ PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 76 of 79	4.12.00	Coal/Limestone Sampling system (a) Coal Sampling Unit shall be controlled through main coal handling plant DDCMIS. Controls and interlocks for proper material flow shall be provided similar to conveyor system. Mimic shall be provided in the Operator Work Station (OWS) at main CHP /FGD control room.	Coal Sampling Unit shall be controlled **through PLC** provided by the Contractor. Kindly accept	Accepted. Coal Sampling Unit shall be controlled through Standalone PLC system . Controls and interlocks for proper material flow shall be provided similar to conveyor system. However, Mimic shall be provided in the Operator Work Station (OWS) at main CHP DDCMIS located at CHP control room
85	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP	General Layout Plan (dwg. No. XXXX-999-POC-F-001)	Kindly confirm if bidder has the provision to modify / optimize the scheme/ layout of CHP, LHP, GHP and BMHP meeting all the functional requirements specified in NIT.	Bidder can optimized the scheme for CHP/LHP/GHP/BMHP by meeting all the functional requirement as per NIT specification. Further, bidder to refer the scheme as indicated in respective flow diagram for compliances.
86	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP		Kindly confirm for utilization of Laydown area (marked for future space to be used for Methanol/hydrogen plant) for stage-III CHP,LHP/GHP facilities.	Bidder's proposal reviewed but not accepted.
87	Sipat Errata_Technical specification	PDF 700 Pages	PAGE 568 of 700	Flow diagram	Coal + Biomass Flow Diagram & LHP/GHP Flow diagram XXXX-001-POM-A-040(OPTION-2) (Rev-B) XXXX-001-POM-A-040(OPTION-1) (Rev-B) XXXX-001-POM-A-039(SH-1) (Rev-B) XXXX-001-POM-A-039(SH-2) (Rev-B)	NTPC requested to review Rev-A flow diagrams issued as part (CHP,BMHP, LHP & GHP) of Re-tender & flow diagrams issued as part of Errata_Technical specification & issue revised flow diagrams in Rev-C after re-conciliation of Conveyor numbering,TP numbering,Number of TP's, BOQ & Capacity like gypsum conveyors & Notes etc.	Noted. Bidder to refer the latest revision only.
	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	CHP Flow Diagram	Coal + Biomass Flow Diagram & LHP/GHP Flow diagram XXXX-001-POM-A-040(OPTION-2) (Rev-A) XXXX-001-POM-A-040(OPTION-1) (Rev-A) XXXX-001-POM-A-039(SH-1) (Rev-A) XXXX-001-POM-A-039(SH-2) (Rev-A)		
88	SECTION– VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	PAGE 33 OF 73	Cl.No. 1.03.7.02.1 (III) & (iv)	(iv) Flow Path III (Biomass stream): **Bidder shall also demonstrate the guaranteed tippling rate of Truck Tipplers.** (iv) Flow Path IV (Lime stone flow path): **Bidder shall also demonstrate the guaranteed tippling rate of Truck Tipplers.**	Customer is requested to amend this this clause inline with Dalipalli Stage-II 1X800MW tender **(i.e. Bidder shall also demonstrate the guaranteed tippling rate of Truck Tipplers. Guaranteed tippling rate shall be as finalized during detailed Engg.)** as the guaranteed truck tippling rate is dependent on following: 1.Capacity of Truck (which will be fixed by customer). 2.Cycle time of operation. 3.Operating efficiency. All the above parameters are dependent on end user, so bidder cannot guarantee the same. Kindly confirm. In case the above recommendation is not acceptable, then we request customer to furnish guaranteed tippling rate of Truck Tipplers for both biomass and limestone handling system in the tender.	Agreed. However, it should not be less than seven for any combination of truck. Bidder to refer the amendment sl. No. MH-01B in this regard.

89	SECTION– VI, PART-A	IIA-14	PAGE 1 OF 5	Cl.No. 2.01.01	Capacity of Lime handling Box Feeders/ Bulk-material Receiving Unit/ Surface feeder each of 150 TPH	We are considering Lime handling Box Feeders/ Bulk-material Receiving Unit/ Surface feeder capacity 150 TPH as entire LHP system capacity is 150 TPH & it will be difficult to show guaranteed capacity of 200 TPH. **Please confirm the rated capacity of Lime handling Box Feeders/ Bulk-material Receiving Unit/ Surface feeder.**	Bidder to refer Errata to Section VI technical specifications SN MH-55
	SECTION– VI, PART-B	A-20	PAGE 25 OF 79	Cl.No. 4.21.00	The intake and onward discharge capacity of Lime handling Box Feeders/ Bulk-material Receiving Unit/ to be 200 TPH per Box Feeder		
	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	CHP Flow Diagram	LHP Flow diagram XXXX-001-POM-A-039(SH-1) (Rev-A & B) Capacity of Lime handling Box Feeders/ Bulk-material Receiving Unit/ to be 200 TPH per Box Feeder		
90	Section-VI, Part-A	IIA-15	4 of 6	2.04.00	Biomass Bucket Elevator along with its supporting structures, Buckets, chain/Belt.	We understand that belt-type bucket elevator is also acceptable for LHP & Biomass Handling system. **Please confirm**	Bidder to comply the stipulations of technical specification. Bidder to provide chain type bucket elevator only for lime stone handling. For biomass handling bidder understanding is in order.
	Section-VI/Part-B, Mech	A-20	24 of 79	4.20.01	The type (Centrifugal/Continuous) of the Bucket Elevator (Chain type) shall be chosen by Bidder for the material and conditions specified		
91	NIT specification				NIT specification documents 1. SIPAT Specification PART-A to E 2. Errata to Section VI technical specifications (Part of tender specs) 3. Sipat_Response_Typical_Queries (Part of tender specs) 4. Clarifications/response of bidder queries during tender discussions	Bidder request customer to clarify the Document order to be referred in case of discrepancy in Quantity, Capacity & Specification of the equipment/system.	Sipat-III Technical Specifications Part A to E shall be read in conjuction with Errata to Section VI technical specifications & Employer's response to typical bidder's queries on Section VI, and the Amendments/ Clarifications issued thereof, in the order of precedence as below: 1. Amendments issued for the Sipat-III in the bulk EPC tender 2. Clarifications issued for the Sipat-III in the bulk EPC tender 3. Errata to Section VI technical specifications (part of Section VI of the Sipat-III bidding documents) 4. Employer's response to typical Bidder's queries on Section VI (part of Section VI of the Sipat-III bidding documents)
92	Employer's response to Typical Bidder's Queries	Clarifications No. 2		370	Bidder's understanding is not correct. Bidder to comply Technical Specification requirement.	Customer is requested to refer Clarification issued in Singrauli tender (Sl No. 150 of Technical clarification 01, page no. 27 of 31) wherein it is accepted the 0.8 m/min shall be applicable for bag filter above buffer hoppers in case of vacuum conveying and for other locations like classifier silos, intermediate silos, main silos, coarse/fine ash hoppers, air to cloth ration of 1.5m/min is acceptable	Issue already clarified, bidder to follow the stipulation of technical specification.
93	Employer's response to Typical Bidder's Queries	Clarifications No. 2		378	Bidder's understanding is not correct. BAHP water pumps can not be used for APH/Duct Hopper ash evacuation. In that case, bidder may consider separate pumps (1W + 1S) for APH/Duct Hopper application.	ECO ash evacuation system is continuous operation. In case, Eco outlet duct hopper ash (as applicable), APH hopper ash and Duct hoppers ash (if applicable) are evacuated in intermittent operation, then its operation will be in sequence after BA evacuation (as per Clause No. of 1.03.09 A, Sub Section IV Functional Guarantees page 34 of 73 of NIT spec), then the same BAHP water pump can be used for BA evacuation and coarse ash evacuation from Eco Outlet, APH, Duct Hopper ash. The same philosophy is considered in Talcher and Lara project. For ECO ash evacuation, separate pump can be installed in boiler area taking suction from continuously running BALP water pump. NTPC is requested to review again w.r.t other recent Talcher, Singrauli and Lara specification.	Issue already clarified, bidder to follow the stipulation of technical specification.
94	Employer's response to Typical Bidder's Queries	Clarifications No. 2		389	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.	Since duty factor for transport air compressors is already considered, duty factory for FA water pump should not be considered. FA water pumps shall work only when dry system (compressors) is not working. Also, Bidder understands that the duty factor of combined ash slurry pumps is considered as 0.5 considering only BA/CA slurry disposal in wet mode. Refer Sl No. 391 of Clarification No. 2 for duty factor of combined ash slurry pump and MH-53 of Amendment No. 2. Kindly review.	Issue already clarified, bidder to follow the stipulation of technical specification.
95	Employer's response to Typical Bidder's Queries	Clarifications No. 2		337	Pumping distance to be considered for calculation of head shall be 14.5 kM	Total length of slurry pipes to be supplied in 39 Kms. Hence each length works out to be 13 km. Moreover the furthest point of ash dyke is not more than 10 kms. Customer is requested to review the maximum pumping distance to be considered for selection of pump head. Additionally, customer has specified that provision should be there for locating additional pump in series within the pump house for future use. Customer is requested to review the maximum pumping distance to be considered for selection of pump head as it is having impact on the number of pumps in a series.	Pumping distance to be considered for calculation of head shall be 13.5 KM or actual whichever is higher. Bidder to refer the amendment sl. No. MH-02B in this regard.
96	Employer's response to Typical Bidder's Queries	Clarifications No. 2		762	Specified elevation of Top of ash dyke corresponds to ultimate dyke height, which shall be considered for slurry disposal pump head selection	With reference to ash dyke details received vide Amendment no. 3, the top of dyke (4th raising) is RL 287 (maximum. Bidder understands that RL difference between ash slurry sump and top of ash dyke.	Specified elevation of Top of ash dyke corresponds to ultimate dyke height, which shall be considered for slurry disposal pump head selection.
97	Errata to Section VI Technical Specifications	Amendment No. 2	16	MH-14	Following are MOC for the parts of DAES valves:-	The DAES valves are proprietary in nature for OEM (AHP suppliers). We have contacted various AHP suppliers like M/s Indure and M/s UCC. Such OEM specific specifications will restrict AHP suppliers and all OEMs shall not be at par. Hence, customer is requested to amend the referred clause. M/s UCC has regretted to follow. Following are UCC observation/recommendation. UCC has supplied valves to NTPC with following MOC. NTPC is requested to accept.	SN MH-14 of Errata to Section VI Technical Specifications is hereby withdrawn.
					Sl Item description Technical Specification requirements		
					1. Buffer hopper RSV Gate & seat /Air lock tank inlet & outlet valve seat & disc MOC: ASTM-A532-82 CLASS-III TYPE-A, Hardness-600 BHN(Min) stress relieved. Lap finish; This is not applicable for Dome Valves	**Seat:** HIGH CHROMIUM WHITE CAST IRON WITH 550-600 BHN, ASTM A532 CLASS 3 or DURITE H/ALLOY CI WITH 550-600 BHN **Disc:** DURITE H/ALLOY CI WITH 550-600 BHN	
					2. Pressure equalizing valve seat MOC: AISI:8620, Hardness - 500-550 BHN (Min),stress relieved. Lap finish	**Seat:** DURITE H/ALLOY CI , 500 BHN MINIMUM or Carbon Steel 6mm as per IS 1570 or IS 2062 and liner shall be 8 mm thick ceramic, 82 HRC.	
					3. Pressure equalizing valve disc MOC: ASTM-A532 CLASS-III TYPE-A, Heat Treated: To achieve 600BHN(Min.) & stress relieved. Lap finish	**Disc:** DURITE H/ALLOY CI , 500 BHN MINIMUM or Carbon Steel 6mm as per IS 1570 or IS 2062 and liner shall be 8 mm thick ceramic, 82 HRC.	
					4. MHV (material handling valve) slide /ESP outlet valve slide MOC: SS 410; HARDNESS:325BHN(Min). Lap finish	**Disc/Slide**: DURITE H/ALLOY CI , 550 BHN MINIMUM	
					5. MHV (material handling valve) seat /ESP outlet valve seat MOC: As per IS:4771-1985, Type-1A; Hardness: 500 BHN (Min), Ni/Cr=30/300. Lap fin- ish	**Seat:** DURITE H/ALLOY CI , 550 BHN MINIMUM	
					6. Branch Segregating valve slide gate MOC: SS-410, Hardness- 325BHN(Min.) Surface finish at both the faces= 16 micron	Vacuum system: **Slide/ Gate:** GRAY IRON G4000 ASTM A159-70 250 BHN	
					7. Branch Segregating valve seat Ni/Cr 30/500 AS PER IS 4771-1985 TYPE 1A (300 BHN MIN.) Lap finish	**Seat:** GRAY IRON G4000 ASTM A159 250 BHN 1st stage Pressure system: **Slide /Gate:** DUCTILE IRON 255 BHN **Seat:** STAINLESS STEEEL 410 WITH 40 HRC	
					In case of any conflict with other clauses, 2.15.00 shall supersede other clauses	NTPC is requested to accept above proposal.	

98	Errata to Section VI Technical Specifications	Amendment No. 2	19	MH-27	SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYS- TEM - XXXX-001-POM-A-025-Rev B	1. As per the revised SLFD, Bidder understands that bottom ash slurry discharge from BAH shall be taken to ash slurry transportation pump house only and not to ash slurry disposal pump house. Please confirm.	Bidder to note that the discharge pipe from bottom ash hopper shall be routed to sump of ash slurry transportation pump house when discharge to dewatering bin is intended otherwise if discharge to ash dyke is intended then the discharge pipe from bottom ash hopper shall be routed to ash sump of slurry disposal pump house. (P&ID corrected)
99	Errata to Section VI Technical Specifications	Amendment No. 2	19	MH-27	XXXX-001-POM-A-026-Rev B	The number of combined ash slurry pump series working is two numbers. In case of jet pump system, the water requirement is increasing due to flushing of pump after every BA/CA slurry discharge (two times in a shift of 8 hrs). In case of FA slurry discharge from intermediate silo, flushing is one time in a shift of 8 hrs. This increases the ash water requirement largely. We understand that when all BA/CA and FA are working in slurry mode, ash water recovery will be available and accordingly the ash water balance and raw water pump shall be selected. Kindly confirm.	Reference tender drawing with ash slurry disposal pump is in order. Bidder to follow the stipulation of technical specification. Raw water pump and water balance to be designed for worst case operation scenario. Bidder to comply with tender requirements.
100	Errata to Section VI Technical Specifications	Amendment No. 2	19	MH-27	XXXX-001-POM-A-028-Rev B	Qty of the Fluidizing blower has been revised to 3 number (2 working + 1 standby) instead of 2 number (1W+1S) for 1W+1SB Intermediate silos (meant for FA slurrification). Please review, it should be 1W+ 1SB only.	Reference tender drawing is in order. Bidder to follow the stipulation of technical specification.
101	Errata to Section VI Technical Specifications	Amendment No. 2	19	MH-27	XXXX-001-POM-A-028-Rev B	Bidder understands that the discharge header along with valves for the conveying air compressors shall be single header and not two headers as this is single unit. Kindly review and confirm.	Bidders understanding is correct. Refer the corrected tender drawing.
102	Errata to Section VI Technical Specifications	Amendment No. 2	19	MH-32	SINGLE LINE FLOW DIAGRAM OF ASH CLASSIFIER SYSTEM (VAC- UUM SYSTEM) - XXXX-001-POM-A-029-Rev B	We understand that the opening and valve arrangement in the classifier silo referred as " to Other classifier" shall be "as applicable" Please confirm .	Bidder's understanding is correct.
103	Errata to Section VI Technical Specifications	Amendment No. 2	19	MH-27	SINGLE LINE FLOW DIAGRAM OF ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM) - XXXX-001-POM-A-029-Rev B	The second classifier system on standby coarse fly ash hopper has been deleted in the revised SLFD. We understand that the opening and valve arrangement in the classifier silo referred as " to 2nd classifier" shall be "as applicable" Please confirm .	Bidder's understanding is correct.
104	Errata to Section VI Technical Specifications	Amendment No. 3	21	MH-33	In case fine ash and coarse ash is coming through same pipelines to the classifiers, Classification of 40 % of ESP ash (40% of ash conveying capacity) in ash classifiers is to be provided. The remaining unclassified ash shall be taken directly to the coarse fly ash hopper. For sizing of classifier, 40% of total number of ash conveying working lines from buffer hopper/ESP shall be considered. In case, calculated number of lines would be fraction, then bidder to consider next higher integer for number of input pipes to the classifier.	**Vacuum system**: In case of 6 Nos (3W+3SB) ash conveying lines coming from buffer hoppers to classifier silo (vacuum system), 40% of 3 working lines is 1.2 and next integer is 2. We understand that the sizing of classifier shall be done for 1.2 (40% of ash conveying capacity for all ESP hoppers) and not 2 (66.7% of ash conveying capacity for all ESP hoppers). We understand that the bypass valve provided below classifier silo is to bypass excess ash (more than 40% of ash conveying capacity) directly to coarse ash hopper. Please confirm. **Pressure system:** In case of 6 Nos (6W) ash conveying lines coming from ESP hoppers to classifier silo (pressure system), 40% of 6 lines is 2.4 and next integer is 3. We understand that the sizing of classifier shall be done for 2.4 (40% of ash conveying line capacity for 1st to 3rd fields of ESP) and not 3 (50% of coarse ash conveying line capacity for 1st to 3rd fields of ESP). We understand that the bypass valve provided below classifier silo is to bypass excess ash (more than 40% of ash conveying capacity) directly to coarse ash hopper. Please confirm. Bidder requests customer to review above so that the capacity of classifier in both the systems (vacuum/pressure) is at par.	Bidder to comply the stipulations of technical specification & its amendment there of. In particular sizing of classifier shall to be done 40% of ash conveying capacity for all ESP hoppers.
105	Errata to Section VI Technical Specifications	Amendment No. 2	28	MH- 49	Complete ash slurry piping.....basalt lined. Cast basalt pipelines along the ash slurry corridor shall be provided at road/rail crossing (Culverts, trenches & Bridges, if any)	We understand that in case of culverts/trenches, maintenance space is there, hence cast basalt lines pipes is desirable. However, in case of piperack/bridges, where sufficient space is available , MS pipes should also be acceptable. Kindly confirm.	Bidder to refer Errata to Section VI technical specifications SN MH-49
106	Errata to Section VI Technical Specifications	Amendment No. 3	7	LA-2	Bidder to route non-cast basalt ash slurry pipelines on pedestal only and pipe culverts shall be provided at rail road crossings	Bidder understands that the BA cast basalt slurry pipes from boiler area/plant area upto BA slurry transportation pump house or combined ash slurry pump house & dewatering bin can be routed on pedestals as per standard practice being followed in NTPC projects. Crossings will have trenches. Please confirm.	Bidder's understanding is correct.
107	Errata to Section VI Technical Specifications	Attachment 3k	Page 3 to 36 of 36	Annexures to Amendment No. 2	Annexures to Amendment no. 2- Attachment 3k (page 3 to 36 of 36)	Bidder understands that the "successful operation of plants for two years" mentioned in attachment 3 K is to be read as "successful operation of plant for one year" as per amendment no. MH 09 (amendment no. 2). Please confirm	Bidder's understanding is in order.
108	Errata to Section VI Technical Specifications	Amendment No. 9 to tech specifications	651 of 700	D9-1	Civil e) Civil and Structural works outside plant boundary for Ash slurry disposal system.	Request customer to confirm whether design of pedestals outside plant boundary are also excluded from bidders scope.	Bidder's understanding is not correct. Design of pedestals outside plant boundary are included in bidders scope.
109	VI (Part A)	I-A PROVENNESS	3 OF 35	3.1 (p)	Provenness of HP Bypass system: Capacity of each valve not less than 750 Ton/hr at 270 Kg/Cm2(abs) & 600 deg.C Main Steam pressure and temperature at Turbine inlet.	This clause is inferred as " 'Capacity of each valve not less than 750 Ton/hr at super critical steam parameters. (i.e. pressure & temperature)." Customer to Confirm.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 690 of Clarificatrion 02.
110	VI (Part A)	VI (Chapter-02)	6 OF 34	B. 29	Control fluid pump assembly including motor and complete coupling	Customer to confirm, whether the requirement is applicable for HP bypass system	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 834 of Clarification 02.
111	VI (Part A)	VI (Chapter-02)	12 OF 34	C. 1 (xxvii.)	Seal kit for Electrohydraulic actuators for HP and LP bypass system- 2 Sets of each	1 Set is inferred as the seal kit required for each type of actuator in HP bypass system.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 600 of Clarification 02.
112	VI (Part A)	VI (Chapter-02)	13 OF 34	C. 1 (xxviii.)	Interface Seal kit for HP/LP bypass servo/proportional valve and blocking unit- 2 Sets	1 Set is inferred as interface seals required for each type of actuator in HP bypass system.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 601 of Clarification 02.
113	VI (Part A)	VI (Chapter-02)	25 OF 34	4.00.00 (3)	a. Electro-Hydraulic Converter/Servo unit/ proportional valve for HPBP b. Blocking unit for HPBP (as applicable) c. Position feedback transmitter for HPBP d. Positioner for HPBP	1 Set is inferred as the components required for HP bypass valve, customer to confirm.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 602 of Clarification 02.
114	VI (Part A)	VI (Chapter-02)	25 OF 34	4.00.00 (5)	Hoses for HP and LP Bypass System- 2 complete sets	It is inferred as 2 complete sets of hoses each for HP and LP Bypass system. Customer to confirm.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 603 of Clarification 02.
115	VI (PART-B)	A-07	4 OF 25	1.16.00 (c)	Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for both HP and LP bypass systems.	Control of the oil system will be implemented in the DCS, no separate control cubicle is envisaged.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 604 of Clarification 02.
116	VI (PART-B)	A-07	4,5 OF 25	1.16.00 (c)	Accumulators shall be sized to take sufficient number of stroking operations of all actuators under a condition of loss of oil supply from the pumps.	Accumulators shall be sized for 2 stroking operations (1 full open & 1 full close) of all actuators. Customer to confirm	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 605 of Clarification 02.

117	VI (PART-B)	A-07	5 OF 25	1.16.00 (h)	All the piping, fittings, valves, oil tanks, strainers including body and element associated with oil system of HP & LP bypass system shall be of stainless steel.	All pipings, fittings, oil tanks and ball valves will be of Stainless Steel MOC. The remaining items like Hydraulic valves, strainers including body and element and other components shall be as per supplier's established practice.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 606 of Clarification 02.
118	VI (PART-B)	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL (E-60)	7 OF 12	41	HP Bypass Valves (Sub QR item)	This shall be changed to HP bypass system	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 608 of Clarification 02
119	VI (Part A)	II- A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	22 OF 28	2.24.01 (b) (2) (Vi)	Four (4) nos. of pneumatic emergency retract drives with matching crank tools for each type of soot blower shall be provided along with required length of connecting pipe, fitting etc. Service air points for actuation of pneumatic drive shall be provided at convenient locations	This is not applicable for all the type of long retractable soot blowers, hence this clause may be removed	The technical specification requirement is clear. Bidder to comply with the same.
120	VI (Part A)	II A-01	25 OF 28	2.30.00 Sl. no. 8	Safety valves and critical valves to be provided with temperature & sound monitoring (may be IOT based) to detect early passing and ensure reliability. Temperature point shall be provided on these valves/lines. For control and monitoring purposes the temperature values shall be taken between 50-75 Deg. C and sound value normally less than 75 db as trigger. The necessary provision shall be accordingly provided with alarm signal in the control room.	Safety valves with temperature & sound monitoring (IOT based) is not envisaged and is not currently provided by any of the OEM manufacturers. Hence safety valves shall be as per earlier executed projects without temperature & sound monitoring.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 210 of Clarifications 02.
121	VI (Part A)	II A-01	25 OF 28	2.30.00 Sl. no. 8	8 d. Sonicleak detection system installation in Safety valves & ERV: 1) Installation of Sonic leak detection system installation in all SLSV and ERVs of critical piping's such as M.S. Safety Valves & ERV/ EBV, CRH SV, HRH SV & ERV/ EBV.	Safety valves & ERV with sonic leak detection is not envisaged and is not currently provided by any of the OEM manufacturers. Hence safety valves and ERV shall be as per earlier executed projects without Sonic leak detection system.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 210 of Clarifications 02.
122	VI (PART-B)	E-60 INDICATIVE VENDOR LIST	14 OF 25	Sl No. 40	ELECTROMATIC RELIEF VALVE (ERV): Bidder is not appearing in the approved vendor list for Electromatic relief valve	Bidder is to be included as approved vendor supplying Electromatic relief valve.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 612 of Clarification 02

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	EMPLOYER'S RESONSE
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
123	VI-C		16 & 17 of 119	8.03.04a(iv)	The complete 3D data (editable model) which shall be utilised for all future detailed engineering related to maintenance, operation, R&M, efficiency improvement of the project etc. Complete 3D model along with as built GADs, layout, isometrics, reports extracted and 3D models for all disciplines , with any other document generated from 3D model and naming conventions with as-built updates along with complete reference databases, component catalogues for all the size range shall be handed over to owner.	Bidder understand since the scope of switchyard pertains to 01 no. 765kV and 02 nos 132kV extension bays only, 3D model will not be applicable for the switchyard scope. Bidder will submit autocad drawings of the extension bays. Please confirm.	Bidder's understanding is correct
	Clarification -1			Sl No.-1	NTPC Reply Data to be submitted to NTPC during detailed engineering as per the provisions of Bidding documents, are not proprietary in nature. Hence Bidder's proposal of providing only the noneditable 3D (review) model is not acceptable. Bidder to further note that there are suppliers available in market who are prepared to provide software with perpetual license. As such, Bidder to comply with Technical specification requirements in entirety.		
124	Clarification -2			Sl no. 173	Bidder comment The sectional drawing of 132kV cable trench is not available. Please provide the same. NTPC Reply Refer Drawing no 0000-215-POE-F-EH1	1) Please refer Detail B for Road crossing. Bidder understand that since there is 02 circuits of 132kV Cable which has to be laid horizontally side by side. Also there is overlap of the route with 765kV transmission line interconnection between 765kV GT and the 765kV GT Bay. Sufficient space is not available to provide 100 % redundancy for 6 runs of cable(i.e. 12 runs). Hence it is suggested to accept one no. additional pipe i.e. 6+1= 7 nos for road/drain/railway line crossing. Please confirm.	The same will be finalised during detailed engg stage.
	Errata to section VI, Annexure to amendment 2				Drg No 0000-215-POE-F-EH1		
125				Drg no. 9500-999-POE-J-001 Rev A	Single Line Diagram- Switchyard	Bidder understands 02 circuits of 132kV cable for interconnection between 132kV bays and 132kV Station Transformer. Spare run of 132kV Cable is not envisaged. Please confirm.	Bidder's understanding is correct
126	VI-B	B-17	35 of 98	08.08.01	The Contractor shall fabricate and install mounting arrangements for the support and installation of all the cables on GI angles / Cable tray supports in the trenches/ above ground.	Bidder understand LT Power & Control cables can be laid on GI angles in trenches and Cable trays for above ground laying. Please confirm.	Bidder's under tanding is correct .
127	VI-B	B-17	28 of 98	Table -I & II	Core Details of CT & CVT	Please provide core details of 132kV CT and CVT	Bidder to finalise the 132KV CT & CVT core details as per the requirement of Protection & metering purpose in line with the speciication .
128	VI-B	B-13	16 of 49	9.00.00 ii)	Dedicated Bay Control units and bay Protection units shall be provided for each bay in the contractor's scope of work. Also, one number BCU shall be provided for the control of SWYD service LT Switchgear.	Bidder understand integration of the mentioned LT extension boards with existing SAS system is not envisaged. Please confirm.	Bidder's understanding is correct.
	VI-A	IIB	11 of 20	1.16.04 ii) s)	The Bidder shall provide ACDB & DCDB Boards for further distribution of 415V AC supply, 220V DC supply for the requirement of Present scope of Bays and these Boards shall be placed in Existing Sipat Stage-I SWYD panel room.		
129	VI-A	I-A	27 of 35	5.14.2 (A)	**(I) 765kV Circuit Breakers:** a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 715 kV or above class which should have been in successful operation for minimum two(2) years prior to the date of Techno-Commercial bid opening.	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor, who have established manufacturing and testing facilities in India and three phase circuit breaker must have been manufactured in the Indian works & successfully type tested as per the relevant standard.**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .I. b
			27 of 35	5.14.2 (A)	**II. 765kV INSTRUMENT TRANSFORMERS (Current Transformers / Capacitor Voltage Transformers as Applicable):** a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno- Commercial bid opening	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor should have Manufactured and type tested single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class prior to the supply of equipment to the project.**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .II. b
			28 of 35	5.14.2 (A)	**III. 765 kV DISCONNECTORS :** (a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(05) nos. of three phase Disconnectors suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor, who have established manufacturing and testing facilities in India and three phase disconnector must have been manufactured in the Indian works & successfully type tested as per the relevant standard.**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .III. b
			28 of 35	5.14.2 (A)	**IV. 765kV SURGE ARRESTER:** a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Surge Arresters suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for a minimum period of two (2) years prior to the date of Techno-Commercial bid opening.	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to amend the Provenness requirement as:- **The Bidder / Sub-vendor, who have established manufacturing and testing facilities in India and single phase Surge Arrestor must have been manufactured in the Indian works & successfully type tested as per the relevant standard.**	The proveness Criteria is clearly indicated on mentioned requirement . Bidder refer to caluse no: 5.14.2(A) .IV. b
130	VI-A	I-A	29 of 35	5.15	The Bidder/ sub vendor should have designed, fabricated, erected and commissioned at least 30 Km transmission line of 400 kV or above voltage class on towers.	The scope of transmission line is limited to approximately 1KM only. Also the actual scope is interconnection of 765kV GT Bay with Generator Transformer. Hence It is requested to remove the PQR scope. or we request the Owner to please remove 765kV Transmission line from the SCOPE of the Bidder.	Bidder to refer Errata to Section VI Technical specifications SN EE-85
131	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	9 OF 20	2.04.04	A redundant station-wide LAN for connecting the unit and other sub systems of DDCMIS, PLCs (as applicable), PC stations etc. as well for connecting to the other off-line services of the Station & connecting to IT LAN. This shall include all cables and accessories required for connecting Contractor's system upto the Employer's systems such as ERP, etc.	Kindly provide the details (purpose, mode of connectivity and distances) regarding employer's system to be connected to the plant station LAN.	Same shall be furnished during detailed engg.
132	SECTION-VI PART-A	E-60 Indicative Vendor List LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER	7 of 25	10	Approved List of Vendor for DDCMIS Bidder is approved for Max DNA System	Bidder make Valmet DNA based DCS System is offered SG,TG, Station C&I, Vibration monitoring System and most of the BoP /Offsite packages for this project. NTPC is requested to approve Bidder for ValmetDNA based DCS system also. Reference List for Vamet DCS is enclosed for ready reference.	To be discussed during detail engineering with relevant supporting documents
133	SECTION-VI PART-A	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	2 OF 3	3.00.00	For HMI items in Coal Handling Plant Control Room in the scope of the contractor A) Till Redundant Incoming feeders (rated 415 V AC) from Employer's existing MCC for Contractor's main redundant UPS system.	Kindly provide the location with terminal point alongwith details of termination	MCC is below the CHP control room. Termination in bidder's scope and same shall be furnished during detailed engg.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	Employer's response
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
134	Sec. VI, PART-B	A-07	8 of 25	2.01.00 (i) (New Clause added in Amendment 01)	Water box, tube plates and support plates material carbon steel as per ASTMA-285 Gr.C or ASTM A-516 GR 70 and suitable for intended duty. ..	Material shall be of Carbon steel as per IS 2062 Gr. BR. IS 2062 Gr. BR is equivalent to ASTM A-285 Gr.C with mechanical properties above par with ASTM 285 Gr. C. Offered grade is suitable for intended purpose. It is to be noted that IS 2062 is part of ASME material i.e. SA/IS 2062 and suitable for pressure parts application.	This is a part of the detailed engineering stage and shall be decided during that stage in case of award. Bidder to comply with the requiments of Technical Specifications.
135	Sec. VI, PART-B	A-07	8 of 25	2.02.00/(C)	…vibration levels shall be Zone A of ISO 10816.	Applicable standard for Vibration for Vacuum pump shall be ISO-10816-1. Vibration shall be as per ISO-10816-1 Zone A/B. ISO 10816-3 is not applicable for LRVP.	ISO-10816-3 is also applicable for Vacuum pumps. Bidder to comply with the requirements of Technical Specification.
136	Sec. VI, PART-B	G-05	8 of 37	2.02.01	Applicable Codes and Standard: ASTM ISO 10816-3 (VIBRATION)		
137	Sec. VI, PART-B	G-06	7 of 14	3.03.04 (ii)(b)	Oxygen content in condensate, at hotwell outlet, shall not exceed 0.015 CC per litre over the entire load range and	In supercritical power plant, oxygen is intentionally dosed in the feedwater cycle for efficient working of boiler. This oxygen level in feedwater is also maintained through deaerator. Since, dosing is deliberately done in the condensate. Therefore it is not possible to demonstrate such a low ppb of dissolved oxygen in the condensate after condenser. This deliberate dosing is not done in sub critical set where it is possible to maintain 0.015cc/ltr of dissolved oxygen in condensate after condenser.	The dissolved oxygen limiting level is achievable in super critical power plant also. Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
138	Sec. VI, PART-B	II-B-02 (MOTORS)	1 of 4	3.01.00 b).	Continuous duty LT motors upto 50KW Output rating (at 50 Deg. C ambient temperature), shall be super Premium Efficiency class-IE4, 50-200 KW shall be of Premium efficiency class-IE3 conforming to IS 12615 or IEC 60034-30.	Clause to be updated as "Continuous duty LT motors upto 200KW Output rating (at 50 Deg. C ambient temperature), shall be of Premium efficiency class-IE3 conforming to IS 12615 or IEC 60034-30."	Bidder's proposal not acceptable. Bidder is requested to comply clause. no.3.01.00 (b) of the technical specification.
139	VI/B	B-13	1 OF 49		General requirements	a) Kindly provide the Single line diagram & System architecture for Substation Automation System at Sipat-I &II.	To be provided during detailed Engineering
140	VI/B	B-13	1 OF 49	1.00.01.1	Control and Monitoring of Switchyard Service Switchgear including Hardware required for the purpose viz. BCU, EFS, LAN Cables etc. GPS Time synchronisation of Switchgear Numerical relays shall also be in the scope of the bidder	Kindly provide the Single line diagram for Switchyard Service Switchgear.	To be provided during detailed Engineering
141	VI/B	B-13	3 OF 49	1.19.00	The interface between BCU and Control Switching Devices shall be in Bidder's Scope.	CSD is non 61850 compliant and is also not shown in SAS communication architecture. Hence CSD interface with BCU shall be hardwired as required.	Bidder's understanding is correct
142	VI/B	B-13	30 OF 49	09.02.11 (c)	Have an operating/resetting time each of less than 15 ms.	LBB protection is time delayed to ensure that breaker is successfully opened on fault. Hence, breaker failure operating & resetting time of 25-35 msec will not affect LBB scheme. In view of this clause, certain relay manufacturer is being forced to supply very high end relays which is not required from application point of view. Customer to confirm operating & resetting time of 25-35 msec for LBB protection.	Bidder's proposal has been reviewed but not accepted. Bidder to comply with tender requirements
143	VI/B	B-13	31 OF 49	09.02.12	Busbar Protection	a) We understand that Bay unit along with tripping relay for present bays are already available in the existsing Busbar protection panel. b) Kindly confirm the make of existing Bubsar protection and provide the existing Busbar protection scheme for reference for both 765KV and 132KV Busbar system. c) Kindly confirm whether the existing Central Unit for 765KV & 132 KV existing Busbar protection has provision of augmenting Peripheral Units of present scope bays.	a) Bidder's understanding is correct. b) The existing make is M/s GE (Formerly M/s Alstom Ltd.). Drawings and details shall be provided to successful bidder at detailed engineering stage. C) It is confirmed. However, it is always advised to the bidder to visit the site and get familiarised with the existing details before submission of the bid.
144	VI/B	B-13 & annexure I of B-13	39 of 49 & 2 of 14	15.00.00, VI(I) & 1.2.2	Phasor Measurement Unit (PMU)	Phasor measurement unit is not applicable as Line protection panel is not in scope of this tender.	Bidder' understanding is correct
145	VI/B	B-13	32 OF 49	09.03.00	Islanding scheme	a) We understand that Islanding panel at SIPAT is already existing and only trip relays for present scope bays are to be considered. Kindly provide the existing Islanding panel schematic drawing b) Kindly clarify the requirement of Islanding scheme for 132KV Switchyard.	Bidder's understanding is correct. Drawings and details shall be provided to successful bidder at detailed engineering stage.
146	VI/B	B-13	32 OF 49	10.02.00	Energy Meters	Refer Substation Automation Architecture XXXX-999-POE-J-003. As per the architecture, separate Metering architecture is existing. Kindly provide the make of existing Energy meters and provide the following: a. Existing Energy meter schematic drawing. b. Existing Energy metering architecture diagram c. Data sheet of existing Energy meter.	Existing make is M/s Secure. Drawings and details shall be provided to successful bidder at detailed engineering stage.
147	VI/B	B-13	33 OF 49	10.02.00	Contractor shall supply energy meters along with metering station, 4 Nos. machine Clients, 20 nos web client license.	Customer to confirm that 4 nos. machine clients called is only for license or 4 nos. separate metering station to be considered along with license.	4 Nos Separate Metering client machines shall be provided.
148	E		5 OF 127		SUBSTATION AUTOMATION SYSTEM ARCHITECHTURE - XXXX-999-POE-J-003	No Large Video Screen for SAS is envisaged in the contract. Kindly confirm.	Bidder's Under standing is correct
149	E		7 of 127		Protection unit of GT bay MU (Merging unit) XXXX-999-POE-J-005	No Merging Unit(MU) has been envisaged.	Bidder's understanding is correct . Bidder refer Errata to Section VI Technical specifications SN EE-45
150	Sec-VI, Part-A	Sub-Sec-IA	07 of 35	4.2.1	In case the bidder/its sub-vendor has acquired the design and technology of the offered pump model from its collaborator under the Technology transfer/Assistance/Licensing Agreement and has executed/is executing the contract(s) for the offered pump model involving design, manufacturing, supply, erection and commissioning, the bidder/its sub-vendor is required to submit the copy of whole/part of the agreement or any other supporting document(s) establishing technology transfer covering drawings/documentation of design, manufacturing, quality assurance plans and imparting relevant training of personnel. Further, the bidder/its sub-vendor shall be required to submit a letter for satisfactory performance of CW pumps along with the techno-commercial bid, as per the format enclosed in the bidding documents.	Customer is requested to waive of the vetting by the Original Technology Provider if the offered model has already been offered in earlier projects and the mentioned documents are already vetted by original technology provider.	Bidder's proposal has been reviewed but not accepted. Bidder to comply with tender requirements.

151	Sec-VI, Part-A	Sub-Sec-IA	21 of 35	4.26.4 (ii)	In case, the bidder or proposed sub vendor is not a manufacturer of proven Wet Limestone Grinding Mills as per clause 4.26.1 (c) above, but have designed, manufactured & supplied dry Grinding Ball Tube mills for at least 500 MW pulverized coal fired power plant, the Bidder or the proposed sub-vendor can also manufacture Wet limestone Grinding Mills provided it has a licensing agreement with a Wet limestone Grinding mills manufacturer who meet the requirements stipulated at clause 4.26.1 (c) above for the Wet limestone Grinding mills and provides extended warranty of three (3) years for the Wet Limestone Grinding Mills. In addition, the Bidder shall be required to furnish a letter of support from Collaborator(s) / Licensor / Technology provider for successful performance of the equipment valid up to the end of defect liability period of the contract as per the format enclosed in the bidding document, at the time of placement of order on the approved sub-vendor.	Customer is requested to modify the clause as "In case, the bidder or proposed sub vendor is not a manufacturer of proven Wet Limestone Grinding Mills as per clause 4.26.1 (c) above, but have designed, manufactured & supplied dry Grinding Ball Tube mills for at least 500 MW pulverized coal fired power plant, the Bidder or the proposed sub-vendor can also manufacture Wet limestone Grinding Mills and provides extended warranty of three (3) years for the Wet Limestone Grinding Mills."	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 288 of Clarifications 02.
152	Sec-VI, Part-A	Sub-Sec-IA	20 of 35	4.26.1 (a)	Application:Wet Limestone based FGD application or ash slurry application in Coal fired power plant	Customer is requested to modify the clause as Application:Wet Limestone based FGD application or ash slurry application in Coal fired power plant or equivalent slurry application in other process plants.	Reply to this query is already included in the section VI under "Employer's response to typical Bidder's queries on Section VI technical Specifications" to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 289 of Clarifications 02.
153	Sec-VI, Part-A	Sec-IIA-06	6 of 10	6.01.00	One set of test kit for measuring oxygen content at deaerator outlet shall also be provided for the station.	Online oxygen measuring provision is being provided by Bidder. Hence, Offline test kit for measuring oxygen content at deaerator outlet is not required. Customer is requested to accept above.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 256 of Clarification 02.
154	Sec-VI,Part-B	Sub-Sec-A-01	38 OF 87	2.03.07	Maximum oxygen content shall be 0.005 cc/lit at deaerator outlet measured as per ASTM-D-5543-09 or Indigo carmine method at all operating condition.	All super critical units operated in oxygenated treatment mode and hence guarantee for maximum oxygen content in feed water system is not applicable for super critical sets.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 257 of Clarification 02.
155	Sec-VI,Part-B	Sub-Sec-G-07	1 OF 2	1.00.00	Tentative Master Drawing list :	Only GA drawing of Heat Exchangers shall be submitted to customer at contract stage for review and approval. Submission of any type of calculation/Crossectional drawing (being proprietary in nature) is not envisaged.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 258 of Clarification 02.
156	Sec-VI,Part-B	Sub-Sec-A-01	38 OF 87	2.03.07	Deaerator capacity below low-low level (BFP tripping point) shall have minimum value of 80m3 (Without dished end volume)	Deaerator Low-Low level shall be 500mm from the bottom of the tank as per Bidder standard practice.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 259 of Clarification 02.
157	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25 & 12 OF 25	5.01.00 & 5.03.00	Low Pressure Heaters and Drain Cooler : Horizontal and U-tube type with integral drain cooler. HIGH PRESSURE HEATERS HP Heaters with de-superheating, condensing and Drain cooling section.	Heaters will be provided with Desuperheating, Condensing and Drain cooling zone as per design Code requirements (HEI).	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 260 of Clarification 02.
158	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25 & 12 OF 25	5.01.00 & 5.03.00	Tube shall be expanded hydraulically in tube sheet.	Tube to tube sheet shall be roller expanded.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 261 of Clarification 02.
159	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25	5.02.00 (e)	Hardened 400 series stainless steel impingement plates for flashed drain inlet from HP heaters, BFP recirculation, boiler startup drains etc.	As per bidder's experience of super critical plants, Hardened 304 series stainless steel impingement plates are also suitable for this purpose. Customer is requested to amend the clause as " Hardened 400 series or 304 series stainless steel impingement plates"	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 262 of Clarification 02.
160	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25	5.02.00 (f)	All water spray valves, splash plates, trays, vent condenser and other elements in contact with undeaerated water or non-condensable gases shall be of SS-304 or SS-410	Customer is requested to modify the clause as follows Elements in contact with undeaerated water or non-condensable gases shall be of SS304 material / SS304 lining material. This is in line with the Deaerators supplied for all 500 MW and above projects.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 263 of Clarification 02.
161	Sec-VI, Part-A	Sub-Sec-II-A-06	6 of 10	7.03.00	Two (2) steam turbine drives for the turbine driven boiler feed pump per unit complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers, preferably hydraulic turning gear,	As per Bidder pre-commissioning/initial operation activities of Steam Blowing, the strainer is removed from the line and blanking fixture is used to isolate the steam turbine from steam supply . After steam blowing, the removed strainer is placed in the line again. Hence, we do not need any additional strainer for initial operation. Blanking device will be supplied by Bidder.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 265 of Clarification 02.
162	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	8 of 34	V.7	One set of Journal bearings and Thrust bearing (complete assembly) with carrier, Collar and pads	Complete thrust bearing assembly considered, however Carrier is not applicable. Separate Collar is not applicable as it is integral to turbine rotor as per Bidder Design. pads are part of Thrust Bearing Assembly . Hence separate pads are not envisaged.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 266 of Clarification 02 and already issued applicable Amendment on the same for Sipat St-III EPC standalone tender. As pads are part of Thrust bearing, same to be provided as part of Thrust bearing assembly.
163	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	8 of 34	V.10	Electrohydraulic assembly for governing system of TDBFP's	Electrohydraulic assemblies in governing systems are generally employed in high pressure governing systems where the control oil pressure is at 160 bar and above. The governing system valve actuator assemblies used in the TDBFPs are low pressure (8 bar) hydraulic actuators which receive only hydraulic signals generated by the IH (current to hydraulic signal) converters mounted in the console. Hence, the EH assembly is not applicable for TDBFPs. Spare I/H convereter cosnidered which is functionally equivalent to electrohydraulic system.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 267 of Clarification 02.
164	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	17 of 34	15.1	One set of emergency over speed governor assembly	Electronic over speed protections, 2 out of 3 voting are used for emergency protection purpose in line with latest practice followed in all the power and industrial steam turbines and hence mechanical over speed protection system is not considered. Accordingly spares for emergency over speed governor assembly not considered.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 268 of Clarification 02.
165	Sec-VI,Part-B	Sub-Sec-A-07	15 of 25	6.05.06 (c)	Particle size impurities test and moisture test as detailed out for Main Turbine, is to be carried out on one oil purification system of BFP drive turbine.	The capacity of oil purifier is 2400 LPH. For this capacity the approved vendors (Alfa Laval and GEA Westfalia) have type tested for particle size and the test was approved by NTPC for the recent project. Hence this test is not envisaged.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 269 of Clarification 02.

166	Sec-VI,Part-B	Sub-Sec-E-12	3 of 4	1.00.00 (7)	Full load full speed/back to back locked rotor torque test for one gearbox.	Gear box already tested for full load full speed/back to back locked rotor torque test and was approved by various customers including NTPC for earlier executed projects. Hence this test is not envisaged.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 270 Clarification 02
167	Sec-VI, Part-A	IIC	2 OF 19	1.06.00	In this package fieldbus-based controls and conventional controls (hardwired 4-20mA/DI/DO) are envisaged.	Bidder is considering conventional i.e. 4-20 mA / (HART) based actuators along with 4-20 mA(HART) based electronic transmitters for all BFPDT (TDBFP) related actuators and Transmitters except for Transmitters which are envisaged only for monitoring/ display on HMI purpose. For monitoring/ display on HMI purpose Transmitters, Bidder will supply fieldbus/profibus based instruments.	Bidder to refer to Sr. No. 257 (Clarification 01) of Employer's Response To Typical Bidder's Queries on Section-VI, Technical Specifications which states that Bidder's understanding is correct. Further, Bidder also to refer Errata to technical specifications SN C-05 in this regard.
168	Sec-VI, Part-A	IIC	2 OF 19	1.06.01	Close Loop controls:		
169	Sec-VI, Part-A	IIC	2 OF 19	1.06.02	Open loop controls:		
170	Sec-VI,Part-B	E-12	2 of 4	1(a)	Performance Tests on each Boiler Feed Pump to determine the characteristic curve (Head, Capacity, Efficiency & Power) at Design Speed and to ensure compliance with design requirements specified in the specification.	Performance test on BFP will be conducted at reduced speed and power and the results will be extrapolated to the specified conditions as per HIS, since it is not feasible to conduct full load, full speed tests at works.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 284 of Clarification 02.
171	Sec-VI,Part-B	E-12	2 of 4	1(a) &1(b)	Measurement shall be carried out at 10%, 25%, 50%, 65%,80%, 100% & 125% of Design Flow with loop water at design temperature. Performance Test at other specified Conditions shall be carried	Performance test measurement shall be carried out at 25%, 50%, 65%, 80%, 100% & 125% of design flow. Performance test measurement at 10% of design flow is not envisaged. Since, the BFP is a very high energy pump and hence running the pump nearer to closed valve condition is not recommended.	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 284 & 856 of Clarification 02.
172	Sec-VI,Part-B	E-12	2 of 4	3(a) &3(b)	Vibration &Noise level	Vibration & Noise Level readings taken during the shop tests for all pumps and its Auxiliaries are for informative purpose only. These levels may be higher than the specified values in view of the presence of valves located in the test pit piping with-in close proximity of the pump due to layout constraints and the temporary foundation arrangement of the test set up.	Detailed test requirements shall be discussed & finalised during detail engg. Bidder to comply specification requirements.
173	Sec-VI,Part-B	A-07	22 of 25	12.01.03	Contractor shall submit the reports of the type tests listed in the "TYPE TEST(S) TO BE CONDUCTED" and carried out within last five years from the date of bid opening	Bidder request waiver for Type tests on TDBFP, TDBP, MDBFP, MDBP & CEP for which special tests mentioned were successfully demonstrated on the equipment same (model/type/size /rating) supplied for previously executed 800 MW projects. Type test are conducted for design validation and earlier conducted reports are valid for identical pumps as there is no change in the design. Hence the type test results and reports of tests conducted earlier on the identical pumps will be furnished during contract stage	Bidder to refer clause no 12.00.00 Sub-section A-07/ Part-B, Section-VI w.r.t. Type test requirement. Bidder to comply technical specification requirement. Requirement of Technical Specification is clear.
174	Sec-VI, Part-A	VI, Chaper-01	20 of 38	.....	VFD TRANSFORMER (If applicable)	Customer is requested to mention the sl. no. of this item and also requested to clarify whether this requirement is for Slurry Pump with VFD of for any other equipment with VFD?	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 290 of Clarification 02.
175	Sec-VI, Part-A	VI, Chaper-01	20 of 38		Electronic cards	Customer is requested to mention the main heading of this requirement. Customer is also requested to clarify whether these items are for VFD of Slurry pump or for any other equipment	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer Sl. no. 290 of Clarification 02.
176	Sec-VI, Part-A	VI/CHAPTER-02	7 OF 34	B.II.3	Thrust Bearing of CEP	Thrust bearing of CEP is already covered under sl no-B.II.1 "Complete Bearing assembly including bearing housing, **thrust bearing**, carrier, journal bearing, cooling coil & thrust collar, etc.)". Hence not quoted against this clause.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
177	Sec-VI, Part-A	VI/CHAPTER-02	7 OF 34	B.III.1.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.III.1.1 " Complete Thrust bearing assembly with housing, carrier & thrust collar & Thrust Pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
178	Sec-VI, Part-A	VI/CHAPTER-02	7 OF 34	B.III.2.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.III.2.1 " Complete Thrust bearing assembly with housing, carrier & thrust collar & Thrust Pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
179	Sec-VI, Part-A	VI/CHAPTER-02	7 OF 34	B.IV.1.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.IV.1.1 " Thrust bearing with housing, carrier & thrust collar & pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
180	Sec-VI, Part-A	VI/CHAPTER-02	8 OF 34	B.IV.2.3	Set of thrust pads of thrust bearing	Thrust bearing assembly along with thrust pads are already covered under sl no-B.IV.2.1 " Thrust bearing with Housing, carrier & thrust collar & pads etc." Hence separate set of thrust pads of thrust bearing is not quoted.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of Technical Specification.
181	Sec-VI, Part-A	VI/CHAPTER-02	8 OF 34	B.VI.1	Complete drip pump assembly with coupling sets (Without Motor)	We understand that Canister is not required as part of spares	Cannister is not required, however coupling requirement is clear and to be provided.
182	Sec-VI, Part-A	VI/CHAPTER-02	9 OF 34	B.VIII.4	Input and output shaft with gears	Customer is requested to clarify whether the runners are required or not?	Runners to be provided if the same is integral to the Input and/or output shaft of MD BFP Hydraulic coupling.
183	Sec-VI, Part-A	Sub-Sec-VI	3 of 3	13.00.00	Bidder shall not indicate "Not Applicable" against any of the spare (except for those items for which "if applicable" is specified). In case of not applicability, functionally equivalent spare to be mentioned with price in the relevant price schedules. Bidder shall not mention any remark other than price value in relevant price schedule.	Some of the items against a Bought Out Item for a bidder may not be applicable . Equivalent item if any as per the equipment supplier will be supplied. Incase there is no equivalent items are there, then Customer should not ask for rebate againt that item	Reply to this query is already included in the section 'Employer's response to typical Bidder's queries on Section VI' to clarify & avoid similar queries. Bidder is requested to refer SN 287 of Clarification 02.

Amendment – 1A Changes to Technical specification of DARLIPALI II Thermal Power Project (1X800MW) "EPC Package "

S. No.	SPECIFICATION REFERENCE				Existing	Read as
	Section / Part	Sub-Section	Page No.	Clause No.		
D1B-1	VI/B	D-1-5	47 of 103	5.10.00	All roads shall be of rigid pavements unless otherwise specified. Rigid pavements shall be constructed with Geopolymer concrete. Concrete road/pavement or rigid pavement, mentioned in specification, shall mean road /pavement constructed with Geopolymer Concrete. All concrete roads shall be unreinforced jointed plain concrete pavement having dowels in transverse joints and tie bars at longitudinal joints……..	All roads shall be of rigid pavements unless otherwise specified. Rigid pavements shall be constructed with either **conventional cement concrete** or with Geopolymer concrete. Concrete road/pavement or rigid pavement, mentioned in specification, shall mean road /pavement constructed with either **Cement Concrete (CC)** or Geopolymer Concrete. All concrete roads shall be unreinforced jointed plain concrete pavement having dowels in transverse joints and tie bars at longitudinal joints……
D1B-2	VI/B	D-1-5	48 of 103	5.10.00.01	For road to be constructed with Geopolymer Concrete	For road to be constructed with **Conventional Cement Concrete** or Geopolymer Concrete
D1B-3	VI/B	D-1-5	49 of 103	5.10.00.02	Geo-polymer concrete road…… is provided in Chapter D-1-8.	**Conventional Cement Concrete or** Geo-polymer concrete road…… is provided in Chapter D-1-8.
C-01	VI/B	VI Chapter-A-05	17 of 27	7.07.07	All piping, valves & instrumentation shall be in the contractor's scope. Provision…..**A pH monitor shall be provided at the discharge of the pumps for measurement and control.** Complete….room. Feeding of lime to bucket elevator can be manual.	All piping, valves & instrumentation shall be in the contractor's scope. Provision…..**A pH monitor shall be provided in the waste water tank for measurement and control.** Complete….room. Feeding of lime to bucket elevator can be manual.

Amendment – 1A Changes to Technical specification of DARLIPALI II Thermal Power Project (1X800MW) "EPC Package "

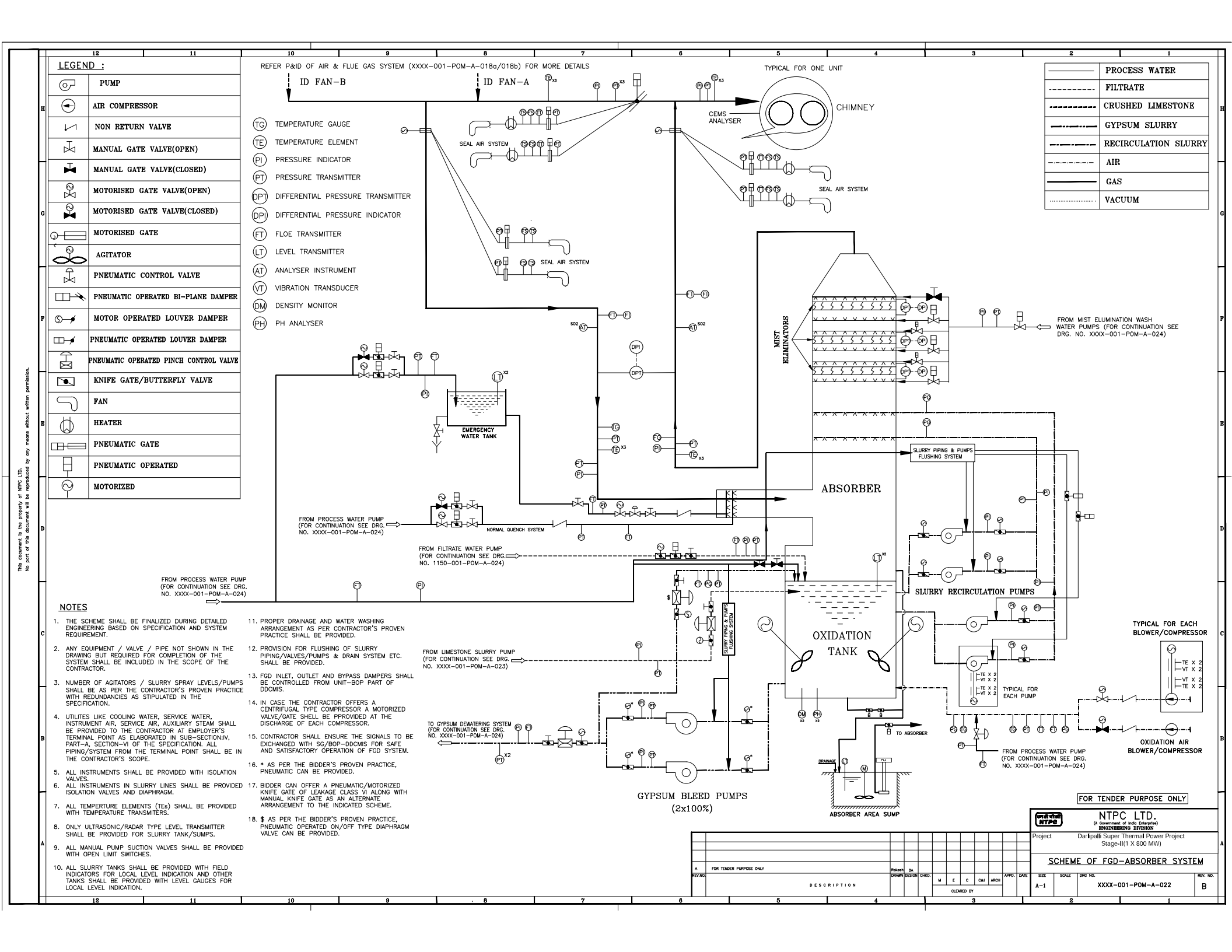
C-02	VI/A	VI Chapter-2	25 of 30	4.00.00	6. Fittings for HPBP, high pressure LPBP etc. - 1 complete set	6. Fittings for HPBP, ~~high pressure~~ LPBP etc. - 1 complete set
SG.1	VI/B	A-02	31 of 67	10.08.07 (d)	Three nos. Duplex Pt-RTD (100 ohm at 0 deg.) with **dual input temperature transmitters** shall be provided for local and remote monitoring of each bearing metal temperature of fans.	THREE NOS. DUPLEX PT-RTD (100 OHM AT 0 DEG.) WITH **1 NO OF DUAL INPUT TT AND 2 NOS OF SINGLE INPUT TT** SHALL BE PROVIDED FOR LOCAL AND REMOTE MONITORING OF EACH BEARING METAL TEMPERATURE OF FANS.
SG.2	VI/B	A-02	37 of 67	12.05.00 (c)	Three nos. Duplex Pt-RTD (100 ohm at 0 deg.) with **dual input temperature transmitters** shall be provided for local and remote monitoring of each bearing metal temperature of fans.	THREE NOS. DUPLEX PT-RTD (100 OHM AT 0 DEG.) WITH **1 NO OF DUAL INPUT TT AND 2 NOS OF SINGLE INPUT TT** SHALL BE PROVIDED FOR LOCAL AND REMOTE MONITORING OF EACH BEARING METAL TEMPERATURE OF FANS.
SG.3	VI/A	I-B (Project Information)	11 of 18	Annexure-IV-2	**Domestic Coal Characteristics**	**Domestic Coal Characteristics** Following Note Added **Note: For FGD design and guarantee conditions- HCL (ppm) wet-45 & HF (ppm) wet-12 may be considered.**
SG.4	VI/E				Scheme of FGD -Absorber System Drg No 9551-001-POM-A-022 Rev A	Scheme of FGD -Absorber System Drg No XXXX-001-POM-A-022 Rev B Revised Drawing attached at Annexure 1 to Amendment No-1A
SG.5	VI/E				Scheme of FGD Milling System Drg No 9551-001-POM-A-023 Rev A	Scheme of FGD Milling System Drg No XXXX-001-POM-A-023A Rev B Revised Drawing attached at Annexure 1 to Amendment No-1A
SG.6	VI/E				Scheme of FGD Gysum Dewatering System Drg No XXXX-001-POM-A-024 Rev A	Scheme of FGD Gysum Dewatering System Drg No XXXX-001-POM-A-024 Rev B Revised Drawing attached at Annexure 1 to Amendment No-1A

Amendment – 1A Changes to Technical specification of DARLIPALI II Thermal Power Project (1X800MW) "EPC Package "

SG.7	VI/A	IV	22 OF 77	1.01.07.02 (c)	viii. Hydro-cyclone Waste Water Sump Pump and Waste Water Pump	viii. Hydro-cyclone Feed Pump(s)
TG-01A	B	A-07	3 of 10	2.01.01 (n)	The air-cooled condensers shall be compatible of working between min and max. specified ambient air temperature. The air-cooled condenser shall also be designed to ensure unit peak load under specified conditions. The bidder shall submit a characteristic curve of the air-cooled condenser for above mentioned range of temperature. Following characteristic curves of ACC shall be provided: i. Heat Load Vs ACC Back Pressure for entire range of ambient temperature. ii. Heat Load Vs ACC Back pressure under different operating conditions (VWO, TMCR, HP-LP Bypass operation, House load operation etc.) iii. ACC Back pressure Vs Fan power under design Heat Load at different ambient air temperature.	The air-cooled condensers shall be compatible of working between min and max. specified ambient air temperature. The air-cooled condenser shall also be designed to ensure unit peak load under specified conditions. The bidder shall submit a characteristic curve of the air-cooled condenser for above mentioned range of temperature. Following characteristic curves of ACC shall be provided: i. ~~Heat Load~~ **Steam Flow** Vs ACC Back Pressure for entire range of ambient temperature. ii. ~~Heat Load~~ **Steam Flow** Vs ACC Back pressure under different operating conditions (VWO, TMCR, HP-LP Bypass operation, House load operation etc.) iii. ACC Back pressure Vs Fan power**/Number of Fans** ~~under design Heat Load~~ **for Steam flow of 105% TMCR with 0% make-up at design condenser pressure (i.e. Guarantee HBD for Condenser pressure)** at different ambient air temperature. T**he Characteristic curve for case (iii) to be developed for following conditions:** **a. All fans (including VFD) operating at 100% of rated speed.** **b. All VFD fans operating at minimum speed with sequential OFF of single speed fans.** **c. All VFD fans operating at an intermediate average speed between full rated speed and minimum speed with sequential OFF of single speed fans.** **Note:** **(1) While developing curves for conditions at (b) and (c) above, first the VFD fans speed reduction shall be considered, after that sequential OFF of single speed fans shall be considered.** **(2) Further the equation for total fan power including single speed drive and VFD fans shall be furnished for cases conditions (a), (b) & (c) above.**

Amendment – 1A Changes to Technical specification of DARLIPALI II Thermal Power Project (1X800MW) "EPC Package "

						(3) The ACC back pressure corresponding to fans under operation shall be extended at least upto worst design condenser pressure.
TG-02A	VI/B	A-07	9 of 28	2.02.00 (k-ii)	ii. Design rating of the gear box ……. shall be checked so that minimum 25% margin is available at Pull Out Torque of the motor.	ii. Design rating of the gear box …… shall be checked so that minimum 25% margin is available at Pull Out Torque of the motor. **NOTE: Based on above design conditions for ACC Gearbox, necessary consideration in civil design shall be made by the bidder.**
TG-03A	VI/B	A-07	9 of 28	2.01.01 (o-xiii)	All necessary structures for …… ……. the ACC and the landing level of staircase shall match with the landing level of elevators provided for ACCs.	All necessary structures for …… ……. the ACC and the landing level of staircase shall match with the landing level of elevators provided for ACCs. **Bidder to plan the levels and location of expansion joints/bellows in such a way that, all Bellows/Expansion joint shall be approachable for operation and maintenance. Further, handling arrangement to be provided for maintenance of the expansion joints/bellows during O&M stage.**
TG-04A	VI/B	A-07	11 of 28	2.02.00 (l)	Type test for fin tube bundle Design Heat transfer coefficient: Type test for performance (Heat transfer co-efficient) of tube bundles using scaled down model or full size model of type offered for this project shall be conduct which shall be witnessed by Employer. Procedure shall be submitted by Bidder for Employers approval.	**DELETED**
Gen–01A	VI/A	IIA-24			Not Used	**New Chapter added for Scope of Work for "Limited Notice to Proceed" (LNTP). Bidder to refer Annexure-C of Errata 01 to Commercial Amendment No. 05 to Bidding Document No: CS-9551/8003-001-2**



NOTES

1. THE SCHEME SHALL BE FINALIZED DURING DETAILED ENGINEERING BASED ON SPECIFICATION AND SYSTEM REQUIREMENT.
2. ANY EQUIPMENT / VALVE / PIPE NOT SHOWN IN THE DRAWING BUT REQUIRED FOR COMPLETION OF THE SYSTEM SHALL BE INCLUDED IN THE SCOPE OF THE CONTRACTOR.
3. NUMBER OF AGITATORS / SLURRY SPRAY LEVELS/PUMPS SHALL BE AS PER THE CONTRACTOR'S PROVEN PRACTICE WITH REDUNDANCIES AS STIPULATED IN THE SPECIFICATION.
4. UTILITES LIKE COOLING WATER, SERVICE WATER, INSTRUMENT AIR, SERVICE AIR, AUXILIARY STEAM SHALL BE PROVIDED TO THE CONTRACTOR AT EMPLOYER'S TERMINAL POINT AS ELABORATED IN SUB-SECTION:IV, PART-A, SECTION-VI OF THE SPECIFICATION. ALL PIPING/SYSTEM FROM THE TERMINAL POINT SHALL BE IN THE CONTRACTOR'S SCOPE.
5. ALL INSTRUMENTS SHALL BE PROVIDED WITH ISOLATION VALVES.
6. ALL INSTRUMENTS IN SLURRY LINES SHALL BE PROVIDED ISOLATION VALVES AND DIAPHRAGM.
7. ALL TEMPERTURE ELEMENTS (TEs) SHALL BE PROVIDED WITH TEMPERATURE TRANSMITERS.
8. ONLY ULTRASONIC/RADAR TYPE LEVEL TRANSMITTER SHALL BE PROVIDED FOR SLURRY TANK/SUMPS.
9. ALL MANUAL PUMP SUCTION VALVES SHALL BE PROVIDED WITH OPEN LIMIT SWITCHES.
10. ALL SLURRY TANKS SHALL BE PROVIDED WITH FIELD INDICATORS FOR LOCAL LEVEL INDICATION AND OTHER TANKS SHALL BE PROVIDED WITH LEVEL GAUGES FOR LOCAL LEVEL INDICATION.
11. PROPER DRAINAGE AND WATER WASHING ARRANGEMENT AS PER CONTRACTOR'S PROVEN PRACTICE SHALL BE PROVIDED.
12. PROVISION FOR FLUSHING OF SLURRY PIPING/VALVES/PUMPS & DRAIN SYSTEM ETC. SHALL BE PROVIDED.
13. FGD INLET, OUTLET AND BYPASS DAMPERS SHALL BE CONTROLLED FROM UNIT-BOP PART OF DDCMIS.
14. IN CASE THE CONTRACTOR OFFERS A CENTRIFUGAL TYPE COMPRESSOR A MOTORIZED VALVE/GATE SHELL BE PPROVIDED AT THE DISCHARGE OF EACH COMPRESSOR.
15. CONTRACTOR SHALL ENSURE THE SIGNALS TO BE EXCHANGED WITH SG/BOP-DDCMIS FOR SAFE AND SATISFACTORY OPERATION OF FGD SYSTEM.
16. * AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC CAN BE PROVIDED.
17. BIDDER CAN OFFER A PNEUMATIC/MOTORIZED KNIFE GATE OF LEAKAGE CLASS VI ALONG WITH MANUAL KNIFE GATE AS AN ALTERNATE ARRANGEMENT TO THE INDICATED SCHEME.
18. $ AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC OPERATED ON/OFF TYPE DIAPHRAGM VALVE CAN BE PROVIDED.

FOR TENDER PURPOSE ONLY

NTPC LTD.
(A Government of India Enterprise)
ENGINEERING DIVISION

Project: Darlipalli Super Thermal Power Project Stage-II(1 X 800 MW)

SCHEME OF FGD-ABSORBER SYSTEM

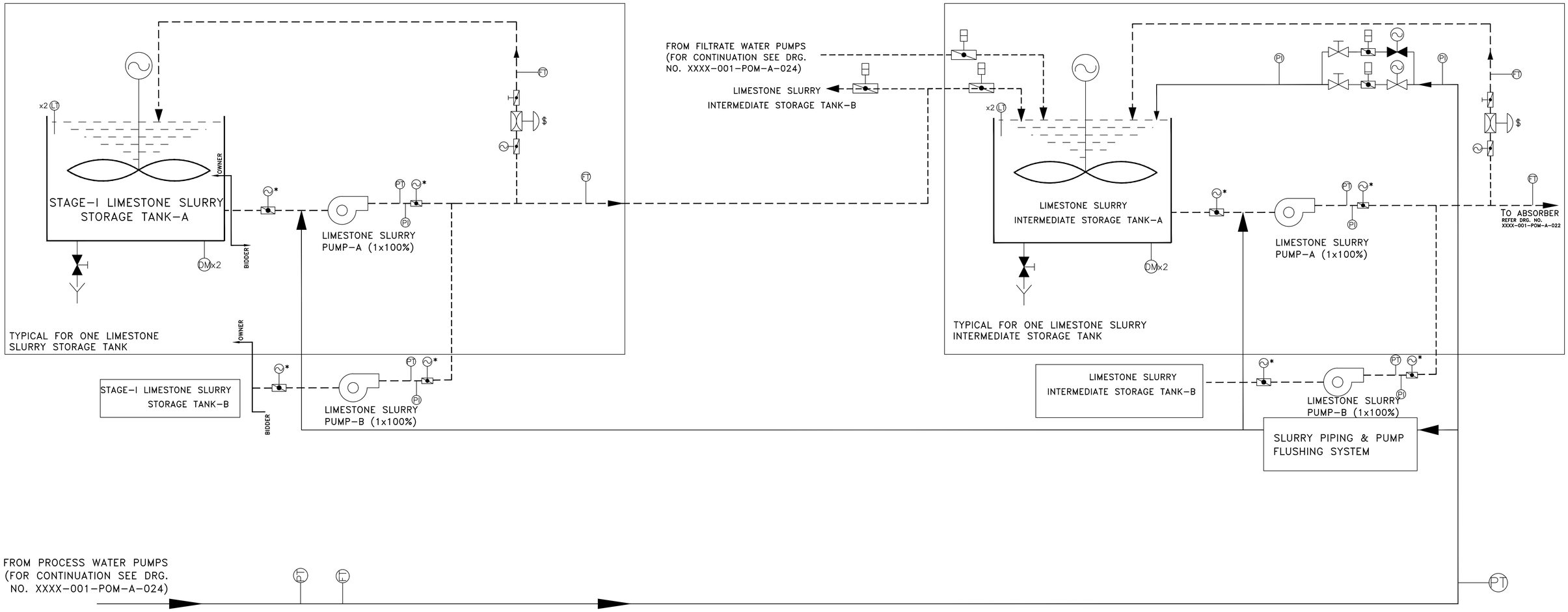
REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD.	DATE
A	FOR TENDER PURPOSE ONLY	Rakesh	DA			

CLEARED BY: M | E | C | C&I | ARCH

SIZE	SCALE	DRG NO.	REV. NO.
A-1		XXXX-001-POM-A-022	B

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TYPICAL ARRANGEMENT OF LIMESTONE SLURRY SYSTEM

NOTES

1. FOR NOTES AND LEGENDS SEE DRAWING NO. 9551-001-POM-A-022.
   LOS-LUBE OIL SYSTEM AS DETAILED IN TECHNICAL SPECIFICATION.
2. LIMESTONE GRINDING SYSTEM SHALL NOT BE IN BIDDER SCOPE.
   TECHNICAL SPECS TO BE REFERRED FOR DETAIL
3. $ AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC OPERATED
   ON/OFF TYPE DIAPHRAGM VALVE CAN BE PROVIDED.
4. * AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC CAN BE
   PROVIDED.

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH	APPD.	DATE
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CLEARED BY

NTPC LTD.
(A Government of India Enterprise)
ENGINEERING DIVISION

PROJECT: DARLIPALLI SUPER THERMAL POWER PROJECT
STAGE-II (1X800MW)

TITLE: SCHEME OF FGD MILLING LIMESTONE SLURRY SYSTEM

SIZE	SCALE	DRG NO.	REV. NO.
A-1		XXXX-001-POM-A-023A	B

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FROM GYPSUM BLEED PUMP
(REFER DRG. NO. XXXX-001-POM-A-022)

To auxiliary Absorbent Tank

TO OTHER HYDROCYCLONE / BELT FILTERS

TO FILTRATE WATER TANK
ALTERNETIVELY TO ABSORBER

PRIMARY HYDROCYCLONE

SECONDARY HYDROCYCLONE FEED TANK

SECONDARY WASTE WATER HYDROCYCLONE X2

LIME FEEDING SYSTEM

PROCESS WATER LINE

LIME SOLUTION TANK

RECIRULATION CUM MIXING

WASTE WATER TANK

REFER SPECIFICATION FOR TERMINAL POINT

WASTE WATER TREATMENT SYSTEM

SEE NOTE-2

VACUUM BELT FILTERS

PROCESS WATER

CAKE WASH WATER TANK

TO GYPSUM HANDLING SYSTEM

AIR DISCHARGE

VACUUM PUMP SEAL

VACUUM PUMP

RECEIVER TANK

BOOSTER PUMPS (2x100%)

LEVEL CONTROL STATION FOR TANK

CLARIFIED WATER

(REFER DRG. NO. XXXX-109-POM-A-004)

PROCESS WATER TANK-2

Emergency spray system
in bypass duct
Cake wash water
Absorber process needs
To normal flue gas quenching system
To Limestone slurry Preparation system
Flushing system header & other process needs

PROCESS WATER PUMPS

WATER

PROCESS WATER TANK-1

To Mist Ellminator Washing System
(REFER DRG. NO. XXXX-001-POM-A-022)

Mist Ellminator Wash Water Pumps

TYPICAL FOR 1x100%

TYPICAL ARRANGEMENT FOR ONE VACUUM BELT FILTER

TO ABSORBERS
(REFER DRG. NO. XXXX-001-POM-A-022)

FOR CONTINUATION SEE
DRG. NO. XXXX-001-POM-A-023

FILTRATE WATER PUMPS (2x100%)

FILTRATE TANK

BELT FILTER WASH WATER PUMP

DRAINAGE

(2X100% PUMP)

GYPSUM DEWATERING AREA SUMP

NOTES

1. FOR NOTES AND LEGEND SEE DRAWING NUMBER XXXX-001-POM-A-022.
2. ARRANGEMENT FOR CAKE AND CLOTH WASHING SYSTEM INDICATED IS TYPICAL. CONTRACTOR MAY OFFER AN ALTERNATE SYSTEM AS PER HIS PROVEN PRACTICE.
3. FLUSHING SYSTEM FOR FILTRATE & WASTE WATER SYSTEM IF REQUIRED SHALL BE PROVIDED BY THE CONTRACTOR.
4. LIME STORAGE AND FEEDING SYSTEM IS ALSO TO BE PROVIDED BY THE CONTRACTOR.
5. * AS PER THE BIDDER PROVEN PRACTICE PNEUMATIC CAN BE PROVIDED.

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY: M	E	C	C&I	ARCH	APPD.	DATE

एनटीपीसी लिमिटेड NTPC Limited (A Government of India Enterprise) ENGINEERING DIVISION

PROJECT: DARLIPALLI SUPER THERMAL POWER PROJECT STAGE-II (1X800MW)

TITLE: SCHEME OF GYPSUM DEWATERING SYSTEM

SIZE	SCALE	DRG NO.	REV. NO.
A-1		XXXX-001-POM-A-024	B

Amendment-01B to Technical Specifications (Section VI) of SIPAT-III (1X800 MW) EPC Package

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
GEN-1B	A	IIA-24	-	-	NOT USED	New Chapter added for Scope of Work for “Limited Notice to Proceed” (LNTP). Bidder to refer Annexure-C of Errata 01 to Commercial Amendment No. 05 to Bidding Document No: CS-9551/8003-001-2.

Amendment-01B to Technical Specifications (Section VI) of SIPAT-III (1X800 MW) EPC Package

Sn	Specification References				Existing	Read As
	Part	Sub section	Page no	Clause no		
MH-01 B	Sectio VI, Part-A	IV, Functional Guarantee	33 of 73	Cl.No. 1.03.7.02.1 (III) & (iv)	(iii) Flow Path III (Biomass stream): • Bidder shall also demonstrate the guaranteed tippling rate of Truck Tipplers. (iv) Flow Path IV (Limestone flow path): • Bidder shall also demonstrate the guaranteed tippling rate of Truck Tipplers.	iii) Flow Path III (Biomass stream): Bidder shall also demonstrate the guaranteed tippling rate of Truck Tipplers which should not be less than 7 for any combination of truck. (iv) Flow Path IV (Limestone flow path): Bidder shall also demonstrate the guaranteed tippling rate of Truck Tipplers which should not be less than 7 for any combination of truck.
MH-02 B	Employer's response to Typical Bidder's Queries	Clarifications No. 2		337	Pumping distance to be considered for calculation of head shall be 14.5 kM	Pumping distance to be considered for calculation of head shall be 13.5 KM or actual whichever is higher.

EMPLOYERS RESPONSE TO TYPICAL BIDDER'S QUERIES ON SECTION VI TECHNICAL SPECIFICATIONS

(CLARIFICATIONS 01 & 02) FOR EPC PACKAGE FOR SIPAT -III(1X800 MW) BIDDING DOCUMENT NO.: CS-8003-001-2

Clarifications 01

SL. NO	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.	SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
1	SECTION VI/ PART-C		16 & 17 of 119	8.03.04 a(iv)	The complete 3D data (editable model) which shall be utilised for all future detailed engineering related to maintenance, operation, R&M, efficiency improvement of the project etc. Complete 3D model along with as built GADs, layout, isometrics, reports extracted and 3D models for all disciplines , with any other document generated from 3D model and naming conventions with as-built updates along with complete reference databases, component catalogues for all the size range shall be handed over to owner. Apart from the 3D Model, all drawings like GADs, Isometrics etc. extracted from the model shall also be submitted by the Contractor in Electronic form. 3D model along with complete Project databases shall be submitted at each model review stage and as final as-built. The contractor shall also submit all the configuration files, customization files, templates and all referenced databases. Further, two Licenses of the used 3D Modelling Software (One for Engineering View and One for Site View) shall be provided along with compatible Hardware for possible review and study of the Model Files being submitted by the Bidder Time to time. All software and hardware shall be supplied by bidder within 3 months of NOA. The 3D modelling software shall preferably be the same software bidder will be using for preparation of 3D model or it shall have all editable features to edit the model supplied by bidder on time to time basis. Database backup shall be taken every month and handed over to NTPC	Owing to proprietary nature of data (copyrights/patents etc.), Bidder will provide non-editable 3D model(review model) along with 3D review software licenses. Bidder will arrange online/offline 3D model review for Customer and accordingly the 3D Review software licenses will be supplied after completion of Engineering. As Subscription based licenses are prevalent in software industry, hence Customer is requested to allow Subscription based software licenses also.	Data to be submitted to NTPC during detailed engineering as per the provisions of Bidding documents, are not proprietary in nature. Hence Bidder's proposal of providing only the non-editable 3D (review) model is not acceptable. Bidder to further note that there are suppliers available in market who are prepared to provide software with perpetual license. As such, Bidder to comply with Technical specification requirements in entirety.
2	SECTION-VI, PART-B	SUB-SEC-TION-A-05 (FGD)	PAGE 19 OF 29	7.07.08	Contractor shall provide 2x100% Lime Neutralization tanks which shall be of minimum 8 hr capacity made of carbon steel with rubber lining along with 2x100% Lime storage silos. The tanks shall be provided with SS dissolving basket, Agitator of SS construction, drain, over flow and dosing connection, level transmitters, Agitators etc. The storage silos and hopper cones shall be fabricated of minimum 10 mm thick carbon steel with a SS lining of grade SS304 of minimum 4 mm thickness in the complete cones to ensure reliable discharge of material. The design of storage silos shall confirm to IS 9178 or any other proven international standards. The storage silo shall be capable of feeding the lime by motorized rotary feeding system to the Lime Neutralization tank.	Regarding the Lime Dosing System in the Waste Water Tank, Bidder proposes follow-ing arrangements in place of Lime Silos, Bucket Conveyors, Hoists with Basket and dosing system as detailed in tender specification: To dose the lime solution through dosing pumps in waste water tank, the lime solu-tion shall be prepared in the dosing tank and directly dosed in the waste water tank. The lime sacks can be stored in the lime storage area. This will be operation friendly and techni-cally the requirement of lime silos, bucket conveyors and Hoists with Basket can be elim-inated. This is similar to the practice generally adopted in the Pre-Treatment plant appli-cation. Kindly accept.	The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
3	SECTION-VI, PART-B	SUB-SEC-TION-A-05 (FGD)	PAGE 20 OF 29	7.07.09	Contractor shall provide 2x 100% Lime Storage Silos for feeding lime to the Lime Neutralization tanks. The lime storage silo shall be of minimum 24 hr capacity equivalent to the requirements of FGD system of 2x800 MW at Design point and shall be complete with supporting steel structure, platforms, power operated outlet gates, level switches, air relief devices, etc. Hydrated lime shall be supplied by the employer in the form of bags. For sizing purpose, bulk density of hydrated lime shall be considered as480 kg/m3. For dust free operation each silo should be provided with a covering arrangement and a self-cleaning bag filter system of suitable capacity containing blower, automatic/on-load cleaning system, etc.		
4	SECTION-VI, PART-B	SUB-SEC-TION-A-05 (FGD)	PAGE 20 OF 29	7.07.10	Bucket conveyors shall be provided by the contractor to feed lime to each of the lime storage silos from ground level. The Bucket conveyors shall be sized to completely feed each lime silo within 2hrs. Adequate storage and feeding system required for feeding the lime to the Bucket conveyors is also in the Contractor's scope.		
5	SECTION-VI, PART-B	SUB-SEC-TION-A-05 (FGD)	PAGE 20 OF 29	7.07.11	A storage room for storing minimum one (1) month requirement of lime for all the units shall also be provided by the contractor.		
6	VI/A	I	1 of 8	1.01.00 f)	Scope of the proposal Complete Civil, Structural and Architectural works, including survey, providing construction offices, field laboratory and construction equipment, construction water supply, construction power distribution from the supply point of Employer, infrastructure works, construction / permanent roads, drainage arrangements, fencing / boundary wall.	Bidder understands that fencing/ boundary wall is excluded from bidder's scope. Please confirm. If not, please provide the layout of proposed fencing and boundary wall in General layout plan clearly to avoid any confusion regarding scope clarity.	Plant Boundary wall and plant boundary Isoloation fencing is excluded from bidder's scope. Scope of Fencing in other area as per the funtional and safety requirement shall be as per technical scope.
7	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-999-POC-F-001, Rev A titled "General Layout Plan"		
8	VI/A	IIB	11 of 20	1.16.04 l)	Dismantling of existing Roads , fencing if required , Foundations, Re-routing of Pipe lines above the ground & below the ground available in the present scope of Bays is also in the scope of Bidder.	Please furnish the details/drawings of all existing facilities / buildings / structure above and below ground level which are coming in proposed plant area.	For extension of 765KV,132KV bays in existing switchyard, dismantling of existing road , fencing is applicable if required . The same will be finalised during detailed engg stage . The existing drawings of road, fencing will be provided during detailed engg stage .

9	VI/A	IID	2 of 8	1.00.00 (4b)	RCC Storm water drainage in Plant area (including facilities/structures) and RCC drains along roads in Bidder's Scope including connection upto disposal point as shown in GLP/Layout of drain. Drains to be constructed simultaneously with roads ……..	Bidder understands that the terminal points of storm water drainage of proposed plant are the outfall points mentioned in the referred tender drawing. Please confirm. Also please furnish the invert levels of the existing drain at proposed outfall point locations for interconnection with existing drain.	Confirmed. During detail engineering, Bidder to design the drain as per existing site condition and technical specification requirement.
10	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-999-POC-A-006, Rev A titled "Layout of Drains"		
11	VI/A	IID	2 of 8	1.00.00 (4c)	Packaged type Sewerage treatment plant (3 nos. as indicated in tender drawing General Layout Plan) and sewage pumping station including sewage pump, sump & house and connection up to sewage treatment plants (either of owner or bidder); connection of sewage lines of all buildings under Bidder's scope to the nearest sewerage system.	Packaged type Sewerage treatment plant (3 nos.) and sewage pumping station are not located in the GLP. Please locate the same. Also please furnish the details of existing sewage network drawing with invert levels for interconnection of proposed sewage lines to the existing nearest sewerage system.	GLP is further developed by bidder during detailed Engg stage. Accordingly 3 nos. STP shall be located suitably in GLP by bidder as per layout requirement.
12	VI/A	IID	4 of 8	1.00.00 (12)	Raw Water system civil Works Civil work associated with the existing Raw water pump house structure and civil works associated with laying of Raw water pipes from Raw water pump house to PT Plant, RW Switchgear//MCC & control room building including transformer foundation.	Please furnish the layout, cross section, inlet and outlet details of existing raw water pump house with existing reservoir outlet pipes. Also please furnish the list of Civil works associated with the existing raw water pump house.	Bidder is requested to refer tender drawing for Existing Raw water pumphouse detail. Further Bidder to refer Amendment D1-44 regarding Clause 1.00.00(12) Civil works associated with addition/alteration/modification as required for installation of raw water pumps in the existing Raw Water Pump House (RWPH) and civil works associated with laying of Raw water pipes from Raw water pump house to PT Plant and AHP plant and all other associated works including Raw water Switchgear/Control/Remote IO Room building, Transformer foundation etc. complete as necessary for commissioning of Stage-III system shall be in bidders scope.
13	VI/A	IID	5 of 8	1.00.00 (22)	Sheds for O&M Workers, including food serving kiosk and bio Toilet Blocks for ladies and gents, in adequate numbers to cater to the workers working in each work area. The sheds should be easily accessible to workers by foot. Minimum 06 numbers of shed in different areas shall be provided. Drinking water facility and maintenance of toilet and shed shall be the responsibility of the bidder till COD of all the units.	Kindly clarify the following: 1. Sheds for O&M Workers is permanent structure or temporary structure. 2. In case of permanent structure, please furnish the detailed specification, layout, finishing schedule etc. 3. Please furnish the location of these sheds in GLP.	1. Sheds for O&M Workers is permanent structure. 2. Refer Amendement 3. Location shall be decided during detailed Engg.
14	VI/A	IID	5 of 8	1.00.00 (29)	Two nos. covered sheds (70mX20M) with steel superstructure and metal sheeting at roof and side sheeting above 1 meter of brick wall with RCC column, beam & Foundation.	Kindly clarify the following: 1. Two no. covered sheds (70mX20m) and Sheds for O&M/Workers (6 nos.) is same building or different. 2. In case different buildings, please furnish the detailed specification, layout, finishing schedule etc for two no. covered sheds. 3. Please furnish the location of these sheds in GLP.	1. Two no. covered sheds (70mX20m) and Sheds for O&M/Workers (6 nos.) is different building. 2. The detailed layout for two sheds shall be developed by bidder during detailed engg stage. Bidder to follow technical specification as mentioned in clause 1.00.00 (29) of IID VI/A .
15	VI/B	D-1-5	67 of 69	5.31.00	FQA BUILDING FQA building shall be RCC construction of single or double storey. Total area shall be decided based on the requirements based in QA chapter, however, minimum area shall not be less than 800 Sqm. Apart from space required to accommodate and operate all the equipments mentioned in the equipment list, office space for 5 executives, one meeting room, spectroscope room, NDT lab, storage room, welding booth, welding simulator area, platforms for instruments/equipments, ladies and gents toilets, space for water cooler and pantry has to be provided as per specifications mentioned elsewhere in the technical specifications.	Bidder understands that FQA building and testing laboratory is same building. Please confirm. Also kindly clarify the following: 1. FQA building/testing laboratory is permanent structure or temporary structure. 2. In case of permanent structure, please furnish the detailed specification, layout drawings and finishing schedule etc.	FQA building and testing laboratory are separate buildings. 1. FQA building is permanent building. Testing laboratory is temporary structure.
16	VI/B	D-1-1	1 of 2	1.01.00	The scope shall also include setting up by the Bidder a complete testing laboratory in the field to carry out all relevant tests for structural steel, reinforcement steel & reinforced concrete (RCC) works.		
17	VI/B	D-1-5	68 of 69	5.37.00	OCCUPATIONAL HEALTH CENTRE WITH CRECHE Occupational Health Centre shall be R.C.C Building with covered area 230 sq.m. This building shall have following facilities. Waiting Lobby cum Reception Doctor's Chamber with attached toilet (Two Numbers) First Aid Room Two bedded patient Room Driver's Room with attached bath and toilet Toilets for women, gents and physically handicap as per NBC Guidelines. Crèche Facilities for 20 children & toilets for children Covered Porch. Covered Parking space for Ambulance in R.C.C	Bidder understands that First aid centre with creche facilities and Occupational health centre with creche is same building. Please confirm. Please furnish the layout drawings of Occupational health centre with creche.	Confirmed. All facilities of Occupational Health Centre with creche facility shall be as per technical specification. The detailed layout and drawing shall be developed by bidder during detailed engg stage.

18	VI/B	D-1-5	68 of 69	5.38.00	O & M WORKERS SHED RCC framed structure with truss roof provided with insulated sheeting catering to 20. No of workers each (approximately 18m x7.5m area) with common rest room, cooking area, drinking water facility, toilet and bathing area along with covered verandah for easy approach to facilities. The rest room should be well ventilated. The rest rooms to be scattered as per work locations and suitably located in GLP. External finishes shall be Premium Smooth Exterior Paint with silicone additives.	Kindly clarify the following: 1. O & M worker's shed is permanent structure or temporary structure. 2. In case of permanent structure, please furnish the detailed specification, layout drawings and finishing schedule etc.	1. O & M worker's shed (Sheds for Construction workers and O&M Workers) is permanent structure. 2. Refer amendment no. D1-59
19	VI/B	D-1-5	68 of 69	5.36.00	WORKER'S ACCOMODATION BUILDINGS Worker's Accommodation shall be provided as per NBC requirement and Local factory act. The Building design shall be as per Tender Drawing. It shall have Brick wall around the Kitchen, Toilet, bathroom and washing area. It shall have Aerated Concrete panel wall with steel structure having sandwich panel roof sheeting.	Kindly clarify the following: 1. Worker's Accommodation building is permanent structure or temporary structure. 2. In case of permanent structure, please furnish the detailed specification, finishing schedule etc.	Worker's Accommodation building is temporary structure.
20	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-001-POC-A-011, Rev 0 titled "Workers Rest Room – Typical Architectural details"	Kindly clarify the following: 1. "Workers Rest room" and "Sheds for O&M/Workers" are same building or different buildings. 2. In case of different buildings, Worker's Rest room is permanent structure or temporary structure. 3. In case of permanent structure, please furnish the detailed specification, finishing schedule etc.	1. "Workers Rest room" and "Sheds for O&M/Workers (Sheds for Construction workers and O&M Workers)" are same buildings. 3. Refer Amendment no. D1-59
21	VI/A	IID	5 of 8	1.00.00 (23)	Facilities for rainwater harvesting in Plant area and other buildings in Bidder's scope.	Please provide the detailed specification, scheme and requirement of water storage pond/capacity for the rain water harvesting in main plant area and other buildings/facilities/structures.	Development of rainwater harvesting scheme for the project and obtaining approval of the scheme from Central Ground water board is in bidder's scope
22	VI/B	D-1-5	1 of 69	5.01.00 i)	All the buildings and site development including landscaping shall be designed to take care of rain water harvesting & ground water recharging. Development of rainwater harvesting scheme for the project and obtaining approval of the scheme from Central Ground water board is in bidder's scope		
23	VI/B	D-1-5	1 of 69	5.01.00 i)	All the buildings and site development including landscaping shall be designed to take care of rain water harvesting & ground water recharging. Development of rainwater harvesting scheme for the project and obtaining approval of the scheme from Central Ground water board is in bidder's scope	Bidder understands that landscaping is excluded from bidder's scope. Please confirm.	Bidder understanding is correct. Landscaping is not in bidder's scope.
24	VI/A	III	3 of 3	4.03.00	Exclusions CIVIL c) Landscaping		
25	VI/A	IID	5 of 8	1.00.00 (28)	Civil, structural, architectural works for SOLAR PV plant on 'roof top of building/facilities in the bidder's scope.	Please furnish the following details: 1. Detailed specification for Civil, structural, architectural works for SOLAR PV plant on 'roof top of buildings. 2. List of buildings/facilities on which roof top Solar PV plant is to be installed.	Refer clause 6.02.09 (I) of section VI part B- sub section D-1-6 of technical specification for loading deatails. Other detailes to be developed by bidder during detailed engineering.
26	VI/B	D-1-5	1 of 69	5.01.00	f) Architectural design of all Power Plant Building shall be suitable for installation of solar photovoltaic panels on roof tops for renewable energy purpose.		
27	VI/B	D-1-5	2 of 69	5.01.00 j)	(j) For Control Rooms, CER, UPS Charger Room area in MPH dry wall construction technology shall be incorporated. Control room shall be designed as designer control room with ACP Cladded wall paneling for housing LVS.	Bidder understands that the said provision is to be incorporated only for internal walls of the mentioned rooms, which is an air-conditioned area. Please confirm. Further, it is requested to give detailed specification for dry wall construction technology.	Bidder shall follow the Technical specfication. Refer Amendment no. D1-23
28	VI/B	D-1-5	5 of 69	5.02.03	Bidder has the option to choose either Alternative -1 or Alternative-2 based on his design philosophy and practice. However, in case Alternative-2 is adopted by bidder, then the bidder has to furnish extended warranty of five years for satisfactory static and dynamic performance of the foundation system.	Bidder understands that for alternative-2 i.e foundation without VIS, additional warranty is only for the foundations and not for the equipment coming over it. Please confirm.	Extended warranty of five years for satisfactory static and dynamic performance of the foundation system is applicable for the foundation.
29	VI/B	D-1-5	10 of 69	5.02.09	Main Power House ii. Design Concept The building shall have connectivity with walkways from Boiler through sliding bearing only.	Please inform where these PTFE bearing is to be installed. On Boiler Side or Powerhouse Side.	PTFE bearing is to be installed on Main Power House side
30	VI/B	D-1-5	11 of 69	5.02.09	Main Power House iii. Architectural Features In front of the power transformers, RCC fire barrier wall shall be provided as per functional requirement in lieu of brick wall at A-row. The above mentioned RCC wall shall be attached with single skin metal sheet on external face.	Considering the difficulties of erecting an RCC wall on A Row wall beams and also that it would be difficult to create openings in RCC walls in case of some requirement at the detailed engineering stage, option of providing 345 mm thick brickwall in place of RCC wall should be given. Please confirm.	Bidder's proposal is not acceptable.
31	VI/B	D-1-5	12 of 69	5.02.09	Main Power House iii. Architectural Features In addition one no ladies toilet shall be provided in each unit at 0.00M and mezzanine floor level and CCR level	Mezzanine floor level would mean one level below operating floor level. Please confirm.	Bidder's proposal is not acceptable. Further to refer Amendment no. D1-34 for "iii. Architectural Features".
32	VI/B	D-1-5	14 of 69	5.02.11.01.04	The minimum grade of concrete for all RCC structures shall be M30.		

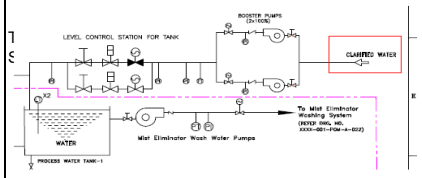
33	VI/B	D-1-5	24 of 69	5.05.11	All liquid retaining structure shall be designed by working stress method as per is 3370 (part-1&2):2009. the thickness of base slab in liquid retaining/ carrying structures shall be minimum 150mm. minimum grade of concrete for liquid retaining structures like sumps/tanks/drain sumps etc shall be m-30.	The referred clauses are contradictory. Bidder understands that the Minimum grade of reinforced cement concrete for all foundations and super structure shall be M25 except for the structures where M30 is exclusively specified. Please confirm.	As referred in clause 8.02.01 b) Minimum grade of reinforced cement concrete for all foundations shall be M25 unless noted otherwise.
34	VI/B	D-1-8	4 of 20	8.02.01 b)	Minimum grade of reinforced cement concrete for all foundations shall be M25 unless noted otherwise. Minimum grade of concrete for other structures/areas (other than machine foundations) shall be M25 for all superstructure and substructure unless noted otherwise elsewhere in this specification.		
35	VI/B	D-1-5	13 of 69	5.02.09	Air Conditioned Office for 25 persons (Including 5 cabins for Senior persons) with Pantry, Toilet block (Ladies and gents toilet separately), conference room for 25 persons, shall be provided in MPH building in addition to other facilities specified. This area shall have access to natural light on three sides minimum. It shall have air lock lobby at entrance with auto sliding doors. Minimum area of office area shall be 350 sq.m. This area shall be positioned over the CR with good aesthetic view and noise reduction and dust isolation.	Bidder understands that space for office are required above Control Room in MPH Building in addition to other facilities specified. In the past practice CCR located at 17.00m and as per this specification required office space will be envisaged above CCR i.e. at 24 m or above level. Please confirm. The required area for office space is limited to 350 sqm only. Please provide details about the type of material for noise reduction and dust isolation.	Bidder understanding is correct. However, final location of office area shall be decided during detailed engineering Stage. Refer amendment no. D1-34
36	VI/B	D-1-5	28 of 69	5.08.00	The drains shall be provided on both sides of the double lane roads and single lane roads. The drains shall be provided on one side of the patrol roads along boundary wall. These shall be designed to drain the road surface as well as all the free and covered areas, etc. Box culverts shall be provided at all rail, road and other crossings. Layout of drain shall be as per layout given in tender drawing "Layout of drain'.	Bidder understands that Boundary wall, patrol road along boundary wall and associated drains is not in bidder's scope. Please confirm.	Bidder understanding is correct. However, Layout of drain shall be as per layout given in tender drawing "Layout of drain'.
37	VI/B	D-1-5	28 of 69	5.08.01	WATCH TOWERS Watch towers shall be RCC construction with all-weather enclosure at 6m height. watch towers shall be provided at 600 m interval along the boundary as well as at corner turning points of the plant boundary. watch towers shall be provided with MS ladders.	Bidder understands that watch towers along the existing boundary wall are already constructed. Hence watch towers are excluded from bidder's scope. Please confirm.	Watch tower (04 nos.) along exisitng boundary wall is in bidder's scope. Bidder to refer amendment no.D1-35 also.
38	VI/B	D-1-5	30 of 69	5.10.03	PATROL ROADS All patrol roads along the boundary wall shall be single lane roads with 3.75 metre wide concrete pavement and 1 metre wide shoulders on one side of the road. as given in tender drawing "Details of road"	Bidder understands that patrol roads and associated drains are not in bidder's scope. Please confirm.	Patrol road is not in bidder's scope. Drain shall be ae per Layout of drain drawing.
39	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-001-POC-A-004, Rev A titled "Layout of Road"		
40	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-001-POC-A-005, Rev A titled "Details of Road"		
41	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-001-POC-A-009, Rev A titled "Maintenance building - Typical architectural details"	Tender drawing of Maintenance building is given but there is no such building mentioned in Technical specigication. Bidder understands that maintenance building is not in bidder's scope. Please confirm.	Bidder's understanding is correct. Maintainance building is not in scope of bidder. Tender drawing no. XXXX-001-POC-A-009 Rev A to be ignored.
42	VI/B	D-1-5	67 of 69	5.33.00	Safety Control Room Safety control room shall be a single storeyed RCC framed building of minimum area 60sqm to accommodate equipments and personals as mentioned in C&I chapter for 24X7 operation. Additionally, it shall have ladies and gents toilet, space for water cooler and Pantry.	Please furnish the layout drawings of safety control room.	Bidder shall follow the Technical specfication. The detialed layout shall be developed by bidder during detailed engineering stage.
43	VI/B	A-17	8 of 30	5.01.11	Air washer units shall be provided at various elevations in TG building (AB & BC Bay). However, air washer units if required to be placed on the roof shall be provided with steel shed (open).	Air washer units and UAF units if placed on the roof shall be kept open without any shed. Technically there is no requirement of steel Shed over the Air Washer and UAF units. Please confirm.	Steel Sheds (open) have been envisaged for UAF/AWU units placed on the roof for sunlight/rain protection. Bidder to comply with specification requirements.
44	VI/B	A-17	9 of 30	5.02.13	UAF units placed on the roof shall be provided with steel shed (open).		
45	VI/B	Civil Works Foundation System	1 of 6	7.01.00	Net allowable bearing pressure shall be limited to Table-1 of Annexure-C.	Net allowable bearing pressure shall be worked out based on the available geotechnical data and shall be finalised during detailed engineering. Please confirm.	Bidder's proposal is not acceptable.
46	VI/B	Civil Works Foundation System	5&6 of 6	Annexure C	The minimum founding level and the corresponding net allowable bearing pressure shall be as given in Table – 1 below.		
47	VI/B	Civil Works Foundation System	1 of 6	7.01.00	Bidder may refer enclosed topographical survey drawing and general layout plan along with bore logs for variation in existing/ natural ground level (NGL) and finished ground level (FGL). .....Wherever ash/coal deposit/brick-bats etc. is found the same shall be treated as filled up soil.	Please furnish Topographical Survey drawing showing existing features, contours and spot levels in Auto Cad format. Please furnish General layout plan drawing in Auto Cad format.	Only PDF format Tender drawing is provided in Tender. Auto cad format drawing may be provided to Successful bidder.

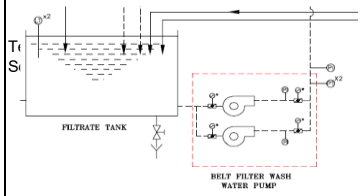
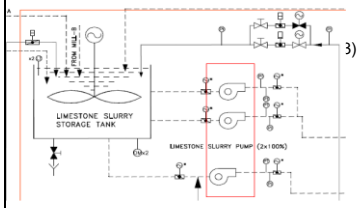
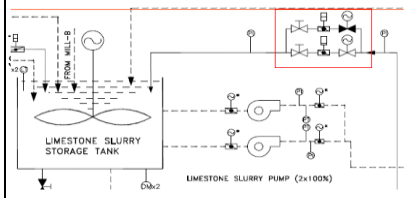
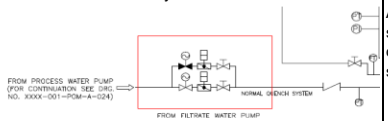
48	VI/B	Civil Works Foundation System	3 of 6	7.03.03	Backfilling in Power House & Boiler Area Backfilling around foundations, trenches, sumps, pits, plinths, etc. shall be carried out with sand in layers not exceeding 300 mm compacted thickness and each layer shall be compacted to minimum 80% of relative density.	Now-a-days sand mining is prohibited in many states as per NGT guidelines. Wherever it is not prohibited, it is very costly. Hence bidder requests customer to allow backfilling in Power House & Boiler Area using approved excavated soil in layers not exceeding 300 mm compacted thickness (higher thickness of layers up to 500mm with heavy mechanical compacting equipment) and each layer shall be compacted to 90% of standard proctor density for cohesive soils and to 80% of relative density for non-cohesive soils. Please confirm.	Bidder's proposal is not acceptable.However,Bidder to refer amanedment no. D1-26 for additional back fill material
49	VI/B	D-1-5	24 of 69	5.05.08	Minimum clearance of the bottom of pipeline for all such locations shall be 1.50 M above the High flood level (HFL)	Please furnish High Flood level (HFL) of the plant area.	High Flood level (HFL) of the plant area is RL(+) 272.6M
50	VI/B	D-1-5	55 of 69	5.23.02	Contractor can also use tubular steel sections for roof truss of conveyor galleries only. The tubular steel section shall be of circular/rectangular/square shape. The circular steel tube shall conform to IS:1161 and rectangular/square steel sections shall conform to IS:4923 …..	Tubular sections have been allowed in various structures of coal handling plant but not mentioned for other areas like power house, mill bunker building etc. Bidder would like to use tubular sections wherever feasible. Please confirm.	Tubular sections to be used only where specifically mentioned. Bidder to comply with specification.
51	VI/B	D-1-9	12 of 33	9.10.09	All internal paints shall be of low VOC (Less than 50 g /L) content conforming to GRIHA rating for reduction of VOC content.	Bidder understands that no GRIHA Rated building is envisaged under bidder's scope of work. Please confirm.	Refer amendment no.D1-42
52	VI/B	D-1-5	33 of 69	5.13.00	For the purpose of area paving, Main plant block is defined as the entire area enclosed between peripheral roads encompassing the Transformer yard area, Main Plant Building area, Service building, Boiler area, ESP area, Chimney area & FGD area.	Bidder understands that Service Building is not in bidder's scope. Please confirm.	Bidder understanding is correct. Service Building is not in bidder's scope.
53	VI/B	D-1-6	18 of 23	6.03.32 (b)	For Service Building & other RCC buildings. These buildings being complete RCC framed structures, conventional RCC slabs of minimum thickness 150 mm shall be provided. The RCC slabs shall be monolithic with RCC beams and RCC columns		
54	VI/B	D-1-5	62 of 69	5.23.18	All open RCC drains shall have removable steel gratings designed for loads as specified under loading clause.	Referred clauses are contradictory. Please specify areas where drains shall have removable steel grating/precast covers. For all other areas, open drains with no cover will be provided. Please Clarify.	This clause is for aplicable for COAL, BIO MASS, LIMESTONE & GYPSUM HANDLING SYSTEM area.
55	VI/B	D-1-5	28 of 69	5.08.00	Open RCC rectangular section, unless required otherwise due to functioned requirement, shall be provided for all drains.		This clause is for aplicable for plant strom water drainage system
56	VI/B	D-1-8	9 of 20	8.05.01	Fencing with gate shall be provided around fuel oil area, and other areas wherever necessary due to security, safety, and statutory requirements as per following specifications. However, for isolation between existing station/township and the project, the total height of fence may be reduced to 2.4m with 450mm barbed wire on top, while other details being same as given below.	Bidder understands that fencing for isolation between existing station and the project is excluded from bidder's scope. Please confirm.	Bidder understanding is correct. Fencing for isolation between existing station and the project is excluded from bidder's scope.
57	VI/B	D-1-8	10 of 20	8.07.00	All steel structures shall be fabricated in factory, transported and erected at site. All factory fabricated structures shall have bolted field connections. Coal bunkers, Lime storage silo and biomass silo with hoppers and chimney flue liners can either be fabricated at factory in segments, transported and welded at site before erection or fabricated at site. For coal bunkers, hoppers and chimney flue liners, to prevent coal dust/flue gas leakages, the applicable field joints shall necessarily be welded. Note: Steel structures shall mean Plant and Non-Plant building structures, boiler & ESP support structures, CHP structures, AHP structures, chimney flue liners support platforms & stairs, pipe and cable support structures. Site welding can be permitted in special cases where final inputs are not available before release of fabrication drawings.	As per prevailing practice in Bidder, Steel structures including PH Structures, Coal bunker, Chimney flue liner etc. are normally fabricated at site in order to meet project schedule matched with erection program. Hence customer is requested to change this clause as "All steel structures shall be either fabricated in factory, transported and erected at site or site fabricated with bolted or welded connections." Please confirm.	Bidder's proposal is not acceptable.
58	-	-	-	-	General	Bidder understands that First aid centre with creche facilities and Occupational health centre with creche is same building. Please confirm.	Bidder to refer reply at sl. No. 17
59	-	-	-	-	General	Please furnish the location of following facilities in General Lay out plan: 1. Sheds for O&M/Workers 2. 2 no. covered sheds 3. Worker's accommodation 4. Workers rest room 5. Safety park 6. Occupational health centre with creche	GLP is further developed by bidder during detailed Engg stage. Accordinglymntioned facilities shall be located in GLP by bidder

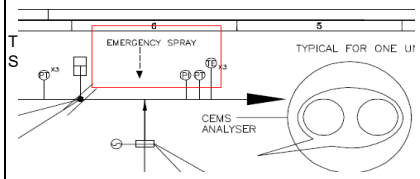
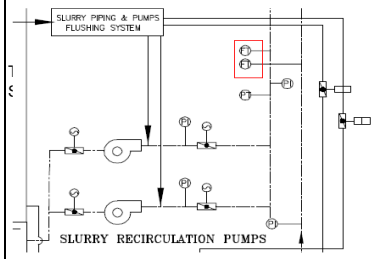
60	-	-	-	-	General	Please furnish the following tender drawings in Auto Cad format: 1. General layout plan 2.Levelling and grading Plan 3. Topographical survey 4. Layout of Road 5. Layout of Drain 6. Details of Roads	Only PDF format Tender drawing is envisaged in Tender
61	VI/B	D-1-8	1 of 20	8.01.02.6	Anti-termite constructional measures and chemical treatment measures shall be given to all vulnerable areas susceptible to termite……	Please furnish the list of vulnerable structures, buildings, where anti termite treatment is required.	Anti-termite treatment is to be carried out by bidder in all vulnerable area in consultation with NTPC during project execution.
62	VI/B	D-1-9	1 of 33	9.02.01 (a)	For handrailing at operating floors of Main Power House including RCC stairs (for one flight above and below operating floor level), passages, around all floor openings shall be Stainless Steel (SS) pipes shall be used. For SS handrail 32NB/50NB/60NB (polished) stainless steel pipe shall be provided.	Please clarify the thickness/gauge of SS steel pipe. Also provide location for use of 32NB, 50NB, 60NB dia.	Refer amendment no. D1-29
63	VI/B	D-1-9	2 of 33	9.03.01	Roof water tanks of adequate capacities depending on the number of users and 8 hours requirement shall be provided for each building and pump house.	Please provide the no. of users in each building under bidder's scope to be considered for roof water tanks.	shall be decided during detailed enginnering.
64	VI/B	D-1-9	2 of 33	9.03.02 (e)	One toilet with required facilities shall be provided for physically challenged persons as per National Building Code requirements	Please specify list of buildings where one toilet with required facilities for physically challenged persons is to be provided.	Refer amendment no. D1-28
65	VI/B	D-1-9	4 of 33	9.04.06	12mm/20mm / 38mm / 75 mm/ 115mm thick acid resistant tile on horizontal and vertical surfaces……..at all levels for all type of works shall include one coat of bitumen primer followed by 12 mm thick bituminastic layer…….. Battery Room in all buildings shall be provided with acid/ alkali resistant tiles on flooring & dado 1200mm high.	Bidder understands that battery room finishes depends on the type of batteries, whether it is Ni-Cd or lead acid. As in Ni-Cd & dry batteries, acid alkali resistant tiles are not required but in lead acid batteries acid alkali tiles for flooring and wall are required. Please confirm the type of finish based on the same.	Bidder's proposal is not acceptable.
66	VI/B	D-1-9	5 of 33	9.04.16	Rubber flooring shall conform to IS 809. The minimum thickness shall be 4 mm with sheet size of 602mm x 602mm. Rubber flooring ……..It shall be acid & alkali resistant and shall be of anti-static grade. In general, BS code shall apply for their technical characteristics.	Please clarify the technical requirement of rubber flooring at TG deck.	Bidder shall follow the Technical Specification
67	VI/B	D-1-9	21 of 33	9.17.00	Table A Interior finishing schedule h) Operating floor ……..Rubber flooring at TG deck.		Refer amendment no. D1-20
68	VI/B	D-1-9	6 of 33	9.06.05 a)	For roofs having structural slope: Top surface of sloped …….. Over the finished surface elastomeric membrane shall be laid. The elastomeric shall comprise of high solid content liquid applied urethane laid over reinforcing layer of polyscrim cloth or non-woven geo-textile. ……	Please clarify the high solid content percentage in the elastomeric membrane used for water proofing along with details about two component of single component. Provide thickness of polyscrim cloth /non-woven geotextile also.	Refer amendment no. D1-42
69	VI/B	D-1-9	6 of 33	9.06.05 b)	For roofs having no structural slope: Screed concrete mix (1:2:4) grading having minimum 25mm thickness ……with 20 mm thick cement: sand (1:4) mortar with chicken wire mesh and pressed precast concrete tiles of 20 mm thickness where applicable shall be laid over mortar at green stage. Provision for thermal expansion of roofing tiles shall be kept by providing an expansion gap in both directions …….	Bidder understands that as per specification for water proofing, 20mm tiles shall be laid over mortar at green stage only. But this procedure shall not be applicable as after laying water proofing membrane and 20mm thick cement mortar with chicken wire mesh, immediate application of tiles on the green concrete not feasible. Application of Tiles shall be done only after drying of the surface with cement sand mortar. Please confirm.	Refer amendment no. D1-42
70	VI/B	D-1-9	11 of 33	9.08.07	The polycarbonate sheet to be used for cladding and glazing purpose in conveyor galleries, Transfer points & pump houses shall have toughed profile to match with the metal cladding profile. Minimum 3.0mm thick fire retardant and UV resistant polycarbonate clean sheet of approved make shall be used. The polycarbonate sheet shall be installed along with …….	Bidder understands that as per specification, minimum 3.0mm thick fire retardant and UV resistant polycarbonate clean sheet of approved make shall be used. 3mm fire retardant sheet not available in the market. Bidder proposes to use 3 mm thick UV resistant polycarbonate sheet without fire retardant to match the profile of the cladding sheet. Please confirm.	Bidder's proposal is not acceptable. Bidder shall follow Technical specification.
71	VI/B	D-1-9	14 of 33	9.11.11	Electrically operated, self-operable/closing, aluminium framed with tinted glass, sliding doors……	Please specify the thickness of fire rated glass used for sliding door in CCR of MPH building whether it is DGU or single glass.	Bidder's understanding is not correct. Bidder shall follow Technical specification.
72	VI/B	D-1-9	15 of 33	9.11.11	The glass must be minimum 14mm clear (MADE IN INDIA)120 min fire rated for Integrity, Radiation control (EW 120) and partially insulation (EI 20) Non Wired Toughened Interlayered glass with a light transmission of 86% and a sound reduction of 38 dB and manufactured in UL & TUV…… The glass shall be tested and certified for no formation of bubbles or yellowing after 5000 hours of exposure to UV radiation by TUV Rheinland as per EN 12543-4.The base glass and finished glass must made in India .	Bidder understands that this is a special type of glass based on customization. 14 mm thickness is rarely manufactured and used for application area mentioned in the specification. Also it is processed by only one manufacturer. Bidder proposes to allow 11mm to 13mm thick glass as it is processed by 3 to 4 manufacturers in the market, to avoid monopoly.	Bidder's proposal is not acceptable. Bidder shall follow Technical specification.

73	VI/B	D-1-9	15 of 33	9.11.11	..... The door shall have water tightness level of 8A when tested as per EN 1027. Fire Rated Door shall be of Makes-Saint Gobain, Acodor , IGI, Matrix	Bidder understands that mentioned makes are not providing complete fire rated system with test certificate and also some of them are not the processor of fire rated glass except Saint-Gobain. As it is a monopolistic item of Saint Gobain, it is requested to provide some more glass manufacturer names to avoid monopoly in the market.	Bidder's understanding is not correct. Bidder shall follow Technical specification.
74	VI/B	D-1-9	16 of 33	9.12.06	Internal Glazed partition in in MPH shall be Vetrotech Saint-Gobain fully glazed fire rated fixed partition with 120 minutes of integrity and radiation control (EW 120) with symmetrical ..... The glass shall be Contraflam Lite 14mm (MADE IN INDIA) clear 120 min fire rated for Integrity, Radiation control (EW 120) and partially insulation (EI 20) Non Wired ..... Facility and including UL-EU Certification and compliant to class 1(B)1 category of Impact Resistance as per EN 12600.	Bidder understands that this is a specialized glass produced by few manufacturers only. The specification 14MM thick fire rated glass is produced by SAINT GOBAIN only. To avoid monopoly in the market, bidder propose 11 to 13mm thick glass for such kind of application and to achieve	Bidder's understanding is not correct.Bidder shall follow Technical specification.
75	VI/B	D-1-9	17 of 33	9.12.06	.....The Partitions shall offer C4 level of wind resistance when tested as per EN12211 and shall provide class 4 level of air permeability as per EN 1026. The Partitions shall also be tested .....The Partitions shall have water tightness level of 8A when tested as per EN 1027. Partition shall be of Makes - Saint Gobain, Acodor , IGI , Matrix ,Tata Pravesh.	Bidder understands that mentioned makes are not providing complete fire rated system with test certificate and also some of them are not the processor of fire rated glass except Saint-Gobain. As it is a monopolistic item of SAINT GOBAIN. Bidder requests to provide some more glass manufacturers names to avoid monopoly in the market with the proposed glass thickness of 11 to 13 mm in place of 14 mm only as 2 hours' fire rating can be achieved by 11mm thick glass also.	Bidder's understanding is not correct.Bidder shall follow Technical specification.
76	VI/B	D-1-9	31 of 33	9.17.00 TABLE-A, NOTE-(7)	Requirement given above are suggestive and minimum. Bidder is welcome to suggest alternative scheme conforming to design functional requirement subject to approval of the Engineer-in-charge.	Bidder understands that as per this clause, alternative material can be proposed by the bidder. Kindly confirm the procedure and modalities to be followed for approval /selection of alternative material.	Refer amendment no. D1-20
77	VI/B	D-1-5	13 of 69	5.02.09 iii)	Control room interiors shall be designed and executed by M/s EVANS / M/s Pyrotech or equivalent vendor who are specialized in control room interior design.	Bidder has designed and successfully executed control room interiors of several national and international power projects. Hence bidder understands that bidder is deemed as equivalent vendor specialized in control room interior design. Please confirm.	Bidder shall engage the Interior design firm specialised in Control room interior deisgn.
78	VI/B	D-1-9	17 of 33	9.13.10	Underdeck insulation shall be provided on the ceiling (underside of roof slab) and underside of floor slab of air-conditioned area depending upon the functional requirements. This underdeck insulation shall consist of 50mm thick mineral wool insulation with 0.05 mm thick aluminium foil & 0.6 mm x 25mm mesh wire netting and shall be fixed to the ceiling with 2 mm wire ties.	Bidder understands that underdeck insulation shall be provided on the ceiling (underside of roof slab) and underside of floor slab of air-conditioned area depending upon the functional requirements of HVAC. Please confirm.	Bidder's understanding is not correct. Bidder shall follow Technical specification.
79	VI/B	A-01	66 of 87	3.13.01 point no. 14	14. Underdeck insulation shall be provided if i) Non A/C area is located just above the A/C area. In this case, underdeck insulation shall be provided underneath of the ceiling of A/C area. ii) Non A/C area is located just below the A/C area. In this case, underdeck insulation shall be provided underneath of the ceiling of Non A/C area. iii) Underneath the ceiling of AHU room located below the non-A/C area or exposed to sun. Underneath the floor of AHU room located above the non-A/C area. iv) Underneath the ceiling of A/C areas exposed to sun.	Bidder understands that underdeck insulation shall be provided on the ceiling (underside of roof slab) and underside of floor slab of air-conditioned area depending upon the functional requirements of HVAC. Please confirm. Areas such as cable vault, switchgear etc. which are coming below the air conditioning area shall not be provided with under deck insulation due to practical constraints. Bidder understands that underdeck insulation provided in Non AC areas are exposed (without false ceiling). Please confirm.	Requirement of Tender specifications is clear. Bidder to comply with specification requirements.
80	SECTION-VI, PART-B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	20 OF 69	5.03.03	Dynamic interference effects due to additional chimney(s)/NDCTS's and other tall structures located upto distance of 20 times diameter at 2/3rd height of subject chimney in the area or in the future expansion stage of the project, as envisaged by the owner at the time testing, shall be determined along with the other topographical features of the local area through model test.	Bidder proposes that dynamic interference effects due to additional chimney(s) / NDCTs and other tall structures located up-to distance of 20 times diameter at 2/3rd height of subject chimney in the area shall be determined along with the other topo-graphical features of the local area through model test. Kindly confirm.	Bidder to comply with technical specification requirements.
81	SECTION-VI, PART-B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	21 OF 69	5.03.09	The inside surface of chimney shell above roof, horizontal surface of shell at top, underside of concrete roof slab, etc shall be painted with epoxy phenolic coating system having total 220 microns DFT.	Bidder understands that no painting is required on inner surface of concrete chimney shell below roof. Kindly confirm.	The inside surface of chimney shell above roof, horizontal surface of shell at top, underside of concrete roof slab, etc shall be painted with epoxy phenolic coating system having total 220 microns DFT. Further, no painting is envisaged on inner surface of concrete chimney shell below top portion.
82	SECTION-VI, PART-B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	22 OF 69	5.03.10	A rack and pinion elevator, with a load carrying capacity of 400 kg (min) (passenger cum goods), cabin floor size of 1100 mm x 1000 mm (min.) and an operating speed of 40 m/min. (approx.), shall be provided for travel from the grade level to the top of the chimney.	Bidder understands that a rack and pinion elevator shall be provided for travel from the grade level up to the platform just below the roof platform. Kindly confirm.	Bidder's understanding is in order. Elevator shall be provided for travel from the grade level up to the platform just below the RCC roof platform.

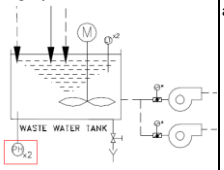
83	SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	28 OF 87	1.05.22.01	Transition duct inside the chimney and chimney flue liner shall be painted with cor-rosion resistant paint for Borosilicate Lining and insulated for Titanium/C-276 cladding irrespective of surface temperature	Bidder understands that only outer surface of chimney flue liner is to be painted with corrosion resistant paint for borosilicate lin-ing. Inner surface of flue liner shall be pro-vided with borosilicate lining so there shall be no exposed surface. Kindly confirm.	The specification clause is intended for the complete exposed surface to be painted with corrosion-resistant paint in case of borosilicate lining.
84	SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	28 OF 87	1.05.22.01	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 8 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining.	For Borosilicate lining, bidder proposes to provide 8mm thick (minimum) mild steel flue with Borosilicate Glass Block Lining of minimum 38 mm thickness for the top flue liner above the roof slab. This is proposed to avoid creation of welding joint between two different materials. It is not feasible to weld MS liner with solid titanium due to non-availability of suitable electrode for weld-ing. External surface of chimney flue liner projecting over the chimney roof shall be wrapped with 2 mm thick Titanium / C-276 sheet. Kindly confirm.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
85	SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	28 OF 87	1.05.22.01	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 8 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining. The minimum length of the capping inside the chimney shall be atleast equal to 150mm.	For Borosilicate lining, bidder proposes to provide 2mm thick titanium sheet over the top portion of the flue can to avoid any damage in between flue can and borosilicate lining. Bidder proposes to provide the 100mm length of the capping from the top portion of the flue inside flue liner as a standard practice of bidder. Kindly confirm.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
86	SECTION – VI, PART-B	SUB-SECTION A - 14 WATER TREATMENT PLANT	3 OF 36	2.02.00	10) Various equipment in the PT Plant will be sized for the following……..	Chemical dosing requirment for PE,PAC,FeCl3,Coagulant aid,Anti-scalant,Anti-Oxidant etc are not given .Pls provide.	Bidder to decide these dosing requirement as per their system design meeting technical specification requirements.
87	SECTION – VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	50OF 87	3.06.00 (6)	6 Chemical House: A common two (2) storey Chemical house of RCC construction shall be provided……..of PT–CW & Potable, PT–DM, PT-RO plant (As applicable)	Chemical storage shall be designed to meet 15 days requirement.Please confirm.	Bidder to refer the tender drawing (POM-A-06) for dimensions of Chemical House.
88	SECTION – VI, PART-E	LIST OF TENDER DRAWINGS	1 OF 7		P & ID ofCoal handling plant run-off water treatment systme in Tender drawing	P&ID of Coal handling plant run-off water treatment system is not provided. Please provide.	Bidder to prepare the P&ID as per offered system design meeeting technical specification requirements.
89	SECTION – VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	49 OF 87	3.05.00	i) Potable Water System Potable water system shall meet the drinking water required for all the plant facilities/ buildings included in Contractor's scope. Capacity of pumps shall be as follows: Minimum Capacity of potable water requirement will be 40 m3/hr	Please specify following, -Capacity & Head Of Potable water Pumps (Colony). -Terminal Points.	Potable water pumps for colony is not envisaged in the scope of this tender. Bidder to thoroughly study & follow tender specification requirements.
90	SECTION – VI, PART-B	SUB SECTION-A-14 WATER TREATMENT PLANT	22 OF 36	13.00.000	Design flow PT-CW Aerator/Stilling Chamber is 2350m3/hr+3% for sludge…….. ……Design flow of each clarifier (Net output) (minimum) 1800 m3/hr	Pls review design flow of each Clarifer in line with Aerator/Stillling Chamber Capacity.	Design flow of clarifier has been reviewed & found in order. Bidder to comply technical specification requirements.
91	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	PAGE 17 OF 29	7.04.02	The filter cloth shall be polyester or polypropylene as per the proven design of the supplier and shall be guaranteed for a minimum life of not less than 7000 hrs.	No GDS supplier provides guarantee for operational life as it depends upon the usage conditions. The guaranteed life of 7000 hours is not being provided by the OEMs for filter cloth. **Please accept.**	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
92	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	Page 17 of 29	7.04.04	The sealing belt shall have minimum life of not less than 7000 hrs.	No GDS supplier provides guarantee for operational life as it depends upon the usage conditions. The guaranteed life of 7000 hours is not being provided by the OEMs for sealing belt. **Please accept.**	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
93	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	Page 18 of 29	7.05.06	Each vacuum receiver tank(s) shall be provided with slide plate type pneumatic vacuum breaker. The plate shall be stainless steel with a min. thickness of 3 mm.	Bidder shall provide as per the proven design of the OEM meeting the system requirement. **Please accept.**	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
94	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	Page 18 of 29	7.04.10	A 2 m (min.) wide platform shall be provided around each belt filter.	Bidder shall provide a common platform between the belt filters of adequate width between the belt filters. **Please accept.**	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
95	SECTION-VI, PART-B	SUB-SECTION-E-4 (FGD)	Page 3 of 5	1.09.00	Vacuum Belt Filter System - QUALITY ASSURANCE PLAN	The Quality Plan shall be submitted by the bidder indicating the applicable details of tests and inspections during contract stage providing necessary technical justifications as per previous experience with similar application. **Please accept.**	The requirements of QP is clearly specified. Bidder to comply technical specification requirement. This may be discussed during detailed engineering

SL. NO	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.	SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
96	VI / A		63 of 361	1	1. If qualification sought as per clause 4.26.1 then the details of the sub vendor (manufacturer) shall be filled by the bidder in the format A to G. 2. If the qualification sought as per the clause 4.26.2, then the details of JV/Subsidiary Company formed for manufacturing of such equipments in India shall be furnished individually for each equipment by the bidder such as	We are public sector company. We conduct open tender process with NTPC QR condition for procurement of FGD BOI. Therefore, Attachment 3K, which pertains to FGD BOI components such as Agitators, Slurry Recirculation Pumps, etc., will be submitted after the award of the contract. Please accept.	The Attachment 3K for provenness of the identified equipment suppliers is to be submitted as as per the schedule identified in the bidding documents. Bidder to comply with the requirements of the technical specification.
97	VI / A		123 of 361	-	LETTER OF SUPPORT FOR SATISFACTORY PERFORMANCE OF (EQUIPMENT/SYSTEM NAME) FOR SIPAT STPP-II STPP (1X800MW)	We were unable to locate letter of support format specific to FGD in tender document. Our understanding is that the letter of format provided in the referenced clause is generic in nature and is applicable for FGD as well. Please confirm if this understanding is correct	Bidder to refer to pages 360 and 361 of Attachment-3K which provides the format for auxiliaries related to Steam Generator, Electrostatic Precipitator (ESP), Flue Gas Desulphurization (FGD) sub systems as applicable as per the proveness criteria given at sub-section-IA, Part-A of provenness of Technical Specification (Sub-section-VI)
98	VI / A	IB	11 of 19	-	DOMESTIC COAL CHARACTERISTICS	Kindly provide chloride/fluoride value in coal or HCL/HF conc. in absorber inlet flue gas for FGD design.	For FGD design and guarantee conditions-HCL (ppm) wet-45 & HF (ppm) wet-12 may be considered. Bidder to refer to Amendment to technical specification Sl. No. SG.3
99	VI / A	IB	3 of 19	13.02.00	**CW system blow down water shall be used for** plant service water requirement, dust suppression system of coal handling plant fire water tanks, **FGD (process water)** facilities, sealing of Vacuum pumps (if applicable) of Ash Handling plant. **Make-up to** AHS Cooling system, HVAC System & **FGD system** shall be met from PT plant of CW system (PT-CW). The	Source of FGD process water/make up water mentioned in two clauses are contradictory to each other. Kindly confirm whether source of FGD process water/make up water is from CW blowdown or from PT plant of CW system.	Bidder to note that the source of FGD process water shall be from CW blowdown. Further, clarified water for FGD Gypsum washing shall be met from PT-CW system.
100	VI / B	A-05	24 of 29	13.01.00	Two (2) Process water Storage tanks (each tank catering to the requirements of 1 x 800 MW units) along with two numbers of 2x100 % Booster water pumps, if required, (Each pump catering to the process water requirements of 1 x 800 MW units) along with all necessary piping, valves, control & instrumentation **to feed the clarified water shall be provided by the Contractor**..... The **tank shall receive clarified water.**	As per referred clause, FGD process water storage tank will receive clarified water. However, in another section of the tender specifications(VI/A-IB-13.02.00), source of FGD process water is indicated as CW blowdown water. Kindly clarify and confirm the source of FGD process water.	FGD process water shall be tapped off from CW blow down which is also the clarified water with operative COC
101	VI / E	Tender Drawing	34 of 91			Source of FGD process water is indicated as clarified water in referred tender drawing.However, in another section of the tender specifications(VI/A-IB-13.02.00), Source of FGD process water is indicated as CW blowdown water. Kindly clarify and confirm the source of FGD process water.	FGD process water shall be tapped off from CW blow down which is also the clarified water with operative COC

102	VI / E	Tender Drawing	34 of 91	-		In the tender drawing, it is observed that the belt filter wash water pump is drawing its suction from the filtrate tank. However, the filtrate tank contains slurry with solids, making the filtrate water unsuitable for belt filter washing. Hence, as per our proven practise, process water will be used for Belt filter wasing. Please confirm.	The Bidder may use process water for belt filter wash water. However, equipments like tank, pumps, valves and instrumentation shall be provided as the specification requirememt
103	VI / E	Tender Drawing	33 of 91			In the tender drawing, it is depicted that there are 3 nos. of limestone slurry pumps for each limestone slurry storage tank. However, under Sec VI-A, Sub Sec IIA-04, clause 3.01.04, the tender specification says total 2 nos. of limestone slurry pumps for 1x800 MW to be provided. Kindly confirm the correct number of pumps to be provided.	Bidder to refer to revised P&ID issued as an Amendment to technical specification SL. No. SG.42 in this regard
104	VI / E	Tender Drawing	33 of 91			In the tender drawing, it is shown that process water is added to the limestone slurry tank via control station. Adding process water to limestone slurry tank will dilute the limestone slurry contained in the tank. Hence, it is not recommend to add process water to limestone slurry tank. Please accept.	Bidder's proposal is not acceptable. The requirement of the technical specification is clear. Bidder to comply with the requirements of the technical specification.
105	VI / E	Tender Drawing	32 of 91		Tender Drg. No. xxxx-001-POM-A-022 (zone D8) Scheme of FGD Absorber System 	In tender drawing, normal quench system is shown. Howvever, in tender specification, there is no mentioning of normal quench system. As per our collaborator proven FGD design also, normal quench system is not applicable. Kindly clarify what is the purpose of normal quench system and if it is mandatorily required, kindly provide the specification for the same.	The scheme for the normal quenching system is used for washing the wet-dry duct interface to prevent scaling in the zone. The requirements of the scheme are indicated in the tender P&ID. The same is to be complied with by the Bidder.
106	VI / E	Tender Drawing	32 of 91		Scheme of FGD-Absorber system: Note 6- All instruments in slurry lines shall be provided isolation valves and diaphragm.	Bidder does not recommend valves in the impulse lines of slurry pipes in order to keep the stub length as minimum as possible and to prevent slurry settlement/blockage issues. Bidder request NTPC to review and confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification
107	VI / E	Tender Drawing	32 of 91 & 34 of 91		Scheme of FGD-Absorber system & Scheme of Gypsum Dewatering system	At the common dischage line of Filtrate water pumps, Valve station and instruments are repeatedly indicated in both the schemes of absorber system and Gypsum dewatering system. Bidder understand that one set of instruments and a valve station are only to be provided. Bidder request NTPC to review and confirm.	Bidder to refer revised P&ID issued as an Amendment at SG.43 in this regard

108	VI / E	Tender Drawing	32 of 91			Emergency Spray is indicated in the FGD bypass duct to chimney in zone H6 of tender drawing. Kindly clarify whether this Emergency Spray is required since this is not called for elsewhere in the tender specification. Please note that, for other NTPC tenders also, NTPC clarified that Emergency spray is not required vide pre bid replies.	Bidder to refer to revised P&ID issued as an Amendment to technical specification SL. No. SG.41 in this regard
109	VI / E	Tender Drawing	32 of 91			In tender drawing, Flow Transmitter is shown on the RC pump discharge header. Magenetic type flow transmitter is applicable for slurry and magetic flow transmitter required minimum 5D/2D straight distance upstream and downstream of flow meter. RC pump header size is typically around 1.8 m. ~13 m Straight distance required for magentic flow meter. As per RC pump piping layout, it is not possible to provide this much straight distance and hence it is not technically possible to provide flow meter in RC pump discharge header. Hence, kindly delete flow meter.	Bidder to refer to revised P&ID issued as an Amendment to technical specification SL. No. SG.41 in this regard
110	VI / A	IB	15 of 19	3	The above represent limestone quality to be considered for basic sizing and guarantees. Further the bidder is required to collect limestone samples from site for analysing is characteristic including reactivity. Bidder shall indicate in its bid the quantity of limestone required for such testing.	Kindly clarify whether limestone reactivity test is to be carried out after award of contract or before award of contract.	The specification requirement is clear in this regard. The scheduling of the limestone reactivity is based on the assessment by the Bidder of the sensitivity of the Bidder's offered FGD design to the FGD reactivity, design margins required etc. while meeting the requirments of the bidding documents.
111	VI / A	IA	16 of 35	4.25.1	The Bidder or Bidder's sub-vendor should have designed, engineered, supplied, erected/supervised erection and commissioned/supervised commissioning of at least one (1) no. of wet limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than 23,00,000 Nm3/hr, with desulphurisation efficiency of at least 90 %, operating in a pulverised coal fired power plant.	We kindly request that the customer consider relaxing the QR (Qualification Requirement) criteria as outlined below: " The Bidder or Bidder's sub-vendor should have designed, engineered, supplied, erected/supervised erection and commissioned/supervised commissioning of at least one (1) no. of wet limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than **22,00,000 Nm3/hr**, with desulphurisation efficiency of at least 90 %, operating in a pulverised coal fired power plant."	The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
112	VI / A	IIA-04	1 of 7	1.02.00	In case of higher pressure /flow requirements are envisaged for instrument & service air and water Contractor shall make its own arrangement.	As per this clause, we understand instrument air & service air will be provided by customer upto certain predefined limit. Kindly specify the ceiling limit for instrument & service air.	BIdder's understanding is not correct. The complete compressed air system for the EPC package is in the scope of the Bidder.
113	VI / A	IIA-04	2 of 7	2.06.00	The waste water from the system shall be collected and neutralized using lime and shall be pumped to the mixing tanks of HCSD System or in any other area with **suitable treatment** so as to suit/ not disturb the destination fluid quality.	Kindly specify a. type of treament required for FGD waste water and b. quality of waste water required after treament so as to bring uniformity among bidders	The functional requirement of the treatment is already specified. The details of the same shall be finalised based on the location to which the neutralised waster water is sought to be pumped.
114	VI / A	IIA-04	4 of 7	4.01.04	2x100 heaters for absorber outlet gate & **bypass gate**	We understand that FGD bypass gate is not applicable. The reference to the bypass gate in this clause is a typographical error. Please confirm.	Please refer to the amendment to technical specification Sl. No. SG.13 in this regard
115	VI / A	IIA-04	4 of 7	4.01.09	Piping from gypsum bleed pumps to gypsum dewatering system, along with recirculation lines (if required) necessary isolation and **control valves**	Control valve is not required in gypsum bleed pump line as per our proven practise. All valves (as per tender P&ID) will be provided for gypsum bleed pump line. Please accept. If control valve is mandatory in gypsum bleed pump line, please inform the purpose of control valve and type of control valve required.	Bidder to refer to the amendment no SG.14 and SG.41 to the technical specifications regarding the Gypsum bleed pumps recirculation valves. Bidder's proposal with regard to discharge valves of Gypsum bleed pumps is not acceptable. Bidder to comply with the technical specification requirement.
116	VI / A	IIA-04	5 of 7	7.00.00	PROCESS WATER& COOLING WATER STORAGE & PUMPING SCHEME	This section does not stipulate any specific requirement for cooling water storage. Kindly confirm whether cooling water stoarge is required. If cooling water storage is required, provide specification for cooling water stoarge if required.	Bidder to follow the water storage requirements along with the pumping scheme as detailed in the technical specifications.

117	VI / A	IV	1 of 73	1.00.01	All CAT-1 Performance Guarantee tests shall be conducted along with initial operation except following a) Coal Pulverisor Wear Parts Warranty b) Particulate Emission/ESP Efficiency, **FGD.**	Kindly specify when FGD PG test is to be done. Is it after completion of initial operation?	The PG test of the FGD shall be carried out during the initial operation or soon after the completion of the initial operation. The Contractor shall make the FGD system ready for conducting the functional guarantee tests in line with the requirements laid out in the bidding documents.
118	VI / A	IV	20 of 73	1.01.07.01 note 5	Guaranteed Unit Auxiliary Power Consumption of FGD system shall be taken by considering the additional pressure drop in the FGD system during FGD SO2 removal efficiency test at specified guarantee point conditions. For this purpose, difference of FGD system pressure drop during FGD SO2 removal efficiency test and that at Unit Auxiliary Power Consumption test shall be loaded as additional Auxiliary Power Consumption.	We understand that if booster fan is not provided, difference in ID fan power consumption measured during FGD SO2 removal efficiency test and that measured during Unit Auxiliary Power Consumption Test will be considered for FGD Power Consumption on account of FGD pressure loss. If booster fan is provided, booster fan power consumption only will be considered for FGD power consumption on account of FGD pressure loss. Kindly confirm our understanding is right.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.
119	VI / A	IV	22 of 73	1.01.07.02 c)	c) FGD System i. Limestone Gravimetric feeder, Wet ball mill and their integral Auxiliaries ii. Vacuum Belt Filter, Vacuum Pump and its integral auxiliaries iii. Booster water pump iv. Waste water pump v. Limestone Slurry Tank Agitators vi. Filtrate Pump(s) vii. Belt Filter Wash Water Pump viii. Hydro-cyclone Waste Water Sump Pump and Waste Water Pump	Wet Ball Mill System and Gypsum Dewatering System along with their associated equipment do not run continuously and are operated in batch mode. As per ASME PTC 40, Bidder calculates duty factors based on running time of equipment at guarantee point conditions and accordingly guaranteed auxiliary power will be furnished. Please accept. Otherwise NTPC is requested to specify duty factors for equipment indicated at sl. no. i to viii.	The formulation of duty factors for limestone grinding system and gypsum dewatering system shall be finalised during detail engineering and shall consider correction of the Auxiliary Power Consumption values measured during the Performance Guarantee Test to the guaranteed conditions.
120	VI / A	IV	22 of 73	1.01.07.02 c)	c) FGD System viii. **Hydro-cyclone Waste Water Sump Pump** and Waste Water Pump	The name of this pump (Hydro-cyclone Waste Water Sump Pump) is ambiguous, and we are unable to understand its intended purpose or service. We kindly request clarification	Bidder to read the referred clause as "viii. Hydro-cyclone feed pump(s)"
121	VI / A	IV	30 of 73	1.03.03 iv)	Pressure Drop across FGD The contractor shall demonstrate that the total pressure drop in the gas path across the FGD System shall not exceed the guaranteed values for the range of coal and loads specified in the Technical Specification	FGD pressure drop is directly related to power consumption of ID fan or booster fanas the case may be. There is guarantee for Auxiliary Power Consumption envisaged in the tender. FGD pressure drop is already accounted in auxiliary power cosumption guarantee. Hence, we request NTPC to remove FGD pressure drop guarantee for this project in line with other NTPC tenders.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.
122	VI / A	IV	30 of 73	1.03.03 vii)	The Contractor guarantees that the maximum purge flow rate to **waste water treatment system** from FGD system for 1x800 MW unit shall be less than 10m3/h averaged over a 24 hour period for a the range of specified coal(s).	As per this clause, we understand that waste water from FGD system is sent to waste water treatment system. However, We could not find requirement of FGD waste water treatment system in other sections of tender specification. Kindly clarify the requirement or details of FGD waste water system.	The functional requirement of the treatment is already specified in clause no. 2.06.00, sub section IIA-04 Part A of section VI. The details of the same shall be finalised based on the location to which the neutralised waster water is sought to be pumped.
123	VI / A	IV	30 of 73	1.03.03 vii)	The Contractor guarantees that the maximum purge flow rate to waste water treatment system from FGD system for 1x800 MW unit shall be less than **10m3/h** averaged over a 24 hour period for a the range of specified coal(s).	FGD waste water purge flow quantity is arrived to limit chloride content in absorber slurry < 20000 ppm. Source of chloride in absorber slurry is mainly from coal. Kindly provide coal chloride content to check adequacy of FGD waste water purge flow quantity.	For FGD design and guarantee conditions-HCL (ppm) wet-45 & HF (ppm) wet-12 may be considered. Bidder to comply with the specification requirement.
124	VI / A	IV	30 of 73	1.03.03 vii)	The Contractor guarantees that the maximum purge flow rate to waste water treatment system from FGD system for 1x800 MW unit shall be less than **10m3/h** averaged over a 24 hour period for a the range of specified coal(s).	FGD waste water purge flow of 10 m3/hr is too less for 1x800 MW unit. Bidder recommends that atleast 15 m3/hr waste water purge flow per unit otherwise it will result in accumulation of high TDS/chloride content in the recirculated slurry which will impact FGD performance. NTPC is requested to review the clarification and provide necessary amendments.	Bidder's proposal is not acceptable. Bidder to comply technical specification requirement.
125	VI / B	A-01	17 of 87	3 viii)	Pressure drop through FGD System 150mm WC or actual whichever is higher (Alternately, separate booster fans for FGD system may be provided. if pressure drop through FGD system exceeds 150 mm WC. In such case, specified pressure drop through FGD system shall not be considered for sizing of ID fan.)	We understand that separate booster is not mandatory even if FGD pressure drop is more than 150 mmwc. ID fan taking care of FGD pressure drop will be provided. Please confirm our understanding is correct.	Bidder's understanding is correct.

126	VI / B	A-05	7 of 29	iv)	The slurry recirculation pumps shall have motor /pneumatic driven knife gate valve at pump suction.	Based on the proven practices of our collaborators, it is highly advisable to install a pneumatic butterfly valve at the suction point of the slurry recirculation pumps. Knife gate valves have a longer opening and closing time, approximately 5 minutes, in comparison to butterfly valves(15 sec). If a knife gate valve is used at the pump suction, it may cause delays in starting the recirculation pump, as one would have to wait until the suction gate valve is fully open. Please accept pneumatic butterfly valve at the suction point of the slurry recirculation pumps.	Bidder's proposal is not acceptable. Bidder to comply technical specification requirement.
127	VI / B	A-05	9 of 29	5.04.00	Provision shall also be provide in the Gypsum Bleed Pumping system by provision of tap off, valves etc. for pumping the gypsum bleed to alternate source.	We understand that only provision for tap off with isolation valve will be provided in gypsum bleed pump discharge header pipe. Piping from tap off to alternate destination is not in bidder's scope. Please confirm.	Bidder's understanding is correct.
128	VI / B	A-05	4 of 29	2.00.00	The complete installation of liners shall be made under the supervision of the liner supplier as per their guidelines.	Since absorber is made of C276 clad plate, no liner is applicable. Hence, clause related to "supervision of the liner supplier" may be deleted.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement. The referred clause refers to the liners for the complete FGD system.
129	VI / B	A-05	19 of 29	7.07.05	In case Bidder opts to provide additionally Lamella separator before the waste water tank and after the secondary hydro cyclone for removing impurities from the system, the solids con-centration in waste water up to max 10% can be acceptable.	Kindly clarify whether Lamella separator (before the waste water tank and after the secondary hydro cyclone) is mandatory or not.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.
130	VI / B	A-05	19 of 29	7.07.07	A pH monitor shall be provided at the discharge of the pumps for measurement and control.		
131	VI / E	Tender Drawing	34 of 91	-	Tender Drg. No. xxxx-001-POM-A-024 (zone F3) Scheme of Gypsum Dewatering System 	As per Part B, pH analyser to be provided at discharge of the waste water pump. As per Tender drawing, ph analyser to be provided in waste water tank. Both clauses are contradictory. As per our proven practise, ph analyser will be provided in waste water tank. Please confirm.	The proposal of the bidder acceptable inline with tender drawing
132	VI / B	A-05	20 of 29	7.07.09	The lime storage silo shall be of minimum 24 hr capacity equivalent to the requirements of FGD system of **2x800 MW** at Design point and shall be complete with supporting steel structure, platforms, power operated outlet gates	2x800 MW mentioned in referred clause is typo error. It shall be 1x800 MW. Please confirm.	Bidder to refer to amendment sl. no. SG.1 in this regard
133	VI / B	A-05	20 of 29	7.08.01	Bidder to provide the portable pumps of suitable capacity to drain the remaining slurry from the tank in max 2 hour into absorber area sump.	As per our proven practise, by opening drain valves in absorber, remaining slurry in absorber will flow automatically by gravity to absorber area sump via trench within 2hrs. Portable pumps to drain absorber tank is therefore not required. Please confirm.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
134	VI / B	A-05	21 of 29	8.04.00	All the slurry pumps shall be provided with motorized suction and discharge valves.	As per Part B, All the slurry pumps to be provided with motorized suction and discharge valves. However, the tender drawings allow for the provision of pneumatic valves based on the proven practices of the bidder for slurry pump suction/discharge. as per our proven practise, we will provide pneumatic valves for slurry pump suction/discharge. Please confirm.	The requirement of the specification is clear in this regard. Bidder to comply with the specification requirement.
135	VI / B	A-05	22 of 29	9.01.00	Contractor shall make arrangements for pumping the drainage water back to the respective system with 2x100% vertical sump pumps.	As per referred clause, 2x100% sump pumps to be provided. However, in tender drawings, only one no. sump pump is shown for each of the respective sumps. Both are contradictory. Kindly clarify.	Bidder to provide 2x100% sump pumps as per the specification requirement in the referred clause

136	VI / B	A-05	22 of 29	10.01.00	Slurry tanks: Replaceable Chlorobutyl/Bromobutyl rubber lining of minimum 5 mm thickness	We interpret that the lining material and lining thickness for slurry tanks, such as the limestone slurry tank, wastewater tank, filtrate tank, and secondary hydrocyclone feed tank, should conform to the specifications provided in their respective sections or headings. The lining material and lining thickness details mentioned in this clause are intended for other slurry tanks for which such specifics are not explicitly stated.	Bidder to refer to the amendment to technical specification SL. No. SG.17 and SG. 35 issued in this regard.
137	VI / B	A-05	22 of 29	10.01.00	Coarse-screen(s) at suction-side of slurry recirculation pumps shall be provided	Both clauses are contradictory. As per our proven practise, Suction screens shall be installed inside the Absorber vessel to protect the Slurry recirculation pumps. Please confirm.	The requirements of the specification are clear. Bidder to provide the screens in the locations as specified in the referred clauses.
138	VI / B	A-05	12 of 29	5.06.22	Suction screens shall be installed inside the Absorber vessel to protect the Slurry recirculation pumps.		
139	VI / B	A-05	25 of 29	14.03.00	An adequately sized manhole with platform (min. 2 sq. m) shall be provided above each spray level	Manhole size (min. 2 sq.m) asked in tender is very large and there is a risk of fall asscoiated with larger manhole. As per our proven practise, manhole of size 600 x 900 mm is adequate and will be provided above spray level. Please accept.	The specification requirement is clear in this regard. The larger size of the manhole provides for easing mobility and, hence, safety. The Bidder is to make necessary system improvements to nullify the risk cited by the Bidder in its clarification. Bidder to comply with the specification requirement.
140	VI / B	A-02	40 of 67	13.01.02 c	For flue gas ducts downstream of ESP, additional fly ash loading on the surface or for one tenth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under	Kindly provide additional fly ash loading for absorber outlet duct upto bypass duct.	The requirement of fly ash loading to be considered for duct design, as specified in the referred clause, is also applicable for absorber inlet and absorber outlet duct sections.
141	VI / B	A-01	20 of 87	1.05.14.01 a 3	Maximum Flue gas velocity from ESP out-let to chimney inlet shall be 15 m/sec.	We understand that maximum Flue gas Velocity for Absorber inlet duct and absorber outlet shall be 15 m/s. Please confirm.	Bidder's understanding is correct.
142	VI / A	IIA-04	2 of 7	3.01.05	On/Off type Diaphragm valves in Limestone circulation lines to be provided instead of pinch control valve.	Similar to limestone recirculation line, on/off type Diaphragm valves shall be provided in gypsum bleed pump recirculation line instead of pinch control valve. Please accept. Note. There is no requirement of control valve in recirulation line as per our proven design.	Bidder to refer to the amendment to technicla specification sl. No. SG.14 and SG.41 to the technical specifications regarding the Gypsum bleed pumps recirculation valves.
143	VI / B	A-05	4 of 29	3.01.00	5. Maximum flue gas velocity through the Absorber (M/sec) - Not more than 4 m/s at Design Point Conditions (not applicable for bubbling type absorber)	Gas Velocity inside the Absorber are design specific parameter and as per our DCFS FGD standard design practice, maximum flue gas velocity through the Absorber is maintained at 4.5m/s. Bidder request NTPC to review and kindly accept.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
144	VI / B	A-01	26 of 87	1.05.21.01	7. SO2 Removal Efficiency **Guarantee Point** To be worked out by the Bidder to achieve SO2 emission in the chimney to less than 60 mg/nm3 (6% O2 dry basis) **Design Point** To be worked out by the Bidder to achieve SO2 emission in the chimney to less than 80 mg/Nm3 (6% O2 dry basis)	Bidder proposes the following Outlet SO2 limits 1.Guarantee Point : 80 mg/Nm3 (6% O2 dry basis) 2.Design Point : 90 mg/Nm3 (6% O2 dry basis) The above mentioned SO2 emission limits are below the Emission norms and it will ensure optimized FGD design. Bidder request NTPC to review and kindly accept the proposal.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
145	VI / B	D-1-5	25 of 69	5.06.01	The civil works for fgd system shall comprise of civil, structural and architectural works below and above ground level of ball mill building, ball mill foundations, fgd control room building, **slurry re-circulating pumps & oxidation blowers building**	The referred clauses are contradictory. Bidder understands & considers that Slurry re-circulating slurry pumps & Oxidation blowers shall be installed in a shed only as per Section-VI, Part-A Sub-section-IIA-04 page 4 of 7 clause 4.01.12 and inline with all ongoing NTPC FGD contracts. Bidder request NTPC to review and confirm.	Bidder's understnading is correct. Bidder to refer Amendment SN D1-21
146	VI / A	IIA-04	4 of 7	4.01.12	All Slurry re-circulating slurry pumps & Oxidation blowers shall be installed in a shed provided with roof sheeting to be provided by the Contractor as per specifications specified elsewhere.		

147	VI / B	A-05	11 of 29	5.06.11	The complete absorber vessel (absorber oxidation tank, absorber tower & absorber outlet duct upto absorber outlet flange) shall be made of clad sheet of C276 / Alloy 59 (minimum 2 mm thickness) by explosion bonding or hot rolling, having minimum 7 mm thick carbon steel as base material.	Glass flake lining is the preferred material for FGD absorber linings worldwide owing to its inherent advantages. Our collaborator, MHI Japan, widely recommends the use of Glass Flake Resin Lining in absorber, citing its ease of application and maintenance. MHI Japan has successfully executed over 80% of their supplied absorbers with Resin Lined Carbon Steel globally. Glass Flake Resin Lining is a cost-effective alternative to alloy material, providing substantial savings in both material and installation costs. This alternative can significantly reduce the overall project budget. Glass Flake Resin Lining offers exceptional resistance to a wide range of corrosive chemicals and temperature conditions typically found in FGD systems. It can withstand the high corrosive/abrasive environment effectively, ensuring a longer service life for FGD. In view of the above, we request NTPC to review and accept 3 mm thickness vinyl ester based glass flake lining for absorber.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.
148	VI / B	A-05	5 of 29	3.02.04	Absorber outlet to bypass duct & duct after by pass damper/gate to chimney inlet shall be made of cladded sheet of minimum 2 mm thickness of either Titanium (Grade 2 as per ASME SB265) or C-276 over 7 mm thick (minimum) mild steel base metal	Glass Flake Resin Lining offers exceptional resistance to a wide range of corrosive chemicals and temperature conditions typically found in absorber outlet duct. It can withstand the high corrosive/abrasive environment effectively, ensuring a longer service life for FGD ducts. In view of the above, we request NTPC to review and accept 2 mm thickness vinyl ester based glass flake lining for absorber outlet duct in line with NTPC Dadri FGD.	Bidder's proposal is not acceptable. The specification requirement is clear in this regard. Bidder to comply with technical specification requirements.

SL. NO	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.	SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
149	VI/B	A-25	946	1	Tentative Roof top Solar Plant Capacity will be 500kWp.	Kindly provide following inputs - 1. Please indicate the maximum capacity of cumulative solar systems be allowed for installation. The limit is required for proper estimation. 2. Please confirm that amount alloted for setting up solar installation would be fixed irrespective of installed capacity. This implies that if the installable capacity is less than maximum allowed installation capacity, then there would be no price adjustment in any manner. 3. Please confirm that indicated capacity is DC capacity.	1. Tentative capacity of roof top solar system is 1000kWp. Actaul capacity shall be as decided during detailed engineering 2. Bidders understanding is not correct 3. Confirmed
150	VI/B	A-25	947	1.6	During O&M period, the bidder shall be responsible for supply of all spare parts as required from time to time for scheduled and preventive maintenance, major overhauling of the plant, replacement of all equipments in the plant including defective PV Modules, Inverters, Transformers etc and maintaining log sheets for operation detail, deployment of staff for continuous operations and qualified engineer for supervision of O&M work, complaint logging & its attending. All PV modules shall be cleaned regularly and water washed at least once in a week.	Please confirm that 1. we can depute our sub-contractor's staff for O&M activities. Deputing Bidder staff is not obligatory. 2. only 1no qualified & experienced supervisor is sufficent to be permanently deputed during O&M period (for total solar systems). 3. Electrician for periodic checking & labours for periodic cleaning of PV modules are allowed to be arranged locally on as and when basis.	1. Bidders Proposal is accepatble. Eventhough the subcontractors staff deputed at site, but still the resposnibility lies with Bidder only. 2. Bidders understanding is correct. 3. Bidders understanding is correct.
151	VI/B	A-25	947	1.8	Bidder to dispose of the packing material, surplus items, unused materials, waste etc. generated during EPC at location(s) identified by NTPC.	Kindly confirm that area for disposal is within NTPC's premises & no separate approvals/permits need to be secured by the bidder.	Bidders Understanding is correct
152	VI/B	A-25	949	5.1	The cables used in the system should be ISI marked PVC or XLPE insulated FRNC armored Copper/aluminum conductor. Cables of various sizes as per load requirement for connecting all the modules / arrays to Junction Boxes and from Junction Boxes to DC distribution box and from DC distribution box to inverter. Cables shall be armoured type if laid in switchyard area or directly buried	Solar cables on DC side are unarmoured Copper conductor. Further, in rooftop solar systems, DC cables are not laid underground. Therefore, please allow unarmoured copper conductor DC cable up to inverter, irrespective of area/building.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications
153	VI/B	A-25	949	5.3	Suitable industrial Grade B rigid conduits shall be provided for cables connecting Solar PV array with Inverter.	Please allow HDPE pipes as conduit for DC cabling, wherever required.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications
154	VI/B	A-25	950	6.6	Built-in meter at PCU/String Inverter and data logger to monitor plant performance through external computer shall be provided. Customized solar monitoring solutions available with Inverter manufacturer shall be preferred.	1. Please clarify whether separte external computer for monitoring solar systems shall be provided by the bidder. 2. If yes, please indicate the features required in the PC. 3. Please confirm that internet required in data loggers would be provided on respective rooftop through LAN cable. 4. Please confirm that recurring charges of internet data consumed would be borne by NTPC.	1. No separate external computer is not in bidder's scope. 3. Connection upto nearest available owners Lan network shall be in bidders scope. 4. Charges till end of AMC period are in Bidders scope
155	VI/B	A-25	951	7	If the output of the inverter matches to the switchgear voltage and suitable for directly connection to grid without galvanic isolation, the requirement of transformer may be ommited except Main Power House building, Switchyard building and Ash Slurry Pump house.	Please allow omission of requirement of transformer in Main Power House building, Switchyard building and Ash Slurry Pump house also, if the individual rooftop capacity is less than 500kWp.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications
156	VI/B	A-25	954	11	An appropriate Solar PV Module cleaning & water washing system complete GI pipes, valves, hose pipes, wipers, mops etc. shall be provided for regular cleaning and water washing of the rooftop Solar PV modules.	Please allow HDPE pipes instead of GI pipes.	Bidders proposal is not acceptable. Bidder Shall comply to the technical sepcifications

157	VI/B	QA-Elec	381	17	Dry Type Transformer	Indicated sub suppliers are approved for HT class. However, dry type transformers used in solar systems are below 1kV class. 1. Kindly clarify that if transformer in solar is required, then referred sub-supplier is applicable for LT class also. 2. If yes, kindly incorporate "TARIL", "Ferromag" & "Servokon" also.	Bidder proposal isn't acceptable. Being a controlled item,new vendor may be proposed during detailed engineering as per NTPC QA Coordination procedure and GTR available with bid specification.
158	VI/B	QA-Elec	383	30	Power Conditioning Unit (PCU)	Kindly incorporate other renowned suppliers of string inverters like - 1. Powerone 2. Delta 3. Kaco 4. Havells 5. other reputed make.	Bidder proposal isn't acceptable. Being a controlled item,new vendor may be proposed during detailed engineering as per NTPC QA Coordination procedure and GTR available with bid specification.
159	VI/B	QA-Elec	383	30.1	String Monitoring Box (SMB)	Kindly incorporate other renowned suppliers like - 1. RSS India 2. Innova 3.KERNEL Sistemi Srl 4. SRR Energy 5. other reputed make.	Bidder proposal isn't acceptable. Being a controlled item,new vendor may be proposed during detailed engineering as per NTPC QA Coordination procedure and GTR available with bid specification.
160	VI/B	QA-Elec	383	31	SPV module	Kindly incorporate other renowned suppliers like - 1. Saatvik 2. Bluebird 3. Renewsys 4. Panasonic 5. other reputed make as per ALMM list.	Bidder proposal isn't acceptable. Being a controlled item,new vendor may be proposed during detailed engineering as per NTPC QA Coordination procedure and GTR available with bid specification.
161	VI/B	QA-Elec			DC Cables	Kindly incorporate other renowned suppliers like - 1. KEI 2. RR Kabel 3. Polycab 4. other reputed make.	Bidder proposal isn't acceptable. Being a controlled item,new vendor may be proposed during detailed engineering as per NTPC QA Coordination procedure and GTR available with bid specification.
162	VI/B	QA-Elec			General	Please confirm that netmetering/gross metering is NOT applicable.	Bidders understanding is not correct, bidder to comply with tender specifications
163	VI/B	QA-Elec			General	Please confirm that solar power termination of individual solar system will be done on respective LT panel of each building.	Bidders understanding is not correct, bidder to comply with tender specifications
164	VI/B	QA-Elec			General	Please confirm that no HT work is involved in solar scope.	Bidders understanding is not correct, bidder to comply with tender specifications
165	VI/B	QA-Elec			General	Please confirm that no separate Lightning Protection is required for solar system, if the respective building is already protected.	Bidders understanding is not correct, bidder to comply with tender specifications

S No.	Section	Part	Sub-Section	Page No.	Clause No.	SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
166	VI	B	B-13	1 OF 49		General requirements	a) Kindly provide the Single line diagram & System architecture for Substation Automation System at Sipat-I &II. b) Kindly provide the GA and schematic drawing of existing Metering panel. Also confirm the make of existing Meters. c) Kindly note that standalone metering system shall be provided for SIPAT stage III without any integration with existing system.	a) Attached as annexure to amendment Sl. No. EE-44 b) Make of Existing meters is Secure make. c) Since only one bay for 765kV and 2 bays for 132kV are envisaged, it is proper to integrate these in existing metering system.
167	VI	B	B-13	1 OF 49	1.00.01.1	Control and Monitoring of Switchyard Service Switchgear including Hardware required for the purpose viz. BCU, EFS, LAN Cables etc. GPS Time synchronisation of Switchgear Numerical relays shall also be in the scope of the bidder	Kindly provide the Single line diagram for Switchyard Service Switchgear.	Switchyard service switchgear shall be as per typical SLD for 415V switchgear with 2 Incomer and 1 Buscoupler as shown in SLD, Drawing no: 9500-999-POE-J-002.
168	VI	B	B-13	3 OF 49	1.19.00	The interface between BCU and Control Switching Devices shall be in Bidder's Scope.	CSD is non 61850 compliant and is also not shown in SAS communication architecture. Hence CSD interface with BCU shall be hardwired as required.	Bidder's understanding is correct.
169	VI	B	B-13	30 OF 49	09.02.11 (c)	Have an operating/resetting time each of less than 15 ms.	LBB protection is time delayed to ensure that breaker is successfully opened on fault. Hence, breaker failure operating & resetting time of 25-35 msec will not affect LBB scheme. In view of this clause, certain relay manufacturer is being forced to supply very high end relays which is not required from application point of view. Customer to confirm operating & resetting time of 25-35 msec for LBB protection.	LBB is a critical backup protection. Hence, Bidder to comply to Specification requirement.
170	VI	B	B-13	31 OF 49	09.02.12	Busbar Protection	We understand that Bay unit along with tripping relay for present bays are already available in the existsing Busbar protection panel. Kindly confirm the make of existing Bubsar protection and provide the existing Busbar protection scheme for reference for both 765KV and 132KV Busbar system.	Existing Busbar protection is GE make with P741 and P743. However, since Peripheral Units(PU) are not available, same is in the scope of the bidder. Existing drawings shall be provided during detailed engineering stage after award of contract.
171	VI	B	B-13 & annexure I of B-13	39 of 49 & 2 of 14	15.00.00, VI(I) & 1.2.2	Phasor Measurement Unit (PMU)	Phasor measurement unit is not applicable as Line protection panel is not in scope of this tender.	Bidder's understanding is correct.
172	VI	B	B-13	32 OF 49	09.03.00	Islanding scheme	We understand that Islanding panel at SIPAT is already existing and only trip relays for present scope bays are to be considered. Kindly provide the existing Islanding panel schematic drawing.	Bidder's understanding is correct. Existing drawings shall be provided during detailed engineering stage after award of contract.
173	VI	B	B-13	33 OF 49	10.02.00	Contractor shall supply energy meters along with metering station, 4 Nos. machine Clients, 20 nos web client license.	Customer to confirm that 4 nos. machine clients called is only for license or 4 nos. separate metering station to be considered along with license.	4 Nos. Machine have to be supplied and these machines shall be placed in various places connected by owner's LAN.
174		E		5 OF 127		SUBSTATION AUTOMATION SYSTEM ARCHITECHTURE - XXXX-999-POE-J-003	No Large Video Screen for SAS is envisaged in the contract. Kindly confirm.	Bidder's understanding is correct.
175		E		7 of 127		Protection unit of GT bay MU (Merging unit) XXXX-999-POE-J-005	No Merging Unit(MU) has been envisaged.	Bidder's understanding is correct. Please refer amendment sl. No. EE-45

S. No.	Sec/Part	Sub- Sec	Page No.	Clause No.	Specification Requirement	Bidder's Query/Clarification	NTPC Reply
176	SECTION – IV	GCC	43 of 90	19.1	Appendix 5 (List of Approved Subcontractors) to the Contract Agreement specifies major items of supply or services and a list of approved Subcontractors against each item, including vendors. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval in sufficient time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties or responsibilities under the Contract.	Bidder has its own robust and exhaustive process to qualify a vendor prior to award of contract. Bidders are meticulously scrutinized by bidder and qualified based on thorough evaluation including Technical as well as financial capability . Hence in order to minimize the ordering time owner may please exempt vendor approval for all type of subcontracting works viz. Civil, E & C and site fabrication etc.	Bidder understanding is not right - Bidder is to furnish the data as mentioned in Appendix 5 and GCC.
177	SECTION VI, PART- B	SUB-SECTION E-59 CIVIL WORKS	2-3 of 6	4.0 (b)	Structural steel (plates and rolled sections i.e. channels, beams & angles) conforming to IS 2062 and Reinforcement steel conforming to IS 1786 supply if in the scope of the contractor shall be procured from Primary Steel Producers (Refer NOTE below).	Procurement from BIS APPROVED SOURCES HAVING VALID BIS LICENCE may kindly be allowed without any approval from NTPC after the award.	Bidder to follow Technical Specifications . Procurement of steel to be done as per TS and mentioned qualifying requirements.
178	SECTION VI, PART- B	SUB-SECTION E-59 CIVIL WORKS	2-3 of 6	4.0 (b)	In case of non-availability of certain steel section/s i.e. Angle smaller than 100x100x10 mm, MS flats, rounds, square bars and chequered plate from above acceptable primary steel producers, an option is given to the Main contractor to source these sections directly from SAIL Conversion/Wet Leasing agent subject to the conditions given at point no. A) below:-------	Procurement from BIS APPROVED SOURCES HAVING VALID BIS LICENCE may kindly be allowed without any approval from NTPC after the award.	Bidder to follow Technical Specifications . Procurement of steel to be done as per TS and mentioned qualifying requirements.
179	SECTION VI, PART- B	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL, SUB-SYSTEM:SG(MECH)	4 of 25	15	-	Procurement from BIS APPROVED SOURCES HAVING VALID BIS LICENCE may be allowed without any approval from NTPC after the award.	Bidder to follow Technical Specifications . Procurement of steel to be done as per TS and mentioned qualifying requirements.
180	SECTION-VI, PART-A	SUB-SECTION–I-A, Proveness	32 of 35	7.1	Bidder or its agency should have executed civil and steel structural works of 500 MW or higher capacity coal based/Lignite based power plant/Nuclear Power Plant, Earth work in filling involving mechanical compaction and cutting in rock, piling, Main power house building and Foundation for Turbo-generator..-----	For civil work proveness criteria - subagency through consortium to be allowed. For civil work proveness criteria work in any infrastructure project may kindly be considered.	Bidder proposal is not acceptable
181	SECTION-VI, PART-A	SUB-SECTION–I (INTENT OF SPECIFICATION)	32 of 35	7.1	Bidder or its agency should have executed civil and steel structural works of 500 MW or higher capacity coal based/Lignite based power plant/Nuclear Power Plant, Earth work in filling involving mechanical compaction and cutting in rock, piling, Main power house building and Foundation for Turbo-generator..-----	Civil & Structural works execution should not be linked with prior experience of TG/Bunker/other building. It should be modified in line with NTPC earlier tender enquiries / contract under execution. Therefore, bidder requests NTPC to amend the QR as follows: "In case Bidder or its agency do not meet the requirements at 7.1 and the Bidder proposes to engage agency (ies) for civil & structuralworks on work volume basis (except for Chimney works), Bidder or its agency (ies) should have executed such works in the past and the annual rate of execution in the reference works should not be less than eighty percent (80%) of the asking rate of such works, (structural steel fabrication & erection, RCC, and earthwork in filling involving mechanical compaction) for which it is being engaged	Bidder proposal is not acceptable
182	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	5 OF 9	4.02.00	The Employer shall issue the following quantities of Fuel oil and Coal per unit for firing up to successful completion of "Initial Operation" (as defined in General Technical Requirements, Part-C, Section-VI of Technical Specification) for each unit free of charge. Fuel Oil -11200 kL Coal- 2.7 lakh MT Fuel oil and coal required for the successful completion of the "Initial Operation", more than the above-specified quantity limits, would be issued by the Employer. However, the Employer shall charge the Contractor the cost of these as per the prevailing landed rates at the site at that time.	Bidder requests NTPC to delete this clause. Coal & fuel oil should be provided free of all charges during Pre-commissioning and commissioning activities.	The specified values for fuel oil and coal, to be issued free of charge by the Employer, is based on Employer's internal assessment of quantities required for the specified activities. Correction of coal quantity for the unit electricity generation during the initial operation is already provided in the bidding documents. The bidder to comply with the requirements of the bidding documents.

SL. NO	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.	SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
183	VI	SUB-SECTION-B – 00 / General Electrical Requirements / 1.11.00	2/15	1.11.00	Locked rotor MVA of ID Fan & MDBFP Motors to be restricted to 75MVA	With Combined ID Fan (Boiler Draft + SCR + FGD) the ratings are as high as 14.5 MW as in case of NTPC Patratu .The same can be much more than 14.5MW depending upon siging calculation during detailed engineering. For MDBFP , the ratings are generally 15 to 17.5 MW in case of NTPC projects of 800 MW . Hence in view of such high capacities of Motors restriction of Starting MVA to 75 MVA is not practical . It varies and even go upto 125 MVA. Hence the same should depend upon the ratings of Motor and should be at least upto 125 MVA.	Refer Amendment Sl. No. EE-03 to technical specifications.
184			15/15	10	Starting voltage requirement	Minimum starting voltage for double cage induction motor (Mill application) shall be 85%RV.	Bidder understanding is not correct. Cl. referred by bidder is not correct. Specification cl. no.10.00.00 Sub-Section B-0 Section-VI, Part-B to be followed.
185		SUB-SECTION-B – 02 Motors	1/4	3.01(B)	Motors upto 200 KW Efficiency IE3	For such low capacity motors we shall offer motors with efficiency class IE2	Bidder proposal is not acceptable. Specification cl. no.3.01.00 (b) Sub -Section B-02 Section-VI, Part-B to be followed.
186			2/4	7.06.00	HT motor bearing housings shall have flat surfaces, in both X and Y directions, suitable for mounting 80mmX80mm vibration pads.	Due to size limitation of small rating HT motors in TEFC enclosure, vibration pad shall be less than 80mmX80mm. For small HT motors offered in TEFC enclosure (Cooling - IC411) due to space constraints Vibration pad size shall be a) Horizontal Motor 40 x 40 x 40 b) Vertical Motor 16 x 30 x 30 The same is followed for all NTPC projects till date.	Bidder proposal may be acceptable. However, bidder to ensure sufficient space available on vibration pad for mounting of vibration probes and same shall be decided during detailed engg.
187			2/4	7.06.00	Noise level for all the motors shall be limited to 85 dB(A)	Noise level for 2 pole motor will be 85+ 3 dB (A)	Bidder proposal is not acceptable. Specification cl. no.7.06.00 Sub -Section B-02 Section-VI, Part-B to be followed.
188			3 /4	7.07.00	Each bearing of HT motor shall be provided with 3 numbers duplex RTDs	Generally 3 RTDs per bearing side is provided for all crtical motors (i.e CEP,MILL FD/ID/PA fan motors etc.). But for small rating (<500KW) non critical TEFC (IC411) motors it is not required. So can we provide 2 BTDs per bearing side for these small rating TEFC (IC411) motors?	Bidder proposal is not acceptable. Specification cl. no.7.07.00 Sub -Section B-02 Section-VI, Part-B to be followed.
189			3/4	7.09	SIC connectors IEEE 386	For 11KV HT Motors, We shall be offering Phase segregated Terminal Box capable of through Fault level of 50 KA for 0.25 secs . The same is proven & already installed in many motors of NTPC & State electricity boards power projects . This shall eliminate Imported SIC Connectors and shall boost Local Manufacturing & Make in India under Atma Nirbhar Bharat initiative of Govt. of India. Detailed write up and reference list can be submitted for your consideration and approval.	Bidder proposal is not acceptable. Specification cl. no.7.09.00 Sub -Section B-02 Section-VI, Part-B to be followed.

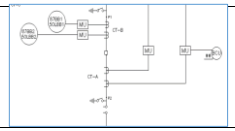
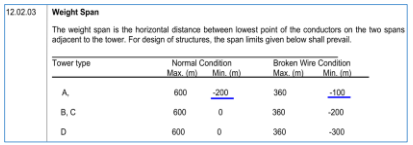
SL. NO	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.	SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
190	Section VI /Part A	I-A	1 of 35		For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the **techno-commercial bid opening date** of EPC package unless otherwise specified in the respective clauses.	In the recent past, it has been observed that there is significant time gap between opening of Techno-commercial bid date and actual award date. In order to rationalize the Provenness requirement with respect to current date as ordering of balance of plant packages by successful bidder goes upto one year from LOA & some sub-vendors may acquire qualification during this time period. To include such potential vendors, referred clause may be modified as under: "For the purpose of qualification of Bidders / Sub-vendor(s), experience shall be reckoned as on the date of submission of vendor proposal for approval but not later than Twelve (12) months from LOA " Kindly accept.	...For the purpose of qualification of Bidders / Sub vendor(s), experience shall be reckoned as on the date of placement of LOA for EPC Package unless otherwise specified in the respective clauses...
191	Section VI /Part A	I-A	9 of 35	4.5	**Air Conditioning System** The Bidder/ its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number of Air conditioning system having a total installed capacity of 300TR or more including stand-by chiller unit (if any), which should have included at least one chilling unit with a minimum capacity of 60TR. The system should have been in successful operation for at least one (1) year. **In addition, the chiller unit(s) proposed to be supplied for this package shall be sourced from the manufacturer(s) who have manufactured and supplied at least one (1) number of similar type of chiller unit having a capacity of not less than 150 TR, which should have been in successful operation for at least one (1) year.**	Bidder/ its sub-vendor are supplying chiller from customer approved makes. Incorporating additional criteria for Sub QR of chiller delays the finalisation of chiller in view of taking approval for Sub QR during detail engineering. Considering the above, the 2nd paragraph of the provenness "In addition, the chiller unit(s) proposed to be supplied for this package shall be sourced from the manufacturer(s) who have manufactured and supplied at least one (1) number of similar type of chiller unit having a capacity of not less than 150 TR, which should have been in successful operation for at least one (1) year." may be deleted please. Kindly accept.	Vendor approval and Provenness compliance are two different things. Bidder to comply with specification requirement.
192	Section VI /Part A	I-A	9 of 35	4.6	**Ventilation System** The Bidder/its sub-vendor should have designed, supplied, erected, and commissioned at least one (1) number ventilation system including **similar** air washer unit having individual fan capacity of 80,000 Cum./Hr. or more. The system should have been in successful operation for at least one (1) year.	It is observed that there are some experienced and reputed Ventilation system vendors having performance certificate with different type of Air washer with capacity in line with PQR. Accordingly the clause may be re-phrased as "The Bidder/its sub-vendor should have designed, supplied, erected, and commissioned at least one (1) number ventilation system including air washer unit having individual fan capacity of 80,000 Cum./Hr. or more. The system should have been in successful operation for at least one (1) year." Kindly accept.	Provenness is required for similar type of air washer units envisaged for the project. Bidder to comply with specification requirement.
193	Section VI /Part A	I-A	11 of 35	4.13	**Mill Reject Handling System** Mill reject handling system offered by the Bidder/its Sub-Vendor shall be only from such manufacturer/supplier who has previous experience of manufacturing/got manufactured and supplying metallic belt conveyor type or chain flight conveyor type handling systems of capacity 1.5 MTPH or higher for any industrial installations which are in successful operation in at least one (1) plant for a period not less than one (1) year. The reference **mill reject** handling systems should be of the same type i.e. metallic belt conveyor system or chain flight conveyor system as is being offered by the Bidder/ its Sub- vendor.	The first paragraph of the clause qualifies manufacturer/supplier who has previous experience in any Industrial Installations, hence the 2nd paragraph may be re-phrased as "The reference handling systems should be of the same type i.e. metallic belt conveyor system or chain flight conveyor system as is being offered by the Bidder/ its Sub- vendor". Kindly accept.	Bidder to refer Amendment sl no. MH-01 for updated provenness.
194	Section VI /Part A	I-A	11 of 35	4.15	**Turbine Hall EOT crane** The Bidder/ its sub-vendor should have designed, manufactured, erected and commissioned **EOT cranes** of capacity 100T or more with minimum crane span of **28 meters**, which is in successful operation in at least one (1) station for a minimum period of one (1) year.	The Gantry/Semi-Gantry Cranes and EOT crane, all are designed as per IS 3177. In fact, Gantry/ Semi-Gantry Cranes (generally outdoor duty) design is similar or more stringent (for leg designing) than EOT crane. Irrespective of type of industry, generally the design standard of Cranes is same. Considering the above, The provenness clause may be re-phrased as below: "The Bidder/ its sub-vendor should have designed, manufactured, erected and commissioned EOT/ Gantry/ Semi-Gantry cranes of capacity 100T or more with minimum crane span of 24 meters, which is in successful operation in at least one (1) station (power plant/ refineries/ shipyard/ workshop or any other industry) for a minimum period of one (1) year. " In addition to the above clause, main bidder may be qualified to manufacture EOT crane in collaboration with the crane supplier who can meet the above mentioned criteria.	Bidders proposal is not acceptable. Bidder to comply with the Specification Requirements.
195	Section VI /Part A	I-A	20 of 35	4.26.1 (e)	**Agitator:** Application = Wet Limestone based FGD application in Coal fired power plant. Eqp rating = Agitator rating not less than that supplied for 500 MW or higher size unit for similar application.	In order to increase vendor base following modification in Provenness clause is requested. "**Application** = Bidder/Sub-vendor should have designed/got designed, supplied, erected and commissioned at least one (1) number agitator for FGD or other process industries like petro-chemical or metals and mining industry etc. successfully running for a period of at least one (1) year. **Equipment Rating:** Bidder/Sub-vendor shall supply only the type of the Agitators (vertical and horizontal) for which the bidder is qualified. Motor rating should be minimum 50% of rated power of largest power consuming agitator."	Bidders proposal is not acceptable. Bidder to comply with the Specification Requirements.
196	SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	20 OF 35	4.26.1 (f):	**Vacuum Belt filters** Application: Wet Limestone based FGD application in Coal fired power plant or in any other process application Equipment rating = **35 T/hr (minimum).**	The Provenness may be modified as below: Application = Wet Limestone based FGD application in Coal fired power plant or in any other process application Equipment rating = **17 T/hr (minimum).** **2. In addition to above, request Customer to consider the following clause for any Bidder/Sub-vendor quoting in partnership with Technology Provider/ Qualified OEM not resulting into JV/Subsidiary:** In case, the Bidder or the proposed sub-vendor is not a manufacturer of proven Vacuum Belt Filters as per clause 4.26.1 (f) above, the Bidder or the proposed sub-vendor shall also be considered qualified for manufacturing and supply of the Vacuum Belt Filters, provided that it has valid partnership agreement for design, engineering, manufacturing, supply of such Vacuum Belt Filters with such manufacturer who meets the requirements stipulated at clause 4.26.1 (f). In addition, the Bidder can furnish a letter of support from Technology provider along with the agreed scope matrix for successful performance of the equipment at the time of placement of order on the approved sub-vendor. Kindly accept.	Bidders proposal is not acceptable. Bidder to comply with the Specification Requirements.
197	SECTION-VI, PART-A	SUB-SECTION-I-A, PROVENNESS	PAGE 23 OF 35	5.4.0	Bidder/ Sub Vendor should have manufactured and supplied at least one (1) number of static automatic voltage regulator type Battery Chargers of highest offered rating or above, in at least one (1) industrial installation, which should have been in successful operation for at least one (1) year.	For Main plant 220V DC Chargers: Due to limited suppliers for charger, Performance for high ratings of chargers are not available with charger suppliers as faced in past projects. Hence, Proven-ness criteria for charger may be considered as below for 220V/ 110V DC Chargers: "Bidder/ Sub Vendor should have manufactured and supplied at least one (1) numbers of static, SCR type, automatic voltage regulator type Battery Chargers of rating 500A or above, in at least one (1) industrial installations, which should have been in successful operation for at least one (1) years."	Bidder proposal is not acceptable. Specification clause no. 5.4.0, Sub -Section I-A, Section-VI, part-A to be followed.
198	SECTION-VI, PART-A	SUB-SECTION-I-A, PROVENNESS	PAGE 26 OF 35	5.12.1 5.12.2 5.12.3	The Bidder/Sub-Vendor should have manufactured & supplied at least one number (one installation) of 16 MVA, 11KV or higher rating oil filled transformers which should have been in successful operation for a period of at least two (2) years. And Bidder/Sub-Vendor should have his own facilities for conducting all routine and type tests as per IS: 2026 (except short circuit test). And 16 MVA, 11 KV or higher rated oil filled transformer manufactured by Bidder/Sub-Vendor should have been successfully short circuit tested.	Due to limited vendor base for transformers and further restrictive provenness (as impulse test is Type test, so inhouse facility is not required also if highest offer rating is not 16MVA then performance and short circuit of 16 MVA or higher rating is not required) cri-teria specified in tender, bidder proposes to update the provenness criteria as below. Kindly confirm. 5.12.1. The Bidder/Sub-Vendor should have manu-factured & supplied at least one number (One Instal-lation) of highest offered rating oil filled transformers which should have been in successful operation for a period of at least two (2) years. And 5.12.2 Bidder/Sub-Vendor should have his own fa-cilities for conducting all routine and type tests as per IS: 2026 (except short circuit test and lightning im-pulse test). And 5.12.3. Any offered rating or higher rating oil filled transformer manufactured by Bidder/Sub-Vendor should have been successfully short circuit tested.	Bidder's proposal is not acceptable and mentioned clause nos by bidder are incorrect. Specification clause no: 5.12.1 having 5.12.1.1, 5.12.1.2, 5.12.1.3 of Sec VI, Part-A,SS-IA to be followed.

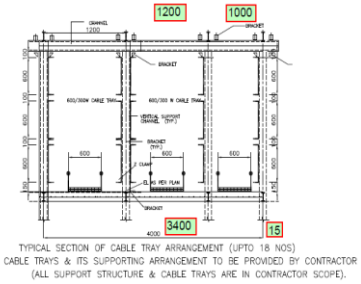
199	SECTION-VI, PART-A	I-A-PROVENNESS	10 OF 35	4.8	**Water Pre-treatment Plant** The Bidder/its sub-vendor should have designed, supplied, erected/supervised erection and commissioned/supervised commissioning at least one (1) number water/waste water treatment plant having capacity of not less than 1000 Cu.m/hr, comprising of clarifiers/tube settlers/thickeners or a combination thereof including civil works. The plant should have been in successful operation for at least one (1) year.	Experience of Civil works included in PT plant PQR is proposed to be removed since the civil work of PTP package is generally done by main bidder being main contractor (EPC bidder). Also Package suppliers may not be intersted to keep civil works in their scope considering the fluctuation in construction cost and time aspects. Further the duration of satisfactory operation also needs to be aligned with actual date of PTP package bid evaluation. We Request Owner to revise PQR of water Pre- treatment Plant as below, **"The Bidder/its sub-vendor should have designed, supplied, erected and commissioned at least one (1) number water/waste water treatment plant having capacity of not less than 1000 Cu.m/hr, comprising of clarifiers/tube settlers/thickeners or a combination thereof.** **The plant should have been in successful operation for at least one (1) year prior to the date of submission of vendor proposal for approval but not later than ordering date of package as per agreed L2 schedule for the project."**	Bidder's proposal reviewed and not accepted. Bidder to comply technical specification requirement.
200	VI / A	IA PROVENNESS	765 kV EQUIPMENT (AIS)	5.14.2 (A)	II-PQR Clause -765kV INSTRUMENT TRANSFORMERS The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening	The Bidder / Sub-vendor should have Manufactured and type tested single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class prior to the supply of equipment to the project.	Bidder proposal is not accetable . Bidder refer to Amendment Sl. No. EE-68
201	I-A		27 of 35	5.14.2	Provenness Requirement for 765kV EHV Equipments i.e Circuit Breaker, Instrument Transformer, Isolators, Surge Arrestors,	Since there are limited suppliers in 765kV Class EHV equipments. It is requested to include the following clause in the Provenness requirement:- **The manufacturer, who have established manufacturing and testing facilities in India can also be considered provided that equipment(s) must have been manufactured in the above Indian works & successfully type tested (as per IEC/IS standard) as on the date of NOA.**	Bidder proposal is acceptable . Bidder refer to Amendment Sl. No. EE-69.
202	Book 5 of 5 QA		06 of 30	Sl no. 22 to 26	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL (QA-Electrical)		Any new sub-vendor proposal (under the category of DR) during detail engineering shall be considered as per the Bid specification, GTR and prevailing vendor assessment procedure of NTPC.
203	I-A		32 of 35	7	PROVENNESS CRITERIA FOR CIVIL & STRUCTURAL WORKS Bidder or its agency should have executed civil and steel structural works of 500 MW or higher capacity coal based/Lignite based power plant/Nuclear Power Plant	We understand that there is no specific Proveness requirement for the civil & structural works of the Switchyard Scope. Please confirm.	Bidder's understanding is correct.

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Queries & Clarification	NTPC Reply
204	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-I-B PROJECT INFORMATION	3 of 19	12.00.00	Final connectivity arrangement shall be as per the decision taken in CMETS-WR (consultation Meeting for evolving Transmission scheme) after submission of connectivity application.	Bidder requests Owner to provide final connectivity arrangement at least before techno-commercial bid submission date.	The power evacuation scheme is not in the present EPC scope of work. The requirement of final connectivity of Sipat -III is not applicable to EPC vendor.
205	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	8 of 20	1.15.00 (i)	The Employer shall provide Two Number (2no) 11kV feeders in Existing Employer 11kV FGD Tie switchgear of Sipat Stage-1 to meet the construction power requirements along with Employer's requirements as indicated under Clause 1.19.00.	Bidder requests Owner to provide the location of "Existing Employer 11kV FGD Tie switchgear of Sipat Stage-1" in the plot plan for BOQ estimation of construction power network.	The stage-1 FGD 11KV Switchgear is located at 1620N and 180W position mentioned as Bidder Ltd in GLP
206	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	8 of 20	1.15.00 (iv)	The Bidder shall extend supply from these 11 kV Construction power feeders to meet the construction power requirements by employing suitable number of 11/0.415KV Packaged substation (PSS) / pole mounted / Pad mounted transformers with proper fencing arrangements and associated switchgears (if required) (meeting the safety requirements as per IE Rules) at the required location for meeting the construction power requirements of **stage-II** at the various locations included in the bidder's scope.	Bidder understands that construction power shall be provided for **Stage-III** only. Owner may please confirm.	Bidder understanding is correct . Bidder to refer to Amendment Sl. No. EE-06
207	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	11 of 20	1.16.04 (vii)	Bus bar protection for all 765kV,132kV bays shall be in bidder's scope(including interfacing with existing Busbar protection) along with necessary hardware , accessories, software etc. Upgradation, if required, for Control Unit in the existing Busbar Bar Protection system is also in the scope of bidder. Peripheral Unit for integration with existing busbar protection relay shall be provided by the Bidder .	Owner requests Bidder to provide architecture and full ordering code of existing BB system central unit for both 765kV & 132kV system. Owner may please accept the same.	The Exisitng 765KV,132KV Busbar protection Control unit(CU) is of GE Make , Model No: P74X.Architerture & Scheme drawing will be provided during Detailed Engg stage on award of contract.
208	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	11 of 20	1.16.04 (x)	Time synchronization equipment (TSE) for switchyard and GRP	Since bidder has supplied SAS network which shall be integrated with the existing SAS system as per tender drawing (XXXX-999-POE-J-003). Hence, Bidder understands that existing time synchronization equipment shall be used and there is no requirement of Time synchronization equipment (TSE) for switchyard. Owner may please confirm.	Bidder Understanding is correct for Switchyard Time synchronizing equipment (TSE) requirement . However TSE for GRP is in the scope of Bidder as shown in Tender SAS Architecture Drawing(XXXX-999-POE-J-003).
209	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	6 of 15	3.05.00(e)	Module Type DA (Motor feeder) : MV Motor Feeders < 2 MW Module Type DAF (Motor Feeder with Differential Protections) : MV Motor Feeders > 2 MW	Bidder understands that Module type DA will be applicable upto 2MW rating, i.e. Module Type DA : MV Motor Feeders ≤ 2 MW Module Type DAF : MV Motor Feeders > 2 MW Owner may please confirm.	Bidder Understanding is not correct. Module Type DA (Motor Feeder) : MV Motor feeder <2MW, Module Type DAF : >= 2MW. Bidder Refer to Amendment Sl. No. EE-09
210	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	6 of 15	3.05.00(e)	Module Type DB (Transformer Feeder) :Transformer Feeders < 5 MVA Module Type DBF (Transformer Feeder with Differential Protections) : Transformer Feeders > 5 MVA	Bidder understands that Module type DB will be applicable upto 5MVA rating, i.e. Module Type DB :Transformer Feeders ≤5 MVA Module Type DBF : Transformer Feeders > 5 MVA Owner may please confirm.	Bidder Understanding is not correct. Module Type DB(Transformer fedeer <5MVA & Module Type DBF : Transformer feeder >=5MVA. Bidder Refer to Amendment Sl. No. EE-10
211	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION ---------- SECTION-VI, PART-B, SUB-SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	9 of 16 -------- 10 of 21	3.06.00 (m) ---------- 4.04.15	Plant control cable Interconnections: f)At least one spare core shall be made available in each of the control cable. ---------- No. of cores in cable — No. of spare cores 2C,3C — NIL 5C — 1 7C-10C — 2 14C & above — 3	There is a discrepancy between mentioned clauses. As per 3.06.00, Bidder has to provide a spare core for each control cable whereas it is mentioned nil for core 2C, 3C in clause 4.04.15. Owner may please resolve the discrepancy.	Bidder to consider at least one spare core for 2C & 3C control cable also. Bidder to refer to Amendment Sl. No. EE-04. for clause no: 15.00.00(vii) of B-13 & Clause no: 04.04.15 of B-10
212	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	7 of 15	3.06.00	All switchboards shall be of double front, draw out, complete closed-door operation, metal enclosed, indoor, floor-mounted, free-standing type of bolted design. Entire bus bar system shall be insulated with PVC sleeves (UL 224). Cable terminations located in cable alley shall be designed to meet the Form IVb Type 7 (as per IEC 60439) for safety purpose.	Owner is requested to allow soot blower switchboard (with IP 55 protection) on the boiler platform. This is inline with NTPC practice for Lara project. Refer attached file. Owner may please confirm.	Refer Ammedment Sl. No. EE-01 to technical specifications.
213	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	8 of 15	3.06.00 (h) (a)	Power factor 415 V Uni-Directional drives is taken as 0.8 and efficiency as 0.85 Power factor of 415 V bidirectional drive loads is taken as 0.65 and efficiency as 0.8 for motor rating less than 15 kW. For motor ratings of 15 kW and above the corresponding values are 0.75 and 0.8.	Owner is requested to consider S1 duty motor efficiency as per IS:12615 Premium Efficiency class-IE3/IE4 (as per tender specification requirement) for sizing of LT Transformer/Boards. Owner may please confirm.	Bidder poposal is not acceptable. The mentioned clause is for finalisizing the sizing of Transformer under worst condtion. Specification cl. no. 3.06.00 h) a) Sub -Section B-0 section-VI, part-B Sizing of LT boards to be followed.
214	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB SECTION B-05(B) MV SWGR- PROTECTIONS, CONTROL & METERING	10 of 10	-	Typical Overall architecture of Switchgear Relay Network.	Since, drawing is not legible. Therefore, Owner is requested to provide legible copy.	Referred drg. is quite legible. However, as per request of bidder better legible copy shall be provided.
215	TECHNICAL SPECIFICATION SECTION – VI, PART-E1	GENERAL LAYOUT PLAN	-	-	Fuel oil MCC Stage-III	As Fuel oil MCC room is far away from stage-III facilities. Hence, Owner is requested to provide incoming electrical power supply from existing switchboard Phase-I or Phase-II FOPH PMCC.	Bidder's proposal not acceptable. No Spare feeders/ extension possible in existing FOPH MCCs. Bidder to arrange power supply as per electrical tender SLD.

216	TECHNICAL SPECIFICATION SECTION – VI, PART-B TECHNICAL SPECIFICATION SECTION – VI, PART-E2	SUB-SECTION B-13 SUBSTATION AUTOMATION SYSTEM SAS architecture drawing (Tender drawing XXX-999-POE-J-003)	21 of 49 -	09.02.03 (iv) -	Individual group of protection systems shall be connected to independent set of SCUs.	Since, no process bus concept is envisaged in Tender Drawing. Hence, Bidder understands that SCU and merging unit(MU) will not be applicable. Owner may please confirm.	Bidder understanding is correct . Bidder refer to Amendment Sl. No. EE-43
217	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-13 SUBSTATION AUTOMATION SYSTEM	3 of 49	1.17.00	Bidder shall offer the Bay Level Units for the EHV system (each circuit breaker with associated dis-connector, Earth switches and instrument transformer shall comprise one bay) complete with Bay Control Units (BCUs) and Bay Protection Units (BPUs). Bay Level Units, common panels like bus bar protection, PLCC panels/communication panels of transmission lines, RTCC panels of transformers etc. shall be housed in existing Switchyard Control Room in Switchyard. Network Controllers,	Since there are no outgoing transmission lines in present scope, hence, no PLCC/ communication panels are envisaged in Bidder's scope. Owner may please confirm. Also, the clause is incomplete. Owner is requested to provide the complete requirement.	Bidder understanding is correct , Bidder refer to Amendment Sl. No. EE-42
218	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-13 SUBSTATION AUTOMATION SYSTEM	3 of 49	1.17.00	RTCC panels of transformers etc. shall be housed in existing Switchyard Control Room in Switchyard. Network Controllers,	RTCC panel requirement is not specified for any of the transformers. Hence same is not applicable. Owner may please confirm.	Bidder understanding is correct.
219	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-13 SUBSTATION AUTOMATION SYSTEM	39 of 49	15.00.00 (vi) (l)	Necessary interconnections for signal exchange between SWYD / SWYD CR to interfacing panels of RLDC, DCS and PMU.	As there are no line bays in present scope of work, hence signal interface with PMU is not applicable in Bidder's scope. Owner may please confirm.	Bidder understanding is correct.
220	TECHNICAL SPECIFICATION SECTION – VI, PART-B TECHNICAL SPECIFICATION SECTION – VI, PART-E2	SUB-SECTION B-13 SUBSTATION AUTOMATION SYSTEM SAS architecture drawing (Tender drawing XXX-999-POE-J-003)	11 of 49 -	6.08.03	Necessary hardware/software to ensure provision for Remote Interface with RLDC shall also be provided by the contractor.	Since, no interface with RLDC is indicated in SAS architecture drawing. Therefore, Bidder shall provide hardware for SAS system as shown in the SAS architecture drawing. Owner may please confirm.	Bidder's,understanding is correct. However, any hardware/software that is required for a fully working system as outlined in Technical specification shall be in the scope of the Bidder.
221	TECHNICAL SPECIFICATION SECTION – VI, PART-B TECHNICAL SPECIFICATION SECTION – VI, PART-E2	SUB-SECTION B-04 TRANSFORMERS AND ASSOCIATED MAINTENANCE, MONITORING & TESTING EQUIPMENTS SINGLE LINE DIAGRAM MAIN PLANT (Drg. No. 9500-999-POE-J-002)	4 of 33 -	1.03.01 (g) NOTES: (2 F)	Outdoor oil filled transformers shall have ratings as indicated in tender SLD, 2500kVA rating is not acceptable. For indoor DTT, 2500 kVA rating is acceptable. Standard LT Transformer rating to be used are indicated below: 2500/2000/1600/1000/630/500/315 KVA.	Bidder understands that 2500kVA oil type transformer is acceptable to the Owner and which is in line with SINGLE LINE DIAGRAM MAIN PLANT. Owner may please confirm.	Bidder understanding is correct . Refer to Amendment Sl. No. EE-48
222	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-17: SWITCHYARD	2 of 98	1.01.07 1.01.14 (i)	In existing 765kV Switchyard the strung bus is with **Quad AAC Bull** and for 132kV switchyard the strung bus is with **Twin AAC Bull** conductor . The equipment interconnections shall be through 4.5" IPS, Al.tube / quad Bull in 765kV switchyard and 3" IPS Al. tube / mim.AAC Bull conductor in 132kV switchyard. The towers and gantries shall be suitable for a normal conductor tension of minimum 2T/conductor in case of **twin moose** and 1.5T/conductor in case of **quad moose** conductor.	Bidder understands that conductor type mentioned under clause no. 1.01.14 is a typo. The conductor type shall be **AAC Bull** as per clause no. 1.01.07. The tension values mentioned in the Clause no. 1.01.14 shall be applicable for Bull conductor also. Owner may please confirm.	Bidder's understanding is correct. Refer Amendment Sl. No. EE-14
223	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION : B-17: SWITCHYARD	2 of 98	1.01.14 (ii)	The minimum vertical distance from the bottom of the lowest porcelain part of the bushing, porcelain enclosures or supporting insulators to the bottom of the equipment structure, where it rests on the foundation pad shall be 2550 mm. All Gantries and towers (Including intermediate/ required for turning etc.) as required from GT, ST stringing , earth wire & its anchoring on A-Row column of TG Building and line take off gantry / with in plant boundary are to be provided by the contractor. Minimum height of intermediate 765KV gantry for AIS shall be 29+ 8.0m peak. Minimum height of 7650KV AIS equipment level shall be 14Mt from the plinth level. The **gantry width** for 765kV AIS shall be min. 54mt or as required to meet the specified clearances and for 132kV switchyard bay width shall be 12mt . Width of gantries shall be 30mt and 12mt for 765kV and 132kV switchyard respectively. The Bay width (Beam Span) for 765kV gantry structures should be 54mt.	Bidder understands that, instead of the **gantry width**, the **bay width** for 765kV AIS shall be min. 54 m or as required to meet the specified clearances and for 132kV switchyard bay width shall be 12 m. Width of gantries shall be 30m and 12 m for 765kV and 132kV switchyard respectively. Owner may please confirm.	Bidder's understanding is correct. Bidder to refer to Amendment Sl. No. EE-15
224	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION : B-17: SWITCHYARD	3 of 98	1.01.21	The control & protection panels belongs to present scope of Bays shall be placed in existing 765kV Control room and 132kV control room building / AC kiosk . The kiosk shall be provided with adequate air conditioning , fire alarm system with at least two detectors and it shall be wired to SAS system of 765kV System. Two nos. of suitable separate power supply from existing LT switchgear shall be provided to each AC kiosk to cater power supply to panels and AC separately.	Owner is requested to provide general arrangement drawing of existing control building to evaluate the available space.	The existng COntrol room drawing Layout drg no: 9545-505-PVE-F-017 is attached. Bidder to acertain the layout & available space by site visit .

225	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION : B-17: SWITCHYARD	4 of 98	1.02.00	**CLEARANCES :** The minimum clearances for 765kV AIS shall be as given below: 765kV / 132kV Phase to earth clearance(Conductor to conductor) 4900mm / 1300mm Phase to earth clearance (rod to structure) 6400mm Phase to Phase clearance (Conductor to conductor) 7600mm / 1300mm Phase to Phase clearance (rod to structure) 9400mm	Bidder understands that the description for clearances shall be as follows : Phase to earth clearance(Conductor to **structure**) Phase to earth clearance (rod to structure) Phase to Phase clearance (Conductor to conductor) Phase to Phase clearance (Rod to **conductor**) in line with IEC 61936 Table -2. Owner may please confirm.	Bidder's understanding is correct. Bidder to refer to Amendment Sl. No. EE-17
226	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-17 SWITCHYARD SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	6 of 98 10 of 15	1.11.01 (e)(i) 3.07.00	Max.fault level(1sec) for 765kV : 50kA for 132kV : 31.5kA The earthing system for plant shall be designed for a life expectancy of at least forty (40) years, for a system fault current of 63 kA for 1.0 sec	Since the fault level of 765kV switchyard is 50kA, hence bidder understands that earthing system to be designed considering system fault current of 50kA for 1Sec. Owner may please confirm.	Bidder's understanding is correct. The earthing system for plant shall be designed for a fault current of 50kA for 1.0 sec.Bidder to refer to Amendment Sl. No. EE-12
227	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-17 SWITCHYARD	9 of 98	2.02.02	The circuit breaker shall be capable for breaking the steady & transient magnetizing current corresponding to 765/132 kV transformers up to 1000 MVA 3 phase rating and 765kV shunt reactor of 330MVAR. It shall also be capable of breaking line charging currents as per IEC 62271-100 with a voltage factor of 1.4.	Bidder understands that 1000MVA is applicable for 765kV Only. For 132kV system same shall be as per OEM type tested design. Owner may please confirm.	Bidder's understanding is correct. Bidder to refer to Amendment Sl. No. EE-18
228	TECHNICAL SPECIFICATION SECTION – VI, PART-B ---------- TECHNICAL SPECIFICATION SECTION – VI, PART-E2	SUB-SECTION B-17: SWITCHYARD ---------- Tender protection SLD (Drg. No. XXXX-999-POE-J-005/006/009)	9 of 98 ---------- -	TABLE-I ---------- -	CORE DETAILS OF 765kV CTs ---------- -	There is a discrepancy in the number of CT cores shown in table-I versus number of cores shown in tender protection SLD(Drg. No. XXXX-999-POE-J-005). Bidder understands that number of CT cores shall be as per tender protection SLD (Drg. No. XXXX-999-POE-J-005/006/009). Owner may please accept the same.	The No of cores shall be provided as per the Table-1. Bidder Refer to Amedment no:1 of tender protection SLDs.
229	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-17 SWITCHYARD	17 of 42	2.13.00	Mandatory Maintenance Equipments : 1. SF6 Gas Handling Plants:- a) SF6 gas filling and evacuating equipment(Portable), Qty : 1no: b) SF6 gas filtering, drying, storage and recycling plant, Qty : 1no: 2. SF6 Gas leak detector, Qty: 1no:	Bidder understands that the requirement mentioned in clause no. 2.13.00 of Sub-section-B-17, Part-B, Sec.-VI is generally applicable to GIS. Since, GIS is not applicable for this project, hence the referred items are not applicable to Bidder. Owner may please confirm.	Bidder to refer to Amendment Sl. No. EE-21
230	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-17 SWITCHYARD	21 of 98	3.05.01	Isolator shall be gang operated for main blades and earth switches. The operation of the three poles shall be well synchronised and interlocked.	Bidder understands that this requirement is applicable only for 132kV Isolators. 765kV Isolators shall be individually operated with separate operating mechanism for each pole. Owner may please confirm.	Bidder understanding is not correct.The poles are not mechanically ganged , but it is electrically ganged . Mechnical (construction) interlock should be provided between isolator & earth switch.The isolator should be Three pole.
231	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-17 SWITCHYARD	-	-	-	Owner is requested to provide following drawings : 1. Existing 765kV switchyard layout drawing with plan and section details. 2. Existing 132kV switchyard layout drawing with plan and section details. 3. Existing switchyard building control building layout drawing 4. Architecture and full ordering code of existing BB protection system central unit. 5. Details/architecture drawing of existing ABT system 6. Earthing layout of existing switchyard	These drawings shall be provided during detailed engineering stage on award of the contract.
232	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB -SECTION – B -23 132 KV CABLE & ACCESSORIES	6 of 10	2.02.00 7.01.00 7.07.00	The design ambient air temperature for cable shall be 50 deg C, when laid in air. The design ambient ground temperature for cables shall be 40 deg C. Cables shall be installed in air, in built up concrete trenches and/or directly buried in soil. Cable installation shall be carried out generally as per applicable standard/ manufacturer guidelines. Cable shall be laid in built up trench. Typical sectional drawing for 132 KV built up cable trench enclosed with this chapter shall be followed for preparing the detailed drawing by contractor. All necessary work like cable tagging, marking, dressing etc. as required shall be in contractor's scope. Construction of buried cable trench shall include excavation, preparation of sieved sand bedding, riddled soil cover, supply and installation of concrete protective covers, back filling and compacting, supply and installation of route markers. Bidder shall furnish the details for burying the cable in ground.	Bidder understands that 132kV cables can be laid in built up concrete trenches and/or directly buried in soil. Owner may please confirm.	The Bidder understanding is not correct .The 132kV cables can be lain in build up concrete trenches.Bidder to refer Amendment Sl. No. EE-40 & EE-41
233	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB SECTION- G-03 LAYOUT PHILOSOPHY	9 of 15	1.03.00 (33)	Bidder to note that Power and earth conductor connecting transformer yard and switchyard shall be anchored on A-row columns. The loads due to the same shall be considered while designing the TG building.	Bidder understands that in some cases A-row stringing is not required for power conductor as per layout requirement. So, in case if stringing is considered on A-row, its loads on TG building will be considered. Owner may please confirm.	Bidder understanding is correct.

234	TECHNICAL SPECIFICATION SECTION – VI, PART-B ---------- TECHNICAL SPECIFICATION SECTION – VI, PART-E2	ELECTRICAL SYSTEM / EQUIPMENTS ---------- Single Line diagram Main Plant (Drg No. 9500-999-POE-J-002)	14 of 20 ---------- -	1.19.00 ---------- -	Following feeders shown in Single line diagram main plant At 11kV Unit swtichgear 6UA & 6UB - FUTURE OWNER'S REQ (1MVA SCR)" - # FEEDER FOR EXCITATION TESTING IF APPLICABLE AT Station swtichgear 6SA : - @ ADDITIONAL INCOMER 1250Amp SUITABLE FOR CABLE TERMINATION FOR OWNER'S USE - # FEEDER FOR EXCITATION TESTING IF APPLICABLE AT Station swtichgear 6SB : - @ ADDITIONAL INCOMER 1250Amp SUITABLE FOR CABLE TERMINATION FOR OWNER'S USE - # FEEDER FOR EXCITATION TESTING IF APPLICABLE Two Number 11kV feeders in 11 kV station switchgear, suitable for connection of 1MVA service transformer, for future owners use.	There is a discrepancy in the owner's future feeder requirement as shown in the single line diagram and clause no. 1.19.00 for 11kV feeders. Bidder understands that 11kV feeders for owner's future use shall be provided as per single line diagram. Further, only one feeder for Excitation testing shall be provided from 11kV Unit switchgear 6A or 11KV station switchgear. Owner may please confirm.	Bidder to refer to Amendment Sl. No. EE-08
235	TECHNICAL SPECIFICATION SECTION – VI, PART-E2	Single Line diagram Main Plant (Drg No. 9500-999-POE-J-002)	-	-	Raw water pump house HT & LT loads shall be fed from owner's existing RW swgrs of stage-II. Any modification required shall be in bidder's scope.	Bidder understands that adequately rated feeders for feeding the power supplies to the HT, LT loads are already available in the existing RW swgrs. Any modification required in the existing panel wiring shall be under Bidder's scope. Owner may please confirm.	Bidder's understanding is not correct. Any modification including power, control , protection/numerical relays, metering etc., as per system requirement shall be in bidder's scope.
236	TECHNICAL SPECIFICATION SECTION – VI, PART-E2	Protection SLD for GT bay (xxxx-999-POE-J-005) Protection SLD for TIE bay (xxxx-999-POE-J-009)	-	-	Mergin units are shown in the drawings. 	Since no process bus concept is envisaged in Substation Automation Architecture drawing, hence Bidder understands that merging units(MU) will not be applicable. Owner may please confirm.	Bidder's understanding is correct. Please refer Amendment Sl. No. EE-45
237	TECHNICAL SPECIFICATIONS SECTION VI, PART-B	SUB-SECTION B-17 SWITCHYARD	48 of 98	11.00.00	765KV TRANSMISSION LINES	Data provided under this clause is for 400kV Transmission line. Since this project consist of 765kV S/C Transmission line, Owner is requested to provide data applicable for 765kV transmission line.	Bidder refer to Amendment Sl. No. EE-28
238	TECHNICAL SPECIFICATIONS SECTION VI, PART-B	SUB-SECTION B-17 SWITCHYARD	49 of 98	11.02.01	Right of way and way leave clearance shall be arranged by the Owner. To evaluate and tabulate the trees and bushes coming within 26 meters on either side of the central line alignment, the trees will be numbered and marked with quality paint serially from angle point 1 onwards and the corresponding number will be painted on the stem of trees at a height of one meter from ground level. The trees list should contain the following:	As per CBIP Manual-323, Corridor for 765kV S/C (Delta Configuration) & CEA regulation (Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022) RoW shall be 32 meters on either side of the central line alignment. Hence, Owner is requested to check the RoW width requirement for 765kV and issue amendment, if required.	Bidder's understanding is correct. The ROW shall be 35mt on either side of the central line .The Bidder to consider S/C Tranmission line for GT O/H connection Bidder to refer to Amendment Sl. No. EE-26
239	TECHNICAL SPECIFICATIONS SECTION VI, PART-B	SUB-SECTION B-17 SWITCHYARD	58 of 98 56 of 98	12.02.03 12.01.03	Weight Span  12.02.03 **Weight Span** The weight span is the horizontal distance between lowest point of the conductors on the two spans adjacent to the tower. For design of structures, the span limits given below shall prevail. Tower type / Normal Condition Max. (m) / Min. (m) / Broken Wire Condition Max. (m) / Min. (m) A, 600, -200, 360, -100 B, C 600, 0, 360, -200 D 600, 0, 360, -300	As uplift load is not specified for tower type A (Suspension), hence bidder understands that minimum weight span for Normal condition (NC) and Broken wire conditions (BWC) (i.e. -200m Min for NC and -100m Minimum for BWC) will not be applicable for tower type-A. Same is in line with clause 12.01.03 as well as CBIP manual-323, for uplift load only tension tower can be used. Owner may please confirm	Bidder to refer to Amendment Sl. No. EE-30
240	TECHNICAL SPECIFICATIONS SECTION VI, PART-B	SUB-SECTION B-17 SWITCHYARD	82 of 98	14.05.07	The proposed 66 kV transmission line may run parallel for certain distance with the existing Transmission lines which may remain energised during the stringing period.	Bidder understands that no 66kV transmission line is applicable for this project. Owner may please confirm.	Bidder understanding is correct. Bidder refer to Amendment Sl. No. EE-34
241	TECHNICAL SPECIFICATIONS SECTION VI, PART-B	SUB-SECTION B-17 SWITCHYARD	85 of 98	15.01.01	All the equipment shall be of the latest design and conform to the best modern practice adopted in the extra high voltage field. The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for 400 kV AC Double circuit transmission with quad moose conductor and will give continued good performance.	Owner is requested to provide required details for 765kV transmission line (including conductor type and its bundle configuration) as applicable for the project.	Bidder to refer to Amendment Sl. No. EE-35
242	TECHNICAL SPECIFICATIONS SECTION VI, PART-B	SUB-SECTION B-17 SWITCHYARD	85 of 98	15.02.02	Parameters of the earthwire: Size (strands & wire diameter) is 7/3.15	As per CBIP manual-323 earth wire size for 765kV transmission line is 7/3.66. Owner is requested to confirm the earth wire size.	Confirmed . Bidder Refer Amendment Sl. No. EE-36
243	TECHNICAL SPECIFICATIONS SECTION VI, PART-B	SUB-SECTION B-17 SWITCHYARD	89 of 98	15.07.01	As alternate contractor may also offer long rod composite insulator for the above application.	Creepage distance for Long rod composite insulator is not specified. Bidder understands that 25mm/kV shall be followed for long rod composite insulators. Owner may please confirm.	Bidder to consider creepage distance shall be of 25mm/kV. Bidder refer to clause no:8.04.03, page no: E-34 of 98.
244	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-17 SWITCHYARD	94 of 100	15.07.03	Bidder to ensure that optical fiber characteristic of the OPGW cable to be supplied shall be compatible with the existing OPGW cable if any.	Owner is requested to share the characteristics of the existing OPGW or confirm the charactistics mentioned in the specification are compatible with the existing OPGW.	Confirmed .Bidder to comply the specification requirement of OPGW cable .
245	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-08: HT, LT AND CONTROL CABLES	3 of 7	2.010.00	All LT power cables of sizes more than 120 sq.mm. shall be XLPE insulated, and sizes shall be of 1Cx150, 1Cx300, 1Cx630, 3Cx150,3CX185, 3Cx240 & 3Cx300 sq.mm	Bidder requests Owner to consider a greater spectrum of cable sizes as opposed to one mentioned in the tender. Bidder proposes the following cable sizes which are in line with past executed NTPC projects. Multi core cable: Upto 400 Sq.mm. Owner may please accept the same.	Bidder proposal is not acceptable. Specification cl. no.2.010.00 Sub - Section B-08 Section-VI, part-B to be followed.

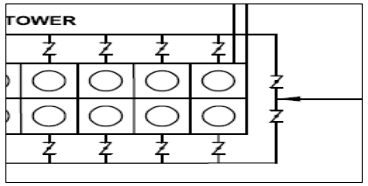
246	TECHNICAL SPECIFICATIONS SECTION – VI , PART-B	SUB SECTION B-06 LT SWITCHGEARS & LT BUSDUCTS	3 of 18	2.03.00 (6)	Vetical Busbar: Copper only	Bidder proposes Owner to consider Aluminium alloy as an alternative to Copper for Vertical busbar of LT Switchgears because limited suppliers are available with panel design having Copper for vertical busbar. Owner may please accept the same.	Bidder proposal is not acceptable. Specification cl. no.2.03.00 (6) Sub -Section B-06 Section-VI, part-B to be followed.
247	TECHNICAL SPECIFICATION SECTION – VI, Part-E	-	-	9500-999-POE-J-004	Dimensio Notes.  TYPICAL SECTION OF CABLE TRAY ARRANGEMENT (UPTO 18 NOS) CABLE TRAYS & ITS SUPPORTING ARRANGEMENT TO BE PROVIDED BY CONTRACTOR (ALL SUPPORT STRUCTURE & CABLE TRAYS ARE IN CONTRACTOR SCOPE). tioned as 18 in	Owner may please review the overall dimension and number of cable trays mentioned in drawing. Bidder understands that the number of trays shall be 15 Nos. as shown in drawing and not 18 Nos. written in note. Also, the overall dimension shall be 3400 mm in line with NTPC practice followed for Lara and Singareni tender. Refer attached file. Owner may please review and update.	Bidder understiang is correct for number of trays i.e 15nos. 1200mm clear space between structures along the cable tresle length for 6nos trays and 1000mm for 3nos trays. Bidder to refer Amendment Sl. No. EE-46
248	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION-B-08 HT LT AND CONTROL CABLES	5 of 7	4.00.05 (a)	CABLE DRUMS: Cables shall be supplied in steel drums of heavy construction.	Bidder requests Owner to consider both steel/wooden drums based on drum length/cable size. Owner may please accept the same.	Bidder proposal is not acceptable. Specification cl. no.4.00.05 Sub -Section B-08 Section-VI, part-B to be followed.
249	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-09 DG SETS	3 of 13	4.10.00	The DG set shall be capable of starting largest size of emergency 415 V drive (motor) having starting KVA/rated KW ratio of 8 (higher if starting current is more than 8) and starting power factor of 0.2.	Bidder understands that DG can be sized with actual starting current of Motor and actual starting power factor, if vendor is offering improved parameters of starting current and pf. Owner may please confirm.	Refer Ammedment Sl. No. EE-02 to technical specifications.
250	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	11 of 15	3.07.00	Earthing & Lightning Protection System Grounding and lightning protection for the entire plant areas or buildings covered in the specification shall be provided in accordance with IS 3043, IEC 62305, IEEE 80 and IEEE 665.	Bidder clarifies that IEEE 665 has been withdrawn. Bidder will follow IEEE 80.	Bidder understanding is correct.
251	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	4 of 18	3.03.04	18W, 220V DC Lighting fixture shall be provided in underground portion of conveyor, each switchgear room, control room, office room, pump house, each drive floor of TPs, staircases of various TPs and buildings and each local control area. DC lighting fixtures shall be fed from 220V DC LDB which in turn will be fed from CHP DC system. The supply to the DC lighting panels shall be automatically switched ON in case of loss of normal AC supply.	Bidder proposes 10W, 220V DC LED lighting fixtures as per OEM. Owner may please confirm	Bidder proposal is not acceptable. Specification cl. no.3.03.04 Sub -Section B-11 Section-VI, part-B to be followed.
252	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	14 of 15	9.00.00	Cables to the feeders protected by breakers: Main protection fault clearing time with 0.12 second minimum.	Bidder proposes fault clearing time of feeders protected by vacuum contactor unit to be 0.01 sec since vacuum contactor unit has HRC fuse. Owner may please accept.	Bidder's understanding is correct.
253	-	-	-	-	-	Bidder requires Feeders of 500kVA from Owner's existing CHP Control Room-1 (at Co-ordinates: 649.35N, 266W) to feed nearby load for TP modification. Since this location is far away from Stage-III facility, Owner shall provide power from existing supply. It will also help Owner in easy operability of nearby load. Owner is request to allocate feeder as per any one option listed below: Option-1: two numbers 500kVA feeders from Existing **LT** Switchgear Option-2: Four numbers 250kVA feeders from Existing **LT** Switchgear Option-3: two numbers 500kVA feeders from Existing **HT** Switchgear	Bidder's proposal not acceptable. Bidder to arrange power supply as per electrical tender SLD/ system requirement.
254	Price Schedule- Break up of Type Test Charges for Equipment Priced in Schedule-1 & 2	-	-	-	Schedule-8A and 8B: Type test schedule	Bidder proposes Owner to delete the requirement of quoting type testing charges in Schedule-8A and 8B of Bid Price Schedules and accept type test certificate in lieu of conducting type test as per latest CEA guidelines on validity of type test certificate. Alternatively, Owner may please exclude the type test charges from bid evaluation since the requirement for conductance of type test is not clear at bid stage and is subject to Owner's discretion in-spite of having a valid type test certificate for similar equipment.	Bidder proposal is not acceptable. Schedule-8A and 8B: Type test schedule to be followed.

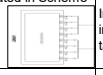
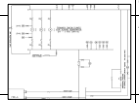
255	TECHNICAL SPECIFICATIONS SECTION – VI , PART-B	SUB SECTION B-06 LT SWITCHGEARS & LT BUSDUCTS	13 of 18	3.14.00	Wireless temperature monitoring system to be provided and same shall be integrated to DDCMIS/ separate HMI. Temperature sensors shall be installed in all relevant joints, contact joints etc. as per the standard OEM Practice, however position of such sensors shall be decided at the time of detailed engineering.	As per bidders past experience and industry practice, wireless temperature monitoring system is generally not provided for LT switchgear since the switchgear design is type tested. Hence, Owner is requested to remove the requirement of wireless temperature monitoring system for LT switchgears. Alternatively, Bidder suggests to provide wired temperature sensors for temperature monitoring of LT switchgear as wireless temperature monitoring system is not a proven practice for LT Switchgear.	Bidder proposal is not acceptable. Same shall be provided for USS, BPMCC, TPMCC and UES switchgear. Ammendment No.1 to be referred.
256	TECHNICAL SPECIFICATIONS SECTION – VI , PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	20 of 20	1.25.00 (c)	Bidder shall provide all necessary technical data/models and carryout all necessary studies (in PSS/E) as indicated in “Formats of Technical Data for connectivity Agreement-FORMATCON- TD-2” applicable for Thermal Power plants as per the CERC (Central Electricity Regulatory Commission)-Connectivity and General Network Access to the Interstate Transmission system Regulation-2022.	Bidder would like to clarify that the PSS/E consists of programs which are used to perform studies related to transmission network. Since, Bidder is main contractor with EPC responsibility, it is not possible to perform such studies by Bidder. Generally such studies shall be performed by either Owner or Grid authority. Bidder will provide all necessary technical data to Owner during detail engineering for conducting grid related studies.	The Submission of studies , modelling data is for statutory requirement to CTU. The Bidder to comply the specification requirement .

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Queries & Clarification	NTPC Reply
257	Section-VI, Part-A	Sub-Section - IIC	2 of 18 & 3 of 18	1.06.02	For open loop control of complete main plant and offsite areas fieldbus based control system, fieldbus based actuators, Profibus DP based IMC in LV SWGR/MCC and fieldbus based PT/DPT/TT shall be provided excluding applications given in Note-A. Contractor to note that Solenoid operated pneumatic open close actuators, HT/LV SWGR/MCC where IMC is not envisaged and instruments other than PT/DPT/TT envisaged under this package are conventional, i.e. not based on fieldbus system. Hence, in most of the FGs of DDCMIS mix of conventional and fieldbus based control system is envisaged. Notes: A. The control system and devices (Actuators, instruments) shall be conventional for following areas/ application: . . II. TG Integral : a. STG Integral Control and Protection System. b. Protection and governing controls of BFP Turbine. c. HP/LP Bypass system controls and protection.	Bidder understands that TG integral, BFPT,HP/LP Bypass system motors (e.g. lube oil, jacking oil etc.) shall have conventional control from respective control system. Please confirm. Accordingly, Bidder shall consider suitably designed iMCC module in respective MCC/Switchgear.	Bidder's understanding is correct. Bidder to refer Amendment No-C05 in this regard.
258	Section-VI, Part-A	Sub-Section - IIC	2 of 18 & 3 of 18	1.06.02	For open loop control of complete main plant and offsite areas fieldbus based control system, fieldbus based actuators, Profibus DP based IMC in LV SWGR/MCC and fieldbus based PT/DPT/TT shall be provided excluding applications given in Note-A. Contractor to note that Solenoid operated pneumatic open close actuators, HT/LV SWGR/MCC where IMC is not envisaged and instruments other than PT/DPT/TT envisaged under this package are conventional, i.e. not based on fieldbus system. Hence, in most of the FGs of DDCMIS mix of conventional and fieldbus based control system is envisaged.	For 2-way/3-way valves and fire damper of Air conditioning and ventilation system, profibus DP based actuators may not be available commercially. Accordingly, Bidder may opt for conventional control for such applications. Please confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
259	SECTION – VI, PART-A	IIC CONTROL & INSTRUMENTATION SYSTEM	7 OF 18	2.04.03	The HMIPIS shall include. iv. **Programmer cum documentation station:** 15 Programmer cum documentation station (3 per unit, 10 for common (1 SAC, 2 WS (1 centralized offsite CR & 1 local), 2 AHP (1 centralized offsite CR & 1 local), 1 CHP, 1 FOPH, 2 FGD (1 centralized offsite CR & 1 local), 1 SWGR))	Owner to clarify Quantity of Programmer cum documentation station. As per the furnished break-up, the total counts to 13 instead 15. Owner is requested to clarify.	Bidders understanding correct the total count of Programmer cum documentation station is13 .
260	SECTION – VI, PART-B SECTION – VI, PART-B SECTION – VI, PART-A	IIIC-02 DDCMIS IIIC-02 DDCMIS IIC CONTROL & INSTRUMENTATION SYSTEM	15 OF 17 3 OF 17 6 OF 18	26.00.00 13.00.00 2.03.05	**HART System** 1. The Contractor shall provide HART management software in a dedicated PC station for each of the Unit DDCMIS for centralized configuration, maintenance, diagnostics & record-keeping for all electronic transmitters, temperature transmitters, control valves and analyzers with HART protocol. **Analog Signal Conditioning & Processing** 4. For Unit DDCMIS, the analog 4-20 mA input cards shall have input resistance >= 250 ohm inside the card / FTA.4-20 mA DC signal will only be used for control purpose and superimposed HART signal will be used for configuration, maintenance, diagnostic and record keeping facility for electronic transmitters and Analyzers etc. The Contractor shall provide integrated HART system **for all DDCMIS** for centralized configuration, maintenance, diagnosis & recordkeeping for all electronic transmitters, control valves & analyzers with HART protocol. DDCMIS AI(4-20 mA) cards shall be HART enabled. Separate HART system is not acceptable.	Discrepancy is observed regarding HART system requirements in various DDCMIS. From Cl. 26.00.00 and Cl. 13.00.00, it infers that Owner intends to use HART modules and HART management software for Unit DDCMIS only. For other DDCMIS, conventional system is acceptable. Owner is requested to clarify.	Bidder understanding is not correct . Integrated HART system is envisaged for all DDCMIS.
261	SECTION – VI, PART-A	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	2 OF 3	3.00.00	**TERMINAL POINTS & EXCLUSIONS:** CONTROL & INSTRUMENTATION	a) Interfaces may be required with Control systems/C&I systems for existing CHP, fuel oil system, fire water system, etc. However, terminal points for the same are not indicated in Cl no. 3.00.00 of Subsection-III. Owner is requested to include terminal points and Exclusions for all C&I interfaces between proposed plant and existing plant. b) Further, Bidder understands that all necessary hardware/ software modifications/ upgradation, as required at owners Control System/C&I System end, to interface with Bidder's system shall be in Owner's scope. Owner is requested to confirm.	a.Bidder to refer clause 2.02.00 Part-A subsection- IIC for terminal point with existing CHP.However, for Fuel oil & Fire water system the Employer's RIO panel shall be terminal point b. Bidders understanding is correct
262	SECTION – VI, PART-B	SUB-SECTION-IIIC-14 CLOSE CIRCUIT TELEVISION (CCTV) SYSTEM	6 OF 5	1.00.00	**Thermal Camera System:** Annexure-I	Application of Thermal camera system as specified in Cl. No. 1.00.00 Annexure-1 is not mentioned in Part A (Scope of Supply). Bidder requests Owner to kindly specify relevant clause no in Part-A (Scope of Supply) for Thermal camera system application.	Thermal camera system is not envisaged under scope of supply for CCTV system.
263	SECTION – VI, PART-B SECTION-VI, PART-A	IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY) I-A PROVENNESS	16 OF 36 31 OF 35	10.00.00 6.6 (c)	**AMBIENT AIR QUALITY MONITORING STATION (AAQMS)** AS PER CONTRACTOR's STANDARD AND PROVEN PRACTICE for Meeting system and LATEST CPCB REQUIREMENT. AAQMS, if offered for this package shall be same or of same series which should have been in successful operation for a period of not less than one (1) year in at least one (1) power station.	Requirement of AAQMS System is not mentioned in Part A (Scope of Supply). Accordingly, Bidder understands that AAQMS System is not in Bidder's scope. Owner is requested to confirm.	Bidder's understanding is correct.

264	Section-VI, Part-A Section-VI, Part-B	Annexure C to IIC Contract quantity Sub-Section-IIIC-02 DDCMIS	17 OF 21 17 OF 17	I 32.00.00	22 Portable Testing and Commissioning tool-Ref Clause no.15.00.00, Sub-section IIIC-02, Part-B, Section VI for technical specification. (2 nos.) The testing and commissioning tool is intended to be used for test operation of any drive, in absence of DDCMIS during initial commissioning (e.g. fan trial run, etc.) While the tool shall be used for all type of drives envisaged in the specification, it is designed to be operated for one drive at a time. Portable trolley mounted system completed with necessary hardware for operating the drives and monitoring its parameter shall be supplied.	Requirement of Portable testing and commissioning tool is not mentioned in Cl no.15.00.00, Sub-section IIIC-02, Part-B. However this requirement is indicated in Cl no.32.00.00, Sub-section IIIC-02, Part-B. We understand that it is typo error and hence bidder shall follow Portable testing and commissioning tool requirement as per Cl no.32.00.00, Sub-section IIIC-02, Part-B. Owner is requested to confirm.	Bidder's understanding is correct. Bidder to refer Amendment No C-02 in this regard.
265	SECTION – VI, PART-B SECTION – VI, PART-B	SUB-SECTION-IIIC-20 CCR Design Guidelines SUB-SECTION-IIIC-01 BASIC DESIGN CRITERIA	1 OF 3 6 OF 6	2.00.00.f 9.03.00	Furniture like Computer tables, Chairs and other furniture related to Central control room, Programmer room, **PC room.** 2) Programmer Room :Programmer Room is envisaged to be located near the CER. This shall house the servers/ other workstations & Engineer station for DDCMIS (SG,TG and BOP C&I systems), various PCs.	Bidder understands that the relevant workstations and engineering workstation shall be located in Programmer room. Separate PC room is not required. Owner is requested to confirm.	Separate PC room is not envisaged.
266	SECTION – VI, PART-A	IIC CONTROL & INSTRUMENTATION SYSTEM	10 OF 18	2.06.00	Contractor to provide 5 nos. Fine pitch LED display (1 for Employer's Admin building gate, 1 for Employer's Main plant gate & 3 for locations to be finalized during detailed engineering) for outdoor application and 5 nos. Indoor LED television (locations to be finalized during detail engineering). These displays shall communicate information & guidance about environment, Advisory from Management, NTPC generation (station wise/unit wise), Business Diversification Information, CSR Activities, safety advisories, Movie on Company's Journey & Awards and Recognitions etc. Additionally, 3 nos. Interactive display board (1 for Employer's Admin building conference room, 1 for Employer's Service building conference room & 1 for CCR conference room) shall also be provided for conference rooms. The exact location of these displays will be finalized during detail engineering.	Based on the purpose and applications defined in subject clause, bidder understands that Fine Pitch LED Display, LED television & Interactive Display Boards shall be connected to Enterprise LAN provided by Owner. We understand that these devices shall not be connected to DDCMIS or Station LAN. Owner is requested to confirm.	Bidder's understanding is correct.
267	SECTION – VI, PART-A	Annexure C to IIC Contract quantity	6 OF 21	2.05.02	Water System DDCMIS: The Control System of Water System DDCMIS has following process blocks. The major equipment/ control loops in each block are indicated below. **PT plant block** ……..Raw Water, …..	As per the Tender Specification, Raw water system shall be controlled from PT Plant Block of Water System DDCMIS. NTPC to kindly note that New Raw Water pump (1 no.) and its auxiliaries are located in Existing Stage II near Raw water Reservoir and are at approximately 1.7 km distance from Stage III nearest C&I room. Bidder understands that Bidder's DDCMIS RIO panel of PTP Block (Water system DDCMIS) & VMS Panel for Raw water system shall be located in Employer's Existing Local control room. Also, Bidder understands that necessary 24VDC and UPS feeders shall be made available by Employer from Existing Employer's system. Please confirm.	Bidder to comply technical specification .However,detailed schematic is to be finalised during Enggineering stage.
268	SECTION – VI, PART-A	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	1 OF 3	1.01.01 1.03.00 1.05.00 1.07.00	Auxiliary Steam System TP for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing Stage-II with motorized isolation valve... Ash handling system & AWRS Tapping point from existing St-II AWRS pipe (located inside plant) shall be at any convenient location decided by the employer during detail engineering. WATER SYSTEM a. Interconnection of Raw water common header with existing stage(s) Fire Detection & Protection System Dedicated & new fire water headers/mains (hydrant & spray) tap-off shall be taken from existing discharge headers of hydrant/spray pumps and shall be routed to Stage-III area for connection to fire water pipe network of Stage-III.	Bidder understands that for Interfaces with Exisiting Stages, any Bidder's supplied MOV, Instrument, etc. located in areas of Existing Stages, shall be hooked up to Owner's Existing control system, as cabling for such long distances to Stage III Control systems shall not be feasible. Please confirm.	Bidder's proposal is not acceptable.Bidder to comply technical specification.
269	SECTION-VI, PART-B	SUB SECTION-A-18 Fire Detection & Protection System	4 of 14	5.08.01	Facility to operate pumps of booster pump house and fire water pump house shall be provided from PC based monitoring station.	As per Tender, Existing fire water storage tanks and pumping system provided in Stage-II shall be used for fire water requirements for Stage-III also . Bidder understands that any control of Existing Fire water pumps (Stage II) is not envisaged from Bidder's Stage III PC based monitoring station. However, Facility for operating Stage III hydrant booster pumps and spray booster pumps is envisaged from Stage III PC based monitoring station. Please confirm.	Bidders understanding is correct
270	SECTION-VI, PART B	SUB SECTION- G-03 LAYOUT PHILOSOPHY	Page 2 of 15	1.01.03	**Control Room for Offsite facilities** Further Remote I/O (RIO) rooms shall be additionally provided on as required basis for offsite areas……..The exact RIO locations shall be finalized based on standard design practices, operational requirements, optimization of spaces etc. subject to owner's approval during detailed engineering stage.	Bidder proposes to have RIO Panel near to Biomass facilities to accommodate Biomass Handling package IO's. The Exact location of Remote Panel shall be finalized during detailed engineering. **Kindly accept the same.**	The specification requirement is clear in this regard .Location shall be finalised during detailed engineering subject to owner's approval .
271	SECTION – VI, PART-A SECTION-VI, PART B	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	PAGE 13 OF 18 Page 32 & 33 of 79	4.00.00(h)-3 2.7.1, 2.7.2, 2.7.3	**The instruments for CHP** and AHP ash conveyor system shall be provided as per standard and proven practice of respective supplier. However, for temp elements, DIN rail type temp transmitters mounted in JBs shall be provided. For Pull Chord Switches, Belt Sway Switches & Zero Speed Switches **Degree of Protection** **Flame proof/Explosion proof for NEC Class 2,Division 1 area**	CHP does not fall under explosion proof application area . Hence, these switches shall be provided as per bidder's standard and proven practice of OEM. Kindly Accept the Same.	Bidder's proposal is not acceptable. Specification requirement is clear. Bidder shall comply to technical specification.
272	SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 34 of 79	2.7.4	One number trip indicator panel per conveyor, which shall display the exact number of safety switches (pull chord or belt sway switches) operated in a loop of conveyor considering 10 % spare switches.	Bidder understands that one number trip indicator(Controller) module shall be supplied for each conveyor. There shall be dedicated Sensor/Terminator Module for each loop of PCS & BSS. The Indicator cum Controller for each loop shall be residing inside Belt Watch Panel (Common for CHP A & B Stream) located at CHP Control Room. **Kindly confirm the same**	Bidder to refer Ammendment Sl. No. MH-04

273	SECTION – VI, PART-B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 12 of 79	4.7.5	To mount vibration sensors suitable arrangement including vibration pads and **notches in the shaft of Crusher for mounting Key Phasor shall also be provided**.	The provision for the notch shall be provided at the Non-Drive End of Crusher's Shaft. **Kindly accept the same.**	Specification requirement is clear. Bidder shall comply to technical specification
274	SECTION – VI, PART-B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 65 of 79	4.05.01	(a.) Coal flow path selection shall be done from CRT/Keyboard to select any one of the following conveying paths. (1) Existing Conveyor 32 to Coal Bunker (2) Existing Conveyor 33 to Coal Bunker (3) Existing Conveyor 38A to Coal Bunker (4) Existing Conveyor 38B to Coal Bunker (5) Combination of above	Bidder understands that existing conveyor 32/33/38A/38B are controlled from Purchaser's existing DDCMIS, hence start command for these conveyors shall be initiated from Purchaser's existing DDCMIS. However, bidder shall be considering the running feedback signals of above mentioned drives for initiation of downstream operation. **Purchaser is requested to provide the running feedback signals(Hard-wired) of aforementioned drives to Bidder's CHP DDCMIS. The required cable, cable tray ,routing etc. for interfacing with bidder's system shall be in Purchaser's scope.**	Regarding control of these conveyors Bidders understanding is correct. However, for terminal point bidder to refer clause 2.02.00 sub section IIC Part-A .
275	SECTION – VI, PART-A	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	PAGE 15 OF 36	7.00.00	**VIBRATION MONITORING SYSTEM:** **Eddy current / piezoelectric type transducers shall be used**. The sensors shall be either **proximity or velocity or accelerometer type.** However, the finally selected sensor type shall also depend on recommendation of the equipment manufacturer & suitable for application requirement which shall be finalized during detail engineering and without any extra price.	Bidder proposes to have Vibration Transmitters for the HT drives located at remote location of Coal/Biomass handling packages considering the distance from main CHP control room & cable routing layout. Kindly accept the same.	Bidder's proposal not accepted .bidder to comply technical speciifcation
276	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A		PAGE 2 OF 18	1.06.01	**Close Loop Controls:** For close loop control of following applications of main plant SG/TG/BOP (Auxiliaries of SG and TG), conventional i.e. 4-20 mA / (HART) based actuators along with 4-20 mA(HART) based electronic transmitters (which are directly used in control of final control element), shall be provided. For balance measurements for even these areas / applications fieldbus-based PT/DPT/TT shall be provided. **FGD (a) Booster Fan Blade Pitch Control** For balance applications of main plant and for all applications of other areas including offsite areas fieldbus based control system, fieldbus based actuators and fieldbus based PT/DPT/TT shall be provided.	1. Bidder understands that for FGD Package ,Fieldbus based actuators and fieldbus based PT/DPT/TT shall be provided for all the application **except Booster Fan Blade Pitch Control Close Loop,where 4-20 mA / (HART) based actuators along with 4-20 mA(HART) based electronic transmitters are to be envisaged.** **Kindly Confirm .** **2. Bidder also proposes to have 4-20 mA / (HART) based Conventional Actuators** for certain specific application in Lime/Gypsum Handling areas skid mounted / operated through only PLC/ local control panel systems like scoop coupling, Traveling tripper, Plough Feeder, Lime Sampling Unit , Dust Extration where it is not possible to have above non-intrusive type actuators.	1. Bidder's understanding lis correct 2. Refer ammendment sl. No. MH-02
277	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	SUB- SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	PAGE 15 OF 18	8.03.00	Following type of Microprocessor based electronic positioner (as per standard and proven practice of valve/damper OEM) is to be provided with all the pneumatic operated control valves and all control dampers being provided by the contractor: a. 4-20mA HART based smart positioner **b. Fieldbus based positioner**	Bidder proposes to envisage 4-20mA HART based Smart Positioner of Valve/Damper in FGD areas as per standard and proven practice of valve/damper OEM . Since, majority of Valves/Dampers comes under OEM's supplied package. **Kindly Accept the same.**	bidder's proposal not accepted .bidder to comply technical speciifcation
278	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-IIA-04 FLUE GAS DESULPHURISATION SYSTEM SUB-SECTION-A-05 (FGD)	PAGE 2 OF 7 PAGE 13 OF 29	3.01.01 6.02.03	The storage silo shall be complete with supporting steel structure, platforms, staircase, air canons, power operated gates, gravimetric feeders, **level switches**, air relief devices, etc. Each Silo shall be provided with three (03) no. of radar type Level transmitters.	1. Bidder understands that for Silo Level Control , Level Transmitters has to be envisaged instead of Level Switches . **Kindly Confirm**. 2. Bidder also proposes two(2) Nos. of Non-Contact type Level Transmitter instead of (03) no. , in case of failure of any transmitter other will act. Also, there shall be limited space & access for mounting these transmitter on the top of Silo. **Bidder requests to accept the same.**	bidder's proposal not accepted .bidder to comply technical speciifcation
279	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	Annexure C to IIC Contract quantity	PAGE 6 OF 21	2.07.00	The Control System of CHP DDCMIS has following process blocks: CHP stream-A block CHP stream-B block **Lime Handling System Stream – A Block** **Lime Handling System Stream – B Block** Separate RIOs shall be provided for each stream (A & B)	1. Bidder understand that entire FGD operation shall be controlled from FGD Control Room. However, few application block such Lime handling block stream -A & B of FGD package are being merged with CHP DDCMIS, However ,Gypsum handling Block is controlled by FGD DDCMIS. This will create further confusion in IO assignment, Controller allocation, Location of Control Panel & Functional Grouping. Hence, bidder proposes to have Lime Handling system block as a part of FGD DDCMIS. **Kindly Confirm.**	bidder's proposal not accepted .bidder to ocmply technical speciifcation
280	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A TECHNICAL SPECIFICATIONS SECTION – VI, PART-A TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-IIA-04 Annexure C to IIC Contract quantity SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	PAGE 6 OF 7 PAGE 16 OF 21 PAGE 12 OF 36	11.02.00 1.03.00 6.04.00	Contractor shall provide air conditioning for the FGD control room and **Analyser room (if separately provided)** & ventilation for the FGD system buildings. SOx ANALYSERS FOR FGD SYSTEM: 1. SO2 Analyzer at FGD Outlet 2. SO2 Analyzer at FGD inlet Specific requirements for In-situ (Path) type SO2, NOx, CO2 & CO analyzers	1. Bidder understands that the technical specification furnished for **SO2 analyzer** is common for Main Plant CEMS application as well as for FGD Package. **Kindly Confirm.** **2.** For FGD Package bidder shall be opting for **In-situ (Path) type SO2 Analyzer** , hence **Seprate Analyser room is not required for the In-situ type Analyzer. T**he corresponding analyzer JB with adequate wheather protection shall be located near to Duct Tapping Point. **Kindly accept the same.**	1. Bidders understanding correct 2. Bidders proposal not accepted. Bidder to ocmply technical specification
281	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	PAGE 12 OF 36	6.04.00 (Table Point 2)	Specific requirements for In-situ (Path) type SO2 Analyzer cum monitor **Measurement Range :0-100 / 0-1000 mg/Nm3 (selectable)**	For FGD application , inlet SO2 Analyzer measuring range shall be as per Process Composition & CPCB Guidelines. **Kindly Confirm.**	Bidder's proposal not accepted .bidder to ocmply technical speciifcation

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Queries & Clarification	NTPC Reply
282	Section-VI/ Part-A	Sub Section-IIA-11 (CW System)	2 of 4	1.02.01[(2a)]	Two (2) numbers **motor operated inching type butterfly valves** of required size for isolating the hot water header to the cooling tower (each) along-with valve supports.	There is a discrepancy in stated tender clauses for type of isolation valves near to cooling tower. Bidder has considered manual type butterfly for CW branch isolation near to cooling tower as per cl. no. 4.08.00 and inline with tender flow diagram. Owner is requested to please confirm.	Motor operated inching type butterfly valves of required size for isolating each hot water branch header to the CT to be provided in line with clause 1.02.01 2(a) of Sub-section IIA-11, Part A, Section-VI of technical specification. Bidder to further refer the Amendment Sl. No. WS-1 in this regard.
	Section-VI/ Part-B	Sub Section-A-15 (CW System)	18 of 40	4.08.00	Two (2) nos. **manually operated butterfly valves** of suitable size shall be provided in branch pipe of each cooling tower.		
	Part-E1	–	58 of 91	Scheme of circulating water system(XXXX-XXX-POM-A-059)	Tender P&ID 		
	Section-VI/ Part-B	Sub Section-A-15 (CW System)	17 of 40	4.07.00	Suitable valves for isolation of any cell for any maintenance or repair work and to regulate the flow of water to individual cells shall be provided.		
283	Section-VI/ Part-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	46 of 87	3.02.00 (h)	Design wet bulb temperature (WBT): 27.5 Deg.C	For 2X800 MW Lara Thermal Power Project design wet bulb temperature for cooling tower is considered as 27 Deg.C. Both Lara and Sipat power plants are located nearby in Chhattisgarh state. So bidder requests owner to recheck design wet bulb temperature for cooling tower.	Tender specifications regarding design ambient WBT is in order. Bidder to follow tender specification requirements.
284	Section-VI/ Part-B	Sub Section A-15 (CW System)	12 of 40	3.17.00	For design of Cooling tower, CT outlet temperature shall be considered as 32 deg. C.	Owner to note that there are discrepancy found regarding the design cold water temperature at cooling tower outlet in various clauses as mentioned alongside. Bidder considers design cold water temperature at cooling tower outlet as 32.5 deg.C. Owner to please confirm.	Bidder to note that design cold water temperature at CT outlet shall be 32.5 deg C as per clause 3.02.00 (g) of sub section A-01, Part B. However, design cold water temperature for Condenser shall be considered as 33 deg.C in line with clause 2.02.03 1(ii) of sub section A-01 of Part B. Further, bidder to also refer Amendment Sl. No. WS-2.
	Section-VI/ Part-B	Sub Section-A-01 (Equipment Sizing Criteria)	46 of 87	3.02.00 (g)	Design cold water temperature at cooling tower outlet: 32.5 Degree C		
	Section-VI/ Part-A	Sub Section-IV (Functional Guarantees)	5 of 73	1.01.01 (xii)	The cold-water temperature of 32.5 deg C shall be guaranteed for the design conditions of CW flow, range, ambient WBT and RH as per the performance test procedure of cooling tower.		
	Section-VI/ Part-B	Sub Section-A-01 (Equipment Sizing Criteria)	35 of 87	2.02.03 [1(ii)]	Design cold water temp.: 33 Deg. C		
285	Section-VI/ Part-B	Sub Section-A-01 (Equipment Sizing Criteria)	37 of 87	2.02.03 [10]	Design pressure for CW piping: Vacuum (0.1 kg/cm² (abs))	There is a discrepancy in stated tender clauses for vacuum pressure consideration for CW pipe design. In view of this, inline with NTPC past executed projects, CW pipe shall be designed considering the expected vacuum conditions as arrived from transient analysis inline with cl. no. 5.18.01.05, c. of Sub Section-D-1-5 Civil works. Please confirm.	Bidder to note that CW pipe shall be designed considering the expected vacuum conditions as arrived from Transient Analysis subject to minimum vacuum of 0.1 kg/cm2 (abs).
	Section-VI/ Part-B	Sub Section-D-1-5 Civil works	43 of 69	5.18.01.05, c.	CW ducts, Following shall be considered for design of CW ducts: Expected vacuum conditions as arrived from transient analysis		
286	Section-VI/ Part-B	Sub Section-A-01 (Equipment Sizing Criteria)	46 of 87	3.02.00(t)	Fasteners and other fitting materials: SS316	Discrepancy found between the two clauses regarding MOC of fasteners and other fitting materials. Bidder understands that SS304 MOC shall be taken for the parts in direct contact with water only. Please confirm.	Bidder's understanding is not correct. Bidder to consider SS-316 for the specified items. Bidder to refer clause 3.02.00 (t) of Sub section A-01 of Part B, Section-VI and Amendment Sl.No. WS-3 in this regard.
	Section-VI/ Part-B	Sub Section-A-15 (CW System)	13 of 40	4.00.00(18)	Any other hardware such as fasteners, clamps, supports etc. in direct contact with water: Stainless steel conforming to AISI: 304 or equivalent.		
287	Section-VI/ Part-B	Sub Section-A-01 (Equipment Sizing Criteria)	45 of 87	3.01.00(e)	110% of friction drop in the entire CW system	Bidder understands that 110% friction drop in the entire CW system means 10% margin to be considered for friction drop in CW piping and fittings only. Please confirm bidder understanding.	Bidder's understanding is correct.
288	Section-VI/ Part-B	Sub Section-A-15 (CW System)	3 of 40	1.02.00(15)	The model shall be based on Froude's law of similitude and shall be tested for following two more flow conditions, viz. - At twice the prototype maximum Froude number, i.e. the Froude number of the model is two times that of prototype. - **At equal velocity criterion, i.e. the velocity is same both in the model and prototype.**	Sump model shall be prepared considering Froude's law of similitude as per HI-9.8 and based on the scale ratio of 1:12 as per specification requirement. As per HI-9.8, Cl. No. 9.8.4.3, "Tests at prototype velocities are not recommended, as this will distort approach flow patterns and unduly exaggerate flow disturbances (e.g., vortices) in the model." Therefore, Bidder understands that "equal velocity criterion" means, equivalent velocity of model and prototype shall be established based on Froude's law of similitude (i.e. 1F for model and prototype) irrespective of actual prototype velocity as per HI-9.8. Request Owner to confirm bidder's understanding.	Bidder's understanding is not correct. Bidder to comply with technical specification requirements.
289	Section-VI/ Part-B	Sub Section-A-15 (CW System)	2 of 40	1.02.00(12)	For the offered pump, contractor should have carried out the model test. Contractor shall furnish the above test results. The model test should have been conducted as per Japanese standard JIS-B-8327 and specific speed of the model tested pump shall lie within ± 5% of the specific speed of the pump offered. If the contractor has not conducted such a model test (including cavitation & NPSHR test) for the offered pump, contractor shall conduct the test (homologous model of the CW Pump) as per Japanese standard JIS-B-8327 in the presence of owner's representative at no extra cost to the Employer. Contractor shall demonstrate the similarity of the impeller vane profile/volute profile for the model pump & the prototype.	Alternatively, CW pump model test shall be done as per HIS, which is being widely accepted in the industry. Owner is requested to confirm the proposal.	Bidder's proposal has been reviewed but not accepted. Bidder to follow tender specification requirements.

290	PART-E1	-	58 of 91	Scheme of circulating water system(XXXX-XXX-POM-A-059)	Duct interconnection valve is indicated in scheme of circulating water system 	As per tender specification Hydro-pneumatic valve is provided at outlet of stand-by CW pump. Bidder understand that being a single 800 MW unit, common CW header is provided for all 3 CW pumps which gives more flexibility of operation. Hence, duct interconnection valve (MOV) is not applicable. Please confirm.	Bidder's understanding is correct.
291	PART-E1	-	58 of 91	Scheme of circulating water system (XXXX-XXX-POM-A-059)	Condenser inlet and outlet tappings. (4 inlet and 4 outlet tappings are indicated in Scheme of circulating water system) 	Inline with NTPC recent tenders (Lara stage- II) Bidder understands that quantity indicated at inlet and outlet of the condenser is indicative. Bidder can consider number of inlet and outlet tappings at condenser inlet and outlet as per condenser design. Owner to please confirm.	Bidder's understanding is correct.The scheme is indicative and number of inlet & outlet tappings at Condenser inlet & outlet shall be in line with bidder's proven design & practice.
292	Section-VI/ Part-B	Sub Section-A-15 (CW System)	39 of 40	5.00.00	Pumps shall be able to pass through solids up to 100 mm and capable of handling waste water which may contain, sludge, plastic solids etc.	Pump OEM's recommends the maximum particle size handling requirement up to 20 mm based on pump design. Owner is requested to review the stated clause with respect to particle size to be handled by submersible pumps. Bidder understand that the maximum particle size can be passed through the pumps shall be as per Manufacturer's standard and design parameters of the respective pumps. Please confirm Bidder's understanding.	Bidder to refer Amendment Sl. No. WS-4 in this regard.
293	Part-E1	--	56 of 91	P&ID diagram of equipment cooling water system(XXXX-XXX-POM-A-038)	Recirculation and flow balancing line in tender P&ID. 	As per tender P&ID bidder confirms to provide flow balancing line for ECW system. For Closed circuit balancing line serves same function as recirculation line. Hence separate recirculation line is not required. Owner to please accept.	Bidder's proposal reviewed but not accepted. Bidder to comply technical specification requirements.
294	Technical Specification SECTION-VI, PART B(Elect).	SUB-SECTION-B – 13 Electrical Hoist Crane and Elevator	3 of 5	8.02.00	Speed control of EOT crane shall be through Variable Voltage Variable Frequency System (VVVF) with minimum 6 (six) pulse design.	Bidder understand that the VVVF control shall be considered only for main EOT crane (i.e. TG Building EOT crane, BFP EOT Crane and CW Pump House EOT Crane). The same is not applicable for all other miscellaneous EOT crane and Hoist. Owner is requested to confirm bidder's understanding.	Bidder understanding is not correct. Referred clause by bidder is not correct. Specification cl.no. 8.02.00 Sub -Section B-15 Section-VI, Part-B to be followed.
295	Technical Specification SECTION-VI, PART B(Elect).	SUB-SECTION-B – 13 Electrical Hoist Crane and Elevator	3 of 5	8.02.00	Provision for controlling the motion from operator cabin (in case of Turbine Hall EOT crane) as well as remote control shall be available.	Bidder understand that the radio remote control shall be considered only for main EOT crane (i.e. TG Building EOT crane, BFP EOT Crane and CW Pump House EOT Crane). For all other miscellaneous crane and hoist, Pendant pushbutton to be considered Owner is requested to confirm bidder's understanding.	Bidder understanding is not correct. Referred clause by bidder is not correct. Specification cl.no. 8.02.00 Sub -Section B-15 Section-VI, Part-B to be followed.

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Queries & Clarification	NTPC Reply
296	SECTION-VI, PART-A SECTION-VI, PART-B	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP SUB-SECTION-IIIC-08	3 of 28 3 of 5	2.06.00 (2) 5.00.00	Double isolation (one motorised and one manual) valve at the suction and Motorised isolation, Electrohydraulic operated control valve and a non return valve on the discharge of the pump. Alternatively, Electrohydraulic operated control valve and a motor operated stop cum check valve is also acceptable. All control valves shall be furnished with pneumatic actuators except for pressure and temperature control valve for auxiliary PRDS application (electro-hydraulic / pneumatically operated) and separator drain control valve (electro-hydraulic type).The Bidder shall be responsible for proper selection and sizing of valve actuators in accordance with the pressure drop and maximum shut off pressure and leakage class requirements.	Bidder clarify that type of actuator for control valve will be based on actuator thrust requirement as per process conditions.	Bidder's understanding is not correct. Sizing of actuator for control valve shall be based on actuator thrust requirement as per process condition. Bidder to note that the type of actuator shall be as per specification requirement.
297	SECTION-VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	9 of 28	2.13.01	**Forced Draft Fans** At least two (02) nos. of duplex thermo couples or duplex platinum RTD's (100 ohms at 0°C) and one no of. temperature indicator shall be provided for bearing metal temperature measurement, control & monitoring shall be included in the scope.	As per space availability and protection interlock requirement , bidder will provide three RTD, inline with previously executed NTPC Projects. Please accept.	Bidder to refer Amendment Sl. No. SG-05 in this regard.
298	SECTION-VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	10 of 28	2.13.02	**Induced Draft Fans** At least two (02) nos. of duplex thermo couples or duplex platinum RTD's (100 ohms at 0°C) and one no of. temperature indicator shall be provided for bearing metal temperature measurement, control & monitoring shall be included in the scope.	As per space availability and protection interlock requirement , bidder will provide three RTD, inline with previously executed NTPC Projects. Please accept.	Bidder to refer Amendment Sl. No. SG-06 in this regard.
299	SECTION-VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	14 of 28	2.15.04	**Primary Air Fans** At least two (02) nos. of duplex thermo couples or duplex platinum RTD's (100 ohms at 0°C) and one no of. temperature indicator shall be provided for bearing metal temperature measurement, control & monitoring shall be included in the scope.	As per space availability and protection interlock requirement , bidder will provide three RTD, inline with previously executed NTPC Projects. Please accept.	Bidder to refer Amendment Sl. No. SG-07 in this regard.
300	SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES: MANDATORY SPARES	25 of 38	2.01.00	10. Any other instruments (If applicable) 11. Any other control system (If applicable)	Bidder clarifies that no other Instruments or Control System is considered than the type of Mandatory Spares mentioned in the List.	Bidder to refer Amendment No-C-04 in this regard.
301	SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES: MANDATORY SPARES	-	-	-	Spares terminology will depend on OEM as approved by Customer. Customer shall accept as per OEM specific terminology as per Customer approved vendors. Any item not applicable for the OEM design will not be considered and commercial rebate shall not be applicable for such items.	Specification requirement is clear. Bidder shall comply to technical specification.
302	SECTION – VI, PART-B	SUB-SECTION-IIIC-02 DDCMIS	3 of 17	13.00.00	Analog Signal Conditioning & Processing	Bidder clarify that IO modules supplied will be as per OEM proven design of DDCMIS vendors approved by NTPC. Customer is requested to kindly confirm acceptance to our request.	Bidder shall supply IO modules complying to technical specification.
303	SECTION – VI, PART-B	SUB-SECTION-IIIC-02 DDCMIS	3 of 17	14.00.00	Binary Signal Conditioning & Processing	Bidder clarify that IO modules supplied will be as per OEM proven design of DDCMIS vendors approved by NTPC. Customer is requested to kindly confirm acceptance to our request.	Bidder shall supply IO modules complying to technical specification.
304	SECTION – VI, PART-B	SUB-SECTION-IIIC-02 DDCMIS	4 of 17	16.00.00	**Wiring Scheme for inputs to Control System** 4. If based on the same set of sensors, any protection action is required in OLCS (e.g., protection stop of drive) in another controller(s), then CLCS Controller shall provide three digital outputs for each such controller from three separate output modules (at defined LVM-Limit Value Monitor blocks inside Controller). The three such digital outputs of CLCS controller shall be acquired in each of the OLCS controllers in three separate digital input modules.	The Philosophy of Triple redundant Signal Exchange is only considered for Protection Signals from DCS to BPS. Signal Exchange within DCS FGs are through dedicated redundant Communication Network, inline with already executed NTPC projects.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
305	SECTION – VI, PART-B	SUB-SECTION - IIIC-02 DDCMIS, ANNEXURE IIIC-02C	1 of 6	1.01.01	The Servers/Workstations/PC Stations/Laptop to be provided by the Contractor should be latest available in the market, with maximum possible configuration of memory & storage and 4K resolution graphics capability for the offered make and model at the time of supply to prevent early obsolescence and shall be subject to Employer's approval. The software packages including OS, Application software as per the functional requirement and Anti-Virus Software with IPS# to be included with the Servers/Workstations/PC Stations/Laptops shall also be the latest version available at the time of supply. Additional softwares viz. Latest MS OFFICE professional (for PC stations), Microsoft Visual Studio (only for Programmer PC), Adobe Acrobat professional (for PC stations) shall also be the latest version available at the time of supply.	Hardware specification of workstation will be selected by DCS OEM as per HMI software requirement	Specification requirement is clear. Bidder shall comply to technical specification.
306	SECTION – VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	2 OF 35	2.01.00	**SPECIFICATION FOR ELECTRONIC TRANSMITTER FOR PRESSURE, DIFF PRESS AND DP BASED FLOW / LEVEL MEASUREMENTS** Range: >400mmwc, Accuracy: 0.060%	For DP Transmitters of Range >400mmwc Accuracy of 0.060% cannot be met Incase of Static Pressure is more than 420Kg/Cm2. Accuracy of such DP Transmitters shall be 0.1% of Range. Please accept.	Bidder's proposal is inline with specification requirement.
307	SECTION – VI, PART-B SECTION – VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY) SUB-SECTION-IIIC-04	5 OF 35 5 OF 36	3.00.00 3.02.00	Temperature Elements and accessories 2 No. of element : Duplex Resistance Temperature Detector (RTD)- No. of element- Duplex	For applications where duplex Temperature Element cannot be provided, Bidder will provide 2 no's Simplex type temperature elements. Please accept.	Bidder's proposal is acceptable. However, same shall be discussed and finalised during detailed engg.
308	SECTION – VI, PART-B	SUB-SECTION-IIIC-04	5 OF 36	3.01.00	MEASURING INSTRUMENTS(PRIMARY & SECONDARY) Thermocouple-	Thermocouple of FEGT is integral to the equipment and is selected as per OEM requirement complying ANSI MC 96.1 standard. It cannot be supplied complying conventional Thermocouple specification	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
309	SECTION – VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	6 OF 35	3.03.00	Metal Temperature Thermocouples Thermocouple wire gauge 16 AWG Protective sheath SS 321 Protective sheath dia 4 mm OD (minimum)	Bidder proposes to use 21AWG K Type Thermocouples with 4.8mm Sheath OD in line with previously executed NTPC Projects for MTTC applications. 16AWG wires cannot be accommodated in 4mm OD Sheath Please accept.	Bidder's proposal is acceptable.
310	SECTION – VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	7 OF 35	3.04.00	**Thermo well** (for all process temp. elements) (d) For furnace zone, impervious ceramic protecting tube of suitable material along with Incoloy supporting tubes and adjustable flanges.	Since protecting tube with impervious ceramic material is prone to damage , Bidder proposes to use protecting tube of inconel material. Please accept.	Bidder's proposal is acceptable.

311	SECTION – VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	8 OF 35	3.08.00	**Multi Input Temperature transmitter (Temperature Multiplexer)** For only information related temperature inputs fieldbus based Multi input temperature transmitters can be provided. **Transmitters shall be capable of withstanding ambient temperature upto 85 deg C**. Maximum number of inputs per such temperature transmitter shall be eight. One (1) no. input shall be kept as spare wired upto TBs of field mounted panel in each multi input TT. These shall be installed in field mounted panels with minimum IP 55 protection class. Exact applications shall be as defined in PART-A of specifications.	Multi Input TTs are capable of withstanding ambient temperature upto 50 deg C and not upto 85 deg C. Further these will be mounted away from High Temperature zones. Please accept.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
312	SECTION – VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	22 OF 35	12.00.00	SPECIFICATION FOR CORIOLIS FLOW TRANSMITTER Process Temperature range 0-200 degree Celsius Others Drain / purging arrangement shall be provided as per standard practice.	Bidder considers Coriolis Mass Flowmeter for LDO Flow Measurement wherein Process Temperature will not exceed ambient Temperature and also Drain/ Purging arrangement is not required for the application. Please accept.	Bidder to refer Amendment No-C-16 in this regard.
313	SECTION – VI, PART-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	23 OF 35	13.02.00	Flow Nozzle Beta Ratio Around 0.7	Flow Nozzle Beta Ratio will be considered between 0.4 - 0.7, meeting the process requirements. Please accept.	Bidder shall comply to specification requirement. However, same shall be discussed and decided during detail engg.
314	SECTION – VI, PART- E	-	-	-	1150-001-POM-A-018b, SCHEME OF AIR & FLUE GAS PATH WITH INSTRUMENTATION (WITH TRI-SECTOR AH) Aerofoil and Associated Instruments FOR AIR FLOW CONTROL	As per Bidder's proven practice Secondary Air Flow is measured using Index Differential Pressure at each FD/ PA Fan Inlet Elbow. Aerofoil as mentioned in NTPC Specification is not used for any of the Control or Monitoring application, hence request NTPC to exclude the requirement from the scope of Bidder.	Bidder's proposal to exclude aerofoil is not acceptable. Bidder shall comply to technical specification. However, control shall be as per OEM's standard and proven practice.
315	SECTION – VI, PART- E	-	-	-	1150-001-POM-A-020, SCHEME FOR PULVERISER (VERTICAL MILL) Hot PA Venturi type Flow Element at Mill Inlet	As per Bidder's proven practice, Hot PA Flow at Mill Inlet is measured using SIant Orifice, inline with previously executed NTPC Projects. Please accept.	Bidder's proposal is acceptable as per standard and proven practice of OEM.
316	SECTION – VI, PART-B	SUB SECTION-A-02	6 OF 67	3.02.01	As a part of the static stability, interalia, the outlet temperature profile for each tube at the intermediate header inlet (if applicable) and vertical wall outlet header be calculated. The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable, and vertical wall outlet). These thermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere. In case the temperature variance in the evaporator tubing temperature during such demonstration is found to exceed the design considerations necessary modifications to the evaporator flow circuits shall be done by the contractor to control the tube temperatures.	Metal Temperature Thermocouples on each tube of Water Wall at top & bottom of Intermediate Header forms a huge number of Thermocouples, difficult to route/ manage at site and are not required for any monitoring, control or protection purposes, hence request NTPC to exclude these MTTC from the scope of supply. Bidder proposes to consider metal thermocouples similar to NTPC Khargone project	Specification requirement is clear. Bidder shall comply to technical specification.
317	SECTION – VI, PART-B	SUB SECTION-A-02	8 OF 67	3.07.00	Provide stainless steel expansion markers/indicator on all the four furnace walls to monitor thermal expansion. Predicted thermal expansion at different levels to be indicated. In addition to local indicators, measurement system (4-20mA Output) for remote indication shall also be provided on all the four furnace walls.	Bidder has no experience of providing thermal expansion measurement system with 4 - 20mA. Hence not considered in the scope of Bidder. If still required, employer is requested to furnish detail specification of the Instrument required for the application along with Suppliers having reference of supplied such systems which are in successful operation.	Bidder to provide thermal expansion measurement inline with Specification requirement. Same shall be discussed during detailed engg
318	SECTION – VI, PART-B	SUB SECTION-A-02	9 OF 67	3.09.00	Suitable temperature monitoring system consisting of 80 nos. of thermocouples should be provided for Bottom hopper, Pent House, Economizer, APH hopper etc. The exact location and number of thermocouples shall be finalized during contract stage. However, Bidder shall furnish unit rates for addition/deletion of the thermocouples with respect to the numbers mentioned above	Bidder has no experience and find no utility in providing temperature measurements at Bottom hopper, Penthouse, Economizer, APH hopper etc., hence not considered in the scope. Customer is requested to kindly confirm acceptance to our request.	Specification requirement is clear. Bidder shall comply to technical specification.Further bidder to refer table under Clause M, Annexure C to IIC Contract quantity, Part-A of tech spec.
319	SECTION – VI, PART-B	SUB SECTION-A-02	30 OF 67	10.08.03	**Primary air flow measurement** (b) PA flow measuring devices shall be provided at air inlet to each Pulverizer as well as at the suction of each fan. PA Fan inlet flow measurement shall be provided using fan inlet elbow. However, if such an arrangement is not possible flow element (venturi/aerofoil / orifice system) shall be provided with three pair of tapping points at suction of each PA Fan.	PA Fan inlet flow measurement shall be provided using fan inlet elbow. Since the measurement is only for monitoring and not used for any Control, Single instrument scheme is considered. Customer is requested to kindly confirm acceptance to our request.	Bidder's proposal is noted. However, triple redundant measurement to be provided for PA fan inlet flow.
320	SECTION – VI, PART-B	SUB SECTION-A-02	38 OF 67	12.09.00	**Flow Measuring Devices** (e) Fan inlet flow measurement shall be provided using fan inlet elbow. However, if such an arrangement is not possible, flow element (venture/aerofoil) shall be provided with three pairs of tapping points at suction of each FD fan.	Bidder clarifies that Fan inlet flow measurement shall be provided using fan inlet elbow with three pairs of tapping points at suction of each FD fan. The same is used for Control & Protection Application. Hence Aerofoil measurement shown in Tender P&ID for Secondary Air measurement is not required. Customer is requested to kindly confirm acceptance to our request.	Bidder's proposal to exclude aerofoil is not acceptable. Bidder shall comply to technical specification. However, control shall be as per OEM's standard and proven practice.
321	SECTION – VI, PART-B	SUB-SECTION-IIIC-09	2 of 6	9.00.00	**Diagnostics &Indication** Channel Level Diagnostics (with reverse polarity, wire break, short circuit & optical /galvanic isolation) for DI / DO, AI & AO shall be provided. Each individual Channel healthiness shall be monitored at workstation / GUI level. 2. Individual signal status of each Input / Output, power supply status shall be indicated on the module faceplates.	Bidder clarify that IO modules supplied will be as per OEM proven design of DDCMIS vendors approved by NTPC. Customer is requested to kindly confirm acceptance to our request.	Bidder shall supply IO modules complying to technical specification.
322	SECTION – VI, PART-B	SUB-SECTION - IIIC-02 DDCMIS ANNEXURE IIIC-02D	4 of 4	9.03.00	The measurement system of control system should be capable of acquiring data from various equipment & system in digital form through serial port, field bus / profibus, Ethernet connection using industry standard protocols. The control system shall include requisite modules for accepting such signals. Examples of such signals will be from remote I/O signals (through extended I/O bus), field bus/profibus type temperature transmitters, fault/diagnostic signals from vibration monitoring system, UPS/DC system etc. Requirement of such ports is indicated at Part-A	Bidder proposes Field bus/profibus for field instruments in DDCMIS /BMS except for Boiler protection system where protection signals shall be hardwired.	Bidder's proposal is not acceptable. Bidder to refer Amendment No-C-05 in this regard.
323	SECTION – VI, PART-B	SUB-SECTION-IIIC-04	15 OF 36	7.00.00	Microprocessor based vibration monitoring system shall be provided for fan/pumps/motors etc. qty. of which shall be as indicated in Part A.	Bidder clarify that vibration monitoring is not applicable for Boiler circulation pump due to following reason BCP and motor is an integrated unit installed in hanged pipe support. The vibration of pump motor unit will be absorbed by the connecting pipe unit as it is suspended from the boiler recirculation pipe work. Hence vibration measurement for BCP is not considered.	Bidders proposal not accepted. Bidder shall comply to technical specifications.
324	SECTION – VI, PART-B	SUB SECTION-A-02	49 OF 67	15.14.00	All soot blowers shall be suitable for local and remote automatic sequential operation	Local Operation of Soot Blower shall be manually through inbuilt LPBS provided with each Soot Blower. Automatic sequential operation is not envisaged locally. Please confirm bidder understanding is correct.	Bidder's understanding is correct.

325	SECTION – VI, PART-B	SUB SECTION- G-03 LAYOUT PHILOSOPHY	2 of 15	1.01.03	Control Rooms / Control Equipment Rooms/ RIO rooms shall be air-conditioned. Batteries for power supply systems as required shall be placed in separate ventilated Battery rooms	Bidder clarify that Air conditioned rooms will be provided subject to feasibility. Else Bidder will consider air conditioned panels for the same. Customer is requested to kindly confirm acceptance to our request.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
326	SECTION – VI, PART-E	Drawing No XXXX-999-POM-AA-004	-	-	Scheme for main steam, Hot reheat & Cold reheat steam	The conductivity type level switch is shown for drip leg in main steam. No specification requirements mentioned for conductivity type level switch in tender. NTPC shall clarify	Details of conductivity type level switch shall be decided and finalised with the contractor during detail engg.
327	SECTION – VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	25 OF 28	2.30.00	Safety valves and critical valves to be provided with temperature & sound monitoring (may be IOT based) to detect early passing and ensure reliability. Temperature point shall be provided on these valves/lines. For control and monitoring purposes the temperature values shall be taken between 50-75 Deg. C and sound value normally less than 75 db as trigger. The necessary provision shall be accordingly provided with alarm signal in the control room.	Bidder request NTPC to give details of proven suppliers and clarify of any such system installed at any of NTPC projects.	The bidders statement is not a clarification. Specification requirement are clear. Bidder shall comply to technical specification.
328	SECTION – VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	25 OF 28	2.30.00	Sonic leak detection system installation in Safety valves & ERV: 1) Installation of Sonic leak detection system installation in all SLSV and ERVs of critical piping's such as M.S. Safety Valves & ERV/ EBV, CRH SV, HRH SV & ERV/ EBV.	Bidder request NTPC to give details of proven suppliers and clarify of any such system installed at any of NTPC projects.	The bidders statement is not a clarification. Specification requirement are clear. Bidder shall comply to technical specification.
329	SECTION – VI, PART-A	SUB-SECTION-VI CHAPTER -01	26 OF 38	2.05.01	Pneumatic and electro-hydraulic actuator assembly	Bidder clarify regarding spare for electrohydraulic actuator as below a) Complete assembly will be provided in case of self contained E/H actuator b) For oil skid type , the applicable components will be provided as per OEM recommendation.	Specification requirement are clear. Bidder shall comply to technical specification.
330	SECTION – VI, PART-A	IIA-01	16 of 28	2.16.05A	Provision for Future Installation of SCR System	Since SCR is not applicable, Bidder is not considering any Electrical & Instrumentation System/items for Future Provision. Please confirm.	Bidders understanding is correct

Clarification 02

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
1	VI / PART-A	A-12	1 OF 12	1.00.00 b)	**Centralized air-conditioning system for main plant TG building** There shall be one (1) central chilled water type air-conditioning plant comprising of screw chilling units, chilled water pumps, condenser water pumps, AHUs, cooling towers, etc. to cater to the A/C requirement of the areas identified for main plant areas like control rooms, control equipment rooms, UPS/Battery charger rooms, static excitation control rooms (if applicable), SWAS room, water analysis lab, etc.	Following type of AC is being proposed for static excitation control rooms (if applicable), SWAS room, water analysis lab, etc. for both units: 1) Static excitation control rooms (if applicable) – Since static excitation panel room is located towards A row side of power house, customer is requested to accept dedicated Split AC/ Ductable split AC/ Air cooled Package AC based on actual cooling requirement for static excitation control rooms (if applicable) as routing chilled water pipe towards A row of power house from Control tower (Location of AC plant) crossing the C-D-E-F bay is not feasible 2) SWAS room, water analysis lab, etc. – if area like SWAS room, water analysis lab, etc. located such that it may not be feasible to route AC duct, Air conditioning of such areas may please accepted with dedicated FCU (fan coil unit) with at least one (1) no. unit of same capacity as standby. Please confirm.	In view of high CFM requirements in Stattic excitation control room (if applicable), chilled water based AHU has been envisaged for the same. Bidder to comply with specification requirements.
	VI / PART-B	A-17	1 OF 30	3.01.00 a)	**Redundancy of various A/C system equipments shall be as follows:** a) For Main Plant Areas [control room, control equipment room, UPS room, battery charger, static excitation control room (if applicable) SWAS room & water analysis lab]: i) Vapor compression type water chilling units: 2X100% ii) Chilled water pumps: 2X100% iii) Condenser water pumps: 2X100% iv) Cooling Towers: 2X100% v) AHUs: At least one (1) no. unit, capacity same as each working unit shall be provided as common standby.		AHU based system shall be provided for SWAS room, Water analysis lab, etc. as per technical specification. Chilled water shall not be routed inside the air conditioned area.
2	VI / PART-B	A-01	65 OF 87	3.13.01, 7	In Air conditioning system the return air shall be through ducts and use of plenum space for return air shall be avoided. Further, FGD control room and ESP Control Room, service building, etc. where various floors are air-conditioned and no intermediate or intervening floor are left non-air-conditioned, the space above false ceiling shall be used as return air plenum.	Please note that roof of AC areas of these buildings viz. FGD control room and ESP Control Room, service building, etc. may be exposed to ambient conditions depending on layout conditions. Also, clear gap between false ceiling and roof is generally less, restricting the usage of return air duct. However, as roof of air-Conditioned Area of these buildings is provided with underdeck insulation to minimize the Air-Conditioned Load, space between the false ceiling and roof for above building / floor shall be used for return air. Please confirm.	Requirement of return air A/C duct is clearly indicated in the specification. Bidder to comply with specification requirements.
3	VI / PART-B	A-01	656OF 87	3.13.01, 17	For other areas, where A/C load is of the order of 25-60 TR, Direct Expansion (D-X) type air cooled condensing units along with AHUs shall be provided depending on the availability of space/ layout etc. For areas, where A/C load is of the order of 5-25TR, ductable split/packaged A/C shall be provided. Smaller areas which are away from the D-X type condensing unit /central chilling units which may require air conditioning upto 5 TR rating shall be served with Hi-wall Split/Cassette air conditioner units as per requirement. Above 60TR of A/C load, chilled water type centralized A/C system shall be provided.	Multiple non ductable Split A.C./ cassette AC may please be allowed for buildings /Control rooms having total heat load up to 10 TR for easy Operation, maintenance, fast pace of erection and less interface issues. Please confirm.	To avoid large nos. of non-ductable split (Hi-wall/Cassette), selection/sizing criteria specified at referred clause has been envisaged. Bidder to comply with specification requirements.
4	VI / PART-B	A-01	68 OF 87	3.13.02, 3	All ventilation systems shall operate on 100% fresh air. Fan envisaged for MCC & Switchgear rooms shall be provided with pre-filters and fine filters and for other areas shall be provided with pre-filter only	We understand that filters are not applicable for exhaust fans. Please confirm.	Bidder's understanding is correct.
5	VI / PART-B	A-17	2 OF 30	4.02.00	Chilling Unit Type: Water-cooled type. (Chillers for main plant shall preferably be with multiple compressors)	Please note that most of chiller manufacturers are not manufacturing chillers with multiple compressors for capacity less than 200TR. Thus, in case the final actual capacity of single chiller works out to be less than 200TR during detail engineering, single compressor machine may please be accepted. Please confirm.	Bidder's understanding is correct.
6	VI / PART-B	E-17	1 OF 3	1.01.05	i) No load air run (free run) test of all types of compressor to check FAD (Free air delivery), Noise, Vibration & Temp. rise of bearing & body.	FAD (Free air delivery) is not applicable for Chillers provded for Air conditioning system. Please confirm	Bidders understanding is correct.
7	VI / PART-E	LIST OF TENDER DRAWINGS	-	Tender drawing number 0000-000-POM-A-054, 0000-000-POM-A-055	Requirement of TE with TT at inlet and outlet line (both chilled water side and condenser wa-ter side) for chiller of Main Plant & ESP/FGD control room	Chiller manufacturer are also providing TE with TT as part of chiller for safety interlock and in such case separate TE with TT is not required and details of TE and TT shall be as per manufacturer standard of chiller. Please confirm.	Bidder proposal is not acceptable. Bidder shall comply to specification requirement.
8	VI / PART-E	LIST OF TENDER DRAWINGS	-	Tender drawing number 0000-000-POM-A-054, 0000-000-POM-A-055	Requirement of Pressure Transmitter at inlet and outlet line (both chilled water side and condenser wa-ter side) for chiller of Main Plant & ESP/FGD control room	Pressure transmitter is shown at the inlet and the outlet of the Chiller which has no interlock with the chiller operation and accordingly not required. Please confirm.	Bidder proposal is not acceptable. Bidder shall comply to specification requirement.
9	VI / PART-B	B-0	12 OF 15	3.09.00	emergency air conditioning and ventilation system requirements pertaining only to the Main Plant areas (like Control Room, Control equipment Room, SWAS Room, UPS Room) shall only be provided the DG backup	As per 3.13.01, 20, DG back up is required only for AC equipment's however as per clause 3.09.00, DG back up is required for both AC and Ventilation system. We have envisaged DG back up for AC equipment as per clause no. 3.13.01, 20 Please confirm.	Bidder's understanding is correct.
	VI / PART-B	A-01	67 OF 87	3.13.01, 20	During normal operation period, all the working equipment shall run on A.C. power supply. However, in case of complete black-out condition, DG sets being provided are required to cater the load of some of the air-conditioning equipment so that Main Plant Control Rooms and CER remain air-conditioned. The equipment to run on DG set are: •1 No. Chilling machine •1 No. chilled water pump. •1 No. condenser water pump. •1 No. cooling tower fan. •2 nos. AHUs for CR & CER •1 No. fresh air fan.		

10	VI / PART-B	A-17	5 OF 30	4.05.01 (1)	Humidity control inside air-conditioned space served by non-ductable split air conditioners is not envisaged.	As explained in clause no. 7.04.00 (b) & 7.04.00 c) and indicated in Tender drawing regarding the basic function and requirement of temperature & Humidity indicators, we understand the following: 1) Temperature & Humidity sensor/ indicators is not applicable in control room served with Split AC/Cassette AC/ Ductable split AC 2) Since there is common AHU room applicable for Main plant control room and CERs, 1 number Temperature & Humidity sensor shall be provided for above mentioned area to serve the purpose as exp- lained in clause no. 7.04.00 b) & 7.04.00 c) and indicated in Tender drawing instead of Multiple numbers 3) as explained in clause no. 7.04.00 b) & 7.04.00 c) and indicated in Tender drawing, to fulfil the purpose, 1 number Temperature & Humidity sensor shall be provided for each AHU room. Additional 15 nos. each of temperature & Humidity indicators is not required. Please confirm	1. Bidder's understanding is not correct. Bidder shall comply to specification requirement. 2. Bidder's understanding is not correct. Bidder shall comply to specification requirement. 3. Bidder's understanding is not correct. These 15 nos. of Temperature cum humidity indicator are not for control and are not to be installed inside AHU room. For quantity of TS & RH in AHU room refer Part E of technical specification. Bidder to comply specification requirement
	VI / PART-B	A-17	22 OF 30	7.07.00 (e)	Relative humidity and temperature measure-ment of all control rooms, CERs and all major air-conditioned areas shall be available in DDCMIS. Relative humidity and temp. meas-urement for main plant control room and CERs to be available in multiple numbers		
	VI / PART-B	A-17	22 OF 30	7.04.00 (b) & 7.04.00 (c)	b) Humidity sensor and gyserstat located in the return air duct shall actuate the PAN humidifier to obtain the desired degree of humidification. c) Humidity and temp. sensor shall be provided and interlocked in steps with winter heater / re-heater / strip heaters for monsoon and winter re-heating or heating as the case may be.		
	VI / PART-B	IIIC-04	28 OF 35	20.02.00	Qty. : 15 nos. each of temperature & Humidity indicators (combined indicators for Humidity and temperature is also applicable). One Set of output signal is to be connected to respective control system. Apart from displaying the temperature/humidity values on indicator		
	VI / PART-E	LIST OF TENDER DRAWINGS		Tender drawing number 0000-000-POM-A-054, 0000-000-POM-A-055	RH sensor and Temperature sensor is shown in each AHU room		Bidder to provide RH sensor and Temperature sensor in each AHU room as indicated in tender drawing.
11	VI / PART-B	A-17	1 OF 30	3.01.00 b)	For ESP control rooms & FGD control rooms etc. of both Units: i) Vapor compression type water cooled screw chiller units: 2X100% ii) Chilled water pumps: 2X100%. iii) Condenser water pumps: 2X100%. iv) Cooling Towers: 2X100%. v) AHUs: 2x100% AHUs for each ESP/FGD Building.	To suit the layout, in case quantity of working AHU worked out more than one (1) number, Redundancy of AHU may please be revised in line with Main Plant Control room at clause no. 3.01.00, a) mentioned as under to have better control and flexibility in operation of the AC System considering varying ambient temperature across the season. v) AHUs: At least one (1) no. unit, capacity same as each working unit shall be provided as common standby. Please confirm	Requirement of total dehumidified air flow (CFM) for ESP/FGD control rooms is much less as compared to main plant TG Building. Accordingly, 2x100% AHUs have been envisaged for each ESP/FGD building. Bidder to comply with specification requirements.
12	VI / PART-B	A-17	1 OF 30	3.01.00 d)	Water System Control Room Building: i) Air cooled (D-X Type) condensing units: 2X100% ii) AHUs: 2x100%	To suit the layout, in case quantity of working AHU worked out more than one (1) number, Redundancy of AHU & DX Unit may please be revised in line with Main Plant Control room at clause no. 3.01.00, a) mentioned as under to have better control and flexibility in operation of the AC System considering varying ambient temperature across the season. v) AHUs: At least one (1) no. unit, capacity same as each working unit shall be provided as common standby. Please confirm	Requirement of total dehumidified air flow (CFM) for water system control building is much less as compared to main plant TG Building. Accordingly, 2x100% AHUs have been envisaged for water system control building. Bidder to comply with specification requirements.
13	VI / PART-B	A-17	9 OF 30	6.01.00	Pump Type: Horizontal Centrifugal, Axially split type casing pump End suction, top discharge horizontal centrifugal pump may be provided for modular air washer units & UAF unit	End Suction pumps with Top discharge requires less space and accessibility around the equipment shall be more in comparison to axially split type casing pump. Hence, End suction top discharge pump may also be allowed for Air conditioning system as allowed for modular air washer units & UAF unit.	Bidder's understanding regarding applicability of "End suction & top discharge" pumps is not correct. End suction, top discharge pumps may be acceptable only in case of modular AWU & UAF units.
	VI / PART-B	A-17	26 OF 30	Annexure –I, clause no. 5 b)	Pump Casing Pump casing shall have axially split type con-struction as specified		
14	VI / PART-B	A-01	686 OF 87	3.13.01, 14)	Underdeck insulation of 50 mm nominal thick-ness of glass wool (32 Kg/cu.m) or rock wool (48 Kg/cu.m) shall be provided if i) Non A/C area is located just above the A/C area. In this case, underdeck insulation shall be provided underneath of the ceiling of A/C area. ii) Non A/C area is located just below the A/C area. In this case, underdeck insulation shall be provided underneath of the ceiling of Non A/C area. iii) Underneath the ceiling of AHU room located below the non-A/C area or exposed to Atmos-phere. Underneath the floor of AHU room locat-ed above the non-A/C area. iv) Underneath the ceiling of A/C areas exposed to sun.	There is contradiction between type and applicability of underdeck insulation. We are considering underdeck insulation as per clause number 9.13.10, page no. 18 OF 36, Sub section D-1-9 of Civil chapter. Please confirm.	Specification Requirements are clear. Bidder to comply with specification requirements.
	VI / PART-B	D-1-9	17 OF 33	9.13.10	Underdeck insulation shall be provided on the ceiling (underside of roof slab) and underside of floor slab of air-conditioned area depending up-on the functional requirements. This underdeck insulation shall consist of 50mm thick mineral wool insulation with 0.05 mm thick aluminum foil & 0.6 mm x 25mm mesh wire netting and shall be fixed to the ceiling with 2 mm wire ties.		Bidder's understanding is not correct Bidder shall follow technical specification
15	VI / PART-A	IV	21 OF 73	1.01.07.02 b	Duty factor for power consumption of A/C equipments of office area in control tower shall be 0.5	Duty factor for Power Consumption for Air Conditioning Equipment's for other areas (i.e. main plant building and for ESP control room building, FGD control room building) is not mentioned in the specification. We have considered duty factor for above areas also as 0.5. Please accept.	Bidder's understanding is not correct. Duty factor for main plant building, ESP & FGD control room buildings, water system control building, etc. shall be one (1.0).
16	VI / PART-B	A-17	13 OF 30	6.05.04(c)	The ducts routed inside the buildings with larger side greater than 2250 mm shall be supported by 16mm MS rods and 50x50x3 mm MS double Angles while those below 2250 mm shall be supported by 10mm MS Rods and 40x40x3 MS angles. The duct supports shall be at a distance of not more than 2000 mm for A/C system.....	Wire Rope Support System are widely used in HVAC Industry for supporting HVAC Ducts. This support system carries Wire Rope which is wrapped around the Duct and looped around the eyebolt fixed to the roof using locking mechanism. Customer is requested to allow us to use "Wire Rope Support System" in addition to Conventional Duct Support System for supporting Air Conditioning and Ventilation Ducts. Wire Rope Support System offers speedy erection of ducts, flexibility in adjustment and is aesthetic appealing. Please accept.	Bidder proposal is not acceptable. Bidder shall comply to specification requirement.

17	VI / PART-B	A-17	9 OF 30 10 OF 30	5.02.05 5.02.12	Unitary air filtration shall be one-bank construction. All header and stand pipes shall be galvanized. Cat walks of suitable width shall be provided for maintenance of nozzle, filter etc. Saturation efficiency of Unitary Air Filtration (UAF) units shall be minimum 60%.	As per specification, UAF shall have one bank construction which restricts saturation efficiency to 60-70%. Option for using double bank construction Air Washer Unit for ESP Building in line with TG Building may also be allowed. This will improve the saturation efficiency and accordingly air requirement can be reduced leading to reduced duct size, clean ducting layout and subsequently reduced power consumption. Please accept.	UAF units have been envisaged for ESP/FGD Buildings. Bidder proposal is not acceptable. Bidder shall comply to specification requirement.
18	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-999-POC-F-001, Rev A titled "General Layout Plan" **Route of Raw water pipe line from existing Raw water pump house Stage-II to proposed Stage-III area**	During site visit, it has been observed that the proposed route mentioned in GLP is having lot of trees, undulations and interface with existing facilities. Bidder understands that customer will provide the levelled land free from trees, bushes, vegetation etc and all the existing facilities will be relocated/rerouted by customer. Please confirm.	Bidder's understanding is not correct. site clearance is in bidder's scope. All the associated work with pipe laying is in bidder's scope.
19	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-999-POC-F-001, Rev A titled "General Layout Plan"	During site visit, it has been observed that proposed Stage-III area is having so many sheds, buildings, mill reject, street light posts etc. Bidder understands that customer will provide the levelled land free from sheds, buildings, mill reject, street light posts, trees, bushes, vegetation etc and all the existing facilities will be relocated/rerouted by customer. Please confirm.	Bidder's understanding is not correct. Site clearance and site Levelling of stage III area is in bidder's scope. Pl refer cluase 3 & 4 d) of 1.00.00 of IID civil work, Part A. Sheds to be dismantled by owner is marked in revised GLP. Refer amendment no D1-27 for revised GLP
20	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-999-POC-F-001, Rev A titled "General Layout Plan"	During site visit, it has been observed that fencing/barricading work of proposed Stage-III area is in progress by customer. Bidder understands that fencing/barricading of proposed Stage-III area for separation with existing plant/township area is excluded from bidder's scope. Please confirm.	Bidder's understanding is correct
21	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-001-POC-A-003, Rev A titled "Site Levelling Plan"	During site visit, it has been observed that site levelling area beyond 560 W grid line towards eastern side is wrongly shown in the drawing as the said area is having exiting facilities like CHP office (Coal Bhawan), roads, buildings etc. Customer is requested to review the same and furnish the revised Site Levelling plan excluding the above said area.	Site levelling drawing identifies the area of levelling. However, the facilities which are operational for exiting units shall be excluded from site levelling works.
22	VI/B	D-1-5	28 of 69	5.08.00	The drains shall be provided on both sides of the double lane roads and single lane roads. The drains shall be provided on one side of the patrol roads along boundary wall. These shall be designed to drain the road surface as well as all the free and covered areas, etc. Box culverts shall be provided at all rail, road and other crossings. Layout of drain shall be as per layout given in tender drawing "Layout of drain'.	During site visit, it has been observed that plant boundary wall, patrol road and associated drains are already constructed. Bidder understands that Boundary wall, patrol road along boundary wall and associated drains is not in bidder's scope. Please confirm.	Bidder's undersatnding is correct. Drain shall be as per tender drawing layout of drain.
23	VI/B	D-1-5	28 of 69	5.08.01	WATCH TOWERS Watch towers shall be RCC construction with all-weather enclosure at 6m height. watch towers shall be provided at 600 m interval along the boundary as well as at corner turning points of the plant boundary. watch towers shall be provided with MS ladders.	During site visit, it has been observed that watch towers along the existing boundary wall are already constructed. Hence watch towers are excluded from bidder's scope. Please confirm.	Watch tower (04nos) is in bidder's scope. Pl refer scope part A, IID. Civil work cl.no. 20(a) of 1.00.00.
24	VI/B	D-1-5	30 of 69	5.10.03	PATROL ROADS All patrol roads along the boundary wall shall be single lane roads with 3.75 metre wide concrete pavement and 1 metre wide shoulders on one side of the road. as given in tender drawing "Details of road"	During site visit, it has been observed that plant boundary wall, patrol road and associated drains are already constructed. Hence bidder understands that Boundary wall, patrol road along boundary wall and associated drains are not in bidder's scope. Please confirm.	Bidder's undersatnding is correct. Drain shall be as per tender drawing layout of drain.
25	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-001-POC-A-004, Rev A titled "Layout of Road"		
26	VI/E	Tender drawings	-	-	Tender drawing no. XXXX-001-POC-A-005, Rev A titled "Details of Road"		
27	SECTION-VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	3 OF 20	1.05.02	Spares (MCCB Modules less than 100 A and MPCB Modules): All Switchgears, Motor Control Centres (MCCs) & AC/DC distribution boards, etc. shall have at least twenty per cent (20%) or minimum two (whichever is higher) fully equipped MCCB/MPCB modules of each rating as spares which shall be uniformly distributed over different vertical sections.	Spares (MCCB Modules less than 100 A and MPCB Modules): All Switchgears, Motor Control Centres (MCCs) & AC/DC distribution boards, etc. shall have at least twenty per cent (20%) or minimum two (whichever is higher) fully equipped MCCB/MPCB modules of each rating range of the selection table as spares which shall be uniformly distributed over different vertical sections.	Bidder proposal is not acceptable. Specification cl. no.1.05.02 Sub -Section IIB Section-VI, Part-A to be followed.
28	SECTION-VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	3 OF 20	1.05.02	Spares (MCCB modules—100A and higher—Starter/DAE-OG/DM Modules): In addition, all Switchgears, MCCs and AC distribution boards shall have as spares at least twenty per cent (20%) of starter modules/MCCB/DAE-OG/DM modules or at least one module (whichever is higher) of each rating range of the selection table, equipped for the rating of the largest auxiliary fed from that range.	It is requested to remove requirement of Spares for DM & DAE-OG, as same is in line with the standard practice followed in all projects.	Bidder proposal is not acceptable. Specification cl. no.1.05.02 Sub - Section IIB Section-VI, Part-A to be followed.
29	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	PAGE 2 OF 20	1.05.01	For all the Switchboard, each section shall have minimum 2 nos of spare modules (i.e. 2 no's motor feeder/2 no's of transformer feeder/1 motor and 1 transformer feeder to be provided). Highest rating of each motor and transformer feeder must be included in the spare.	If only motor feeders are there on a particular board/section, then only 1 no. spare motor feeder will be provided. Same is the case for spare transformer feeder.	Bidder proposal is not acceptable. Specification cl. no.1.05.01 Sub - Section IIB Section-VI, Part-A to be followed.
30	SECTION – VI, PART-A	Annexure C to IIC Contract quantity	PAGE 1 OF 21	A 1.00.00	Various types of cabinets / equipments, ECP (for mounting synchronizing relays, aux. PTs, other relays etc. shall be provided on as required basis.	ECP is not applicable, Only ECD is applicable as per cl. no. 1.14.00, Sub Sec-IIB, Page 7/20. Pl confirm.	Bidders understanding not correct . Bidder to ocmply technical specifications
31	SECTION – VI, PART-A	Annexure C to IIC Contract quantity	PAGE 12 OF 21	1.01.00	All hardware & software along with necessary licenses shall be capable of handling 30% additional call stations over and above the number of call stations specified in each zone for future use.	It is understood that 30% additional call stations supply is not in bidders' scope. Bidder has to make only provision for these additional call stations (future use) in bidder supplied IP based PA system.	Bidders understanding not correct . Bidder to ocmply technical specifications
32	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM /EQUIPMENTS	PAGE 4 OF 20	1.06.00	220V DC System for Main Plant and FGD	DC Health Monitoring System for Main Plant (220V) battery shall only be provided as per clause 1.00.00, section-VI, Sub-section B-19, Part-B, Page 1 of 5. Kindly confirm. There wiill be no DC Health Monitoring System for for FGD DC System. Kindly confirm.	Bidder understanding is correct.
33	SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 12 OF 15	3.08.00	DC Health Monitoring Systems for Main Plant (220 V) shall be provided to monitor the condition of each battery cell of 220V battery banks on-line on 24x7 basis.		
34	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM /EQUIPMENTS	PAGE 5 OF 20	1.08.00	In addition to above, cabling works, as indicated under Clause 1.19.00, required for Employer's requirement shall also be in bidder scope.	Bidder understands that clause 1.19.00 refers to un-cabled 415V switchgear feeders & 11 KV Feeder to be provided for owner's requirement and there are no scope of cables, cabling (trays & support), civil works associated with clause 1.19.00. If any Cabling items are to be included in bidder's scope for Customer use its BOQ to be furnished.Customer to confirm.	Employer requirement for feeders shall be provided as per Specification cl.no. 1.19.00 Sub -Section IIB Section-VI, Part-A. However, employer feeder requirement shall not be considered for transformer sizing.
35	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM /EQUIPMENTS	PAGE 6 OF 20	1.09.00	HT power cables required to feed the transformer feeders, motor feeders and inter-stage connection……	Any Inter-stage connection (between Stage-II to Stage-III or Stage-I to Stage-III) is not envisaged in SLD. And Connection between 11KV Switchgears of two units of Stage-II in the present proposal is through Segregated Phase Busduct. Accordingly, any HT power cable for interstage connection is not envisaged. Kindly confirm.	Any interconnection between Existing stages and proposed stage is not envisaged.
36	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM /EQUIPMENTS	PAGE 6 OF 20	1.09.02	In addition to above, HT power cables, as indicated under Clause 1.19.00, if required for Employer's requirement shall also be in bidder scope.	Bidder understands that clause 1.19.00 refers to un-cabled 415V switchgear feeders & 11 KV Feeder to be provided for owner's requirement and there are no scope of cables, cabling (trays & support), civil works associated with clause 1.19.00. If any Cabling items are to be included in bidder's scope for Customer use its BOQ to be furnished.Customer to confirm.	Bidder to refer Amendment Sl.No EE-68.

37	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM /EQUIPMENTS	PAGE 15 OF 20	1.19.00	415V switchgear feeders as indicated below (at suitable location to be decided during detailed engineering). (a) 4 Nos. MCCB–125A (b) 4 Nos. MCCB–250A (c) 4 Nos. MCCB-400 A (d) Total 6 Nos. ACB outgoing – 1000 A (in unit emergency switchgear and station service switchgear for feeding owner's loads).	We understand that a) Only un-cabled feeders shall be provided for feeding owner's loads as per the list in specification. The load of these feeders shall not be considered in system equipment (viz transformer, PMCC, MCC, Emergency DG etc) sizing. Also, there are no scope of cables, cabling (trays & support), civil works associated with clause 1.19.00. b) The quantity of the feeders indicated in the list indicate total quantity. Total 18 nos. feeders shall be provided for owner's load as per the list. Please confirm.	i) confirmed ii) confirmed.
38	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM /EQUIPMENTS	PAGE 15 OF 20	1.19.00	Two Number 11kV feeders in 11 kV station switchgear, suitable for connection of 1MVA service transformer, for future owners use.	Total Two Number Uncabled 11kV feeders in 11 kV station switchgear, suitable for connection of 1MVA service transformer, for future owners useshall be provided. This load shall not be consider in station transformer/station switchgear sizing.	Bidder understanding is correct.
39	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 1 OF 15	1.05.00	Allowable Voltage variation under worst operating condition: 11KV/3.3KV +/- 6%	In line with the standard practice followed in all projects engineered by Bidder, a voltage variation of +/-10% may please be allowed.	Bidder's proposal is not acceptable. Bidder to follow Clause no1.05.00 of Subsection-B0, Part-B, Section-VI of Technical specification.
40	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	5 of 15	3.04.01	Each unit transformer shall be sized for the following: a) The loads of One set of unit auxiliaries corresponding to 60% TMCR plus b) Loads due to outage of largest transformer connected to the bus plus d) SCR load requirement of 1 MVA plus c) Multiplied by no load voltage correction factor as defined at Cl. 3.04.00.	Un-cabled feeder shall be provided for feeding customer's load requirement of SCR (1MVA).	Bidder to refer Amendment Sl.No EE-7.
41	SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 5 OF 15	3.04.01	Station Transformer Each Station transformer shall be sized to meet the requirements of the worst case of following contingencies: Case I: Outage of One Unit transformer a) Loads served by fully loaded Unit transformer as defined above plus b) MDBFP load for one unit plus c) Meeting the station loads distributed on the respective station boards plus d) Loads due to outage of largest transformer /outgoing feeder (except station to unit/station tie feeders) connected to the bus plus e) Multiplied by no load voltage correction factor as defined at 3.04.00.	As per recent proposal with NTPC, sizing criteria for ST has been amended by NTPC and same is reproduced below Station Transformer Scheme Each Station transformer shall be sized to meet the requirements of the worst case of following contingencies: Case I: Outage of One Unit transformer a) Loads served by fully loaded Unit transformer as defined above plus b) MDBFP load for one unit, plus c) Meeting the station loads distributed on the respective station boards plus d) Loads due to outage of largest transformer /outgoing feeder (except station to unit/station tie feeders) connected to the bus plus "Since outage of only one largest transformer is to be considered (Since it is case of One UT outage), therefore outage of another largest transformer is not applicable. Hence, sizing criteria point no.(d) above is not applicable and not considered." e) Multiplied by no load voltage correction factor as defined at 3.04.00. Pl. confirm that above sizing criteria excluding point no. (d) for ST	Refer Ammendment Sl.No. EE-74.
42	SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 5 OF 15	3.04.01	While calculation the total station load during HP-LP Bypass condition, Single stream operation of CHP/AHP shall be considered	While calculating Station Transformer size Single stream operation of CHP/AHP shall be considered. Pls. confirm.	Confirmed.
43	SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	PAGE 5 OF 15	3.04.02	Adequate number of Auxiliary Transformer shall be provided to meet the demand on 11KV,3.3 KV and 415V systems under most onerous conditions, with the criteria that each 3.3KV/415 V switchgear / MCC / DB shall be fed by 2x100% or 3 X 50 % transformers /feeders or as per feeding arrangement as shown in tender SLD, and these shall be rated to carry the maximum load including owner's load (if applicable) expected to be imposed. Individual Transformer for CHP systems shall be sized to cater to load of single stream running in case of one feeder/transformer outage	1. As per specification, owner's loads to be considered for sizing the Auxiliary Transformers is not specified under any clause/ section. Bidder is not considering any loads pertaining to owner for sizing of the Auxiliary Transformers. Customer to confirm the same. 2. Individual Transformer for CHP & AHP systems shall be sized to cater to load of single stream running in case of one feeder/transformer outage	1) Bidder understanding is correct w.r.t sizing calculation for aux.transformers. However, Bidder to refer clause 1.19.00 regarding owners feeders requirement. 2) Confirmed
44	SECTION – VI, PART-B	SUB-SECTION-B – 0 GENERAL ELECTRICAL REQUIREMENTS	PAGE 11 OF 15	3.08.00	An ageing factor of 1.25 shall be considered.	Bidder understands that the ageing factor of 1.25 shall be applicable to Ni-Cd battery. The aging factor is not applicable for plante type battery as per standard practice and OEM & IEEE recommendation. Kindly confirm.	Refer Ammendment Sl.No-75.
45	PART-E	Single line diagram –main plant	PAGE 1 OF 1	9587-999-POE-J-001, rev-A	Additional incomer suitable for cable termination (1250 A) for OWNER's USE	Additional un-cabled incomer shall be provided for cable termination (1250 A) for commissioning purpose. Supply of cable is not envisaged. Kindly confirm.	Bidder's understanding is correct.
46	PART-E	List of Tender Drawings	---	Dwg. No. : Tender SLD (Drg. No 9500-999-POE-J-002)	Owner use feeders	Bidder understand that bidder's scope is limited to Un-Cabled HT feeder for Owner use feeders . NO HT & LT power/control/screen control Cable is in bidder scope of supply.	Bidder's understanding is correct.
47	PART-E	List of Tender Drawings	---	Dwg. No. : Tender SLD (Drg. No 9500-999-POE-J-002)	Owner use feeders	We are not considering any loading on account of owners use feeders for sizing various transformers & LT/ HT Switchgears other than "SCR load requirement of 1 MVA " as mentioned under sizing of criteria of Unit Transformer. Customer to confirm the same.	Bidder's understanding is correct.
48	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	6 of 15	3.05.00	The sizing Criteria for a Typical MV Switchboard shall be determined by the size of the transformer feeding the board. As a design Philosophy the Board continuous Current shall be selected as (1.1) * (Full load current at rated voltage on the Transformer's secondary) at 50 deg. C Ambient.	Since Aux. Transformer is already sized with 10% margin so HT switchgear fed from these transformer should have no margin. The HT switchgear rating shall be kept as secondary rated current of the Aux. transformer Please confirm.	Bidder understanding is not correct. Specification cl. no.3.05.00 Sub -Section B-0 Section-VI, Part-B to be followed.
49	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	7 of 15	3.06.00. (h).(a) & 3.01.00 (b)	……Cable terminations located in cable alley shall be designed to meet the Form IVb Type 7 (as per IEC 60439) for safety purpose.	Type 7 requires Individual, integral cable glanding facilities to be provided for each circuit/module and Cable gland is not required in gland plate at bottom which is not suggested. Also if cable gland is provided at both places i.e. bottom gland plate & at each module then it is difficult to terminate & for future maintenance. Therefore it is requested to allow Cable alley design as per Form IVb Type 6 (as per IEC 60439) for safety purpose.	Refer Ammendment Sl.No EE-01.
50	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION & SUB SECTION-II-B-02 MOTORS	8 of 15 & 1 of 4	3.06.00. (h).(a) & 3.01.00 (b)	Power factor 415 V Uni-Directional drives is taken as 0.8 and efficiency as 0.85. & Continuous duty LT motors upto 200 KW Output rating (at 50 deg.C ambient temperature), shall be Premium Efficiency class-IE3, conforming to IS 12615, or IEC:60034-30.	As per the LT motor spec, premium efficiency class-IE3 type motors are only allowed for the continuous duty LT motors. In line with this clause, value of efficiency as per IE3 efficiency class shall be considered in LT swbd sizing, for uni-directional, continuous drives. P.f shall be considered 0.8 in line with specification. Please confirm.	Bidder poposal is not acceptable. The mentioned clause is for finalisizing the sizing of Transformer under worst condtion. Specification cl. no. 3.06.00 h) a) Sub -Section B-0 section-VI, part-B Sizing of LT boards to be followed.
51	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	9 of 15	3.06.00. (m). (f)	At least one spare core shall be made available in each of the control cable.	In line with standard practice followed in all projects engineered by Bidder, spare core shall be provided in control cable for size 5C & above. Please confirm.	Bidder's proposal is not acceptable. Refer Ammendment Sl.No EE-11
52	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	8 & 9 of 15	3.06.00. (h).(d) & 3.06.00. (k)	A spare capacity of about 10 % shall be kept for addition of loads during detail engineering as many of the LT loads cannot be predicted during the Rating selection of the Board. & Spare capacity and Future Requirements: Each of the LV switchboards shall be designed for 1.1 times the required rating as a spare capacity.	In line with the standard practice followed in all projects engineered by Bidder, please note that 10% design margin is already considered in LT swbd. Sizing to cater to future load variations.Therefore additional 10% spare capacity margin is not required & same is in line with the standard practice followed in all projects. Customer to confirm the same.	Refer Ammendment Sl. No. EE-73
53	SECTION-VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	8 of 15	3.06.00 (J)	All indoor floor mounted switchgear (PCCs/MCCs), ACDBs of busbar rating more than or equal to 100 A and DCDBs shall require to qualify the Sub-QR clause of LT switchgear.	Since MLDB/WDB are rated for 200A for which most of the manufacturer of MLDB/WDB will be unable to meet Sub-QR clause of LT switchgear. So this clause may be written as "All indoor floor mounted switchgear (PCCs/MCCs), ACDBs of busbar rating more than 200 A and DCDBs shall require to qualify the Sub-QR clause of LT switchgear.	Bidder's proposal is not acceptable. For LT switchgear sub-QR, Clause no: 5.6.0 of Provenness, Part-A, Subsection-IA is to be followed. However, for MLDB/WDB provenness criteria shall not be applicable.

54	SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	10 OF 15	3.07.00	Earthing & Lightning Protection System	Soil resistivity may please be provided for grid designing	Soil resistivity report is attached as a part of Geo Technical survey report at subsection D-1-12 Annexure C of section VI part B Civil Works
55	SECTION-VI, PART-B	SUB-SECTION-B – 04 TRANSFORMERS AND ASSOCIATED EQUIPMENTS	21 OF 33	1.09.05. a (1)	(1.) Ohmic value measurement (For resistance & reactance separately).	Ohmic value measurement of reactance is not applicable.Pls. confirm.	Bidder understanding is not correct. Specification cl.no. 1.11.06 Sub -Section B-04 Section-VI, Part-B to be followed.
56	SECTION-VI, PART-B	B-04: TRANSFORMERS AND ASSOCIATED MAINTENANCE, MONITORING & TESTING EQUIPMENTS	PAGE 8 OF 36	1.05.01. (f)	LT Auxiliary outdoor transformers up to and including 2500KVA, 33kV shall have maximum losses of STAR-2 rating or better as per latest BEE guideline. The outdoor transformer up to 2500KVA, 33kV shall also comply with latest IS:1180	We understand 2500KVA outdoor oil filled transformer is allowed in line with the clause 1.05.01. (f) of transformer specification SUB-SECTION-B-04: TRANSFORMERS AND ASSOCIATED MAINTENANCE, MONITORING & TESTING. Further, for indoor applications, LT transformers upto 2500KVA, DTT shall be applicable. Please confirm.	Bidder understanding is not correct. 2500kVA oil filled transformers are acceptable. However, 2500kVA Dry type transformers are only applicable in case of UST and SST. Please refer Tender SLD.
57	SECTION-VI, PART-B	SUB-SECTION-B – 04 TRANSFORMERS AND ASSOCIATED EQUIPMENTS	6 OF 33	1.04.07	Bushings below 52 kV …….. epoxy RIP type. All condenser bushings shall be non-communicating type.	Bidder request to allow epoxy resin bushing in place of epoxy RIP bushing upto 1.1kV, since epoxy RIP bushing is not available upto 1.1kV.	Bidder understanding is not correct. Specification cl.no. 1.06.07 Sub -Section B-04 Section-VI, Part-B to be followed.
58	SECTION-VI, PART-B	SUB-SECTION-B – 04 TRANSFORMERS AND ASSOCIATED EQUIPMENTS	14 of 33 18 of 33	1.01.02 & 1.09.03	Type tests criteria for Auxiliary oil filled transformers rated upto 16MVA, 11kV (only type test report has to be submitted) II) TYPE TEST (#)	Both the clauses are contradictory. Kindly clarify weather type tests needs to be condcucted for Aux. transformer rated upto 16 MVA.	Bidder understanding is not correct. Specification cl.no. 1.11.00 Sub -Section B-04 Section-VI, Part-B to be followed. If valid type test report are not available then type test is to be conducted.
59	SECTION-VI, PART-B	SUB-SECTION-B – 06 LT SWITCHGEARS & LT BUSDUCTS	3 OF 18	2.03.00 (6)	Vertical Busbar - Copper Only	It is requested to also allow High Conductivity Aluminium Alloy in Vertical Busbars for supply feeders.	Bidder proposal is not acceptable. Specification cl.no. 2.03.00 (6) Sub -Section B-06 Section-VI, Part-B to be followed.
60	SECTION-VI, PART-B	SUB-SECTION-B – 06 LT SWITCHGEARS & LT BUSDUCTS	4 OF 18	2.04.00 (5)	Internal Arc Classification - 50kA for 0.5sec	It is requested to allow Internal Arc Classification - 50kA for 0.3sec.	Bidder proposal is not acceptable. Specification cl.no. 2.04.00 (5) Sub -Section B-06 Section-VI, Part-B to be followed.
61	SECTION-VI, PART-B	SUB-SECTION-B – 06 LT SWITCHGEARS & LT BUSDUCTS	13 OF 18	3.14.00	Wireless temperature monitoring system to be provided and same shall be integrated to DDCMIS/ separate HMI. Temperature sensors shall be installed in all relevant joints, contact joints etc. as per the standard OEM Practice, however Position of such sensors shall be decided at the time of detailed engineering. This shall be provided for the following switchgears: USS, BMCC, TMCC, and EMCC.	Wireless temperature monitoring system has not been provided in LT Switchgears in Power Plants in any previous projects. It's provenness is also not established. Accordingly, bidder requests to exclude the same from the scope. If customer insists to provide the Wireless temperature monitoring system, kindly explicitly identify the switchgear names as specified switchgear names are not applicable. There is no USS in 800MW Power Plants and Boiler & Turbine switchgears are PMCC instead of MCC. Kindly list out the switchgears and also quantify the joints, contact joints, positions etc. to be considered for temperature monitoring for estimation by bidder.	Bidder proposal is not acceptable. Same shall be provided for USS, BPMCC, TPMCC and UES switchgear. Ammendment Sl. No. EE-70 to be referred.
62	SECTION – VI, PART-B	SUB-SECTION-B-08 HT LT AND CONTROL CABLES	(Pg. 2 of 7)	Clause No. 2.02.00	All cables including EPR cables shall be flame retardant, low smoke (FRLS) type designed to withstand all mechanical, electrical and thermal stresses developed under steady state and transient operating conditions as specified elsewhere in this specification.	No HT Power/LT Power/LT control cables are with EPR insulation. Fire Survival (FS) HT power/ LT Power/LT control cables are not envisaged. Please confirm. No application and requirements defined in specification for EPR fire survival cable. EPR fire survival cable is not applicable and not to be considered. Please confirm.	Confirmed.Bidder under standing is correct.
63	SECTION – VI, PART-B	SUB-SECTION-B-08 HT LT AND CONTROL CABLES	(Pg. 5 of 7)	Clause No. 4.00.05	Cables shall be supplied in steel drums of heavy construction	Steel drum shall be provided for HT power cables. All other types of cables shall be provided in wooden drums as a practice followed for all NTPC projects.	Bidder proposal is not acceptable. Specification cl.no. 4.00.05 (a) Sub -Section B-08 Section-VI, Part-B to be followed.
64	SECTION VI, PART-B	SUB-SECTION-B-08 HT LT AND CONTROL CABLES	PAGE 3 OF 7	2.010.00	All LT power cables of sizes more than 120 sq.mm. shall be XLPE insulated, and sizes shall be of 1Cx150, 1Cx300, 1Cx630, 3Cx150, 3Cx240 & 3Cx300 sq.mm However for cable sizes upto 120 sq.mm. both XLPE insulated & PVC insulated LT power cables are acceptable.	As per standard industrial practice, bidder proposes to include 1Cx400sqmm, 3CX25, 3CX50, 3CX95, 3.5X25, 3.5CX50, 3.5CX95, 3.5CX185, 3.5CX240, 3.5X300 cable also. Kindly accept the same.	Refer to ammendment Sl. No. EE-72
65	SECTION VI, PART-B	SUB-SECTION-B-08 HT LT AND CONTROL CABLES	PAGE 4 OF 7	4.00.01	Method of curing for 33/33 KV Cables shall be "dry curing / gas curing ".	We understand that Method of curing of 33/33 KV cables shall be dry curing / gas curing. Method of curing of 11 KV / 11V voltage grade cables is not mentioned in the specification. We understand that for 11 KV / 11kV voltage grade cables method of curing shall be dry curing / gas curing / steam curing . Please confirm.	Bidder understanding is correct.
66	SECTION-VI, PART-B	SUB SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	2 OF 21	2.01.04	No sub- zero level cable vault/trenches shall be provided below control building/switchgear rooms in main plant.	Some small switchgear/control panel may come at 0.0M elevation inside power House building, for which cable trench/ slit shall be permitted.	Bidder to comply technical specifications.
67	SECTION-VI/ PART-B	SUB SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	3 of 21	3.01.03	Cable trays shall have standard width of 150 mm, 300 mm & 600 mm and standard lengths of 2.5 metre.	Bidder proposes cable trays width of 450 mm alongwith 150 mm, 300 mm & 600 mm.	Bidder proposal is not acceptable. Specification cl.no. 3.01.03 Sub -Section B-10 Section-VI, Part-B to be followed.
68	SECTION-VI/PART-B	SUB SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	3 of 21	3.1.04	Cable troughs shall be required for branching out few cables from main cable route.	The following sentence may be considered instead of the sentence on the left column mentioned in the specification i.e. "Wherever few cables are branching out from main trunk route troughs/ Local Buried Pipe / Slit / Branch Trays shall be used. Please confirm. (The above is in line with other clauses specification since the specification also informs to use Slits, branch trays.)	Bidder understanding is correct.
69	SECTION-VI/PART-B	SUB SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	4 of 21	3.02.02(F)	Cantilever arms of 320 mm, 620mm and 750 mm in length are required, and shall be as shown in the enclosed drawing	Since only 600mm, 300mm and 150mm, cable trays are to be used as per technical specification, Cantilever arms of 170mm for 150mm wide tray, 320mm for 300mm wide tray and 620/750mm for 600mm wide cable tray shall be provided. The same is in line with other NTPC projects executed by Bidder.	Bidder understanding is correct.
70	SECTION-VI/PART-B	SUB SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	6 of 21	3.09.01	The cable clamps/ties required to clamp multicore cables shall be of SS-316 material, 12mm wide, polyster coated ladder lock type.	Self-locking, Nylon ties shall be used for clamping of multicore cables	Bidder proposal is not acceptable. Specification cl.no. 3.09.01 Sub -Section B-10 Section-VI, Part-B to be followed.
71	SECTION-VI, PART-B,	SUB SECTION-B-10, CABLING, EARTHING & LIGHTNING PROTECTION	Page 9 of21	4.04.04	….Single core cable in trefoil formation shall be laid with a distance of four times the diameter of cable between trefoil center lines and clamped at every one metre….	As per IS 1255 clause no. 8.8.5, when single core cables are laid in trefoil formation distance of 'D' (one cable diameter) between two adjacent trefoils is to be maintained. Same shall be followed in this project also. Please confirm.	Bidder proposal is not acceptable. Specification cl.no. 4.04.04 Sub -Section B-10 Section-VI, Part-B to be followed.
72	SECTION-VI/PART-B	SUB SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	10 of 21	4.4.09	Wherever few cables are branching out from main trunk route troughs shall be used.	The following sentence may be considered instead of the sentence on the left column mentioned in the specification i.e. "Wherever few cables are branching out from main trunk route troughs/ Local Buried Pipe / Slit / Branch Trays shall be used. Please confirm. (The above is in line with other clauses speci-fication since the specification also informs to use Slits, branch trays.)	Bidder understanding is correct.
73	SECTION-VI/PART-B	SUB SECTION-B-10 CABLING, EARTHING & LIGHTNING PROTECTION	10 of 21	4.4.14(3)	Power and control cables for AC drives and corresponding emergency AC or DC drives shall be laid in segregated routes. Cable routes for one set of auxiliaries of same unit shall be segregated from the other set.	It shall be complied to the extent feasible for essential drives only	Bidder proposal is not acceptable. Specification cl.no. 4.04.14 (3) Sub -Section B-10 Section-VI, Part-B to be followed.

74	SECTION-VI, PART-B,	SUB SECTION-B-10, CABLING, EARTHING & LIGHTNING PROTECTION	Page 18 of 21	9.00.00 (b) (1)	….Bus duct support or Transformer body shall be at least 8.0M from A-Row of TG building to clear the movement of GT/ Stator/UT/ST/UAT on rail line.…	Distance from A-row of bus duct support or transformer body shall be decided during detailed engineering. However, it will be ensured that clear movement space shall be provided for transformer movement. It may also be noted that Stator handing shall be through unloading bay using tandem operation of EOT crane. Please confirm.	Bidder to comply technical specifications.
75	SECTION-VI, PART-B	SUB-SECTION B-10 CABLING, EARTHING AND LIGHTNING PROTECTION	19 OF 21	9.00.00 b)1	Separate Switchgear Rooms shall be provided for each unit. For TG building, all HT boards shall be provided in HT switchgear room at only one floor and all LT boards shall be provided in LT switchgear room at only one floor.	All LV switchgear pertaining to power house building cannot be placed at single floor. Generally, unit, station PMCCs are kept at one floor level and boiler boards are kept at other floor level. Also, AC plant swgr is also kept in AC plant room. Hence, please confirm different floor levels for LV boards as per load center in power house building. Also, as per requirement very limited numbers of LT board can also be placed inside MV swgr room in case of space constraint in LV switchgear room. Moreover, in offsite area Placing MV & LV switchgear in same switchgear room is allowed as per specification. Inline with that same may please be allowed in Power House building.	Bidder proposal is not acceptable. Specification cl.no. 9.00.00 (b) (1) Sub -Section B-10 Section-VI, Part-B to be followed.
76	SECTION-VI, PART-B	SUB-SECTION B-10 CABLING, EARTHING AND LIGHTNING PROTECTION	19 of 21	9.00.00 (B)(2)(b)	Back Clearance - 1.5 M (Min.)	Back clearance as 1.5M (Min) shall be provided in general except for incomer feeder panel wherein back clearance of 1.0M (Min) shall be provided.	Bidder proposal is not acceptable. Specification cl.no. 9.00.00 (b) (2) (b) Sub -Section B-10 Section-VI, Part-B to be followed.
77	SECTION-VI, PART-B	SUB-SECTION B-10 CABLING, EARTHING AND LIGHTNING PROTECTION	20 of 21	9.00.00 (B)(5)	Cable trench/Cable vault for LT switchgear/MCC room at EL 0.0M, 1400 wide x 1400 deep cable trench shall be provided to route the cables. Horizontal cable trays shall be routed in cable trenches	Bidder understands that more wider and deep trenches are allowed based on the cable tray requirements to suite site conditions and layout constraints.	Cable trenches are envisaged for the HT, LT switchgear/MCC room for low density of panels/cables up to 1400WX1400D. For higher requirement of cables, cable vault/galleries to be planned.
78	SECTION-VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	7 of 18	10 (h)	Each lighting panel (LP-3) shall be fed from a 415V/42V, 3 phase-4 wire, 3 KVA transformer.	This shal be done by 24V Supply Module with transformer 240V/24V located inside the panel to feed the 24V 5A Receptacles for maintenance at TG Hall/ Boiler Platforms as mentioned in Annexure-I Chapter B-10. 24V Supply module shall be fed from 3PH lighting Panel which in turn shall be fed by Lighting Distribution Board (LDB). The same is in line with the recent NTPC executed jobs of North Karanpura and Patratu. Kindly confirm.	Bidder proposal is not acceptable. Specification cl.no. 4.00.00, 10 (h) Sub -Section B-11 Section-VI, Part-B to be followed.
79	SECTION-VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	8 of 18	10 (i)	LP-1 : 415V, 63A(min.), 18Nos.,20A, 240V MCB, AC2 duty contactor and Programmable Digital Timer of 24 hour range 10A, 240V selector switch, fuse, etc. outdoor type and IP:55 degree of protection	LP-1: shall be with 415V 63A single incomer with 18 Nos Outgoing feeder with 240V MCB of Indoor, Outdoor and Decorative type.	Astrononomical Programmable Digital Timer are envisaged for automatic control of outdoor/periphery lighting. Speecification requirement to be met.
80	SECTION-VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	8 of 18	10 (i)	LP-2 : 415V, 63A(min.), 12Nos.,20A, 240V MCB: AC2 duty contactor and Programmable Digital Timer of 24 hour range 10A, 240V selector switch, fuse, etc. outdoor type and IP:55 degree of protection:	LP-2: shall be with 415V 63A single incomer with 12 Nos Outgoing feeder with 240V MCB of Indoor, Outdoor and Decorative type.	Bidder refer the same reply for LP-1
81	SECTION-VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	8 of 18	10 (i)	LP-3 : 1 No., 4A fuse 3 KVA transformer,40A TPN MCB : 24 Nos., 16A, 45V MCB	This shall be 24V Supply Module with transformer **240V/24V 5A** located inside the panel to feed the **24V 5A Receptacles** for maintenance at Boiler Platforms. 24V Supply module shall be fed from 3PH lighting Panel which in turn shall be fed by Lighting Distribution Board (LDB).Kindly confirm.	Bidder proposal is not acceptable. Specification cl.no. 4.00.00, 10 (i) Sub -Section B-11 Section-VI, Part-B to be followed.
82	SECTION-VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	8 of 18	10 (i)	LP-D1 1No. 220V,32 A, DP Isolator : 6Nos.,16A, 220V DP Switch & Fuse	LP-D : 220V 32A DP Switch & Fuse Incomer and 6 Nos 16A DP MCB outgoing.	Confirmed.
83	SECTION-VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	8 of 18	10 (i)	There is no details of street lighting panel ….	Street Lighting panel (Outdoor Type) with 415V 100/63A Incomer and 6 Nos 415V 20A Outgoing	Bidder proposal is acceptable.
84	SECTION-VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	8 of 18	10 (i)	Power supply shall be fed from 415 / 240 V normal AC supply, emergency AC supply and 220V DC supply through suitable number of conveniently located lighting distribution boards (LDB) and lighting panels (LP). AC lighting supply shall be isolated from main supply by 2x100% isolation transformers of max. rating of 50 KVA for 10/15 nos. outgoing feeder with changeover switch facility. The isolation transformer shall be fed from two different bus sections of MCC and fault level restricted to 3 KA at Lighting Panels.	Power supply shall be fed from 415 / 240 V normal AC supply, emergency AC supply and 220V DC supply through suitable number of conveniently located lighting distribution boards (LDB) and lighting panels (LP). AC lighting supply shall be isolated from main supply by **1x100% isolation transformers in Main Plant area and 2x100% isolation transformers in Off-site (Balance of Plant)** area of max. rating of **100 or 50 KVA for 12 to 8 nos**. outgoing feeder with changeover switch facility for 2x100% one. **The fault level restricted to 9 KA at Lighting Panels.**	i) Bidder proposal of 1X100% isolation Transformers in main plant area is not acceptable . Speficiation requirement to be followed. ii)The rating of 100 or 50KVA with Bus coupler to be envisaged.
85	SECTION VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	10 OF 18	4.04.00	Junction box for indoor lighting shall be made of fire-retardant material. Material of JB shall be Thermoplastic or thermosetting or FRP type.	The Material of JB shall be Thermoplastic or thermosetting or FRP type. However, the same shall not be fire retardant material. Fire retardant JBs are required in Hazardous areas however now a days the hazardous area lighting fixtures comes with inbuilt JB so the indoor JBs are not required to be made of fire-retardant material. Please confirm.	Bidder proposal is not acceptable. Specification cl.no. 4.04.00, Sub -Section B-11 Section-VI, Part-B to be followed.
86	SECTION VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	10 OF 18	4.04.00	Flexible conduit shall be water proof and rust proof made of heat resistant TERNE coated steel.	We propose to provide Electro galvanised PVC coated flexible conduit. Please confirm.	Refer Amendment Sl. No. EE-76
87	SECTION VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	11 OF 18	4.08.00	Lighting fixtures shall generally be group controlled directly from lighting panel. However, in office areas, control shall be provided through switch boxes. Each switch shall control a maximum of three fluorescent fixtures.	Please note that the loading of LED fixture is very small and as a standard practice 10-15 lighting fixtures are group controlled from the switch. If 3 fixtures are controlled from a switch, there will be lot of wiring and conduiting leading to difficulty in erection and maintenance.	Bidder proposal is not acceptable. Specification cl.no. 4.08.00 Sub -Section B-11 Section-VI, Part-B to be followed.
88	SECTION VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	11 OF 18	4.12.00	Occupancy based Passive Infra-red sensors The sensors shall be recess mounted, programmable type suitable for lighting load of 6A with variable off delay settings. The detection area shall be minimum 5 metres for standard room height of 3mt. All the calibrated settings shall be stored in non-volatile memory of PIR sensor which shall be unaffected by power supply fluctuations. Necessary 16A contactor shall be supplied along with each sensor & shall be located inside the switch box	Please note that in case occupancy sensor is used to control the lighting fixtures, the power supply from lighting panel is extended to occupancy sensor and lighting fixtures are controlled from occupancy sensor. The outgoing feeder of lighting panel is already protected and additional 16A contactor is not required for the sensor. Further, it will not be feasible to mount the contactor near the occupancy sensor. Accordingly, it is requested to remove the requirement of 16A contactor.	Refer Amendment Sl No. EE-77
89	SECTION VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	18 of 18	ANNEXURE B DC LIGHTING	Avg Lux level for CCR/ CER - 100 SWYD CR - 20 Strategic Control Points - 20 (TG Bldg, Boiler, SWAS, etc) Cable Vault, Boiler Staircase	DC lighting shall be provided at strategic locations to enable safe man movement in line with Cl no:3.03.00. To mainten average lux level of 100/ 20 lux level for DC lighting will result in huge number of DC fixtures and more over AC emergency lighting also provided in all these mentioned Main Plant areas.	Bidder proposal is not acceptable. Specification cl.no. Annexure-B Sub -Section B-11 Section-VI, Part-B to be followed.
90	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	PAGE 7 OF 20	1.14.00	Control of Electrical System of Main Plant, EHV Breakers of Generator Bay and Balance of Plant (BOP) shall be provided from DCS with suitable ECD (Electrical Control Desk) and/or Soft HMI. The details of the same are specified in relevant sections of Control and Instrumentation.	Please confirm if ECD is required for BOP areas also.	It is confirmed that ECD and/or Soft HMI is required for BOP Areas also.

91	SECTION – VI, PART-B	B-0 & B-10	10 OF 15 & 11 OF 21	3.07.00 & 5.01.00	The earthing system for plant shall be designed for a life expectancy of at least forty (40) years, for a system fault current of 63 kA for 1.0 sec	The earthing system for plant shall be designed for a life expectancy of at least forty (40) years, for a system fault current of 50 kA for 1.0 sec as per design considered in other NTPC projects	Bidder's understanding is correct. The earthing system for plant shall be designed for a fault current of 50kA for 1.0 sec.Bidder to refer to Amendment no:1.
92	SECTION-VI/PART-B	Book 3 of 5/SUB-SECTION-IIIC-13	1 of 3	3.01.02	The call stations and standalone amplifiers shall be individually IP addressable.	FCS/ DTS or Stand Alone Amplifiers shall be IP addresable but Loud Speakers shall be of analog type. Please confirm.	Bidders understanding not correct . All component of PA system shall be IP based.
93	SECTION-VI/PART-B	Book 3 of 5/SUB-SECTION-IIIC-13	1 of 3	2.00.00	POWER SUPPLY ARRANGEMENT	All Ethernet switches (where localised UPS Supply not available) shall be having distributed mini UPS having power backup which in turn shall be fed by normal Lighting socket. These Ethernet switches shall be powering POE DTS/FCS. Please confirm	Bidder's understanding is correct
94	SECTION-VI/PART-E	BLOCK DIAGRAM OF IP BASED PA SYSTEM 0000-999-POI-A-071A			Bidder to ensure that 100% cores are kept as spares in all types of Fibre optic cables.	10% cores shall be kept as spares in all types of Fibre optic cables.	Bidder proposal is not acceptable Further, Bidder to refer clause 2.04.00 IIIC-07, Part B.
95	SECTION-VI/PART-E	BLOCK DIAGRAM OF IP BASED PA SYSTEM 0000-999-POI-A-071A			All Interconnecting cables between Switches shall be Fibre Optic Cable. Signal cable from Switches to Call Stations shall be CAT-VI.	Signal Cable from Handset/ Standalone amplifiers to Loud Speakers shall be copper cable.	Bidder proposal is not acceptable
96	SECTION-VI/PART-B	Book 3 of 5/SUB-SECTION-IIIC-13	2 of 3	4.02.00	The outdoor wall/column mounting type call station shall be dust-tight and weather proof, with appropriate protection against direct rain, ingress of dust and moisture conforming to IP-65 degree of protection as per IS/IEC:60947-1, outdoor wall/column mounting type. The indoor desk-top mounting type call station shall have a degree of protection of at least IP-32	Outdoor FCS shall be with or without handset. Please confirm	The same shall be finalized during detail engineering
97	SECTION-VI/PART-B	Book 3 of 5/SUB-SECTION-IIIC-13	2 of 3	4.04.00	The indoor desk mounting type call stations shall preferably be PoE powered	Indoor Desktop Station or Outdoor FCS both shall be POE powered. Please confirm.	The same shall be finalized during detail engineering
98	SECTION-VI/PART-B	Book 3 of 5/SUB-SECTION-IIIC-13	3 of 3	9.00.00	LOUDSPEAKERS	Loudspeakers analog or IP Based is not mentioned. FCS/ DTS or Stand Alone Amplifiers shall be IP addressable but Loud Speakers shall be of analog type. Please confirm.	Bidders understanding not correct . All component of PA system shall be IP based.
99	SEC VI/ PART- E (Tender Drgs.)	0000-999-POI-A-071A, RA		Note no.3	Bidder to ensure that 100% cores are kept as spares in all types of Fibre optic cables.	10% cores shall be kept as spares in all types of Fibre optic cables.	Bidder proposal is not acceptable Further, Bidder to refer clause 2.04.00 IIIC-07, Part B.
100		SUB SECTION-G-03, LAYOUT REQUIREMENTS	6 of 15	1.03.00 (17)	Clear Head room at different floors 2.5m (Minimum) within Main Plant Building below pipes, ducts, Structures &. cable trays etc-2.5 Min	Clear headroom for walkway in cable vaults as 1.8M shall be permitted.	Bidder to comply specification requirement .
101		SUB SECTION-G-03, LAYOUT REQUIREMENTS	6 of 15	1.03.00 (18)	Minimum Clear head room in control tower area shall be 5m.	Control tower maximum clear height as 4.5M EL in CD Bay passage may be allowed.	Bidder to comply specification requirement .
102	SECTION-VI/PART-B	SUB SECTION- B-08	Pg 3 of 7	3.00.01 b)	The voltage drop in the cable, during motor starting condition, shall be limited to 10% and during full load running condition, shall be limited to 3% of the rated voltage	The voltage drop in the cable, during motor starting condition, shall be limited to 15% and during full load running condition, shall be limited to 3% of the rated voltage.	Bidder proposal is not acceptable. Specification cl.no. 3.00.01 (b) Sub-Section B-08 Section-VI, Part-B to be followed.
103	SECTION-VI, PART-B,	SUB SECTION B-12 FIRE PROOF CABLE PENETRATION SEALING	Page 1 of 7	2.01.00	Type A fire sealing system is either Silicone foam or equivalent foam system or using individual blocks for each cable along with suitable frame work rated for one hour. Type A is to be implemented at floor openings below C&I panels, control panels/Boards etc. in CER & CCR/Control Room	Type A fire sealing system shall be provided in panels of CCR/CER only. Type -A fire sealing system is not envisaged for other control room. Also please note that many control rooms are at zero meter above trench so fire sealing is not applicable for the panels placed above the cable trench.	Bidder proposal is not acceptable. Type -A fire sealing system is applicable for other control rooms where floor openings are envisaged.
104	SECTION-VI, PART-B	A-24	2 OF 6	1.02.00 (2.)	Emergency safety devices: The lift shall be provided with safety devices attached to the lift car frame and placed beneath the car. The safety device shall be capable of stopping and sustaining the lift car up at the governor tripping speed with full rated load in car.	Safety device in form of limit switches are placed below the lift car to stop and sustain the lift car. Further, safety governors are also installed on sides of car which come in operation during free fall of elevator or when speeds are higher than tripping speeds. During above mentioned situations safety governor gradually hold the guiderail and bring the elevator to complete rest. Kindly provide confirmation.	Bidder to comply the specification requirement.
105	SECTION-VI, PART-B	A-24	3 OF 6	1.03.01 (d)	Bidder shall provide emergency indicator to in-dicate the location of elevator in case of elevator being stuck up between the floors through automatic flashers (both audio and vis-ual).	There are two condition which are envisaged for stuck up of elevator: 1) If the elevator is stuck between floors in power condition, the floor indicator will be visible with a message –"Out of Service" 2) If the elevator is stuck between floors in Power-off con-dition, the floor indicator will not be available. Once power is restored the lift moves to the nearest landing & the indi-cator will get updated. Further, as per reputed / regular elevator suppliers stuck-up condition positioning of elevator cannot be indicated in either of above condition. Kindly furnish acceptance.	Bidder to comply the specification requirement.
106	SECTION-VI, PART-B	SUB SEC-TION- G-03 LAYOUT PHILOSO-PHY	11 of 14	1.03.00 (41)	All cranes shall be provided with approach rung ladders at least at two places. Where ever cranes can't be maintained in situ on the carriage, facility to draw them to Maintenance platforms as well as provision of suitable platforms shall be considered by the bidder.	One No. wire rope sling of suitable length shall be provided for each single girder crane to draw the crane manually to the maintenance platform. Please confirm.	To be reviewed during detailed engineering.
107	SECTION-VI, PART-C	GENERAL TECHNICAL REQUIREMENT	82 of 119	LIST OF CODES AND STANDARDS	IS:2266 : Steel wire ropes for general engineering purposes : BS :302 : 1968	In addition to IS 2266, kindly allow to use high strength wire rope of grade 2160 as per international standard which is referred in GENERAL TECHNICAL REQUIREMENT (GTR). Also note that BS 302 as mentioned in referred clause is superceded with EN 12385.	Requirement of Technical specification is clear. Bidder to follow the applicable code as mentioned in cl. No. 7.01.00 (ix)/Sub-section-A-07/Part-B for EOT Crnae wire rope design which is also in line with Make in India requirements.
108	SECTION-VI, PART-B	SUB SECTION-A-07	18 OF 25	7.01.00 (ix)	Wire rope of extra flexible plough steel and of 6/36 or 6/37 construction conforming to IS: 2266 (latest edition)		
109	SECTION-VI, PART-B	SUB SECTION-A-07	20 OF 25	7.04.00	Structural steel plates rolled section: Mild steel, grade 'B' of IS 2062 in 100% killed, normalised and ultrasonically tested quality or high strength steel of IS 8500 as appropriate.	We understand that structural steel plates for manufacturing of cranes shall be selected as per clause no. 7.04.00 of sub section A-07 which is appilcable for crane package. The referred clause in civil section is not appilcable for crane structure. Please confirm.	Specification requirements for structural steel for Crane is clear. Bidder to follow cl. no. 7.04.00/Sub-section-A-07/Part-B/Section-VI For fabrication of crane gantry girder structure clause10.04.01 a) is applicable
110	SECTION-VI, PART-B	SUB-SECTION-D-1-10	2 OF 4	10.04.01 a)	Rolled sections shall be of grade designation E250, Quality A/BR, Semi-killed/ killed conforming to IS 2062. All steel plates shall be of Grade designation E250, Quality BR (fully killed), conforming to IS 2062 and shall be tested for impact resistance at room temperature. Plates beyond 12mm thickness and up to 40mm thickness shall be normalized rolled. Plates beyond 40mm thickness shall be vacuum degassed & furnace normalised and shall also be 100% ultrasonically tested as per ASTM – A578 level B-S2.		

111	SECTION-VI, PART-B	SUB-SECTION-B-15	3 of 5	8.02.00	b) Necessary input & output devices to be provided to reduce harmonics, as per IEEE519, at supply side of the drive at the switchgear.	We understand that the requirement as referred in clause 8.02.00 b) is not appilcable for drive less than 100 KW. We shall consider six pulse drive without active front end harmonic filter for upto 100 KW drive which shall not be able to meet the requirement of harmonic levels as mentioned in IEEE519 as referred in clause 8.02.00 b). Kindly confirm.	Bidder's proposal is not acceptable. Bidder to meet Technical specification requirement.
112	SECTION-VI, PART-B	SUB-SECTION II-B-03	3 OF 11	5.02.00	415 V/690 V LV VFD: The Variable frequency drive (VFD) system shall be of a modern proven design for similar applications in power plants/industry. The system shall be either Current Source Inverter (CSI) or Voltage Source Inverter (VSI) type with minimum Twelve (12) pulse design / 6 pulse with active front end harmonic filter. **For drives less than 100 KW Six (6) pulse can be offered meeting all other requirements.**		
113	SECTION – VI, PART-A	Mandatory Spares	25 OF 38	2.02.00, Chapter-01, SG & Auxiliaries	MEASURING INSTRUMENTS (for all systems supplied under this chapter including Auxiliary Boiler, FOPH, Dosing System, ECW, Air compressor system, FGD, De- NOx, Skids)	Measuring Instruments mandatory spares for Compressed Air System are specified separately under two different clause. Bidder have considered measuring instruments mandatory spares as per Cl. No. 1.06.00, page 3 0f 16, wherein detailed list of Mandatory spares for CAS is being provided. Pl. confirm.	Bidder's understanding is correct
		Mandatory Spares	3 OF 16	1.06.00, chapter-07, Plant Utilities	MEASURING INSTRUMENTS		
114	SECTION- VI, PART - B	SUB SECTION- G-04 STANDARD PG TEST PROCEDURE	218 of 227	3	3. Test conditions responsibility & prerequisites before the test vii. Successful completion of trial operation of Compressors.	Pl. confirm the trial operation period for CAS. Also, pl. confirm the handover schedule for CAS package after successful completion of trial operation and PG Test.	Bidder to refer clauses 26.02.00 and 27.00.00 of Part-C of Technical Specification.
115	SECTION- VI, PART - B	SUB SECTION-A-16 COMPRESSED AIR SYSTEM	3 OF 7	4.03.03	Compressor shall have 25% minimum turndown capability (at 45 deg C & 75% RH). Compressor shall be provided with IGV at the suction flange.	Bidder understands that this clause is applicable for Centrifugal compressors only and not for Screw compressors. Pl. Confirm.	Bidder's understanding is correct.
116	SECTION-VI, PART-B	SUB-SECTION-A-05(FGD)	PAGE 2 OF 29	1.03.08	In case of a power failure all items of equipment (e.g. minimum one agitator in absorber and limestone slurry tank, Process water pump & lube oil system of Booster Fan) which may cause irreversible damage to the FGD System shall be connected to the emergency power supply system to be provided by the Contractor. Bidder shall furnish a list of all such Auxiliaries in its bid proposal.	Agitators are not required to be connected to Emergency power supply as per proven practice being followed by collaborator. Equipment needing emergency power connection shall be decided based on process requirement and the recommendations of the collaborator & OEM for different equipment.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
117	SECTION-VI, PART-B	SUB-SECTION-A-05(FGD)	PAGE 20 OF 29	7.08.03	Agitation shall be provided to prevent settlement of slurry by sufficient no. of Top entry agitators or side entry agitators (as per the proven practice of bidder) with emergency flush start system	In the offered technology the impeller of absorber agitators are mounted above the slurry settling zone, thus starts without flushing system even after a long shutdown as per collaborator proven design successfully operating worldwide. Hence, requirement of separate flushing system is not envisaged.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
118	SECTION-VI, PART-B	SUB-SECTION-A-05(FGD)	PAGE 23 OF 29	11.05.00	The material for the shaft (which is continuously in contact with slurry) and agitator blades of the Absorber Agitators shall be made with Alloy 926 or better material. For Agitators in other tanks, agitator blades shall be made with Alloy 926 or better material & shaft can be rubber lined. This does not release the Contractor of the responsibility for selecting the correct materials.	Please also accept that for agitators in other tanks, agitator blades shall be made with carbon steel rubber lined as per proven collaborator experience.	The specification requirement allows bidder to offer better material than Alloy 926 based on its proven practice. Specification requirements are clear in this regard. Bidder to comply with the specification requirements.
119	SECTION-VI, PART-B	CIVIL WORKS FOUNDATION SYSTEM	PAGE 1 OF 6	7.01.02	The tanks shall rest on flexible tank pad foundation, resting on sand with concrete ring wall to retain sand	Foundation of Tanks will be provided as per IS 803 in which tank lies on the top of foundation ring wall as per standard practice.Please accept	Bidder's propsal is not acceptable.
120	SECTION-VI, PART-A	IIB	3 OF 19	1.05.03	Communicable Numerical Relays (with IEC 61850) in all MV Switchgears & LV Switchgears. b) IEC 61850 Ethernet switches in Switchgear panels – Sufficient quantity of Ethernet switches as per requirement for all boards. At least 2 ports per switch shall be kept as spare ports. c) Cat5e Ethernet cable / FO cable for connection of Numerical Relays to Ethernet switches in all Switchgears. d) Optical Fibre Cable with fire-retardant outer sheath as required for the complete numerical relay network. e) Optical Fibre Cable termination equipment such as LIU, patch cord, etc. for the complete network.	Kindly clarify whether Data Concentrator is applica-ble or not. Drawings 0000-205-POE-A-001 is not available in tender document.	1. Data Concentrator for switchgear SCADA is not applicable. 2.Bidder under standing is not correct. Drawing No. 0000-205-POE-A-001 is available in subsection B-05(B), part B of technical specification.
121	SECTION-VI, PART-A	IIB	7 OF 19	1.14.00	Control Philosophy for plant Electrical System Control of Electrical System of Main Plant, EHV Breakers of Generator Bay and Balance of Plant (BOP) shall be provided from DCS with suitable ECD (Electrical Control Desk) and/or Soft HMI. The details of the same are specified in relevant sec-tions of Control and Instrumentation.	No details are available for suitable ECD (Electrical Control Desk)in relevant sections of Control and Instrumentation. Kindly elaborate the requirement of ECD with what breakers are to be controlled etc in details.	Bidder to refer Clause no 4.05.00, SUB-SECTION-IIIC-11 CONTROL DESK & PANELS, Part-B of Technical specification. However, the detail scheme of ECD shall be finalised during detailed engg.
122	**SECTION-VI, PART-A,**	SUB-SECTION-VI CHAPTER -1, SG & AUXILIARIES,	PAGE 17 OF 36		Mandatory Spares:	As per the APRDS mandatory spares list given in specification, it appears that at s.no-1.20.00 A(1) HCPRDS main valve and s.no-1.20.00 B(1) LCPRDS **valve as a whole are to be provided as a spare.** This appears grossly incorrect as main system has 1 HCPRDS valve and 1 LCPRDS valve while **2 Nos of each of these valves are required** as spares. This results into higher cost of mandatory spares (approx. more than 2 times of main APRDS system package). We understand this is an error and the parts listed under s.no. 1.20.00(A)(1)(1.1 to 1.6) & 1.20.00(B)(1)(1.1 to 1.6) are only to be considered as mandatory spares. **Kindly check and confirm.**	Bidder to supply the spares inline with the requirements of the technical specifications.
123	SECTION – IV	SUB SEC - IV	Page no. 7 of 73	Cl. no. 1.01.02	CATEGORY – I GUARANTEE (x) Unit Auxiliary power consumption (xi) Station auxiliary power consumption	SIPAT-III being one (1) unit, there are no common station facilities as it happens in case of multiple units. All station auxiliaries are decided for the 1x800 MW unit. In view of this, Owner is requested to keep single aux power consumption guarantee instead of separate unit and station aux power guarantees for performance guarantee & LD purpose.	Bidder's proposal reviewed and not accepted. Bidder to comply technical specification requirements.
124	SECTION – VI, PART-B	A-02	50 OF 67	16.01.01	Auxiliary steam when sourced through this interconnection shall be available at a maximum rate of 60 T/hr with parameters 16 ata/ 310°C at Stage-I TP.	NTPC is requested to revise the auxiliary steam available maximum rate to 70 T/hr because mentioned 60T/Hr in specification is in lower side as per past project experience.	Maximum 60 T/hr of Auxiliary Steam at the mentioned parameter shall be available from existing stage. Bidder shall comply with the requirements of Technical Specification.
125	TECHNICAL SPECIFICATION SECTION – VI, PART-A BID DOC. NO.	SUB SECTION- IIA-10 WATER TREATMENT PLANT	10 of 11		Interconnection with existing Stage-I (3660 MW) DM Plant: Interconnection of Stage-III DM tanks to be made with existing Stage-I Boiler fill pumps (Pump parameters- 175 m3/h & 150 mWC; tentative route length 3000 m). b) Necessary provision of isolating valve in existing Stage-I DM water line to its boiler and interconnecting DM water line from Stage-I to stage-III DM tank shall be in bidder's scope. c) Piping with associated valves and other equipment required to complete the system shall be in bidder's scope.	NTPC is requested to kindly specify Coordinates of location of following Interconnection envisaged with Stage-I a) Stage I DM Plant/Tanks Location (Pump parameters, tentative route length etc.) Also,any such Interconnection is not mentioned in Scope TP & Exclusion.(SUB-SECTION-III,TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT, Pg- 1 of 3). Kindly claify the scope	Bidder to refer the GLP for the same. Further, bidder to refer Amendment Sl. No. WS-12

126	VI / B	SUB SECTION- G-04 STANDARD PG TEST PROCEDURE	Page 61 of 227	TABLE-2: LIST OF EQUIPMENT'S CONSIDERED FOR STATION AUXILIARY POWER CONSUMPTION	e) Mill Reject System: **Compressor**: Compressor: Duty Factor 1.0 (per unit power consumption shall be 50% of Power Consumption of the working compressor)	This is to bring to your notice that since pneumatic type mill reject system is not mentioned so corresponding clause for mill reject compressor shall not be applicable. Instead, bidder is considering the following clause in SECTION – VI, PART-A, SUB-SECTION-IV FUNCTIONAL GUARANTEES, f) Mill Reject System – "Mill reject mechanical type Conveying system: Duty Factor 1.0".	Bidder's understanding is correct. Pneumatic type Mill reject system is not applicable.
127	VI / A	Annexure C to IIC Contract quantity	PAGE 9 OF 21	2.00.00 LIST OF AREAS FROM WHICH SOFT SIGNALS IS TO BE CONNECTED TO DDCMIS (OTHER THAN REMOTE I/O)	4. From **Air compressor** (IAC, PAC, **Mill Reject system**) to SA DDCMIS	This is to bring to your notice that since pneumatic type mill reject system is not allowed so corresponding clause for mill reject compressor shall not be applicable. Kindly also confirm that the references of mill reject compressor mentioned elsewhere in specification shall not be applicable.	Refer ammendment Sl. No. C-01 in this regard
128	VI / B	SUB SECTION-A-01	PAGE 71 OF 87	EQUIPMENT SIZING CRITERIA, PAGE	The **Service air requirement of mill reject** shall not be included while sizing the compressor capacity, as separate & dedicated compressors are to be provided for the same.		Bidder's understanding is correct. Pneumatic type Mill reject system is not applicable.
129	VI / B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	PAGE 47 OF 87	3.03.00 ECW System for each Unit	b Flow b. For SG ECW system- Design flow required for all SG auxiliaries + other Station Auxiliaries (Air compressors, **Mill reject**, Ash Handling compressors, FGD any other system envisaged by the bidder)		The requirement is aplicable for the system envisaged meeting technical specifications.
130	VI / B	SUB SECTION A-15 CW SYSTEM	PAGE 24 OF 40	2.01.02	Coolers of Station Auxiliaries like Instrument & Plant (Service) Air Compressors, Compressors of Mill reject handling system, Compressors of Ash handling system, FGD & SCR system, etc		
131	VI / B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	PAGE 83 OF 87	4.03.06 MILL REJECT HANDLING SYSTEM	Sizing grid shall be provided in mill reject pyrite hopper to remove mill reject of size >40mm.	Sizing grid is not applicable for mechanical conveying type mill reject handling system.	Bidder's understanding is correct.
132	VI / B	SUB-SECTION-A-22 MILL REJECT HANDLING SYSTEM	PAGE 2 OF 3	2.02.00 Metallic Conveyors	2.03.00 Data Sheet 7) Tensioning arrangement - Hydraulic/pneumatic	Screw type/ Gravity type tensioning arrangement for conveyor type mill reject system is used by some of OEMs as per their proven practice and hydraulic/ pneumatic tensioning arrangement are not applicable for their system. Accordingly, these tensioning arrangements may also be allowed.	Bidder's proposal for alternate tensioning arrangement is not acceptable. Bidder to comply stipulation of Technical Specification.
133	SECTION– VI PART-B	SUB SECTION- G-03	PAGE 1 OF 15	Clause No. 1.01	General layout plan indicating the available spaces for proposed project is as shown in the tender drawing. It shall form the basis for further elaboration by the Bidder for the plant facilities, which are in his scope.	Bidder understands that facilities other than Main plant layout can be rearranged/relocated for sequential location and overall simplification of layout wherever necessary.	To be reviewed during detailed engineering May be allowed subject to compliance with technical specification
134	SECTION– VI PART - B	SUB SECTION- G-03	PAGE 3 OF 15	Clause No. 1.02	Bidder has an option to develop his own layout keeping the location/orientation of the main power block, power evacuation corridor, make-up water corridor same as shown in General Layout Plan.	Bidder understands that there are no TG Building lay-out drawings in the bid and bidder can decide TG Building size, floor levels as per their practice. Kindly confirm	To be reviewed during detailed engineering Bidder to comply with the requirements stipulated in chapter G-03 .
135	SECTION– VI PART - B	SUB SECTION- A-07	PAGE 19 OF 25	Clause No. 7.02.01	One (1) no of Electrically operated travelling cranes (Double Girder type) for each unit with associated auxiliaries, alongwith electrical equipment, control & instrumentation as required and specified shall be provided in the BC bay for erection and maintenance of Boiler feed pump and their auxiliaries. The capacity of each crane shall be 10% over and above the heaviest component/equipment (including Drive Turbine assembly) to be handled (including lifting beam and slings etc., if provided) or 25 Tonne whichever is higher.	As per bidders practice, erection of BFP/Drive Turbine will be done by external crane. EOT will be provided in the BC bay for maintenance of Boiler feed pump and their auxiliaries with capacity as specified in the tender specification. Kindly confirm. Lifting beam and swiveling arrangement for BFP crane is not required hence not being considered. Kindly confirm.	Bidder understnading is not correct. BFP EOT crane may also be needed for erection/ handling of BFP/drive turbine in future.Bidder to comply specification requirement. "If provided" is already mentioned regarding lifting beam and swivelling arrangement in the reffered clause.
136	SECTION– VI PART - B	SUB SECTION- A-24	PAGE 6 OF 6	Clause No. 2.01.00	Suitable EOT Crane/HOT Crane/Monorail beams with hoists/Chain Pulley Blocks of adequate capacity, to meet the erection and maintenance requirements are to be provided by the vendor for the various areas/equipment. Some of the areas/equipment not covered by TG hall EOT cranes are indicated below. For balance areas/equipment, not listed hereinafter, the requirements of Specification shall be followed. (a) Feed water heaters & deaerator (Applicable Hoists/Chain pully block for maintenance purpose shall be provided). (b) Various pumps & Heat Exchangers. (c) Condenser Water Boxes (front & rear), (Applicable If hinged type water box not envisaged) (d) CW Butterfly Valves (e) Vacuum Pumps (f) Control Fluid Room (g) Auxiliary cooling water (clarified) pumps and DM cooling water pumps of ECW systems. (h) Central Lube Oil System room. (i) Any other equipment. The above requirement is indicative only, the requirement given in the respective chapter is to be adhered to.	As per bidders practice, Heaters are handled by TG Hall EOT in AB Bay & then dragged to their locations. As such, no separate EOT/Hoist is required. In addition, one time erection of De-aerator is done by mobile crane from CD Bay. As such, no separate EOT Crane /Hoist is required. There is no other major equipment. Hence, no other EOT/Hoist is being envisaged.	EOT crane is not envisaged for Feed water heaters & deaerator. However, applicable Hoists/Chain pully block for general maintenance purpose shall be provided.
137	SECTION– VI PART - B	Sub-Section – A – 13	PAGE 4 OF 8	Clause No. 2.01.00	For piping systems with operating temperature 500 Deg. C and above, the first (innermost) 75 mm thickness shall be of ceramic fiber Insulation followed by subsequent layers of mineral wool/LBM.	As per market availability single layer of 75 mm thickness of Ceramic Fiber is not available. Hence, Two layers of ceramic fiber with combined thickness 75mm may be provided. Kindly confirm.	Bidder understanding is correct. Bidder to comply specification requirement.
138	SECTION– VI PART - A	SUB SECTION- III	PAGE 1 OF 3	Clause No. 1.00	Terminal Points	1. Kindly provide the terminal points coordinate/location for Auxiliary Steam System, Potable water system, FOPH, other systems 2. In order to route pipes from existing units to stage-III for various systems new trestle/pedestal (as applicable) will be planned. However, existing pipe racks/pedestal can be used for routing pipes/cables related to Auxiliary Steam System, Potable water system, FOP, other systems wherever required. Kindly confirm.	1. TP Location for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing HT Auxiliary Steam Header of Stage II with motorized isolation valve as indicated in the tender drg. Shall be Dummy Connection with Valve given near Axis No.19 and in BC Bay at 33.350 M elevation floor of Unit # 5 TG Bay in HT Header. Colony potable water system is not in bidder's scope. 2. Existing Pipe racks / pedestals shall not be used for the upcoming units; however in exceptional cicumstances, same may be considered during detailed engineering if found technically feasible.
139					General	Customer to provide auto cad copy of Plot plan.	Auto cad shall be shared with the successful bidder.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
140	SECTION – VI/ PART A	IIC	5 OF 19	2.02.00	For CHP DDCMIS, necessary signal exchange with Employer's existing stage-I CHP DDCMIS system shall also be in Contractor's scope. For this signal exchange , the number of I/Os shall be considered as DI: 32 DO: 16 AI:8 AO:8. The exact scheme shall be finalized during detail engineering. Employer's stage-I CHP DCS/RIO panel shall be the terminal point.	Kindly provide the distance between existing Stage-I/II CHP DDCMIS/RIO panel from the upcoming CHP DDCMIS for stage-II.	In this regard, Bidder to refer GLP.
141	SECTION – VI/ PART A	IIC	7 OF 19	2.04.03, II	26 LVS (10 per Unit, 4 AHP, 4 WS, 4 CHP, 4 FGD)	The quantity of LVS asked is significantly higher than the normal requirement for the power plant. Kindly reconsider the requirement as this will result in significant auxiliary power consumption losses.	Bidder's proposal is not accepted. Bidder to comply thechnical specifications
142	SECTION – VI/ PART A	IIC	7 OF 19	2.04.03	Additional HMIPIS items / quantity if any required, other than those indicated above, for achieving the complete DDCMIS functionality, shall also be in the scope of the Contractor. Further control room expansion and (or) modification if required shall also be in the scope of the Contractor.	Kindly provide the details (purpose, mode of connectivity and distances) regarding employer's system to be connected to the plant station LAN.	The same shall be finalised during detail engineering
143	SECTION – VI/ PART A	IIC	8 OF 19	2.04.04	This shall include all cables and accessories required for connecting Contractor's system upto the Employer's systems such as ERP, etc..	Kindly provide the details (purpose, mode of connectivity and distances) regarding employer's system to be connected to the plant station LAN.	The same shall be finalised during detail engineering
144	SECTION – VI/ PART A	IIC	10 OF 19	2.06.00	Contractor to provide 5 nos. Fine pitch LED display (1 for Main plant gate &4 for locations to be finalized during detail engineering) for outdoor application	Kindly provide the size of fine pitch led display to be supplied.	Size of Fine pitch LED display can be derived from the resolution and selected pixel pitch.
145	SECTION – VI/ PART B	IIIC-02	4 OF 5	1.05.00	Fieldbus Junction boxes made of SS 316 and specially designed for fieldbus application...These Filedbus JBs shall have suitable cover and gasket and shall have protection class of IP-66 or better..	Fieldbus Junction boxes made of SS 316 and specially designed for fieldbus application…These Filedbus JBs shall have suitable cover and gasket and shall have protection class of IP-66 or better.. Sheet Steel JBs with IP65 protection is widely prevalent in use for Profibus. Kindly accept. Cabinet in place of JBs can be used in places where there is wide concentration of signals. NTPC is requested to accept and mention the material and IP clause applicable for Cabinet.	Bidder's proposal is not accepted .Bidder to comply thechnical specifications

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
146	VI-A	II-D	1 of 8	1.16.00	Cutting of trees of girth more than 30cm shall be done by the Owner	We understand the clause is applicable for the entire scope of the work. Please confirm.	Cutting of trees of girth more than 30cm shall be done by the Owner. Site clearance including cutting of trees of girth less than 30 centimeters is in bidder's scope. Further Bidder to refer amendment no. D1-9
147	VI-B	B-17			765 & 132kV Switchyard	Please provide the following drawings:- 1) Existing Cable trench Layout 2) Existing EHV Equipment Structure Drawings 3) Existing Switchyard Tower and Beam Drawings 4) Existing Earthmat Layout Drawing or existing earthmat spacing 5) Existing Switchyard Layout & Section drawings Since the scope is extention of the existing switchyard, so the above drawings are required to avoid any mismatches.	The exisitng drawings will be provided during detailed engg stage.
148	VI-B	B-17	2 of 98	1.01.07	In existing 765kV Switchyard the strung bus is with Quad AAC Bull and for 132kV switchyard the strung bus is with Twin AAC Bull conductor . The equipment inter connections shall be through 4.5" IPS, Al.tube / quad Bull in 765kV switchyard and 3" IPS Al. tube / mim.AAC Bull conductor in 132kV switchyard.	1) We understand that the equipment interconnection including jack bus shall be through 4.5" IPS, Al.tube / quad Bull in 765kV switchyard and 3" IPS Al. tube / twin AAC Bull conductor in 132kV switchyard. Please confirm. 2) We understand since the 765kV Transmission Line is extention of the Generator Transformer Bay, the connection will be through quad Bull conductor. Please confirm. 3) We understand the 765kV Transmission line will be erected inside the plant boundary. Please confirm.	Bidder understanding is not correct . The jack Bus with is Quad AAC Bull conductor . Equipment interconnection is 4.5" IPS tube for 765KV & 3" IPS tube for 132KV
	VI-B	B-17	85 of 98	15.01.01	Transmission Line Material - The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for 400 kV AC Double circuit transmission with quad moose conductor and will give continued good performance.		Bidder refer to Amendment , Sl. No: EE-35
	VI-A	II-B	9 of 20	1.16.00	One(1) No. of 765kV Single Circuit Cross country interconnecting overhead Tie line between Sipat Stage-III(1X800MW) GT and 765kV Stage-I Switchyard with Twin Moose Conductor on towers with redundent OPGW connectivity		Bidder under standing is not correct .
	VI-A	II-B	9 of 20	1.16.02	One(1) No. of 765kV Single Circuit Cross country interconnecting overhead Tie line between Sipat Stage-III GT and 765kV Stage-I Switchyard with Twin Moose Conductor on towers		Refer Technical Amendment to Technical Specification. 1. Existing SLD/Layout of Sipat-I/II 765/132kV switchyard is being provided with Amendment Sl No. EE-79. 2. Connection shall be Quad BERSIMIS/Hexa ZEBRA. 3. All transmission line towers are located inside land boundary of Sipat STPP.
149	VI-A	II-B	12 of 20	1.16.07 vi	765kV Transmission Line:- The weed growth/ tree cutting shall be responsibility of the Contractor.Contractor may note that Employer shall not pay any compensation for any loss or damage to the properties or for tree cutting due to contractor's work. However the approval for the same shall be obtained by Owner.	1) It is requested to exclude tree cutting and its statutory clearances from the scope of the bidder. 2)We understand right of way including all statutory and administative clearances will be in the scope of the owner. Please confirm.	1. Bidder's proposal is not acceptable. 2. Bidder's understanding is correct.
	VI-B	B-17	49 of 98	11.01.07			
	VI-B	B-17	49 of 98	11.02.01 11.02.02	Right of way and way leave clearance shall be arranged by the Owner. Payment of compensation towards the clearances, etc. will be the responsibility of the Owner.		
150	VI-B	B-17	3 of 98	1.01.21	The control & protection panels belongs to present scope of Bays shall be placed in existing 765kV Control room and 132kV control room building / AC kiosk .	We understand The control & protection panels belongs to present scope of Bays shall be placed in AC Kiosk only if sufficient space not available in Control Room Building. Please confirm.	Bidder's understanding is correct.
151	VI-B	B-17	37 of 98	Annexure-1	Specification of Bay Kiosk	We request RCC type Bay Kiosk is also allowed. Please confirm.	Bidder's proposal is not acceptable.
152	VI-B	B-17	18 of 98	Annexure-I	Requirement of Controlled Switching Device for 400KV Circuit Breaker if applicable	We understand that the specification is applicable for 765kV Circuit Breaker as well. Please confirm.	CSD is not applicable for 765kV GT bay.
153	VI-B	B-17	16 of 98	2.12.01	765kV Class Circuit Breakers (AIS) a) Rated continuous current .- Minimum 3150/2000 A at rated ambient temperature as per the Single line diagram	1)The details are not available in the tender SLD (Drg ref 9500-999-POE-J-001) Rev A. Please provide the continuous current rating. 2) The Specification of 132kV Circuit breaker not available. Please provide	Refer Amendment Sl.No:EE-19 for 765KV CB & EE-20 for 132KV CB.

154	VI-B	B-17	23 of 98	3.07.01	765kV Isolator a) Rated continuous current at 50deg.cen ambient temperature.- Minimum 3150/2000 A at rated ambient temperature as per the Single line diagram 132kV Isolator a) Rated continuous current at 50deg.cen ambient temperature.- Minimum 2000/1250 A at rated ambient temperature as per the Single line diagram	The details are not available in the tender SLD (Drg ref 9500-999-POE-J-001) Rev A. Please provide the continuous current rating.	Bidder Refer to Amendment , Sl. No: EE-22, EE-23
155	VI-B	B-17	21 of 98	3.05.01	Isolator shall be gang operated for main blades and earth switches	We understand that the isolators will be electrically gang operated for 765kV and Mechanically gang operated for 132kV. Please confirm.	Bidder understanidng is not Correct. The poles are not mechanically ganged , but it is electrically ganged . Mechnical (construction) interlock should be provided between isolator & earth switch.The isolator should be Three pole.
156	VI-B	B-17	43 of 98	9.11.05. f) ix	Contractor shall also provide interconnection (two interconnection per Unit) of Switchyard Earth mat with the Plant earth mat	As the current scope include bay extention work,hence the same is not applicable. Please confirm.	Bidder understanding is correct. However, Earth mat for extended bay shall be connected to nearest Earth Mat.
157	VI-B	B-17	67 of 98	12.08.04	Tower Testing Procedure	We understand that for tower designs having valid type test reports, the tests are not required to be repeated. Please confirm.	Confirmed.
158	VI-B	B-06	12 of 18	3.03.00	All ACDBs, DCDBs and Solenoid Valve DBs shall be of fixed module type	1) We understand that the ACDB & DCDB shall be of fixed module type. Please confirm. 2) We understand that the ACDB & DCDB are feeder extention boards and will cater only to the Auxiliary power reqirements of the 01 no. 765kV GT Bay & 02 No 132kV ST bays.Please confirm.	Bidders understanding is correct.
	VI-A	IIB	11 of 20	1.16.04.II.S	The Bidder shall provide ACDB & DCDB Boards for further distribution of 415V AC supply, 220V DC supply for the requirement of Present scope of Bays and these Boards shall be placed in Existing Sipat Stage-I SWYD panel room.		
159	VI-A	IIB	11 of 20	1.09.00	SITE SUPERVISION OF EQUIPMENTS The contractor shall ensure that, erection, testing and commissioning of, GIS, Circuit Breaker, Isolator, Instrument Transformer, Surge Arrestor, Substation Automation System & protective relays is carried out, under the supervision of manufacturer of respective equipment.	As per the general practice, OEM supervison during erection, testing and commissioning will be provided for Circuit Breakers, Isolators ,Substation Automation System & protective relays. For other equipments, erection, testing and commissioning will be carried out in bidder supervision. Please confirm.	Bidder's understanding is not correct. GIS is not applicable for this project.
160	VI-A	II-B	13 of 20	1.16.08.ix	ABT based energy metering system as indicated in protection SLDs/Metering Architecture and dummy panels for mounting owner supplied meters and its integration with existing ABT system	1) We understand that supply of ABT complaint energy meter is in scope of owner, please confirm. 2) We understand that Controlled Switching Device is required in the 765kV CB installed in Tie Bay only. Please confirm.	1. Bidder's understanding is not correct. Only owner supplied ABT energy meters (marked as EM*) shall be in the scope of owner. 2. Bidder's understanding is not correct. CSD is not envisaged for 765kV Bays.
				Drg no. XXXX-999-POE-J-005	Protection SLD for GT Bay		
				Drg no. XXXX-999-POE-J-009	Protection SLD for TIE Bay		
161				Drg no. XXXX-999-POE-J-005 Drg no. XXXX-999-POE-J-009	Protection SLD for GT Bay Protection SLD for TIE Bay	In the referance SLDs, Merging Units (MU) are shown to carry CT signals to Relays, however in the Control Cabling Philosophy, signals to be transmitted through LT Copper Control Cables. We understand that in switchyard scope, signals to be transmitted between EHV equipments and Control-Monitoring & protection panels via LT Copper Control Cables. Please confirm.	Bidder's understanding is correct. Please refer Amendment Sl.No. EE-43 and EE-45.
	VI-B	B-13	32 of 49	9.03.00.vi	Shall have a separate dedicated islanding trip through contacts (self-reset) bay SCUs for each of the EHV breaker including all EHV bays and future bays as per switchyard SLD		
	VI-B	B-13	38 of 49	15.00.00	Control Cabling Philosophy in Switchyard		
162	VI-B	B-13	1 of 14	Annexure-I to B-13	Network Configuration and Equipment Characteristics	In the current switchyard scope, there is no line bays. We understand that Fiber Optic Tele communication Equipments (FOTE) in not envisaged in the current switchyard scope.	Bidder's understanding is correct.
163	VI-C		15 of 119	8.03.04 a i	All the plant layouts shall be made in computerized 3D modelling system. The Employer reserves the right to review the 3D model at different stages during the progress of engineering. The layout drawings submitted for Employer's review shall be fully dimensioned and extracted from 3D model after interference check.	We understand that the approval on the drawings shall be made on the drawings submitted in hard/soft copies. The computerized 3D Model shall not be binding/prerequisite on the approvals of the submitted hardcopies/softcopies of drawings. Please confirm.	Provision of specification requirement is clear . Bidder to follow specification requirement .

164					General- Quality Assurance	We understand for the Illumination System, there is no specific approval required for the System integrator. The illumination items to be procured as per the Customer Quality Assurance requirement.Please confirm.	Bidder understanding is not correct. Items pertaining to illumination system like Lighting mast, Poles, Lighting Fixtures, etc. are controlled as indicated in Part VI-B, E-60 subject to meeting bid technical specification. However NTPC QA does not cover any approval regarding system supplier of Illumination i.e System integrators
165	VI-B	B-17	34 of 98	8.04.03	Electromechanical Strength 120kN for 765kV Insulator String	We understand the Electromechanical Strength should be 210kN for 765kV Insulator String, please confirm.	Bidder to refer Amendment sl. no:EE-24
166	VI-B	B-17	52 of 98	11.06.00	Electrical System Data	The system data is given for 400kV, please provide data for 765kV	Bidder refer to Amendment Sl. no:EE-28 and EE-29
			57 of 98	12.02.01	The normal ruling span of the line shall be 400 meters for 400 KV towers.		
167	VI-B	B-17	89 of 98	15.07.00	Disc Insulator- Electromechanical Strength 120kN	We understand composite polymer insulators are also accpetable.The Electromechanical Strength should be 210kN for 765kV Insulator String Please confirm.	Bidder to refer Amendment Sl. No:EE-39
168	VI-B	B-17	7 of 98	1.12.03	Type Test to be conducted on AIS Circuit Breaker	We understand that type test list mentioned as per the Schedule 8-B to be considered. Please confirm.	Confirmed . Applicable for both 765KV, 132KV CB .
	Schedule 8-B			2.A & 2.B	Type Test on Ais Circuit Breaker		Confirmed
169	VI-B	B-23	2 of 10	3.01.01	The 132kV cable shall consists of single core 800 sq.mm stranded copper compacted circular conductor,	Due to long distance of approx 2000 mtrs higher size of 1000/1200 sq mm copper conductor may be required. Please confirm the same is acceptable to employer.	800 sq mm is the minmum cable size required. Further, during detail engineering actual cable sizes shall be finalised.
170	VI-B	B-23	2 of 10	3.01.04	The cable shall be suitable for installation in air, in built up concrete trench and/or directly buried in soil	132kV Cable laying in both buried cable trenches or in GI angles/Cable Trays through cable trenches are acceptable to employer. Please confirm.	The Bidder understanding is not correct .The 132kV cables can be laid in build up concrete trenches.Bidder to refer Drawing no 0000-215-POE-F-EH1.
171	VI-B	B-23	4 of 10	3.07.00	METALLIC SHEATH	Corrugated Al sheath is also acceptable, please confirm.	Bidder understanding is correct.
172	VI-B	B-23	5 of 10	5.03.00	FRP TRENCH COVER	In existing yard, the trench covers are RCC type. Please confirm RCC trench covers are also acceptable.	Bidder to comply the technical specification requirement.
173	VI-B	B-23	6 of 10	7.01.00	Cable shall be laid in built up trench. Typical sectional drawing for 132 KV built up cable trench enclosed with this chapter shall be followed	The sectional drawing of 132kV cable trench is not available. Please provide the same.	Refer Drawing no 0000-215-POE-F-EH1
174	VI-B	B-23	7 of 10	7.03.00	Selection of cable drums for each run shall be so planned so as to avoid straight through joints.	Due to very long distance of more than 2000 mtrs, and limitation of cable lengths per drum of approx 500 mtrs. Minium 4-5 joints/run is envisaged. Please confirm.	Bidder understanding is correct. Bidder can propose higher drum lenght to mininmize joints
175				Drg no. XXXX-999-POC-F-005	General Layout Plan	During Site visit, following observations are made in 132kV Cable routing(as per the General layout plan.) A) There are trees, distribution power lines, drains and railway track along the route. We understand that providing incumberance free path for laying of the 132kV cable will be in the scope of employer, please confirm. B)Dismantling of distribution power lines and railway tracks is in owner's scope. Please confim	Bidder's understanding is not correct. All associated works for routing of 132kV ST connection are in Bidder's scope. Connection including crossing of railway lines, roads and drain etc is in Bidder's scope.
						During Site visit, following observations are made in 765kV Line routing(as per the General layout plan.) A) 06 nos of Transmission line towers are marked in the drawing. It is requested that if any preliminary route survey carried out, please provide a copy of the report for referance purpose. B) Due to limited space, Narrow based towers/monopole towers are also acceptable. Please confirm.	Bidder Refer to Amendment sl. no: EE-47, Annexure -E2 preliminary route survey of S/C line. Bidder may use Narrow based Towers .
176	VI-B	B-17	51 of 98	11.03.05 d iii	The crossing shall normally be at right angle to the railway track.	We understand that the mentioned clause is not mandatory rquirement. Please confirm.	Confirmed.

177	VI-A	II-B	9 of 20	1.16.01	Bay details are as shown in the Single Line diagram associated with SIPAT STPP Stage-III (1X800MW) of 765kV Bay addition in existing 765kV Switchyard	A)We understand owner will provide clear incumbrance free land for the 765kV bay extention within the switchyard boundary. B) During Site visit, no dismantling work is observed inside the switchyard boundary with respect to roads, foundations and pipe lines. It is requested to delete the same from the switchyard scope or else provide specific details.	Bidder understanding is correct.
		II-B	11 of 20	1.16.04.II.I	Dismantling of existing Roads , fencing if required , Foundations, Re-routing of Pipe lines above the ground & below the ground available in the present scope of Bays is also in the scope of Bidder.		Bidder understanding is not correct. For extension of 765KV,132KV bays in existing switchyard, dismantling of existing road , fencing is applicable if required . The same will be finalised during detailed engg stage .
				Drg no. 9500-999-POE-J-001 Rev A	Single Line Diagram- Switchyard		The Bidder refer to Part-E Tender drawings and same is attached
178	VI-A	Annexure C to IIC	12 of 21	F	Contract quantities for CCTV SYSTEM for O&M	We understand for the current scope,CCTV cameras are not envisaged in the 765kV & 132kV Switchyard extentions. Please confirm.	Bidders understanding is not correct. However, the exact locations shall be decided during detail engineering.
179	Part_B_Book_Elec	132 kV class Post Insulators	489	06.04.01		Please provide the following details: Top PCD, Bottom PCD, Creepage Distance, Total Height of Insulator	Bidder to design the above details & consider as per the lay out requirement . The creepage distance is min. 25mm/kV ,

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180	VI/A	IIA-06	2 of 10	2.02.04	Steam turbine control fluid and its purification system along with its conditioning system shall be complete with control fluid tank, control fluid pumps with drive motors, strainers, accumulator, control fluid coolers, waste fluid tank, purification equipment including fluid circulation pumps with drive motors, associated piping,valves, fittings and specialties, hangers and supports,Instrumentation and control hardware to make the system complete in all respects for the 800 MW units	Kindly modify the spec as ,"Steam turbine control fluid and its purification system along with its conditioning system shall be complete with control fluid tank, ..., strainers / filters, ..."	Bidder to refer amendment TG-8 in this regard
181	VI/B (Mechanical)	G-07	2 of 2		Tentative Master Drawing List	Master Drawing List will be agreed and finalised after order.	Bidder's understanding is correct.
182	VI/B (Mechanical)	A-07	7 of 25	1.20.00	Type Test of Metallic expansion Joints of Steam Turbine	Type Test of Metallic expansion Joints are not envisaged.	Query with respect to reference clause is not correct. Bidder to comply with the specification.
183	VI/B (Mechanical)	A-07	7 of 25	1.19.00	Furnish turbine clearance diagram indicating values for radial & axial clearances and leakage rate from glands.	Submission of leakage rate is not envisaged.	Bidder to comply with the specification requirements.
184	VI/A	I	5 of 8	3.00.00	The tender drawings are enclosed along with the specification as Part-E, Section-VI and shall supplement the requirements specified in these technical specifications. The scope and terminal points of the equipment to be furnished under this EPC package shall be as identified in these drawings read in conjunction with text of the specification.	We understand that tender drawings for Steam Turbine & auxiliaries are only indicative and for information only. These are not binding.	Bidder understanding is not correct. Bidder to comply with the specification requirements.
185	VI/A	IV	1 of 73	1.00.01 (f)	The Contractor shall make the plant ready for the performance guarantee tests before start of Initial Operation. All CAT-1 Performance Guarantee tests shall be conducted along with initial operation.	All the efforts will be made to make unit ready for performance guarantee test before start of Initial Operation, however CAT-1 performance guarantee test shall be conducted after stabilization of Unit as per satisfaction of both parties.	Bidder's proposal reviewed and not accepted. Bidder to comply with tender requirement.
186	VI/A	IV	10 of 73	1.01.03.01 (2)	In case any of the above correction curves are not submitted along with price bid , no negative corrections shall be allowed on turbine Heat rate on this account .Positive corrections if required to be applied, the amount shall be decided by Employer. Further, no positive corrections shall be allowed on turbine output on this account. Negative corrections if required to be applied, the amount shall be decided by Employer.	Correction Curves shall be generated after approval of Heat Balance Diagrams and shall be submitted for Approval and inclusion in TG-PG test procedure.	Bidder's proposal is not acceptable. Bidder to comply with technical specification requirement.
187	VI/A	IV	10 of 73	1.01.03.01 (2)	Variation in power factor, frequency, generator hydrogen pressure and voltage	Generator is not allowed to operate with variation in Hydrogen pressure & any variations in pressure shall be taken care during operation from safety aspects. Hence, no correction curve is envisaged for the same. It may be noted that same practice is also followed in all supercritical projects like Barh, Gadarwara, Mauda, North Kanpura, Khurja, Talcher etc. Hence Hydrogen Pressure Correction Curve is not applicable.	Bidder's understanding is correct.
188	VI/B (Mechanical)	G-04	9 of 227	3.3	The turbine generator performance test is carried out according to ASME PTC 6-2004 or latest revision and technical specification. Uncertainty on the test results is not applicable on account of measuring instruments inaccuracy & Fluctuation of parameters during the conductance of test. Ageing correction is not applicable for TG Cycle Heat Rate & Output test. Test will be conducted during trial operations. No shutdown will be allowed on account of PG Test preparations.	Aging is a physical phenomenon and once steam enters into the cycle the aging of the components starts. Hence the aging period will be considered from the date of first synchronization to the conductance of PG test.	PG test shall be conducted along with initial operation. Hence, ageing correction is not applicable. Bidder to comply specification requirements.
189	VI/B (Mechanical)	G-04	14 of 227	4.7	Duration of test run shall be two hours. One hour as minimum is necessary before the test run to confirm whether the plant is at satisfactory condition for the test.	Duration of test shall be two hours, out of which most stable 1 hour period shall be selected for calculation and reporting.	Test duration is based on Standard PG Test procedure. Bidder to comply the technical specification requirement.
190	VI/B (Mechanical)	G-07	6 of 8	51	Gland leakage coefficients	Such data requested in data sheets is proprietary in nature, hence cannot be furnished.	Bidder to comply technical specification requirement.
191	VI/B (Mechanical)	A-07	7 of 25	1.18.01 Note	Any additional heat balances deemed necessary by the Employer shall be furnished. All the heat balances shall show turbine output, mechanical and electrical losses in turbine and generator and input to shaft driven auxiliaries, if any.	Mechanical losses, Generation Efficiency should be given in Guaranteed HBD's as per standard practice.	Bidder to comply technical specification requirement.
192	VI/ E	TENDER DRAWING PART-E (MECHANICAL)	–	P&ID NO. XXXX-999-POM-A-004, XXXX-999-POM-A-005, XXXX-999-POM-A-007	MS, HRH & CRH P&ID HP & LP BYPASS SYSTEM P&ID EXTRACTION SYSTEM P&ID FOR HEATERS	It is observed that multiple instruments are indicated at various locations which are not required. Bidder proposes that instrument shall be offered as per OEM practice for TG integral & LP Bypass system with philosophy of 3 instruments for protection, 2 instuments for control & interlock and one instruments for alarm / monitoring/ indication. The Instruments Valves & fittings etc. under hook-up diagrams shall be as per Bidder standard practice.	Bidder's proposal is not acceptable. Bidder shall comply to the specification requirements.
193	VI/B (Mechanical)	A-07	3 OF 25	1.11.00 (b)	<u>TG Protection:</u> Advisory trips by Operator shall be avoided. ... Apart from mandatory turbine protection, these protections shall include, but not be limited to following: a. TG Bearing temperature b. TG Shaft/bearing vibration c. Differential Expansion d. Low Main steam temperature e. Any other safety requirement as required	Only alarm on Differential Expansion & Low Main Steam Temp is available. Auto Protection is not envisaged as per OEM standrad practice. Differential expansion - As per OEM philosophy, Thermal expansion is considered during all static and transient operations in the design stage. Furthermore differential expansion is limited by monitoring various temperature measurements (turbine stress evaluator). Hence, Automatic tripping is not envisaged. This is in line with OEM standard practice and followed in all supercritical Bidder projects. Main steam low- As per OEM philosophy, The main steam and hot reheat steam temperature is typically subject to change during startup / shutdown and in steady-state operation. During startup the temperature is regulated via X-criterias and stress margins. In steady state operation the temperature should remain steady unless major transient (for example load rejection, issues in boiler). In either case the temperature is not expected to violate the limit value. Limit violation is regulated within limits as per IEC-45 which includes control behavior and the thermal inertia of the steam generator and the operating conditions which normally occur in power plants and taken care in SG/BoP systems. Hence main steam low protection is not envisaged in TG functional group. This is in line with OEM standard practice and followed in all supercritical Bidder projects.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
194	VI/B (C&I)	IIIC-03	1 OF 2	1.00.00 (i)	Differential expansion (of HPT, IPT & LPT), overall expansion (of HPT & IPT), bearing vibration, computed absolute shaft vibration (from relative shaft vibration and bearing vibration)	1.) Inherent design of OEM (push rod mechanism) does not pose requirement of relative expansion measurements in IPT turbine in all load regimes. The expansion in IP turbine in subsequently shifted to LP turbine by push rod mechanism concept. Hence, differential expansion at only HPT front and LPT rear end are provided. 2.) At low speeds, shaft vibration is an indication of eccentricity. Separate eccentricity probe is therefore not provided. 3.) At each bearing pedestal of the turbo set the following vibration measurements are taken a) Relative shaft vibration in X&Y direction b) Two absolute bearing pedestal vibration in either X or Y direction This is in line with OEM standard practice and followed in all supercritical Bidder projects.	Specification requirement is clear. Bidder shall comply to techical specification.
195	VI/B (C&I)	IIIC-01	1 OF 6	04.00.00	STANDARDISATION AND UNIFORMITY OF HARDWARE	It may not be feasible to supply primary and secondary instruments of the same make as various units of Bidder are involved. Some of the package supplied by Bidder- Haridwar are bought out from vendor in assembled condition. This is as per Bidder's Standard and proven practice.	Specification requirement is clear. Bidder shall comply to techical specification.
196	VI/B (C&I)	IIIC-07	6 OF 6	6.00.00	FIELD MOUNTED LOCAL JUNCTION BOXES (As per standard and proven practice of vendor)	Aluminium casted and fabricated Junction boxes shall be provided for Turbine area.This is as per Bidder's standard and proven practice.	Bidders proposal not accepted. Bidder to ocmply technical apecifications
197	VI/B (Book 2 of 5 Elec)	IIB-02	1 OF 4	3.01.00	AC MOTORS	All LT motors continuous duty type conforming to IS 12615, or IEC:60034-30, premium efficiency class- IE3 shall be provided. This is as per Bidder's standard and proven practice.	Bidder proposal is not acceptable. Specification cl. no.3.01.00 (b) Sub -Section B-02 Section-VI, Part-B to be followed.

198	VI/B (C&I)	IIIC-04	2 OF 36	2.01.00	SPECIFICATION FOR ELECTRONIC TRANSMITTER FOR PRESSURE, DIFF PRESS AND DP BASED FLOW / LEVEL MEASUREMENTS	All field electronic transmitter shall be HART protocol complied for STG and auxiliaries area. This is in line with OEM standard practice and followed in all supercritical Bidder projects.	Refer amendment sl. No. C-05 in this regard
199	VI/B (book 2 of 5 Elec.)	B-01	7 of 25	6.00.00 (15.E)	At least six (6) numbers of dual axis optical sensor type vibration pickups at each end of overhang portion of the winding shall be provided, symmetrically located around the periphery with connection to Turbine Supervisory system for vibration monitoring and trend recording. Suitable connection between the pickups and Turbine Supervisory system for vibration monitoring shall be provided. Also a standalone system for the vibration monitoring system is also acceptable.	As Generator winding bars are tightly fitted/bounded with each other and further suitable support has been provided to each bars. Hence, very less vibration seen in tangent direction and vibration always seen in radial direction only. Hence, as per OEM standard practice and to meet tender specification requirements, Bidder propose to provide 12 No. single axis (instead of dual axis) optical sensors each side (TE EE side) for measuring radial vibration only.	Bidder proposal is not acceptable. Specification cl. no.6.00.00 (15)(E) Sub -Section B-01 Section-VI, Part-B to be followed.
200	VI/B (Mechanical)	G-07 (Tentative master drawing list)	2 of 43	120	Drawings and datasheet of shell side/tube side relief valves of drain cooler and LP Heaters (2, 3, 4 & 5).	LPH-1 &2 shall be in the neck of condenser. Requirement of drawing & datasheet for shell side/tube side relief valves for LP Heater-2 is also not applicable. Therefore, it is requested to clarify and confirm the requirement of referred documents/drawings for LPH-2.	Master Drawing List (MDL) provided in the Specification is Tentative. MDL shall be finalized after the award of the package.
201	VI/B (Mechanical)	A-07	7 of 25	2.00.00 (d)	Minimum material grade/standard has been specified for the condensing plant. However, bidder may opt for better material.	Minimum material grade for shell, water boxes & other parts of condensing plant is not given. Therefore, it is to clarify whether IS 2062 Gr-BR E250 qualify for the minimum material grade/standard for condensing plant (condenser). Bidder has been using material as per IS 2062 in all the 800MW/ 660MW/ 500MW sets supplied to various utilities which are in operation for last 25-30 years and it is suitable for intended purpose.	Bidder to refer Amendment TG-10 in this regard
202	VI / B (book 2 of 5 Elec)	II-B-02 (MOTORS)	1 of 4	5.00.00	Temperature Rise: Air Cooled motors: 70deg C by resistance method for both thermal class 130(B) & 155(F) insulation.	Air Cooled motors: 70deg C by resistance method for both thermal class 130(B) & 155(F) insulation. However, it is understood that for DC motors, as the class of insulation is class H, hence the temp rise shall be limited to 95 deg C.	Bidder's understanding for DC Motors is correct.

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203	VI/A	IB	11 of 19	Annexure IV-2	DOMESTIC COAL CHARACTERISTICS: Ash(%) in Design coal As per Proximate analysis:39.5% As per Ultimate analysis:41%	Please clarify % of ash in design coal to be considered.	Bidder to refer to Amendment to technical specification Sl. no. SG.3 in this regard.
204	VI/A	IB	11 of 19	Annexure IV-2	2.11 HGI: 45 (For Design coal) and 40 (For Worst coal)	HGI mentioned in SIPAT coal analysis is lower when compared with similar Indian coals. Generally for Indian coals, HGI will be more than 50. Please review and revise the HGI of Design coal and worst coals.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
205	VI/A	IB	11 of 19	Annexure IV-2	4.0 Ash fusion range Hemispherical temperature:12150 Deg.C for worst coal (Range of coal supplies 95% and 5%)	Bidder understands that this value is 1215 Deg.C. Please confirm.	Bidder to refer to Amendment to technical specification Sl. no. SG.3 in this regard.
206	VI/A	II A-01	21 of 28	2.24.01 (2) (V)	One intrascope suitable for inspection of all steam generator pressure parts……	Bidder propose to offer alternative design of video scope, which is advanced and refined version of intra scope. Customer is requested to accept both intra scope & video scope for this application	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
207	VI/B	A-02	32 of 67	11.03.04, IV	LDO pumps:3 (2 working + 1 standby)	LDO pumps:2 (1 working + 1 standby) as per Fuel oil scheme. Please confirm.	Bidder to refer to Amendment to technical specification Sl. no. SG.38 in this regard.
	VI/E	Fuel oil scheme	24 of 91		LDO pumps:2		
208	VI/A	II A-01	24 of 28	2.30.00	Specific features catering to boiler reliability… 4. Ceramic removal pads insulation to be provided in area requiring frequent insulation removal like Burner panel area and soot blower area.	1. Burner Panel / Wind box will be insulated with Ceramic Fiber Blanket in place of Ceramic Pad type insulation as the application area needs flexible type of insulation material. 2. Soot Blower area is covered with a seal box, which is filled with Castable Refractory of Gr. A and over the seal box Ceramic Blanket insulation will be installed.	The details shall be discussed based on the type of burner/system offered, during detail engineering stage, to have O&M flexibility. Bidder to supply in line with specified requirements.
	VI/B	A-13	7 of 8	2.03.00 (9, b)	Burner panel and Soot Blower area. - Ceramic Pad type insulation		
	VI/B	A-13	7of 8	2.03.00 Sl. No. 9-b	Burner panel and soot blower area: Ceramic pad type insulation.	1. Burner Panel / Wind box is insulated with Lightly Resin Bonded Wool. 2. Soot Blower area is covered with a seal box, which is filled with Castable Refractory of Gr. A and over the seal box LRB Wool insulation is applied. This is the established design practice followed in all boilers and Ceramic pad type insulation is not feasible.	
209	VI/A	II A-01	24 of 28	2.30.00	7. Boiler to be provided with vacuum cleaning system network to ensure proper hygiene. In this context portable system to capture the ash around the boiler peripheral surface shall be provided along with net worked transmission of captured ash to a common location. Following specific elevations of Boiler requiring installation of vacuum cleaning arrangement in Boiler Front, Rear, LHS and RHS are also to be covered other than required areas: 1) Penthouse Floor 2) Gooseneck area floor covering both first pass and backpass. 3) Boiler Scaffolding door floor covering both first pass and backpass 4) Top wall blower tier floor covering both first pass and backpass 5) Top burner top floor covering both first pass and backpass 6) Burner bottom floor covering both first pass and backpass 7) S Panel (approx.8.5 to 9M)	Customer requested to provide more details / reference of this system. Bidder understanding is to provide portable vacuum cleaners (7 Nos.) with de-dusting bin at each location.	Bidder to comply with the installation of vacuum cleaning arrangements as per the specifications requirement.
210	VI/A	II A-01	25 of 28	2.30.00	8. Safety valves and critical valves to be provided with temperature & sound monitoring (may be **IOT based**) to detect early passing and ensure reliability. Temperature point shall be provided on these valves/lines. For control and monitoring purposes the temperature values shall be taken between 50-75 Deg. C and sound value normally less than 75 db as trigger. The necessary provision shall be accordingly provided with alarm signal in the control room. Further, following may be noted w.r.t. above scope for temperature measurement on critical valves for passing a. All valves including drain and vents in critical piping such as M.S.Stop valves and its integral bypass valves, Boiler Startup vent, M.S.Pipe drains and vents, CRH & HRH pipe drain & vents b. All master drains of SH and RH spray station. c. Drains & Vents of circulation system d. Sonic leak detection system installation in Safety valves & ERV: 1) Installation of Sonic leak detection system installation in all SLSV and ERVs of critical piping's such as M.S. Safety Valves & ERV/ EBV, CRH SV, HRH SV & ERV/ EBV.	Safety valves with sound monitoring (IOT based) is not available. Hence safety valves shall be without sound monitoring. Safety valves & ERV with sonic leak detection is not available. Hence safety valves and ERV shall be without Sonic leak detection sys-tem	This shall be discussed during detail engineering in line with specification requirement.
211	VI/A	IV	2 of 73	1.00.01, (g)	Instruments for PG test and instruments for process control of similar applications are envisaged to be of same make and model having same accuracy level. …… Instruments to be used for PG test shall be additionally supplied over and above the instruments shown in tender P&IDs. PG test equipment being supplied, installed and commissioned for each unit, shall be retained by employer after completion of PG test. Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation. All PG test process parameters shall be made available in DDCMIS	Most of the boiler parameters will be recorded through plant instruments only. Flue gas & Air side temperature measurements will be done as per grid based method (In line with Code requirement) and due to corrosive environment, keeping more number of TCs & O2 tapping Probes continuously in the field may leads to failure/chocking of these instruments. Hence, as per specification, additional instruments like TCs and probes required for PG Test will be supplied along with main supply. However, installation of these instruments can be done at site just before the PG test. Calibrated Flue gas analyser will be brought to site for measuring flue gas composition @ ECO outlet / APH Outlet offline.	Specification requirement is clear. Bidder shall comply to technical specification.
212	VI/B	A-02	6 of 67	3.02.01	The stability of the thermo-hydraulic design of the evaporator shall be demonstrated by the contractor by conducting stability analysis (both static and dynamic) of the finalized evaporator design. As a part of the static stability, interalia, the outlet temperature profile for each tube at the intermediate header inlet (if applicable) and vertical wall outlet header be calculated. The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable, and vertical wall outlet). These thermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere. In case the temperature variance in the evaporator tubing temperature during such demonstration is found to exceed the design considerations necessary modifications to the evaporator flow circuits shall be done by the contractor to control the tube temperatures. The mechanical design of the evaporator shall be carried out considering its primary stresses due to internal pressure as well as secondary stresses due to loads like weight membrane panel, buckstays, ash, and other elements loaded on evaporator, differential stresses restrained thermal expansion be-tween evaporator tubes and the evaporator support elements etc. The calculations in support of the same shall be submitted by the contractor.	Stability analysis (both static and dynamic) and other calculations of the evaporator design are proprietary in nature and the same will not be submitted.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.

213	VI/B	A-01	6 of 87	1.05.02, (d)	The working fluid temperature to be considered for design of pressure part tubes starting from water wallbottom ring header upto and including the water wall outlet headers shall be arrived by adding an additional margin of minimum 40°C to the maximum predicted/expected fluid temperature in these pressure parts. The working fluid temperature to be considered for design of pressure parts starting from downstream of water wall outlet headers upto first stage of superheater attemperation shall be arrived by adding an additional margin of minimum 15 deg C to the maximum predicted/expected fluid temperature in these pressure parts. The margins as per IBR and other codes shall be taken over and above the working fluid temperatures so arrived. For the other pressure parts where no design margin is specified in the IBR and the above specified 40 °C or 15°C margin is not applicable, the working fluid temperature to be considered for design of pressure parts shall be arrived at by adding following margin to the maximum predicted/expected fluid temperature in these pressure parts: i) 5 °C for inlet headers and its connecting tubes, pipes downstream and upstream of attemperators and other pipes in pressure parts. ii) 15°C for outlet headers and their connecting tubes except at final super heater and final reheater outlet. iii) For final super heater and final reheater outlet a margin of 5°C shall be taken.	Pressure parts design temperature will be based on worst case of all operating conditions and over and above adding additional margin will increase the thickness of the pressure part components. For cyclic loading design thickness of components is important and should be as minimum as possible and hence margins will be as specified in the IBR. Customer is requested to remove requirement of additional margins specified in the specification.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
214	VI/B	A-01	7 of 87	1.05.02, (e)	(v) Upto & above 610 degree Celsius Austenitic stainless steel, SA- 213 UNS S30432 Shot Peened, or approved equivalent.	TP347H Shot peened also shall be included in the list.	The specifications are the minimum requirement. Bidder to comply specification requirement. Further, if the bidder feels to utilize any improved version towards overall reliability and hence the improved boiler performance, then the same should be substantiated with proven references & data.
215	VI/B	A-01	8 of 87	1.05.04, (5)	Means of Temperature Control (b) REHEATERS* Tilting of burners/gas biasing/gas recirculation (gas to be tapped off after ID fans), spray water attemperation (utilising water tapped off from interstage of BFP)	Excess Air will also be used for RH Temperature control as per Bidders practice.	Agreed. However, the bidder has to carfeully select the excess air requirement and within allowable limits as governed by the upstream and downstream equipment sizing (like FD & ID fans) so as not to increase the pressure drops, velocities & power consumption of the equipment/fans handling air & flue gas.
216	VI/B	A-01	9 of 87	1.05.05	(vi) Maximum depth of tube banks/sections in the direction of gas flow: 2 Meters or maximum soot blowing radius, whichever is lower.	Economiser bank depth may be allowed upto 2.5mtrs to include economizer future area addition with present for optimum design.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
217	VI/B	A-01	20 of 87	1.05.14.01, a,3	The flue gas flow & ash accumulation patterns at such part/low loads shall be studied based on the CFD/Physical model test (PMT) of ducts & ESP as part of this contract. The same along with contractor's experience of similar cases (boiler/coal& ash type etc.) shall be used for selecting the final gas velocities by the contractor.	Duct sizes are decided based on duct sizing criteria specified in the specification. Duct layout/ routing is based on space available. Equal distribution of gas flow is ensured by maintaining symmetrical arrangement.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
	VI/B	A-02	39 of 67	13.01.01	CFD Modeling	Physical model test (PMT) of ducts & ESP results as part of this contract is more accurate than CFD	
218	VI/B	A-02	40 of 67	13.01.02	For flue gas ducts downstream of ESP, additional fly ash loading on the surface or for one tenth of duct full of ash or for maximum possible accumulation of ash in the ductwork, under all normal, upset or abnormal operating conditions, whichever is higher.	Bidder will consider 1 ft of ash in the duct after ESP, since ash concetration in flue gas after ESP is minimal.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
219	VI/B	A-02	8 of 67	3.07.00	Provide stainless steel expansion markers/indicator on all the four furnace walls to monitor thermal expansion. Predicted thermal expansion at different levels to be indicated. In addition to local indicators, measurement system (4-20mA Output) for remote indication shall also be provided on all the four furnace walls.	Product meeting this specific requirement is not available with contacted vendors & online sources. No such system can be offered.	Bidder proposal is not acceptable. Bidder to comply to specification requirement. Further the same shall be discussed and finalized during detailed engineering for a suitable solution.
220	VI/B	A-02	11 of 67	6.04.00	The pump shall be suitable for cyclic operation as specified in part-A-01 of part-B of the technical specifications. The specific features adopted in this regard shall be brought out by the contractor like casing shape & design including its curvature/corner radius, stress concentration areas, no. of pieces/joints for a pump casing, materials adopted, performance monitoring etc. with proper justification. A CFD and FEM analysis to conform to specified cyclic requirements shall be carried out and furnished by the contractor alongwith the pump data sheet. Online monitoring requirements on the pump casing/heat barrier shall be recommended by the OEM like an array of thermocouples to give adequate indication of temperatures. The pump OEM shall share the test/inspection/feedback data of high load cycling power plant cases where the offered pump design has been successfully run.	Boiler recirculation pump is in operation during wet mode/less than minimum once through load only. Cyclic loading requirements are specified for the loads above minimum once through load, where pump will not be in operation. Hence these additional requirements are not required and not considered.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
221	VI/B	A-02	14 of 67	7.01.01, 10	Space Provision Keep provision of space for atleast 20% ad-dition of additional economizer and 10% for the reheater surfaces in future. The surface provisioning shall be flue gas upstream sec-tion of the economizer. Structure/hanger de-sign shall be suitable for loads due to these additional surfaces (filled with water) also.	Bidder understands, provision of space requirement mentioned is for the heating surfaces provided in second/back pass (horizontal banks). Customer to confirm.	The space requirements are mentioned for the type of heat transfer surfaces as specified. Bidder to comply with the specifications requirements.
222	VI/B	A-02	15 of 67	7.02.02	For continuous monitoring of temperature variation across the length of the headers six (06) thermocouples shall be provided on each Superheater header and reheater header except the final superheater header. The number of thermocouples for each final superheater header shall be 30. This re-quirement is over and above the require-ments specified in clause no. 7.02.01 above.	Thermocouples will be provided on inlet and outlet headers of Pendant / Horizontal superheater / reheater sections only. Headers of steam cooled Roof / Enclosures are not considered for this requirement. Further in case of split header (i.e. when a header is split to take care of expansion issues), it is considered as a single header for the purpose of thermocouples.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement. Split headers to be considered as separate headers for the purpose of thermocouples.
223	VI/B	A-02	40 of 67	13.01.06. (iii)	Pipe struts, trusses, bracing: ASTM A 53 or equivalent seamless steel pipe. Material conforming to equivalent Indian standard shall also be acceptable.	ERW pipe also may be accepted, since it is confirming to the functional requirement.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirement.
224	VI/B	A-02	40 of 67	13.01.05 (a)	Minimum 8 mm thick steel plates for gas ducts upstream of ESP and minimum 6mm thick steel plates for gas ducts downstream of ESP.	• The duct to absorber inlet tapping is at downstream of ESP ducting. Hence, 6 mm thickness will be provided as per Section VI/Part B, Sub section A-02, page 40 of 67, clause 13.01.05. (a).	Bidder to refer to Amendment to technical specification Sl. no. SG.24 in this regard.
	VI/B	A-05	5 of 29	3.02.04	The duct to Absorber inlet shall be made of Carbon steel of minimum 7mm thickness. The duct from Absorber outlet to bypass duct & duct after by pass damper/gate to chimney inlet shall be made of cladded sheet of minimum 2 mm thickness of either Titanium (Grade 2 as per ASME SB265) or C-276 over 7 mm thick (minimum) mild steel base metal. Cladding shall be done to achieve the required quality as per ASTM B 898-11.	• The duct from Absorber outlet to bypass duct & duct after by pass damper/gate to chimney inlet shall be made of cladded sheet of minimum 2 mm thickness of either Titanium grade 1 or C276 or Glass flake lining over 6mm thick (minimum) mild steel base metal.	
225	VI/B	A-02	42 of 67	13.01.09 (b)	(2) …Such internal stiffeners for the flue gas duct between boiler and ESP shall be provided with erosion protection shields.	Internal stiffenetrs are provided with sufficient thickness to take care of the flue gas erosion. Separate erosion protection shields are not required.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
226	VI/B	A-02	49 of 67	15.18.00	The furnace should be provided with wall blowers so selected such that cleaning coverage per wall blower should not be more than 2m in radius and there should be no left out portion. One wall blower elevation below the lowest burner elevation shall be provided along with wall blowers located immediately above top elevation coal burners upto the horizontal plane at the furnace nose tip at entry to the radiant superheater…	Bidder does not recommend wall blowers upto the horizontal plane at the furnace nose tip. Wall blowers will be provided in furnace zone below intermediate header (spiral to vertical wall). Bidder Supplied wall blowers/LRSBs have a cleaning radius of 3m and working satisfactorily in all of bidder supplied boilers. Hence coverage of wall blower/LRSBs shall be with 3m cleaning radius.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
	VI/B	A-02	50 of 67	15.21.00	While deciding coverage of LRSBs the maximum coverage of LRSB shall not be con-sidered more than 2m of blowing radius		
227	VI/B	D-1-5	2 of 78	5.02.01	Bidder shall integrate the Mill & Bunker Build-ing with boiler supporting structure.	Boiler will be integrated with Mill building through interconnection platforms at required levels.	Bidder's proposal is acceptable.
228	VI/A	II D	5 of 8	1.00.01	All steel structures shall be fabricated in factory, transported and erected at site. All factory-fabricated structures shall have bolted field connections.	For SG Bidder agrees to provide the type of bolts mentioned in this clause for field connections Field Structural Connections shall be as follows, 1) Main Columns : Fully Bolted Connections 2) Column to Beam : Connecting Cleat is welded with Column and bolted with Beams 3) Column to Vertical bracings : Gusset is Welded with Column and Bolted with Bracings. 4) Ceiling Structures : Connecting Cleat is bolted with girder and welded with beams 5) Horizontal truss and mid landings : Fully Welded Connections 6) Platforms : Fully Welded Connections 7) ID system structure : Fully Welded Connections	Bidder's proposal is not acceptable. Bidder to comply with the specification requirement.
	VI/B	D-1-8	10 of 20	8.07.00	All steel structures shall be fabricated in factory, transported and erected at site. All factory fabricated structures shall have bolted field connections.		
229	VI/B	D-1-8	10 of 20	8.07.00	All steel structures shall be fabricated in fac-tory, transported and erected at site. All fac-tory fabricated structures shall have bolted field connections… Note: …Site welding can be permitted in special cases where final inputs are not available before release of fabrication drawings.		

230	VI/B	A-01	13 of 87	1.05.08.03	Minimum Guaranteed Life of Coal Pulverizer Wear Parts ITEM MINIMUM LIFE IN EQUIVALENT HOURS (1) Seals 20000 (2) Grinding elements 8000 [See note (a) below] (Rolls/Balls and Rings/Race) (3) Mill discharge valves 15000 (4) Classifier cone and 25000 other items lined with Ceramic material (as applicable) (5) Classifier vane 25000 (as applicable)	For the offered mill: a) Seals are not applicable for offered mills. d) Classifier Cone not applicable for offered mills. e) Classifier vanes not applicable for offered mills.	The specified life details are for the wear parts as defined elsewhere in the specifications (refer Sub-section-VI, part-A also). Accordingly, the same shall be applicable. Further, the details shall be discussed during detail engineering based on the type of pulverizer offered and their corrseponding specific wear parts in line with the specifications requirements.
231	VI/B	A-02	25 OF 67	10.05.13 ii & iii	(ii) Grinding Rings/Race - Material with hardness 550 BHN (min.) at surface (with adequate chilled depth). (iii) Grinding balls/rolls - Material with hardness 350 BHN (min.)	Grinding rings/ Race is termed as bull Ring segments as per our of-fered design. Material of construction – Rolls' Inserts & Bull Ring Segments shall be of Sintered carbide. The inserts shall be bound with soft grey iron metal for the Rolls. The hardness difference shall be less than 100 BHN, but would not affect the performance of the same.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
231	VI/B	A-02	26 OF 67	10.05.17	Provide suitable arrangement for readily determining the oil level in the gear box(es) and all other lubricated parts.	lubrication for gearbox is circulating type lubrication system. Level is monitored in lube oil tank.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
233	VI/F	VI	8 OF 38	1.06.00 (13)	Hydraulic loading cylinder	Not Applicable for offered mill (Functional Equvalent is Spring, which is already covered under 1.06.00(11)).	Bidder to provide the equivalent item in case of non-applicability in provided system/equipment. Further, Bidder to refer clause 13.00.00 of sub section-VI, Part-A, Section-VI of Technical Specifications. The specifications requirements are clear and bidder to comply the same.
234	VI/F	VI	8 OF 38	1.06.00 (15.4)	Mill Bottom	Mill Bottom is applicable for mills with worm-Type gearbox. Mill is offered with planetary gear box. Functional equivalent is not applicable for offered mill.	Bidder to provide the equivalent item in case of non-applicability in provided system/equipment. Further, Bidder to refer clause 13.00.00 of sub section-VI, Part-A, Section-VI of Technical Specifications. The specifications requirements are clear and bidder to comply the same.
235	VI/F	VI	8 OF 38	1.06.00 (25)	Mill lower skirt	Not aplicable for offered mills. Functional equivalent is not applicable for offered mill.	Bidder to provide the equivalent item in case of non-applicability in provided system/equipment. Further, Bidder to refer clause 13.00.00 of sub section-VI, Part-A, Section-VI of Technical Specifications. The specifications requirements are clear and bidder to comply the same.
	VI/F	VI	8 OF 38	1.06.00 (27)	Classifier blades	Classifier blades are not applicable for offered mill (Dynamic Classifier is offered). Functional equivalent is not applicable for offered mill.	
236	VI/B	G-06	12 of 14	3.05.01 (g)	Standard commissioning tests and procedures as per Contractor's practice for Steam Generator, SCR System, FGD System and other equipment / auxiliaries.	Standard commissioning tests and procedures for SCR system supply shall be exclcuded.	Bidder's understanding is correct.
237	VI/ A	IIA-03	1 of 1		Biomass Further, the related special monitoring & analytical instruments on account of bio-mass co-firing towards satisfactorily performance of the boiler & auxiliaries are also included.	Monitoring & analytical instruments for Biomass co-firing as appropriate for our design are considered in bidder's scope of supply. M/s NTPC is requested to indicate any special monitoring & analytical instrument for bio-mass co-firing in tender specification.	Bidder to consider all required Monitoring & analytical instruments as per system/process requirements as specified in the specification.
238	VI/ A	IIB	3 of 20	1.05.02	LV SWITCHGEARS... The LV switchgears is of Intelligent type for Motor controller	Soot blowers are fractional HP motors powered from Soot blower MCC (SBMCC). Hence, bidder proposes to envisage conventional type Soot Blower MCC without Intelligent motor controllers and associated specification requirements. M/s NTPC is requested to confirm.	Bidder Proposal is acceptable.
	VI/ B	B-0	7 of 15	3.06.00 (f)	LV Switchgears f) For protection of motors below 30kW, MPCB (only Short-circuit release) and Intelligent motor controller (IMC) with current sensing module shall be provided ...		
	VI/ B	B-0	10 of 15	3.07.00	The Design Philosophy shall be as follows: (c) All LT Contactor controlled motor/heater feeders shall be controlled from DDCMIS through Intelligent Motor Controller (IMC) on profibus DP communication.		
239	VI/B	IIIC-07	5 of 6	1.01.00	Note: Heat resistant instrumentation cable shall have same specification as of G/F type instrumentation cable as specified above, except that insulation and outer sheath material shall be Teflon and cable shall be suitable for continuous operation at 205 Deg. C	Tender specification calls for outer sheath thickness of 1.8mm for Teflon insulated cables which is not inline with the JSS51038 standard which is applicable for Teflon insulated heat resistant instrumentation cables(G/F type). M/s NTPC is requested to review and issue amendment on the outer sheath thickness requirement for Teflon insulated cables.	Refer ammendment Sl. No C-17
240	VI/B	II-A-02	8 of 67	3.07.00	In addition to local indicators, measurement system (4-20mA Output) for remote indication shall also be provided on all the four furnace walls.	M/s NTPC is requested to provide type of measurement and detailed specification for furnace thermal expansion measurment system.	Bidder to provide any type of suitable measurement to meet the intent of specification.
241	VI/A	II-A-01	24 of 28	2.30.00 (6)	Flue Gas Ducts to be provided with strain gauge/ ash level meter at sharp bend locations of duct and common duct area after airpreheater.	M/s NTPC is requested to provide type of measurement and detailed specification for flue gas duct ash level meter.	Bidder to provide any type of measuring instrument suitable for monitoring of dust level in the flue gas duct. Further same shall be discussed and finalized during detailed engineering.
242	VI/B	II-A-02	6 of 67	3.02.01	The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable, and vertical wall outlet). These thermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere.	M/s NTPC is requested to provide detailed specification for metal temperature thermocouples to be provided for this purpose.	Bidder to refer clause no 3.03.00, Sub Section-IIIC-04, Part-B for technical specification of metal temperature thermocouples.
243	VI/A	I	6 of 8	4.08.00	All the plant layouts shall be made in computerized 3D modelling system as detailed in Part C of the Technical Specification.	It is clarified that for Steam generator & auxiliaries, • 3D Plant review model of boiler reflecting "as de-signed" conditions will be delivered at the end of the project • 3D model will be utilized to develop plant layouts and for interference checking internally, however, finalized drawings will be completed using Auto CAD • Major equipment & sub system of the boiler will be covered in the plant modeling. • 3-D modeling will be started after completion of engineering only & not connected to any contract schedule. • Review model only will be submitted Further, P&IDs will be created as per Bidder's standard practice.	Bidder proposal is reviewed and not accepted . Bidder to comply with tender specifications .
244	VI/C	GTR	15 of 119	8.03.04, a(i)	All the plant layouts shall be made in computerized 3D modelling system. The Employer reserves the right to review the 3D model at different stages during the progress of engineering. The layout drawings submitted for Employer's review shall be fully dimensioned and extracted from 3D model after interference check.		

245	SECTION-VI, PART-A	SUB SECTION-II A-01	8 of 28	2.11.01	…..all auxiliary steam piping to SCAPH, mill fire fighting etc. and drain piping from SCAPH tank(s) to atmospheric flash tank	There is a mismatch among three clauses. Bidder propose to take the condensate/drain from SCAPH directly to atmospheric flash tank .	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
246	SECTION-VI PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	23 of 87	1.05.18.01	The atmospheric flash tank shall be sized to receive following …..All drains from Steam Generator such as drains from water wall headers, attemperators headers, SCAPH drains, soot blowers drains, superheater, reheater etc.		
247	SECTION – VI, PART-B	SUB SECTION-A-02STEAM GENERATOR & AUXILIARIES INCLUDING ESP	21 of 67	9.02.02	Condensate from SCAPH, through SCAPH tank, shall lead to atmospheric flash tank in the boiler area		
248	SECTION – VI, PART-B	SUB SECTION-A-08 Power Cycle Piping	1 of 19	1.02.00	Bends used in Piping of BFP-T Exhaust to Condenser should be of Alloy Steel of A 691 Grade 2 – ¼ Cr class 21 / 22 or A – 691 grade 1- ¼ Cr Class 21 / 22	Material of Bends used in Piping of BFP-T Exhaust to Condenser shall be same as that of parent pipe.	Bidder's proposal not acceptable. Bidder to comply specification requirement.
249	SECTION – VI, PART-B	SUB SECTION-A-08 Power Cycle Piping	6 of 19	1.07.00 Note 6	Bends in BFP-T Exhaust Piping to condenser shall be of alloy steel of A691-2¼Cr.CL- 21/22 or A691-1¼Cr. CL-21/22.		Bidder's proposal not acceptable. Bidder to comply specification requirement.
250	SECTION – VI, PART-B	SUB SECTION-A-08 Power Cycle Piping	4 of 19	1.07.00	SPECIFICATION FOR PIPES & FITTINGS: Construction of Alloy steel fittings -Seamless	Construction of alloy steel TEE's may also be allowed from seamless forged components in line with spherical wye piece.	Bidder's proposal not acceptable. Bidder to comply specification requirement.
251	SECTION – VI, PART-B	SUB SECTION-A-08 Power Cycle Piping	11 of 19	1.12.00 (2)	Bend thinning allowance shall be provided for all bends as per the recommendations of ASME B 31.1. However, bidder/contractor shall ensure that the minimum wall thickness at any point in the finished bend shall not be less than the calculated minimum straight pipe wall thickness.	Bend thickness for the various portion of the bends (Extrados, Intrados and straight) shall be as per ASME CI 102.4.5 and latest IBR regulation.	Bidder's proposal not acceptable. Bidder to comply specification requirement.
252	SECTION – VI, PART-B	SUB SECTION-A-08 Power Cycle Piping	14 of 19	2.07.00(1)	Each rod of a double rod hanger support shall be designed for the full hydro test load coming on the double rod hanger assembly	Each rod of a double rod hanger support shall be de-signed for operating load coming on the double rod hanger assembly.	Bidder's proposal not acceptable. Bidder to comply specification requirement.
253	SECTION – VI, PART-B	A-9 Low Pressure Piping	4 OF 20	2.03.05	IS-2062 Gr.-E-250B/ASTM A-36/ASTM A-53 type 'E' Gr. B/IS-3589 Gr. 410 /IS-1239 Heavy.	IS -2062 GR-E-250 A may also be allowed	Bidder's proposal not acceptable. Bidder to comply specification requirement.
254	SECTION – VI, PART-A	TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	1 of 3	1.06.00	Terminal point for LDO supply and return	Please specify the loacation(Terminal point) on existing supply and return fuel oil header from which tap off has to be taken.	Bidder to refer amendment sl. No. MH-52
255	SECTION – VI, PART-E	Tender Drawings	24 of 91	Fuel oil scheme	Fuel oil scheme		

SL. NO	BID SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
256	Sec-VI, Part-A	Sec-IIA-06	6 of 10	6.01.00	One set of test kit for measuring oxygen content at deaerator outlet shall also be provided for the station.	Online oxygen measuring provision is being provided by Bidder. Hence, Offline test kit for measuring oxygen content at deaerator outlet is not required. Customer is requested to accept above.	Specification requirement is clear in this regard. Bidder to comply specification requirement
257	Sec-VI,Part-B	Sub-Sec-A-01	38 OF 87	2.03.07	Maximum oxygen content shall be 0.005 cc/lit at deaerator outlet measured as per ASTM-D-5543-09 or Indigo carmine method at all operating condition.	All super critical units operated in oxygenated treatment mode and hence guarantee for maximum oxygen content in feed water system is not applicable for super critical sets.	Sometimes there may be requirement of AVT operation during unit running also. In case of oxygenated treatment mode oxygen content may be more but when unit will run in AVT mode this should be less than 0.005 cc/lit. So dearator should be capable for maintaining maximum oxygen content of 0.005 cc/lit at deaerator outlet.Bidder to comply specification requirement.
258	Sec-VI,Part-B	Sub-Sec-G-07	1 OF 2	1.00.00	Tentative Master Drawing list :	Only GA drawing of Heat Exchangers shall be submitted to customer at contract stage for review and approval. Submission of any type of calculation/Crossectional drawing (being proprietary in nature) is not envisaged.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
259	Sec-VI,Part-B	Sub-Sec-A-01	38 OF 87	2.03.07	Deaerator capacity below low-low level (BFP tripping point) shall have minimum value of 80m3 (Without dished end volume)	Deaerator Low-Low level shall be 500mm from the bottom of the tank as per Bidder standard practice.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
260	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25 & 12 OF 25	5.01.00 & 5.03.00	Low Pressure Heaters and Drain Cooler : Horizontal and U-tube type with integral drain cooler. HIGH PRESSURE HEATERS HP Heaters with de-superheating, condensing and Drain cooling section.	Heaters will be provided with Desuperheating, Condensing and Drain cooling zone as per design Code requirements (HEI).	Specification requirement is clear in this regard. Bidder to comply with the specification requirements.
261	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25 & 12 OF 25	5.01.00 & 5.03.00	Tube shall be expanded hydraulically in tube sheet.	Tube to tube sheet shall be roller expanded.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
262	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25	5.02.00 (e)	Hardened 400 series stainless steel impingement plates for flashed drain inlet from HP heaters, BFP recirculation, boiler startup drains etc.	As per bidder's experience of super critical plants, Hardened 304 series stainless steel impingement plates are also suitable for this purpose. Customer is requested to amend the clause as " Hardened 400 series or 304 series stainless steel impingement plates"	Hardened 400 series stainless steel is better material for specified requirements. Bidder proposal is not acceptable. Bidder to comply specification requirement.
263	Sec-VI,Part-B	Sub-Sec-A-07	11 OF 25	5.02.00 (f)	All water spray valves, splash plates, trays, vent condenser and other elements in contact with undeaerated water or non-condensable gases shall be of SS-304 or SS-410	Customer is requested to modify the clause as follows Elements in contact with undeaerated water or non-condensable gases shall be of SS304 material / SS304 lining material. This is in line with the Deaerators supplied for all 500 MW and above projects.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
264	Sec-VI, Part-A	Sub-Sec-II-A-06	3 of 10	2.02.08	Portable turbine preservation system consisting of adequate numbers of air driers including, fans, motors, filters, heater drying wheel, connecting pipings, valves, fittings etc. for preservation against corrosion of turbine during idle periods shall be provided. One number system per station shall be provided.	Turbine preservation systems are not considered for BFP drive turbine as per our standard scope of supply. We presume these are specified for main Steam turbine as per our understanding.	Bidder understanding is correct.
265	Sec-VI, Part-A	Sub-Sec-II-A-06	6 of 10	7.03.00	Two (2) steam turbine drives for the turbine driven boiler feed pump per unit complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers, preferably hydraulic turning gear,	As per Bidder pre-commissioning/initial operation activities of Steam Blowing, the strainer is removed from the line and blanking fixture is used to isolate the steam turbine from steam supply . After steam blowing, the removed strainer is placed in the line again. Hence, we do not need any additional strainer for initial operation. Blanking device will be supplied by Bidder.	Specification requirement is clear in this regard. Bidder to comply specification requirement.
266	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	8 of 34	V.7	One set of Journal bearings and Thrust bearing (complete assembly) with carrier, Collar and pads	Complete thrust bearing assembly considered and hence separate pads not considered. Thrust collar for offered BFP drive turibne is integral to steam turbine rotor and hence collar is not applicable . Also carrier is not applicable for offered bearing assembly , hence not offered.	Bidder to refer amendment TG-11 in this regard.

267	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	8 of 34	V.10	Electrohydraulic assembly for governing system of TDBFP's	Electrohydraulic assemblies in governing systems are generally employed in high pressure governing systems where the control oil pressure is at 160 bar and above. The governing system valve actuator assemblies used in the TDBFPs are low pressure (8 bar) hydraulic actuators which receive only hydraulic signals generated by the IH (current to hydraulic signal) converters mounted in the console. Hence, the EH assembly is not applicable for TDBFPs. Spare I/H convereter cosnidered which is functionally equivalent to electrohydraulic system.	Bidder to refer General note 3 in page-33 of 34 of Part-A/Sub-Section-VI, Chapter-02/Section- VI regarding not applicable item.
268	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	17 of 34	15.1	One set of emergency over speed governor assembly	Electronic over speed protections, 2 out of 3 voting are used for emergency protection purpose in line with latest practice followed in all the power and industrial steam turbines and hence mechanical over speed protection system is not considered. Accordingly spares for emergency over speed governor assembly not considered.	Bidder to refer General note 3 in page-33 of 34 of Part-A/Sub-Section-VI, Chapter-02/Section- VI regarding not applicable item.
269	Sec-VI,Part-B	Sub-Sec-A-07	15 of 25	6.05.06 (c)	Particle size impurities test and moisture test as detailed out for Main Turbine, is to be carried out on one oil purification system of BFP drive turbine.	The capacity of oil purifier is 2400 LPH. For this capacity the approved vendors (Alfa Laval and GEA Westfalia) have type tested for particle size and the test was approved by NTPC for the recent project. Hence this test is not envisaged.	Bidder to refer clause no 12.00.00 Sub-section A-07 Part-B, Section-VI w.r.t. Type test requirement. Bidder to comply technical specification requirement.
270	Sec-VI,Part-B	Sub-Sec-E-12	3 of 4	1.00.00 (7)	Full load full speed/back to back locked rotor torque test for one gearbox.	Gear box already tested for full load full speed/back to back locked rotor torque test and was approved by various customers including NTPC for earlier executed projects. Hence this test is not envisaged.	Detailed test requirements shall be discussed & finalised during detail engg. Bidder to comply specification requirements.
271	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	23 OF 34	1.00.00.3.a.(i)	Transmitters of all type, range and model no. (For the measurement of Pressure, differential pressure flow, level, temperature etc.)	Flow Transmitters are not applicable for BFPDT.	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.
272	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	23 OF 34	1.00.00.3.c	Pressure, Differential Pressure, Flow, Level and temperature switches	Switches are not applicable as transmitters are provided.	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.
273	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	24 OF 34	1.00.00.3.d	Pressure, Differential Pressure, Flow, level and temperature gauges	Flow Gauges are not applicable for BFPDT.	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.
274	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	26 OF 34	4.00.00.B.2	Electronic Cards/PCB's/interface units etc. of all types used in TSS	PCB's are not applicable as cards/modules are provided	Bidder's understanding is correct.
275	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	26 OF 34	4.00.00.C.2	Electronic Cards/PCB's/interface units etc. of all types	PCB's are not applicable as cards/modules are provided	Bidder's understanding is correct.
276	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	26 OF 34	4.00.00.D	Load Transducers, frequency transducers & any other transducers (as applicable)	Not Applicable for BFPDT	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.
277	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	26 OF 34	4.00.00.E	Auto Synchroniser	Not Applicable for BFPDT	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.
278	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	27 OF 34	4.00.00.F.(ii)	Solenoid valves to be used in extraction NRVs (as applicable)	Solenoid valves in extraction NRVs -Not Applicable for BFPDT	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.
279	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	27 OF 34	5.00.00.(iv)	Purge meters	Not Applicable for BFPDT	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.
280	Sec-VI, Part-A	Sub-Sec-VI-chapter-2	31 OF 34	3.00.00	CONTROL VALVES, ACTUATORS AND ACCESSORIES	We understand this clause is applicable for CONTROL VALVES, ACTUATORS AND ACCESSORIES for CPU only.	Bidder's proposal is not acceptable. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied under STG chapter.

281	Sec-VI, Part-A	Sub-Sec-VI-chapter-12	9 OF 10	8.00.00.(i)	Transmitters	Not Applicable for BFPDT as wireless transmitters are not provided. Only wired tx are provided.	Bidder's query is not clear. This clause is for Wireless system as specified in Clause no 2.04.5 , SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM , Part-A of tech spec.
282	Sec-VI, Part-A	Sub-Sec-VI-chapter-12	9 OF 10	8.00.00.(ii)	Repeaters / Routers	Not Applicable for BFPDT	Bidder's query is not clear. This clause is for Wireless system as specified in Clause no 2.04.5 , SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM , Part-A of tech spec.
283	Sec-VI, Part-A	Sub-Sec-VI-chapter-12	9 OF 10	8.00.00.(iii)	Gateway along with antenna / access point	Not Applicable for BFPDT	Bidder's query is not clear. This clause is for Wireless system as specified in Clause no 2.04.5 , SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM , Part-A of tech spec.
284	Sec-VI,Part-B	Sub-Sec-E-12	2 of 4	1.00.00(a)	Performance Tests on each Boiler Feed Pump to determine the characteristic curve (Head, Capacity, Efficiency & Power) at Design Speed and to ensure compliance with design requirements specified in the specification. Measurement shall be carried out at 10%, 25%, 50%, 65%,80%, 100% & 125% of Design Flow with loop water at design temperature. Performance Test at other specified Conditions shall be carried out on all Boiler Feed Pumps at their respective Speeds at design temperature.	Performance test on BFP will be conducted at reduced speed and power and the results will be extrapolated to the specified conditions as per HIS, since it is not feasible to conduct full load, full speed tests at works. Performance test measurement shall be carried out at 25%, 50%, 65%, 80%, 100% & 125% of design flow.	Detailed test requirements shall be discussed & finalised during detail engg. Bidder to comply specification requirements.
285	Sec-VI,Part-B	Sub-Sec-G-05 & E-12	1 of 38 and 2 & 3 of 4	1.01.00 and 1.00.00	Type tests for TDBFP, TDBP, MDBFP & MDBP: (i) NPSH (R) Test on one BFP and one BP (ii) Pressure pulsation test on one BFP (iii) Axial thrust measurement on one BFP (iv) Complete strip down test of BFP which undergone above tests (v) Pressure drop test on one strainer for each type and size	Type test of BFP will be carried out at reduced speed.	Detailed test requirements shall be discussed & finalised during detail engg. Bidder to comply specification requirements.
286	Sec-VI, Part-A	Sub-Sec-IIA-06	6 of 10	7.01.00	MDBFP- Base plate	Individual foundation frame shall be offered for MDBFP as recommended by our collaborator MHI, Japan. Similar arrangement was followed for all the supercritical projects executed for NTPC. Customer is requested to accept the above.	Specification requirement is clear in this regard. Bidder to comply specification requirement.
287	Sec-VI, Part-A	Sub-Sec-VI	3 of 3	13.00.00	Bidder shall not indicate “Not Applicable” against any of the spare (except for those items for which “if applicable” is specified). In case of not applicability, functionally equivalent spare to be mentioned with price in the relevant price schedules. Bidder shall not mention any remark other than price value in relevant price schedule.	Some of the items against a Bought Out Item for a bidder may not be applicable . Equivalent item if any as per the equipment supplier will be supplied. Incase there is no equivalent items are there, then Customer should not ask for rebate againt that item	Specification requirements are clear, bidder to comply with tender specifications.
288	Sec-VI, Part-A	Sub-Sec-IA	21 of 35	4.26.4 (ii)	In case, the bidder or proposed sub vendor is not a manufacturer of proven Wet Limestone Grinding Mills as per clause 4.26.1 (c) above, but have designed, manufactured & supplied dry Grinding Ball Tube mills for at least 500 MW pulverized coal fired power plant, the Bidder or the proposed sub-vendor can also manufacture Wet limestone Grinding Mills provided it has a licensing agreement with a Wet limestone Grinding mills manufacturer who meet the requirements stipulated at clause 4.26.1 (c) above for the Wet limestone Grinding mills and provides extended warranty of three (3) years for the Wet Limestone Grinding Mills. In addition, the Bidder shall be required to furnish a letter of support from Collaborator(s) / Licensor / Technology provider for successful performance of the equipment valid up to the end of defect liability period of the contract as per the format enclosed in the bidding document, at the time of placement of order on the approved sub-vendor.	Customer is requested to modify the clause as "In case, the bidder or proposed sub vendor is not a manufacturer of proven Wet Limestone Grinding Mills as per clause 4.26.1 (c) above, but have designed, manufactured & supplied dry Grinding Ball Tube mills for at least 500 MW pulverized coal fired power plant, the Bidder or the proposed sub-vendor can also manufacture Wet limestone Grinding Mills and provides extended warranty of three (3) years for the Wet Limestone Grinding Mills."	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.

289	Sec-VI, Part-A	Sub-Sec-IA	20 of 35	4.26.1 (a)	Application:Wet Limestone based FGD application or ash slurry application in Coal fired power plant	Customer is requested to modify the clause as Application:Wet Limestone based FGD application or ash slurry application in Coal fired power plant or equivalent slurry application in other process plants.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
290	Sec-VI, Part-A	Sub-Sec-VI, Chaper-1	20 of 38	.....	VFD TRANSFORMER (If applicable)	Customer is requested to mention the sl. no. of this item and also requested to clarify whether this requirement is for Slurry Pump with VFD of for any other equipment with VFD?	SN of VFD transformer may be considered under clause 1.22.06 (A). Bidder's understanding is correct thatVFD spares considered here are for slurry pumps.
291	Sec-VI, Part-A	Sub-Sec-VI, Chaper-2	15 OF 34	11a(vi)	**TURBINE DRIVEN BOILER FEED PUMP (BFP):** Set of filter elements / cartridges, O-rings, gaskets for Duplex Lube oil filter for **both &** TDBFP	We understand that this clause is for TDBFP spares only.	Bidders understanding is correct. Further, bidder to refer amendment TG-13 in this regard
292	Sec-VI, Part-A	Sub-Sec-VI, Chaper-2	16 OF 34	12(vi)	**MOTOR DRIVEN BOILER FEED PUMP (BFP) / BFP RECIRCULATION VALVE:** Set of filter elements / cartridges, O-rings, gaskets for Duplex Lube oil filter for both MDBFP	We understand that this clause is for MDBFP spares only.	Bidders understanding is correct. Further, bidder to refer amendment TG-14 in this regard
293	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	1 of 29	1.00.00.A.1 (iii)	Pump shafts line bearings/ bushes only (line bearings / bushes for impeller shaft, intermediate shafts, drive shaft, bowl bearing)	Line shaft is not applicable for offered pump. Bearings applicable for concrete volute pump is quoted under clause no-1.00.00.A.1(ii).	Bidder to refer Amendment SN WS-13 in this regard
294	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	1 of 29	1.00.00.A.1 (vi)	Wearing rings or equivalent for impeller (if applicable)	Not applicable for offered Pump. Equivalent items are not there.	Bidder's request reviewed. Spares (if applicable) of the offered equipment shall be supplied by bidder.
295	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	1 of 29	1.00.00.A.1 (vii)	Wearing rings or equivalent for Casing/ Bowl (if applicable)	Not applicable for offered Pump. Equivalent items are not there.	
296	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	1 of 29	1.00.00.A.1 (viii)	Impeller Shaft and Line shafts with fasteners (as applicable)	impeller shaft if applicable for offered pump only.Line shaft is not applicable.	
297	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	1 of 29	1.00.00.A.1 (ix)	All shaft Couplings with fasteners (as applicable)	Line shaft couplings are not applicable. Coupling between Pump & Motor is quoted under sl no-1.00.00.A.1 (X)	
298	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	1 of 29	1.00.00.A.1 (xi)	Bushes with fasteners for the all Couplings as applicable	Line shaft couplings are not applicable. Motor to Pump Coupling bushes is quoted under sl no-1.00.00.A.1 (XII)	
299	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	1 of 29	1.00.00.A.1 (xv)	Impeller with impeller nut	Impeller nut is not applicable for offered pump. Equivalent item i.e impeller plate is offered.	
300	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	2 of 29	1.00.00.A.1 (xvi)	Oil Seal Ring (if applicable)	Not applicable. Equivalent item is not there.	
301	Sec-VI, Part-B	Sub-Sec-VI, Chaper-8	2 of 29	1.00.00.A.1 (xvii)	Deflectors (if applicable)	Not applicable. Equivalent item is not there.	

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
302	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP	General Layout Plan (dwg. No. XXXX-999-POC-F-001)	(a) No clear height & adequate space available for addition of a new Flap Gate & Chute arrangement for taking feed from C-19B in TP-17. (b) Exit of new proposed skew conveyor (C-32) from TP-17 is not feasible due to space constraints. Due to above constraints, bidder requests customer to provide proposed conveyor (32) profile	(a) Examined GA Drw of TP-17,suitable arrangement (in line with Technical specification) is feasible for taking feed of new conveyor from TP-17. (b) Same reply as above Bidder to refer Amendment Sl MH-22 of the Coal + Biomass flow diagram. Submission of proposed conveyor profile during detail engineering is in the scope of the Bidder.
	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.00.00	SCHEME OF COAL CONVEYING PLANT: Coal required for the proposed unit shall be catered from the existing Coal Handling plant ..... **"Conveyor C-32 shall take feed from upstream conveyor C-19B at TP-17"....**		
303	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP	General Layout Plan (dwg. No. XXXX-999-POC-F-001)	(a) No clear height & adequate space available for addition of a new Flap Gate & Chute arrangement for taking feed from C-28 in TP-24. (b) Exit of new proposed conveyor (C-33) from TP-24 is not feasible due to space constraints. Due to above constraints, bidder requests customer to provide proposed conveyor (33) profile	(a) Examined GA Drw of TP-24,suitable arrangement (in line with Technical specification) is feasible for taking feed of new conveyor from TP-24. (b) Same reply as above Bidder to refer Amendment Sl MH-22 of the Coal + Biomass flow diagram. Submission of proposed Conveyor Profile during detail engineering is in the scope of the Bidder.
	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.00.00	SCHEME OF COAL CONVEYING PLANT: Coal required for the proposed unit shall be catered from the existing Coal Handling plant ..... **"CC-33 shall take feed from existing upstream conveyor C-28 at TP-24".....**		
304	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP	General Layout Plan (dwg. No. XXXX-999-POC-F-001)	(a) No clear height & adequate space available for addition of a new Flap Gate & Chute arrangement for taking feed from C-31A in TP-18. (b) Exit of new conveyor (C-38A) from existing TP-18 not feasible due to space constraints. Due to above constraints, bidder requests customer to provide proposed conveyor (38A) profile	(a) Examined GA Drw of TP-18,suitable arrangement (in line with Technical specification) is feasible for taking feed of new conveyor from TP-18. (b) Same reply as above Bidder to refer Amendment Sl MH-22 of the Coal + Biomass flow diagram. Submission of proposed Conveyor Profile during detail engineering is in the scope of the Bidder.
	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.00.00	SCHEME OF COAL CONVEYING PLANT: Coal required for the proposed unit shall be catered from the existing Coal Handling plant ..... **"C- 38A taking feed from existing upstream conveyor C-31A at TP-18".....**		
305	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP	General Layout Plan (dwg. No. XXXX-999-POC-F-001)	(a) No clear height & adequate space available for addition of a new Flap Gate & Chute arrangement for taking feed from C-29 in TP-25. (b) Exit of new conveyor (C-38B) from existing TP-25 not feasible due to space constraints. Due to above constraints, bidder requests customer to provide proposed conveyor (38B) profile & Arrangment	(a) Examined GA Drw of TP-18,suitable arrangement (in line with Technical specification) is feasible for taking feed of new conveyor from TP-18. (b) Same reply as above Bidder to refer Amendment Sl MH-22 of the Coal + Biomass flow diagram. Submission of proposed Conveyor Profile during detail engineering is in the scope of the Bidder.
	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.00.00	SCHEME OF COAL CONVEYING PLANT: Coal required for the proposed unit shall be catered from the existing Coal Handling plant ..... **"C-38B taking feed from existing upstream conveyor C-29 at TP-25"....**		
306	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.00.00	SCHEME OF COAL CONVEYING PLANT: .....Subsequently, C-34A/B and **C-38A/B** shall discharge feed into C-35A/B. C-35A/B shall finally feed Bunker conveyors **C-37A** directly and C-37B through C-36A/B.	Bidder requests customer to check the conveyor no. mentioned & update the same as per CHP flow diagram	Bidder to refer Amendment, Sl MH-22 and Sl MH-24.
	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	CHP Flow Diagram	Coal + Biomass Flow Daigram		
307	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.02.00	Designated Conveyors shall have arrangements for manual stone picking arrangement at an appropriate location.	Bidder shall not consider any stone picking arrangment as per CHP flow daigram. Please confirm. If customer insists, then bidder requests to customer to specify the location on which conveyor stone picking arrangment to be provided.	Bidder's understanding is correct. Stone picking arrangement is not envisaged. Bidder to refer Amendment Sl MH-21.
308	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.04.00	Necessary modification works of existing Transfer Points required for feeding into the proposed conveyors, complete with all civil, structural and electrical works including chutes, monorails etc. In case, necessary valley angle could not be available by providing Flap Gates for feeding into new conveyors, Belt feeders / Reversible Belt Feeders may be installed in the existing Transfer Points to ensure feed into new conveyors from existing conveyors. Modification activities shall be carried out in such a manner that the existing system operations shall be least affected.	Bidder requests customer to provide the following drawings/Documents to check the feasibility of tapping from exsisting TP/Conveyors at TP-17,TP-18,TP-24 & TP-25. 1. AUTO-CAD drgs. of Mechanical GA, Structural GA with STADD Calculations & Civil Foundations drgs. of TP-17,18,24,25 and Conv- 22A/B,23A/B,19A/B,28,29,30 & 31A/B and Conv.-14A/B. bidder requests customer to give relaxation for following pararmeters for design of Coal handling plant considering space/layout constraint. 1. Minimum chute Valley Angle of 55 deg.(instead of 60) 2. Conveyor inclination/slope upto 16 degrees 3. Head room CLERANCE 2 MTRS	All the major drawing of existing system are furnished in Tender Drws. Other Drws. of the existing system shall be shared with the sucessful bidder, if required. Same shall be shared in pdf format only, Auto CAD drgs. is not available. 1. Bidder's proposal for relaxation of minimum chute Valley angle shall be acceptable for existing Tranfer Points after review during detail engineering. Bidder to refer Amendment Sl MH-22 of the Coal + Biomass flow diagram 2. Bidder's proposal is not acceptable for Conveyor inclination/slope. 3. Head room clearance (in existing Transfer Points) shall be reviewed during detail engineering and shall be relaxed suitably if required due to the layout constraints.
309	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	CHP Flow Diagram	Passenger cum goods elevator at CH,TP-- & BMS (1 TON Capacity-3 Nos.))	We are considering Passenger cum goods elevator at TP-29,TP-30 & BMS main storage silo, Please confirm	Bidders' understanding is correct only for total number of Elevators in Coal handling & Biomass storage system. Further, Bidder to refer Amendment Sl MH-22 of the Coal + Biomass flow diagram for locations of the Elevators.

310	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	CHP Flow Diagram	Four (06) Nos. Electronic Belt weighers complete with all mechanical, supporting arrangement, electrical, and accessories on Conveyors (C-32, C-33, C-35A/B and C- 38 A/B).	There is a mismatch in Belt weigh scales Qty. w.r.t CHP flow diagram Please confirm the QTY. of Belt weigh scales & Loaction of the same	Bidder to refer revised Coal & Biomass Flow Diagram issued as Amendment, SI MH-22 for quantity of Belt scales & locations.
	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 2 OF 6	1.14.00	Four (04) Nos. Electronic Belt weighers complete with all mechanical, supporting arrangement, electrical, and accessories on Conveyors (C-32, C-33 and C- 38 A/B).		
311	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	CHP Flow Diagram	Four (06) Nos. Metal Detectors complete with all mechanical, electrical, civil,structural works and accessories on Conveyors (C-32, C-33, C-35A/B and C- 38 A/B).	There is a mismatch in Metal detector Qty. w.r.t CHP flow diagram Please confirm the QTY. of Metal detector & Loaction of the same	Bidder to refer revised Coal & Biomass Flow Diagram issued as Amendment-1, SI MH-22 for quantities of Metal detectors & locations.
	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 2 OF 6	1.15.00	Four (04) Nos. Metal Detectors complete with all mechanical, electrical, civil,structural works and accessories on Conveyors (C-32, C-33 and C- 38 A/B).		
312	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	CHP & Biomass Flow Diagram	One (1) No. Pitless type weigh bridge (100 T Capacity) shall be provided at Biomass Handling area.	bidder requests customer to clarify whether One (1) No. Pitless type weigh bridge (100 T Capacity) for biomass handling system required or not? If weigh bridge required for Biomass handling bidder request customer to revise the clause 2.02.00 acoordingly	Weigh bridge in Biomass handling system is in the scope of the bidder. Bidder to refer Amendment SI MH-23 in this regard.
313	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 3 OF 6	2.02.00	One (1) No. Pitless type weigh bridge (100 T Capacity) shall be provided at Limestone unloading building for weighing of received Limestone Truck.		
314	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 4 OF 6	2.06.00	Necessary modification works of existing Transfer Points required for blending into existing conveyors by the proposed Biomass conveyors, complete with all civil, structural and electrical works including chutes, monorails etc.	1.Bidder is not considering any blending equipments at existing conveyor while feedeing from biomass conveyor. **Please confirm** **2.**Bidder is not considering any modification works for existing transfer point for blending into existing conveyors by the proposed Biomass conveyors. **Please confirm**	1. Bidder's understanding is correct. 2. Suitable modification works of existing transfer points and existing conveyors shall be required for blending of Biomass. Hence, bidder's understanding is not correct.
315	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 4 OF 6	2.08.00	Belt scale at Employers' Coal conveyor shall be in the scope of the Bidder.	Bidder understands that 2 nos. belt scales to be installed on existing employers conveyor -14A/B, bidder requests customer to indicate same in flow diagram & also privide the AUTO-CAD drg. of Coal conveyor BCN-14A/B. **Please Confirm**	Bidder's understamding is correct. Bidder is further to refer Amendment SI-MH-22 for revised Coal + Biomass flow diagram. Auto- CAD drw. is not available with NTPC, PDF copy shall be provided.
316	Sec VI,Part A	IIA,16	5 of 18	1.01.05 (E,c)	Two (2) (one working + one standby) nos. decanted water transfer pumps along with drive motors , accessories & supports.	Bidders understands that these decanted water transfer pumps shall be required if water flow by gravity is not feasible. These pumps shall transfer water from the surge tank (near dewatering bin) to the ash water tank. Please confirm.	Bidder to refer Single line Flow diagram of Bottom ash handling system where both the options has been specified. Decanted water transfer pump may not be required if water flow by Gravity is feasible.
317	Sec VI,Part E	XXXX-001-POM-A-028		Note: 7	Suitable dust suppression facilities shall be provided in silo area	Please elaborate the dust suppression requirement in silo area whether only wash water pump shall be provided for dust suppressoing in silo area or any other requirement to be considered.	Bidder to refer Amendment MH-27 for revised Single Flow Diagram for details of Dust supression system.
318	Sec VI,Part A	IIA-16	15 of 18	1.03.00	Decanted water shall be pumped from owners' existing pumping system located at ash dyke. It has been envisaged that existing pumping system (5 W + 2S, Pumps of 950 M3/Hr capacity, St-I & St-II) and existing AWRS pipeline (two pipeline of St-I & St-II) shall be used for the new Stage. Hence, pipelines complete with flow control valves, bends, fixtures, couplings, fittings, gaskets, nuts, bolts, clamps, structural steel supports and other accessories from tapping point (suitable point inside plant) of Stage-II AWRS pipe (700 NB Dia) shall be provided by the bidder.	1. Bidder understands that 700NB Dia shall be considered for AWRS Pipe Line. Please provide the co-ordinate for terminal point of AWRS Pipe (Stage-II) inside the plant. 2. Bidder understands that the pipe shall be connected from existing header inside plant to ash water tank of Stage-. Water treatment in not envisaged. Please Confirm.	1. Bidder to refer Amendment MH-51 for scheme of tapping from existing system and terminal point. 2. Bidder's understanding is correct w.r.t requirement of Water treatment.
319	Sec VI,Part A	IIA-16	12 of 18	1.01.08 (m)	While loading ash in wagons, top lids of wagons need to be accessed. For ensuring safety while accessing the top of wagon, a suitable platform at approx. height of 4.5 Mtrs above railway track all along the length of track in silo area shall be provided.	Bidder understands that one no. suitable platform of 600 mm width at 4. 5 mtrs elevation from Fly ash storage silo-1 to Fine ash silo shall be provided. Kindly confirm.	For ensuring safety, suitable platform dimension for access & approach to the top of Wagons, shall be finalized during detail engineering.
320	Plot Plan				Various ash handling facilities indicated in the tender plot plan	Please confirm whether various ash handling facilities can be relocated to suit the AHP requirment.	Ash handling Facilities may be relocated during detail engineering in consultation with NTPC, meeting the functional requirement.
321	Sec VI,Part B	A-21	29 of 42	3.06.00	FAD of each set of working compressor at ambient condition: 1200 m3/hr (min.). Bidder to justify the same during detailed Engg.	In line with recent NTPC tenders like Talcher, Lara, the ash handing requirement of 1200 m3/hr instrument air shall be considered in main plant area compressors. It may be noted that separate IA compressor + dryers are not envisaged in tender SLFD. Hence, separte IA compressors is not being envisaged for AHP. Please confirm.	Bidder's understanding is correct as separate instrument air compressor is not envisaged for AHP.

322	Sec VI, Part-A Sec VI, Part-A Sec VI, Part-A Sec VI, Part-A Sec VI, Part-A	IIA,16 IIA, 16 IIA, 16 A-12 A-12	8 of 18 8 of 18 11 of 18 4 of 11 4 of 11	1.01.06 (C,iii) 1.01.06 (C,Vii) 1.01.08 (f) 3.00.00(f) 3.00.00(g)	To meet the complete requirement of ash handling system such as actuation of material handling, segregation valves; various water and airline valves, slurry valves ; bag filter cleaning etc to be cater from 'Unit Air Receiver for Ash handling#1', and air receiver 'Fly ash Silo & Ash Classification System'. One (1) no. instrument air receiver near ESP of each unit along with safety relief valve, automatic drain trap and other accessories complete with supporting steel structures to meet the complete requirement of buffer hoppers and ESPs such as actuation of valves, bag filter cleaning etc. Two (2) nos. air receiver along with safety relief valve, automatic drain trap and other accessories complete with supporting steel structures to meet the complete requirement of ash storage silos such as actuation of silo ash inlet valves, segregation valves ; various water and airline valves, slurry valves ; bag filter cleaning etc. One number unit air receiver of minimum capacity 10 m3 to be located near ESP Buffer Hopper Area for Ash Handling System One number of air receiver of minimum capacity 10 m3 for Fly ash storage Silo area and Ash classification system to be located near Silo Utility building.	Bidder Understand that following Qty of air receiver shall be considered. 1. One number Air Receiver of minimum capacity 10 m3 near ESP area. 2. One number Air Receiver of minimum capacity 10 m3 for Fly ash storage silo area. Please confirm.	Specified capcity & number of Air recivers are minimum. Bidder to consider actual numbers & capacity as per the functional requirement of Ash handling system. Actual number & capacity shall be equal or more than the specifed.
323	Sec VI, Part-A	IIA,16	10 of 18	1.01.07 (n)	The bagging plant shall be sized for 50 % of the fine ash (Classified fine ash). The bagging plant shall have provision for mechanized bagging of this fine ash. Fine ash shall be bagged in 50 kg cement bags. The quantity of fine ash shall be 35 kg in cement bag of 50 kg. Suitable numbers of such bagging streams shall be provided. No standby stream shall be required.	Kindly specify the bagging plant capacity in terms of No. of bags per hour. Bidder undersatnds that that the bags shall be provided by customer. The material/make of bags shall be speciifed by bidder during detail engineering for procurement by customer. Kindly confirm.	For number of bags per hour, Bidder to refer Amendment MH-40. Bidder's understanding is correct for Bags & material/make of Bags.
324	Sec VI, Part-A	IIA,16	10 of 18	1.01.07 (o)	The bags shall be stored in suitable closed storage area having a provision to store bags filled in 8 hours. Mechanized transportation (without manual intervention) of fly ash bags from bagging machine up to the storage shed and from storage shed to load into the Trucks, by suitable conveying system along with associated arrangements. Provisions for direct loading of bags into trucks without storing shall also be there. Adjustment to load bags in all types of Trucks shall be provided.	Bidder understands that Loading of bags shall be limited to open trucks only. Kindly confirm. Bidder understands that mechanized transportation means that transportation of filled bags from bagging unit to storage shed or loading into trucks. It is not feasible to have mechanised transporation of filled bags from storage shed to trucks. Kindly confirm. Manual interventon will be required for stacking of bags on trucks/storage shed during this mechanized transportation. Kindly confirm.	Mechanized transportation of Bags & Storage shed has been deleted. Bidder to refer Amendment MH-42.
325	Sec VI, Part-A	IIA,16	10 of 18	1.01.08 (a)	The silos shall be complete with all fittings, accessories and supporting steel structures, access staircases, platforms, as required for safe and reliable operation and maintenance of main fly ash storage system. Each fly ash storage silo shall have six (6) outlets, Four(4) outlets for unloading ash to rail & closed truck through rotary feeders, One(1) for unloading ash to open truck with rotary feeders and ash conditioners and One(1) blanked outlet for future use.	In single flow diagram for fly ash handling system shown(XXXX-001-POM-A-028) that each silo (Fly ash Storage silo-1 and 2) has 8 nos outlets, 4 outlets for unloading ash to rail & 1 outlet for closed truck through rotary feeders, One(1) for unloading ash to open truck with rotary feeders and ash conditioners and One(2) blanked outlet for future use. Please Confirm whether it is 8 Nos or 6 Nos.	Bidder to refer Amendment MH-27 for revised Single Flow Diagram w.r.t required number of outlets.
326	Sec VI, Part-A	IIA,16	9 of 18	1.01.07 (g)	The fine ash shall be pneumatically conveyed to fine ash silo, located in Fly ash silo complex with the provision of bagging plant. Suitable number of outlets shall be provided for feeding to the bagging plant. This silo shall have one outlet provided with telescopic chute and rotary feeder for loading the ash into closed tankers. The silo shall be provided with Target box and bag filter assembly along with pulse jetting arrangement, fan units etc. and other accessories, Five (5) nos. Slide plate type isolation valves below the silo, Required numbers segregation valves for isolation of fly ash transportation lines and required numbers of silo inlet valves of specified type, All necessary hydraulic or pneumatic actuators, All interconnecting compressed air pipelines complete with valves, fittings, pipe rack and supporting steel structure, All nuts, bolts and jointing materials at flanged termination points.	In single flow diagram for fly ash handling system shown(XXXX-001-POM-A-028) that Fine ash silo has 5 nos outlets, 2 outlets for unloading ash through telescopic chutes, 1 outlet for closed truck through rotary feeders and two nos. for future use. 1. Bidder understands that out of 2 outlets with telescopic chutes, one no. shall be used for rail loading and the other shall be used or closed truck loading. Kindly confirm. 2. One no outlet shall be for open truck loading. kndly confirm. 3. 1 or 2 mos outlet shall be used for bagging system. 4. 1 no. outlet shall be for future use. Kindly confirm.	Bidder to refer Amendment MH-27 for revised Single Flow Diagram for Fly ash handling system w.r.t required number of oulets.
327	Sec VI, Part-A	Annexure C to IIC Contract quantity	14 OF 21	3.00.00	Note-2: Contractor shall provide suitable opening in Bottom ash hopper with sight glass (if not available in bottom ash hoppers) in front and back side of bottom ash hoppers. Cleaning arrangement of sight glass using service water (if not available) shall be provided by the contractor from nearest available tapping point.	Inspection windows with water spray (from BALP water pump) is standard arrangment being proivded in bottom ash hopper. Bidder understands that the referred sight glass is same we have referred at inspection window. Kindly confirm.	Bidder's understanding is correct .
328	Sec VI, Part-A	IIA,16	12 of 18	1.01.08 (q)	Two (2) nos. (one working + one standby) vertical sump drainage pumps along with drive motor and accessories for fly ash storage silo area to pump the accumulated ash water to the ash slurry sump of bottom ash slurry disposal pump house or to dyke including piping along with necessary valves, fittings, supports, etc. as specified and as required.	Pumping to Ash dyke through sump pump is not feasible. Bidder understands that the drain pumps of fly ash silos area shall be dischargd to bottom ash slurry sumps. Kindly confirm .	Bidder's understanding is correct and as per the specification requirement.
329	Sec VI, Part-A	IIA,16	4 of 18	1.01.05 (c,f)	Two (2) nos. (One working+ one standby) vertical sump drainage pumps for Bottom ash slurry transportation pump house, with drive motors complete with piping, valves, fittings, supports, inserts, sleeves etc.	Drain pump is not shown in Single line flow diagram of Bottom ash handling system (XXXX-001-POM-A-025) for Bottom ash area and combined slurry pump house. Kindly confirm the requirement of drain pumps in Bottom ash hopper area and Ash slurry pump house area.	Bidder to provide Sump drainage pumps as per the Technical specification.
330	Sec VI, Part-A	IIA,16	3 of 18	1.01.05 (C, b)	Three (3) lengths of bottom ash slurry transportation MS pipelines with basalt lining, complete with pipe bends, fixtures, elbows, gaskets, nuts, bolts, structural steel supports and other accessories as specified and as required from (i) the bottom ash slurry transportation pumps to Dewatering Bins and from (ii) the bottom ash slurry transportation pumps to Ash slurry disposal sump.	Bidder understands that there shall be branching with a knife gate valve required in each line for slurry disposal to either the dewatering bin or to the Ash Slurry disposal sump. Please confirm.	Bidder's understanding is correct. Pneumatic operated Knife gate valves shall be required for branching of slurry disposal lines.
331	Sec VI, Part-A	IIA,16	3 of 18	1.01.05 (C, c)	Bottom ash slurry transportation pump shed, housing the bottom ash slurry transportation pumps and motor sets.	Bidders understand that the Bottom Ash Slurry Transportation Pump Shed and the Combined Ash Slurry Pump Shed are in under same building. Please confirm.	Both Pump shed may be combined together into single shed if found feasible technically during detail engineering.
332	Sec VI, Part-A	IIA,16	6 of 18	1.01.06 (A,iii)	Eight (8) lengths of Dry fly ash Cast Iron / MS piping from ESP Hopper outlets onwards up to Ash classifier system complete with valves, specialties, bends, pneumatic actuators, structural steel supports, platforms etc.	As per Line diagram (XXXX-001-POM-028) shown, Six (6) lengths of Dry fly ash Cast Iron / MS piping from ESP Hopper outlets onwards up to Ash classifier system. And Two(2) length of dry fly ash piping from ESP Hopper outlets onwards directly to Fine Fly Ash Hopper. Please confirm.	Bidder to follow referred Single line Flow diagram for number of piping length of Dry Fly ash that Bidder to provide as a minimnum.

333	Sec VI, Part-A	IIA,16	6 of 18 7 of 18	1.01.06 (A,b,ii) 1.01.06(A,b,iii)	Each intermediate fly ash storage silo shall have three (3) outlets, One(1) outlets for unloading ash to closed truck through rotary feeders, One(1) for unloading ash to open truck with rotary feeders and ash conditioners and One(1) blanked outlet for future use. Four (04) numbers (two working + two standby) Feeder ejector below each intermediate Silo with expansion joints, vertical pipe connections, cylinder operated valve, slurry discharge piping up to slurry disposal sump, and necessary fixing clamps, and structural steel as required.	Mentioned clauses are contradicted each other. In single flow diagram for fly ash handling system shown(XXXX-001-POM-A-028 that 5 outlet for each intermediate tank, 4 nos feeders ejector(2 w+2S) for each intermediate tank and 1 blanked for future. Please confirm.	Bidder to refer Amendment Sl MH-38 for oulet requirement below intermediate Silos.
334	Sec VI, Part-A	IIA,16	7 of 18	1.01.06(A,b,iii)	Alternately, one mixing tank below each intermediate Silos with suitable agitator arrangement for pumping of ash slurry up to slurry disposal sump, and necessary fixing clamps, valves etc.Two (02) nos. horizontal ash slurry pumps (1W + 1S) for each tank, complete with drive arrangement, base plates, foundations bolts, inserts, embedments and accessories, complete with supports, all slurry and water connections, etc.	Mixing tank and slurry pump not shown in Single Line diagram (XXXX-001-POM-028). Please confirm and also Kindly review the following proposal. 1. Slurry can be disposed through feeder ejector/jet pumps, 2. Slurry Pump house shall be located near ash clasifier area and required feeder ejector/jet pump shall be installed below the coarse ash and fine ash hoppers, then slurry disposed from ash clasifier hopper to slurry sumps. In such case, intermediate silo will not be required.	Bidder's proposal is not accerptable. Bidder to follow Technical specification requirement.
335	Sec VI, Part-A	IIA,16	7 of 18	1.01.06(A,b,vi)	2 x 100% capacity wash water pumps along with drive motor and accessories for intermediate fly ash storage silo area along with dedicated hose pipe.	Bidder understands that 2x100% capacity wash water pump are required at Main fly ash silo areas only. Please confirm.	Bidder's understanding is not correct. Bidder to provide 2x100% capacity wash water pump in both Main FA Silo & Intermediate Silo area.
336	Sec VI, Part-A	IIA,16	4 of 18	1.01.05 (C,g)	Six (6) nos. solenoid operated pneumatically actuated knife edge gate valve at the suction and discharge of bottom ash slurry transportation pumps.	Bidder understands that 3 nos valves for suction and 3 nos for discharge of Bottom ash slurry transportation pump.	Bidder's understanding is correct.
337	Sec VI, Part-A Sec VI, Part-B	IIA,16 A-01	13 of 18 77 of 87	1.01.08 (b) 4.01.02 (M)	The length of total combined Ash disposal pipelines shall be 39,000 m (excluding fittings and including branch pipes for garlanding of mine void) or the actual distance (excluding fittings) including branch pipes for garlanding of mine void, whichever is higher. (i) Minimum pumping distance – 14.5 Km or as per actual distance for the farthest disposal point in ash dyke, whichever is higher.	1. Customer is requested to confirm the pumping distance and head to be considered for the design of Ash Slurry Pump. 2. Bidder requests customer to limit the scope upto plant boundary (near 900 W and 425N). In such case, the scope of pipe supply in bidder's scope shall not be limited to 39000 mtrs only. 3. Kindly clarify "mine void". Bidder understands the discharging/garlanding mine void is not in the scope of Bidder.	1. Pumping distance to be considered for calculation of head shall be 14.5 KM. 2. Bidder's proposal to limit the scope of upto Plant boundary is not acceptable. 3. Bidder's undertsanding is correct, Mine Void is not applicable. However, garlanding in Ash Dyke shall be in the scope of the Bidder. Bidder to refer Amendment MH-49 for slurry disposal pumping system.
338	Sec VI, Part-A	IIA,16	8 of 18	1.01.06 (C,iv)	Pipe support structures for all Ash conveying lines to be provided. Pipe lifting and shifting arrangement in pipe rack must be provided.	Request to elaborate the requirement of "Pipe lifting and shifting arrangement in pipe rack" for clarity.	Bidder to refer Amedment Sl MH-19 for the lifting & shifting arrangement.
339	Sec VI,Part B	A-21	15 of 42	1.13.00	Vibrating feeder requirement: For uniform feeding of dewatered bottom ash on to conveyors/crushers/open trucks.	As per the flow diagram, discharge to open trucks is envisaged and not to conveyors or crushers. Kindly confirm. Kindly specify the capacity of Vibrating feeder.	Bidder's understanding is correct. Rated capacity of the Vibrating feeder shall be 100 TPH minimum.
340	Sec VI,Part B	A-21	25 of 42	3.02.00-3 (b)	Minimum 7.1 mm Thk for 200 NB to 450 NB.	Bidder understands that the wall thickness of water and air pipe shall be 6.3 mm for 200 NB to 450 NB as per other NTPC projects and Dimensional tolerance as per IS:3589 shall also applicable for MSERW Pipe. Kindly confirm	Bidder's understanding is not correct. Bidder to comply Technical Specification requirement.
341	Sec VI,Part B	A-21	25 of 42	3.02.00-3 (c)	Minimum 8.8 mm Thk for above 450 NB.	Bidder understands that the wall thickness of water and air pipe shall be 7.1 mm for 450 NB and 8 mm for 500 NB & above as per other NTPC project and Dimensional tolerance as per IS:3589 shall also applicable for Spiral Welded Pipe. Kindly confirm .	Bidder's understanding is not correct. Bidder to comply Technical Specification requirement.
342	Sec VI,Part B	A-21	1 of 42	1.01.00 (e)	TSS of Overflow Water-Less than 100 ppm	Bidder understands that the TSS of Overflow water shall be less than 100 ppm at discharge of Surge tank Tank . Kindly confirm.	Technical specification is clear. In thic regard, refer Notes of Single line Flow diagram of Bottom ash handling system.
343	Sec VI,Part B	A-21	2 of 42	1.01.01 (a) & (b)	Hopper Body-Tested Quality mild steel plates.....including seal trough shall be constructed of 6 mm thick SS:316. Refractory Anchors-Stainless Steel AISI 316	Bidder propose SS 316 / SS 316L also for seal trough and Refractory Anchors. Kindly confirm.	Alternate material for the referred application shall be reviewed during detail engineering. Equivalent or superior material meeting the functional requirement is acceptable.
344	Sec VI,Part B	A-21	13 of 42	1.09.00	Expansion Joint for Economiser/ECO Duct System/APH/Duct Hopper -Water Seal type Expansion Joint	1. Bidder proposes for water seal type expansion joint/bellow type. In case of Bellow type expansion joints, the same shall be as per Clause 2.02.00 (Page 19 of 42). Kindly confirm that both the type of expansion joints are acceptable. 2. In case of space limitation/ layout constraint fabric type suitable for such temperature of ash can be provided. Kindly confirm.	Bidder to comply stipulation of Technical specification requirement.
345	Sec VI,Part B	A-21	15 of 42	1.12.00 (5.0)	The dewatering storage bins shall be.....receive the ash from retractable chutes.	Retractable chute is not possible in case of ash coming out of dewatering bin. The same shall be canvas type. Kindly review.	Type of chute which is technically suitable for dewatering Bin application shall be finalized during detail engineering.
346	Sec VI,Part B	A-21	15 of 42	1.12.00 (6.0)	Material of Dewatering bin , settling tank & surge tank:MS, IS:2062 and min. 10 mm thick. All perforated plate of Decanters (center to side) shall be SS 316 L.	All perforated plate of Decanters (center to side) shall be SS 316 L/SS 316 . Kindly review.	Alternate material for the referred application shall be reviewed during detail engineering. Equivalent or superior material meeting the functional requirement is acceptable.
347	Sec VI,Part B	A-21	19 of 42	2.01.00	Body : Cast Iron FG 260 hardened to 180-200 BHN Gate:- 10 mm thick MS with 10-15 microns hard chrome... The chrome plating...to 300-350 BHN.	Body : Cast Iron FG 260/ Ductile Iron hardened to 180-200 BHN Gate:- 10 mm thick MS with 10-15 microns hard chrome... The chrome plating....to 300-350 BHN. Or SS with stelliting to achieve hardness of 300-350 BHN.	Alternate material for the referred application shall be reviewed during detail engineering. Equivalent or superior material meeting the functional requirement is acceptable.
348	Sec VI,Part B	A-21	19 of 42	2.02.00 (4.1)	Bellows: To suit the Duty Condition and meeting the requirements of EJMA standard.	Bellows MOC shall be MS/SS 304/SS 316/SS 316L. Kindly confirm.	Technical specification is clear. Material for the referred application shall be reviewed during detail engineering.
349	Sec VI,Part B	A-21	20 of 42	2.04.00 (b)	Type of Fly Ash Feed Valves/Branch Isolation Valvefor Pressure System-Plate Type/Butterfly /Dome/Cone Type	Type of Fly Ash Feed Valves/Branch Isolation Valvefor Pressure System-Plate Type/Butterfly /Dome/Cone Type/Slide Type/Swing Type/As per OEM proved design. Kindly review and confirm as these are OEM proprietary design valves	Bidder's understanding is correct.
350	Sec VI,Part B	A-21	20 of 42	2.04.00 (b)	MOC of Fly Ash Feed Valves/Branch Isolation Valve	MOC of the Fly Ash Feed Valves/Branch Isolation Valve is properitery design of OEM. Hence it shall be as per OEM proven design.	Bidder to comply Technical specification requirement.

351	Sec VI,Part B	A-21	21 of 42	2.07.00	Pipelines: CI Pipelines conforming.....conveying pressure greater then 3.5 kg/cm2	Bidder propose the MS Pipe to IS:3589 of 9.5 mm wall thickness irrespective of conveying pressure.	Bidder's proposal is not acceptable. Bidder to comply stipulation of Technical Specifications.
352	Sec VI,Part B	A-21	23 of 42	2.11.00	Dryness of Air at Outlet of Conveying/Transportation Air Compressor : Dry Air with Dew Point of (-) 20 Deg C at 1 ata pressure.	In case the pressure conveying is designed for pressure in the range of 1.5 to 3 kg/cm2, air dryer should be optional because dryness of air is not feasible at such low operating pressure and secondly, few AHP system suppliers use hot air for conveying of ash as per their proprietary design. Kindly confirm that air dryer shall be optional.	Bidder's proposal is not acceptable. Bidder to comply stipulation of Technical Specifications.
353	Sec VI,Part B	A-21	23 of 42	2.13.00	Weigh Bridge Platform Size : 24X3 (Approx.)	24X3m is not possible for weigh bridges meant for rail wagon. The size shall depend on wagon dimension. Kindly confirm the weigh bridge for rail wagon shall be provided as per requirment of wagon.	Bidder's understanding is correct. Dimensions of the Weigh Bridge platform shall be finalized during detail engineering.
354	Sec VI,Part B	A-21	30 of 42	3.07.00	Speed of Sump Drainage Pumps-Max. 1500 rpm	For higher head requirment above 25 MWC, the speed of pump may exceed 1500 rpm. Request to confirm for higher speed for drain pumps for pump head gretaer than 25 MWC.	Higher speed of sump drainage pump shall be reviewed during detail engineering.
355	Sec VI,Part B	A-21	30 of 42	3.08.00	40-300 TPH for Truck/Bulkar/Rail Wagon Loading through Dry Ash unloader	Bidder requests to consider dry ash unloader for truck/bulkar/rail wagon shall be 40-200 TPH as per standard practice . 300 TPH is too high capacity and will limit vendors for rotary feeders and unloaders. Kindly confirm.	Bidder's proposal is not acceptable. Rating is in line with Lara-II.
356	Sec VI,Part B	A-21	31 of 42	3.09.01	Intermediate Ash Slurry tank- the tank shall be.....piping & valves	a. There shall be no inspection window in Intermediate Ash Slurry Tank as tank is open on top. Kindly confirm. b.The capacity of Transfer Tank shall be based on the space availability below Hopper and surrounding structure/foundation as there is paucity of space in boiler area. However, minimum capacity shall be 5 minutes as per standad NTPC/CEA practise followed in case of of ash slury sump. Kindly confirm C.We understand that gunniting shall be with refractory material or concrete mixture. Kindly confirm	a. Confirmed. b. Bidder to comply Technical Specification requirement. c. Material shall be finalized during detail engineering.
357	Sec VI,Part B	A-21	34, 35 of 42	5.01.00 (6)	Type of Coupling	Kindly clarify the type of coupling of Coarse ash pumps- F/C and gear box or V- belt driven.	Type of coupling shall be finalized during detail engineering in line with the Technical specification.
358	Sec VI,Part B	A-21	34 of 42	5.01.00 (4)	1. Conditioner Water pump: 2 Working for HCSD silo + 1 standby, if applicable. 2. Conditioner Water pump: 2 Working for Fly ash silo, if applicable. 3. Wash water pumps: 1 working+1 standby (For Fly ash silo area) 4. Wash water pumps: 1 working+1 standby (For HCSD Silo Area) 5. FAHP water Pump: 1 working+1 standby	Bidder understand the following:- 1. Conditioner Water pump for HCSD system-Not applicable 2. Wash Water Pump- Wash water pump for fly ash silo area. 3. Wash Water Pump-Wash water paump not applicable for HCSD system 3.FAHP Water Pump- FAHP water Pump Not applicable, but FA water Pump (1 working+1 standby) is applicable. 4. Flushing Water Pump- Capacity is same as one Ash Slurry Disposal Pump. Kindly confirm.	HCSD system is not applicable in this Project. Other pump requirement shall be finalized during detail engineering in line with the Technical specification requirement.
359	Sec VI,Part B	A-21	35 of 42	5.01.00 (8)	Drive Motor Rating of Slurry Duty Pumps -20% margin over and above the maximum load demand in the entire operating range of Pump at 50 Deg Celcius. Drive Motor Rating of Water Duty Pumps -10% margin over and above the maximum load demand in the entire operating range of Pump at 50 Deg Celcius.	Bidder understands that the margin on drive rating shall be considered 15% over and above the selected capacity and head of water pumps. Kindly confirm Bidder understands that the margin on drive rating for fluid coupling driven pumps (slurry and BA overflow pumps) shall be considered 15% over and above the capacity and maximum head at maximum speed of fluid coupling. Kindly confirm	Bidder's understanding is not correct. Bidder to comply Technical Specification requirement.
360	Sec VI,Part B	A-21	35 of 42	5.01.00 (9)	Ash slurry pump efficiency To be selected by bidder. However, for the purpose of evaluation no credit shall be giv-en for pump efficiency in excess of 70% while handling ash slurry for ash slurry dis-posal pumps, bottom ash slurry transporta-tion pump and BA overflow pump.	Bidder understands that actual efficieny of pumps shall be selected during sizing of motor. Kindly confirm.	Efficiency of the pump shall be finalized during detail engineering in line with the Technical Specification requirement.
361	Sec VI,Part B Sec VI,Part E	A-21 XXXX-999-POM-A-37	36 of 42	5.01.00 Plant water Scheme.	Note- The Ash Slurry Disposal Pumps shall also required.....into consideration while sizing the pumps.	We understand the sludge from WTP and DM plant shall be taken in sizing of BA slurry transportation pumps. Kindly confirm.	Handling sludge of WTP/DM plant or other areas of the plant and handling waste water etc for the plant and design of the Slurry disposal pump are in the scope of the EPC bidder.
362	Sec VI,Part B	A-21	37 of 42	7.06.00	No Pipe trenches are to be routed inside or outside the building.	Pipe trenches may be provided for routing of pipes inside compressor house in man movement area.Kindly accept.	Bidder's proposal is not acceptable. Bidder to comply stipulation of Technical Specifications.
363	Sec VI,Part B	A-21	38 of 42	7.12.00 (F) (i)	Bidder shall provide grating to cover the complete sump for all sumps including sumps in the Ash water pump house and silo area.	Bidder understands that this clause is not applicable for Settling tank and Surge tank and BA Overflow tank. Kindly Confirm. In case of RCC ash water tanks, tanks shall be covered with partly with RCC and balance open part with gratings.	Bidder's understanding is correct.
364	Sec VI,Part B	A-21	42 of 42	9.00.00 (6)	One no. Dew Point meter for each TAC.	Dew point meter shall be applicable only in case dryers are provided for TAC.	It may be noted that TAC Dryers are in the scope of the bidder.
365	Sec VI,Part B	A-01	73, 74 of 87	4.01.02 (A)	ESP Ash-90%	In case, duct hopper (with 5% ash collection) is provided by boiler manufacturer, then ESP ash collection should be taken as 85% for design of AHP. In other words, ESP ash + duct hopper ash shall be 90% ash collection for ESP and AHP design. ESP ash collection as 90% should be considered in case duct hoppers are not provided. Kindly confirm.	Bidder's understanding is not correct. Bidder to comply Technical Specification requirement.
366	Sec VI,Part B	A-01	74 of 87	4.01.02 (B) (b) (ii)	Dewatering bin System: Each bin shal lhave provision to hold .....eight hours of ash. Two Chutes shall be provided from each bins along with feeding arrangement to Truck/dumpers.	Bidder understand Two (1W+1S) Chutes shall be provided from each bins along with feeding arrangement to Truck/dumpers.Kindly confirm.	It is confirmed that two chutes to be provided from each for Truck Loading and both the chutes shall be working simultaneously. Third chute shall be used for emergency evacuation purpose.
367	Sec VI,Part B	A-01	73 of 87	4.01.01 (a,ii)	Dewatering Bins shall be of proven design/supplier for similar applications	We understand that the AHP suppliers who met the provness clause of AHP are the proven design/supplier for dewatering bins.	Bidder's understanding is not correct. In this regard, Bidder to refer Amendment SI-MH 17 .
368	Sec VI,Part B	A-01	74 of 87	4.01.02 (C)	Ash Bulk Density of Bottom Ash & Fly Ash for Load calculation-1.6 T/m3.	Bidder understand that this density 1.6 mentioned in the technical spec of Ash Handling Part shall be considered for civil & structural design of Bottom Ash Hopper, silos and dewatering bins only. Density of Slurry Pipes shall be considered 1.1-1.2 (as per actual calculation) for design of supporting structure/pedestal design.Kindly confirm.	Bidder's understanding is not correct. Bidder to comply Technical Specification and consider specified density for load calculations for the design of supporting structure/pedestal of slurry Pipes.
369	Sec VI,Part B	A-01	76 of 87	4.01.02 (I)	Friction Factor C	Bidder understands that th friction factor C for Coarse ash slurry, Fly ash slurry shall be 140 and drain discharge shall be 120 . Kindly confirm	Details of drain discharge is not clear. Same shall be finalized during detail engineering.

370	Sec VI,Part B	A-01	77 of 87	4.01.03 (3)	Bag Filter- Air to Cloth ration taken for bag selection shall be taken as maximum 0.8 m/min.	Bidder understand that this design condition is for bag filter provided in FAE tower in case of vacuum conveying. However, vent filter for Coarse ash hoppers, classifiers, fly ash silos shall be designed with air to cloth ratio of 1.5 m/min as per NTPC practice.Kindly confirm.	Bidder's understanding is not correct. Bidder to comply Technical Specification requirement.
371	Sec VI,Part A	III-Terminal Point & Exclusion	1 of 3	1.03.00	Tapping point from existing St-II AWRS pipe (located inside plant) shall be at any convenient location decided by the employer during detail engineering.	Regarding the terminal point for AWRS piping, which shall be inside plant boundary. Kindly provide teh coordinate of terminal point for clarity.	Bidder to refer Amendment Sl MH-54 for clarity of Terminal Point.
372	Sec VI,Part E	SLFD			As per Flow diagram: XXXX-001-POM-A-025 Rev.A Bottom Ash Handling System in General Layout Plan has shown that Common slurry pump house.	Bidder understands that "Bottom ash Slurry disposal pump house" and " B.A Slurry transportation pump house" are same in the name of common slurry pump house. Please confirm.	Both Pump house may be combined together into single house if found feasible technically during detail engineering.
373	Sec VI,Part E Sec VI,Part E	SLFD			As per Flow diagram: XXXX-001-POM-A-025 Rev.A [Single Line Flow Diagram of Bottom Ash Handling System (Jet Pump dischage)]- APH & Duct Hopper (Coarse Ash slurry system discharge)	Bidder understand that 6 length MS pipe consider from jet pump discharge to slurry transportation sump. And 2 length of MS pipe consider form coarse ash slurry pump discharge to ash slurry disposal sump. Coarse Ash Discharge line shall go to BA Transportation Pump House in place of Slurry Disposal sump. Kindly check.	Bidder's understanding is not correct for material of Ash slurry pipe. Further, bidder to refer revised Single line flow diagram of Bottom ash handling system as per Amendment MH-27.
374	Sec VI,Part E	SLFD			As per Flow diagram: XXXX-001-POM-A-025 Rev.A Sludge(BA Overflow settling tank) and Sludge (Dewatering Bin settling tank)	The single-line flow diagram shows that sludge from the Sludge Tank (BA overflow system) goes to the ash slurry disposal sump, and sludge from the Sludge Tank (De-Watering Bin) goes to the slurry transport Pump House. Sludge from sludge Tank(BA Overflow tank) shall go to BA transport Pump House. Please confirm.	Sludge from all sources of AHS shall goes to Ash slurry disposal sump.
375	Sec VI,Part A Sec VI,Part E	IIA,16 SLFD	14 of 18	1.02.00	c)HP and LP Seal water pumps (one working + one standby each) for meeting the seal water requirement of Combined slurry disposal pumps and drain water pump of Combined slurry pump house, etc. These pumps shall be located in the Combined ash slurry disposal pump house. As per Flow diagram: XXXX-001-POM-A-025 Rev.A (Notes-12)	As per Flow diagram: XXXX-001-POM-A-028 Rev.A shown that BA ash seal water shall be installed BA slurry transportation pump house. According to clause IIA-16-1.02.00 (C), HP and LP seal water pumps shall be installed in the Combined ash slurry pump house. Bidder under stand that HP and LP seal water shall also be utilized for sealing of combined ash slurry pump. All seal water pump Pumps shall be installed at a common location (Common seal water Tank). Please confirm.	As per the Flow diagram: XXXX-001-POM-028 Rev A, BA seal water is not indicated. Bidder's understanding is not correct completely. As per the specified clause, location and application of HP & LP seal water pump is clear. Bidder to follow Specification requirement. Bidder's understanding is not correct for common location of Seal Pumps. Bidder to follow Specification requirement.
376	Sec VI,Part A Sec VI,Part E	IIA,16 SLFD	14 of 18 Note No: 12	1.02.00	b)Seal/cooling/other water pumps and motors complete with all the accessories of drive and mounting as specified and as required. Bottom ash seal water pumps (one working + one standby) for meeting the seal water requirement of clinker grinder, BAOF pump sealing, BA slurry transportation pumps, drain water pump of BA slurry pump house, etc. These Pumps shall be located in the Boiler area. As mentioned in flow diagram XXXX-001-POM-A-025 Rev.A, For sealing of BA slurry Transportation pumps.....these shall be located in the BA slurry transportation pump house.	The location of the seal water pump is contradictory, please confirm.	Location of seal water pump shall be in Boiler area. Bidder to refer revised Single line flow diagram of Bottom ash handling system as per Amendment MH-27.
377	Sec VI,Part A Sec VI,Part A Sec VI,Part E	IIA-16 IIA-16 SLDF	11 of 18 11 of 18	1.01.08 (d) 1.01.08 (d)	Pitless type Weigh Bridge for rail loading below each dry fly ash silos and in between two Coarse ash Silos, minimum Four numbers, complete with all electrical, controls, civil and structural works for weighment of rail Wagons during filling. Two (2) nos. (one at entry and another at exit) Pitless type Weigh Bridge shall be provided at dry fly ash silo area for Truck/Bulker loading complete with all electrical, controls, civil and structural works for weighment of trucks/bulkers before and after filling. Note:(XXXX-001-POM-A-028) One NO. weigh bridge for rail loading below each main fly ash silo complete with all electrical controls, civil and structural works. for weighment from silos.	We propose to consider pit type weigh bridge for rails for maintaing the top of rail elavation. Pitless type shall be provided for trucks.Please confirm. Bidder understand that Pitless type Weigh Bridge for rail loading below fine fly ash silos and in between two Fly ash storage silos . Minimum Four number pitless type weigh bridge shall be considered for rail loading. And Two (2) nos. (one at entry and another at exit) Pitless type Weigh Bridge fr truck loading. Please confirm.	Bidder's proposal is not acceptable for pit type weigh bridge. Bidder to comply Technical Specifications. For quantity of Weigh Bridge, bidder to refer Amendment Sl MH-29.
378	Sec VI,Part E	SLDF			As per Flow diagram: XXXX-001-POM-A-025 Rev.A [Single Line Flow Diagram of Bottom Ash Handling System (Jet Pump System)]- APH Hopper water requirement shown from ECO/APH/DUCT Hopper Pump Header.	Bidder understand that there is a specific pump for ECO hopper water requirement. As Eco hopper continuous water is required and for APH/DUCT water required only once/twice in a shift (in case of intermittent operation). Bidder understands that the water required for APH/DUCT hopper ash evacuation shall be met from BAHP water Pumps. Kindly confirm	Bidder's understanding is not correct. BAHP water pumps can not be used for APH/Duct Hopper ash evacuation. In that case, bidder may consider separate pumps (1W + 1S) for APH/Duct Hopper application.
379	Sec VI,Part A	Mandatort Spare Chapter-3	9 of 14	7.01.10	Résilience plate	Resilience Plate of Fluid Coupling of slurry pump is not applicable.	Bidder to refer Amendment Sl MH-47
380	Sec VI,Part B	G-03	10 of 15	39 (VII)	A walkway of 600mm (minimum width) with handrails & toe guards shall be provided all along length of the gallery of pipe & cable trestle for maintenance of cables where the height of trestle is more than 3 m, ladders for approach to these platforms shall be provided near roads, passage ways and turning points. In the tier of trestle, wherever fly ash handling pipes are routed, grating platform all along the length and for full width of the gallery and trestle of that tier shall be provided. Further, one walkway of 600mm clear width shall also be ensured on the tier meant for routing the fly ash handling pipes.	Bidder understand that if Fly Ash Handling Pipes and Water/Air Pipe shall be on same tier then grating shall be provided below fly ash pipes only not for full width of the gallery and trestle of that tier shall be provided.Kindly confirm	Bidder understanding is not correct. Bidder has to provide grating in full width of the gallery for any ash handling pipe(fly ash or bottom ash) being routed in the gallery . Bidder to refer amendment LA-1 in this regard
381	Sec VI,Part E	SLFD			As per Flow diagram: XXXX-001-POM-A-025 Rev.A [Single Line Flow Diagram of Bottom Ash Handling System(combine Ash Slurry Sump).	There are 12 inputs in the ash slurry sump shown in the Single-Line Flow Diagram (SLFD) for wet coarse ash and wet fly ash. The bidder understands that 2 slurry pipes come from the coarse ash tank, 4 slurry pipes come from the Intermediate silo, 3 for Bottom ash hooper + ECO hopper ash slurry pipe, 1 for drain pump and 1 for clarified slude(Bottom ash overflow pump) Please inform the utilization of balance 1 no slurry pipe.	Inputs in the ash slurry sump shown in the single line diagram is indicative. Same shall be reviewed during detail engineering meeting the functional requirement of the complete system.
382	Sec VI,Part E	SLFD			As per Flow diagram: XXXX-001-POM-A-028 Rev.A [Single Line Flow Diagram of Fly Ash Handling System(Pressure System).	As per the SLFD, 2 out of 6 coarse fly ash lines are indicated to terminate at Fine fly ash silo. We understanda that it is drafting error. Kindly review.	Bidder's understanding is not correct. Bidder to follow Single line flow diagram of Fly ash handling system.
383	General Layout Plan-8024-999-POC-F-001				Rerouting of Existing Ash Pipe	Bidder understand that Rerouting of Existing Ash Pipe including the engineering, design, supply, construction of pedestals, dismantling, erection of pipes and fittings & accessories shall be in owner scope , which is coming in proposed Ash Handling Area provided by owner.	Bidder's understanding is not correct

384	General Layout Plan-8024-999-POC-F-001				Railway line shown below Fly ash silos	Bidder understands that the scope of supply of rails below fly ash storage silos are in owner's scope.	Bidder's understanding is correct.
385	Sec VI,Part A	IV-Functional Gurantee	34 of 73	1.03.09 (A)	Bottom Ash System ,APH Ash, Duct Hopper (if applicable)- Bottom Ash evacuation- The total time for evacuating four (4) hour collection of bottom ash from a unit corresponding to collection rates specified shall not exceed 85 minutes including five (5) minutes time required.....	Bidder understand that it shall be bottom ash and Eco ash. Kindly confirm.	Bidder's understanding is correct. It shall be Bottom ash, Eco Ash and Eco duct ash (if applicable)
386	Sec VI,Part A	IV-Functional Gurantee	35 of 73	1.03.09 (B)	Economizer + Eco duct Hopper (if applicable) ash handling system- In case of wet type Intermittent type bottom ash removal system, the ash collected in economiser hoppers will drop continuously into bottom ash hopper through vertical pipes, flushing connection, flushing equipment in form of slurry. From bottom ash hopper, the economiser ash shall be evacuated and transported to ash slurry sump of bottom ash slurry pump house along with bottom ash.	In case ECO duct hopper is applicable, Bidder proposes to take slurry either to BAH or Coarse ash tank. Kindly confirm. In case ECO duct hopper is applicable for our system, evacuation time shall increase. Hence, bidder proposes to increase the evacuation time suitably to 60 minutes as against 45 minutes speciifed. Kindly confirm.	Bidder's proposal is acceptable. Increase in evacuation time due to the Eco duct hopper shall be reviwed during detail engineering.
387	Sec VI,Part B	A-21	22,23 of 42	2.11.00	Air compressor for conveying/ transportation: Indoor screw type compressor with refrigerant type air drier.	Bidder requestes to consider oil free Centrifugal compressor also in addition to oil free screw compressor due to limited OEMs of compressors. Please Confirm.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
388	Sec VI,Part A	IV-Functional Gurantee	23 of 73	1.01.07.02 (e) (8)	(i) Fly ash conveying air compressors with air drying plant (ADP) 1 for Conveying air compressor.	Bidder understand that it shall be 0.75 for Fly ash conveying air compressors . Kindly confirm.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
389	Sec VI,Part A	IV-Functional Gurantee	22 of 73	1.01.07.02 (e) (4)	Fly ash water pumps, 1 for Fly ash water pumps	The bidder understands that either dry or wet FA system shall work. Hence, if dry FA system is consodered then wet FA system should not be considered or vice versa. Since wet FA system shall not work regularly, dry FA system (compressors) can be considered for power consumption. In such case, FA Water pumps should not be considered. Kindly confirm.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
390	Sec VI,Part A	IV-Functional Gurantee	22 of 73	1.01.07.02 (e) (5)	Bottom Ash Slurry transportation pumps. 1 for Bottom ash slurry transportation Pump.	Biddder undersatnds that it should be 1 for continous operation and 0.5 (0.3125+0.1875) for intermittent operation. Kindly confirm.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
391	Sec VI,Part A	IV-Functional Gurantee	22 of 73	1.01.07.02 (e) (6)	Combined Ash Slurry disposal pumps. 0.875 for Combined ash slurry disposal Pumps.	Since wet FA system is sought not be considered, then it shall be same as BA Slurry transportation system i.e., "1 for continous operation and 0.5 (0.3125+0.1875) for intermittent operation" . Kindly confirm.	Bidder's proposal is acceptable for Ash slurry disposal pumps. Bidder to refer Amendment Sl. MH-53 for revised weightage factor.
392	Sec VI,Part A	IIA-16	4 of 18	1.01.05 (D,iii)	Two (2) numbers (1 working + 1 standby) economizer ash water pumps along with valves, pipes & fittings for both the units. These pumps shall be located in the ash water pump house.	Since BA LP water pump is running continuously, bidder proposes to install economoser water pumps in boiler area by taking suction of the economizer pump from BALP header in boiler area . This will facilitate auxiliary power saving. Please Confirm.	Bidder's proposal is not accepted. Bidder to follow Technical specification requirement.
393	Sec VI,Part A Sec VI,Part E	IIA-16 SLFD	9 of 18	1.01.07 (j)	Six (6) numbers (4 working + 2 stand by) screw type transport air compressors suitably sized and designed to cater to the ash transportation, along with silencer, filter, after cooler along with all other accessories and supporting structures, platforms etc. as specified and as Required. As per Flow diagram: XXXX-001-POM-A-029 Rev.A (Single Line Flow Diagram for ash classifier system(Pressure System).	In the SLFD, it is specified that there are 5 Transport Air Compressors (3 in operation + 1 on standby) allocated for the fly ash hoppers (classifier area), Please verify both the quantity and the configuration for the Transport Air Compressors (TAC) in this scheme.	Bidder to refer Amendment MH-27 for revised Single Flow Diagram for ash classifier system.
394	Sec VI,Part E	SLFD		Note:10	As per Flow diagram: XXXX-001-POM-A-028 Rev.A [Single Line Flow Diagram for Fly Ash Handling System (Pressure System)]Note no 10-Necessary Head Room (6.8 m. Min) to be provided below Silo for Truck/rail Wagon Movement. The silo unloading facility shall be suitable for open truck/closed tanker/ rail wagon loading. However, Bidder shall ensure that the clearance of Ash Silo over the railway track shall be as per railway /RDSO guidelines. The scope also includes getting approval from railway.	As per Note No 5 of General Layout Plan-8024-999-POC-F-001-which reads-" Additional railway line is required for Track Hopper, Wagon tipplers and Ash Silo rail line shown in GLP are indicative. All the required study,necessary approvals & construction required for railway siding work are in scope of NTPC." Hence, bidder understands that the scope of study and getting approval from railway is in the scope NTPC . Kindly confirm. 2. We understand that the location of FA silos near railway line is final. Kindly confirm	1. Bidder's understanding is correct. 2. Tentative location of FA Silos has been indicated in the GLP and same shall be finalized during detail engineering after reviewing the functional requirement or other constraints.
395	Sec VI,Part B	A-01	77 of 87	4.01.02 (M)	Elevation of top of ash dyke : RL 310 m	Bidder understands that for head calculation of ash slurry pumps, difference of ash slurry sump low level and ash dyke top (RL 310 mtrs) shall be considered. Kindly confirm	Bidder's understanding is correct for static head calculations of ash slurry pumps.
396	Sec VI,Part A IIA-16	IIA-16 IIA-16	9 of 18 10 of 18	1.01.07, C 1.01.07 (q)	It is envisaged that "In case of Fine Ash & Coarse Ash are coming through same pipeline to the Classifiers, Classification of 40% of ESP Ash (40% of Ash Conveying Capacity) in Ash Classifiers is to be provided. The remaining unclassified ash shall be taken directly to the Coarse Fly Ash Hopper. The Ash Transportation capacities from the coarse ash hopper to the silos must be designed considering zero classification also.	In case fine ash and coarse ash are not comning through same pipeline which is in case of pressure conveying system, then to achieve classification for 40% of ESP ash, we understand 2 out of 6 lines shall discharge to classifier silo. Kindly confirm	For clarity, Bidder to refer Amendment Sl MH-33.
397	Sec VI,Part B	A-01	77 of 87	4.01.02 (K)	Storage capacity for Classifier Block Silos/Hoppers are as follows: - Fine fly ash Hopper-500 (T), Coarse Fly ash Hopper-500 (T), Classifier Silo -200 (T). Main storage for fine Ash Silo shall have minimum 1750 MT effective storage capacity.	As per Flow diagram: XXXX-001-POM-A-029 Rev.A (Single Line Flow Diagram for ash classifier system(Pressure System). It is shown that Fine fly ash hopper-250T, Coarse Fly ash Hopper-250T(Each), Classifier Silo-200T and main storage of fine ash silo is 1000T. Please Confirm.	Bidder to follow storage capacity as per the revised Single line Flow duagram. Further, Bidder to refer Amendment Sl MH- 46.
398	Sec VI,Part A	IIA-16	12 of 18	1.01.08 (u)	Suitable arrangement for Bulker washing shall be provided.	Bidder understand that one 50 NB tapping of water with manual valve and pipe shall be required for Bulker Washing. Kindly confirm.	Bidder's understanding is correct. However, diameter of pipe, pressure of wash water, location of washing and suitable nozzle to meet the washing requirement of Bulker shall be finaized during detail Engineering.
399	Sec VI,Part B	A-01	74 of 87	4.01.02 (B)	Fly Ash System- 8 hours Ash Collection shall be removed in 6 hors for ESP Ash.	Bidder requested customer confirm that the fly ash design critreria for 2nd stage conveying and 3rd stage fly ash conveying (as applicable).	It may be noted that for all the stages, fly ash conveying design criteria shall be same , i.e. 8 hrs ash collection shall be removed in 6 hrs.
400	Sec VI,Part B	A-21-Ash Handling Plant	32 of 42	4.00.00	Ash Slurry Piping & Accessories: Ash Slurry Concentration: Not more than 28% (w/w)	Bidder understand that the 28% concentartion shall be for combned Ash slurry. However, the slurry concentation for coarse ash and Fly Ash shall be max 30 % (w/w). Kindly confirm.	Bidder's understanding is not correct for slurry concentration of Coarse ash and Fly ash. Bidder to refer Amendment Sl MH-48

401	Sec VI,Part A Sec VI,Part B	II A-16 A-21	9 of 17 23 of 42	1.01.06(E) e 2.12.00	The fine ash and coarse ash after classification shall be stored in separate RCC hoppers/structural steel hoppers, fine ash hopper and coarse ash hopper respectively. The capacity of the fine ash hopper (01 no) and coarse ash hopper (02 no) shall be 250 Tonnes each. Classifier Silo/Intermediate FA Silo- MOC- MS Plate, IS:2062 min 10 mm thick..	Bidder understand that fine ash and coarse ash hopper shall be either RCC or strcutural. Kindly confirm.	Bidder's understanding is not correct. As per the specification, after classification Fine ash Hopper & Coarse ash hopper shall be either RCC / structural steel whereas Classifier Silo (before Classification) and intermediate FA Silo shall be of Structural steel only.
402	Sec VI,Part B Sec VI,Part A	D-1-5 IID	23, 24 of 69 3 of 8	5.05.06 1.00.00 (9,i)	Pipe supports shall be provided for ash slurry pipes pipes, dry fly ash(FA) pipes including RCC thrust blocks and any other supports required to complete the system. Over-ground pipes shall be supported on RCC pedestals except for FA pipes which shall be on elevated steel trestles. Unless noted otherwise, the top of concrete pedestals shall be minimum 500 mm above surrounding ground level/paving level. Pipes shall be suitably anchored with RCC pedestals to resist lateral and vertical movements as per system requirement. RCC pedestals for ash slurry disposal pipes lines Miscellaneous works like Transformer Foundation, Fencing, Paving etc.	In main plant area, where paving is provided, bidder requests to consider pedestal height of 300 mm for better man-movemnet in these areas. Other area (non paved area), it can be 500 mm. Kindly confirm.	Bidders proposal is not acceptable
403	Sec VI,Part E	SLFD			Typical arrangement shown in drawing (XXXX-001-POM-A-028)	Since wet system is specified for ECO & ECO duct hoppers, dry system conveying along with water cooling jacket for surge hoppers is not applicable. Kindly confirm.	Bidder's understanding is correct.
404	Sec VI,Part A	I	6 of 8	4.03.00(i)	Bidder shall supply a quantity not less than 10% of the full charge or one (1) year topping requirement (whichever is higher) of each variety of lubricants ……..to be utilized during the first year of operation.	Bidder propose to provide the first fill lubricants and chemicals of the clarifier till COD of the Ash Handling System to NTPC. Kindly confirm.	Bidder proposal not accepted. Tender requirements are clear, bidder to follow technical specifications.
405	Sec VI,Part E	SLFD			As per Flow diagram: XXXX-001-POM-A-029 Rev.A [Single Line Flow Diagram for Fly Ash Handling System (Pressure System)]- Low Level Switch in Air Lock/Pump Tank	Low level switch is not required in Air Lock/Pump Tank as there is no interlock in pneumatic conveying system. Kindly review.	Shall be reviewed & finalized during detail engineering.
406	Sec VI,Part E	SLFD			As per Flow diagram: XXXX-001-POM-A-029 Rev.A [Single Line Flow Diagram for Fly Ash Handling System (Pressure System)]- Ash Discharge Valve below Air Lock/Pump Tank	Bidder understand that for first stage pressure conveying valve at the bottom of the vessel may not applicable . Hence, it may be made it optional as per OEM's design.Kindly confirm.	Shall be reviewed & finalized during detail engineering.
407	SECTION VI, PART-B	SUBSECTION-B-10 STATION LIGHTING	7 of 20	4.00.00 10 (h)	LP-3 Type Lighting panel	LP-3 Type Lighting Panel not considered for CHP, AHP, LHP & GHP areas. Requested customer to confirm.	Bidder understanding is correct.
408	SECTION VI, PART-B	SUBSECTION-B-10 STATION LIGHTING	8 of 20	4.00.00	20 A, SP24 V AC(Industrial) Socket	20 A, SP24 V AC(Industrial) Type Socket not considered for CHP, AHP, LHP & GHP areas. Requested customer to confirm.	Bidder understanding is correct.
409	INSTRUMENT AND CONTROL DEVICE LIST APPENDIX-I TO PART-A	ANNEXURE-III TO CONTRACT QUANTITIES FOR DDCMIS	7 of 8	7.00.00	Coal & Lime handling form CHP Control Room.	Gypsum handling also from CHP Control Room. Customer to confirm.	Gypsum handling is controlled from FGD control room. Further refer amendment sl. No MH-03
410	SECTION –VI, PART-B	SUB SECTION B-06 LT SWITCHGEARS & LT BUSDUCTS	13 OF 18	7.00.00	Intelligent Motor Controller (IMC) 1. Each motor/heater feeder shall consist of MPCB/MCCB (with S/C release only), Power contactor & intelligent motor controller (IMC) to ensure Type-2 Co-ordination. If the ESP controller and rapping motor are provided in the ESP switchgear, same shall be with IMC having MPCB/MCCB. If separate controller is provided and only supply feeder is envisaged from ESP Switchgear, the requirement of IMC may be excluded.	IMC is not considered for Local Control panels like Scoop coupling panel, All the local panels for Electro mechanical application like Sump Pump, MD, SM, Coal/Lime sampling unit, DE/DSS LCP, Travelling tripper etc. Kindly confirm. PMCC/MCC located in switchgear room will be provided with IMC(Intelligent Motor controller)	Bidder understanding is correct.
411	SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	34 of 79		One number trip indicator panel per conveyor, which shall display the exact number of safety switches (pull chord or belt sway switches) operated in a loop of conveyor considering 10 % spare switches. It shall also monitor the condition of field cable connecting the switches in series and generate signal, if field cable is found broken or short. The trip indicator panel shall display the operated switch number. The same indication shall also be available in DDCMIS OWS/ SR PLC. Panel shall have Modbus/TCP IP/OPC redundant interfacing with concerned DDCMIS/PLC for monitoring and diagnostic purpose only. Trip Indicator panel shall be separate for PCS and BSS respectively. Complete software shall also be provided by bidder. Redundant power supply shall be provided with each trip indicator. LCD display shall be provided with each trip indicator for details like fault location, fault indication etc. Trip Indicator shall be provided with dual digital outputs, which shall be hardwired in control system. Each event/Trip shall be recorded in the trip indicator and DDCMIS.	In general practice for all NTPC/Non NTPC projects one common BWP is considered in switchgear room with multiple modules for various conveyors. One trip indicator panel shall be provided in respective MCC. Each panel shall comprising of one common module for each conveyor(Each module to display BSS and PCS indication)	Refer Amendment sl. No MH-04 in this regard.
412	SECTION-VI, PART-B	SUB-SECTION B-10 CABLING, EARTHING AND LIGHTNING PROTECTION	4 OF 21	3.02.05	FOR COAL HANDLING PLANT/FGD PLANT/ ESP AREA THE FOLLOWING SHALL ALSO BE APPLICABLE: a) All overhead cable routes shall be along the route of the conveyor gallery on separate supporting structures and cables shall be laid in vertical trays. The bottom of the steel shall be such that the existing facilities, movement of trucks/human beings etc. does not get affected. The cable trestle shall have a minimum 600mm clear walk way and shall have maintenance platforms as required. The bottom of the steel supporting structure shall be generally at 3.0M above the grade level except for rail/road crossings where it shall be at 8.0M above grade level. Tap offs from the overhead cable trestle can be through shallow trenches with prior approval of the Employer. Directly buried cable, if essential, shall not have concentration of more than 4 cables on one route. b) Cable trenches shall be provided only in Switchgear/MCC rooms. c) Cables shall not be routed through the conveyor galleries except for the equipment located in the conveyor galleries for a particular conveyor i.e. protection switches, receptacles etc. d) Cables for PCS and BSS shall be routed along the conveyors through GI conduits.	a) Horizontal tray arrangements is considered in cable rack/pipe rack for AHP area. Please confirm. b) Cable trenches are considered in switchgear room for CHP/AHP/LHP/GHP area. Please confirm c) Cable will be routed through conveyor gallery specifically for Bunker TP to Bunker floor and inside the tunnel area where overhead cable rack connectivity is not possible. Kindly accept.	Bidder proposal is not acceptable. Specification cl.no.3.02.05 Sub -Section B-10 Section-VI, part-B to be followed.

413	SECTION VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	11 of 18	4.12.00	Occupancy based Passive Infra-red sensors The sensors shall be recess mounted, programmable type suitable for lighting load of 6A with variable off delay settings. The detection area shall be minimum 5 meters for standard room height of 3mt. All the calibrated settings shall be stored in non-volatile memory of PIR sensor which shall be unaffected by power supply fluctuations. Necessary 16A contactor shall be supplied along with each sensor & shall be located inside the switch box	Occupancy based sensors not considered for CHP, AHP, LHP & GHP areas. Requested customer to con-firm.	Bidder proposal is not acceptable. Specification cl. no.4.12.00 Sub -Section B-11 Section-VI, part-B to be followed.
414	SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	7 OF 15	3.06.00.f	f) For protection of motors below 30kW, MPCB (only Short-circuit release) and Intelligent motor controller(IMC) with current sensing module shall be provided and for motors from 30kW and below 90kW, MCCB and Intelligent motor controller(IMC) with current & voltage sensing module shall be provided. Motor feeders below 90kW (up to 160kW for CHP conveyor motors) shall be contactor controlled. Contactors shall be of 250% of motor FLC for fan and compressor application and 200% of motor FLC for other application. The motor feeders for 90kW & above shall be Air Circuit Breaker controlled. All moving and fixed contacts of each draw-out modules must be of rating more than 150% of MCCB/MPCB mounted inside the module. Each phase of vertical bus bars shall be separated by phase barrier.	Motors for DE or DSS system of CHP area with motor rating up to 160KW are considered with contactor controlled similar to CHP conveyor motor. Kindly confirm	Bidder proposal is not acceptable. Specification cl. no.3.06.00 (f) Sub -Section B-0 Section-VI, part-B to be followed.
415	SECTION – VI, PART-B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	31 of 79	2.7.1 Pull Chord switches 2.7.2 Belt sway switches 2.7.3 ZSS	Flame proof/Explosion proof for NEC Class2,Division 1 area	NEC Class 2, Division 1 area is not applicable for CHP area. PCS, BSS, ZSS: IP-65, Non-Flammable, addressable, indicating type shall be provided. All other contractual requirement shall be followed. Kindly confirm	Specification requirement is clear. Bidder to comply to technical specification.
416	SECTION – VI, PART-B	SUB-SECTION-IIIC-17 ELECTRICAL ACTUATORS	1 OF 4	3.00.00	Electrical actuators for valves / dampers / gates (other than covered in 2.00.00) -These actuators shall be Non-Intrusive type electric actuators. The interface of these actuators with DDCMIS shall be of two types viz. with Hardwired interface and with Fieldbus interface. The common requirements of both these type of actuators are specified at clause 4.00.00, specific requirements of Non-Intrusive hardwired actuators are specified at clause 5.00.00 and specific requirements of Non-Intrusive fieldbus actuators are specified at clause 6.00.00. The applications where these two types of actuators are to be provided is specified in Part-A of Technical Specifications.	Proposed to provide Electrical Actuators as per Standard practice for skid mounted /operated through only PLC/ local control panel systems like scoop coupling, tripper, paddle feeder, LSU, CSU where it is not possible to have non-intrusive type filed bus based actuators. Kindly accept.	Refer Amendment Sl. No MH-02 in this regard.
417	SECTION – VI, PART-A	SUB-SECTION-I-A PROVENNESS	24 OF 35	5.6.0	Provenness criteria for LT SWITCH-GEAR	Kindly exempt the provenness criteria applicability for sub vendor for the supply of LT switchgear for machines like Stacker reclaimer since major OEMs are not participating in the tender due to limited number of panels.	Bidder to comply specification requirement.
418	SECTION-VI, PART-A	SUB-SECTION–IIA-15	PAGE 1 OF 6	1.00.00	Coal required for the proposed unit shall be catered from the existing Coal Handling plant and necessary coal conveying arrangements to be provided for interconnection of the proposed unit from the existing Coal conveying stream. Conveyor C-32 shall take feed from upstream conveyor C-19B at TP-17 and C-33 shall take feed from existing upstream conveyor C-28 at TP-24. Both C-33 and C-32 shall discharge into C-34A/B at TP-27 and TP-28. Similarly, C- 38A taking feed from existing upstream conveyor C-31A at TP-18 and C-38B taking feed from existing upstream conveyor C-29 at TP-25, shall discharge into C-39A/B at TP-26. Subsequently, C-34A/B and C-38A/B shall discharge feed into C-35A/B. C-35A/B shall finally feed Bunker conveyors C-37A directly and C-37B through C-36A/B.	As the coal tapping has to be done from existing TPs, kindly confirm if the existing TPs are capable of taking additional loads of new conveyor gallery and any additional strengthening of existing TPs is not in bidders scope.	Additional modification & strengthening (if required) of the exsiting TP's is in the scope of the Bidder.
419	SECTION-VI, PART-A	SUB-SECTION–IIA-15	PAGE 1 OF 6	1.00.00	Coal required for the proposed unit shall be catered from the existing Coal Handling plant and necessary coal conveying arrangements to be provided for interconnection of the proposed unit from the existing Coal conveying stream. Conveyor C-32 shall take feed from upstream conveyor C-19B at TP-17 and C-33 shall take feed from existing upstream conveyor C-28 at TP-24. Both C-33 and C-32 shall discharge into C-34A/B at TP-27 and TP-28. Similarly, C- 38A taking feed from existing upstream conveyor C-31A at TP-18 and C-38B taking feed from existing upstream conveyor C-29 at TP-25, shall discharge into C-39A/B at TP-26. Subsequently, C-34A/B and C-38A/B shall discharge feed into C-35A/B. C-35A/B shall finally feed Bunker conveyors C-37A directly and C-37B through C-36A/B.	Steel structure and foundation drawings of existing TPs may please be provided	Drawings (pdf copy) shall be shared with the successful bidder after award .
420	SECTION-VI, Part-A	SUB-SECTION-IIA-16	PAGE 13 of 18	1.01.08	b) Three (03) lengths of combined ash slurry disposal MS pipelines from combined ash slurry pumps up to Ash dyke including garlanding at dyke end and extensions into the ash dyke at number of discharge points complete with basalt lined pipe bends, fixtures, elbows, gaskets, nuts, bolts, structural steel supports and other accessories as specified and as required. Cast Basalt pipelines along the ash slurry corridor shall be provided as specified and as required. For garlanding of Mine Void, MS bends shall be provided. The length of total combined Ash disposal pipelines shall be 39,000 m (excluding fittings and including branch pipes for garlanding of mine void) or the actual distance (excluding fittings) including branch pipes for garlanding of mine void, whichever is higher.	As per the scope in the previous projects of Lara/Talcher, Terminal Point for Ash slurry disposal piping (combined ash slurry) and AWRS piping may be restricted to 5 m inside plant boundary, balance scope may please be excluded.	Bidder's proposal is not acceptable. Bidder to comply requirement of Technical Specifications.
421	SECTION – VI, PART-A	SUB-SECTION-IID	PAGE 3 OF 8	1.00.00	a. Ash Water Pump House open type	It is understood that Ash Water Pump House is not an RCC building or Steel building/shed. Kindly confirm.	Bidder understanding is correct
422	SECTION – VI, PART-A	SUB-SECTION-IID	PAGE 5 OF 8	1.00.00	17. Coal, Bio mass Limestone and Gypsum Handling Plant All civil, structural & architectural works associated with coal, Lime stone, Gypsum handling plant, i.e., transfer points, crusher house,	Bidders understands that coal crusher house is not in the scope of this project. Please clarify.	Bidder to note that crusher house shall be provied for lime stone. Coal crusher house is not in the bidder's scope
423	SECTION – VI/PART-E				Tender drawings	Description is not legible	Query not clear
424	SECTION – VI/PART-E				Civil Tender drawings	Autocad drawing for the plot plan required with the list of new facilities/ buildings may please be provided	Auto cad of GLP will be provided to successful bidder
425	SECTION-VI, PART-B	SUB-SECTION-D-1-5	PAGE 23 OF 69	5.05.06	Over-ground pipes shall be supported on RCC pedestals except for FA pipes which shall be on elevated steel trestles.	Kindly clarify the grating requirement for FA pipe rack, if it has to be provided for the full width?	Grating to be provided for full width of gallery of FA pipe rack
426	SECTION-VI, PART-B	SUB-SECTION-D-1-5	PAGE 24 OF 69	5.05.11	All liquid retaining structure shall be designed by working stress method as per is 3370 (part-1&2):2009.	Crack width for liquid retaining face and non-liquid/earth face may please be specified.	Bidder to refer amendment D2-50

427	SECTION-VI, PART-B	SUB-SECTION-D-1-5	PAGE 58 OF 69	5.23.08	Brick wall cladding (1m height above FFL) shall be provided all around the periphery of pump houses	It is understood balance height on the sides is uncladded, Kindly confirm.	PL refer amendment no. D1-49.
428	SECTION-VI, PART-B	SUB-SECTION-D-1-5	PAGE 24 OF 69	5.05.08	minimum clearance of the bottom of pipeline for all such locations shall be 1.50 m above the high flood level (HFL).	Please provide the HFL.	HFL is RL(+) 272.6m
429	SECTION-VI, PART-B	SUB-SECTION-D-1-5	PAGE 48 OF 69	5.19.01.10	The minimum grade of concrete for all RCC structures associated with DM plant, PT plant, ETP and CW chemical treatment and CSSP shall be of grade M30.	Bidder understand that CSSP is not in the scope. Kindly clarify.	Minimum grade of concrete for CSSP shall be M30, if adopted as per Mech. Scope / System Requirement.
430	SECTION-VI, PART-B	SUB-SECTION-D-1-8	PAGE 10 OF 20	8.06.00	Minimum thickness of the grating shall be 40 mm	SUB-SECTION-D-1-5/5.23.12/PAGE 60 OF 69: The minimum size of main bars shall be 25 x 6. Kindly clarify for minimum thickness of 25mm for staircase is contradictory to minimum thickness requirement of grating.	PL refer amendment no. D1-48.
431	SECTION-VI, PART-B	SUB-SECTION-D-1-9	PAGE 1 OF 33	9.02.01	wherever the height of the building is more than 12m, railing height shall be 1.2m	Kindly confirm that 1.2m high handrail is not applicable inside the coal conveyor galleries.	Minimum 1000 mm high (from floor/ roof level) hand railing shall be provided along walkways of coal conveyer.

S No	BID SPECIFICATION				SPECIFICATION REQUIREMENT	Pre-Bid Queries/ Clarifications	NTPC Reply
	Section	Sub-Section	Page No.	Clause No.			
432	VI-A	SUB SECTION-IV	6 of 73	1.01.02 (iv)	For deficiency in Average Condenser Pressure in mm Hg(abs) measured at 300mm above top row of condenser tube at 840 MW, 0% makeup, design CW temperature and design CW flow - Not more than 65 mmHg (abs)	Customer has envisaged excessive margins for the design of condenser cooling water system. TG cycle is guaranteed for condenser back pressure of 77 mmHg (abs) at 33 DegC. However, the condenser cooling water system is specified to be designed with design back pressure for condenser is 65 mmHg at 33 DegC, approx. 18% margin over the TG cycle guarantee back pressure of 77 mmHg. To understand the excessive margin, when condenser is designed with back pressure of 65 mmHg at 33 degC, 77 mmHg back pressure will be achieved when CW inlet temperature at condenser inlet is 36.3 deg C. therefore there is margin of 3.3 deg C which is excessive. It leads to increase in sizes of all components of CW system such as condenser, CW Pumps and especially IDCT and also increase in Aux power consumption of CW pumps by approx. 30% (i.e approx. 2 MW). Another way to understand the excessive margin is that if three (3) CW pumps are run to meet the CW flow required at 65 mmHg at 33 degC, then to meet the CW flow requirement at 77 mmHg at 33 degC, only two CW pumps will be required to operate i.e. the auxiliary power consumption of one CW pump is additional, if condenser is designed at 65 mmHg at 33 degC and operated at 77 mmHg at 33 degC.. It is suggested to limit the margin to a rational value of approx. 10% i.e. the condenser design back pressure may be selected as 70 mmHg instead of 65 mmHg.	Bidders proposal is not acceptable. Bidder to comply with technical specification requirements.
	VI-A	SUB SECTION-IV	4 of 73	1.01.01 (iii)	TG Output: Continuous TG output of 840 MW unit load (i.e. 105% of rated load) under rated steam conditions at 77 mm Hg (abs) condenser pressure with zero make-up.		
	VI-B	SUB SECTION-A-01	35 of 87	2.02.03 (vi)	(vi) Guarantee Condenser pressure - To be optimised by bidder but not exceeding 65 mmHg (abs).		
433	VI-B	SUB SECTION-A-01	45 of 87	3.01.00 (e)	Total Head of the CW pump at rated flow: Sum of static lift from minimum water level in CW pump house sump up to the top elevation of hot water distribution at Cooling Tower + 110% of friction drop in the entire CW system + pressure drop across Condenser with 2 mWC margin (minimum).	The additional 2 MWC margin in addition to 10% margin on friction drop for CW pumps head selection leads to excessive increase in Auxiliary power consumption. This 2 MWC additional margin corresponds to approx. 20% margin on entire friction drop. i.e, total margin on friction drop is increased to 30%. This will lead to unnecessary increase in the operating cost of the plant. Hence the 2 MWC margin is not required and may be removed.	Bidder's proposal reviewed and not accepted. Bidder to comply with technical specifications requirement.
434	VI-B	G-04	98 of 227	-	PG Test Procedure for TG & SG Plate Heat Exchanger (PHE)	Two PG Test procedures are enclosed in the speciication. Please clarify which is to be referred.	Both PG Test procedures are same for TG & SG PHEs. Bidder to follow accordingly.
	VI-B	G-04	160 of 227	-	PG Test Procedure for TG & SG Plate Heat Exchanger (PHE)		
435	VI-A	SUB SECTION-IV	5 of 73	1.01.01 (xii)	Cooling Tower: The cold-water temperature of 32.5 deg C shall be guaranteed for the design conditions of CW flow, range, ambient WBT and RH as per the performance test procedure of cooling tower elaborated elsewhere in the specification.	There is ambiguity in specification at two different clauses. Customer to confirm which clause is correct.	Design cold water temperature at CT outlet shall be 32.5 deg C as per clause 3.02.00 (g) of sub section A-01, Part B. Further, bidder to refer Amendment Sl.No. WS-2 in this regard.
	VI-B	SUB SECTION-A-15	12 of 40	3.17.00	For design of Cooling tower, CT outlet temperature shall be considered as 32 deg. C.		
436	VI-B	SUB SECTION-A-01	35 of 87	3.02.03 (1-ii)	Condenser Design Parameters: Design cold water temp. : 33 Deg. C	Customer has envisaged excessive margins for the design of cooling tower as below: 1. Please note that condenser is designed for 33 deg C. However the cooling tower is designed for cold water temperature of 32.5 deg C, which is approx. 12% margin in cooling tower approach i.e. 4.2 deg C instead of 4.7 deg C. 2. Customer has envisaged 1 DegC margin in range of cooling tower, which amount to approx. 10% margin on heat load. The above margins excessively increase in cooling tower size and cost. Further the approach for cooling tower is 32.5-28.3 = 4.2 DegC, is a difficult approach for such a large flow cooling tower and will be prone to frequent underperformance. The cooling tower approach for IDCT should be at least 5 degC. The specification requirement of designing the Condenser for 65 mmHg back pressure for arriving at cooling tower design flow has resulted in increase of Cooling tower flow by atleast 20% over the functional requirement. These conditions have resulted in requirement of large area for cooling towers. Hence it is requested to please revise the design cold water temperature at cooling tower outlet inline with design condenser cold water temperature i.e 33 degC.	Bidder's proposal reviewed and not accepted. Bidder to comply with technical specification requirements.
	VI-A	SUB SECTION-IV	5 of 73	1.01.01 (xii)	Cooling Tower: The cold-water temperature of 32.5 deg C shall be guaranteed for the design conditions of CW flow, range, ambient WBT and RH as per the performance test procedure of cooling tower elaborated elsewhere in the specification.		
	VI-B	SUB SECTION-A-01	46 of 87	3.02.00 (g)	Design Cold water temperature at cooling tower outlet - 32.5 deg C		
	VI-B	SUB SECTION-A-01	46 of 87	3.02.00 (e)	Design Range - Temp. rise across condenser + 1 deg C		
	VI-B	SUB SECTION- A-01	46 of 87	3.02.00 (g) & 3.02.00 (h)	Design Cold water temperature at cooling tower outlet = 32.5 degC. Re-circulation allowance (min.)=0.8 DegC. Design wet bulb temperature (WBT) = 27.5 degree C Design inlet wet bulb temperature=Design ambient WBT + Recirculation allowance in deg C=28.3 DegC.		
	VI-A	SUB SECTION-IV	6 of 73	1.01.02 (iv)	For deficiency in Average Condenser Pressure in mm Hg(abs) measured at 300mm above top row of condenser tube at 840 MW, 0% makeup, design CW temperature and design CW flow - Not more than 65 mmHg (abs)		Bidders proposal is not acceptable.

437	VI-B	SUB SECTION-A-07	23 of 25	Annexure-I, Sl. No. 4	Worst condenser pressure mmHg(abs) 89	Customer has envisaged excessive margins for the design of condenser cooling water system. Condenser is designed for back pressure of 65 mmHg at 33 degC. Accordingly the maximum cooling water temperature for worst condenser pressure of 89 mm Hg (abs) shall be 39 deg C instead of 36 degC. Hence same may be corrected.	Bidder to comply with Technical Specification requirements.
	VI-B	SUB SECTION- A-01	37 of 87	2.02.03, S. No.9.0 (f)	Maximum temperature of condenser cooling water=36 Deg C.		
438	VI-A	SUB SECTION-IIA-11	1 of 4	1.01.01 (8)	Carrying out physical sump model study and .....CW sump including forebay, **transition zone**, CW channel from cooling tower to CW pump house.	We understand that flow transition take place in CW forebay only and we are considering the same as transition zone.This is also as per HIS. Pl. confirm. In case our understanding is incorrect, customer may pl. define the transition zone clearly.	Bidder to note that transition zone to be provided at the end of channel and before Forebay.
439	VI-B	SUB SECTION- A-01	47 of 87	3.03.00 S. no.3c	Plate Heat Exchangers (TG and SG separate) Secondary water outlet temperature = Not more than the design hot water temperature at condenser outlet	Please note the design CW inlet temperature to PHE on secondary side is 36 degC i.e. 3 DegC more than design Condenser CW inlet temperature (33 degC). Therefore, the Cooling water outlet temperature for PHE should also be not more than (3 deg + hot water temperature at Condenser outlet). Customer to confirm.	Bidder's understanding is not correct. Secondary water at PHE outlet shall not be more than CW temp temperature at Condenser outlet.
440	VI-B	SUB SECTION- A-15	29 of 40	2.05.00	Service Water System Clarified water from the clarified water tank (along with supply of treated wastewater from LETP) shall be used as service water. Service water pumps shall take suction from this tank and supply water to the service water pipe network. Service water distribution shall be used for effective cleaning /washing of each area and shall also fill the service water tank provided on roof top of each building to supply water to toilets.	As per the referred clause of specification service water pumps are taking suction from Clarified water tank, however as per Plant water scheme, TENDER DRG NO:XXXX-999-POM-A-037, REV-A service water pumps are taking suction from service water tank. Please clarify. In case service water tank is applicable, please provide the details like capacity, location, type etc.	Bidder to note that separate service water tank with supply from the clarified water tank as well as treated wastewater from LETP has been envisaged. For capacity of service water tank, bidder to refer clause 16.00.00 (XIV) Page 26 of 36 of sub section A-14, Part B of technical specifications.
	VI-B	SUB SECTION- A-01	49 of 87	3.05.00 (h)	h) Service Water System Clarified water from the clarified water tank shall be used as service water. Treated water from LETP shall also be used as service water. Service water pumps shall take suction from this tank and supply water to the service water pipe network.		
	VI-E				PLANT WATER SCHEME, TENDER DRG NO:XXXX-999-POM-A-037, REV-A		
441	VI-B	SUB SECTION- A-01	45 of 87	3.01.00 (j)	Internal Diameter of CW pipes in CW pump discharge up to inlet to cooling tower (excluding non-encased portion of piping connected to condenser): Design velocity not to exceed 2 m/sec	Please note the Pump discharge nozzle size are much smaller than pipe sizes arrived with design velocity of 2 m/s. For better layout in CW Pump house customer is requested to accept velocity of 2.5 m/s at pump discharge also. Please note the Pump discharge pipe length in CW Pump house is only 5 m to 10 m. Customer to confirm.	Bidder's proposal reviewed but not accepted. Bidder to comply with tender requirement.
442	VI-E	P&I Diagram of Equipment cooling water system, Tender drawing no: XXXX-XXX-POM-A-038, REV-A	-	-	Cooling water tapping for Vaccuum Pump heat exchanger is taken from ACW Pump discharge.	Please note the pressure drop across vaccuum Pump heat exchager is less than pressure drop across series Condenser hence Cooling water tapping can be taken from condenser inlet and outlet pipe itself and not from ACW Pump discharge as boosting of pressure is not required. Customer is requested to accept.	Bidder's proposal reviewed and not accepted. Bidder to comply with technical specification requirements.
443	VI-E	P&I Diagram of Equipment cooling water system, Tender drawing no: XXXX-XXX-POM-A-038, REV-A	-	-	Non return valve are shown at secondary cooling water (ACW), primary DMCW for Turbine generator (TG DMCW) and primary DMCW for steam generator (SG DMCW).	Please note that motorised isolation valves are provided at ACW and DMCW Pump discharge and same are also interlocked with Pump start/ stop, therefore NRVs at ACW and DMCW Pump discharge are not required. Customer is requested to accept.	
444	VI-A	SUB SECTION-VI, Chapter-08	1 of 29	1.00.00	MANDATORY SPARES FOR WATER SYSTEM AREA (CW, ACW, ECW, RAW WATER, CT, WTP AREA ETC.)	We understand that mandatory spares for highlighted pumps shall be applicable as follows: 1. DMCW & ACW Pumps: Inline with clause 14, chapter-08, page 7 of 29 only. 2. Raw water pump (PT & Ash): Inline with clause 16, chapter-08, page 10 of 29 only. 3.Condensate transfer pump: Inline with clause 1.04.00 B, chapter-01, page 4 of 38 only. 4. Other horizontal pumps in Plant water system: Inline with clause 17, chapter-08, page 10 of 29 only. Pl. confirm.	Bidder's understanding is partially correct. Mandatory spares for equipments covered under Water System area including Condensate transfer pump shall be as per chapter-8.
	VI-A	SUB SECTION-VI, Chapter-08	7 of 29	14	ECW System- DMCW & ACW Pumps		
	VI-A	SUB SECTION-VI, Chapter-08	10 of 29	16	Auxiliary Water Pumps		
	VI-A	SUB SECTION-VI, Chapter-08	10 of 29	17	Horizontal Centrifugal Pumps (For each Type & Size)		
	VI-A	SUB SECTION-VI, Chapter-01	4 of 38	1.04.00 B	Condensate Transfer Pumps and acessories		Condensate transfer pump of SG area shall be covered as per Chapter 1.
445	VI-A	SUB SECTION-VI, Chapter-08	7 of 29	14 (c)	DMCW & ACW Pumps motor with motor bearing1 no motor including its bearing and 1 additional set bearings of each type & size	As the mandatory spares for DMCW & ACW Pumps motors are repeated in appreaing in chaptre-02 and chapter-08. kinldy clarify which clause to be applicable for this DMCW & ACW pumps motor.	Bidder to consider mandatory spares covered under Chapter-8 for indicated equipments.
	VI-A	SUB-SECTION-VI CHAPTER-02	3 of 32	16 (b)	ACW Pumps and DMCW Pumps motor with motor bearing--1 no motor of each type and 1 Set brg of each type		
446	VI-B	SUB SECTION-A-01	46 of 87	3.02.00 (c)	Quantity of water to be cooled by Cooling Towers of One Unit: Quantity of water to be cooled by Cooling Towers of One Unit: CW pumps flow per unit (+5% margin to be considered in hot water distribution system to avoid overflow)	We understand that design flow to cooling tower shall be sum of CW & ACW flow only. 5% margin in flow shall be considered in hot water distribution piping and duct inside IDCT. Pl. confirm.	Bidder to note that quantity of water to be cooled by cooling tower of one Unit shall CW pumps flow for one Unit. Additional 5% margin to be considered in hot water distribution system of IDCT.
447	VI-A	I-A	8 of 35	4.3	Induced Draught Cooling Tower: The Bidder/its Sub-vendor should meet the qualifying requirements of any.....	In the provenness criteria of IDCT, please clarify the definition of "bidder". Whether bidder means EPC contractor of Power Plant?	Bidder's understanding is correct in case of EPC package.

448	VI-A	I-A	8 of 35	Note for 4.3:	The Bidder/its sub-vendor should offer only the same type i.e. counter flow or cross flow and of the same construction type i.e. RCC construction or FRP construction of Cooling Towers for which the bidder/its sub vendor/Holding Company/Subsidiary/Collaborator/ Associate (i.e., the firm meeting requirements of clause 4.3.1 above) is qualified	Pl. note that this clause is restricting the no. of biddrs for qouting for thes package. Presently due to covid and other financial constraints the no. of bidders for this package are limited. Please note that the thermo-hydraulic design of cooling tower is same for RCC construction cooling tower and FRP construction cooling towers. Therefore customer is requested to accept the bidder who has done either type of the cooling tower construction to offer IDCT in any construction. To enable same, the bidder may be allowed to associate or employe a structural designer for RCC construction or FRP construciton, as the case may be.	Bidder's proposal reviewed and not accepted. Bidder to comply with technical specification requirements.
449	VI-A	I-A	8 of 35	4.3	Induced Draught Cooling Tower: The Bidder/its Sub-vendor should meet the qualifying requirements of any……	Cooling tower bidders who are meeting the provenness criteria shall design (thermo-hydraulic design as well as structural design), manufacture, supply, erect at site and supervise the construction of cooling towers. Customer is requested to accept the construction of cooling tower sub-structure (RCC basin including IDCT foundation) as well as superstructure (RCC structure including fan deck above the ground) by a civil construction company to be employed by EPC bidder, based on the design carried out by the successful cooling tower bidder. We have successfully executed the IDCT packages as per above philosophy for various projects 2X660 MW Maitree Bangladesh, 1X250 MW NSPCL Rourkela, 1X370 MW KPCL Yelahanka CCPP etc.	Bidder's proposal reviewed and not accepted. Bidder to comply with technical specifications requirement.
450	VI-B	SUB SECTION-A-15	13 of 40	4.00.00, S. no. 16	Recovery Stack: RCC for RCC IDCT	Pl. confirm recovery stack can be of FRP construction also in case of RCC IDCT for faster execution.	Bidder's proposal reviewed and not accepted. Bidder to comply with technical specifications requirement.
451	SUB-SECTION-I-A/ PROVENNESS		10 OF 35	Cl. No. 4.11	The Bidder/its sub-vendor should have executed contracts for cooling water treatment program of at least two (2) different cooling water systems each having a flow rate not less than 10,000 Cu.M/hr operating in alkaline pH range and both the treatment programs should have been in successful operation for at least one (1) year. These contracts should include supply of chemicals, operation and maintenance of the system. The Chemicals used in these programs should have been organic polymers/ organic phosphorous compounds/ organic phosphates-based chemicals.	Requirement of at least two (2) different cooling water systems w.r.t. provenness is stringent which will restrict the vendor's participation. Customer is requested to please review this provenness requirement and make it to one (1) no. of cooling water system in line with the latest tenders/ contracts e.g. 3 x 800 MW Patratu STPP.	Bidder's proposal reviewed and not accepted. Bidder to comply with technical specifications requirement.
452	P&ID OF CW CHEMICAL TREATMENT SYSTEM		59 OF 91	**P&ID No.:** XXXX-XXX-POM-A-060, Rev. A	Section X-X: Bulk Acid Storage Tanks : 3 nos. are indicated.	Kindly review the requirements, confirm the quantity and capacity of each Bulk Acid Storage Tank to be provided.	Section X-X is indicative, bidder to follow clause 1.04.0 (4) of sub-section IIA-11, Part-A of Technical specification in this regard.
453	IIA-11 CW SYSTEM		3 OF 4	1.04.0 CW CHEMICAL TREATMENT/ **4)**	Two (2) Nos acid storage tank (H_2SO_4) of capacity adequate for minimum 15 days requirement, however, capacity of each tank shall not be less than 50 cum.		
454	IIA-11 CW SYSTEM		3 OF 4	1.04.0 CW CHEMICAL TREATMENT	Complete CW Treatment System including acid handling, storage and dosing system, Chemical measuring tanks & dosing system for HEDP & PBTC (common), Polymeric dispersant, Bio-dispersant, Corrosion inhibitor (Zn) including monitoring equipment like Deposit monitor/fouling monitor, bio-fouling monitor, Corrosion test coupons with test racks, online instant corrosion rate monitor, online ORP monitor, analysis kits with reagents etc., online pH meter and conductivity meter etc. required for smooth operation of treatment program.	Detailed data sheet for CW chemical treatment system including valves MOC, CW chemical dosing line MOC etc. is also not found included/ mentioned in the respective technical specification/ P&ID. Kindly clarify/ provide the same.	Bidder to refer tender P&ID (POM-A-060) for MOC
455	P&ID OF CW CHEMICAL TREATMENT SYSTEM		59 OF 91	**P&ID No.:** XXXX-XXX-POM-A-060, Rev. A/ Notes 3	Drain from Acid Storage Area shall be collected and led to Neutralising Pit.	Requirement of collecting Acid from Acid Storage Area has only been specified in this Note. Please clarify about other CW speciality chemicals also. As per standard practice, all chemicals including Acid (H_2SO_4) shall be lead to N-PIT through drain. Please confirm. Further to above, disposal/ transfer arrangement and scope for this nutralised chemicals may also please be cofnirmed.	Bidder's understanding is correct. Treated discharge from N-Pit shall be led to CW channel and complete system is in bidder's scope. Bidder to refer tender P&ID (POM-A-060) for CW Chemical treatment system in this regard.
456	P&ID OF CW CHEMICAL TREATMENT SYSTEM		59 OF 91	**P&ID No.:** XXXX-XXX-POM-A-060, Rev. A/ Notes 7	Location of Tap off from CW Pump discharge/ common recirculation line for monitoring instruments such as diposit monitor/ pH monitor to be decided as per condition.	Kindly confirm that this requirement of specification is to be followed and tapping for mounting the monitors/ analysers shall not be taken from CW return (hot water) lines.	Bidder's proposal reviewed. Tap off for CW chemical treatment system shall be taken from cold CW water, and the scheme & location of tapping shall be decided during detail engineering to suit at Site condition.
457	SUB SECTION A-15 CW SYSTEM		28 OF 40	1.00.00/ C)	Acid (H_2SO_4) tanks shall be MS construction, horizontal, with dished (Toro spherical) ends.	Kindly confirm the capacity of acid day/ measuring tanks.	Bidder's query is not relevant on the specification clause indicated. However, bidder to refer clause 1.04.0 (2), sub-section IIA-11, Part-A of technical specification for capacity of H_2SO_4 day/measuring tanks.

458	VI / PART- A	SUB SECTION-IIA-22 SEPARATION OF PLANT DRAINS FROM STORM WATER DRAINS	2 OF 3	1.01.00 (a)	The effluent from the TG Area pit(s) /sump(s) shall be pumped to Waste Service Water Sump (WSWS) located in WTP area. Portable type oil skimmer(s) & portable oil centrifuge shall be provided in the TG Area pit(s) /sump(s)and purified oil shall be used either in non-critical units for lubrication purpose or the same shall be disposed of.	As per referred clauses and treatment scheme given by NTPC, TG effluent shall be transfered to WSWS for treatment and already oil skimmers (2 nos.), Portable oil Centrifuge (1x100%) have been envisaged in WSWS to skim the oil in waste water before pumping into Lamella Clarifier. Therefore provision of Portable type oil skimmer(s) & portable oil centrifuge in the TG Area pit(s) /sump(s) is not required. Further, their is a space constraint in TG Hall, it is not feasible to install the Oil skimmer in TG ETP pits as oil skimmer operation requires bigger space in ETP pits situated in TG hall.	Bidder to refer Amendment Sl. No. TG-15 in this regard.
	VI / PART - B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	52 OF 87	3.06.00 C (3)	Waste service water treatment system a) One (1) number RCC waste service water sump (WSWS) in two (2) sections shall be provided for collection of waste service water. Service water effluents and other plant effluents from various areas of the plant shall be routed to this waste service water sump. Facility shall be provided to collect free oil from these sumps to MS Oil drum and oil skimmers (2 nos.), Portable oil Centrifuge (2x100%) of suitable capacity shall be provided for reuse of oil.		
459	VI / PART - E	TENDER DRAWINGS / SCHEME FOR PLANT EFFLUENT SEPARATION TG AREA	-	-	DRG NO.XXXX-001-POM-A-015A For transfer of effluent from BFP and COT/DOT area, effluent transfer pumps are shown.	In drg no. XXXX-001-POM-A-015A, for transfer of effluent from BFP and COT/DOT area, pumps are shown. It is suggested that that effluent may be routed to TG area effluent sump through gravity to make the collection simple and overall optimization of system. Hence, we request customer not to insist for the requirement of effluent transfer pumps for BFP and COT/ DOT area.	Bidder's proposal is not acceptable. Bidder to comply to the technical specification requirement.
460	VI / PART- A	SUB SECTION-IIA-22 SEPARATION OF PLANT DRAINS FROM STORM WATER DRAINS	2 OF 3	1.01.0	d) To meet that above requirement, RCC Area pit(s) / sump(s) and associated submersible pumps, piping, fitting, valves etc., as per requirements given below, to discharge the effluent/ wash water/ blow downs etc. from RCC pit/ sump to Liquid Effluent Treatment Plant (LETP)/ WSWS/CSSP/ Ash Slurry Sump or tank (as the case may be) are to be provided, supplied and installed by the bidder. f) Auto coupling arrangement type submersible pump of capacity 2X100% for each pit/ sump should be selected such that it shall generally evacuate the RCC pit/ sump within 20 minutes. The operation of the pumps shall be interlocked through level measurement devices to be installed in the RCC pit/sump so that the pumps shall start automatically and empty the RCC pit. Further, the discharge pressure of the pump should be enough to discharge the fluid handled to LETP (WSWS)/CSSP/Ash Slurry Sump or tank/CW channel as the case may be, as per clauses mentioned below.	Bidder proposes that the types of pumps (screw/centrifugal/submersible) to be installed in the ETP pits shall be decided during detailed engineeing depending on the type of fluid handled/ location of tranfer. Bidder also proposes that evacuation time shall be decided during detailed engineering based upon collection and treatment scheme finalisation. Hence, NTPC is requested not to restrict criteria for 20 minutes evacuation time.	Bidder to refer Amendment Sl. No. WS-10 in regards to type of pumps. Bidder's proposal regardinig criteria for 20 minutes evacuation time from RCC pit/sump reviewed and not accepted. Bidder to comply technical specification requirements.
	VI / PART- A	SUB SECTION-IIA-22 SEPARATION OF PLANT DRAINS FROM STORM WATER DRAINS	2 OF 3	1.01.00	g) Submersible pumps shall be permanently fixed in the pits/sumps.		Requirement of Technical specification is clear. Bidder to comply with the specification. Query pertaining to cl. No. 1.01.00 (g) not clear.
461	VI / PART- A	SUB SECTION-IIA-22 SEPARATION OF PLANT DRAINS FROM STORM WATER DRAINS	2 OF 3	1.04.00	Mill & Bunker Building Area The wash water from mill floor area shall be collected in the mill floor area RCC pit/ sump(s). Separate RCC pit/sump(s) for the mill bays shall be provided. The wash water from various floor such as tripper floor, feeder floor, Mill base etc. shall be led through down-comer pipes to the RCC pit/ sump(s). This water collected in the RCC pit/ sump shall be led to Coal slurry settling pond (CSSP) by pumping.	Bidder proposes that waste water from Mill & Bunker Building Area shall be pumped to nearest TPs, as the effluent from TPs shall be ultimately routed to CSSP for further disposal.	Bidder's proposal reviewed but not accepted. Bidder to comply with tender requirement.
462	VI / PART - B	SUB SECTION-A-14 WATER TREATMENT PLANT	1 OF 36	1.01.00	4) b) Coal laden water in the plant shall be treated in settling ponds and decanted water recycled/reused in Coal handling plant suitably.The treatment plant shall be designed suitably to receive and treat excess storm water mixed with coal laden water in existing CSSP of Stage -II and supernatant water recycled to CW channel (meeting CW make-up quality), with provision for diverting the treated supernatant water to storm water drain & Waste service water to be treated in ETP. Lime, alum, and suitable synthetic flocculent dosing to be envisaged to increase the settling rate of suspended solids. The pH of treated supernatant water is expected to be acidic in nature (pH: 2.8-7.8) and required to be neutralized prior to discharge in CW channel, storm water drain & ETP with required lime dosing facilities. The clarifier sludge shall be dewatered using the Filter press for dried coal particles to be reused.	The supernatant from CHP Run-off Water Treatmnet system is envisaged to route to Storm Water Drain/WSWS/ CW channel. Bidder understanding is that the supernatant from CHP Run-off Water Treatmnet system shall have not bearing on the sizing, designing and capacity of WSWS in LETP. Please confirm.	Bidder's understanding is not correct. Bidder to refer equipment sizing criteria of CSSP/WSWS and comply to technical specifications requirement.
463	VI / PART - B	SUB SECTION –VI CHAPTER-08 WATER SYSTEM	12-18 OF 29	2.00.00	Mandatory Spares for PT, DM, ClO2 Systems	C&I Mandatory spares for LET system is not mentioned in the clauses SUB SECTION –VI / CHAPTER-08 WATER SYSTEM/ 2.00.00. Bidder understand that there is no C&I mandatory spares applicable for LET system. Kindly confirm.	Bidder to note that LET system has been defined under the heading PT, DM, ClO2 systems. Accordingly, C&I mandatory spares for LET system shall be governed by Mandatory spares for PT, DM, ClO2 systems.
464	VI / PART- A	SUB-SECTION-I INTENT OF SPECIFICATION	3 OF 8	1.02.00	Water Treatment Plant Including, - DM plant and CW chemical treatment. - Pre treatment and liquid effluent treatment plant - Chlorine di-oxide plant - Condensate polishing unit including regeneration facility **- Reverse osmosis plant for waste water**	Discrepancy is observed between referred drawing and tender specification for ETP as the RO system for Waste water is not mentioned in Equipment Sizing Criteria/ SUB SECTION-A-01/ PART - B / section -IV. In absence of clarity, Bidder understands that all liquid effluents shall be collected and treated with Flash Mixer / Tube Settler in line with tender drawing of Liquid Effluent Treatment System (XXXX-XXX-POM-A-001) and no any Reverse Osmosis System (RO) treatment is envisaged for waste water system. Please confirm the Bidder's understanding and kindly amend the specifications.	All liquid effluents shall be collected and treated with Flash mixer/tube settler and lamella clarifier in line with tender drawing of Liquid Effluent Treatment System and recycled/ reuse within plant boundary. Further, based on Bidder's design for the reuse of treated wastewater, any additional requirement of wastewater RO shall be decided by the bidder to ensure ZLD compliance.

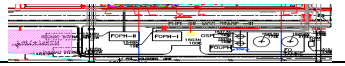
465	SECTION-VI, PART-B	SUB-SECTION-D-1-5	27 of 69	5.07.00	Complete sewerage system including Sewage Treatment Plant for facilities within the plant is in bidder's scope. Bidder shall provide 'De-centralized Sewage Treatment' units. The capacity of the Decentralized Sewage Treatment' units should be as per the design requirements, subject to minimum combined capacity of 75 Cum/day. Design of Sewage treatment plant shall be as per CPHEEO manual. Primary, Secondary and Tertiary treatment to be provided. Treated sewage water shall be used for horticulture purpose as per quality requirement of CPHEEO manual. Cement concrete pipes of class NP-3 as per IS 458 shall be used below ground level for sewage disposal in all areas other than main plant area. However, for pressure pipes and in main plant areas, and under roads spun Cast Iron pipes conforming to IS 1536 of required class shall be used. RCC manholes with CI cover shall be provided at every 30m along the length, at connection points, and at every change of alignment, gradient or diameter of a sewer pipeline. This shall be as per IS 4111. Sewage pump stations shall be provided as per IS 4111. Bidder shall have to provide complete arrangement for sewage disposal up to the sewage treatment plant including pumping facilities.	1. Alternatively, kindly confirm if, bidder may provide a Centralized Sewage Treatment Plant' for facilities within the plant with minimum combined capacity of 75 cum/ day and MBBR technology shall be used for centralized sewerage treatment plant. This is in line with recent PATRATU project amendment. Kindly confirm acceptance. 2. Pl. note that CI pipes are available in higher sizes i.e. 80 NB and above. Being very small capacity STP re-quirement, the sewage shall be pumped/ fed through gravity as per site requirement & the pipe sizes are expected to be less than 80 NB. In view of above, the pipe material of HDPE/ PVC may pl. be allowed. This is as accepted/ approved by M/s NTPC in PANKI & PATRATU project. 3. Treated Sewage Water (after tertiary treatment) shall be used for horticulture purpose in nearby ar-ea of respective STPs only. However, if this is not to be utilized for horticulture purpose, the treated sewage water (after meeting the environmental norms w.r.t. Sewage Discharge) shall be led to storm water drain. Please accept/ confirm. 4. There is no mention of EQMS in the specs. We understand that the EQMS is not to be provided. 5. Please confirm the type of control system to be envisaged for Sewage Collection Sumps and Decentral-ized STPs.	1.Bidder's proposal is not acceptable. Bidder to follow technical specification. 2. Bidder's proposal is not acceptable. However, if diameter of pipe required during detailed engineering is less than 80 NB, HDPE/ PVCpipe may be considered for lower diameters on case to case basis. 3. Collection/ storage of effluent treated sewage after tertiary teatment is not in bidder's scope. 4. Bidder's understanding is correct. 5. Manual electrically operated control system is envisaged.
466	SECTION – VI, PART-B	SUB-SECTION A - 14, WATER TREATMENT PLANT	20 OF 36	11.01.00 (7)	6) The ClO2 generation system shall have variable dosing rate of 10% to 100% of the design dosing rate or better. (7)To have optimum accuracy, the dosing pumps used shall be with powerful variable speed stepper motor with internal stroke speed control and have a minimum turn down ratio of 1:800 for precise control of ClO2 generation. Accuracy should be +/-1 % or better. Dosing pump should have LCD display to see the capacity set and alarms if any.	For Controllable capacity range of 10%-100% generator, dosing pumps with turn down ratio 1:800 can not be applicable. Both the clauses (6)&(7) are contradictory to each other, please clarify	Bidder's understanding is not correct. Bidder to comply to technical specification requirement.
467	SECTION – VI, PART-B	SUB SECTION- IIA-10WATER TREATMENT PLANT	5 OF 12	1.02.03(b)	Two(2) Nos (2x100%) of Bulk Acid Storage Tanks (33% HCl) (Tanks shall have net effective storage capacity of 15 days (minimum 4 hours dosing/day in case of CW System and continuous dozing in case of PT system) requirement or 2 x 35 m3 whichever is higher excluding free board and dead storage) with all nozzles, vents, fume collection/absorber, Density indicator, neutralization system, drain, overflows etc. These tanks shall be of FRP (with UV protection) construction.	Please calrify wether each storage tank shall have 15 days capacity or all 2 tanks shall have total net effective capacity of 15 days.	Each tank shall have net effective storage capacity of 15 days (min. 4 hours dosing/day in case of CW system and continuous dosing in case of PT system) requirement subject to minimum capacity of 35 m3 excluding free board and dead storage. Tender specifications are clear and bidder to comply technical specification requirements.
468	SECTION – VI, PART-B	SUB-SECTION A - 14 WATER TREATMENT PLANT	19 OF 36	11.00.00	Design capacity of generator(s) for CW system & PT system shall meet requirement for ClO2 dozing for the total circulating water flow to maintain a free chlorine dioxide residual of at least 0.2 mg/l in the far reaches of the distribution system at all times.	Please specify meaning of ''far reaches of the distribution system'' for PT-ClO2 system.	"far reaches of the distribution system" means farthest point of the distribution system starting from dosing point.

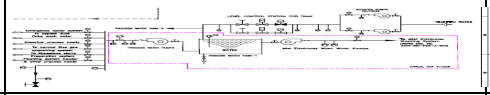
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	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
469	SECTION – IV	GCC	73 of 90	40	The Time(s) for Completion specified in the SCC shall be extended if the for Completion Contractor is delayed or impeded in the performance of any of its obligations under the Contract	We understand, Contractor shall be eligible to claim Price Adjustment for the work executed during extended period even with provisional time extension approval. Also no LD shall be deducted even provisional time extension has been provided by customer. In addition of time extension, we request Employer to introduce provision for suitable overstay compensation in addition to the Contract Price in case there is any delay or default or breach of the Contract due to reasons not attributable to the Contractor.	Provision of Bidding Documents shall prevail
470	SECTION – IV	GCC	57 OF 90	25.3.3	The Project Manager shall, after consultation with the Employer, and within forty five (45) days after receipt of the Contractor's notice, issue an Operational Acceptance Certificate.	We request the Owner to consider 7 days in place of 45 days after the notice.	Provision of Bidding Documents shall prevail
471	SECTION – IV	GCC	59 OF 90	27.8.1	At the end of the Defects Liability Period, the contractor liability ceases except for latent defects. The contractor's liability for latent defects warranty shall be limited to a period of five (5) years from the end of Defects Liability Period. For the purpose of the this clause, the latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the Defects Liability Period as defined in this GCC clause 27, but later.	We request Employer to modify the clause as follows: At the end of the Defects Liability Period, the contractor liability ceases except for latent defects. The contractor's liability for latent defects warranty shall be limited to a period of One (1) years from the Completion of defect liability period. The cost burden of the proof that the damage of the facilities is caused by a latent defect ishall be with the employer.	Provision of Bidding Documents shall prevail
472	SECTION-IV (GCC)	Terms of Payment	31-32 of page 90	12.4	A single designated ESCROW account shall be opened by the Contractor in any Scheduled Bank of India under intimation to Employer. All payments related to Erection / Civil / Site Fabricated Structural works by the Employer due under the contract to the Contractor shall be released into above-mentioned ESCROW account set up as per the Tri-Partite Escrow Agreement between Employer, Contractor and Escrow Bank. .... The Detailed Operative Procedure and Terms and Conditions of Escrow Account (Schedule III of draft agreement) shall be finalized between the Employer, Contractor and the Escrow Bank within 15 days of the placement of award.	Bidder has to face following dificulties due to Escrow account:- 1. Most of the MSME vendors accept payment through TREDS (RXIL) and hence payment is being automatically debited from bidder's separate account other than Escrow account 2. Steel is being procured by bidder's centralized department through LC and payment is being auto debited from bidder's separate account other than Escrow account 3. Long time for setting up a project specific Escrow account coupled with the complexities for initial release of payment in the Services Contract lead to release of payments due to the sub-agencies in the initial stages of execution from bidder's separate account 4. Insistence of the parties involved in the tri-partite agreement for various documentary proof lead to delays in release of funds and hinder project progress. There have been many instances wherein release of funds was delayed due to demand of various documents not required as escrow agreement. This leads the funds remaining idle in the Escrow account for bidder and hence, adversely impacting cash flows. In view of the above, NTPC is requested to kindly delete the provision of single designated ESCROW account.	Provision of Bidding Documents shall prevail
473	SECTION-IV (GCC)	No Claim for interest or damage	83 of 90	50.1	1.Interest on money due to the contractor Contractor shall not be entitled to any interest or damage in case of any delay on the part of the Employer to pay the amount due upon measurement---------- 2.No claim for interest or damage: No claim for interest or damage will be entertained or be payable by the Employer in respect of any amount or balance which may be lying with the Employer or may become due upon settlement/adjudication of any dispute, difference or misunderstanding between the parties by way of arbitration or court proceedings----------	We request Employer to introduce provision for suitable compensation in case there is any delay in payment due to reasons not attributable to the Contractor.	Provision of Bidding Documents shall prevail
474	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	08 of 20	1.15.00	The Employer shall provide Two Number (2no) 11kV feeders in Existing Employer 11kV FGD Tie switchgear of Sipat Stage-1 to meet the construction power requirements along with Employer's requirements as indicated under Clause 1.19.00..... The charges for the actual energy consumed by the bidder (Energy Charges Only) shall be recovered by the Employer based on prevalent rate of DISCOM and type of connection used	Power for the purpose of construction and commisssioning may please be provided by Owner free of all charges at 415 V. Also customer may provide supply point of electricity at major construction sites i.e. SG,TG area for both units Further to note that incase construction power is not provided by the customer free of all charges, we understand that only Energy charges shall be recovered from contractor and all the fixed charges shall be borne by Owner. Kindly confirm.	Bidder's understanding is not correct.
475	SECTION – VI, PART-A SECTION – VI, PART-D	SUB-SECTION-IID CIVIL WORKs ERECTION CONDITIONS OF CONTRACT	07 of 8 11-12 of 70	2.02.00 28.09.00	Construction water shall be the responsibility of Bidder during all stages of construction. However, construction water may be provided by Owner at one point on chargeable basis. Bidder shall arrange for further distribution/transportation to required location by their own Contractor shall make all arrangements himself for the supply of construction water as well as potable water for labour and other personnel at the worksite/colony. However, drawal of construction/potable water from bore-well shall be permitted if found suitable. Any statutory clearance required shall be obtained by the contractor. Assistance, if required shall be provided by the owner.	1) Water for construction purposes may please be provided by customer on free of all charges. 2) Customer shall provide a supply point of water at construction sites i.e SG/ TG area for both units. If owner is not able to provide construction water free of all charges, may kindly confirm same shall be Provided by customer on chargeable basis and charges for construction water may also be provided in bid document. If above mentioned proposal is not acceptable and bidder has to inevitably arrange construcion water at their own, Employer may please confirm construction of borewell is permitted in plant premises or not.	Bidder's proposal is not acceptable. Construction water may be supplied at one point on chargeable basis based on availability. Rate of the same shall be decided by NTPC based on the cost to NTPC, which shall be intimated during the execution stage.
476	SECTION - VII, BOOK 3 OF 3 (PART-1)	Appendix-3	2 of 3	Note- 3	Any loss or damage to the plant and equipments during handling, transportation, storage, installation, commissioning, and all activities to be performed till the "Completion of Facilities" shall be to the account of the contractor	Bidder shall take Inusrance till Full Load /COD, whichever is earlier as per IRDAI guidelines guidelines and after that Owner has to take O&M policy of its own.	Provision of Bidding Documents shall prevail
477	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	6 of 8	4.03.00	All the first fills of consumables and one year's topping requirements of consumables such as greases, oil, lubricants, servo fluids / control fluids, gases (excluding H2, CO2 and N2 for Generator) etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning / initial operation and to establish completion of facilities shall be supplied by the Contractor	First fill of consumables such as greases, oil, lubricants, servo fluids/control fluids, gases (excluding H2, CO2 and N2 for Generator) and essential chemicals shall be supplied by Bidder till Full Load/COD whichever is earlier.	Bidder's proposal reviewed and not accepted. Bidder to comply tender specification requirements.
478	SECTION – VI, PART-A	SUB-SECTION-D-1-5 CIVIL WORKS	6 of 8	2.01.00	Development of Bidders temporary staff colony and worker colony along with toilets & fencing etcFor safety of worker, bidder to provide separate approach road for their movement, as per site conditions, which shall be completely isolated from material movement road/path. No material movement shall be allowed on approach road meant for worker colony. Sole responsibility of development and maintenance of above facilities for construction workers hired by the Contractor or his sub-contractors shall rest with the Contractor. Land, water, electricity for the worker & staff colony shall be arranged by the Contractor as stipulated elsewhere in Technical Specification.	For construction of labor colony Land of 30,000 SqM may please be provided by customer within plat premises/in proximity of plant premises free of all charges. Apart from this ownner may kindly provide adequate water, electricity fuel supply, sanitation, fire prevention and fire-fighting equipment for contractor's staff and labour free of all charge	Bidder's proposal is not acceptable.
479	SECTION – VI, PART-A	SUB-SECTION-D-1-5 CIVIL WORKS	6 of 8	2.02.00	Construction of following temporary facilities of bidder a) Construction office, b) Construction stores (covered) & open stores as per his requirement. c) Workshops for maintenance of construction plant and equipment. d) Material/field testing laboratory facilities and any other temporary building.	Owner may please provide land free of charge for temporary offices, fabrication yard, and storage facilities with in plant boundary. Temporary accommodation, including all fencing, water supply at two points (both for drinking and construction purposes), electricity, fuel, supply, sanitation, fire prevention and fire-fighting equipment for contractor's staff and labour free of charge.	Bidder's proposal is not acceptable.
480	SECTION – VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	8 OF 73	1.01.02 (Note iv)	Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed Fifteen percent (15%) of the Contract Price.	Aggregate liability for liquidated damages for failure to attain the functional guarantee may please be limited to a maximum of 05% of the Contract Price	Provision of Bidding Documents shall prevail
481	SECTION – VI, PART-D	-	29 of 70	44.19.00	If any contractor worker found working without using the safety equipment like safety helmet, safety shoes, safety belts, etc. or without anchoring the safety belts while working at height the Engineer I/c shall have the right to regulate the payment in accordance with provisions of SCC. Further such defaulting worker shall be sent out of the workplace immediately and shall not be allowed to work on that day. Engineer I/c / Safety Officer of NTPC will also issue a notice in this regard to the contractor.	Owner is requested to delete the penalty clause. No penalty shall be imposed on contractor as mentioned in the clause.	Bidder's proposal reviewed and not accepted as safety is paramount. Bidder to comply tender specification requirements.
482	SECTION – VI, PART-D	-	12 of 70	31.00.00	The Contractor shall have total responsibility for all equipment and materials in his custody stores, loose, semi-assembled and/or erected by him at Site. The Contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss. All materials of the Contractor shall enter and leave the Employer Site only with the written permission of the Employer in the prescribed manner.	Watch and ward arrangement shall be taken care by contractor. However, the arrangement for a strong security set up to insulate complete project contours shall be costumer's responsibility.	Bidder to consider the arrangements as specified in the specifications only.
483	SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	11 OF 20	1.16.04.II. Point I)	Dismantling of existing fencing roads, temporary sheds and building, foundations, re-routing of pipelines above the ground and below the ground available in present scope of bays is also in the scope of the bidder.	Since, the underground facilities are not visible, the underground facilities to be modified/ re-routed/ dismantled may please be taken care by the Owner. Hence, Scope of dismantling may please be deleted from bidder's scope. If above proposal not acceptable to customer,please share the details (drawing, quantity in nos., weight in tonnage etc.) for any existing above and below ground facilities which are to be dimolished/ rerouted/ reinstalled/dismantled.	For extension of 765KV,132KV bays in existing switchyard, dismantling of existing road , fencing is applicable if required . The same will be finalised during detailed engg stage . The existing drawings of road, fencing will be provided during detailed engg stage .

484	SECTION-VI, PART-A,	SUB-SECTION-IIA-01 STEAM GENERATOR AND AUXILIARIES INCLUDING ESP	1 of 28	1.03.03	Supply of all consumables (except coal oil and limestone) like chemicals for chemical cleaning, passivation, inhibition etc., Catalysts, fuel oil & coal for firing be-yond declared quantity (during bid stage as per Sub Section-I, part-A), oil for line flushing, nitrogen for blanketing, consumables for air/ gas tightness tests and any other consumable as may be required for above pre-commissioning/ commissioning activities.	Fuel oil till Trial Run/ Initial Operation beyond predefined quantity may please be provided by Owner free of cost.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of the technical specification.
485	SECTION VI, PART- B	SUB-SECTION E-59 CIVIL WORKS	2-3 of 6	4.0 (b)	Structural steel (plates and rolled sections i.e. channels, beams & angles) conforming to IS 2062 and Reinforcement steel conforming to IS 1786 supply if in the scope of the contractor shall be procured from Primary Steel Producers (Refer NOTE below).	Procurement from BIS APPROVED SOURCES HAVING VALID BIS LICENCE may kindly be allowed without any approval from NTPC after the award.	Bidder to follow Technical Specifications . Procurement of steel to be done as per TS and mentioned qualifying requirements.
486	SECTION VI, PART- B	SUB-SECTION E-59 CIVIL WORKS	2-3 of 6	4.0 (b)	In case of non-availability of certain steel section/s i.e. Angle smaller than 100x100x10 mm, MS flats, rounds, square bars and chequered plate from above acceptable primary steel producers, an option is given to the Main contractor to source these sections directly from SAIL Conversion/Wet Leasing agent subject to the conditions given at point no. A) below:-------	Procurement from BIS APPROVED SOURCES HAVING VALID BIS LICENCE may kindly be allowed without any approval from NTPC after the award.	Bidder to follow Technical Specifications . Procurement of steel to be done as per TS and mentioned qualifying requirements.
487	SECTION VI, PART- B	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL. SUB-SYSTEM:SG(MECH)	4 of 25	15	-	Procurement from BIS APPROVED SOURCES HAVING VALID BIS LICENCE may be allowed without any approval from NTPC after the award.	Bidder to follow Technical Specifications . Procurement of steel to be done as per TS and mentioned qualifying requirements.
488	SECTION-VI, PART-A	SUB-SECTION-I-A, Proveness	32 of 35	7.1	Bidder or its agency should have executed civil and steel structural works of 500 MW or higher capacity coal based/Lignite based power plant/Nuclear Power Plant, Earth work in filling involving mechanical compaction and cutting in rock, piling, Main power house building and Foundation for Turbo-generator..-----	For civil work proveness criteria - subagency through consortium to be allowed. For civil work proveness criteria work in any infrastructure project may kindly be considered.	Bidder proposal is not acceptable.Bidder to follow PROVENNESS CRITERIA FOR CIVIL & STRUCTURAL WORKS requirements.
489	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	5 OF 9	4.02.00	The Employer shall issue the following quantities of Fuel oil and Coal per unit for firing up to successful completion of "Initial Operation" (as defined in General Technical Requirements, Part-C, Section-VI of Technical Specification) for each unit free of charge. Fuel Oil -11200 kL Coal- 2.7 lakh MT Fuel oil and coal required for the successful completion of the "Initial Operation", more than the above-specified quantity limits, would be issued by the Employer. However, the Employer shall charge the Contractor the cost of these as per the prevailing landed rates at the site at that time.	Bidder requests NTPC to delete this clause. Coal & fuel oil should be provided free of all charges during Pre-commissioning and commissioning activities. If consumption of Coal & Fuel oil Qty. goes beyond the specificed quantity same has to be borne by NTPC and no penalty/recovery shall be imposed on bidder. May please confirm the same.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of the technical specification.
490	SECTION-VI, PART-A	SUB-SECTION-I (INTENT OF SPECIFICATION)	32 of 35	7.1	Bidder or its agency should have executed civil and steel structural works of 500 MW or higher capacity coal based/Lignite based power plant/Nuclear Power Plant, Earth work in filling involving mechanical compaction and cutting in rock, piling, Main power house building and Foundation for Turbo-generator..-----	Civil & Structural works execution should not be linked with prior experience of TG/Bunker/other building. It should be modified in line with NTPC earlier tender enquiries / contract under execution. Therefore, bidder requests NTPC to amend the QR as follows: "In case Bidder or its agency do not meet the requirements at 7.1 and the Bidder proposes to engage agency (ies) for civil & structuralworks on work volume basis (except for Chimney works), Bidder or its agency (ies) should have executed such works in the past and the annual rate of execution in the reference works should not be less than eighty percent (80%) of the asking rate of such works, (structural steel fabrication & erection, RCC, and earthwork in filling involving mechanical compaction) for which it is being engaged	Bidder proposal is not acceptable.Bidder to follow PROVENNESS CRITERIA FOR CIVIL & STRUCTURAL WORKS requirements.
491	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	8 OF 8	2.03.00	Bidder shall use a Lay down area as shown in tender GLP drawing. area marked in GLP totalling 50 acres (approx.) are identified as laydown /preassembly area. Fencing of the laydown area in the area marked for laydown is in bidder's scope.	We understand the Employer shall provided encumbrance free land for storageyard, Site office etc.	NTPC shall provided encumbrance free land of 50 acres (approx.) as laydown area and fencing will be in scope of bidders.
492	SECTION – VI, PART-A	SUB-SECTION-IIA-21 (SOLAR P.V.)	1 of 1	bullet point 3	Complete design, engineering, manufacture, inspection, supply, transportation, storage, insurance, civil work, erection, testing, commissioning and one year O&M of the grid connected rooftop Solar PV plants including all auxiliaries.	NTPC has one of the best O&M capabilities in India for power projects whereas Bidders do not have such competence. Even the system suppliers and equipment(s) supplier do not have such competency to operate the plant. Bidder requests NTPC to delete O&M services from EPC scope.	Bidder's proposal reviewed and not accepted. Bidder to comply tender specification requirement
493	SECTION – VI, PART-A	SUB SECTION IIA-11 CW SYSTEM	3 of 4	1.04.0 (8)	Supply of all chemicals and O&M for complete CW Treatment System for one (1) year operation after PG test including first fill for all the units, etc. for the complete plant as per system requirement and as specified.	Owner is requested to delete the scope of O &M from the scope of the bidder.	Bidder's proposal reviewed and not accepted. Bidder to comply tender specification requirement
494	SECTION – VI, PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	18 OF 19	25.00.00	Comprehensive Annual Maintenance Services (AMS) for three (03) years after warranty period shall be provided for the following system 1. Distributed Digital Control, Monitoring & Information System (DDCMIS) 2. Analyzer instruments of DM / PT, LET, Chlorination (ClO2), CWT and CPU plant. 3. CEMS and EQMS 4. Public address system (PA) 5. Wireless Instruments & System including fieldbus instruments 6. Closed circuit television system (CCTV)	Owner is requested to delete the scope of three years Annual Maintenance Services (AMS) from the scope of the bidder.	Bidders proposal is not accepted .Bidder to comply technical specifications
495	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	1 OF 8	1.00.00	Site clearance including cutting of trees of girth less than 30 centimeters. Cutting of trees of girth more than 30 centimeters shall be done by the owner. However, removable and disposal of roots, trees of girth less than 30 centimeters and other vegetations in the bidder scope.	The land with approach for disposal shall be identified and arranged by the Owner within maximum leads upto 5 Km from Plant boundary free of all cost. Further, treee cutting of below 30 cm girth also to be done by owner.	Bidder's proposal is not acceptable.
496	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	5 OF 8	1.00.01	All steel structures shall be fabricated in factory, transported and erected at site. All factory-fabricated structures shall have bolted field connections. Coal bunkers with hoppers, Lime stone and Biomass silos, Chimney flue liners, CW duct liners can either be fabricated at factory in segments, transported and welded at site before erection or fabricated at site. For coal bunkers, hoppers and chimney flue liners, to prevent coal dust/flue gas leakages, the applicable field joints shall necessarily be welded.	Bidder request employer to provide sufficient levelled & graded land / space for development of site fabrication facility	Bidder's proposal is not acceptable.
497	SECTION – VI, PART-A TECHNICAL SPECIFICATION SECTION-VI, PART-A	Annexure- C to subsection II C SUB-SECTION-I-A PROVENNESS	20 of 21 31 of 35	N(1) 6.6 (f)	Safety Control Room: 1) IP based PTZ dome camera (HD)(wired/wireless) Proveness Criteria: The combination of offered make of IP based camera and offered make of video management software, for CCTV system, should have been in successful operation for a period of not less than one (1) year in a large industrial setup viz power plant, cement plant, petroleum refinery, steel plants or coal mine, having installation of minimum forty (40) nos. cameras.	As per Bid condition readiness of safety control room is Criteria for processing of RA bill, in view of above it is proposed that Cemera with same specificaton shall be installed for safety control room however Provenes shall shall not be established at that time. Bidder's RA bills shall be processed without establishment of Proveness Criteria. Further, Proveness shall be established at the time of installation of O &M cameras as both has to be interchangable and earlier cameras shall be taken back by bidder.	Bidders proposal is not accepted .Bidder to comply technical psecifications
498	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	5 of 8	4.02.00	Pre-commissioning and commissioning activities Commissioning Fuel	Calorific Value and other parameters of Fuel Oil and Coal should be specified and same may please be incorporated in the formula for arriving at corrected coal quantity to be issued free of cost.	Bidder's proposal is not acceptable. Bidder to comply with the requirements of the technical specification.
499	SECTION – VI, PART-C	GENERAL TECHNICAL REQUIREMENTS	44 of 119	26.02.00	**Initial Operation:** ...(b) The 'Initial Operation' of the complete facility as an integral unit shall be conducted for 720 continuous hours. During the period of initial operation of 720 hours, the contractor shall conduct the trial run as per clause 26.05.00 to demonstrate the compliance to the requirements as stipulated in the CERC (Indian Electricity Grid Code) Regulations, 2023. The Initial Operation shall be considered successful, provided that each item/part of the facility can operate continuously at the specified operating characteristics, for the period of Initial Operation with all operating parameters within the specified limits and at or near the predicted performance of the equipment/ facility.	Operating parameters shall be within specified limits and at or near predicted performance provided necessary boundary conditions are met at the least. Hence, this portion of this clause may be modified as below. The Initial Operation shall be considered successful, provided that each item/part of the facility can operate continuously at the specified operating characteristics, for the period of Initial Operation with all operating parameters within the specified limits and at or near the predicted performance of the equipment/ facility **subject to the condition that specified boundary/battery limit conditions are met and fuel oil and coal with specified characteristics are fired.**	The specification requirements are clear, bidder to comply.
500	SECTION – VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	11 of 73	1.01.03.02 (e)	Unless otherwise specified, the guarantees shall be based on design coal firing with coal/ ash analysis as given in the table at Annexure-IV-2, Sub-Section-I-B (Project Information) of Part-A of Technical Specification. The performance guarantee test will be carried out along with the Initial Operation of facilities or as per the time frame specified for a particular equipment/ plant/ system in the Technical specifications. Delay in conductance of the test beyond this period will not be normally permitted by the EMPLOYER. In the event of EMPLOYER agreeing to conductance of such tests after Initial Operations, for reasons not attributable to the EMPLOYER, as assessed by the Employer, no factor for ageing shall be considered for computing performance of the equipment.	This clause should specify a way out or suitable compensation if Employer is not able to fire design coal. Firing coal beyond specification may cause accelerated deterioration of equipment and same may be economically irreversible. This situation may lead to potential loss, both direct and indirect, to bidder. Owner is requested to delete the clause.	The specification requirements are clear, bidder to comply.
501	SECTION – VI, PART-E	LIST OF TENDER DRAWINGS			List not legible	kindly provide the legible list of applicable drawings	Drawings are legible and needs to be opened in latest version of the software else can be opened in web browser.

502	General	-	-		Building & Other Construction Workers (Regulation of Employment & Conditions of Service) Act, 1996	In case BOCW Act is applicable, Bidder shall pay the cess to the concerned authorities through their Sub-contractor and following the statutory compliance in the act. Customer shall not recover amount against BOCW Act from Bidder and proof of payment in the form of challan shall be submitted to Customer for compliance against BOCW Act.	Provisions of Bidding Documents shall prevail.
503	General				Approach road to construction site shall be done by NTPC.	NTPC to confirm	Bidder's query is not clear. Road for constrcution phase is in bidder's scope
504	General				Excavated earth disposal	NTPC to confirm the availablity of land for disposal along with approach road at the start of the project.	As such any disposal of earth is not envisaged. In case of requirement of disposal of balance back fill earth, the same shall be done in the areas in consultation with NTPC during the project execution.
505	General				2 Nos. of material entry/exit gates requied	NTPC to confirm the exact location of entry gate and material gate in GLP. These should be provided near bidders identified storage yard .	One material gate & one Main gate is availible for plant. For approach to stage III area one level crossing and one underpass is available.
506	General				Availability of Flats in township for bidders staff.	NTPC to confirm the availability with rates.	Bidder to note that no accomodation is available for Bidder's staff in NTPC township.

SL. NO	ENQUIRY SPECIFICATION					SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	Chapter	PAGE NO.	CLAUSE NO.			
507	VI/A	VI	2	19 of 34	C.19.f	Stator winding bar and connector (one set comprises of one full pitch of top bars and two bars of each variant)	Bidder will offer 1 No of each type of winding bars along with connectors under 1 set. NTPC to accept.	Bidder proposal is not acceptable. Specification cl. no.C-19 (f) Sub -Section VI Chapter-02 Section-VI, Part-A to be followed.
508	VI/A	VI	2	20 of 34	C.19.2.g	Temperature and Pressure switches	Not Applicable as per OEM Standard. NTPC to record.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
509	VI/A	VI	2	27 of 34	5.00.00	Process connection piping (for impulse piping/tubing, sampling piping/tubing and air Supply piping as applicable) (iii) Fittings - 100 Nos. of each type	100 nos. of each type is much more than recommended mandatory spares. Bidder will offer 10 nos. fitting of each type as mandatory spares. NTPC to accept.	Bidder to comply the specification requirements
510	VI/A	VI	2	2 of 34	A.6	Aux oil pump/startup oil pump complete assembly for Main Turbine along with complete coupling (Mounted on oil tank)	Tank mounted Main oil pump is provided . So there will be MOP in place of AOP in our offer. NTPC to accept.	Bidder to refer amendment TG-9 in this regard.
511	VI/A	VI	6	2 of 4	15.a	Steam trap & Y strainers up to 25 NB. Qty - 10 nos. of each type, material, size & class per unit.	For turbine integral piping, installed Qty. of steam traps per unit is 2 nos only. Hence, as per our standard practice bidder can be offered only 2 nos of Steam Traps . NTPC to confirm.	Bidder's proposal not acceptable. Bidder to comply specification requirement.
512	VI/A	VI	Mandatory Spares	3 of 3	13.00.00	Bidder shall not indicate “Not Applicable” against any of the spare (except for those items for which “if applicable” is specified). In case of not applicability, functionally equivalent spare to be mentioned with price in the relevant price schedules. Bidder shall not mention any remark other than price value in relevant price schedule.	Bidder shall indicate “Not Applicable” against any of the spare if the same will Not Applicable as per OEM Standard & vendor design. NTPC to accept.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
513	TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	31 of 69	5.12.00	Fuel Oil Handling system The civil works are to be provided for following fuel oil handling system areas as mentioned below: a. Fuel Oil pressurizing pump house. **b. Pedestals and foundations to support the interconnecting piping between LDO tanks to the pressurizing pumps as well as piping from tanker unloading area to the** Unloading pump house and further on to the LDO tank. c. Oil water separator pit.	In Present Tender, Fuel oil unloading system is not being envisaged in contractor Scope and only Fuel Oil Pressurizing pump house is being envisagde. On account of Space Constrainst as well as Optimizing the Layout/Space Requirement, Bidder proposes to place new Fuel Oil Pressurizing pump House with tentative space requirement of (**30 m X15 m**)near to FOPH I & FPOH II. (Print Screen & Google Image Screen in given below) Kindly accept:-  	Bidder's proposal is accepted provided space 30mx15m availability at site.
	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID DOC.NO.	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	PAGE 1 OF 3	1.06.00	Terminal point for LDO supply and return - Supply line (400 NB) from existing Stage-II FO storage tanks (2x4000 KL) - 200 NB return line header to the existing Stage-II FO storage tanks (2x4000 KL) for LDO return line from the boiler.		
514	TECHNICAL SPECIFICATION SECTION-V I, PART-A	SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE	PAGE 33 OF 34	SUB-SECTION-VI CHAPTER-02 STEAM TURBINE GENERATOR	Control & Instrumentation Mandatory Spares for specific sub-systems such as **hydrogen generation plant and Condensate Polishing Unit** (if applicable), the spares shall be governed by the spares indicated against the corresponding specific clauses only. For all remaining systems / equipments offered under the present scope of work, the spares shall be offered in totality as per the complete C&I items supplied in accordance with the applicable clauses of C&I items.	Please note that we have not found any detailed technical specification of hydrogen Generation plant in the tender. In view of same we understand that the same is not in bidder's scope. Please clarify. In case same is in Bidder scope, customer is requested to provide the detailed specification for the same.	Bidder's understanding is correct. Hydrogen generation plant is not in the scope of the bidder.
515	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B BID DOC. NO. CS	SIPAT SUPER THERMAL POWER STATION STAGE- III (1X800 MW) EPC PACKAGE	PAGE 1 OF 1	ANNEXURE IIIC-02B TG C&I CONTROL SYSTEM	Other Miscellaneous TG system controls : (1.) Condenser on load tube cleaning (as applicable) , **Debris Filter (as applicable)** & SCS controls (as applicable)	Since No Detailed Specification are Provided for Debris Filter, We understand same is not applicable. In case same is in Bidder scope, customer is requested to provide the detailed specification for the same urgently.	Debris filter is not in scope of the package
516	SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE	TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.	PAGE 1 OF 2	SUB-SECTION-E-9 COLTCS	CONDENSER ON LOAD TUBE CLEANING SYSTEM/DEBRIS FILTER FOR MAIN TURBINE CONDENSER AND DRIVE TURBINE CONDENSER (IF OFFERED)		
517	SIPAT SUPER THERMAL POWER PROJECT STAGE - III (1X800MW) BID DOC NO.: CS-8003-001-2	EPC PACKAGE APPENDIX-II TO SECTION – III (BDS)	PAGE 1 OF 10	Work Schedule for Sipat STPP Stage-III (1X800 MW)	Suggestive Schedule for award of BoP's Fire Detection & Protection System, **Fire tender and Fire Station Equipment**	Bidder understand existing **Fire Tender and Fire Station System/Building & its equipments** to be used & not envisaged in Present Tender. Also, Layout of Sipat is very Compact & accordingly, Same is not being considered in our Offer. If same is applicable, Kindly furnish the detailed Specification.	Bidder's understanding is correct that Fire Tender and Fire Station Equipment have not been envisaged.
518	SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID DOC.NO.	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	PAGE 1 OF 3	TERMINAL POINTS & EXCLUSIONS AND Owner's INPUT Clause 1.01.00	Auxiliary Steam system a) TP for Auxiliary Steam interconnection for **Auxiliary Steam Station Header with existing Stage-II** with motorized isolation valve and NRV as indicated in the tender drg. b) The stub/Tee-off connections with Isolating valve and blank flange on the auxiliary steam Unit/Station header for future connections as indicated in the tender drg. All the interconnection with existing piping system to be done by the bidder. All the valves and fittings, Anchors / Additional Supports required for interconnection shall be provided by the bidder.	As per specification, **interconnection for Auxiliary Steam Station Header** with existing Stage -II with motorized isolation Valves and NRV are to be provided. Kindly specifiy the Parameters & Routing for the same. Also, Bidder understand **existing** Trestles/Pipe Rack etc. can be utilised for Routing of Same please Confirm.	Bidder to refer clause no. 2.10.03/Sub-section-A-01/Part-A/Section-VI & 16.01.01/Sub-section-02/Part-B/Section-VI alongwith their amendments SG.4 and SG.26 Bidder to make own arrangements for routing of Aux. steam interconnection pipes from existing stage. Existing pipe/cable trestle shall not be used.
519	SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID DOC.NO.	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	PAGE 1 OF 3	TERMINAL POINTS & EXCLUSIONS AND Owner's INPUT Clause 1.02.00	Plant Water System a) Potable water supply line up to Terminal point for interconnection with colony supply line.	As per specification, interconnection for Potable water supply line up to Terminal point for interconnection with colony supply line is to be provided. Customer is requested to **Kindly specifiy the Parameters & Routing for the same**. Also, Bidder understand existing Trestles/Pipe Rack etc. can be utilised for Routing of Same please Confirm.	Potable water system for Colony is not under bidder's scope.
520	SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID DOC.NO.	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	PAGE 1 OF 3	TERMINAL POINTS & EXCLUSIONS AND Owner's INPUT Clause 1.05.00	WATER SYSTEM a. Interconnection of Raw water common header with existing stage(s).	As per specification, interconnection for Raw water common header with existing stage(s) is to be provided. Customer is requested to kindly claify the following:- a) Routing of Raw Water Pipe line with **ST-III (1X800 MW).** b) Bidder understands Raw Water pipe line has to cross MGR Railway line. Accordingly, Customer is requested to kindly clarify whether MGR Crossing envisaged is through Over head Line crossing or Under the MGR crossing i.e. Burried Pipeline to be planned. Kindly clarify c) Incase Customer, mentioned Burried Pipeline to be planned, Kindly mark the area for MGR Crossing along with necessary provisions to be illustrated for Crossing. Also, Bidder understand all approval for MGR Pipeline Crossing from Competent authority to be taken care by Customer.	Routing of the Raw water pipeline for Stage-III is already shown in GLP. Bidder to refer GLP. Burried pipeline under MGR crossing is proposed, however, based on feasibility bidder to decide. For MGR crossing, necessary approval from competent authority shall be sought by the owner.
521	SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID DOC.NO.	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	PAGE 1 OF 3	TERMINAL POINTS & EXCLUSIONS AND Owner's INPUT Clause 1.06.00	Terminal point for LDO supply and return - Supply line (400 NB) from existing Stage-II FO storage tanks (2x4000 KL) - 200 NB return line header to the existing Stage-II FO storage tanks (2x4000 KL) for LDO return line from the boiler.	 A) During Site Visit, It was apprised by Customer that existing HFO Pumps placed in FOPH P/H can be dismantled & St-III HFO Pumps, can be placed inside existing FOPH pump house. Customer to kindly confirm whether existing P/H after dismantling of HFO pumps to be planned or new FOPH Pump House to be provided. B) Incase of new FOPH(Fuel Oil Pressurizing & Heating unit) to be planned. Kindly confirm space available near to FPOH I & FOPH II can be used. Also Provide Routing of planned FOPH lines. C) Bidder understand from Terminal point that only Supply line (400 NB) from existing Stage-II FO storage tanks (2x4000 KL) & 200 NB return line header to the existing Stage-II FO storage tanks (2x4000 KL) for LDO return line from the boiler is to be provided only. Provision for Interconnection is already available in existing system D) Bidder understand existing Trestles/Pipe Rack etc. whereever possible can be utilised for Routing of FOPH Line. please Confirm.	Space under utilisation for existing HFO not to be used for new pumps. New buidling as shown in the revised GLP need to be considered. Further, bidder to refer amendment sl. No. MH-52.
522	SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800 MW) EPC PACKAGE TECHNICAL SPECIFICATION SECTION – VI, PART-A BID DOC. NO.	SUB SECTION- IIA-10 WATER TREATMENT PLANT	PAGE 10 OF 11	TERMINAL POINTS & EXCLUSIONS AND Owner's INPUT Clause 1.02.03	C) **Interconnection with existing Stage-I (3660 MW) DM Plant:** a) Interconnection of Stage-III DM tanks to be made with existing Stage-I Boiler fill pumps (Pump parameters- 175 m3/h & 150 mWC; tentative route length 3000 m). b) Necessary provision of isolating valve in existing Stage-I DM water line to its boiler and interconnecting DM water line from Stage-I to stage-III DM tank shall be in bidder's scope. c) Piping with associated valves and other equipment required to complete the system shall be in bidder's scope.	As per specification, Interconnection with existing Stage-I (3660 MW) DM Plant is to be provided. Customer is requested to Kindly specifiy the Parameters & Routing for the same. Also, Bidder understand existing Trestles/Pipe Rack etc. whereever possible can be utilised for Routing of Same. please Confirm.	Tentative route length has been furnished in the tender. Feasible route for interconnectionis to be decided by bidder. Bidder's understanding is not correct for utilising existing Trestles/Pipe rack etc.

523	General Layout Plan				Existing Sheds placed near to ST III 	 Customer is requested to kindly Clarify Present status of Sheds. We understand these **sheds will be dismantled by** Customer & encumberance free land will be provided by Bidder.Accordingly, Bidder can plan its facilities, as per requirements. Please confirm.	Bidder's understanding is not correct. These sheds are not to be dismantled. Bidder plan accordingly.
524	SIPAT STAGE-III (1X800 MW) EPC PACKAGE	TECHNICAL SPECIFICATION SECTION – VI, PART-A BID DOC. NO ..... SUB-SECTION-A-12 PLANT UTILITIES	PAGE 3 OF 11	2.00.00 €	Miscellaneous areas:All other areas like compressor houses, ash silo utility building, pump houses, MCC/switchgear rooms, electrical and C&I battery rooms,water system control building, **workshops**, stores, cable vaults, etc. covered under Bidder's scope and shall be ventilated by a combination of 'supply air fans & roof exhauster fans' or 'supply air fans & exhaust fans' or 'supply air fans & back draft dampers' or 'fresh air in-take louvers & exhaust air fans'. For ventilation of battery rooms and oil rooms, flame proof motor shall be used. Further, toilets shall be provided with propeller type exhaust air fans.	We understand **Workshop & its equipment** are already avaialble in SIPAT ST-I & II Units. Accordingly, Same is not being envisaged & required for STAGE III. Kindly confirm Bidders understanding. If same is required, Kindly provide Detailed specification of same.	Bidder's understandins is correct that O&M workshop has not been envisaged.
525	SIPAT STAGE-III (1X800 MW) EPC PACKAGE	Scheme of Gypsum Dewatering Scheme	PAGE 3 OF 12	2.00.00 €	Scheme of Gypsum Dewatering Scheme	Bidder request NTPC to allow Usage of CW Blowdown water in FGD Process Water areas in place of Clarifed Water like FGD NTPC Projects. Following, benefits can be availed by usage of same:- 1) Minimization of Water Consumption, 2) Optimization of Overall Water Cycle. Kindly review & Confirm.	Bidder to refer clause 13.02.00 of sub section IB, Part A and tender drawing POM-A-037 of technical specifications.
526	SIPAT STAGE-III (1X800 MW) EPC PACKAGE	General			FQA Lab	We understand FQA lab are already avaialble in SIPAT ST-I & II Units. Accordingly, Same is not being envisaged & required for STAGE III. Kindly confirm Bidders understanding. If same is required, Kindly provide Detailed specification of same.	Blider's understanding is correct. No FQA lab is envisaged.
527	SECTION-VI, PART-B	SUB-SECTION A - 11 CONDENSATE POLISHING UNIT	04 of 16	4.05.0 , Sr. No. 13	Operating pressure for service vessels shall be normal operating pressure of condensate extraction pump. Service vessel design pressure shall be equal to shut off pressure of condensate extraction pump plus 5% margin.	Please note that the operating pressure for service vessels shall be normal operating pressure of condensate extraction pump which is much below the shut off head of condensate extraction pump and hence Service vessel design pressure shall be equal to shut off pressure of condensate extraction pump. Customer is requested to kindly accept the same.	Bidder's proposal reviewed and not accepted. Bidder to comply with tender specification requirement
528	SECTION-VI, PART-A	SUB-SECTION IIA-20 CONDENSATE POLISHING UNIT	1 of 2	2.04.00 b)	One (1) set of regeneration facilities consisting of Resin separation vessel, Cation,Anion regeneration vessel(s), Resin make-up hopper, Mixed resin storage vessels (1 nos) etc.	Customer to please note that there is ambiguity regarding regeneration vessels requirement mentioned in different clauses of the specification and tender P&ID: Bidder understands that one (1) set of Resin Separation & Cation Regeneration Vessel, Anion Resin Regeneration Vessel & Mixed Resin storage vessel (2 Nos.) to be considered. The regeneration vessels are supplier specific and hence the vessel name shall be as per supplier recommendation. Kindly confirm bidder's understanding.	Bidder's understanding is correct with regard to nomenclature of resin separation & regeneration vessels. Bidder to comply with tender specifications.
	SECTION-VI, PART-B	SUB-SECTION A - 11 CONDENSATE POLISHING UNIT	5 of 16	4.06.00 a)	One (1) common facility for regeneration of the ion exchange resins from the condensate polishers of all the turbo-generator units shall be provided utilizing three (3) tank concepts and consisting of: 1) Resin Separation & Cation Regeneration Vessel (1 sets). 2) Anion Resin Regeneration Vessel (1 sets). 3) Mixed Resin storage vessel (1 sets).		
	SECTION – VI, PART-E	LIST OF TENDER DRAWINGS	P&I Diagram for Condensate Polishing Plant (XXXX-XXX-POM-A-013 sheet 2 of 2)		As per P&ID it is indicated One (1) set of regeneration facilities consisting of Resin separation vessel and Cation regeneration vessel ,Anion regeneration vessel, Mixed resin storage vessels-I (1 no) & Mixed resin storage vessels-II (1no) .		
529	SECTION-VI, PART-A	SUB-SECTION IIA-20 CONDENSATE POLISHING UNIT	2 of 2	2.04.00 j)	One (01) number of DM water Storage tank for CPU regeneration system.	Customer to please note that there is ambiguity regarding number of dedicated DM water Storage tanks required for CPU package as mentioned in different clauses of the specification and tender P&ID: Bidder understands that one (1) number dedicated DM water storage Tank of vertical cylindrical type in MS construction internally painted with epoxy has to be provided in case CPU regeneration facility are located away from DM plant regeneration area. Kindly confirm bidder's understanding.	Bidder's understanding is not correct. Bidder to provide two (02) numbers of DM water storage tank for CPU regenerations system. Bidder to also refere Amendment Sl. No. WS-7.
	SECTION-VI, PART-B	SUB-SECTION A - 11 CONDENSATE POLISHING UNIT	10 of 16	5.10.00	DM Water storage tanks for Condensate polishing Plant : Two (2) numbers of DM Tanks of vertical cylindrical type in MS construction internally painted with epoxy shall be provided. ..... Note: If CPU regeneration facility are located in DM plant regeneration area, total DM water .....Also, minimum two (2) numbers of DM water storage tanks shall be provided.		
	SECTION – VI, PART-E	LIST OF TENDER DRAWINGS	P&I Diagram for Condensate Polishing Plant (XXXX-XXX-POM-A-013 sheet 2 of 2)		As per CPU tender P&ID, 2 nos. DM storage tanks have been indicated.		
530	VI/B	B-06	13 OF 18	7.00.00	Each motor/heater feeder shall consist of MPCB/MCCB (with S/C release only), Power contactor & intelligent motor controller (IMC) to ensure Type-2 Co-ordination.....	Drive pertaining to soot blower are fractional KW drive, so pls. allow Non-IMC feeders for these loads as huge no. of IMC are required to feed these loads. Many heater feeders are theomostatically controlled & in that case only supply feeder is provided from LT switchgear without having any contactor so in that case IMC is not applicable. Also in the case of heater being controlled from PLC/DDCMIS , contactor is required in LT switchgear heater feeder but still no OLR is applicable so kindly allow Non-IMC feeders for heater feeder having contacor.	Bidder proposal is accepted in line with the provisions of clause 7.00.00 of Sub section B-06 Part B Section VI
531	SECTION-VI, PART-F	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	PAGE 22 OF 38	1.22.12	Mandatory Spares- Belt (if applicable): 1 Set	For spare belt, bidder shall supply wear belt or sealing belt. We are not considering the mother / drainage belt in mandatory spares. **Kindly confirm.**	BIdder's proposal is not acceptable. Bidder to comply with te specfication requirements.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
532	Section-VI, Part A	Sub-Section- IIA-04 FGD System	Page 3 & 4 of 7	4.01.04	Motorized isolation gates at Absorber gas inlet, Absorber gas outlet along with 2x100 seal air fans for each gate and 2x100 heaters for absorber outlet gate & **bypass gate**. A bi-plane bypass damper along with 2x100 seal air & 2x100 heaters shall also be provided in the bypass duct.	Bidder understands that in the FGD Bypass Duct, only Quick Opening Bi-plane Damper is required, and Guillotine Gate is not applicable in the FGD Bypass Duct. This is in-line with tender P&ID. Please confirm bidder's understanding. Also, it shall be noted that as per the technical specification- Section-VI, Part B, Sub-Section- A-05 (FGD), Clause no: 3.03.01 & 3.03.02 (Page 5 of 29), In the FGD Bypass duct, Bypass Damper is only applicable & Bypass Gate is not applicable. **In recent projects like NTPC Talcher Stage-III (2x660 MW), NTPC Lara Stage-II (2x800 MW) & SCCL (1x800 MW), FGD Bypass Gate was not applicable.**	Bidder to refer amendment no SG.13 in this regard.
533	Section-VI, Part A	Sub-Section- II A-01 (SG & Auxiliaries including ESP)	Page 27 of 28	5.00.00	**5.00.00. Provision for CO2 to Methanol in Sipat STPP Stage-III 1 x 800 MW Project** .... Provisions shall be given in both the units. The tap-off duct portion shall be provided with necessary isolation gates in each tap-off. These Gates are to be made of Carbon steel with C276 cladding of sheet of minimum thickness 1.6 mm along with 2x100 % Seal Air fans. Also, seals to be made of Alloy C-276 or better material. Blanking plates shall also be provided in each tap-off duct after isolation gates.	We understand that only Inlet tap-off duct with Gate (for CO2 to Methanol system) is required, and Outlet tap-off duct (with Gate) is not required as in recent projects like NTPC Talcher Stage-III (2x660 MW), NTPC Lara Stage-II (2x800 MW), SCCL (1x800 MW) project. Please confirm. Also, it is mentioned that "Provisions shall be given in both the units". It shall be noted that for Sipat STPP Stage-III 1x800 MW project, only 1 unit is applicable.	Bidder's understanding is correct. Further, bidder to comply the specifications requirements for details on tap-off duct.
534	Section-VI, Part F	Sub-Section- VI (Mandatory Spares) Chapter-01 SG & Auxiliaries	Page 19 of 38	1.22.02	**1.22.02. Gates in Flue Gas System of Air Flue gas path of Boiler including FGD.** 1. Seals: 1 set of each type and size (Set means compete replacement for one gate) 2. Actuator: 1 no. of each type	Clause no: 1.22.02 is coming under **clause no: 1.22.00 FGD system** in the Mandatory Spares List. However, in clause 1.22.02, it is mentioned as "**Gates in Flue Gas System of Air Flue gas path of Boiler including FGD**". Please inform whether under clause 1.22.02 (which is coming under clause 1.22.00 FGD System), Seals and actuators for **only FGD Gates** are required to be considered (OR) whether Seals and actuators for complete flue gas system (i.e. from Flue Gas APH Inlet Gate till ID Fan Outlet Gate + FGD) require to be considered? Please clarify.	This clause is applicable for Gates in Flue Gas System of Air & Flue gas path of Boiler including FGD. Bidder to refer amendment no SG.20 in this regard.
535	Section-VI, Part F	Sub-Section- VI (Mandatory Spares) Chapter-01 SG & Auxiliaries	Page 19 of 38	1.22.02	1.22.02. Gates in Flue Gas System of Air Flue gas path of Boiler including FGD **2. Actuator: 1 no. of each type**	Already, **Electrical Actuators** (complete + its components) are considered under Clause No: **2.08.00 Electrical Actuators** (coming under 2.00.00 Control and Instrumentation section of Mandatory Spares List). Therefore, bidder would like to inform that mandatory spares items for Electrical Actuators will be considered under any 1 of these clauses only (repetition of same spares under different clauses will be avoided, and project cost can be reduced). Please confirm.	For Electrical actuators, mandatory spares are to be provided as per Clause No: 2.08.00 Electrical Actuators.
536	Part-E (Tender Drawings), Section-VI	Scheme of FGD-Absorber System (Drg. No: XXXX-001-POM-A-022 Rev. No. A)	-	-	For FGD Inlet Guillotine Gate's Seal Air System, Temperature Transmitter (TT), Flow Switch (FS), Temperature Switch (TS), and Pressure Transmitter (PT) are shown in the Scheme of FGD- Absorber System drawing.	Please note that FGD Inlet Guillotine Gate does not require any Seal Air Heaters (as per technical specification). Temperature Transmitter (TT), Temperature Switch (TS) and Flow Switch (FS) are applicable only when Seal Air Heater is applicable (as in the case of FGD Outlet Guillotine Gate & FGD Bypass Damper). However, for FGD Inlet Guillotine Gate, seal air heater is not applicable and hence, Temperature Transmitter (TT), Temperature Switch (TS) and Flow Switch (FS) are not applicable. Only Pressure Transmitter (PT) is applicable for FGD Inlet Guillotine Gate (similar to ID Fan Outlet Guillotine Gates). Please confirm our understanding. **This same point was already agreed for NTPC Talcher Stage-III (2x660 MW), NTPC Lara Stage-II (2x800 MW) & previous tender for NTPC Singrauli Stage-III (2x800 MW) project also.**	Bidder to refer amendment no SG.41 in this regard.
537	Part-E (Tender Drawings), Section-VI	Scheme of Air & Flue Gas Path with Instrumentation (With Tri-sector AH) Drg. No: 001 POM A 1, Sheet 1 of 2, Rev. A)	-	-	Scheme of Air & Flue Gas Path with Instrumentation P&ID shows SCR reactor along with SCR Inlet Gate, SCR Outlet Gate, Economizer Bypass Gate & Economizer Bypass Control Damper, in light grey colour.	Please note that as per Clause No: 2.16.05A in Section VI, Part A, Sub Section-II A-01, Page 16 of 28, "**Provision for Future Installation of SCR System**" is mentioned. However, the tender P&ID (Scheme of Air & Flue Gas Path with Instrumentation) indicates SCR reactor along with SCR Inlet Gate, SCR Outlet Gate, Economizer Bypass Gate & Economizer Bypass Control Damper, in light grey colour. Bidder understands that SCR Inlet Gate, SCR Outlet Gate, Economizer Bypass Gate & Economizer Bypass Control Damper are not required at present, and these **will be part of future SCR only** as per Clause No: 2.16.05A in Section VI, Part A, Sub Section-II A-01, Page 16 of 28, "**Provision for Future Installation of SCR System**". Please clarify and confirm bidder's understanding.	BIdder to refer the legend in the referred P&ID where in the light grey colour, mentioned in the Bidder's clarification, is to be read in conjunction with the Biddder's scope mentioned in Part-A of the technical specification. The provisioning for future installation of SCR is clear in the specification
538	Section-VI, Part B	Sub-Section- A-02 (SG & Auxilia-ries in-cluding ESP)	Page 58 of 67	22.01.02	Leak tightness testing of dampers for each type and size of damper at shop to demonstrate the guaranteed gas tight-ness efficiency (on flow).	Leak tightness testing will be conducted for 1 number of each type and size of Gate & Biplane Damper, irrespective of Sub-vendor/ Sub-supplier.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
539	Section-VI, Part A	Sub section-II, A-01	454/953	2.16.05A	Provision for Future Installation of SCR system	Please confirm whether the APH should be SCR ready or not	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
540	Section-VI, Part B (Book 1 of 5)	Sub section-II, A-02	487/963	9.01.03	Air Heater Seals - The Contractor shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-in-leakage.	The drift in air heater leakage will not exceed 2%, one year after demonstration of above gauranteed air-in-leakage	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
541	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 5 OF 38	1.05.00 Fans A. ID Fans Sl no. 9.2	ID Fans: Hydraulic servomotor Seal ring kit(complete)	In latest design Axial Reaction Fans offered by Bidder for FD, ID & PA Fan application in all the super-critical 660 MW, 800 MW TPP's of NTPC, loose spare items (like seal kit etc.) are not applicable for Hydraulic adjusting device (HAD) because the same cannot be replaced or serviced at project site as it requires special skill set/ equipment for dis-assembly, re-assembly, static / dynamic testing of HAD. Spare HAD shall be used in case of any repair/ replacement and HAD servicing shall be done only at Bidder vendor works after replacing damaged parts. For this requirement, Two no's HAD spare for each application are already applicable for FD, ID & PA Fans. NTPC is requested to note the same and delete this spare loose item requirement. These spares are not applicable in all the super-critical 660 MW, 800 MW projects of NTPC including Patratu 3x800 MW TPP.	Bidder to provide the equivalent item in case of non applicability in provided system/equipment. Further, Bidder to refer clause 13.00.00 of sub section VI, Part A, Section VI of Technical Specifications. The specifications requirements are clear and bidder to comply the same.
542	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 6 OF 38	1.05.00 Fans B. FD Fans Sl no. 8	FD Fans: Hydraulic servomotor Seal ring kit(complete)		
543	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 7 OF 38	1.05.00 Fans C. PA Fans Sl no. 8	PA Fans: Hydraulic servomotor Seal ring kit(complete)		
544	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 5 OF 38	1.05.00 Fans A. ID Fans Sl no. 10	ID fan impeller liner	Impeller liners and Casing liners are not applicable for Axial Reaction ID Fans as per Bidder design practise followed in all the super-critical 660 MW, 800 MW TPP's executed by Bidder for NTPC. These spares are applicable for Radial ID Fans offered in Sub-critical 500 MW Projects. Accordingly, no item is offered against this clause in the previous super-critical 660MW, 800 MW TPP projects of NTPC executed by Bidder. NTPC may please modify the requirement including the clause with "if applicable" similar to amendment issued for SCCL 1x800 MW tender or else delete this requirement. This amendment is critical for smooth execution of contract as functionally equivalent spare item cannot be offered against this requirement.	Bidder to refer Amendment no SG.18 and SG.19 in this regard.
545	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 5 OF 38	1.05.00 Fans A. ID Fans Sl no. 11	ID fan casing liner		
546	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 9 OF 38	1.09.00 Seal Air Fans Sl no. 1.0	Seal Air Fan: Fan assembly (excluding fan body)	We clarify that shaft with impeller assembly excluding bearings shall be offered.	Specification requirement is clear in this regard. Complete fan assembly (excluding fan body) to be provided as spares. Bidder to comply with technical specification requirement.
547	SECTION – VI, PART-B	SUB-SECTION-E60 Indicative Vendor list	PAGE 1 OF 25	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL(FORMAT NO. QS-01-QAI-P-1B/F1-R0). SL NO. 2: FD, PA & ID FANS	STATIC, ROTATING COMPONENTS AND BLADES - NTPC APPROVED VENDORS	Bidder propose modification of this clause as "STATIC, ROTATING COMPONENTS AND BLADES - NTPC APPROVED VENDORS. APPROVED VENDORS FOR FGD BOOSTER FAN APPLICATION IN NTPC FGD PROJECTS WERE ALSO APPROVED FOR FD, ID & PA FAN APPLICATION." NTPC is requested to make this proposed modification to speed up the vendor approval process and avoid duplication of vendor approvals already obtained for Axial Booster Fans in ongoing NTPC FGD Projects. This will also facilitate in timely project execution.	Bidder to follow NTPC technical specification requirement. Any Vendor approval is project and package specific.
548	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 5 OF 38	1.05.00 Fans A. ID Fans Sl no. 6.4	ID Fans: Lube Oil / Hydraulic Oil system: Filters	Against this clause, filter element is offered for all previous NTPC projects. However, we have submitted the same as remarks against this clause in the bid submission in all those projects as the same is allowed. Since, we are not allowed to write any remarks against mandatory spares for this tender in the bid submission, NTPC may revise the requirement as Filter element or else modify the description as filter assembly to offer complete filter element with casing assembly. Ambiguity may please be addressed through suitable amendment as there is no room for discussion on mandatory spares left out to bidder because of tender conditions.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
549	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 6 OF 38	1.05.00 Fans B. FD Fans Sl no. 4.4	FD Fans: Lube Oil / Hydraulic Oil system: Filters		
550	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 7 OF 38	1.05.00 Fans C. PA Fans Sl no. 6.4	PA Fans: Lube Oil / Hydraulic Oil system: Filters		

551	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 5 OF 38	1.05.00 Fans A. ID Fans Sl no. 12	ID Fans: Lube Oil cooler	Against this clause, cooler tube bundle is offered for all previous NTPC projects. However, we have submitted the same as remarks against this clause in the bid submission in all those projects as the same is allowed. Since, we are not supposed to write any remarks against mandatory spares for this tender in the bid submission, NTPC may revise the requirement as Lube oil cooler tube bundle or else modify the description as Lube oil cooler assembly to offer complete assembly. Ambiguity may please be addressed through suitable amendment as there is no room for discussion on mandatory spares left out to bidder because of tender conditions.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
552	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 6 OF 38	1.05.00 Fans B. FD Fans Sl no. 11	FD Fans: Lube Oil cooler		
553	SECTION – VI, PART-F	SUB-SECTION-VI CHAPTER -01	PAGE 7 OF 38	1.05.00 Fans C. PA Fans Sl no. 11	PA Fans: Lube Oil cooler		
554	VI Part-A	II-B ELECTRICAL SYSTEM / EQUIPMENTS	3 of 20	1.05.02	All Switchgears, Motor Control Centres (MCCs) & AC/DC distribution boards, etc. shall have at least twenty per cent (20%) or minimum two (whichever is higher) fully equipped MCCB/MPCB	Bidder proposes 10% or minimum two feeder spares for the LT Switchboards instead of 20% or minimum two (whichever is higher). Owner may kindly review and comment.	Bidder proposal is not acceptable. Specification cl.no.1.05.02 Sub -Section IIB Section-VI, part-A to be followed.
555	VI Part-B	A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	63 of 67	8.03.00	The dust hoppers shall be electrically heated up to a minimum of lower one third (1/3) of the dust hopper height but not less than 1.5 metre in height by thermostatically controlled curved panel heating elements matching with curved surfaces of conical hopper to prevent ash bridge formation by maintaining the ash temperature above 140 deg C	The panel type heater's curved metallic enclosures are bent to the desired radius/shape at factory and supplied. However, during erection at site, any slight variation in the installation location may result in improper contact of panel heaters with the hopper curved surface, which may affect the desired performance. The vendors for curved panel type heaters are only one or two. In view of the above, bidder request owner/ NTPC to consider blanket type and other heater types that are suited to conical hopper surface heating requirements.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
556	VI Part-B	A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	64 of 67	8.07.00	Acoustic 3D Level Scanner Based Level Monitoring System / NOGS (Naturally Occurring Gamma Sensor) based level monitoring system for each ESP Hopper in the First Three Fields shall be provided complying with requirements indicated in Sub-Section-IIIC-03	The acoustic 3D level scanner / NOGS level scanners is yet to be commissioned and proven for ESP hopper applications. The cost is higher than the cost of conventional Ash level indicators, and the vendor availability is limited. Hence, owner/ NTPC may kindly consider conventional ash level indicators instead of 3D acoustic level scanner/ NOGS based level monitoring for ESP hopper applications. Owner may kindly review and confirm.	Bidder's proposal is not acceptable. Bidder shall comply to technical specification.
557	VI Part-B	B-0 GENERAL ELECTRICAL SPECIFCIATION	7 of 15	3.06.00 (d)	MCCB shall be provided for all supply feeders of current rating above 16 Amp and including 400A.	For ESP LT Switchgear, MCCB shall be provided up to 630 A, and breaker modules shall be provided for current above 630 A. This is in line with the standard design practise of ESP switchgear for projects. Owner may kindly review and confirm.	Bidder proposal is not acceptable. Specification cl. no.3.06.00 (d) Sub -Section B-0 Section-VI, part-B to be followed.
558	VI Part-B	B-02 MOTORS	1 of 4	3.01.00 (b)	Continuous duty LT motors upto 50 KW Output rating (at 50 deg.C ambient temperature), shall be super Premium Efficiency class-IE4, 50-200 KW shall be of Premium Efficiency class –IE3, conforming to IS 12615, or IEC:60034-30.	The ESP geared rapping motor is fractional horse power drive and is operated intermittently for ESP application. Since the ESP rapping motor operation is intermittent , IE4 motors are not provided. Instead IE2 rated motors are provided. This is in-line with other NTPC projects also. Owner may kindly review and confirm.	Bidder proposal is not acceptable. Specification cl.no.3.01.00 (b) Sub -Section B-02 Section-VI, part-B to be followed.
559	VI Part-B	B-08 HT ,LT POWER CABLES	5 of 7	4.00.05 (a)	Cables shall be supplied in steel drums of heavy construction.	Bidder proposes wooden drum also in addition to steel drums for the power cables. Owner may kindly review and confirm.	Bidder proposal is not acceptable. Specification cl.no.4.00.05 (a) Sub -Section B-08 Section-VI, part-B to be followed.
560	VI Part-B	IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	5 of 36	3.02.00 (1)	Type of RTD: Four wire, Pt-100	Bidder proposes that 3-wire RTD may also be given for temperature measurement of the various equipment (FANS/ Motors etc) as per the bidder's proven design. This is in-line with design provided for various projects. Owner may kindly review and confirm for 3-wire RTD / 4-wire RTD (as per bidder design) for FANs application..	Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.
561	VI Part-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	5 of 19	1.06.02 (M)	For High torque (> 1000 Nm) electric actuators: Contractor may propose non-intrusive fieldbus electrical actuators without SIL2 certification.	The SIL-2 compliant models include imported actuators and are about 5 times costlier. Considering the initial cost, maintenance as well as spares costs and the import requirements, bidder request NTPC to kindly remove the SIL-2 requirement for the electrical actuators. Owner may review and confirm that, SIL-2 certification is not applicable for the electrical actuators	Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.
	VI Part-B	IIIC-17 ELECTRICAL ACTUATORS	2 OF 4	4.11.00	SIL Certification:		
562	VI Part-E / Tender SLD	Part-E/Elect_Cnl/ 9500-999-POE-J-002 REV-A Single Line diagram- MAIN PLANT		SLD Notes point (F) .	(F) . Standard LT transformer rating to be used are as follows 2500/2000/1600/1000/630/500/315 KVA.	Bidder understands that use of both LT ONAN and LT DRY type transformers upto 2.5 MVA are allowed as per SLD . However in Sec-B-04-/1.03.01, it is mentioned that ONAN transformers are allowed only till 2.0 MVA. Kindly review and confirm that ONAN LT transformers can be provided till 2.5 MVA. The same is in-line with the other NTPC EPC projects also. Owner may kindly review and confirm.	LT ONAN Transformer upto 2.5MVA is acceptable. Please refer Amendment Sl.No. EE-48.
	VI Part-B	SUB SECTION B-06 LT SWITCHGEARS & LT BUSDUCTS	13 of 18	7.00.00	Each motor/heater feeder shall consist of MPCB/MCCB (with S/C release only), Power contactor & intelligent motor controller (IMC) to ensure Type-2 Co-ordination. If the ESP controller and rapping motor are provided in the ESP switchgear, same shall be with IMC having MPCB/MCCB. If separate controller is provided and only supply feeder is envisaged from ESP Switchgear, the requirement of IMC may be excluded.	a) ESP rapping motors are fractional horse power motors. We are offering separate ESP controller which controls the ESP rapping motor . The controllers ensures the best sequence of rapping of various fields and provides better coordination of rapping motors for achieving the desired emission parameters. No control is envisaged from the ESP switchgear. Only supply feeder with OLR and power contactor is provided from ESP switchgear. b) The ESP heaters (hopper/ insulator) are thermostat controlled for maintaining the desired temperature. No control is envisaged from the ESP switchgear. Only supply feeder with contactor is provided from ESP switchgear. Further, IMC not applicable for heater feeders. The ESP motor and heater controls are proven design being offered in all the NTPC contracts. Since no control of rapping and heaters are envisaged from ESP switchgear (only supply feeder with OLR & contactor are provided in ESP switchgear) , bidder proposes ESP switchgear without IMC. Owner may kindly review this requirement based on the implementation of ESP motor and heater controls in the various NTPC projects. Owner may Kindly review and confirm.	Bidder proposal is accepted in line with the provisions of clause 7.00.00 of Sub section B-06 Part B Section VI.
563	VI Part-B	SUB-SECTION-IIIC-17 ELECTRICAL ACTUATORS	1 of 4	3.00.00	These actuators shall be Non-Intrusive type electric actuators. The interface of these actuators with DDCMIS shall be of two types viz. with Hardwired interface and with Fieldbus interface	Bidder proposes that all the actuators for the gates and dampers can be hardwired interface instead of fieldbus interface for the following reasons: a) Providing Uniformity of communication interface for all the actuators b) Some vendors don't have the Profibus based actuators for the complete range Owner may kindly review and confirm for hardwired actuators for gates and dampers instead of fieldbus based actuators.	Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.
564	VI Part-B	SUB-SECTION-IIIC-04 MEASURING INSTRUMENTS (PRIMARY & SECONDARY)	2 of 36	2.01.00	Microprocessor based 2 wire loop powered electronic transmitter with 4-20 mA DC HART/ Fieldbus (Foundation Fieldbus /Profibus PA complying to IEC 61158.) output signal shall be provided.	Bidder understands that bidder can provide either HART based / fieldbus based transmitters , as per the tender specification. Hence bidder proposes HART based transmitters for all applications instead of fieldbus based transmitters. This shall provide uniformity. Owner may kindly review and confirm	Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.
565	NA				General Electrical query-2	The number of layers of cables in the cable trays is not mentioned. Bidder understands that the maximum cable layer is 2 layers for power cables and 3 layers for control and instrumentation cables. This is based on standard practise being followed for all other NTPC projects also. Owner may kindly review and confirm	Bidder proposal is not acceptable. Multicore Power cable shall be laid in touching formation in single layer. Control and Instrumentation cables can be laid in 3 layers subject to max cable tray filling upto 80% of tray depth only.

566	NA				General mandatory spares query	In case mandatory spares are repeated at more than one location, bidder proposes to consider only at one location (the one location where maximun quantity is specified shall be considered). Owner may kindly review and confirm the same. In case mandatory spares are to be considered in all the locations wherever it is specified, same may be clearly indicated to the bidders.	It is clarified that in case Mandatory spares are repeated at more than one location, Bidder to consider item/spare indicated with maximum quantity, unless otherwise specifically stated.
567	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	17 of 73	1.01.05.02	The corrections for the flue gas flow and ESP inlet flue gas temperature in excess of the values for these parameters under guarantee point conditions, shall be allowed only in case and to the extent such variations are caused solely due to changes in specified coal properties and ambient conditions. Further, the corrections for the flue gas flow and temperature lower than the guarantee point values shall be applied based on actually measured test values. Subject to the above, the corrections for the variation in flue gas flow, inlet dust burden and ESP inlet flue gas temp. shall be based on the above computed test values and the procedure indicated in the next para.	The tender indicates that estimating and applying corrections to parameters for their variation to the extent of change in specified coal properties and ambient conditions (during PG test), while assessing ESP performance. It may kindly be noted that ESP is designed for a specified set of parameters and is operated at actual condition. Hence, corrections will be applied for variation on actual test parameters (viz. gas flow, temperature & inlet dust) from guarantee point parameters while assessing ESP performances. This is applicable even for ESPs included in SG package as the change in parameters are not due to ESP. If the measured values are higher and corrected values are lower, corrections for design values will be taken for calculation of ESP efficiency. NTPC to note that corrections are allowed for actual measured values for all direct ESP contracts including recent projects like Mouda, Solapur, etc.	Bidder's query is not clear. However, bidder to note that the scope of EPC Package includes all equipment/systems upstream and downstream of ESP is included in the subject tender. Hence, the factors except for the coal properties and the ambient conditions within the scope/control of the bidder. Accordingly, the referred clause in the technical specifications allows for corrections solely due to changes in specified coal properties and ambient conditions.. Specification requirement is clear in this regard and the bidder to comply with the technical specifications.
568	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	17 of 73	1.01.05.03	Ca.Cb.Cc etc. are Correction factors for flue gas at temperature, moisture content in flue gas, ESP inlet dust loading, sulphur and sodium contents of coal ash based on correction curves furnished by the Bidder and approved by the Owner.	The corrections for variation in flue gas flow, gas temperature, inlet dust concentration, sulphur content will be considered and the same will be submitted during contract stage.	The specification requirement is clear in this regard. Bidder to comply with the specification requirement.
569	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	20 of 73	1.01.07.01	Method of computation of Aux. Power consumption for ESP: The measurement for guaranteed auxiliary power consumption shall be carried out during ESP collection efficiency test. The method for computing the power shall be as described below:- a) Power consumption of ESP will be measured pass wise and for one pass (Say ESPA) at a time with the help of energy meter in ESP MCC. b) Energy meter reading will be taken before starting the collection efficiency test and after completion of collection efficiency test. c) Before starting collection efficiency test, switch off all the TR sets, all hopper heaters, all insulator heaters/pent house fans (if applicable) and rapping systems serving to one pass.	The method specified involve shutting down of total ESP fields just before start of emission test to measure external loads connected in ESP LTMSB. It is suggested that such switching off of the fields, heaters, rappers shall not be resorted to just before starting emission test. Hence, no external loads shall be connected to ESP LT Switchgear or (if not) this external load can be measured after completion of emission test i.e. ESP can be switched off after the emission test. Hence the power measurement test shall be taken up after completion of emission test.	Bidder's proposal reviewed and not accepted. Bidder to follow the procedure as given in the clause 1.01.07.01 of sub section IV, Part A Section VI.
570	VI/A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	2 of 73	1.00.01 (g)	Instruments for PG test and instruments for process control of similar applications are envisaged to be of same make and model having same accuracy level. However, instruments for PG test are also acceptable as per standard and proven practice of the contractor/OEM and in such case, instruments for process control shall be as per requirements specified in Part-B of technical specifications. Instruments to be used for PG test shall be additionally supplied over and above the instruments shown in tender P&IDs. **PG test equipment being supplied, installed and commissioned for each unit, shall be retained by employer after completion of PG test.** Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation. **All PG test process parameters shall be made available in DDCMIS.**	During PG Test of ESP, outlet emission is measured by isokinetic sampling for particulate matter measurement as per EPA standard. The standard requires only portable instruments which does not warrant any erection or commissioning. It is also not possible to record the isokinetic sampling kit parameters in DDCMIS. For ready reference of Particulate emission, Opacity monitors are provided at ESP outlet. Other operating parameters of ESP will be recorded in IOS with interface to DDCMIS.	Bidder understanding is correct. Further bidder to comply to specification requirement.
571	VI/A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	31 of 38	5.01.00	3) Emitting Electrodes	Helical wire type emitting electrodes will be envisaged as per bidder's proven design & hence other types of emitting electrodes are not applicable. Customer is requested to suitably amend the specification title with "as applicable for the specific design"	Bidder to refer to amendment to technical specification sl. no. SG.11 in this regard.
572	VI/A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	31 of 38	5.01.00	11) Rappers	Tumbling hammers will be envisaged as per bidder's proven design & hence electric rappers are not applicable. Customer is requested to suitably amend the specification title with "as applicable for the specific design"	Bidder to refer to amendment to technical specification sl. no. SG.8 in this regard.
573	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	60 of 67	2.01.01 (a)	The model study shall also include a gas distribution study in the inlet and outlet duct as well as, the cross over duct to find out the effect of isolation of one stream of the ESP,	As per ICAC code, the gas distribution study will be conducted at ESP inlet duct only and not at ESP outlet ducts.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
574	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	60 of 67	2.01.01 (b)	The model study shall include all connecting duct work from air preheater gas outlets to the induced draft fans inlets, induced draft fan outlet to FGD inlet, FGD outlet to chimney flue inlet and also from the induced draft fan outlet to chimney flue inlet (in FGD bypass condition) including the inlet duct transition piece	The ESP Physical Flow Model will include the design of all connecting duct work from the air preheater gas outlets upto the induced draft fans inlets only. Physical modeling from Induced draft fan outlet, Ducts to/from FGD & chimney flue Inlet (FGD bypass duct) including the inlet duct transition piece is excluded from ESP Physical Flow Model study as we are not measuring air velocities in the Physical Flow Model beyond ESP Casing, as per ICAC standard. Flow correction devices if any, beyond ID fan is not required since this will not have any impact on ESP Flow Model study.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
575	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	62 of 67	8.01.00	Dust hoppers shall be of conical type. ESP hoppers other than that of conical type shall not be acceptable.	Pyramidal hoppers which have similar ash flowability characteristics to conical hoppers, may also be accepted owing to simplicity of construction.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
576	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	63 of 67	8.01.00	Hopper valley angle to the horizontal shall not be less than sixty five (65) degrees.	Hopper valley angle of 60° may be accepted as being followed for other projects of similar capacity.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.

577	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	66 of 67	14.00.00	A comprehensive flowability study of fly ash from ESP hoppers shall be conducted by the contractor to ensure smooth flow of ash under various operating conditions of the plant including Steam Generator, ESP and Fly Ash Removal System. The hoppers are required to promote mass flow without arching and rat holing problems. The main aim of the flowability study is to ensure consistent flow from each hopper to the ash removal system and following requirements shall be met by the contractor in this connection: i) The study could be conducted on scaled down model of ESP hopper prepared by the bidder and at different relevant temperatures……	Bidder clarifies as below for conductance of the test.: Evaluation of mass flow design parameters under gravity condition i.e valley angle for a given top opening of hopper with specified material of construction and outlet opening dimension by conducting shear test on three ash samples, as provided by NTPC. The test will be conducted at: a) Ambient temperature at test condition b) Maximum 60 deg. C. Bidder may engage an external laboratory to conduct the above test. The report on the above study will be furnished to NTPC by Bidder for information purpose. There shall be no effect on the project work schedule and no hold on the detailed engineering of ESP. No physical modeling is envisaged.	Specification requirement is clear in this regard. Bidder to comply the specifications requirements. Procedure for ash flowability study of ESP hoppers shall be discussed and finalised during detail engineering.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
578	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION-IIIC-09 PROGRAMMABLE LOGIC CONTROLLER SYSTEM	Page 1 of 6	1.00.00.3	All electrical devices like switches/ transmitters/ controller/ analyzer/solenoid valves which are located in the hydrogen generation plant shall be made intrinsically safe by providing suitable type of transformer isolated barrier/ Zener barrier of standard make in case it is a standard and proven practice of the bidder. Otherwise such instruments shall be provided with explosion proof enclosure suitable for hazardous areas described in National Electric Code (USA), Article 500, Class-I, Division-I or EN60079-14or shall comply with the essential requirements of ATEX directives. All fittings, cable glands etc. for the above requirement shall be strictly as per NEC recommendation article, 500 to 503	CHP/AHP/LHP/GHP are not envisaged under hazardous area	Bidder proposal is not acceptable. Bidder shall comply to specification requirement.
579	SECTION VI, PART-B	SUB-SECTION B-09 DG SETS	Page 10 of 13	9.00.00.ix	Six numbers of Duplex type or 12 nos. Simplex type Resistance element Temperature Detectors (RTDs) shall be suitably distributed at locations where highest temperatures may be expected in stator windings and one (1) element in each bearing	No of RTD per phase will be as per OEM(Alternator) standard .	Bidder proposal is not acceptable. Specification cl.no. 9.00.00 Sub -Section B-09 Section-VI, Part-B to be followed.
580	Section-VI/Part-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	15 OF 20	1.19.00	EMPLOYER'S REQUIREMENT In addition to above, following items required for Employer's use are also included in bidder's scope. These equipment's shall conform to technical specification requirements as stipulated in Part B for respective equipment's. 1. 415V switchgear feeders as indicated below (at suitable location to be decided during detailed engineering). (a) 4 Nos. MCCB–125A (b) 4 Nos. MCCB–250A (c) 4 Nos. MCCB-400 A (d) 6 Nos. ACB outgoing – 1000 A (in unit emergency switchgear and station service switchgear for feeding owner's loads 2. Following requirements of construction power for employers' office/ construction use: Construction power at 415 V at two locations with total load 100 KVA along with suitable metering arrangement at each location.	Customer to furnish employer load requirement in each switchgear room of CHP/AHP/FGD to avoid any change in transformer sizing and MCC design during DE.	Employer requirement for feeders shall be provided as per Specification cl.no. 1.19.00 Sub -Section IIB Section-VI, Part-A. However, employer feeder requirement shall not be considered for transformer sizing.
581	SECTION – VI, PART-A	Annexure C to IIC Contract quantity	9 of 21	1.01.00	CONTROL DESKS AND PANELS Following are the contract quantities of control desks: Arc shaped Control Desks shall be provided as mentioned below. 1. UNIT Control Room - 8m (1 per unit) 2. Unit In charge Desk (UID)- 3m (1 common) 3. Centralized Off-site Control Room-4m (for Water System) 4m (for Ash Handling System) 3m (for FGD System) 4. CHP System CR- 4m (1 per system) 5. FGD System CR- 3m (1 per system) Note-4 The following instruments shall be furnished for each Coal Handling Plant to be mounted on the draw out section of Control Desk of each Coal Handling Control Room. 1. Stop PB: 45 nos. 2. Release PB: 1 no. 3. Emergency stop PB: 1 no. (With cover)	For CHP application, Control desk with Stop PB and Emg PB is considered as per specification without Mimic/Annunciation panel. For AHP system arc shaped Control desk for placement of OWS/EWS without any PB's is considered. Please confirm	Bidder's proposal for CHP control desk is not acceptable. Bidder shall provide arc shaped control desk with draw out console meeting the requirements of the referred clause.
582	SECTION –VI, PART-B	SUB SECTION B-06 LT SWITCHGEARS & LT BUSDUCTS	11 of 18	3.01.00	All equipment associated with an incomer or outgoing feeder shall be housed in a separate compartment of the vertical section. Two-tier breaker arrangement in a vertical section shall be offered for outgoing breaker feeders of rating up to 1600A. Fixed part of vertical busbar and moving part of draw-out modules for power connection shall be of Silver/Tinned plated Copper only. No live parts shall be accessible with equipment drawn out. The Module compartment door shall have external padlocking facility with MCC frame/fixed structure. The MCC module will have a hole with a grommet on side plate of the module truck for taking Profibus DP connector with 2 nos. armoured profibus DP cables from Cable alley to IMC's profibus DP port for making daisy chain connection of IMCs by DDCMIS vendor in an MCC panel. Alternatively, good quality Secondary Isolating Contacts(SICs) can be offered for Profibus DP communication port connection & isolation between moving & fixed parts of MCC. A separate compartment shall be provided for relays and other control devices associated with a circuit breaker. For breaker controlled motor feeders, an aux. relay shall be provided for taking Local push button station(EPB) "normally open (NO)" contact input from field and provide potential free output to DDCMIS to avoid probable mixing of switchgear control voltage with DDCMIS 24V DC voltage. This aux. relay shall have 2NO+2NC contacts.	EPB shall be wired directly as a DI to IMC and then communication established to DDCMIS through Profibus communication. No separate H/W is considered between LT switchgear and DDCMIS panels.	Bidder proposal is not acceptable. Specification cl. no.3.01.00 Sub -Section B-06 Section-VI, Part-B to be followed.
583	SECTION VI, PART-B	SUB-SECTION-B-08 HT LT AND CONTROL CABLES	5 of 7	4.00.05.a	Cables shall be supplied in steel drums of heavy construction. The drum shall be designed on the basis of weight, diameter, bending radius and length of cable.	Steel drum is considered only for HT cables. Kindly confirm the requirement of steel drum for LT Power, control and instrumentation cables	Bidder proposal is not acceptable. Specification cl. no.4.00.05 Sub -Section B-08 Section-VI, Part-B to be followed.
584	SECTION VI, PART-B	SUBSECTION-B-11 STATION LIGHTING	15 of 18	Annexure-A Sl No-k	Avg lux level of 50 with Industrial type LED Luminaire for Cable galleries/vault	For overhead cable rack, Pipe cum cable rack illumination is not considered. Kindly confirm	Confirmed.
585	SECTION VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	9 of 15	3.06.00	m) Plant control cable Interconnections a) Standard control cable sizes shall preferably be 3CX1.5, 5CX1.5, 7CX1.5 & 10CX1.5 mm2 ,14CX1.5 mm2	19Cx2.5 sq.mm Control cable also to added to the standard cable size. Kindly confirm	Confirmed.
586	SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	26 of 35	5.12.1	AUXILIARY OIL FILLED TRANSFORMERS AND HT TRANSFORMERS	Provenness criteria of only 16MVA, 11KV and above transformer is mentioned. For any Aux transformer up to 2500KVA/11KV or 3.3KV (Dry or oil type), standard provenness criteria of Bidder shall be used. Please confirm	Bidder understanding is not correct. Specification cl.no. 5.12.1 Sub -Section I-A Section-VI, Part-A to be followed.
587	SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	1 to 35 of 35	5	PROVENNESS CRITERIA FOR ELECTRICAL EQUIPMENTS	Provenness criteria for many of the electrical equipment's are not defined in the specification. In such cases wherever criteria are not available, Standard provenness criteria of Bidder shall be used. Please confirm.	Bidder understanding is correct. For provenness criterion of electrical equipments Specification cl.no. 5.0 Sub -Section I-A Section-VI, Part-A to be followed.
588	General				Make of components for HT/LT/Control/Instrumentation cables including make of XLPE cable	Make of components shall be as per vendor preferred including XLPE material. Special encouragement shall be given for made in India components as per government guidelines. Please accept	Bidder proposal isn't acceptable. BOI make controls shall be finalized during MQP approval.
589	SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	26 of 35	5.10.0	HT power cables .The bidder/Sub-vendor should have manufactured and supplied following cables	Customer may please specify the time line (eg. For the last ten years or so)	Time line is not applicable for HT power cable proveness criterion . Specification cl.no. 5.10.0 Sub -Section I-A Section-VI, Part-A to be followed.

590	SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	26 of 35	5.12.1.2	Bidder/Sub-Vendor should have his own facilities for conducting all routine and type tests as per IS: 2026 (except short circuit test).	All Type tests if required for Auxiliary transformer up to 2500KVA-11KV/3.3KV, 11KV/415V and 3.3KV/415V shall be conducted in NABL accredited labs like CPRI/ERDA etc. Please confirm	Bidder proposal is not acceptable. Specification cl.no. 5.12.1 Sub - Section I-A Section-VI, Part-A to be followed.
591	Section-VI/Part-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	Page 5 of 19	2.02.00	For CHP DDCMIS, necessary signal exchange with Employer's existing Stage-I/II CHP DDCMIS system shall also be in Contractor's scope. For this signal exchange, the number of I/O's shall be considered as DI: 32 DO: 16 AI:8 AO:8. The exact scheme shall be finalized during detail engineering. Employer's stage-I/II CHP DCS/RIO panel shall be the terminal point.	Cabling from CHP DDCMIS to external CHP is not considered in Bidder scope, only provision shall be made available in CHP DDCMIS as per the IO list shared in the contract.	Bidder's understanding is not correct. Cabling from contractor's CHP DDCMIS to Em-ployer's existing Stage-I/II CHP DDCMIS system (located inside plant premises) is in bidder's scope.
592	SEC VI/ PART-A	SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM	PAGE 8 OF 19	2.04.5	Wireless link	Wireless communication is envisaged only in Stacker reclaimer and not considered for the following area 1.AWRS, since we have considered standalone DDCIMS system 2.Paddle feeder 3.Coal/Lime sampling PLC	Bidder's understanding is not correct. 1.Bidder shall provide wireless for AWRS complying to technical specification. 2. Wireless link is not envisaged for Paddle feeder. 3. Wireless link is not envisaged for Coal/Lime sampling PLC

Sl. No.	BID SPECIFICATION				SPECIFICATION REQUIREMENT	Pre-Bid Queries/ Clarifications	NTPC Reply
	Section	Sub-Section	Page No.	Clause No.			
593	VI	Part C	58 of 119	30.00.00	The equivalent 'A' weighted sound pressure level measured at a height of 1.5 m above floor level in elevation and at a distance of one (1) meter horizontally from the nearest surface of any equipment/machine, furnished and installed under these specifications, expressed in decibels to a reference of 0.0002 microbar, shall not exceed 85 dBA.....	The noise level of Diesel Engine set required for Fire Water Pump will be as per OEM standard. No enclosure will be provided for emergency DE required for Fire water pump set. Customer is requested to confirm the same.	Bidder's undersatnding is not correct. Bidder to comply with specification requirement. Necessary enclosure shall be provided to meet noise level as per specification.
594	VI	Part B--A18	3 of 14	5.04.00	Location of Infrared detectors on coal conveyors	1. One infra red detector shall be located near head of the coal/biomass conveyor. Infra red detector is not considered at the tail end of the conveyor. 2. No infrared detectors are considered for limestone, gypsum, ash and biomass conveyors. Customer may please confirm.	1. Bidder's proposal is acceptable 2. Bidder's understanding is not correct. Bidder shall provide infrared detectors for all biomass conveyors complying to technical specification.
595	VI	Part B--A18	5 of 14	5.08.03	Interface between fire water pumps PLC, Fire Detection & Alarm (FDA) and plant DCS	1. Fire water pumps PLC shall be interface with station wide LAN for two –way transfer of signals for information sharing through dual fibre optic connectivity. 2. Fire detection & alarm system shall be interfaced with Fire water pumps PLC (drives running status) via hardwiring with interface modules. 3. Fire detection & alarm system shall be interfaced with plant DCS (fire alarm and system trouble) via hardwiring with interface modules. Customer may please confirm.	1. Bidder's proposal is not acceptable. Bidder shall comply to specification requirments. 2. Bidder's proposal is not acceptable. Bidder shall comply to specification requirments. 3. Bidder's proposal is not acceptable. Bidder shall comply to specification requirments.
596	VI	Part B--A18	8 of 14	5.15.00	Cabling for Fire Detection & Alarm (FDA)	1. Cable size of 1 Pair x 1.5 sqmm, armoured, shielded shall be used for loop wiring. 2. Cable size of 2C x 2.5 sqmm armoured shall be used for powering various devices in loop and solenoid valves of spray system 3. Inside buildings cables shall be laid directly on the wall with saddle spacers. No conduit shall be used for laying FDA cables. 4. In conveyor areas, cables shall be burried along the conveyor length with HDPE conduits. Customer may please confirm.	1. Bidder's proposal is not acceptable. Bidder shall comply to specification requirments. 2. Noted 3. Bidder's proposal is not acceptable. Bidder shall comply to specification requirments. 4. Bidder's proposal is not acceptable. Bidder shall comply to specification requirments.
597	VI	Part B--A18	10 of 14	5.18.00	Multisensor detector shall be provided for return air ducts of main plant, which shall consist of intake probe, detector housing, and exhaust pipe etc. The detector shall be mounted outside the duct.	Duct detectors are not considered as multisensor detectors shall be provided in the AHU room. Customer may please confirm.	Multi sensor detectors shall be provided inside AHU room and Duct detectors shall be provided inside return air duct.
598	VI	Part B--A18	8 of 14	5.13.00	Power Supply for Fire Alarm Panels & Repeater Alarm Panel	Fire Alarm Panels shall be powered from 1 no. of 230 V AC plant UPS system. Customer may please confirm.	Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.

S No	BID SPECIFICATION				SPECIFICATION REQUIREMENT	Pre-Bid Queries/ Clarifications	NTPC Reply
	Section	Sub-Section	Page No.	Clause No.			
599	VI (PartA)	VI (Chapter-02)	6 OF 34	B. 29	Control fluid pump assembly including motor and complete coupling	Customer to confirm, whether the requirement is applicable for HP bypass system	Control fluid pump assembly including motor and complete coupling mentioned here is for Main Turbine governing oil supply system.Bidder to comply with the specification requirements.
600	VI (PartA)	VI (Chapter-02)	12 OF 34	C. 1 (xxvii.)	Seal kit for Electrohydraulic actuators for HP and LP bypass system- 2 Sets of each	1 Set is inferred as the seal kit required for each type of actuator in HP bypass system.	The requirement against this clause is both for HP&LP Bypass system. Bidder has to provide seal kit for all electrohydraulic actuatotrs (Steam as well as spray valves) as per the quantity specified. Bidder to comply with the specification requirements.
601	VI (PartA)	VI (Chapter-02)	12 OF 34	C. 1 (xxviii.)	Interface Seal kit for HP/LP bypass servo/proportional valve and blocking unit- 2 Sets	1 Set is inferred as interface seals required for each type of actuator in HP bypass system.	The requirement against this clause is both for HP&LP Bypass system. Bidder to comply with the specification requirements.
602	VI (PartA)	VI (Chapter-02)	24 OF 32	4.00.00 (3)	a. Electro-Hydraulic Converter/Servo unit/ proportional valve for HPBP b. Blocking unit for HPBP (as applicable) c. Position feedback transmitter for HPBP d. Positioner for HPBP	1 Set is inferred as the components required for HP bypass valve, customer to confirm.	1 set means components required for complete set of valves in HP Bypass system including stop valves, control valves and spray control valves.
603	VI (PartA)	VI (Chapter-02)	24 OF 32	4.00.00 (4)	Hoses for HP and LP Bypass System- 2 complete sets	It is infered as 2 complete sets of hoses each for HP and LP Bypass system. Customer to confirm.	Specification requirement is clear in this regard. Bidder to comply with the specification requirements.
604	VI (PART-B)	A-07	4 OF 25	1.16.00 (c)	Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for both HP and LP bypass systems.	Control of the oil system will be implemented in the DCS, no separate control cubicle is envisaged.	Bidder to refer amendment TG-12 in this regard.
605	VI (PART-B)	A-07	4,5 OF 25	1.16.00 (c)	Accumulators shall be sized to take sufficient number of stroking operations of all actuators under a condition of loss of oil supply from the pumps.	Accumulators shall be sized for 2 stroking operations (1 full open & 1 full close) of all actuators. Customer to confirm	Specifications requirements are clear and bidder to comply the same. Further, specific details shall be discussed during detail engineering in line with the specifications requirements.
606	VI (PART-B)	A-07	5 OF 25	1.16.00 (h)	All the piping, fittings, valves, oil tanks, strainers including body and element associated with oil system of HP & LP bypass system shall be of stainless steel.	All pipings, fittings, oil tanks and ball valves will be of Stainless Steel MOC. The remaining items like Hydraulic valves, strainers including body and element and other components shall be as per supplier's established practice.	Specification requirement is clear in this regard. Bidder to comply with the specification requirements.
607	VI (PART-B)	A-08	9 OF 19	1.08.00 (D)	Body & Bonnet for Spring loaded bypass Valve: A234 Gr.WCC/A105/A182 F36 or better	A216 is for steel castings and A234 is for wrought carbon steel and alloy steel fittings of seamless and welded construction. Body of the Spring Loaded Bypass Valve shall be of A216 Gr.WCC in place of A234 Gr. WCC.	Bidder's understanding is correct. Body of the Spring Loaded Bypass Valve shall be of A216 Gr.WCC in place of A234 Gr. WCC.
608	VI (PART-B)	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL (E-60)	7 OF 12	41	HP Bypass Valves (Sub QR item)	This shall be changed to HP bypass system	Bidder understanding is not correct. As per QA practise, both the terms are being used and carry the equivalent meaning.
609	VI (PartA)	II- A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	22 OF 28	2.24.01 (b) (2) (Vi)	Four (4) nos. of pneumatic emergency retract drives with matching crank tools for each type of soot blower shall be provided along with required length of connecting pipe, fitting etc. Service air points for actuation of pneumatic drive shall be provided at convenient locations	This infered "Emergency retraction tools (emergency hand crank) for each type soot blowers"	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
610	VI (PartA)	II- A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	PAGE 25 OF 28	2.30.00Sl. no. 8	Safety valves and critical valves to be provided with temperature & sound monitoring (may be IOT based) to detect early passing and ensure reliability. Temperature point shall be provided on these valves/lines. For control and monitoring purposes the temperature values shall be taken between 50-75 Deg. C and sound value normally less than 75 db as trigger. The necessary provision shall be accordingly provided with alarm signal in the control room.	Safety valves with sound monitoring (IOT based) is not available. Hence safety valves shall be as per earlier executed projects without sound monitoring.	This shall be discussed during detail engineering in line with specification requirement.
611	VI (PartA)	II- A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	PAGE 25 OF 28	2.30.00Sl. no. 8	8 d. Sonicleak detection system installation in Safety valves & ERV: 1) Installation of Sonic leak detection system installation in all SLSV and ERVs of critical piping's such as M.S. Safety Valves & ERV/ EBV, CRH SV, HRH SV & ERV/ EBV.	Safety valves & ERV with sonic leak detection is not available. Hence safety valves and ERV shall be as per earlier executed projects without Sonic leak detection system.	This shall be discussed during detail engineering in line with specification requirement.
612	VI (PART-B)	E-60 INDICATIVE VENDOR LIST	PAGE 14 OF 25	Sl No. 40	ELECTROMATIC RELIEF VALVE (ERV): Bidder is not appearing in the approved vendor list for Electromatic relief valve	Bidder is to be included as approved vendor supplying Electromatic relief valve.	To be discussed during detail engineering with relevant supporting documents

SL NO	CHAPTER/ VOLUME	CLAUSE NO	DESCRIPTION AS GIVEN IN THE TENDER DOCUMENTS	COMMENTS/ CLARIFICATION	NTPC Reply
613	Technical specification Section-VI & Technical specification Section-VI, Part-E: tender Drawings (Electrical)	Cl. 1.05.00 of Section-VI & Drg no. : 0000-501-POE-A-002	Monitoring system of GT & Transformer outdoor layout	We understand that composite monitoring system (CMS) is not required with 315 MVA, 765 Kv GT. Customer to confirm the same, and arrange to furnish the revised Transformer outdoor layout drg no. 0000-501-POE-A-002 after removing CMS as shown in drawing.	Bidder's understanding regarding Non-applicablity of CMS for GT is correct. Please refer amendment Sl.No. EE-66.
614	Technical specification Section-VI & Technical specification Section-VI, Part-B: (book 2 of 5 -electrical)	1.04.07 _Winding and bushing details: -- as per & Cl. no. 6.00.00 Insulation level	Cl:1.04.07 _Winding and bushing details: -- For GT: as per Annexure-A of CEA.... & Cl. no. 6.00.00 Insulation level for 800 kV class transformer windings & bushings	Insulation level for 800 KV class transformer winding and bushing at both clauses of respective documents are different. Customer to confirm which insulation level for 800 KV winding and bushing shall stand applicable.	Clause no. 1.04.07 to be followed for BIL of winding and GT Bushing. Refer Amendment Sl.No EE-49.
615	Technical specification Section-VI	1.07.00	Neutral Grounding Reactor (NGR)	As per SLD, GT is shown to be directly grounded. Therefore, we understand NGR for 315 MVA, 765 Kv GT is not required. Customer to confirm the same	Bidder query is not correct. Clause no 1.07.00 refers to Neutral Grounding Resistor(if applicable). Further, Neutral Grounding Resistor is not applicable for GT.

S No	BID SPECIFICATION				SPECIFICATION REQUIREMENT	Pre-Bid Queries/ Clarifications	NTPC Reply
	Section	Sub-Section	Page No.	Clause No.			
616	VI (PartA)	II- A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	22 OF 28	2.24.01 (b) (2) (Vi)	Four (4) nos. of pneumatic emergency retract drives with matching crank tools for each type of soot blower shall be provided along with required length of connecting pipe, fitting etc. Service air points for actuation of pneumatic drive shall be provided at convenient locations	This infered "Emergency retraction tools (emergency hand crank) for each type soot blowers"	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
617	VI (PartA)	II- A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	PAGE 25 OF 28	2.30.00Sl. no. 8	Safety valves and critical valves to be provided with temperature & sound monitoring (may be IOT based) to detect early passing and ensure reliability. Temperature point shall be provided on these valves/lines. For control and monitoring purposes the temperature values shall be taken between 50-75 Deg. C and sound value normally less than 75 db as trigger. The necessary provision shall be accordingly provided with alarm signal in the control room.	Safety valves with sound monitoring (IOT based) is not available. Hence safety valves shall be as per earlier executed projects without sound monitoring.	This shall be discussed during detail engineering in line with specification requirement.
618	VI (PartA)	II- A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	PAGE 25 OF 28	2.30.00Sl. no. 8	8 d. Sonicleak detection system installation in Safety valves & ERV: 1) Installation of Sonic leak detection system installation in all SLSV and ERVs of critical piping's such as M.S. Safety Valves & ERV/ EBV, CRH SV, HRH SV & ERV/ EBV.	Safety valves & ERV with sonic leak detection is not available. Hence safety valves and ERV shall be as per earlier executed projects without Sonic leak detection system.	This shall be discussed during detail engineering in line with specification requirement.
619	VI (PART-B)	E-60 INDICATIVE VENDOR LIST	PAGE 14 OF 25	Sl No. 40	ELECTROMATIC RELIEF VALVE (ERV): Bidder is not appearing in the approved vendor list for Electromatic relief valve	Bidder is to be included as approved vendor supplying Electromatic relief valve.	To be discussed during detail engineering with relevant supporting documents
620	VI/ A	IIA-03	1 of 1		Biomass Further, the related special monitoring & analytical instruments on account of bio-mass co-firing towards satisfactorily performance of the boiler & auxiliaries are also included.	Monitoring & analytical instruments for Biomass co-firing as appropriate for our design are considered in bidder's scope of supply. M/s NTPC is requested to indicate any special monitoring & analytical instrument for bio-mass co-firing in tender specification.	Bidder to consider all monitoring and analytical instruments as per system/process specified in technical specifications.
621	VI/ A	IIB	3 of 20	1.05.02	LV SWITCHGEARS… The LV switchgears is of Intelligent type for Motor controller	Soot blowers are fractional HP motors powered from Soot blower MCC (SBMCC). Hence, bidder proposes to envisage conventional type Soot Blower MCC without Intelligent motor controllers and associated specification requirements. M/s NTPC is requested to confirm.	Bidder proposal is acceptable.
	VI/ B	B-0	7 of 15	3.06.00 (f)	LV Switchgears f) For protection of motors below 30kW, MPCB (only Short-circuit release) and Intelligent motor controller (IMC) with current sensing module shall be provided …		
	VI/ B	B-0	10 of 15	3.07.00	The Design Philosophy shall be as follows: (c) All LT Contactor controlled motor/heater feeders shall be controlled from DDCMIS through Intelligent Motor Controller (IMC) on profibus DP communication		
622	VI/B	IIIC-07	5 of 6	1.01.00	Note: Heat resistant instrumentation cable shall have same specification as of G/F type instrumentation cable as specified above, except that insulation and outer sheath material shall be Teflon and cable shall be suitable for continuous operation at 205 Deg. C	Tender specification calls for outer sheath thickness of 1.8mm for Teflon insulated cables which is not inline with the JSS51038 standard which is applicable for Teflon insulated heat resistant instrumentation cables(G/F type). M/s NTPC is requested to review and issue amendment on the outer sheath thickness requirement for Teflon insulated cables.	Bidder to refer ammendment sl. No. C-17 in this regard.
623	VI/B	II-A-02	8 of 67	3.07.00	In addition to local indicators, measurement system (4-20mA Output) for remote indication shall also be provided on all the four furnace walls.	M/s NTPC is requested to provide type of measurement and detailed specification for furnace thermal expansion measurment system.	bidder shall comply technical specification .Further same shall be discussed & finalised during detal engineering
624	VI/A	II-A-01	24 of 28	2.30.00 (6)	Flue Gas Ducts to be provided with strain gauge/ ash level meter at sharp bend locations of duct and common duct area after airpreheater.	M/s NTPC is requested to provide type of measurement and detailed specification for flue gas duct ash level meter.	bidder shall comply technical specification .Further same shall be discussed & finalised during detal engineering
625	VI/B	II-A-02	6 of 67	3.02.01	The variance of tube outlet temperature shall be validated by carrying out site demonstration for the first boiler during commissioning by affixing metal temperature thermocouples at each evaporator outlet tube (at intermediate header inlet, if applicable, and vertical wall outlet). These thermocouples shall be over and above the requirements for metal temperature thermocouples specified elsewhere.	M/s NTPC is requested to provide detailed specification for metal temperature thermocouples to be provided for this purpose.	bidder shall comply technical specification .Further same shall be discussed & finalised during detal engineering

626	VI/A	II-C	12 of 19	4.00.00 (d)	Temperature Transmitters: (i) In case of multiple measurements of temperature for any application, resulting in trip / protection, where logic implementation tolerates failure of one TE (e.g. 2v3, 2v4 etc.), for only one of the TE, dual TT is to be provided.	For temperature elements of PA/FD/ID fan bearings & HT motor bearings, as per Cl 4.00.00 (d)-Vol VI-Part A-Sec II-C-Page 12 of 19, one number of dual input TT & two numbers of single input TT are envisaged. M/s. NTPC is requested to confirm.	Bidder's proposal is not acceptable. Bidder to follow Clause no 7.07.00 of Part-B, Chapter B-02 of Section-VI.
	VI/B	II-A-02	31 of 67	10.08.07	PRIMARY AIR FANS (d) Three nos. Duplex Pt-RTD (100 ohm at 0 deg.) with dual input temperature transmitters shall be provided for local and remote monitoring of each bearing metal temperature of fans.		
	VI/B	II-A-02	31 of 67	12.05.00	FD & ID FANS Fan Bearings (c) Three nos. Duplex Pt-RTD (100 ohm at 0 deg.) with dual input temperature transmitters shall be provided for local and remote monitoring of each bearing metal temperature of fans.		
	VI/B	II-B-02	3 of 4	7.07.00	Each bearing of HT motor shall be provided with 3 numbers duplex RTDs connected to three numbers dual input transmitters with display.		

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			NTPC Reply
627	SECTION – VI/PART-E				Civil Tender drawings - GLP (TP-17 & 18)	1) There are space constraints for providing new conveyor along existing conveyor as shown in GLP. For tapping from the existing TP, there is huge quantum of work involved w.r.t.modifications, dismantling, re-erection & strengthening of existing TP. NTPC to ensure that required design related inputs like design document, staad file, loading details, all civil & strucutural drawings etc. for the existing TP shall be provided. 2) Cable rack outside TP needs to be re-routed, Electrical, civil and structural inputs shall be provided by NTPC. 3) For the modification works, site fabrication works may be involved, bidder should be allowed to do welding/welded connections for the same. 4) Any system shut down due to above modification shall be taken care by NTPC and bidder shall not be liable for any financial implication for the same.	Bidder to refer Ammendment S. No. No. D1-46 for Civil Drawings. Bidder to refer Cl. 8.07.00 of Section-VI, Part-B, Sub-Section-D-1-8. The shutdown proposal of the system shall be submitted well in advance to NTPC for review & necessary action as per contract.
628	SECTION – VI/PART-E				Civil Tender drawings - GLP (TP-24 & 25)	1) There are space constraints for providing new conveyor along existing conveyor as shown in GLP. For tapping from the existing TP, there is huge quantum of work involved w.r.t.modifications, dismantling, re-erection & strengthening of existing TP. NTPC to ensure that required design related inputs like design document, staad file, loading details, all civil & strucutural drawings etc. for the existing TP shall be provided. 2) Any system shut down due to above modification shall be taken care by NTPC and bidder shall not be liable for any financial implication for the same.	Bidder to refer Ammendment S. No. No. D1-46 for Civil Drawings. The shutdown proposal of the system shall be submitted well in advance to NTPC for review & necessary action as per contract.
629	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP	General Layout Plan (dwg. No. XXXX-999-POC-F-001)	Bidder request NTPC to allow site fabrication for tapping point related structures/Chutes (TP-17,TP-18,TP-24 & TP-25) as lot of modification work is involved and it has to be done at suite at site condition.	Bidder to refer Cl. 8.07.00 of Section-VI, Part-B, Sub-Section-D-1-8
	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.00.00	SCHEME OF COAL CONVEYING PLANT: Coal required for the proposed unit shall be catered from the existing Coal Handling plant ……..		
630	Section-VI/ Part-A	SUB-SECTION-IIA-15 COAL CONVEYING & BIOMASS HANDLING PLANT	PAGE 1 OF 6	1.00.00	SCHEME OF COAL CONVEYING PLANT: Coal required for the proposed unit shall be catered from the existing Coal Handling plant ……..	Bidder request customer to provide following drawings for checking of feasibility/fouling etc. 1. Cable gallery/bridge of CHP stage-II which covers areas of TP-17,TP-18,TP-24 & TP-25, Pump house near TP-27, proposed area of CHP stage-III areas like pump house near TP-27,TP-28 etc. 2. GA of CHP pump house near proposed TP-28 3. GA of MCC near Proposed TP-27 & MCC near proposed TP-26 4. Piping layout drawings of Fire fighting,DS,PW,SW water systems for in and around areas covering of TP-17,TP-18,TP-24 & TP-25, Pump house near TP-28 and MCC near Proposed TP-27 & MCC near proposed TP-26 5. Fire water piping and related pipes drawings marked in plot plan near proposed TP-26 6. Interconnecting chutes and flap gate drawings of TP-17,TP-18,TP-24 & TP-25. 7. Roads & Drain layout drawings near TP-17,TP-18,TP-24 & TP-25 and CSSP-II.	Critical drawings are already shared in tender. Further, drawings required shall be shared with successful bidder during detailed engineering
631	Section-VI/ Part-E	Tender Drawings	PAGE 1 OF 7	GLP	General Layout Plan (dwg. No. XXXX-999-POC-F-001)	Bidder understands that tree cutting, dismantling of EMD sheds near proposed TP-28/27, removal of mill reject/scrap/temporary canteen & sheds etc. in proposed CHP stage-III area, Biomass handling area and LHP/GHP area is in Customer scope. **Please confirm.**	Bidder to refer Amendment D1-27 for revised GLP for shed to be dismantled by owner
632	Section-VI/ Part-A	SUB SECTION-IIA-14 LIMESTONE & GYPSUM HANDLING PLANT	PAGE 4 OF 5	3.07.00	Gypsum from storage shed shall be loaded to user's trucks directly from discharge chute or using front end loader/ pay loader	Following equipments/facilities are not considering in Bidders scope of supply. 1. Front end loader/ pay loader 2. Dozers 3. Front end loader/ pay loader & dozer sheds 4. Area repair shop 5. Locomotive shed etc. **Please confirm.**	Bidder's understanding is correct
633	Section-VI/ Part-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	PAGE 79 OF 87	4.02.06	i) The coal delivered to power station, shall be of size 250 mm and below. However, occasionally 1-2% coal of 400 mm lump size may also be encountered. ii) Due to open cast method of mining involved, the coal may contain shale and sand stone as high as 20%. Also, occasionally, metal pieces like broken shovel teeth, brake shoe, wires etc. may also come along with coal	Stage-III CHP system is designed for crushed coal, hence refered clauses is not applicable for CHP. **Please confirm**.	Bidder's understanding is correct for i) Further, ii) is applicable for crushed coal.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
634				Drg no. XXXX-999-POC-F-005	General Layout Plan		Bidder to refer Ammendment No . D1-27
635	VI-B	B-17	49 of 98	11.03.01	The detailed survey shall be carried out along the Transmission Line alignment by successful bidder/contractor. The report shall be in line with CBIP-Manual- Transmission line -323 guidelines.	During Site visit, and subsequesnt discussion with transmission line OEMs following observations are made in 765kV Line routing (as per the General layout plan and the marked notch area) Due to limited space, and close vicinity to cooling tower and narrow corridoor space,feasibility of overhead transmission line is practically difficult. It is requested to provide land corridor of minimum 64 metres (Same is the requirement as per CBIP manual)	Bidder refer to Amendment Sl. No:EE-47, Annexure-E2 (Preliminary route survey)

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
636	VI -B	IIIC-04	19 of 36	10.01.07	AAQMS CO Analyser Range: 0-1 PPM to 0-1000 PPM	Revision in analyser ranges is proposed as below: CO Analyser Range 0-1 PPM to 0-100 PPM Above proposed ranges are adequate for ambient air measurement. CPCB and NTPC, in their tenders for AAQMS, specify above ranges for CO analyzer.	AMBIENT AIR QUALITY MONITORING STATION (AAQMS) is not in the scope of the bidder
637	VI -B	IIIC-04	16 of 36	10.00.00	AMBIENT AIR QUALITY MONITORING STATION (AAQMS)	QUANTITY OF AAQMS/ANALYZERS IS NOT AVAILABLE IN THE TENDER DOCUMENTS. PCRI IS PROPOSING QUANTITIES OF ITEMS BASED ON RECENT SUPPPLY/REQUIREMENT IN NTPC PROJECTS AS MENTIONED BELOW: 1. SOX, NOX, CO, O3 ANALYSER, Multi gas Calibration system, PC based Data logger for individual AAQMS stations, UPS - 04 Sets 2 Mercury Analyser - 01 Set 3 Suspended Particulate Monitors - 08 Sets 4 Sampling Inlet Heads – PM2.5, PM10, TSP - 04 Sets 5 PC Based Data Logger for Central Station with A4 Laser Printer Along with UPS - 01 Set 6 Meteorological sensors- Wind speed sensor, wind direction sensor, air temp sensor, relative humidity sensor, solar radiation sensor, rain gauge - 01 Set 7 Meteorological Mast - 01 Set 8 Sample Handling System Including Compressed Air For Purging. - 04 Set 9 CDAS and Connectivity of CDAS Station to Individual AAQMS Stations - 01 Set 10 Window A/C for AAQMS Stations (1.5 Tons Each) - 8 nos	
638	VI-A	IIA-23	2 of 2	2.01.00	Sr. No. 45 – Stop Watch	QUANTITY OF STOP WATCH IS NOT AVAILABLE IN THE TENDER DOCUMENTS. BIDDER IS PROPOSING 01 No. QUANTITY BASED ON RECENT SUPPPLY/REQUIREMENT IN NTPC PROJECTS.	Bidder's understanding is correct.

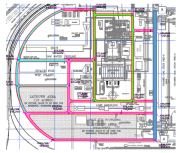
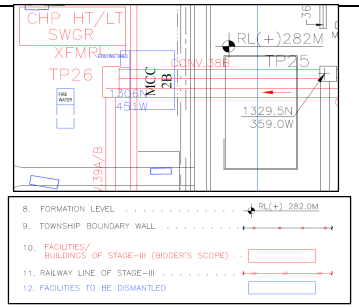
SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
639	VI	C	46 of 119	28.00.00	Training of Employer's Personnel	We request that the number of man-months training shall be mutually agreed after Award. All the expenditure towards travel (internal & external), boarding and lodging and living expenses of Employer's personnel shall be borne by the Employer for all types of trainings. Any kind of training shall only be provided by Bidder's personnel experts at Bidder works / project site only. However if training is not availed by employer during the contract period no rebate on this account shall be admissible in contract price. NTPC to confirm.	Bidders proposal is not accepted provisions of clause 28.00.00 part C section VI of technical specifications shall prevail.
640	VI-A	VI			Mandatory Spare List	Wherever, Bidder quotes lot price for a clause/system in the list of mandatory spares, the offered price will remain same regardless of the deletion / change of items / quantity corrections etc as applicable to the particular design/vendor selected during execution. This should not be a point of contention during execution of the order. NTPC to confirm the same.	Bidder's proposal reviewed and not accepted. Bidder to comply technical specification requirements
641	VI-A	VI		13.00.00	Mandatory Spare List	Bidder shall indicate "Not Applicable" against any of the spare if the same is Not Applicable as per its/OEM/vendor design. Technical equiv. shall be supplied if it is establish during detailed engg., however, there shall be no rebate for NOT applicable items indicated by the bidder in its offer if no tecnical equiv. item is found . Wherever Lot price is quoted by the bidder for a clause/system in the list of mandatory spares, the offered price will remain same if any sub-item is found Not applicable during detailed engg. for the design of the supplier and no rebate shall be offered for such items.	Bidder to refer clause 13.00.00 of sub section VI of Part A of technical specifications in this regard.
642	VI-A	II-D	Page 6 of 8	2.01.00	**LABOUR & STAFF COLONY**	We request NTPC to provide Land for labour & staff colony within Plant boundary. Availability of above land within plant boundary shall help in smooth execution of the project.	Bidder's proposal is not acceptable. Bidder to refer clause no. 2.01.00 f).
643	VI-A	II-B & II-C	Page 3 of 20 Page 18 of 19	1.05.03 25.00.00	Switchgear /Numerical Relay Networking Annual Maintenance Services (AMS)	Annual Maintenance Contract/ Services(AMC) As per technical specification requirements, AMC/AMS to be provided for certain C&I / Instruments for 03 years. We understand that on successful completion of facilities and completion of defect liability period, NTPC will release the contractor's Bank Guarantees, applicable payments and close the contract. Therefore, providing AMC beyond defect liability period is not envisaged.	Bidders understanding is not correct. Bidder to note that AMC/AMS is part of the EPC contract. Accordingly closure of EPC contract shall be done upon successful completion of AMC/AMS
644	VI-B	E-59	2 of 6	4.0 b)	Structural steel (plates and rolled sections i.e. channels, beams & angles) conforming to IS 2062 and Reinforcement steel conforming to IS 1786 supply if in the scope of the contractor shall be procured from Primary Steel Producers (Refer NOTE below). Currently, Primary Steel Producers acceptable……	Steel products are only to be procured from Primary Steel producers indicated in the NTPC specification. As per notification/order dated 14.12.16, 09.08.16 and 12.05.16 by the Ministry of Steel, Govt. of India, such classification fo steel producers is disposed off. Such classification will also lead to situation wherein deliveries committed by NTPC specified steel producers are not adhered or these steel producers are not evincing keen interest in supply of certain steel sections to match supply schedule. Request NTPC to amend the specification accordingly in the said clause and at other places wherever such classification is indicated.	The clause is as per Qualyfing requirement for steel producers in TS having production capacity of 1 Million Ton per annum.For sections, if any which are not being supplied by enlisted steel suppliers, provision for procuring such sections are already envisaged in the tech specifications. Hence Bidder has to follow the Technical Specification reqirements
645	VI-A	SUB SECTION-VI	3 of 3	13.00.00	Bidder shall not indicate "Not Applicable" against any of the spare (except for those items for which "if applicable" is specified). In case of not applicability, functionally equivalent spare to be ……	a. Generally, lot price is quoted by the bidder for a main system considering applicable items (for the offered design) under that heading. In such scenario, there should not be a question of rebate (for not applicable items in the lot) during execution/closing of the Contract. b. In case there is no equiv. spare technically for a specified spare, there should not be a question of rebate during execution/closing of the Contract. Kindly confirm the above understanding	Bidder's proposal reviewed and not accepted. Bidder to comply technical specification requirements
646	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	1 of 8	1.01.00 (d)	Compliance with statutory requirements and obtaining clearances from statutory authorities, wherever required	Bidder request Owner to obtain the necessary statutory approval and clearances. However, bidder may assist the Owner for the obtaining the same. Owner is requested to provide an exhaustive list of statutory approval to be obtained by NTPC for Sipat EPC project.	Bidder's proposal is not acceptable. Bidder to comply tender requirements.
647	General				Dismantling of existing structures/substructures/facilities, as per specifications.	Bidder request NTPC to dismantle the super-structure / sub-structure of various facilities/buildings specified in bidding documents prior to award, and provide the encumbrance free land for complete facilities under the scope of bidder as on date of NOA. NTPC to confirm and issue suitable amendment.	Bidder to refer Amendment D1-27 for revised GLP for sheds to be dismantled by owner. Further, removal of any sub-structure is in bidder's scope.
648	General				Movement of ODC consignment in Material Storage Yard wherein existing overhead transmission line is present	Bidder request NTPC to arrange any type of clearance/ liasoning/ associated fees etc. with state authority for shutting down the transmission line for movement of materails and any delay in arranging the permission shall be attributable to NTPC.	Bidder to arrange all clearances on their own and has to plan its own arrangement for movement of ODC consignment up to plant site.
649	General				Approach to site/Material Storage Yard	Bidder request NTPC proper entry to site 7 Stogare yard/lay down area. The complete land for Stage-II is in MGR bulb wherein only 02 entry points are available. One is underpass which is very low in height and material/T&P movement is not possible thru it. Second access is above groung, howver, the MRG rail has to be crossed for that and we envisage following difficulties : 1) Each Consignment has to cross MGR crossing with overhead transmission line as height of underass is too low. Due to the transmission line each of the ODC may be stranded at the aforesaid rail crossing. It is most likely that the transmission line has to be removed for few of the ODC consignments. Due to retention of vehicles, contractor will have to pay huge demurrage charges also to its transporter as hydraulic trailers carrying ODC consignment have very high demurrage charges. 2) During Peak erection time, movement of vehicles will be hindered due to Railway crossing and this may lead to long queue of vehicles within existing plant. 3) 20 Acre of laydown area is outside MGR. Movement of erection material/equipment from that area to the erection site is difficult. This has safety issues also. NTPC to provide clear access to the site/storage/laydown are.	Bidder has to plan the execution activities based on the site assessment. Materials which cannot be transported through RUB, Bidder has to co-ordinate with the owner for movement over MGR rail crossing. For critical ODC consignment requiring removal of MGR overhead transmission line inside the plant, the successful bidder has to furnish the exact movement plan to the owner well in advance for making necessary arrangement for the same. Bidder has to comply the tender requirements.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
650	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	1 of 14	1.01.02	Bottom ash hopper Liners	Bidder understands that this shall be "Bottom ash hopper Liners (As applicable)"	Bidder's understanding is correct. Bidder to refer Amendment Sl MH-47.
651	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	4 of 14	4.02.02	Air lock/Pump tank outlet valve	Bidder understands that for 1st stage ash conveying the outlet valve is not applicable and hence the mandatory spares shall also be not applicable. Kindly confirm	Bidder to note that for 1st stage conveying, referred spares shall be provided in case it is applicable. Hence, Technical specification is clear.
652	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	5 of 14	4.02.03	Air lock/Pump tank inlet/outlet valve seats (each)- 16 nos	Bidder understands that for 1st stage ash conveying the outlet valve is not applicable and hence the mandatory spares shall also be not applicable. In such case, the quantity should be 8 nos. Kindly confirm	Bidder to note that for 1st stage conveying, referred spares shall be provided in case it is applicable. Hence, Technical specification is clear. Bidder to comply for quantity of spares.
653	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	5 of 14	4.03.00	Vacuum Conveying system	Bidder understands that this shall be read as " Vacuum Conveying system (if applicable)"	Bidder's understanding is correct. Bidder to refer Amendment Sl MH-47.
654	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	7 of 14	4.08.00	Vacuum Pump	Bidder understands that this shall be read as " Vacuum pump (as applicable)"	Bidder's understanding is correct. Bidder to refer Amendment Sl MH-47.
655	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	8 of 14	5.00.00	Fly Ash Conveying Line / isolation valves/ fittings couplings	Bidder understands that this clause pertains to Vacuum Conveying system and hence it should be " As applicable" Kindly confirm.	Bidder's understanding is correct. Bidder to refer Amendment Sl MH-47.
656	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	9 of 14	6.01.02	Storage Silo Aeration pads	Bidder understands that these aeration pads are either the fabric or ceramic stones which are used in fludidiisng pads. Kindly confirm	Bidder's understanding is correct. Aeration Pads are fluidising pads and either Fabric type or Ceramic stone type or other types proven for such application.
657	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	9 of 14	6.01.03	Storage Hopper aeration Sectionalizing valves	Kindly elaborate these valves.	Generally, there is one common header for fluidization of all the Silos/Hoppers. However, fluidization is done in loaded Silos/Hoppers. Hence, Fluidization is done in individual Silo/Hopper as per the requirement. The valve used for that is termed as sectionalizing valve.
658	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	9 of 14	6.01.06	Interconnection Valves at silo top/ FA transport pressure lines	Bidder understands that these valves refer to valves provided on silo top or on piperack near silos for interconnection of FA transport pressure lines in different silos.	Bidder's understanding is correct.
659	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	9 of 14	7.00.00	Bottom & Fly Ash Slurry Disposal System	Bidder understands that this refers to BA Transportation pumps and combined ash slurry disposal pumps. Kindly confirm.	Bidder's understanding is correct. Bidder to refer Amendment Sl MH-47.
660	Section-VI/ Part-A	Sub Section VI Chapter 03 AHP	10 of 14	7.03.01	Ash Slurry Pipes and fittings (bends)- 25% of popluation of each size	1. Bidder understands that 25% quantity on bends used in ash slurry pipes are only to be considered for mandatory spares. Kindly confirm. 2. In case pipes are also to be considered for mandatory spares, then kindly review the quantity mentioned as 25% as we feel 5% of total population of ash slurry pipes are sufficient in place of 25%. Kindly confirm. 3. In case pipes are also to be considered, we understand that it shall be on MS pipes and not on cast basalt lined pipes. Kindly confirm.	Bidder to refer Amendment Sl MH-47.
661	Section-VI/ Part-B	Sub Section A-21 AHP	4 of 42	1.04.00	Sl No. 3- Size of valves- Same as parent pipe size.	In case of 225 NB pipe size, the valves shall be 200 NB. Kindly confirm.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
662	Section-VI/ Part-B	Sub Section A-21 AHP	13 of 42	1.09.00	Sl No. 5- Approximately 350 mm seal will be maintained.	Bidder understands that the based on the expansion details of respective hoppers provided by boiler manufacturer, the water type expansion joints shall be designed. Kindly cofnirm.	Bidder's understanding is correct. Approximate seal (towards principal z-z axis) has been specified.
663	Section-VI/ Part-B	Sub Section A-21 AHP	13 of 42	1.10.01	2nd para- The feeder ejectors shall be designed to extract the ash at the above specified rates, for a minimum of 25 mm wear on the throat without changing the input water parameters…	Bidder understands this 25 mm wear on the throat is not applicable to feeder ejectors. This clause is only applicable for jet pumps. Kindly confirm.	Bidder's understanding is correct.
664	Section-VI/ Part-B	Sub Section A-21 AHP	27 of 42	3.03.00	Sl No. 2- Same as parent pipe size	For special applications and proven design of AHP suppliers, size of few valves like vent valve above vessel, equalising/pressurising valve of ash vessels, control valve (as applicable) shall not be same as parent pipe size. The valve sizes shall be as per recommendation and proven design of OEMs of AHP. Kindly confirm	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
665	Section-VI/ Part-B	Sub Section A-21 AHP	34 of 42	5.01.00	Sl No. 3- "15% margin shall be provided in the pump capacity for all water pumps"	Bidder requests for 10% as per all executed NTPC projects against specified 15% margin. Kindly confirm.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
666	Section-VI/ Part-B	Sub Section A-21 AHP	34 of 42	5.01.00	Sl No. 5 i) Pump speed- 1500 rpm	Bidder requests that in case of HP seal water pumps (if provided), which are high head and low flow pumps, 2900/3000 rpm pumps will also be accepatble to NTPC. Kindly cofnirm.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
667		Tender Drawings- Plot plan			Temporaray/Permanent structures in the plot plan	1. Bidder requests for updated autocad copy of the Plot plan. Plot plan should be updated with all facilities prevailing/constructed at site like cable trestles in CHP area, Ash silos, MCC rooms, cable trestles in ash silo area,culverts, any other facilities overground/underground which are permanent in nature for aasessment of the owrk involved in the contract. 2. Bidder understands that the facilities which are not shown in plot plan are either temporary structure or minor in nature and customer will provide clear front of all the encumbraces for carrying out Stage-III construction works. While visiting the site, we have noticed few temporary facilities like Mahamaya canteen, coal stoarge space along with boundary wall near CHP office (coal bhavan), Portable sewage treatment plant and toilet which are near to existing silo utility builidng, ash bagging system and ash bag storage area in between space of last existing silos and upcoming Stage-III silos. These facilities will hamper the stage-III construction works.	1. Only PDF format Tender drawing is provided in Tender. Auto cad format drawing may be provided to Successful bidder. Exisitng structure like cable trestle, MCC room, etc are not shown for clarity. Exustingh silo and some major culvert are shown in GLP. 2. Bidder's understanding is not correct. Bidder has to develop GLP as per the scpe of work and system requirements.
668					GA and layout drawings of exiting AHP facilities which are having interface with Stage-III contract	Bidder requests for following drawings: 1. Ash Silo area complex. 2. GA of Pitless weigh bridge arrangement provided in exisiting silos for rail wagons along with truck movement. 3. Mech Layout of ash slurry pedestals outisde plant boundary. 4. Mech layout of ash dyke garlanding pipes. 5. Civil drawing of pedestals, culvert outside plant boundary and in and around ash dyke. 6. Civil foundation drg of existing ash silos and silo utility builidng near envisaged Stage-III silos.	"For drawing of Pitless weigh bridge arrangement at Silo refer amendment no. D2-56. Other civil drawings shall be shared to succesfull bidder."
669					General Query	Due to larger dia structures, Site fabrication may please be permitted for Settling tank, surge tank and dewatering bins of AHP as logistics for bringing these pre-fab structures are more cumbersome.	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
670					General Query	Bidder understands that the railway track will be dismantled by customer for carrying out works of Ash Silos. Kindly confirm.	NTPC will dismantle the required stretch of Railway track for specific period only, on request of qualified bidders for carrying out the works of ST-III Ash silo.
671					General Query	Bidder understands that obstruction free clear front will be provided by customer for construction of stage-III ash silos and there will not be any rail wagon unloading operation from the existing silos.Obstruction free front is mandatory to meet the stringent plant milestone schedules. Kindly cofirm.	NTPC will provide the obstruction free clear front for construction of stage-III ash silos.
672					General Query	Bidder understands that cable rack from silo utility building to ash silos shall be modified by customer to provide clear approach of trucks/bulkers.	The modification of cable/pipe rack or construction of underground culvert from silo utility building to ash silos ST-I to provide clear approach of trucks/bulkers from Stage-III Silo shall be in bidder's scope. Necessary cable/pipe removal and its fresh laying will be carried out by NTPC.
673					General Query	In case pipe bridge is provided for crossing ash slurry pipes over electrified rail tracks near plant boundary, required permit, necessary approvals and time shall be provided by customer. Kindy confirm.	Necessary approval will be provided by NTPC.
674	SEC VI/ PART-B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	PAGE 65 OF 79	4.02.00	All the above local control panels shall be accessi-ble and located near their respective equipment and shall be complete with all the re-quired controls, interlocks, annunciation's etc. However, for items (h) and (i) above, controls shall be through Employer's DDCMIS/contractor's PLC as applicable. Further, necessary controls, indications and annunciations for all the above equipment shall also be provided at main CHP Control Room as described under relevant clause.	Please provide the details of Equipment to be controlled from Employer DDCIMS and main CHP Control room. Bidder understand that main CHP Control room to be provided by the Bidder.	Refer ammendment sl. No MH-05

675	SEC VI/ PART-B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	PAGE 64 OF 79	4.01.00	The assessment of available space in the existing CHP Control room shall be undertaken by the contractor. Further control room expansion and (or) modification if required shall be in the scope of the Contractor.	1) Please share the Layout drawing of Existing CHP Control room and its Location. 2) Also clarify whether Bidder supplied CHP system to be controlled from main CHP Control room or Existing CHP Control room.	1. The same shall be shared during detail engineering 2. Bidder's query not clear .however, refer clause 4.00.00(operation & Control philosophy) sub section A-20 Part-B
676	SECTION-VI, PART-A	I-B PROJECT INFORMATION	18 OF19	Annexure-IIIA	Total Suspended Solids (TSS) data not availabel in Raw water analysis.	Please provide 'Total Suspended Solids (TSS) data in Raw water Analysis	Bidder to refer Amendment Sl. No. WS-11 in this regard.
677	VI / A	IV	30 of 73	1.03.03 vi)	The contractor shall demonstrate that the purity of the gypsum produced shall not be less than 90%, chloride content shall not be more than 100ppm and the moisture content shall not be more than 10% for the range of specified coal(s) and based on CaO content of 51% in limestone.	As per sub section IV, limestone purity to be considered for Gypsum purity guarantee is CaO 51% ⇒**CaCO3 91%** As per Sub section IB, limestone purity to be considered for Gypsum purity guarantee is **CaCO3 89%** Both clauses are contradictory. Kindly clarify.	Bidder to refer to amendment to technical specification sl. no. 46 in this regard
678	VI / A	IB	14 of 19	Notes. 1	Guaranteed parameters (guarantee on limestone consumption, auxiliary power consumption & gypsum purity) shall be based on available (reactive) CaCO3 content of 89%.		
679	SECTION – IV	GCC	43 of 90	19.1	Appendix 5 (List of Approved Subcontractors) to the Contract Agreement specifies major items of supply or services and a list of approved Subcontractors against each item, including vendors. Insofar as no Subcontractors are listed against any such item, the Contractor shall prepare a list of Subcontractors for such item for inclusion in such list. The Contractor may from time to time propose any addition to or deletion from any such list. The Contractor shall submit any such list or any modification thereto to the Employer for its approval in sufficient time so as not to impede the progress of work on the Facilities. Such approval by the Employer for any of the Subcontractors shall not relieve the Contractor from any of its obligations, duties or responsibilities under the Contract.	Bidder has its own robust and exhaustive process to qualify a vendor prior to award of contract. Our Bidders are meticulously scrutinized and qualified based on thorough evaluation including Technical as well as financial capability . Hence in order to minimize the ordering time owner may please exempt vendor approval for all type of subcontracting works viz. Civil, E & C and site fabrication etc.	Bidder's understanding is not right. Bidder to furnish the data as mentioned in appendix 5 and GCC.
680	Section-VII Book 3 of 3 (Part-1) (Form of Contract Agreement) SECTION – VI, PART-B	Appendix-1 (Terms and Procedures of Payment) SUB-SECTION E-59 QA CIVIL WORK	28 of 32	Payment Procedure INDICATIVE FIELD QUALITY PLAN, Cl. No. 4.2 (ii) Concreting		Concrete Cube strength Test: As this is a long term project & concreting is continous process, in order to maintain cash inflow bidder's RA bills shall be processed against 7 days test report only. May kindly confirm.	INDICATIVE FIELD QUALITY PLAN, Cl. No. 4.2 (ii) Concreting has provision for 7 and 28 days test which needs to be complied as per TS. Bidder's proposal not accepted
681	SECTION – VI, PART-A, SUB-SECTION-I INTENT OF SPECIFICATION	5 OF 9	4.02.00	Pre-commissioning and commissioning activities	The Employer shall issue the following quantities of Fuel oil and Coal per unit for firing up to successful completion of "Initial Operation" (as defined in General Technical Requirements, Part-C, Section-VI of Technical Specification) for each unit free of charge. Fuel Oil -11200 kL Coal- 2.7 lakh MT Fuel oil and coal required for the successful completion of the "Initial Operation", more than the above-specified quantity limits, would be issued by the Employer. However, the Employer shall charge the Contractor the cost of these as per the prevailing landed rates at the site at that time.	Bidder requests NTPC to delete this clause. Coal & fuel oil should be provided free of all charges during Pre-commissioning and commissioning activities. If consumption of Coal & Fuel oil Qty. goes beyond the specificed quantity same has to be borne by NTPC and no penalty/recovery shall be imposed on bidder. May please confirm the same.	Bidder proposal is not acceptable.Bidder to comply specification requirement.
682					Regarding fuel oil and coal issued free of charge	Deletion of limit or alternatively increasing the free limit to 15700 kL and 3.8 lakh MT upto successful completion of Initial Operation	The specified values for fuel oil and coal, to be issued free of charge by the Employer, is based on Employer's internal assessment of quantities required for the specified activities. Correction of coal quantity for the unit electricity generation during the initial operation is already provided in the bidding documents. The bidder to comply with the requirements of the bidding documents.
683	VI-A	I	Page 7 of 8	4.09.00	The Contractor shall be responsible to undertake some activities related to its Corporate Social Responsibility (CSR) in the immediate vicinity of the project. The Contractor shall undertake such activities after prior consultations with the Employer to ensure that the efforts of the Employer and Contractor are complemented. The share of CSR expenditure to be incurred by the vendor / contractor for this project in the total CSR expenditure incurred by the vendor/contractor as a company will be in the same proportion as the turnover of the project concerned to the total company turnover. This will be certified by the charted accountant once every fiscal year. Such activities will be undertaken by the contractor / vendor in consultation with the Employer.	Please refer specification requirements regarding share of CSR expenditure to be incurred by the vendor / contractor for this project. This does not provide the level playing field to all the bidders. We request NTPC to indicate expenditure to be incurred for carrying out the CSR activities in the immediate vicinity of the project as stated.	CSR activities as per the provision (Rules) under section 135 of the companies Act 2013 relating to CSR and other circulars / instructions of various government departments viz MoEF etc. are to be carried out by the contractor, being statutory in nature.
684	VI-D & VII Book 3 of 3		10 of 70	27.00.00 Appendix-6 to Contract Agreement	Facilities to be provided by the Employer	We request NTPC to physically hand over the clear encroachment free land immediately after award of Contract i.e. within one month of issuance of NOA.Only Employer shall be responsible for coordinating and resolving all issues with Central & State Government, local bodies and local authority w.r.t land acquisition.	Land acquisition is not envisaged for the plant area. Bidding documents are clear, bidder to comply.
685	VI-A	I	Page 7 of 8	4.10.00	The vendor / contractor shall visit the site to ascertain the position of land acquisition etc.		
686	General				Access to & Possession of site	Employer shall ensure the site is approachable from state & national highways for material movement. If there is any obstruction or local issues pertaining to movement of goods the Employer shall be responsible for resolving same, the Contractor shall be entitled to suspend the work till such site issues are resolved	Bidder to refer Cl no 2.00.00 Sub-section-I, Intent of Specification, Part-A/Section- VI of technical Specification.
687					Regarding Coal characteristics	Worst coal HGI of 40 petains to very poor grindable coal quality which has not been noticed by the Bidder it its experience. Further, in NTPC Lara, the HGI for same was specified as 48. Request NTPC to retain the coal parameters (w.r.t HGI) in sync with that of NTPC Lara	Bidder's proposal reviewed but not accepted. Bidder to comply tender requirement.
688					Regarding critical issues of CHP and AHP	NTPC to review the technical & demographic constraints. Bidder request NTPC to do upfront coal TPs modification and delete the scope of ash slurry disposal pipeline.	TPs modification reviewed and found technically feasible. Bidder' s proposal is not acceptable, bidder to comply with tender specifications. The proposed ash slurry disposal pipeline is to be laid on NTPC land. Bidder's proposal is not acceptable, bidder to comply with tender requirements.

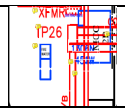
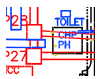
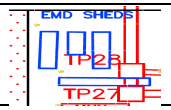
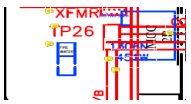
689	Section VI, Part B	D-I-8 (Civil Works)		8.07.00	Rgarding site fabrication of steel structures	Amendment of the clause for allowing Bidder to fabricate the steel structures at site with bolted or welded connections	The bidder's proposal is not acceptable. Please refer clause 1.00.01 of part A section VI, sub section IID (civil work) of technical specification, as per which site fabrication is allowed only for specific items. Additionally, Bidder is advised to refer to clause 8.07.00 of part B subsection D-1-8, section VI , part B of technical specification.
690	SECTION-VI,PART-A	SUBSECTION – 1-A	3 of 35	3.1 (p)	Provennes of HP Bypass system "Capacity of each valve not less than 750 Ton/hr at 270 Kg/Cm2(abs) & 600 deg.C Main Steam pressure and temperature at Turbine inlet".	This clause may be revised as: "Capacity of each valve not less than 750 Ton/hr at super crtiical steam parameters (i.e. Pressure and temperature)"	Bidder proposal is not acceptable.Bidder to comply specification requirement.

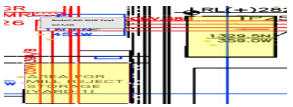
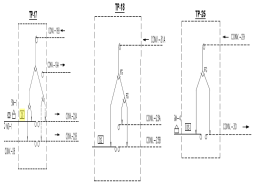
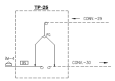
Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
691	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	D-1-4	2 of 4	4.03.1	The specified formation level(s) shall be achieved …… by raising by controlled filling with borrowed earth where the existing ground levels are lower than the specified level.	Subject to suitability of earth, Bidder can consider surplus available excavated earth from within the plant boundary for filling purpose. Please confirm	Bidder's understanding is correct. Further, Bidder to refer amendment Sl. No. D2-57.
692	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	D-1-5	39 of 86	5.08.00	Plant Storm Water Drainage System	Bidder requests Owner to provide the size and invert level of inlet/outfall drains shown.	During detail engineering, Bidder to design the drain as per existing site condition and technical specification requirement.
693	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	D-1-4	02 of 04	4.03.00	Bidder shall ensure that road access and drainage facilities for each block is available when site levelling in that block is completed. Unless otherwise mentioned, all roads and drains within a block shall be constructed by the bidder within a month from the date of completion of site levelling of that block.	Bidder understands that mentioned schedule is not feasible. Bidder proposes to construct road and drain as per requirement and progress at site.	Bidder's understanding is not correct. Roads and drains are to be provided as mentioned in the referred clause.
694	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	D-1-5	39 of 86	5.07.00	SEWERAGE SYSTEM	Bidder request to give information regarding number of users for the design of sewage treatment plant.	As mentioned in the refered clause - "The capacity of the Decentralized Sewage Treatment' units should be as per the design requirements, subject to minimum combined capacity of 75 Cum/day."
695	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	8 of 8	2.03.01	d. RCC drains in the entire laydown area and along roads shall be planned so as to ensure proper disposal of rainwater.	Laydown being a temporary facility, Bidder understands that suitable RCC/PCC/Brick/Earthen drains etc. shall be provided in laydown area to ensure proper disposal of rainwater and avoid waterlogging. Please confirm	Bidder's understanding is not correct. Bidder is requested to follow technical specification.
696	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	SUB-SECTION-D-1-5 CIVIL WORKS	40 of 86	5.10.00	All roads shall be of rigid pavements unless otherwise specified. Rigid pavements shall be constructed with Geopolymer concrete.	Bidder's request Owner to allow Cement Concrete roads as an alternative to Geopolymer concrete road.	Bidder's proposal is not acceptable.Bidder to comply with specification requirement.
697	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	D-1-9	2	9.03.01	All Buildings shall be designed with Toilets as per NBC norms.	Bidder understand that Toilet block shall be provided in buildings with permanent occupancy. Buildings like pump houses, electrical buildings, etc. with no permanent occupancy shall not be requiring Toilet blocks. Please confirm.	Bidder understanding is not correct.Bidder to comply with specification requirement.
698	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	D-1-9	2	9.03.02.e	One toilet with required facilities shall be provided for physically challenged persons as per National Building Code requirement	Bidder understands Handicap toilet shall be applicable only for Service building. As per scope of works, Service building is not envisaged, Hence, this clause may not be applicable.	Bidder understanding is not correct. Bidder to refer amendment D1-28
699	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	D-1-9	3	9.03.02.h 9.03.01	GI concealed water supply pipe of minimum 12 mm diameter of medium class, cast iron sanitary pipe (with lead joints) of minimum 75 mm diameter, floor trap with Stainless Chlorinated Polyvinyl Chloride (CPVC) pipes, confirming to IS 15778, having thermal stability for hot & cold water supply including all CPVC plain & brass threaded fittings shall be used for internal piping works for service water and potable water supply. For installation of CPVC pipes guidelines as stipulated in Clause No. 18.9 , CPWD specifications shall be followed	The mentioned clause is contradicting with clause 9.03.01, where water supply pipes are mentioned as CPVC and drainage as UPVC. Owner requested to clarify.	Bidder to refer amendment D1-28
700	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	5 of 8	1.00.00	29) Two nos. covered sheds (70mX20M) with steel superstructure and metal sheeting at roof and side sheeting above 1 meter of brick wall with RCC column, beam & Foundation. 22) Shed for O&M Workers	a) **Covered shed** : Kindly provide Location in plot plan and Height of covered shed Also clarify the purpose of these two cover sheds. b) **O&M Worker Shed**: Kindly provide Location in plot plan for Shed of O&M Workers	a) GLP is to be further developed by bidder during detailed Engineering stage. Accordingly covered shed shall be located in GLP by bidder Purpose of these two covered sheds is for storage of materials. b) GLP is to be further developed by bidder during detailed Engineering stage. Additionally bidder to refer amanedment no. D1-18. Further Construction workers and O&M Workers shed shall be located in GLP by bidder.
701	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	5 of 8	1.00.00	20.a) Watch tower	As proposed plant is located in existing plant, bidder is not envisaging any new watch towers requirements. Owner to confirm.	Bidder understanding is not correct. Watch tower (4 nos.) is in bidder scope. Pl refer Civil Scope chapter IID, Part A Cl. No.1.00.00 Sl No 20(a).
702	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	i) SUB-SECTION-D-1-6 ii) SUB-SECTION-D-1-5	i) 8 of 23 ii) 55 of 69 & 61 of 69	i) 6.03.03 ii) 5.23.02 & 5.23.14	i) Design of steel structures shall be done as per provisions of IS:800: 2007 (Limit state design) and other relevant IS standards including National Building Code(2016). For design of coal bins and loading hopper IS:9178 (part I to III) shall be followed. ii) The steel structures using tubular sections shall be designed and fabricated as per IS:806 – "Code of Practice for use of steel tubes in general building construction."	NTPC to kindly confirm: Steel section using tubular sections shall be design as per IS:800-2007(Limit state design), and not using IS : 806.	Limit state design philosophy is to be followed for design of steel structures as per IS 800:2007.However, IS : 806 is to be referred for properties of tubular sections. Bidder to comply to specifications requirement.
703	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	i) SUB-SECTION-D-1-5 ii) SUB-SECTION-D-1-9 iii) SUB-SECTION-D-1-5	i) 67 of 69 ii) 29 of 33 iii) 67 of 69	i) 5.31.00 ii) Table A INTERIOR FINISHING SCHEDULE iii) 5.30.00	i) FQA BUILDING ii) Vehicle parking sheds iii) PARKING	i) Owner to please confirm location and scope for FQA Building as same is not mentioned in Section VI / Part A (Sub-Section-IID Civil Works) Bidder understands that same is not in the scope of work and temporary FQA lab will be provided during construction period. Incase permanent FQA building is envisaged, request owner to furnish necessary details such as size of FQA building, location in plot plan etc. Owner to also confirm. ii) Location in plot plan & Size of vehicle parking sheds, capacity etc. iii) Location in plot plan & Size of open car/scooter parking, capacity etc.	i) Bidder's understandingis not correct.FQA lab is in bidder scope. FQA lab is permanent building ii) GLP is to be further developed by bidder during detailed Engineering stage. Accordingly vehicle parking shed shall be located in GLP by bidder iii) GLP is to be further developed by bidder during detailed Engineering stage. Accordingly car/scooter parking shall be located in GLP by bidder

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
704	SECTION VI / PART E TENDER DRAWINGS (CIVIL)	-	80 of 91	Layout of Roads		Road marked in "Blue" colour in the attached image Point A: 434.99W, 599.57N Point B: 434.99W, 1390N As existing road is present at Blue marked area, Bidder understand that the same is excluded from the Bidder's scope of work. Please confirm.	Bidder's understanding is correct.
705	SECTION VI / PART E TENDER DRAWINGS (CIVIL)	-	i) 84 of 91 ii) 83 of 91		i) Maintenance Building ii) Safety Park	i) Scope for Maintenance Building is not mentioned in the Part A: Civil Works & Part B (Civil). Bidder understands that same is not in the scope of work. Incase same is envisaged, request owner to furnish necessary details (Building type, size of building, Crane/Hoist, capacity, travel etc.) for scope consideration. Owner to confirm. Ii) Scope for Safety Parks is not mentioned in the Part A: Civil Works & Part B (Civil). Bidder understands that same is not in the scope of work. Owner to confirm.	i) Maintainance building is not in scope of bidder. Tender drawing no. XXXX-001-POC-A-009 Rev A to be ignored. ii) Safety park is not in scope of bidder. Tender drawing no. XXXX -001-POC-A-008 to be ignored.
706	SECTION VI / PART E TENDER DRAWINGS (CIVIL)	-	78 of 91	-	Area Grading	Removal of existing materials lying at site within proposed Stage III premises are in Owner's scope. Also any building or facility fouling with proposed units of Stage III shall be either dismantled or relocated by Owner. Please confirm.	Removal of existing materials lying at site within proposed Stage III area is in Owner's scope. Dismantling or relocation work within proposed Stage III area is not in the scope of bidder.
707	SECTION-VI, PART-B BOOK 4 OF 5 – CIVIL WORKS	SUB-SECTION-D-1-12(D) CIVIL WORKS	2 of 2	Annexure B	The basic wind speed "Vb" at ten meters above the mean ground level : 47 meters/second	As per IS 875 (Part 3) : 2015; Plant location is locating within Zone -2 i.e. Basic Wind Speed = 39m/s. However as per Annexure B Basic Wind Speed is mentioned as 47m/s. Owner is requested to confirm basic wind speed to be considered for the plant.	Bidder to refer amendment Sl No D1-79.
708	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	3 of 8	1.00.00	i. RCC pedestals for ash slurry disposal pipes lines Miscellaneous works like Transformer Foundation, Fencing, Paving etc. j. Culverts/local humps or bridges as per site conditions, for routing of the ash pipes at crossing for nallah /water body crossing /roads/rail lines etc.	Owner is requested to descope providing and laying of ash slurry pipelines outside the plant boundary. Please confirm.	Bidder's proposal is not acceptable.
709	SECTION – VI, PART-A	SUB-SECTION-IID CIVIL WORKS	8 of 8	2.03.00	Bidder shall use a Lay down area as shown in tender GLP drawing. area marked in GLP totalling 50 acres (approx.) are identified as laydown /preassembly area.	Laydown area provided in the General Layout Plan is not sufficient. Bidder would require approx. 100 acres of land as laydown area. Owner to provide additional land for laydown area within the vicinity of plant premises.	Bidder's proposal is not acceptable. 50 acres of land is available for laydown purpose as marked in GLP. Bidder has to arrange additional land (if required) on its own without any additional commerciall implication to owner
710	Tender Drawings			XXXX-999-POC-F-001 GENERAL LAYOUT PLAN		Existing electrical building MCC-2B shown in blue colour. Legend marking in drawing shows that building marked in blue colour will be dismantled. However, bidder understand that this building facilitates the Stage I & Stage II operational requirement and hence cannot be dismantled. Kindly confirm bidders understanding.	Existing electrical building MCC-2B shown in blue colour is not to be dismantled. Bidder to refer amendment Sl No D1-27
711	Tender Drawings			XXXX-999-POC-F-001 GENERAL LAYOUT PLAN		Bidder found that existing pipe rack/cable gallery nearby CHP facilities have not been shown in general layout plan. Bidder request owner to update general layout plan drawing showing all existing facilities.	Bidder to refer amendment Sl No D1-27.

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
712	VI/B	G-07 MDL	2 OF 2	Tentative Master Drawing List		Drawing list is not updated in line with Stage III facilities in coal handling plant. Bidder request to provide updated drawing list.	This is Tentative Master Drawing List. Detailed Master Drawing List shall be finalised after awrad of the contract.
713	VI/B	D-1-5	62 OF 69	5.23.17.01	For all coal Conveyors, each down comer shall lead the water / coal slurry to RCC pit (of 2 Cu.M capacity) to allow settling of coal. The water from the pit shall overflow into contractor's R.C.C drain, which will lead the discharge finally into coal slurry settling pond.	Bidder understand that coal slurry drain of Stage III facilities shall be connected to existing coal slurry drainage network/CSSP. Bidder request to provide existing coal slurry network drawing as a part of tender drawing.	Bidder to refer amendment Sl No D1-45.
714	VI/B	D-1-6	8 OF 23	6.03.03	x	The steel design method to be used in the existing transfer house's modification and strengthening work must follow the working stress approach, which was originally used to build the steel structure. Kindly confirm bidders understanding.	Bidder's understanding is correct.
715					General	Owner to share complete Mechanical and Civil foundation & Structural drawings and design calculation of of existing transfer towers wherein modifications are envisaged.	Bidder to refer amendment Sl No D1-45 for civil drawing. Mechanical drawings shall be shared with the successful bidder during detailed engineering.

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
716	SECTION-VI, PART-A SECTION-VI, PART-B	SUB-SECTION-IIA-15 COAL & BIOMASS HANDLING PLANT SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	1 of 6 23 of 79	1.02.00 4.19.00	Designated Conveyors shall have arrangements for manual stone picking arrangement at an appropriate location. Manual Stone Picking arrangement at a suitable location in the conveyor gallery of before Crusher House shall be provided complete with platforms, overhead lighting, hand railings, suitable seating, safety hook & holding arrangement for manual pickers, disposal chutes to ground level etc.	The Bidder understands that proposed plant CHP scope begins with receiving material from the existing transfer towers. Therefore, there is no need to include a manual stone picking arrangement. Please confirm Bidder's understanding.	Bidder's understanding is correct. Further, Bidder to refer Amendment SL MH- 21 in this context.
717	SECTION-VI PART-E	Coal + Biomass flow diagram (drg No.XXXX-001-POM-A-040 (Option-2). Rev.A)				In existing TP-24, Conv 28 is feeding to Conv-29. Bidder understands that in TP-24, Bidder to provide provision to feed both Conv-29 and Conv-33. Please confirm Bidder's understanding.	Bidder's understanding is correct. Bidder to provide provisions to feed both the downstram conveyors. Further, bidder to refer revised Coal & Biomass Flow Diagram issued as Amendment Sl MH-22.
718	SECTION-VI, PART-A SECTION-VI PART-E	SUB-SECTION-IIA-15 COAL & BIOMASS HANDLING PLANT Coal + Biomass flow diagram (drg No.XXXX-001-POM-A-040 (Option-2). Rev.A)	1 of 6	1.00.00	Rated capacity of the all the conveyors shall be 2600 MTPH.	There is a discrepancy in the specified capacities of the traveling trippers. The CHP system's capacity is stated as 2600TPH, while the traveling tripper's capacity is indicated as 2200TPH. Owner is requested to confirm the capacity of the traveling tripper to be considered.	Rated capacity of travelling tripper shall be 2600 TPH in line with the rated Conveyor capacity. Bidder to refer further Revised Coal & Biomass Flow Diagram issued as Amendment Sl MH-22.
719	SECTION-VI, PART-A	SUB-SECTION-IIA-15 COAL & BIOMASS HANDLING PLANT	4 of 6	2.08.00	Biomass blending rate shall be controlled automatically based on feedback of Coal feed rate from Belt scale at Employers' Coal conveyor and Biomass conveyors. Belt scale at Employers' Coal conveyor shall be in the scope of the Bidder.	Since Bidder is considering Belt scale in Conv 32 and Conv 33, which in turn is taking feed from existing conveyors 14A/B and 19A/B. Hence, Bidder has not considered separate belt scale in existing conv 14A/B. Bidder requests Owner's acceptance on the same.	Bidder's procesal for not considering separate Belt scale in existing conv 14 A/B is not acceptable. Bidder to refer further Revised Coal & Biomass Flow Diagram issued as Amendment Sl MH-22.
720	SECTION-VI, PART-A	SUB-SECTION-IIA-15 COAL & BIOMASS HANDLING PLANT	6 of 6	3.14.00	Bidder to note that the above list is not exhaustive and any work required for integration of complete system and ensuring its satisfactory running shall be in the scope of work and supply for this package.	Bidder understands that the scope of work not explicitly mentioned in the specification will be considered an additional scope during detail engineering. Owner is requested to confirm the above.	Technical specification is clear with respect to the Coal & Biomass Handling system. Bidder to comply stipulation of Technical Specification.
721	-TECHNICAL SPECIFICATIONS SECTION-VI PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	80 of 87	4.02.06	ii) HGI of coal shall be between 44 to 65. Normally, moisture content in coal vary between 12% to 15%. However, for design purposes moisture content of 20% shall be considered for both coal and limestone.	Bidder requests Owner to provide sieve analysis report of incoming coal and limestone.	In this context, Bidder to refer Limestone characteristics furnished in Sub-section IB, Part A of Technical Specification. For coal, Bidder to note that Coal shall be conveyed after Crushing i.e. size of Crushed Coal are mostly (-) 20 mm size.
722	-TECHNICAL SPECIFICATIONS SECTION-VI PART-B '- SECTION-VI PART-E	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA '- Drg no - XXXX-001-POM-A-040(OPTION-2)	80 of 87 '53 of 91	4.02.06	- f) For the purpose of volumetric computation, bulk density of coal shall be taken as 800 kg/m3 and for biomass 600 kg/m3 and blending ratio of Biomass with Coal is 20 % (by weight). Therefore, for calculation of belt conveyor capacity for their drives and drive motors KW requirement and sizing (volume calculations) of chute, hoppers etc., the above bulk density shall be considered. For all other purpose (viz) for stresses/load on structures, torque calculations of bucket wheel of Stacker Reclaimer, loading of VF tables, sizing of actuators, calculation of plugged chute, Hoppers loads etc., the bulk density of coal shall be taken as 1100 Kg/m3. - As per flow diagram bio mass conveyor BMC-1/2 capacity is 260TPH.	Considering 20% blending ratio with rated capacity of coal handling system i.e. 2600TPH, the blending capacity of Bio mass conveyor BMC-1/2 shall be ~520TPH (rated). However, as per referred tender specification Biomass conveyor capacity is mentioned as 260 TPH while biomass equipment capacities are 240TPH. In view of above discrepancy, Bidder shall consider the Biomass equipment capacity as 240 TPH and biomass conveyor capacity as 240TPH in line with recent tenders. Kindly confirm.	20% blending ratio shall be achieved by running two Biomass conveyor BMC-1/2 simultaneously into a single downstream Conveyor. Further, for revised capacity, Bidder to refer Amendment Sl MH-56 & MH-22 of the Coal + Biomass flow diagram.
723	-TECHNICAL SPECIFICATIONS SECTION-VI PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	80 of 87	4.02.06	- f) For the purpose of volumetric computation, bulk density of coal shall be taken as 800 kg/m3 and for biomass 600 kg/m3 and blending ratio of Biomass with Coal is 20 % (by weight). Therefore, for calculation of belt conveyor capacity for their drives and drive motors KW requirement and sizing (volume calculations) of chute, hoppers etc., the above bulk density shall be considered. For all other purpose (viz) for stresses/load on structures, torque calculations of bucket wheel of Stacker Reclaimer, loading of VF tables, sizing of actuators, calculation of plugged chute, Hoppers loads etc., the bulk density of coal shall be taken as 1100 Kg/m3.	Bidder requests the Owner to provide clarification regarding the required Biomass density to be considered for load and stress calculations.	Bidder to consider 1100 kg/m3 as coal/biomass density for load & stress calculation.
724	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	7 of 79	4.3.4	Wire rope shall be of pre-formed type, hemp cored, regular lay 6/36 construction with a breaking strength of 160 -175 kgf/ sq. mm. The reverse bend of ropes is not acceptable. The minimum number of falls of rope shall be four (4).	As per manufacturer recommendation, steel cored wire rope is superior than hemp cored and used for hoist applications widely. Bidder requests Owner to accept the steel cored wired ropes.	Bidder's proposal is acceptable.
725	- SECTION-VI PART-E	'- Drg no - XXXX-001-POM-A-040(OPTION-2)	53 of 91		No metal separation shown in flow diagram.	Bidder would like to clarify that, there are currently no provisions for ferrous metal separation in biomass handling system. Bidder proposes to provide additional, Suspended Magnet on conv BMC-1/2 before metal detector to avoid frequent tripping of conveyor due to ferrous metal detection. Bidder request Owner to relook & issue amendment suitably.	Bidder to refer Amendment Sl MH-22 for revised Coal + Biomass flow diagram.
726	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-IIA-15 COAL& BIOMASSHANDLING PLANT	4 of 6	2.07.00 2.08.00	Two (2) numbers of Storage Hopper/Silo/Bins for Biomass Pallets shall be provided. The storage Hopper/Silo/bin shall have the minimum effective storage capacity (each) of 750 MT of Biomass Pallets. Storage Hopper/silo/bin shall be complete with all mechanical, electrical civil & structural works. -One number (1 Nos) of Mechanical Extractor & Biomass Feeder below each Biomass storage silos with drives, dust hoods (for Feeder), all mechanical, electrical accessories and supporting structures etc to feed the Biomass to downstream conveyors. Mechanical extractor also known as Silo extractor/Rotary extractor, is a machine for efficiently extracting materials having poor natural flowing properties such as fibrous, wet materials prone to blockage. Silo extractor/Rotary extractor consists of rotating chute, extractor blade/sweeper arm/paddle wheel, slewing arrangement etc. shall be provided. -Biomass feeders may be Belt feeder or Chain Feeders with VVVF drive. Suitable Biomass feed regulating mechanism to the Extractor and Biomass Feeder below silo/bins shall be provided for taking feed from silo and discharging onto onward conveyors..	1. Bidder would like to propose semi open storage shed of capacity 1500T for Biomass pellets instead of biomass storage silo as an alternative option. From the shed biomass can be further conveyed considering either of the two following options: a. Pellets are carried by trucks and discharged into the BRU. From the BRU, they will be directly fed into biomass conveyors for further discharge onto existing coal conveyor 14A/B. b. Dozer will doze the pellets to underground hopper (50 T or as decided by Owner). gates & vibrating feeder (with VFD) provided below the hoppers will discharge pellets in biomass conveyor which will further convey biomass to feed existing coal conveyor 14A/B. Bidder requests Owner to accept the above alternative option.	Bidder's proposal is not acceptable. Bidder to comply to the technical specification requirement.
727	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER-04 COAL HANDLING PLANT	5 of 13	(L) (Q)	**FLAP GATES (INCLUDING THAT OF TRIPPERS)** Actuator (complete with motor, gear box, limit switches etc.) - 1 nos. of each type & rating Flap gate shaft 1 nos. of each type & rating **TRAVELLING TRIPPERS/MT** Flap gate actuator with motor, gear box, position / thrust switches - 1 set of each type	As per referred clauses, there are duplicate spares mentioned for flap gate actuators of traveling tripper. In view of above, Bidder understands that flap gates actuator for travelling tripper shall be considered as per clause (Q) only and not as per clause (L). Please confirm the Bidder's understanding.	Confirmed. Bidder to provide mandatory spares for flap gate for tripper as per serial no Q

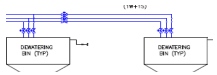
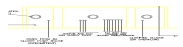
728	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	25 of 79	4.21.00	The Box Feeder should be a robust, proven, above the ground for unloading from trucks / self-tipping trucks or from loader shovels	Please provide details , type and dimension of trucks with number of maximum wheels to be used for biomass handling.	Bidder to consider all types of truck used for the transportation of bulk material ranging from 4 to 16 no of wheels.
729	- TECHNICAL SPECIFICATIONS SECTION – VI, PART-A '- SECTION-VI PART-E	SUB-SECTION-IIA-15 COAL& BIOMASSHANDLING PLANT - "- Drg no - XXXX-001-POM-A-040(OPTION-2)	2 of 6 53 of 91	1.13.00	Four (04) Nos. Electronic Belt weighers complete with all mechanical, supporting arrangement, electrical, and accessories on Conveyors (C-32, C-33 and C- 38 A/B).	Owner to note that Number of belt weighers as mentioned in referred tender clause are not matching with Flow diagram. Please check and confirm the numbers of belt weighers are to be provided.	Bidder to refer revised Coal & Biomass Flow Diagram issued as Amendment Sl MH-22. Belt weigh scale required for existing Conveyor 14A/B for Biomass blending purpose is also included in revised Coal + Biomass Flow Diagram.
730	- TECHNICAL SPECIFICATIONS SECTION – VI, PART-A '- SECTION-VI PART-E	SUB-SECTION-IIA-15 COAL& BIOMASSHANDLING PLANT - "- Drg no - XXXX-001-POM-A-040(OPTION-2)	2 of 6 53 of 91	1.14.00	Four (04) Nos. Metal Detectors complete with all mechanical, electrical, civil, structural works and accessories on Conveyors (C-32, C-33 and C- 38 A/B).	Owner to note that Number of metal detectors as mentioned in referred tender clause are not matching with Flow diagram. Please check and confirm the numbers of belt weighers are to be provided.	Bidder to refer revised Coal & Biomass Flow Diagram issued as Amendment Sl MH-22.
731	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-IIA-15 COAL& BIOMASSHANDLING PLANT	4 of 6	2.08.00	Silo extractor/Rotary extractor consists of rotating chute, extractor blade/sweeper arm/paddle wheel, slewing arrangement etc. shall be provided.	The Bidder seeks clarification regarding the rotating chute aspect of the mechanical extractor. Bidder requests the Owner to provide additional information regarding the mechanical extractor's requirements. Also, Bidder request Owner to furnish the suppliers of Mechanical Extractor for Biomass Handling	Functional requirements of mechanical extractor is provided in technical specification. Mechnical extractor shall be used to feed Biomass pallet from storage silo in a control rate as per the blending requirement. Bidder may provide alternate equipment suitable for this application, as per the Technical specification.
732	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-IIA-15 COAL& BIOMASSHANDLING PLANT	4 of 6	2.08.00	Mechanical extractor also known as Silo extractor/Rotary extractor, is a machine for efficiently extracting materials having poor natural flowing properties such as fibrous, wet materials prone to blockage. Silo extractor/Rotary extractor consists of rotating chute, extractor blade/sweeper arm/paddle wheel, slewing arrangement etc. shall be provided.	Bidder suggests an alternative solution by proposing the use of a rod gate, rack pinion gate, and vibrating feeder (with VFD) instead of the mechanical extractor and belt feeder, as there are no concerns regarding the flowability of biomass. The Bidder requests Owner to accept the above proposal.	Bidder's proposal is not acceptable. Bidder to comply to the technical specification requirement.
733	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	20 of 79	4.17.00	- i) Flooring of Cabin Vitrified ceramic tiles of mat finish '-Granite tiles to be provided for cabin flooring and bidder shall take care of the height of same in selecting counter weights.	There is discrepancy in type of flooring to be considered for cabin flooring of elevator. Owner to clarify type of flooring to be considered in elevator.	Bidder to consider vitrified tiles for elevator flooring
734					General	Bidder understands that following items are not in the Bidder's scope as they are not mentioned in tender documents and flow diagram: a) Dozer b) Pay loader c) Any Trucks required Kindly confirm Bidder's understanding.	Bidder's undertsanding is correct.
735	- SECTION-VI PART-E 'TECHNICAL SPECIFICATION SECTION-VI, PART-A	'- Drg no - XXXX-001-POM-A-040(OPTION-2) 'SUB-SECTION-IIA-15 COAL& BIOMASSHANDLING PLANT	53 of 91 '6 of 8	- '2.04.00	'Biomass Bucket Elevator along with its supporting structures, Buckets, chain/Belt, drive motors, drive units, sprockets, pits etc., all electrical etc. including all civil, structural, and architectural works for tower, tower supporting structures and their associated foundations. Bucket Biomass elevator shall convey the biomass on the reversible belt feeder, placed over biomass main storage silos. Reversible belt feeder shall feed the biomass to either silo-1 or silo-2.	As per Flow diagram & Specification, there is reversible belt feeder as a feeding arrangement to the Biomass silos. However, Bidder would like to propose alternate option of plough feeder for feeding to Biomass silos, depending on the layout requirements and the feeding arrangement. Bidder requests Owner to accept the alternate option.	Alternate option with diverter plough arrangement shall also be acceptable for feeding into biomass silo.
736	- TECHNICAL SPECIFICATIONS SECTION – VI, PART-A '- SECTION-VI PART-E	SUB-SECTION-IIA-15 COAL& BIOMASSHANDLING PLANT - "- Drg no - XXXX-001-POM-A-040(OPTION-2)	1 of 6 '53 of 91	1.00.00	Conveyor C-32 shall take feed from upstream conveyor C-19B at TP-17 and C-33 shall take feed from existing upstream conveyor C-28 at TP-24. Both C-33 and C-32 shall discharge into C-34A/B at TP-27 and TP-28. Similarly, C- 38A taking feed from existing upstream conveyor C-31A at TP-18 and C-38B taking feed from existing upstream conveyor C-29 at TP-25, shall discharge into C-39A/B at TP-26.	Owner is requested to share following existing drawings 1. Existing building TP-17, TP-18,TP-24 & TP-25 mechanical and structural drawing. 2. Existing conveyor 28, 29, 30, 19A/B, 31A, 22A/B, 23A/B, 14A/B conveyor mech & structural GA drawing and technical parameters like belt speed which will be followed for rest of the conveyors. 3. Drive motor calculation, along with gearbox and coupling details of above listed existing conveyors. 4.Mechanical, structural and foundation drawings of all the cable racks around the existing transfer towers and in the path of proposed conveyors 32,33, 38A and 38B. 5. Firefighting pipe layout and valve rooms located near to the existing transfer towers. 6. Details and piping layout of dust control and other utility system in the existing transfer towers.	All the major drawing of existing system are furnished in Tender Drws. Other Drws. of the existing system shall be shared with the sucessful bidder, if required.
737	- SECTION-VI PART-E	- Drg no - XXXX-999-POM-F-1	90 of 91			Owner is requested to share GA, structural and civil drawings of CHP MCC room and fire water tank indicated in the Plot plan.	Bidder to refer amendment no. .D1-46 for For CHP related drawings of existing structures
738	- SECTION-VI PART-E	- Drg no - XXXX-999-POM-F-1	90 of 91			Owner is requested to share GA, structural and civil drawings of CHP pump house indicated in the Plot plan.	CHP Pump house Drawing shall be shared with the sucessful bidder
739	- SECTION-VI PART-E	- Drg no - XXXX-999-POM-F-1	90 of 91			The plot plan specifies that structures marked in blue will undergo dismantling. Bidder understands that dismantling work of the same is not in Bidder's scope Please confirm Bidder's understanding.	Bidder to refer Amendment no. .D1-27 for revised GLP
740	- SECTION-VI PART-E	- Drg no - XXXX-999-POM-F-1	90 of 91			Owner is requested to confirm, whether existing CHP MCC room and underground fire water tank will also be dismantled?, since same is marked in blue colour. Please clarify about dismantling and scope of work.	Bidder to refer Amendment no. .D1-27 for revised GLP

741	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	10 of 79	4.6.4	While deciding the layout of buildings namely Transfer Points, Crusher house, Pump Houses the Bidder shall consider the following parameters. (1) Working space around the equipment shall be approx.1000 mm as a good engineering practice. (2) Generally, 1200 mm passage all around inside periphery of the Transfer points/Crusher house (except at Conveyor entry/ exit) shall be provided. (3) Building height shall take care of the following parameter: In case of handling of the equipment one over the other, the clearance between moving & stationary equipment shall be 500 mm (minimum).	Due to space constraints in existing junction towers, there may be no possibility to provide conventional maintenance facilities. Further, Bidder will check during detail engineering to provide either hook or hoist for the maintenance as per the space and height availability in existing transfer towers. Owner is requested to review the same during detail engineering & allow for relaxations in the existing towers only.	Bidder's understanding is correct. Suitable relaxations (from the specifed practices) shall be allowed for existing Transfer Points after review during detail Engineering.
742	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	42 of 79	2.1.2	2.1.2 Floors-- RCC construction with facility to wash the floors. Min. slope of 1:80 for floors in TPs and 1:100 for floors in crusher house shall be provided towards drain pipes.	Due to modifications in the current transfer towers, if new belt feeders or equipment are added to any floor or if a new floor is being constructed within the existing transfer towers, the flooring will not be reinforced concrete (RCC) due to height constraints. Owner is requested to confirm.	Bidder's proposal shall be accpted for new Belt Feeder or equipment in existing Transfer Tower only.
743	- SECTION-VI PART-E	- Drg no - XXXX-999-POM-F-1	90 of 91			The highlighted yellow area on the plot plan is used for the storage of mill rejects at site. It is obstructing the path of conveyors 38A/38B and 34A/B. Owner is requested to confirm that the mill rejects will be cleared, ensuring the entire area is made available for the CHP facilities.	It is confirmed that mill rejects will be cleared by NTPC.
744	TECHNICAL SPECIFICATIONS SECTION-VI, PART E(2)	COAL + BIOMASS FLOW DIAGRAM Drg. No.-XXXX-001-POM-A-040	Page 52 of 91	COAL + BIOMASS FLOW DIAGRAM Drg. No.-XXXX-001-POM-A-040		As flow diagram is silence about scope of DS/SW/PW In existing TP-17,TP-18 & TP-25 whether Bidder to consider DS system at discharge & receiving of owners' conveyor or it will be in Owner's scope. Please clarify. If Bidder to consider it, Owner to provide details input of Owner's conveyor as required for DS connectivity with it.	Bidder to consider DS at receiving end of the proposed conveyors under the scope of the Bidder in exisiting TP-17, TP-18, TP-24 & TP-25.
745	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 48 of 79	2.5.0 (ii)	(ii) Capacity 50 cub. M /hr minimum with 10% margin	Bidder understands that 10% margin shall be considered on calculated Capacity. In case calculated pump capacity with margin is less than 50 cub. M /hr ,Pump Capacity shall be 50 cub. M /hr . Please confirm Bidder understanding is correct.	Bidder's understanding is correct.Pump capacity shall be 50 cub. M /hr.
746	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 25 of 79	4.21.00	Unloading area for Biomass shall be enclosed type so that dust could not spread into the surrounding. Adequate ventilation and dust extraction system shall be provided.	Bidder understands that DS system shall be provided at all Biomass transfer points and Biomass unloading encloser area also in line with Lara project PBQ reply. Please confirm the Bidder's understanding.	Bidder's understanding is not correct to arrest dust nuisance in Biomass handling. Bidder to provide DE (Dry type) at all Biomass transfer points and Biomass unloading encloser area in line with Limestone Handling as per cl 2.01.02 (c) (ii) , A-20, Part B of Technical Specification. Further, Bidder to refer Amendment Sl MH-22 for revised Coal + Biomass flow diagram and Amendment Sl MH- 50.
747	- SECTION-VI PART-E	*- Drg no - XXXX-001-POM-A-040(OPTION-2)	53 of 91			Bidder propose to provide alternate option in place of Flap gate to make feasible. Bidder request Owner to allow & confirm.	Alternate option in place of Flap gate in existing Transfer points shall be accepted during detail engineering , if found feasible & suitable to meet the functional requirement.
748	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	8 of 79	4.4.3	The height of the skirt board for belt feeders/ reversible belt feeders shall be minimum 1000 mm.	In the existing transfer towers, skirtboard of height as mentioned in the clause no. 4.4.3 cannot be accommodated due to existing building dimensions. Bidder will consider the skirtboard height as per design requirement to accommodate in the existing transfer towers. Owner is requested to confirm.	Relaxation on the height of the skirt board for belt feeder/reversible belt feeder shall be accepted (applicable for existing Transfer Points) during detail engineering due to the Layout constraints.
749	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	5 of 79	4.1.6	Rating of all drive motors of conveyors shall not be less than 110 % of the power required at drive motor output shaft at specified design capacity. The motor rating shall be at 50 deg Cent. Ambient. Single LT drive motors shall be used for conveyor drive ratings up to 160 KW. For conveyor drive rating beyond 160 KW, single HT drive shall be used for conveyors.	Bidder understands dual drive can also be provided wherever required for HT motors based on layout requirement. Please confirm acceptance.	Technical specification is clear. Bidder to provide only one HT drive for single conveyor.
750	SECTION-VI, PART B	SUB-SECTION: A-21	15 of 42	1.13.00	**VIBRATING FEEDER** (i) Requirement: For uniform feeding of dewatered bottom ash **onto conveyors**/open trucks	Bidder understands that conveyors below dewatering bins are not envisaged. Please confirm Bidder's understanding.	Bidder's understanding is correct. Conveyors are not envisaged below dewatering bins.
751	SECTION-VI, PART-A PART-E1	SUB-SECTION-IIA-16 SUB-SECTION-IIA-16 SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM) DRG. No. (XXXX-001-POM-A-029) Rev. No. A	9 of 18 9 of 18 -	1.01.07 1.01.07 -	(j) **Six (6) numbers (4 working + 2 stand by) screw type transport air compressors** suitably sized and designed to cater to the ash transportation, along with silencer, filter, after cooler along with all other accessories and supporting structures, platforms etc. as specified and as Required. (e) The fine ash and coarse ash after classification shall be stored in RCC/Structural steel hoppers, separate for fine ash and coarse ash respectively. The capacity of the fine ash hopper (01 No) and coarse ash hopper (02 No) shall be 250 Tonnes each. Tender Flow Diagram: **2 x 5 Nos. Transport Air Compressor** has been mentioned. and 5 nos. of Conveying ash streams are working.	Owner to review and clarify the following points: (i) Normally for two units, two numbers of coarse ash hoppers are envisaged per recent NTPC Singrauli & Lara Projects. Here in flow diagram and tender specification for Sipat (1x800 MW) two numbers of coarse ash hopper are mentioned. Bidder understands that one number of coarse ash hopper shall be provided for single unit. Kindly confirm the numbers of coarse ash hoppers along with the FA evacuation working lines to be considered as there is no standby coarse ash hopper envisaged as per tender. ii) As tender specification and flow diagram, there are total 5 nos. FA conveying lines are working and no. of working transport air compressors are shown as 4 nos. Request Owner to recheck the quantity of **working TACs and working lines.**	Bidder to refer Amendment Sl MH- 27 for revised Single Line diagram for Ash Classifier system.

752	SECTION-VI, PART-A PART-E1	SUB-SECTION-IIA-16 SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM) DRG. No. (XXXX-001-POM-A-029) Rev. No. A	9 of 18 -	1.01.07 -	(b) Suitable numbers of ash classifier as required shall be provided to meet the requirement. The ash classifier shall be of proven design for similar application. Efficiency of the Classifier shall be 95% minimum. No standby classifier shall be required. Tender Flow Diagram: **2 nos ash classifiers are shown**	Discrepancy observed regarding numbers of ash classifier in referred clauses. In view of single unit, Bidder understands that there will be only one ash classifier and not two numbers. Owner is requested to confirm and issue an amendment suitably.	Suitable number of Ash cliassifier (as per the available capacity) to be provided. Hence, number of classifier may be one or more. However, bidder to refer Amendment Sl MH-27 for revised Single Line diagram for Ash Classifier system, where one number Ash classifier has been shown for indicative purpose.
753	SECTION-VI, PART-A SECTION-VI, PART-A	SUB-SECTION-IIA-16 SUB-SECTION-IIA-16	9 of 18 11 of 18	1.01.06 (E) 1.01.08	(g) ..... The silo shall be provided with Target box and bag filter assembly along with pulse jetting arrangement, fan units etc. and other accessories, **Five (5) nos. Slide plate type isolation valves below the silo**, Required numbers segregation valves for isolation of fly ash transportation lines..... h. **Six (6) nos. Slide plate type isolation valves** below each fly ash storage silos.	There is contradiction regarding slide plate valves quantity below Main FA silos as per stated clause. Please confirm the number of valves to be provided below the Main FA silos.	Bidder to refer Amendment Sl MH- 37 & 40
754	SECTION-VI, PART-A PART-E1	SUB-SECTION-IIA-16 SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM) DRG. No. (XXXX-001-POM-A-029) Rev. No. A	9 of 18 -	1.01.07 (E) -	(i) Suitable arrangement of aeration blowers **(one for all hoppers + 1 standby**) for the aeration of hoppers shall be provided. For the aeration of the above ash silo no, **one working + one standby aeration blower** shall be provided. Bidder shall **consider total 3 nos. (2W + 1S) aeration blowers along with heaters**. Please confirm.	There is contradiction regarding the quantity of aeration blowers for coarse fly ash hopper and fine fly ash hopper in stated clause and flow diagram, Bidder shall consider total 3 nos. (2W + 1S) aeration blowers along with heaters. Please confirm.	Bidder to refer Amendment Sl MH- 27 for revised Single Line diagram for Ash Classifier system.
755	SECTION-VI, PART-A PART-E1 SECTION-VI, PART-B	SUB-SECTION-IIA-16 SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM) DRG. No. (XXXX-001-A)-POM-A-028) Rev. No. A SUB-SECTION: A-21	11 of 18 12 of 18 - 23 of 41	1.01.08 1.01.08 - 2.13.00	d. Pitiless type Weigh Bridge for rail loading below each dry fly ash silos and in-between **two Coarse ash Silos, minimum Four numbers**, complete with all electrical, controls, civil and structural works for weighment of rail Wagons during filling. m. The pitching of ash silo and overall arrangement of hydro-mix conditioner units, telescopic chutes, air slides etc **shall facilitate simultaneous loading of three wagons** (BOXN/BCFC/BCCW/BTAP) from two number of Coarse Fly ash Silos. **Note no. 18:** .....**One (1) No. Weigh Bridge for rail unloading below each mail fly ash silo** complete with all electrical, controls civil and structural work for weightment from silos..... Weigh bridges capacity : 100 tonnes **Platform size 24m x 3m (approx.)** Weigh bridge should take care of locomotive (weighing upto 150T) moving over weigh bridge at a speed of 8 Kmph. (For weigh bridges on the rail lines)	There is contradiction regarding the quantity of Weigh Bridge below dry fly ash silos in stated clause (i.e. 4 vs 2). Bidder shall consider total 2 rail weigh bridges i.e. 1 nos. below each main FA silo. Also, platform length of 24m will not be possible with simultaneous loading of 2 wagons. The platform size shall be to suit weighment of various Ash Tankers/Rail wagons. Please confirm and issue an amendment suitably.	Bidder to consider one number Pitless type Weigh Bridge below each Fly Silos i.e. total three numbers Weigh bridge to be considered for Railway Wagon loading.This is in addition of Weigh Bridge specified for weighment of Bulker/Tanker. Further, Bidder to refer Amendment Sl MH- 29, 30
756	PART-E1	GENERAL LAYOUT PLAN (DRG. NO. XXXX-999-POC-F-001)	-	-	Tender General Layout Plan	i) Owner is requested to provide existing railway siding drawing and proposed railway siding drawing for phase-III to develop the fly ash silo area layout and to check the interdistance of rail tracks.	Drawing shall be provided to the successful bidder.
757	SECTION-VI, PART-A PART-E1	SUB-SECTION-IIA-16 SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM) DRG. No. (XXXX-001(A)-POM-A-028) Rev. No. A	11 of 18 -	1.01.08 -	**(I) Five (5) numbers of Dry fly ash unloaders** from each dry fly ash storage silo along with rotary feeders, telescopic chutes and other accessories as specified and as required. Tender Flow Diagram (Single Line Flow Diagram For Fly Ash Handling system) Below Fine fly ash Silo No. of Dry Fly Ash Unloader - **2 Nos.** (Shown) (One (2) no. below each silo)	There are contradiction in quantity of Dry fly ash unloaders stated clause and flow diagram for fine fly ash silo. Bidder understands that only two (2) nos. dry FA unloader below fine ash silo shall be provided as per SLFD. Please confirm Bidder's understanding.	Bidder to refer Amendment Sl MH- 27 for revised Single Line diagram for Fly ash handling system.
758	SECTION-VI, PART-A PART-E1	SUB-SECTION-IIA-16 SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM) DRG. No. (XXXX-001(A)-POM-A-028) Rev. No. A	11 of 18 -	1.01.08 -	(c)Mass flow meter/Solid flow meter **(Five numbers below each silo)** complete with all electrical, controls etc to be provided for measurement of ash quantity (total or part, as required) during filling of ash to the road tanker/Rail Wagons. **Tender Flow Diagram (Single Line Flow Diagram For Fly Ash Handling system)** **6 Nos. Mass Flow Meter are shown below Fly Ash Storage Silo and 3 Nos. are shown below Fine Fly Ash Storage Silo.**	There is contradiction regarding quantity of mass flow meter below Fly ash Storage silo and fine fly ash storage silo. Bidder understands that mass flow meter shall be provided 5 nos. below Fly ash storage silo and 2 Nos. below fine ash storage silo. Please confirm Bidder's understanding.	Bidder to refer Amendment Sl MH- 27 & MH-45 for revised Single Line diagram for Fly ash handling system.
759	SECTION-VI, PART-B	SUB-SECTION: A-21	36 of 42	7.12.00	(A) ASH WATER PUMP HOUSE v) The ash **water pump house shall be open type.**	Owner requested to confirm there is no ash water pump house building. Only ash water sump (Semi-Overground) to be considered and all the water pump shall be installed on the foundations of RCC grade slab which is open to sky. Also, please clarify the extent of RCC grade slab to be considered for ash water pumps. Whether any maintenance bay to be considered on the grade slab.	Bidder's understanding is correct, there shall not be any ash water pump house building. Fondation for the Water Pumps shall be as per the Technical specification.
760	SECTION-VI, PART-B	SUB-SECTION: A-01	74 of 87	4.01.02	(C) Ash Densities:	Volumetric ash density for coarse ash (Eco hopper, APH, SCR & Duct hopper) is not specified in the tender specification. Bidder has considered density of 0.75 ton/m3 for coarse ash, please confirm.	Bidder to consider 0.65 T/m3 density for Coarse ash from Eco, eco duct hopper and APH ash, for Storage Volume Calculation.
761	SECTION-VI, PART-B SECTION-VI, Part-A	SUB SECTION-A-01 SUB-SECTION-IIA-16	75 of 87 13 of 18	4.01.02(M) 1.01.08	**(M) Ash slurry disposal system** Minimum pumping distance – 1**4.5 Km or as** per actual distance for the farthest disposal point in ash dyke whichever is higher. b) **The length of total combined Ash disposal pipelines shall be 39,000 m** (excluding fittings and including branch pipes for garlanding of mine void)or the actual distance (excluding fittings) including branch pipes for garlanding of mine void, whichever is higher.	Considering brownfield project, Bidder understands that pipe length based on expected garlanding concept of slurry pipe on existing ash dyke may be different than Bidder's estimation. In view of above and to keep all Bidders at par, request NTPC to fix the supply quantity of combined ash slurry pipes right from Combined ash slurry pump house to dyke including ash dyke slurry pipe garlanding. Accordingly, request to amend the stated tender clause.	For supply quantity of ash slurry disposal piping, Bidder to refer Amendment sl. MH-49.
762	SECTION-VI, PART-B	SUB SECTION-A-01	75 of 87	4.01.02(M)	(i) **Elevation of top of Ash dyke:- RL 310 m**	Owner is requested to confirm, RL 310 m is corresponding to ultimate dyke height or stater dyke height, which shall be considered for combine ash slurry disposal pump head selection.	Specified Elevation of top of Ash Dyke corresponds to ultimate dyke height , which shall be considered for slurry disposal pump head selection.

763	SECTION-VI, PART-A SECTION-VI, PART-A TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	SUB-SECTION-I-B SUB-SECTION-IIA-16 SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	1 of 19 15 of 18 1 OF 3	5.00.00 1.03.00 1.03.00	**WATER** Water cooled Condenser is envisaged for Sipat Stage-III of 1x800 MW Unit. The consumptive make-up water requirement for this **Project would be about 2300 Cum/Hr with ash water recirculation system in operation.** Decanted water shall be pumped from owners' existing pumping system located at ash dyke. It has been envisaged **that existing pumping system (5 W + 2S, Pumps of 950 M3/Hr capacity, St-I & St-II) and existing AWRS pipeline (two pipeline of St-I & St-II) shall be used for the new Stage.** Hence, pipelines complete with flow control valves, bends, fixtures, couplings, fittings, gaskets, nuts, bolts, clamps, structural steel supports and other accessories **from tapping point (suitable point inside plant) of Stage-II AWRS pipe (700 NB Dia) shall be provided by the bidder.** Tapping point from existing St-II AWRS pipe (located inside plant) shall be at any convenient location decided by the employer during detail engineering.	i) Bidder understands that ash water recovery will be received when both BA and FA will be disposed in slurry mode. Accordingly, Bidder considers 70% recovery from ash pond during slurry mode operation for proposed stage-III TPP. Please confirm Bidder's understanding. Ii) In absence of clarity, Bidder will tap off ash water recovery pipe from existing stage-II ash water recovery pipeline within plant boundary in line with referred terminal points and will considered one no. ash water recovery pipe upto ash water sump from plant boundary. Please confirm Bidder's understanding.	i) Bidder's understanding is not correct. Ash water recovery will be received when only BA, only FA or both BA & FA will be disposed in slurry mode.Further, Bidder to refer Amendment Sl MH-51. ii) Bidder to tap off from both St-I or St-II Ash water recovery pipes. For details, Bidder to refer Amendment Sl MH-51.
764	SECTION-VI, PART-A	SUB-SECTION-VI	2 of 3	4.03.00	Ash Dyke scope is not included in exclusion.	1) In absence of clarity, Bidder understands that Ash dyke and its modification related to civil work shall be under Owner scope. Please confirm Bidder's understanding. 2) Since the combined ash slurry pipes shall be laid into existing ash dyke, request owner to review and clarify following concerns, i) whether ash slurry pipes shall be garlanded in phase-I and phase-II ash dyke both. ii) Scope of energy dissipaters at dyke end slurry disposal points iii) slurry pipes shall be laid at top of dyke bund **or** at NGL outside the ash dyke iv) Provide ash dyke sectional drawings v) L section drawings of existing ash slurry pipe corridor.	1) Bidder's understanding is correct. however, civil works related to garlanding pedestal is in bidder scope. 2) (i) Garlanding of ash slurry pipes in Stage-I & Stage-II Ash dyke both shall be in the scope of the Bidder. (ii) Scope of energy dissipaters at dyke end slurry disposal points shall not be in the scope of the Bidder, (iii) Slurry pipe shall be routed as per actual site condition (Iv) Bidder to refer amendment no..D2-54 (v) Bidder to refer amendment no..D2-55
765	PART-E1 SECTION-VI, Part-A SECTION – VI, PART-A SECTION-VI, PART B	-SCHEME OF GYPSUM DEWATERING SYSTEM DRG. No.: XXXX-001-POM-A-024, REV. NO.: A SUB-SECTION-IIA-16 SUB-SECTION-IIA-04 'SUB-SECTION: A-21	- 3 of 18 2 of 7 '34 of 42	- 1.01.05(C) 2.06.00 '5.01.00	Tender Flow Diagram (Scheme of Gypsum Dewatering System) **Shown FGD waste water to HCSD mixing tank** Common System for Jet Pump/ Scrapper Conveyor system **Bottom ash slurry shall be transported to Dewatering bins normally.** However, in case of non-utilization, Bottom ash slurry shall be disposed to ash dyke through Ash slurry disposal Pumps. .....The water removed from the absorber shall be recycled to the absorber. The **waste water from the system shall be collected and neutralized using lime and shall be pumped to the mixing tanks of HCSD** System or in any other area with suitable treatment so as to suit/ not disturb the destination fluid quality. **HORIZONTAL CENTRIFUGAL PUMPS** 4. Nos. operating - Conditioning Water pumps: 2 Working for **HCSD silo** + 1 standby, if applicable Wash water pumps: 1working +1 standby (For **HCSD silo** area, if applicable)	As per tender specification HCSD system in not applicable. However, tender flow diagram shows that FGD waste water shall be transferred to HCSD tank. In view of this, Owner is requested to specify the FGD waste water disposal scheme during Bottom ash slurry transportation to Dewatering Bin. However, FGD waste shall be transferred to combined ash slurry pump house during Bottom ash slurry disposal to ash dyke through Ash slurry disposal Pumps. Further, Owner to note that FGD waste water contains high chlorides of approx. 20000 ppm. Ash dewatering bin system are closed loop system and continuous addition of chlorides through FGD waste water shall have impact on materiel of construction of ash handling system. Also, tender technical specification specify neutralization of FGD waste water though lime dosing and does not specify FGD waste water chloride removal treatment. In view of above, Owner is requested to mention the final disposal scheme of FGD waste water during Bottom ash slurry transportation to Dewatering Bin to suitable location to keep all the Bidders' at par.	HCSD system is not applicable. Bidder to refer Amendment Sl **SG.45**
766	PART-E1 SECTION-VI, PART-B SECTION-VI, PART-B	SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM) DRG. No. XXXX-001-POM-A-028 Rev. no. A SUB-SECTION-D-1-8 SUB-SECTION-D-1-5	- 9 of 20 22 of 69	- 8.04.00 5.05.01	Flow diagram Note no. 10 **Necessary Head room (6.8 Min)** to be provided below silo for truck/ Rail wagon movement. B. Vertical clearance: A minimum **vertical clearance of 8.5m** shall be maintained between Rail top level and bottom of structure. However, a minimum **vertical clearance of 6.5m shall be maintained between Rail top level and bottom of structure** in case of FA silo. *Vertical clearance: A minimum vertical clearance of 8.5m shall be maintained between Rail top level and bottom of structure.	There are contradiction amongst various clauses regarding vertical clear headroom below fly ash silo mentioned herewith. Bidder shall provide **6.8 mtr clear head room** below fly ash silo for truck/ Rail wagon movement. Please confirm.	Confirmed. Bidder to provide (Min) 6.8 mtr clear head room below Fly ash Silo.
767	SECTION-VI, PART A SECTION – VI, PART-A SECTION – VI, PART-A	SUB SECTION –IB SUB-SECTION-IV SUB-SECTION-IIA-16	11 of 19 34 of 73 12 of 18	ANNEXURE-IV-2 1.03.09 1.01.08	Coal Analysis: For Range of coal supplies 95%. **Worst Coal : Ash - 45%** **GCV - 3000 Kcal/Kg** Range of coal supplies 5% **Worst Coal : Ash - 46%** **GCV - 2900 Kcal/Kg** **Ash Handling Plant** (i) In case bidder offers interrmittent type bottom ash removal system employing..... from each **individual hopper section in a unit will be removed in parallel.** ..... Ash removal from APH and Duct Hoppers. Total time for evacuating four (4) hours of ash collection from all the hoppers of (APH +Duct Hoppers) of a unit corresponding to collection rates specified shall not exceed **45 mins (including change over time. The total time for evacuating four (4)** hour collection of bottom ash from a unit corresponding to collection rates specified shall not exceed **85 minutes including five (5) minutes time required for starting, stopping, sequential change over** from one unit to second unit ..... Combined ash Slurry disposal pumping system a) **Three (03) streams of horizontal combined ash slurry disposal pumps .....out of which one stream will be working, one stream will be normal standby and other stream will act as maintenance standby**. Provisions shall be there for locating another additional Pump in series within the Pump House, for future use.	As per the ash handling design criteria and ash cleaning time as specified in tender specification, the capacity of one ash slurry pump will be quite high. In view of above, bidder proposes following combined ash Slurry disposal pumping system, a) **Four (04) streams** of horizontal combined ash slurry disposal pumps .....out of which **two stream will be working**, one stream will be normal standby and other stream will act as maintenance standby. Request owner to review above proposal and issue amendment.	Reviewed Bidder's proposal . Bidder to refer Amendment Sl MH- 27 for revised Ash slurry disposal scheme, Further Bidder to refer Amendment Sl MH- 52.

768	SECTION-VI, PART-A PART-E1	SUB-SECTION-IIA-16 'SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM) DRG. No. XXXX-001-POM-A-028 Rev. no. A	6 of 18 -	1.01.06 (b) -	..... Each intermediate fly ash storage **silo shall have three (3) outlets**, One(1) outlets for unloading ash to closed truck through rotary feeders, One(1) for unloading ash to open truck with rotary feeders and ash conditioners and One(1) blanked outlet for future use. **Single Line Flow Diagram** **No truck out provision is shown below intermediate silo.**	There is contradiction in stated tender clause and flow diagram regarding number of outlet provision provided for truck out below intermediate silos. Bidder understands that only one(1) no outlet shall be provided for silo unloading in case of emergency emptying of intermediate silo. Please confirm Bidder's understanding.	Bidder's understanding is correct. There shall not be any truck loading arrangement from Intermediate Silos. Bidder to refer Amendment MH-38
769	SECTION-VI, PART-A SECTION-VI, PART-B PART-E1	SUB-SECTION-IIA-16 SUB-SECTION: A-01 SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM) DRG. No. XXXX-001-POM-A-028 Rev. no. A and DRG. No. XXXX-001-POM-A-029 Rev. no. A	9 of 18 10 of 18 77 of 18 -	1.01.07 1.01.08 4.01.02 -	(a) The fly ash coming from ESP hoppers or buffer hoppers of shall be led to a **classifier silo of capacity 200 tonnes**. ..... (e) The fine ash and coarse ash after classification shall be stored in RCC/Structural steel hoppers, separate for fine ash and coarse ash respectively. **The capacity of the fine ash hopper (01 No) and coarse ash hopper (02 No) shall be 250 Tonnes each.** **Three (2) nos. Main fly ash storage silos (RCC Silos) of 1500 MT effective storage capacity each**, for road and rail loading of dry fly ash and **one (1) no. dry fly ash storage silos (RCC Silo) for fine ash of 1000 MT** effective storage capacity complete with an aeration system, dust suppression system and all other accessories as required and as specified. **(K)Ash Storage silos** Storage capacity for Classifier Block Silos/Hoppers are as follows: - **Fine fly ash Hopper-500 (T), Coarse Fly ash Hopper-500 (T)**, **Classifier Silo -200 (T)**. **Main storage for fine Ash Silo shall have minimum 1750 MT** effective storage capacity. ..... Tender Flow Diagram. Shown Capacities are as mentioned below: 1. Fly Ash Storage Silo- 1500 MT 2. Fine Fly Ash Storage Silo- 1000 MT 3. Coarse Fly Ash Hopper - 250 MT 4. Fine Fly Ash Hopper - 250 MT 5. Classifier Silo - 200 MT	There is contradiction in stated tender clause regarding the storage capacity of Fly ash Storage silo, coarse ash hopper and fine ash hopper. Bidder shall consider storage capacity of silo as mention below, inline with Part-A of tender specification: 1. Fly Ash Storage Silo- 1500 MT 2. Fine Fly Ash Storage Silo- 1000 MT 3. Coarse Fly Ash Hopper - 250 MT 4. Fine Fly Ash Hopper - 250 MT 5. Classifier Silo - 200 MT Please confirm.	For Storage Capacity, Bidder to refer Amendment MH-27 for revised Single line diagram.
770	SECTION-VI, PART-A SECTION-VI PART-B	SUB-SECTION-IIA-16 SUB SECTION-A-01	12 of 18 77 of 87	1.01.08 4.01.02	m. The pitching of ash silo and overall arrangement of hydro-mix conditioner units, telescopic chutes, air slides etc shall facilitate simultaneous loading of three wagons (BOXN/BCFC/BCCW/BTAP) **from two number of Coarse Fly ash Silos.** Suitable arrangement for Control of movement of Telescopic spout shall have to be provided in all three X-Y-Z directions to facilitate loading of ash into Wagons. **(K) Ash Storage silos** Two Fly ash Silos of 1500 MT effective capacity each having rail cum road loading facility shall be provided for the unit to receive ash from ESP Hoppers. An additional fine ash silo of capacity **1000 MT shall be provided at a separate location/adjacent to Fly ash Storage Silos having facility for feeding to the ash bagging plant.**	In absence of clarity, Bidder understands that only fine ash below main fine ash silo shall be disposed through bags only and no wagon unloading is envisaged for fine ash silo. Please confirm.	Bidder's understanding is not correct. In addition to the Bagging facility, Wagon loading arrangement is envisaged for fine ash Silo. Further, Bidder to refer Amendment Sl. MH-30.
771	SECTION-VI, PART-A	SUB-SECTION-IIA-16	14 of 18	1.02.00	e) All ash water and seal water piping from **Owner's terminal points** to all the equipment's and sumps complete with fittings, valves, strainers, flanges, askets, nuts, bolts, hangers, supports, flushing nozzles, agitating nozzles, etc. as specified and as required.	AHP seal water shall be tapped from service water tank which is under bidder scope. Hence, no separate terminal points with Owner are applicable. Please confirm.	Bidder's understanding is correct. Further, Bidder to refer Amendment Sl. MH-28.
772	PART-E1	SINGLE LINE FLOW DIAGRAM FOR BOTTOM ASH HANDLING SYSTEM (PRESSURE SYSTEM) DRG. No. (XXXX-001-POM-A-025) Rev. No. A	-	-	Tender flow diagram At settling tank and surge tank of Bottom Ash Overflow, **connection from other unit is shown.**	There is a typo error in tender flow diagram and it is shown that effluent from other unit is transferred to settling tank and surge tank. Bidder understands that proposed settling tank and surge tank will be used for phase-III BA overflow water clarification only. Please confirm.	Bidder to refer Amendment Sl MH- 27 for revised Single Line diagram for Bottom ash handling system.
773	TECHNICAL SPECIFICATIONS SECTION-VI, PART-A	SUB-SECTION-IIA-16 ASH HANDLING SYSTEM	9 of 18	(b) (d)	ASH CLASSIFICATION AND BAGGING SYSTEM Suitable numbers of ash classifier as required shall be provided to meet the requirement. The ash classifier shall be of proven design for similar application. Efficiency of the Classifier shall be 95% minimum. No standby classifier shall be required. The classified fine ash shall have a size of (-) 45 microns (95%). All the ash conveying and generation rates shall be considered as per clause no 4.01.02 of sub section A-02 of part B of section VI.	Regarding the requirement of classifier system please clarify the following: 1) Particle size distribution of fly ash is required to select the classifier and to guarantee the output. 2) Classifier efficiency is mentioned as 95%. Quality of product is mentioned as 95% less than 45 microns. Both cannot happen together. Hence, please clarify the requirement. Owner is requested to furnish the above mandatory clarifications for designing ash classification system. In absence of these, Bidder can not guarantee the ash classification system as mentioned in the specification and requests Owner to exclude the ash classification system from Bidder's scope of work.	1) Particle size distribution of ash shall be the input from bidder being a EPC Pkg. 2) Bidder to refer Amendment MH-32 for Fine ash Particle size.
774	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	13 OF 35	(iii)	4.19 Ash Handling System Notes to Clause no. 4.19.1 The systems mentioned at 4.19.1 (a), (b),(c) & (d) above, should have been in successful operation in at least one (1) plant for at least two (2) years. For the purpose of qualification, the experience as at 4.19.1 (a), (b), (c) & (d) above in separate plants also is permissible.	Owner is requested to modify the provenness criteria as follows in line with recent joint discussion with CEA: "The systems mentioned at 4.19.1 (a), (b),(c) & (d) above, should have been in successful operation in at least one (1) plant for at least one (1) ~~two (2)~~ year~~s~~. For the purpose of qualification, the experience as at 4.19.1 (a), (b), (c) & (d) above in separate plants also is permissible."	Bidder to refer Amendment Sl. MH-09 for revised Provenness Criteria.

775	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	12 OF 35	(iii)	4.19 Ash Handling System 4.19.1 The Bidder/ its Sub- vendor(s) should be supplier of ash handling system(s) and should have executed ash handling system(s) involving design, engineering, manufacturing/got manufactured, supply, erection /supervised erection and commissioning/ supervised commissioning for- (a) (i) Wet Bottom Ash handling system comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or a submerged Scraper Chain Conveyor system designed for pulverized coal fired boilers: (ii) Wet Bottom Ash handling system comprising either a Jet pump system (for Water impounded Bottom Ash Hopper) consisting of Feed Gate, Clinker Grinder, Oil/Air Convertor tank, Water pumping system as a minimum or a Submerged Scraper Chain Conveyor system The above Wet Bottom Ash handling system under (i) & (ii) shall be designed for the following conveying capacities for pulverized coal fired boilers: Jet Pump System : 50 tonnes/hour (dry ash basis) or more per jet pump. Submerged Scraper : 20 tonnes/hour (dry ash basis) Chain Conveyor System or more per Conveyor. The reference Bottom Ash Handling systems should be of the same type i.e. jet pump system or submerged scraper chain conveyor system as is being offered by the Bidder/ its Sub- vendor. In case, Bidder/its sub-vendor qualifies through (a) (iii), the bidder shall engage a design agency who has done design/vetting of design of bottom ash handling system comprising of Jet pump system in conjunction with Water impounded Bottom ash hopper.	In view of limited AHP qualified vendors, Bidder request Owner to amend the AHP provenness criteria as follows in line with our joint discussion with CEA. "4.19 Ash Handling System 4.19.1 The Bidder/ its Sub- vendor(s) should be supplier of ash handling system(s) and should have executed ash handling system(s) involving design, engineering, manufacturing/got manufactured, supply, erection /supervised erection and commissioning/ supervised commissioning for- (a) (i) Wet Bottom Ash handling system comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or a submerged Scraper Chain Conveyor system designed for pulverized coal fired boilers: **OR** (ii) Wet Bottom Ash handling system comprising either a Jet pump system (for Water impounded Bottom Ash Hopper) consisting of Feed Gate, Clinker Grinder, Oil/Air Convertor tank) Jet Pumps, Water pumping system as a minimum or a Submerged Scraper Chain Conveyor system The above Wet Bottom Ash handling system under (i) & (ii) shall be designed for the following conveying capacities for pulverized coal fired boilers: Jet Pump System : 50 tonnes/hour (dry ash basis) or more per jet pump. Submerged Scraper : 20 tonnes/hour (dry ash basis) Chain Conveyor System or more per Conveyor. The reference Bottom Ash Handling systems should be of the same type i.e. jet pump system or submerged scraper chain conveyor system as is being offered by the Bidder/ its Sub- vendor. In case, Bidder/its sub-vendor qualifies through (a) (ii), the bidder shall engage a design agency who has done design/vetting of design of bottom ash handling system comprising of ~~Jet pump system in conjunction with~~ Water impounded Bottom ash hopper, **feed gate, air-oil convertor tank & clinker grinder."**	Bidder to refer Amendment Sl. MH-06 for revised Provenness Criteria.
776	SECTION-V I, PART-A	SUB-SECTION-VI CHAPTER - 03 ASH HANDLING PLANT	'3 OF 14	'3.04.00 3.04.09	Mandatory Spares: Flushing Water Pumps/BA Hopper Overflow Water Pumps/**Surge Tank Overflow Pumps** **Motor for Flushing water pump/BA Hopper overflow pump/Surge tank overflow pump may be included**	Bidder understands that surge tank overflow pump is not envisaged as per specification, hence, the spares for the same mentioned in referred clause is also not applicable. Please confirm Bidder's understanding.	Bidder's understanding is correct. Further, Bidder to refer Amendment Sl. MH-47.
777	SECTION-V I, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	23 OF 73 '23 OF 73	8. 9. 12. 6.	e) Ash Handling Plant List of drives with corresponding weightage factors thereof for which power consumption is to be guaranteed is as follows: (i) Fly ash conveying air compressors with air drying plant (ADP): 1 Transport air compressor with air drying plant (ADP): 1 Transport air compressor with air drying plant (ADP) for classification system: 1 Combined ash slurry disposal pumps: 0.875	In view of lean and dry disposal of fly ash, the duty factors mentioned for combined ash slurry pump and transport air compressor after classifier are on higher side as FA will not be evacuated in dry and wet mode parallelly. In view of this, Bidder understands that following referred drives shall be applicable in line with duty factor mentioned in NTPC Singrauli Project: 8. (i) Fly ash conveying air compressors with air drying plant (ADP): 1 12. Transport air compressor with air drying plant (ADP) for classification system: 0.40 6. Combined ash slurry disposal pumps: 0.5 and 9.0 Transport air compressor with air drying plant (ADP): 1 will only applicable in case vacuum- pressure conveying, however, sr. no 12 and 6 shall be applicable in both cases i.e pressure-pressure & vacuum-pressure. Please confirm Bidder's understanding.	Bidder to refer Amendment Sl. MH-53 for revised weightage factors.
778	SECTION-VI, Part-A	SUB-SECTION-IIA-16	13 of 18	1.01.08	b) **The length of total combined Ash disposal pipelines shall be 39,000 m** (excluding fittings and including branch pipes for garlanding of mine void)or the actual distance (excluding fittings) including branch pipes for garlanding of mine void, whichever is higher.	In view of recent tender i.e NTPC Talcher, NTPC Lara & NTPC Singrauli, Bidder understands that Bidder scope of ash slurry disposal piping shall be within plant boundary. Kindly confirm Bidder's understanding.	Bidder's understanding is not correct. Complete ash slurry disposal piping work including outside plant boundary is in Bidder's scope.
779	Single Line Flow Diagram no. - XXXX-001-P0M-A-025					Valve arrangement at inlet line to DWB in this drawing is not in order. Owner is requested to confirm that valve arrangement shall be as per Bidder's requirement to suit layout.	Bidder to refer Amendmen Sl MH- 27 for revised Single Line diagram for Bottom ash handling system..
780	Single Line Flow Diagram no. - XXXX-001-P0M-A-025 TECHNICAL SPECIFICATIONS SECTION-VI, Part-A	SUB-SECTION-IIA-16 ASH HANDLING SYSTEM	6 of 18	1.01.06	 As per flow diagram, at Combined slurry sump, 7 Nos. pipe line is shown for Fly Ash & Coarse Ash slurry pipes. 2 nos. coarse ash slurry line is shown as per SLD no. XXXX-001-P0M-A-025 (i) Eight (8) lengths of Dry fly ash Cast Iron / MS piping from junction points of ESP Hopper outlets onwards up to the Intermediate Silos complete with changeover valves, other valves, specialties, bends, pneumatic actuators, structural steel supports, platforms etc	At Combined slurry sump, 7 Nos. pipe line is shown for Fly Ash & Coarse Ash slurry pipes. However as per specification, 8 Nos. of Fly Ash slurry lines from intermediate Silo and 2 nos. coarse ash slurry line is shown as per SLD no. XXXX-001-P0M-A-025 Owner is requested review & clarify the No. of FA Slurry lines & coarse ash slurry lines to combined slurry sump.	Bidder to refer Amendment Sl MH- 27 for revised Single Line diagram for Bottom ash handling system.
781	Part-A	Sub Section-I-B Project Information	8 of 19	Annexure-IIIA	Raw water analysis	The individual consituents of anion are not matching with total Anion values. Further, the water analysis is not balanced as total cation is not equal to total anion. Owner is requested to revisit the raw water analysis.	Bidder to refer Amendment Sl. No. WS-11 in this regard.
782	Part-A Part-E1	Sub Section- IIA-10 Water Treatment Plant	2 of 12 70 of 91	1.01.03 (d) XXXX-XXX-POM-A-006	One (1) number bypass channel of RCC Construction to by-pass clarifier(s) with required isolation gate(s). Only inlet channel to PT-DM clarifier is shown in the P&ID. Bypass channel is not shown.	Discrepancy is observed in the mentioned clause. Bidder understands that a bypass channel shall be provided to bypass the PT-DM clarifier. Please confirm.	Bidder's understanding is correct. As per clause 1.01.03 (d), One (1) number bypass channel of RCC construction to by pass PT-DM clarifier with required isloation gate & facilities shall be provided.

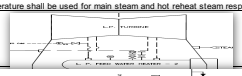
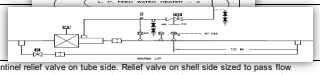
783	Part-A Part-E1	Sub Section- IIA-10 Water Treatment Plant	3 of 12 70 of 91	1.01.04-c & f XXXX-XXX-POM-A-006	c) **Alum Solution** preparation & dosing system consisting of required number of RCC Alum solution preparation tanks, agitators, alum solution dosing pumps complete with all necessary piping, fittings, feed piping, water supply piping, overflow and drain piping, sampling connections etc. f) **PAC dosing** system (for PT-CW & PT-DM OPTION-1 systems) consisting of required number of tanks, agitators, dosing pumps complete with all necessary piping, fittings, feed piping, water supply piping, overflow and drain piping, sampling connections etc. **Only Alum dosing** has been shown in the tender P&ID (Drg no. 9586-001-POM-A-006)	Discrepancy observed for Alum and PAC dosing system. Owner to note that Alum and PAC, both are coagulants – hence, Bidder understands that two coagulants are not required, and dosing shall be considered as per P&ID only. Please confirm.	Both Alum & PAC dosing systems to be provided. Details shown in P&ID are minimum requirement. All systems and equipment to be provided in line with technical specifications.
784	Part-A Part-E1	Sub Section- IIA-10 Water Treatment Plant	3 of 12 70 of 91	1.01.04 (g) XXXX-XXX-POM-A-006	g) One (1) number RCC overhead filtered water storage tank of required capacity, on top of chemical house with water supply line from the discharge of **filtered water pumps**, associated valves, piping, fittings etc. As per the tender P&ID, overhead filter storage tank make-up shall be done from the **potable water pumps.**	This is with regard to contradiction for overhead filtered water storage tank make up. Bidder shall consider that supply to overhead filter water storage tank will be from potable water pumps only, as per tender P&ID. Please confirm.	Bidder's consideration is not correct. Bidder to note that supply to overhead filtered water storage tank (on top of Chemical house) shall be from discharge of filtered water pumps.
785	Part-A Part-E1	Sub Section- IIA-10 Water Treatment Plant	3 of 12 62 of 91	1.02.01 (b, c) XXXX-XXX-POM-A-005	b) **1x100%** HCl dosing pumps (1W + 1S) for each Chlorine-di-oxide generator c) **1x100%** NaClO2 dosing pumps (1W + 1S) for each Chlorine-di-oxide generator. Total 2 numbers **(2x100%)** HCl dosing pumps are shown for Chlorine-di-oxide generator Total 2 numbers **(2x100%)** NaClO2 dosing pumps are shown for Chlorine-di-oxide generator.	There is a contradiction for quantities of HCL dosing pumps and NaClO2 dosing pumps as mentioned in stated clauses. Bidder shall consider total 2 nos. HCl dozing pumps and 2 nos. NaClO2 dosing pumps (i.e. 1 x 100% for each chlorine dioxide generator) for the PT chlorination system as per 1.02.01, (b),(c). Please confirm.	Bidder's understanding is correct. Bidder to provide 2x100% HCl dosing pumps and 2x100% NaClO2 dosing pumps for PT-CW system.
786	Part-B Part-E1 Part-B Part-A	Sub Section A-01, Equipment Sizing Criteria Sub Section A-14, Water treatment Plant Sub-section-IIA-10 Water treatment plant	52 of 87 70 of 91 1 of 36 6 of 12	3.06.00, C, (2) (a) XXXX-XXX-POM-A-006 1.01.00, (4), (a) 1.03.02 (b)	The filters backwash water shall be collected and recycled back to the **PT-DM clarifier.** The filter backwash water to be recycled back to the **stilling chamber of PT-CW clarifier**, as per tender PID. The filter backwash water to be recycled back to the CW Clarifier. The filter backwash water of DM Plant to be recycled **DM Clarifier.** Backwash water pumps, its drives, associated piping and valves from the above pumps to **stilling chamber of PT-DM system.**	Discrepancy is observed in technical specifications and tender P&ID for recycle of filter backwash wastewater. Bidder suggests to recycle backwash wastewater back to stilling chamber of PT-CW system as shown in tender PID. Please confirm.	Bidder to note that Filter backwash water shall be recycled to stilling chamber of PT-DM clarifier as per specification.
787	Part-B Part-E1	Sub Section A-01, Equipment Sizing Criteria	50 of 87 70 of 91	3.06.00, A, (6) (b) XXXX-XXX-POM-A-006	Alum Solution preparation & dosing system consisting of minimum three (3)nos of Alum solution preparation tanks, agitators, alum solution dosing pumps (2W+1S) for PT-CW Clarifiers, (2x100%) for PT-DM Clarifier, (2x100%) for Lamella clarifier/tube settlers etc. 5 nos of alum dosing pumps are represented in tender SLFD, and total 7 nos of pumps are written.	Bidder understands that in case of Option I - Ion exchange DM plant & ETP, **7 nos of alum dosing pump** shall be provided as per specified tender clause 3.06.00, A, (6) (b). However, for option-II, UF+RO+MB based DM plant, no. of alum dosing pumps shall be **5 nos,** since alum dosing is not envisaged in this option for PT-DM clarifier. Please confirm.	Bidder's understanding is not correct. The alum dosing system with 7 nos of alum dosing pumps is to be provided and bidder to refer part-B, sub-section A-01 clause 3.06.00 A (6)(b)in this regard.
788	Part-B Part-E1	Sub Section A-01, Equipment Sizing Criteria	52 of 87 70 of 91	3.06.00, C, (2) (b) XXXX-XXX-POM-A-006	Two (2) (2x100%) (1W+1S) numbers of backwash disposal pumps shall be provided. Three (3) numbers of backwash disposal pumps are shown in tender drawing.	Discrepancy is observed for quantity of backwash disposal pumps. Please confirm the quantity of pumps.	P&ID is indicative. Two(2x100%) (1W+1S)backwash disposal pumps shall be provided by the bidder in line with clause 3.06.00 C (2) (b) of sub section A-01 of Part B of technical specifications.
789	Part-B	Sub Section A-01, Equipment Sizing Criteria	51 of 87	3.06.00, A, (6) (h & i)	Anti-scalant handling, storage, and dosage system with bulk storage for one(1) month's storage with design dose, Anti-scalant preparation tanks (2) with motorized agitator, capacities of both tanks together shall be sized to prepare and store 1 day requirement of Anti-scalant, Anti-scalant dosing pumps (2x100%). Anti-oxidant handling, storage, and dosage system with bulk storage for one(1) month's storage with design, Anti-oxidant preparation tanks (2) with motorized agitator, capacities of both tanks together shall be sized to prepare and store 1 day requirement of Anti-oxidant, Anti-oxidant dosing pumps (2x100%).	Discrepancy is noticed for bulk storage tanks for anti-oxidant & anti-scalant dosing. Bulk storage tanks for antiscalant & antioxidant are not shown in PID, but same has been provided in tender specifications (clause no. 3.06.00, A, (6) (h & i)) . Please confirm the requirement of bulk storage tanks.	Detail shown in P&ID is indicative & minimum. Bidder to provide complete system/equipment meeting specification requirement (clause no. 3.06.00, A, (6) (h & i)).
790	Part-B Part-E1	Sub Section A-01, Equipment Sizing Criteria	55 of 87 68 of 91	3.06.00, D, 3, B, (c) XXXX-XXX-POM-A-003	Degasser Blowers for Degasser **(2x100%).** 2 no's of Degasser blowers are shown for each degasser tower. Total **4 numbers of blowers** are showing in PID.	Discrepancy is found with respect to degasser tower blowers. Bidder shall consider 2 x 100% of blowers for each Degasser towers as per the P&ID. Please confirm.	Bidder's consideration is correct. Bidder to provide 2x100% Degasser blowers for each Degasser tower.
791	Part-B Part-E1 Part-E1	Sub Section A-01, Equipment Sizing Criteria	56 of 87 68 of 91 66 of 91	3.06.00, D, 4, (c) XXXX-XXX-POM-A-003 XXXX-XXX-POM-A-002	Neutralizing waste disposal system- DM plant Effluent drains, UF back wash, UF/RO cleaning chemicals etc. shall be connected to the **N-Pit** and shall be led suitably to Ash handling system. UF backwash waste water is being sent to **Filter backwash pit** in the tender SLFD. UF backwash waste water is being sent to **Filter backwash pit** in the tender SLFD.	As per tender specification, UF backwash waste water for both the options of DM system, is going to N-pit, and further to Ash Handling Plant. This is in contradiction to Part E1, where UF backwash is being sent to Filter backwash pit. Please clarify the scheme to be followed for UF backwash.	Bidder to refer Amendment Sl. No. WS-17 in this regard.
792	Part-B	Sub Section A-01, Equipment Sizing Criteria	56 of 87	3.06.00, D, 4, (d)	Backwash waste disposal system for DM plant - Backwash water from AC filters and fast/final rinse wastewater of DM plant shall be connected to the backwash collection pit (DM). Back wash water shall be pumped to the inlet channel of PT-DM clarifier.	Backwash/Rinse waste sump will be envisaged only in case of ion exchange based DM plant (for ACF backwash wastewater). In case of UF+RO based DM plant, UF backwash wastewater shall be sent to Filter backwash pit (common for Potable & DM RGF backwash) and MB regeneration waste shall be sent to N-pit. No wastewater will be sent to backwash/rinse waste sump. Please confirm.	Bidder;s proposal reviewed & not accepted. Bidder to comply technical specification requirements.
793	Part-B	Sub Section A-01, Equipment Sizing Criteria	57 of 87	3.06.00, D, 4, (i)	RO Reject shall be led to Coal handling plant for reuse in dust suppression system.	Since unloading and stacking in not in Bidder's scope of work for CHP package, hence, RO reject can not be use in CHP dust suppression, hence, Bidder understands that RO reject will be taken to N-pit for further disposal in ash slurry handling system. Please confirm Bidder's understanding.	Bidder's understanding is not correct. RO reject shall be led up to coal handling plant for owner's dust suppression system.

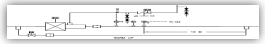
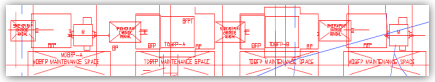
794	Part-B Part-B Part-A	Sub-section A-14 Water Treatment Plant Sub section-A-01 Equipment Sizing Criteria Sub section-IIA-10 Water Treatment Plant	7 of 36 52 of 87 6 of 12	3.10.00 b,2,d 3.06.00, C,3,a 1.03.03, b	d) Oil skimmer (2x100%) **Oil centrifuge (2x100%)** One (1) number RCC waste service water sump (WSWS) in two (2) sections shall be provided for collection of waste service water. Service water effluents and other plant effluents from various areas of the plant shall be routed to this waste service water sump. Facility shall be provided to collect free oil from these sumps to MS Oil drum and oil skimmers (2 nos.), **Portable oil Centrifuge (2x100%)** of suitable capacity shall be provided for reuse of oil. b) Facility to collect free oil from these sumps to a MS oil drum of 200 litre capacity with the help of Drum type (2 Nos.) oil skimmers, **Centrifuge (1 no.)** of required capacity.	Discrepancy observed between tender clauses for Oil centrifuge configuration. Please confirm Oil centrifuge Configuration	2x100% oil centrifuge shall be provided. Bidder to refer Amendment Sl. No. WS-14 in this regard.
795	Part-A Part-E1	 Sub section-IIA-10 Water Treatment Plant 	9 of 12 68 of 91	2.00.00 (B) (3) (d) XXXX-XXX-POM-A-003	Complete degassifier system for removal of CO2 in permeate water from RO units, consisting of **one degasser towers** of required capacity with spray nozzles, mist eliminators, packing, packing support structures, operating platforms, ladders, gratings etc. **Two nos of degasser towers** are shown in the tender PID, 1 for each stream.	Bidder understands that 1 number of Degasser tower has to be provided for each stream, hence total 2 numbers of degasser tower shall be provided. This is inline with tender PID. Please confirm.	Bidder's understanding is correct.
796	Part-E1	--	--	--	P&ID for Coal Handling plant run-off water treatment system	Since unloading and staking is not in Bidder's scope, hence, Bidder understands that coal run off water treatment system shall not be in Bidder's scope. Please confirm Bidder's understanding. Further, if the same to be considered for existing CHP area, please furnish the scheme for coal handling plant run-off water treatment system	Bidder's understanding is not correct. Bidder to provide clarifer system for existing CSSP. Bidder to also refer clause 1.03.04 of sub section IIA-10 (Page 6 of 12) of Part A of tender specifications.
797	Part-B	Sub-Section A-14 Water Treatment Plant	22 of 36	12.00.00	CSSP (Stiling chamber) design flow(min):- 2000 m3/hr + 3% for sludge Clarifier Design Flow of each :- 2000 m3/hr clarifier (Net output) (minimum)	Since unloading and staking is not in Bidder's scope, hence, Bidder understands that coal run off water treatment system shall not be in Bidder's scope. Please confirm Bidder's understanding. Further, if the same to be considered for existing CHP area, Bidder understands that CSSP Clarifier design capacity shall be 2000m3/hr to take care coal run off water from phase-II as well as phase-III including storm water. Please confirm Bidder's understanding.	
798	Part-A Part-B	Sub section-IIA-10 Water Treatment Plant 'Sub-section A-14 Water Treatment Plant	8 of 12 32 of 36	2.00.00 (B) (1) (b) 21.00.00 (A) (1)	Ultra-filtration system membranes skid (UF) **(2x100%)** (Pressurized type) along with basket strainers and necessary valves, piping, fittings etc. Number of trains of UF - **2 x 60%**	Discrepancy observed in the configuration of UF system in UF+RO+MB based DM system. Bidder has considered Ultra-filtration system membranes skid (UF) (2x100%) as per cl. No. 2.00.00 (B) (1) (b). Please confirm.	2x100% UF to be provided for RO based DM plant. Further, Biddeer to also refer Amendment Sl.No. WS-6.
799	Part-B Part-E1	Sub-section A-14 Water Treatment Plant --	33 of 36 68 of 91	22.00.00 (C) (2) XXXX-XXX-POM-A-003	Number of HPP - **One(1) per RO train + 1 common standby** **2 Nos** of High pressure pumps are shown	As per datasheet in Part-B, 1 number of high pressure pumps needs to be considered for each RO train (total 2 number of streams) along with a common standby, whereas in tender PID, 2 nos of pumps are shown. Bidder understands that 2 x 100% high pressure pumps shall be considered for 2 x 100% RO trains/streams as per tender P&ID (Part-E1). Please confirm.	Bidder's understanding is correct. 1x100% High pressure pumps for each RO stream is to be provided . Bidder to refer Amendment Sl. No. WS-15 in this regard.
800	Part-A	Sub section-IIA-10 Water Treatment Plant	7 of 12	2.00.00 (A) (g)	Two (2) numbers of UF feed Tanks complete with all accessories, three (3) nos. ultrafiltration. UF feed pumps complete with drive motors and accessories as required, **two (2) nos. Ultrafiltration skids** (Polishing UF) complete with all necessary piping, valves and, instrumentation etc.	Configuration of UF system for Ion Exchange based DM plant is not provided in the datasheet of Part-B. In absence of clarity, Bidder shall consider the same configuration as of the RO based DM system, i.e. 2 x 100%. Please confirm.	Bidder's consideration is not correct. Bidder to provide the system as per scope and comply technical specification requirements.
801	Part-B	Sub-Section A-14 Water Treatment Plant	34 of 36	23.00.00, (2)	Design flow per unit (min) - 75 m3/hr	Since configuration of MB vessel is 3 x 50% (Cl. No. 2.00.00, B, 3, (g)) and net out for DM plant shall be 75 m3/hr, Bidder understands that capacity for each MB unit shall be 75/2 = 37.5 m3/hr. Please confirm	Bidder to provide 2x100% MB vessel. Bidder to refer Amendment Sl. No. WS-16 in this regard.
802	Part-A Part-B Part-E1	Sub section-IIA-10 Water Treatment Plant 'Sub-Section A-14 Water Treatment Plant --	8 of 12 6 of 36 34 of 91	2.00.00, A, (o) 3.07.00 XXXX-001-POM-A-024	Neutralised waste shall be pumped to Ash Slurry Sump/tank. The sludge shall be transferred to the ash slurry tank/sump by means of sludge transfer pumps. As per tender flow diagram, FGD waste is being sent to HCSD Tank.	a. HCSD system is not applicable as per tender. Owner to specify the FGD waste water disposal scheme. b. Bidder understands that N-pit waste and PT plant sludge are transferred to Common ash slurry sump. However, the resultant flow (to be transferred to Ash dyke) will be very less compared to the combined ash slurry pump capacity. Hence, it is not advised to transfer all the above mentioned waste (inclusive of FGD waste) to common ash slurry sump for further disposal to ash dyke. Please specify the scheme for same.	The sludge, neutralised waste, FGD waste shall be transferred to ash slurry sump/tank. Bidder to design the system meeting the tender requirement as minimum.
803	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT SUB SECTION A-15 CW SYSTEM	2 of 3 29 of 40	1.07.00 2.01.0	Dedicated & new fire water headers/mains (hydrant & spray) tap-off shall be taken from existing discharge headers of hydrant/spray pumps and shall be routed to Stage-III area for connection to fire water pipe network of Stage-III. From the water reservoir in the Plant, raw water shall be drawn to the Raw Water pump house sumps (existing system). Raw water pumps (PT and Ash) shall be provided to supply water up to the Water PT Plant, Ash water tank and fire water tank	In plant water scheme tappings from ash water makeup system and CW blowdown is connected to fire water tank. However as per clause 1.07.00 fire water tank is not in Bidder's scope. Hence, Bidder has not considered separate tappings from CW blowdown and Ash water makeup system to existing fire water tank. Owner is requested to please confirm Bidder's consideration.	Bidder's understanding is correct.
804	Part-A Part-E1	Sub-Section IIA-20 Water Treatment Plant --	1 of 2 63 of 91	2.02.00 XXXX-XXX-POM-A-013 (SH. 1 of 2)	Two (2) x 50% capacity back washable type cartridge pre-filters for each unit shall be provided for the commissioning period, start-up period as first cleaning step as well as normal continuous operation, complete with automatically operated by-pass, associated piping, pumps (with at least one stand-by), pneumatically operated valves etc. No pre filter shown in P&ID of CPU.	Discrepancy observed in the scope of pre-filter between referred clause of tender specification and P& ID. Hence, as per past execute NTPC project and as per tender flow diagram, bidder has not considered any pre filters for CPU. Please confirm.	Bidder's consideration is not correct. Details shown in P&ID are minimum requirement & indicative, bidder to provide required number of pre-filters in line with specification requirements- Part A, Sub-section IIA-20, clause No. 2.02.00.
805	Part-A Part-E1	Sub-Section IIA-20 Water Treatment Plant --	1 of 2 64 of 91	2.04.00, b) XXXX-XXX-POM-A-013 (SH. 2 of 2)	One (1) set of regeneration facilities consisting of Resin separation vessel, Cation, Anion regeneration vessel(s), Resin make-up hopper, **Mixed resin storage vessels (1nos)** etc. **2 nos of mixed resin** storage vessel shown in P&ID	Discrepancy observed in the scope of Mixed resin storage vessels between referred clause and P& ID. Hence, as per past execute NTPC project and as per tender cl. No. 2.04.00,b), bidder has considered Mixed resin storage vessels (1nos). Please confirm.	Bidder's consideration is confirmed. Further, details shown in P&ID is indicative.
806	Part-B Part-B	Sub Section A-11 Condensate Polishing Unit Sub Section A-11 Condensate Polishing Unit	7 of 16 8 OF 16	4.06.00 e), (ii), (5) 5.03.00	Two (2) acid measuring tanks of adequate capacity to hold acid for two (2) regenerations. Each tank shall be adequate to hold chemical for 125% of one regeneration--	Discrepancy observed regarding measuring tank capacity. Bidder has considered Two(2) acid measuring tanks each of adequate capacity to hold chemical for 125% of one regeneration as per cl. No. 5.03.00. Please confirm.	Bidder's understanding is correct.

807	Part-A Part-B Part-E1	Sub-Section IIA-20 Water Treatment Plant Sub Section A-11 Condensate Polishing Unit --	2 of 2 10 OF 15 64 of 91	2.04.00 (j) 5.10.00 XXXX-XXX-POM-A-013 (SH. 2 of 2)	**One (01) number** of DM water Storage tank for CPU regeneration system. Two (2) numbers of DM Tanks of vertical cylindrical type in MS construction internally painted with epoxy shall be provided..... .....Note: If CPU regeneration facility are located in DM plant regeneration area, total DM water storage requirements for CPU plant as mentioned above may be clubbed with total DM water storage requirements of DM plant as specified elsewhere to decide the effective capacity of the DM tanks. Also, minimum two (2) numbers of DM water storage tanks shall be provided. **2 nos** of DM Water storage tank shown in P&ID	There is contradiction between tender clauses and P&ID for DM water storage tank (for CPU) configuration. Please clarify the contradiction in the numbers of DM storage tank for CPU regeneration. However, as per clause no. 5.10.00, Sub-Section A-11, CPU, DM water tank for CPU can be combined with DM water storage tank in DM plant area. Hence, separate DM water tanks will not be envisaged if CPU regeneration facility is near to DM Plant area. Please confirm.	Two (02) no of DM water storage tank for CPU regeneration system is in bidder's scope. Please refer Amendment Sl. No. WS-7. Further, if CPU regeneration facility are located in DM plant regeneration area, total DM water storage requirements for CPU plant as mentioned above may be clubbed with total DM water storage requirements of DM plant as specified elsewhere to decide the effective capacity of the DM tanks. Also, minimum two (2) numbers of DM water storage tanks shall be provided.
808	SECTION-V I, PART-A	SUB-SECTION-VI CHAPTER-02 STEAM TURBINE GENERATOR	28 OF 34	1.00.00	CPU/Regen Area Blowers 4) Gears	Owner is requested to delete the requirement of "Gear" as the same is not applicable.	Bidder to provide spares for Gear if applicable.
809	SECTION-V I, PART-A	SUB-SECTION-VI CHAPTER-02 STEAM TURBINE GENERATOR	29 OF 34	1.00.00	Agitators 4) Any other agitator assembly with motor & gear box	Owner is requested to delete the requirement of "Any other agitator assembly with motor & gear box" as the same is not applicable.	Bidder to provide spares for "Any other agitator assembly with motor & gear box" if applicable.
810	SECTION-V I, PART-A	SUB-SECTION-VI CHAPTER-02 STEAM TURBINE GENERATOR	28 OF 34	1.00.00	CPU/Regen Area Pumps including N-pit & Backwash 6 Stuffing box for each type	Owner is requested to delete the requirement of "Stuffing box for each type" as the same is not applicable. Hence, Bidder understands that Stuffing box, if applicable, will be considered. Kindly confirm Bidder's understanding.	Bidder's understanding is correct.
811	SECTION-V I, PART-A	SUB-SECTION-VI CHAPTER-02 STEAM TURBINE GENERATOR	31 OF 34	1.00.00 (7)	4. Complete Turbidity Analyzer (including sensing unit, Electronic Transmitter unit, Pre-fabricated cable with connector as minimum) 5. Dissolved O2 Analysers(including sensing unit, Electronic Transmitter unit, Pre-fabricated cable with connector as minimum) (if applicable) 6. Turbidity analysers (including sensing unit, Electronic Transmitter unit, Pre-fabricated cable with connector as minimum) (if applicable)	a) Bidder wish to inform that Turbidity analyzer spares are repeated, Please refer Sr. No. 4 and Sr. no. 6. Please delete repeated clauses. b)B Bidder wish to clarify that Turbidity analyzer and Dissolved O2 analyzer are not applicable as per CPU OEM design. Bidder understands that since Turbidity analyzer and Dissolved O2 analyzer are not required as per OEM design, spares for these analyzers shall be considered as not applicable. Please confirm.	a) Sl no-4 under the referred clause stands DELETED. b) Bidder's understanding is correct. Bidder shall provide mandatory spares complying to specification requirements for all items being supplied for CPU.
812	Part-B	Sub-Section A-23 LP Dosing And Oxygenated Treatment System	1 of 4	1.03.00	Sodium and Chloride limit in case of both CWT & AVT feed water shall be maintained upto 2 ppb each at Condensate Polishing Plant outlet. It is proposed to install 100% capacity Condensate Polishing Unit for **each of the 2 x 660 MW units.**	There is discrepancy observed in tender clause regarding power plant capacity. Bidder understands that there is 1x800MW unit Kindly confirm Bidder's understanding.	Bidder's understanding is correct.
813	Part-A	SUB SECTION –VI CHAPTER-08 WATER SYSTEM	28 OF 29	3.00.00	Mandatory spares of ClO2 Blowers: 1) Impeller with lock nuts and washers . . . . 6) V-belts-Belt Agitators: 1) Agitator assy of each type	Owner to note that air blower & agitator for CLO2 system are not applicable, hence, mandatory spares for air blower agitator mentioned under referred clause are not applicable. Kindly review and delete the requirement.	Please refer Amendment Sl. No. WS-8
814	Technical Specification Section - VI, Part A	SUB-SECTION-B – IIA-22 Separation of Plant Drains from storm water drains	3 of 3	1.11.00	The wash water from the FOPH area containing traces of oil shall be pumped to oil water separator RCC pit in the fuel oil unloading area. The decanted water shall be reused/recycled for the washing of fuel oil handling areas. Parallelly, decanted water shall be collected in FOH area RCC pit/ sump(s) and pumped to Employer's waste service water sump (WSWS) located in LET plant.	Bidder understands that wash water from Stage-III forwarding pump house shall be discharged in existing oily water separator pit. Hence, Oily water separator along with decanting pump and dirty oil pump have not been considered by the Bidder. Please confirm Bidder's understanding.	Bidder's underestanding is correct.
815	Technical Specification Section - VI, Part B. Tender Drawings Section - VI, Part E. Technical Specification Section - VI, Part A	SUB-SECTION–A-02 Steam Generator and Auxiliaries including ESP. -- SUB-SECTION-B – IIA-01 Steam Generator and Auxiliaries including ESP	33 of 67 24 of 91 17 of 28	11.03.04 -- 2.18.00	LDO Pumps : (v) No. of pumps :**3** (2 working +1 standby) Flow Scheme of Fuel Oil shows 2 nos. LDO pumps Two (02) rotary positive displacement type LDO pumps with motor, coupling, coupling guards etc.	There is a discrepancy amongst stated tender clauses for no. of LDO pumps. Bidder has considered Two (02) rotary positive displacement type LDO pumps with motor (1 Working + 1 Standby) as per part-A. Please confirm.	Bidder to refer Amendment to technical specification Sl. no. SG.38 in this regard
816	Technical Specification Section - VI, Part B. Tender Drawings Section - VI, Part E	SUB-SECTION–A-02 Steam Generator and Auxiliaries including ESP --	33 of 67 24 of 91	11.03.04 --	Drain Oil Pumps : (v) No. of pumps :3 Flow Scheme of Fuel Oil shows 1 no pump for Drain oil tank at Fuel Oil Pump House & 1 no pump for Drain oil tank at Steam Generator area.	There is a discrepancy amongst stated tender clause & Flow Scheme for no of Drain Oil Pumps. Bidder has considered 1 no. pump for Drain oil tank at Fuel Oil Pump House & 1 no pump for Drain oil tank at Steam Generator area. Please confirm.	Bidder to refer Amendment to technical specification Sl. no. SG.38 in this regard
817	Technical Specification Section - VI, Part A	SUB-SECTION–A-02 Steam Generator and Auxiliaries including ESP	35 of 67	11.05.01	All piping system shall be sized to meet the fuel oil requirements of 02 (two) number Steam Generator(s) operating simultaneously at 30% BMCR load.	Typo error is found as mentioned in stated tender clause. Considering 1x800 MW unit, Bidder has considered fuel oil pipe sizing to meet the fuel oil requirements at 30% BMCR load of 01 (one) number of Steam Generator. Please confirm.	Bidder has incorrectly qouted the specification. Th ereferred clause content includes the following: "All piping system shall be sized to meet the fuel oil requirements of 01 (one) number Steam Generator operating at 30% BMCR load."
818	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	SUB-SECTION-III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	1 of 3	1.02.00	Potable water supply line up to Terminal point for interconnection with colony supply line.	Owner to please provide terminal point details (i.e. pressure requirement at terminal point, location, size, elevation etc.) and provide location in General Layout drawing.	Potable water supply to Colony is not in Bidder's scope.
819	PART-E1	Existing Raw water pump house GA drawing	57 of 91		Existing Raw water pump house GA drawing	GA drawing details of stage-1 items i.e. raw water pumps, pipings, crane etc. are not shown in the GA drawing furnished along with tender, which is required to check feasibility of piping interconnection and pump installation.. Bidder understands for stage-III raw water pump shall be handled by existing EOT crane and gates/ screen shall be handled by existing hoist. Owner to confirm. Owner to please provide GA drawing of raw water pump house of stage-1 Raw water pump details , piping, EOT crane and Hoists details.	The GA drawing of existing Raw water pump house indicates the handling arrangement (EOT crane capacity- 5 T, Gate Hoist- 3T, Trash Rack hoist- 2T). Further, bidder to note that the interconnection of header is outside the pump house. Further, in case of requirement of any additional lifting arrangement to complete the scope of work shall be in Bidder's scope.
820	TECHNICAL SPECIFICATION SECTION – VI, PART-A TECHNICAL SPECIFICATIONS SECTION-VI PART-B TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB SECTION IIA-11 CW SYSTEM SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA SUB SECTION A-15 CW SYSTEM	3 of 4 48 of 87 35 of 40	1.05.00 (1) 3.05.00 4.07.01	The Raw water system should be designed with Forced water lubrication. The system shall be designed with Forced water lubrication. The type of lubrication i.e., self-water lubrication or forced water lubrication shall be provided.	Discrepancy found between Clause 1.05.00, 3.05.00 and 4.07.01. Bidder understands self water lubrication is also acceptable as an alternative for Raw water pumps. Owner to please confirm.	Raw water system is to be designed with forced water lubrication.. Further, bidder to note that the clause 4.07.01 (Page 35 of 40) of Annexure-2 of sub section A-15 of Part B is a generic specification for all vertical pumps covered in the scope (whether forced water lubrication or self lubrication).

821	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB SECTION IIA-11 CW SYSTEM	3 of 4	1.05.00 XXX-XXX-POM-A-001	Service water system including 2x100% Service water pumps In P&ID and Layout of Liquid effluent treatment system Three (3) nos. of service water pumps are indicated.	Discrepancy found regarding number of service water pumps. Owner to please check and inform requirement of service water pumps.	2x100% service water pumps are to be provided. Shown P&ID is indicative.
822	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	39 of 69	5.18.01	Existing Stage-I Raw Water Pump House During construction it should be ensured that in any case running operation of water channel/ RCC conduit of Stage-I&II shall not be hampered. Further, associated structure for & including supply of valves/gates are also to be provided for isolation of the connection.	Bidder understand that stoplog and screens are already provided for proposed one no. Raw/AHP water pumps for stage-III as per the Existing raw water pump house GA drawing. Hence, during erection of proposed pump, the associated sump will be isolated. Please confirm bidder's understanding.	Bidder to refer Amendment D1-45.
822	Section - VI, Part A	SUB-SECTION-B – III TERMINAL POINTS & EXCLUSIONS AND OWNER'S INPUT	1 of 3	1.01.01	a) TP for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing Stage-II with motorized isolation valve and NRV as indicated in the tender drg.	Request owner to provide location in tender plot plan for auxiliary steam interconnection header with existing stage-II.	TP Location for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing HT Auxiliary Steam Header of Stage II with motorized isolation valve as indicated in the tender drg. Shall be Dummy Connection with Valve given near Axis No.19 and in BC Bay at 33.350 M elevation floor of Unit # 5 TG Bay in HT Header.
823	Part-E1	-	-	Tender Plot plan	Area allocated for Main ash silo and Fine ash silo on railway line	Considering the area allocated in plot plan, It shall not be feasible to locate 2 Nos. Main fly ash silos along with rail weigh bridges and FA silo approach road with required turning radius. Request owner to revisit the Main FA silo area layout.	Bidder to refer Amendment Sl. D1-27 for revised GLP
824	SECTION – VI, PART-A	SUB-SECTION-IID	1 of 8	1.00.00	SCOPE OF CIVIL, STRUCTURAL & ARCHITECTURAL WORKS OF EPC PACKAGE The scope of civil, structural and architectural works shall include topographical survey, geotechnical investigation, site clearance, dismantling of existing structures/substructures/facilities,.....	In absence of clarity, Bidder understands that dismantling and Re-laying of existing rail lines during stage-III main FA silos construction shall be under owner's scope. Also, necessary statutory/RDSO approvals for rail line works shall be under owner's scope. Please confirm Bidder's understanding.	Bidder undersatnding is correct
825	Section - VI, Part B Section - VI, Part B Section - VI, Part B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT SUB SECTION- G-03 LAYOUT PHILOSOPHY	8 of 69 66 of 69 9 of 15	5.02.08 5.23.27.1 1.03.00 (39) (II)	The level of the bottom chord (bottom of steel) of the gallery shall be at least 3.0m above the finished paving level in general... The bottom of steel in case of cable / pipe galleries and trestles shall be generally 3m above the ground except... In the outlying area, pipe and cables can be routed on trestle with headroom of 2.1m or on pedestals...	Discrepancy found between Clauses, Bidder shall be consider as per Section-VI, Part B, 1.03.00 (39) (II). Owner requested to confirm.	Bidder undersatnding is correct. Clause 5.02.08, 5.23.27.1 are in confirmity . Bidder to follow above mentioned clauses. Headroom clearance of 2.1m shall be maintained as per layout requirements and gallery bottom chord level to be maintained at 3 m .

S. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
826	SECTION – VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	5 OF 73	1.01.01	CATEGORY-I GUARANTEES (ix) Unit Auxiliary power consumption (x) Auxiliary Power Consumption for Station Auxiliaries	Bidder shall provide separate Auxiliary Power consumption guarantee for both the categories (i.e., Unit & Station auxiliaries) individually. However, for LD levy purpose shortfall in actual Auxiliary Power consumption in one of the categories, if any, shall be adjusted against benefit achieved in other category, if any. Please confirm acceptance.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
827	SECTION – VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	2 OF 73	1.00.01 (g)	Instruments for PG test and instruments for process control of similar applications are envisaged to be of same make and model having same accuracy level. However, instruments for PG test are also acceptable as per standard and proven practice of the contractor/OEM and in such case, instruments for process control shall be as per requirements specified in Part-B of technical specifications. Instruments to be used for PG test shall be additionally supplied over and above the instruments shown in tender P&IDs. PG test equipment being supplied, installed and commissioned for each unit, shall be retained by employer after completion of PG test. Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation. All PG test process parameters shall be made available in DDCMIS.	PG test shall be performed by using special test instruments required for PG test and shall be separate from the process instruments. High accuracy dataloggers shall be used to retrieve the data and the same shall be used for performance evaluation. Accordingly Bidder request owner to kindly modify the following clause inline with earlier NTPC Talcher project :- Instruments for PG test and instruments for process control of similar applications are envisaged to be of same make and ..... Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
828	SECTION – VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	50 OF 73	2.02.02	No shutdown shall be allowed for installation of PG test instrument/ flow nozzle etc. Any advanced class instrument system such as those using electronic devices or mass flow technique shall be arranged by the contractor, if required. However, same shall be installed before start of initial operation of unit. For determination of primary flow to the turbine, a calibrated low Beta-ratio throat-tap nozzle assembly shall be installed permanently in condensate line prior to initial operation, same shall be also used for process control.	Bidder request owner to kindly modify the following clause inline with earlier tender of NTPC for Talcher project :- "No shutdown shall be allowed for installation of PG test instrument/ flow nozzle etc. Any advanced class instrument system such as those using electronic devices or mass flow technique shall be arranged by the contractor, if required. However, same shall be installed before start of initial operation of unit. For determination of primary flow to the turbine, a calibrated low Beta-ratio throat-tap nozzle assembly shall be installed permanently in condensate line prior to initial operation.	Bidder's query regarding Sipat Specification is not correct. Bidder to comply with the specification requirements.
829	SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	3 OF 35	3.1, p	Provenness criteria for critical equipment(s) and bought out items : p) Name of equipment : HP Bypass system Type of equipment : HP Bypass system for supercritical steam turbine generator sets Equipment rating : Capacity of each valve not less than 750 Ton/hr at 270 Kg/Cm2(abs) & 600 deg.C Main Steam pressure and temperature at Turbine inlet.	Bidder/Sub vendor should be allowed to meet the referred steam parameters & Flow requirement through multiple projects (i.e. multiple/different project references can be considered for meeting individual parameters (i.e. Pressure, Temperature & Flow) provenness). Please confirm acceptance.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
830	SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	4 OF 35	3.1, q	Provenness criteria for critical equipment(s) and bought out items: q) Name of equipment: LP Bypass system Type of equipment: LP Bypass system for steam turbine generator sets Equipment rating: Capacity of each valve not less than 750 Ton/hr at pressure corresponding to 100% TMCR condition reheat pressure (abs) & 600 deg.C reheat temperature at Turbine inlet.	Bidder/Sub vendor should be allowed to meet the referred steam parameters & Flow requirement through multiple projects (i.e. multiple/different project references can be considered for meeting individual parameters (i.e. Pressure, Temperature & Flow) provenness). Please confirm acceptance.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
831	Section – VI, part-A	SUB SECTION-VI MANDATORY SPARES	_	_	MANDATORY SPARES	Mandatory spares which are duplicated at different clauses in Mech/Elec/C&I sections, Bidder will consider the spare as per the section where higher qty is specified. Other sections shall be ignored for the same spares. Please confirm acceptance.	It is clarified that in case Mandatory spares are repeated at more than one location, Bidder to consider item/spare indicated with maximum quantity.
832	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	5 of 34	21	LP Bypass control valve (Set of all internals required to complete one valve assembly except valve body) : 1 No.	Please clarify whether Bonnet to be included or it is excluding Bonnet.	Bonnet to be also provided. Bidder to comply with the specification requirements.
833	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	5 of 34	23	LP Bypass stop valve (Set of internals required to form one valve assembly except valve body) : 1 No.	Please clarify whether Bonnet to be included or it is excluding Bonnet.	Bonnet to be also provided. Bidder to comply with the specification requirements.
834	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	6 of 34	29	Control fluid pump assembly including motor and complete coupling : 1 No.	Please clarify whether this spare is related to HPU of HP LP Bypass system pump-motor assembly or Main Turbine control fluid pump	Control fluid pump assembly including motor and complete coupling mentioned here is for Main Turbine governing oil supply system. Bidder to comply with the specification requirements
835	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	12 of 34	xxvii.)	Seal kit for Electrohydraulic actuators for HP and LP bypass system : 2 Sets of each	By pass system does it mean all valves in HP & LP i.e. HP & LP Steam control valve, LP steam stop valve, HP & LP spray control valve and HP spray stop valve. Please clarify.	The requirement against this clause is both for HP&LP Bypass system. Bidder has to provide seal kit for all electrohydraulic actuatotrs (Steam as well as spray valves) as per the quantity specified. Bidder to comply with the specification requirements.
836	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	13 of 34	2 (ii)	Soft packing like gaskets/pressure seal/sealing ring, gland packing rings for HPSV, **HPCV, HPBYPASS VALVE**, HP BYPASS SPRAY STOP & CONTROL VALVE, IPSV, IPCV, LP BYPASS SV, LPBYPASS CV, LP bypass water injection valve : 2 Sets for each kind of valve	What is the difference between HPCV and HP Bypass valve? Under rest of the clause when HP control valve was specified it was treated as HP bypass valve. Please clarify.	Bidder's understanding is not correct. HPCV means main turbine control valve. Bidder to comply with the specification requirements.
837	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	27 of 34	5.00.00	PROCESS CONNECTION PIPING (FOR IMPULSE PIPING/TUBING, SAMPLING PIPING/TUBING AND AIR SUPPLY PIPING AS APPLICABLE)	Bidder understands that this requirement is not applicable to Tubing/ fitting coming on hydraulic actuators, Field Tubing and Fittings of Hydraulic Power Supply Units of HP-LP Bypass system. Please confirm acceptance.	Bidder's understanding is correct .However, Bidder to comply technical specification .
838	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	6 of 34	26	HP Bypass Valve complete assembly : 1 no.	Bare stem valve excluding complete servomotor assembly offered against this clause. Please confirm acceptance.	Complete HP Bypass valve with all internals and valve body excluding servomotor/Actuator ,yoke assembly, controls and feedback transmitters to be supplied. Bidder to comply with the specification requirements.
839	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	25 of 34	4.00.00 A (2)	a. Electro-Hydraulic Converter/Servo unit/proportional valve for LPBP b. Blocking unit for LPBP (as applicable) c. Position feedback transmitter with links for LPBP d. Positioner for LPBP e. Controller as applicable 1 set	Please clarify LP BP means only LP bypass stop & control valve or it is inclusive of LP bypass spray control valve also.	LP BP means complete set of valves in LP Bypass system including stop valve, control valve & spray control valves.
840	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	25 of 34	4.00.00 A (3)	a. Electro-Hydraulic Converter/Servo unit/ proportional valve for HPBP b. Blocking unit for HPBP (as applicable) c. Position feedback transmitter for HPBP d. Positioner for HPBP 1 set	Please clarify HP BP means only HP bypass control valve or it is inclusive of HP BP spray control valve & HP BP spray block valve.	HP BP means complete set of valves in HP Bypass system including HPBP control valve, spray block & control valves.
841	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	27 of 34	4.00.00 (F)	(i) Solenoid valves in the Electrohydraulic governing & protection circuit of main turbines, BFP turbines, HPBP & LPBP : 10 % or 1 no. of each type and model whichever is more	Please clarify HP/LP BP means only HP/LP bypass control valve or inclusive of other valves like HP BP spray control valve, HP BP spray block valve & LP bypass spray control valve also.	Bidder's understanding is not correct. Quantity envisaged is 10% of total quantity of each type of solenoids for complete HPBP/LPBP system being supplied in this package.
842	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	8 of 34	VI (1)	Complete drip pump assembly with coupling sets (Without Motor) : 1 no	Bare pump assembly without canister will be offered against this clause. Please confirm acceptance.	Cannister is not required, however coupling requirement is clear and shall be provided.
843	Section – VI, part-A	SUB SECTION-VI, MANDATORY SPARES CHAPTER-02 STEAM TURBINE GENERATOR	8 of 34	V (5&6)	DRIVE TURBINE OF BFP : Auxiliary Control valve complete assembly : 1 No. Auxiliary control valve servomotor complete assembly : 1 No.	Not applicable in our design & also no equivalent spare has been envisaged. Please confirm acceptance.	In case the specified item is not applicable, equivalent mandatory spares pertaining to the offered design shall be supplied by the bidder.
844	Section – VI, part-B	SUB SECTION-B-02, Motors	3 of 4	7.10.00	3.3/6.6 KV motors shall be offered with dust tight phase segregated double walled (metallic as well as insulated barrier) Terminal box.	Alternately Elastimold type Terminal box should also be accepted as per OEM standard proven practice. The same was accepted in recent tender of NTPC for Talcher 2x660 MW project. Please confirm acceptance.	This shall be finalised during the detailed engineering.
845	Technical Specification Section - VI, Part B	Sub-Section A-01 Equipment Sizing Criteria	38 of 87	2.03.07	The deaerator shall be designed such that maximum oxygen content shall be 0.005 cc/litre at deaerator outlet measured as per ASTI	All super critical units operated in oxygenated treatment mode and hence guarantee for maximum oxygen content in feed water system is not applic	Sometimes there may be requirement of AVT operation during unit running also. In case of oxygenated treatment mode oxygen content may be more but when unit will run in AVT mode this should be less than 0.005 cc/lit. So dearator should be capable for maintaining maximum oxygen content of 0.005 cc/lit at deaerator outlet.Bidder to comply specification requirement.
846	Technical Specification Section - VI, Part A	Sub-Section, IV Functional Guarantees & Liquidated Damages	4 of 73 8 of 73	1.01.01 1.01.03	ii) Unit Heat Rate at 55% TMCR load Guaranteed Unit Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm2 (abs) and rated Main Steam and Reheat Steam temperature at 77mmHg(abs) condenser pressure with zero make up at 440 MW load (i.e. 55% of rated load) . iii) Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C (as selected) at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load) with **one TDBFP in operation.**	Bidder understand that for 55% TMCR Heat rate guarantee, One (1) TDBFP shall be in operation. Please confirm.	Bidder understanding is correct. Bidder to further refer Clause No. 1.01.03/(iii) of the Functional Guarantee chapter/sub-section-IV/Part-A.

847	Technical Specification Section - VI, Part B	Sub-Section, G-01 Operating Capability Of Plant Sub-Section, A-01 Equipment Sizing Criteria	1 of 4 44 of 87	1.01.00 2.08.00	(j) TG output for house load operation may be considered 50 MW atleast for 1 hours. (d) HP-LP bypass operation under rated steam conditions with bypass valve open to full capacity and turbine on house load (5% of rated load).	As per Sub-Section-G-01/Clause 1.01.00 (j), House load operation is mentioned with 50 MW. However, as per Sub-Section-A-01/Clause 2.08.00 (d), it is mentioned as "5% of rated load" which is 40 MW. Please confirm correct House load power output.	Bidder to refer amendment TG-5 in this regard againt clause no. 2.08.00 (d)/Sub-section-A-01/Part-B/Section-VI.
848	Technical Specification Section - VI, Part E Tender Drawings	Dwg. No.: XXXX-999-POM-A-007 (Extraction Steam P&ID for Heaters)	-	-		As per tender P&ID, extraction steam tapping for BFPT prior to power operated NRV. Bidder proposes to take extraction steam tapping for BFPT after power operated NRV as per their standard proven practice as followed in past executed NTPC projects. Please confirm acceptance.	Specification requirements are clear. However, Bidder proposal regarding extraction steam tapping point shall be finalised during detail engineering. Bidder to comply with the specification requirements.
849	Technical Specification Section - VI, Part A	Sub-Section, IIA-06 Turbine Generator & Auxiliaries	6 of 10	7.03.00	Two (2) steam turbine drives for the turbine driven boiler feed pump per unit complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers……	Bidder propose permanent strainer for steam turbine drives for the turbine driven boiler feed pumps in place of temporary strainer for better steam quality management as per turbine drive manufacturer recommendation. Please accept the same.	In addition to permanent strainer, additional strainer shall be provided. Specification requirement is clear, Bidder to comply with the specification requirements.
850	Technical Specification Section - VI, Part A	Sub-Section, IIA-06 Turbine Generator & Auxiliaries	6/7 of 10	7.03.00	Two (2) steam turbine drives for the turbine driven boiler feed pump per unit complete with ESV, control valves, non return valves for single admission drives, permanent & temporary steam strainers, preferably hydraulic turning gear, hand barring device, atmospheric relief diaphragm and it's vent piping, all interconnecting piping, foundation base plates, integral gland seal system, complete lube oil and control oil system including oil tank, oil coolers, duplex oil filters, 2x100% vapour exhausters, 100% capacity centrifuge for each steam turbine driven pump……	Bidder propose 1x100% capacity portable centrifuge common for two steam turbine drives / turbine driven boiler feed pumps. This is based on the past executed projects and has been accepted in supercritical projects including NTPC & other state electricity board projects. Please confirm acceptance.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
851	Technical Specification Section - VI, Part B	Sub-Section-A-08 Power Cycle Piping	1 of 19	1.02.00 (a)	BFP-T Exhaust Piping 60- 120 M/sec However, Bends used in Piping of BFP-T Exhaust to Condenser should be of Alloy Steel of A 691 Grade 2 – ¼ Cr class 21 / 22 or A – 691 grade 1- ¼ Cr Class 21 / 22	Owner to please note that Material of Bends used in Piping of BFP-T Exhaust to Condenser shall be same as that of parent pipe. Please accept the same.	Bidder proposal not acceptable. Bidder to comply specification requirement.
852	Technical Specification Section - VI, Part B	Sub-Section-A-07 Steam Turbine & Auxiliaries System	16 of 25	6.05.09 (d)	In case bidder offer extraction steam to BFPT arrangement as per BOX-B of tender P&ID of extraction steam to BFPT then the pressure regulating valves in the CRH and Auxiliary steam line shall necessarily be electro hydraulically operated.	As per tender P&ID, separate electro hydraulically operated control valves in auxiliary steam and CRH steam line to BFPT is shown. Bidder proposes to supply common electro-hydraulic control valve in Auxiliary steam and CRH steam line to BFPT as per OEM standard and proven practice followed in past executed NTPC projects and other state board projects. Owner is requested to approve the same.	Bidder proposal is not acceptable. Actuators for BFPT shall be provided as per scheme given in Tender drawing. Bidder to comply with the specification requirements.
853	Technical Specification Section - VI, Part B Technical Specification Section - VI, Part E Tender Drawings Technical Specification Section - VI, Part A	Sub-Section-A-02 Steam Generator & Auxiliaries including ESP Dwg. No.: XXXX-999-POM-A-006 (Auxiliary Steam System P&ID) Sub-Section - III Terminal Points & Exclusions	50 of 67 - 1 of 3	16.01.01 - 1.01.01	Further, the Bidder shall provide an interconnection arrangement at station header with High Temperature Aux. Steam station header of existing stage-I (2x800 MW) units (Approx. length of interconnecting line is about 2250 meters).Auxiliary steam when sourced through this interconnection shall be available at a maximum rate of 60 T/hr with parameters 16 ata/ 310°C at Stage-I TP. Bidder shall consider the same for start-up procedures during initial commissioning.  **Note 10:** The operating pressure & temperature of Aux. Steam unit station header shall be optimized by the bidder maintaining a minimum 50°C superheat and minimum temperature of 310°C. TP for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing Stage-II with motorized isolation valve and NRV as indicated in the tender drg.	In absence of clarity between Cl. No. 16.01.01 and Auxiliary Steam System P&ID (Dwg. No.: XXXX-999-POM-A-006), Owner is requested to connect the Stage-I & Stage-II header as shown in the Auxiliary Steam System P&ID (Dwg. No.: XXXX-999-POM-A-006) and provide a single Terminal Point location (i.e. co-ordinate) with elevation at the existing aux. steam header for the further extension of the station aux. steam header to the Stage-III header as these inputs are not available in Cl. No. 1.01.01, Sec-VI, Part-A. Bidder understands that connection of Stage-I & Stage-II aux. steam header is not in the Bidder's scope of work. Owner is requested to confirm and amend the clause 16.01.01 accordingly. Further, in the tender drawing of Auxiliary Steam System, it is mentioned in Note-10, the minimum temperature to be maintained in the station aux. steam header as 310°C. Therefore, considering the temperature requirements of Turbine & Boiler OEM, Owner is requested to provide the steam parameters at the TP as **16 ata / 320°C**. In addition to above, allocation of auxiliary steam as 60 T/Hr is very less for 800 MW unit. Owner is requested to enhance the requirement by another 30 T/Hr so that uninterrupted aux steam supply will be available for different consumers of Boiler and Turbine during trouble-free operation of various start-up cases.	The available aux. steam flow and paramters from the Stg.-II have been specified. Any additional flow requirement or steam paramteres shall be in the scope of the Bidder. Bidder to also refer to the amendment to technical specification Sl. no. TG-7 for Drg. No.- XXXX-999-POM-A-006 and Sl. no. SG.26.
854	Technical Specification Section - VI, Part B	Sub-Section-G-02 Unit Operating Philosophy	3 of 5	8.2	Run Back Operation: In case when both the TDBFP's are running MDBFP shall be kept in Hot standby mode. In case when one TDBFP trips, runback shall be initiated to 75% Load.	As per OEM Feed water to fuel firing ratio is an important parameter to be maintained in OTSC boilers. It is extremely important that minimum required waterwall flow to be maintained at all times when firing is ON in the boiler to prevent. Further, single TDBFP operation capability will be checked during detail engineering based OEM pump characteristic envelope. Therefore runback percentage with single TDBFP operation will be decided during detail engineering.	Specification requirements are clear. However, Bidder proposal regarding runback shall be finalised during detail engineering.
855	Technical Specification Section - VI, Part B	Sub-Section-G-02 Unit Operating Philosophy	4 of 5	8.2	No BFP trip will be initiated on Separator level high-high, BFP shall be run in recirculation.	BFP trip is a safety protocol and deviation is not acceptable as per the bidders' operational philosophy. This clause may be modified or deleted as stated below: "Bidder propose that BFP recirculation valve shall be opened at separator level high and BFP trip at separator level high-high shall be retained".	Bidder proposal regarding recirculation valve opening at separator level high will be finalised during detail engineeering. However, bidder proposal is not acceptable regarding BFP tripping at separator level high high.
856	Technical Specification Section - VI, Part B_BookQA	Sub-Section-E-12 Boiler Feed Pumps	2 of 4	1.00.00 (a)	Performance Tests on each Boiler Feed Pump to determine the characteristic curve (Head, Capacity, Efficiency & Power) at Design Speed and to ensure compliance with design requirements specified in the specification. Measurement shall be carried out at 10%, 25%, 50%, 65%,80%, 100% & 125% of Design Flow with loop water at design temperature. Performance Test at other specified Conditions shall be carried out on all Boiler Feed Pumps at their respective Speeds at design temperature.	Many manufacturers does not offers / recommend to conduct performance test below recommended flow, therefore performance tests at 10%, 25% flow will not be done. It's more like pump running in dry conditions which may damage the pump internals. Performance test is performed at reduced speed and temperature meeting HIS guidelines and Note 5 of Sub Section E-12.	Bidder to meet specification requirements.Detailed test requirement shall be discussed during post award MQP finalisation.
857	Technical Specification Section - VI, Part B_BookQA	Sub-Section-E-12 Boiler Feed Pumps Sub-Section-E-10 Condensate Extraction Pumps	3 of 4 2 of 2	Note (1) Note (2)	Shop tests shall be conducted with soften Quality Water.	Water quality used for shop tests shall be as per approved manufacturer standard practice.	Bidder to meet specification requirement.
858	Technical Specification Section - VI, Part B	Sub-Section A-07 Steam Turbine & Auxiliaries System	11 of 25	5.02.00 (e)	Hardened 400 series stainless steel impingement plates for flashed drain inlet from HP heaters, BFP recirculation, boiler start-up drains etc.	As per bidder's experience of super critical plants, Hardened 304 series stainless steel impingement plates are also suitable for this purpose. Owner is requested to amend the clause as "Hardened 400 series or 304 series stainless steel impingement plates"	Hardened 400 series stainless steel is better material for specified requirements. Bidder proposal is not acceptable.Bidder to comply specification requirement.
859	Technical Specification Section - VI, Part B	Sub-Section A-07 Steam Turbine & Auxiliaries System	11 of 25	5.02.00 (f)	All water spray valves, splash plates, trays, vent condenser and other elements in contact with undeaerated water or non-condensable gases shall be of SS-304 or SS-410.	Customer is requested to modify the clause as mentioned below: "Elements in contact with undeaerated water or non-condensable gases shall be of SS304 material / SS304 lining material". This is in line with the Deaerators supplied for all 500 MW and above projects.	SS304 lining is not acceptable. Bidder to comply specification requirement.
860	Technical Specification Section - VI, Part B Technical Specification Section - VI, Part B	Sub-Section-A-01 Equipment Sizing Criteria Sub-Section-G-05, Standard Type Test Procedure	42 of 87 2 of 37	2.06.04 1.03.00	(b) First stage suction specific speed: Not in excess of 10000 (US units) and 9500 US units based on 3% head break down of that impeller of main pump and booster pump respectively at their respective design point. Acceptance Criteria : 2. NPSH(R) (3% head drop) at Design point shall not be less than the NPSH(R) determined by the suction specific of 8000 US unit and 9500 US unit for main pump and booster pump respectively calculated with the flow of Design point with Inter-stage closed.	Due to mismatch between Cl. No. 1.03.00 and 2.06.04, Bidder propose to consider suction specific speed (NPSHR at 3% head drop) of 10000 (US units) for main pump (BFP) at design point. Kindly confirm acceptance.	Bidder to refer amendment TG-6 in this regard against clause no. 1.03.00/Sub-Section-G-05/Part-B/Section-VI.
861	Technical Specification Section - VI, Part B	Sub-Section A-07 Steam Turbine & Auxiliaries System	24 of 25	Annexure-I	Note (6): In the sliding pressure mode of operation the throttle pressure will slide down from rated pressure to a value corresponding to 40% of rated pressure. For computing heat balance for sliding pressure mode of operation at 80%, 70%, 60%, 50% & 30% of Unit rated load, rated temperature shall be used for main steam and hot reheat steam respectively.	For loads below 50% of rated load the main steam temperature and reheat steam temperature shall be fine tuned based on Boiler OEM proven practice. Please confirm acceptance,	Bidder to refer complete Note (6) ANNEXURE-I Sub-section A-07, Steam Turbine and Auxiliaries System (Page 24 of 25). Bidder to comply with the specification requirements.
862	Technical Specification Section - VI, Part E Tender Drawings	Dwg. No.: XXXX-999-POM-A-007 (Extraction Steam P&ID for Heaters)	-	-		As per tender P&ID, PT connection has been shown for the Extraction lines to LPH#1 & 2. Owner to please note that these are neck mounted heaters mounter in the condenser neck. Therefore, it is not feasible to install PT in the extraction lines to LPH#1 & 2. Please confirm acceptance.	Bidder to provide the instruments as per tender P&ID and comply with the specification requirements.
863	Technical Specification Section - VI, Part E Tender Drawings	Dwg. No.: XXXX-999-POM-A-005 (HP & LP Bypass System P&ID)	-	-		As per tender P&ID, Warm-up arrangement has been shown. Owner to please note that Warm-up arrangement for HP/LP Bypass Valves shall be as per Bypass Valves OEM recommendation. Please confirm acceptance.	Bidder to refer NOTE 3 in Referred Tender drwaing. Bidder to comply with the specification requirements.
864	Technical Specification Section - VI, Part B	Sub-Section-A-01 Equipment Sizing Criteria	38 of 87	2.03.06 (f)	Provide sentinel relief valve on tube side. Relief valve on shell side sized to pass flow from two ruptured tubes (four open ends) or 10% of water flow corresponding to VWO condition with 3% make up and 77 mmHg (abs) condenser pressure at 10% accumulation whichever is higher and set to open at heater shell design pressure.	Owner to please note that Shell side relief valve shall be sized for 10% of the feed water flow, or Flow based on the clean rupture of one heater tube resulting in two (2) open ends discharging , whichever is greater, at 10% accumulation as per criteria stipulated in HEI. Please confirm acceptance.	Bidder's proposal is not acceptable, as specified requirement is over and above code. Bidder to comply with the specification requirements.
865	Technical Specification Section - VI, Part B	Sub-Section-A-01 Equipment Sizing Criteria	37 of 87	2.03.04	Each of the LP heaters and drain cooler shall be capable of handling 110% of the design condensate flow from 2x50% condensate extraction pumps without undue vibration and other deleterious effects. Each of HP heaters shall be capable of handling 110% of the design flow from one BFP without undue vibration and other deleterious effects.	Owner to please note that LP & HP heaters needs to be designed to handle design flow of CEP & BFP respectively. As design flow of BFP & CEP has sufficient margin on actual requirement hence additional 10% margin over and above the design flow is not required. Please provide acceptance on the same.	Specification requirement is clear in this regard, heaters shall be capable of handling 110% of design flow. Bidder to comply with the specification requirements.

866	Technical Specification Section - VI, Part E Tender Drawings	Dwg. No.: XXXX-999-POM-A-005 (HP & LP Bypass System P&ID)	-	-		Bidder would like to clarify that breakdown orifice is not required in HP bypass downstream piping as per bidder's standard practice followed in all executed projects. Hence, the same will not be considered as per bidder's standard practice. Please confirm acceptance.	Bidder to refer NOTE 3 in Referred Tender drwaing. Bidder to comply with the specification requirements.
867	Technical Specification Section - VI, Part B Technical Specification Section - VI, Part B	Sub-Section A-01 Equipment Sizing Criteria Sub-Section A-08 Power Cycle Piping	40 of 87 2 of 19	2.06.01 (i) 1.03.00 (d)	4) Emergency point (TDBFP) Two turbine driven boiler feed pumps to be capable of generating the discharge pressure not less than steam generator highest safety valve set pressure corresponding to 105% of boiler maximum continuous rating (at 0% make up). The design pressure of complete feed water discharge piping system downstream FRS first isolation valve shall not be less than maximum of the following: (i) 1.05 times the maximum operating pressure (including BMCR condition) at BFP discharge. **(ii) Pressure required at BFP discharge under lowest spring-loaded safety valve on boiler separator blowing condition.** (iii) Design pressure as required by IBR / ASME.	Attached is Interpretation to PG-61.5, Feed Water Supply for a Steam Generator With No Fixed Water Level. This was published in ASME website in July 2014. Per interpretation 1-13-15, it is not required to size the BFP as per PG-61.5. Further as per Cl. No. 1.03.00 (d) of Power Cycle piping, design pressure for FW piping downstream FRS first isolation valve shall be selected for lowest safety valve set pressure at BMCR flow. Hence, Bidder would like to consider the emergency point for BFP capability as flow corresponding to BMCR condition and head corresponding to maximum expected pressure at economizer inlet or corresponding to lowest safety safety valve set pressure which ever is maximum. Please confirm acceptance.	Bidder's proposal is not acceptable. Bidder to comply with the specification requirements.
868	Technical Specification Section - VI, Part B	Sub-Section A-01 Equipment Sizing Criteria	3 of 87	1.04.00	(ii) Start-up: The steam generator shall also be capable of start-up without HP-LP by-pass system in service.	Owner to please note that as per OEM standard start-up procedure for supercritical plant, it is only possible to start the boiler with the HP-LP bypass valve in operation. Please confirm acceptance.	The capability is required based on the operational experience of the Employer. Bidder to make necessary modifications to its start-up philosophy/procedure to comply to the technical specification requirement.
869	Technical Specification Section - VI, Part B Technical Specification Section - VI Part E - Tender Drawings	Sub-Section A-01 Equipment Sizing Criteria General Layout Plan	41 of 87 -	2.06.01 -	ii) Motor driven BFP: 1) 1x30% MDBFP shall meet all the above conditions (i.e. (i) (1) to (5) above) except that the flow of 1x30% Motor driven Boiler feed pump shall be 30% of the total flow arrived for 2x50% TDBFPs. 	Owner to please note that in Cl. No. 2.06.01, Sec-VI, Part-B as well as in tender drawing of Feedwater System P&ID (8024-999-POM-A-010), the BFP configuration for each unit is mentioned as: a. 1 x 30% MDBFP b. 2 x 50% TDBFP However, in the General Layout Plan (Dwg. No.: 1150-999-POC-F-001, Rev A), four (04) nos. of Boiler feed Pumps (02 nos. MDBFP & 02 nos. TDBFP) has been shown. Bidder understands that the BFP configuration for each unit as mentioned in Cl. No. 2.06.01, Sec-VI, Part-B as well as in tender drawing of Feedwater System P&ID (8024-999-POM-A-010) shall be followed and no space provision for future MDBFP shall be envisaged in the TG Building. Please confirm our understanding.	Referred Tender drawings do not pertain to Sipat St-III(1X800 MW) EPC package. Requirements of Technical Specification and Tender drawings are correct. Bidder to comply with the specification requirements.
870	Technical Specification Section - VI, Part B	Sub-Section A-07 STEAM TURBINE AND AUXILIARIES SYSTEM	15 of 25	6.05.07	**Codes** Design of drive turbines generally in accordance with API 612 and 614 and testing in accordance with ASME PTC-6.	American Petroleum Institute (API) is usually applicable for oil & gas industries & same is not applicable for Power projects. Hence API will not be considered for this project for any equipment design. Please confirm acceptance. Accordingly Bidder proposes to design BFP drive turbine as per IEC 45 / as per the OEM standard proven practice. Please confirm acceptance. Further, Bidder would like to inform that a separate PG test as per PTC-6 is not envisaged exclusively for BFP drive turbine as the same is part of overall PG test done for the STG. Owner is requested to confirm the acceptance.	Bidder's proposal for Drive Turbine design code as IEC 45 is not acceptable. Bidder to comply with the specification requirements.

S. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
871	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION- E-00 INTRODUCTION TO QUALITY ASSURANCE SPECIFICATION	PAGE 1 OF 1	-	Various standards referred in this document shall be the latest revisions.	Bidder request to follow clause "PART-C 5.00.00 CODES & STANDARDS of GENERAL TECHNICAL REQUIREMENTS 5.02.00 Unless covered otherwise in the specifications, the latest editions (as applicable as on the date of bid opening), of the codes and standards given below shall also apply; as there is different requirement in different sections of specification"	Bidder understanding is not correct E-00 which is QA Chapter part is to be followed for QA Portion of the specification.
872	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-01 STEAM GENERATOR AND AUXILIARIES	Page 2 of 13	(d)	(d) i) SHOP WELDS: Finished butt welds shall be subjected to RT or UT. Wherever the code/standard/process specifies random sampling, the same shall be minimum 20%. (ii) FIELD WELDS: a) Finished butt welds shall be subjected to RT or UT. Wherever the code/standard/process specifies random sampling, the same shall be minimum 20% b) Finished butt welds not covered under random sampling for RT/UT, referred above at point(a) shall be subjected to RT or UT or PAUT.	Bidder propose to perform extent of RT/UT at field welds shall be same as Shop welds Additionally PAUT /Recordable UT may be used in lieu of RT/UT Bidder understand, clause (ii) b) will be applicable to joints not part of clause a) (i.e. 20%)	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
873	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION –E-05 LP PIPING PACKAGE (MECHANICAL)	2 of 3	Note 1	100% Hydraulic test shall be carried out. Weld joints not subjected to hydraulic test due to some unavoidable reasons, shall be subjected to 100% RT/PAUT.	Bidder request to provide option for performing RT/PAUT in lieu of Hydraulic Test	Bidder proposal is not acceptable. Hydrotest is carried out to validate the design & strength of the component. Bidder to follow the technical specification
874	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-06 POWER CYCLE PIPING	Page 1 of 5	1.01.00	(f) All butt welds in alloy steel piping of P-91, X -20, X-22 & material P15E group & above shall be checked for RT/ UT/PAUT+TOFD & MPI after SR.	(f) All butt welds in alloy steel piping of P-91, X -20, X-22 & material P15E group & above shall be checked for RT/ UT/PAUT/TOFD & MPI after SR. Bidder has worked with similar NDT process and has successfully completed activity in past projects. Bidder request to kindly confirm	The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. This may be discussed during detailed engineering
875	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-06 POWER CYCLE PIPING	Page 2 of 5	2 3	Piping (h) Non-destructive examination of welds shall be carried out in accordance with the relevant design/manufacturing codes. However, as a minimum, the following requirements shall be met. Further statutory requirement, wherever applicable shall also be complied with. (1) Temperature > 400 Deg, C or pressure exceeding 71 bar. (i) 100% RT/UT on butt welds and full penetration branch welds. (ii) 100% MPE. (2) Temperature > 175 Deg, C upto 400 Deg. C or pressure exceeding 17 bar and upto 71 bar. (i) 100% RT/UT on butt welds and full penetration branch welds for pipe dia. more than 100 NB. (iii) 100% MPE.	Bidder request to provide option for performing Penetrant testing in lieu of MPE Where ever the vent pipes are used under these conditions will be 10% RT or UT tested as these are open to atmosphere. Also, alternative to RT, UT/Advanced NDT may be performed in line with bidder standard practice	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
876	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-06 POWER CYCLE PIPING	3 of 5	1.05.00	(b) Hardened/stellitted valve disc and seat are to be subjected to LPI and hardness check.	Hardness testing on seat/disc may be performed on a sample test coupon (PTC) instead of actual seat. The Sample test coupon will undergo same process as that of actual seat material and the hardness of this test coupon will be measured. As the hardness test on actual seat creates indentation on seat, which may become a leak path in the feature during the valve operation. (inline with Sub section E-08 1.07.01).	Bidder proposal is not acceptable. LPI & Hardness testing requirements are clearly specified. Bidder to comply technical specification requirement.
877	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-6 POWER CYCLE PIPING	Page 1 of 5	1.01.00	Piping (b) All pipe lengths under this package, including piping where alloy steel is used shall be subjected to 100 % ultrasonic examination as per material specification standard with acceptable notch depth of 5% of the selected wall thickness (1.5mm maximum) except for the following piping system:	All pipe lengths shall be subjected to100% Ultrasonic Examination or 100% Hydrotest as per Material specification.	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
878	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-6 POWER CYCLE PIPING	Page 1 of 5	1.01.00	Piping (e) Non-destructive examination of welds shall be carried out after post weld heat treatment, if any. Piping: (i) Wherever SR/PWHT is envisaged for alloy steel, above NDTs shall be after SR/PWHT.	Bidder request, RT or UT of butt joints will be done before PWHT and MPI or DPT will be after PWHT	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
879	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-6 POWER CYCLE PIPING	Page 2 of 5	1.02.00	Fittings: Raw material of all forged/formed fitting shall be ultrasonically tested. All mother pipes used for fitting shall be ultrasonically tested or hydraulic tested.	All the pipes used for formed fittings shall be UT or Hydrotested as per pipe material specification. (There is a contradictory statement in the first and second sentence.)	Bidder proposal is not acceptable. Hydrotest is carried out to validate the design & strength of the component. Bidder to follow the technical specification
880	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-8 STEAM TURBINE & INTEGRAL AUXILIARIES	Page 23 of 26	1.07.03	1.07.03 Butterfly valves: (h) After assembly, one valve of each size with respective actuator shall be shop operated over the full range of movement in both the directions, with the body subjected to the full hydrostatic pressure conditions, to demonstrate that the unit is in working order without any leakage through the joints and torque switches/clutches, limit switches are operating satisfactorily. During the test, hand wheel operation, opening/closing time and current drawn shall also be checked.	As per all the Butterfly valve manufacturer practice, after assembly of valve, the valve functional test will be done with respective actuator operated over the full range of movement in both the directions without subjecting the body hydrostatic pressure conditions. Please note that the body is already hydrotested in assembled condition.	Bidder proposal is not acceptable.The detailed test requirements shall be discussed & finalised during post award MQP finalisation.
881	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-08 STEAM TURBINE & INTEGRAL AUXILIARIES	Page 24 of 26	1.10.02	(c) All welds between condenser neck and LP turbine shall be subjected to 100% radiographic and magnetic particle examination.	Bidder request to perform PT in lieu of Magnetic Particle Testing as there is very limited access available for performing NDT	Bidder proposal is not acceptable.The detailed test requirements shall be discussed & finalised during post award MQP finalisation.
882	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-8 STEAM TURBINE & INTEGRAL AUXILIARIES	Page 13 of 26	1.03.01	(d) To ensure dimensional control of condenser, parts\sub assemblies shall be trial assembled at shop. BIDDER shall furnish his proposal in this regard, which will be subject to Employer's approval. The extent/need for trial Assembly of various parts of Condenser / sub assemblies like Water Box, Water Chamber, Hotwell, Main Tube plate and support plate, its alignment and trial insertion of few tubes etc. shall be as per Manufacturers standard established practices. Such established practices shall be furnished to NTPC during finalization of quality plan.	As per Bidder standard practice, all the Support plates and main tube sheets assembled one above the other for ensuring alignment through insertion of few tubes. As per Bidder standard, it is not envisaged to trial assemble water box, water chamber, hot well Main tube plate and support plate at the workshop.	Bidder proposal is not acceptable.The detailed test requirements shall be discussed & finalised during post award MQP finalisation.
883	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-8 STEAM TURBINE & INTEGRAL AUXILIARIES	Page 16 of 26	1.04.02	1.04.02 Vacuum pump: The test should be conducted with the respective motors to be supplied.	The test shall be done either job motor or calibrated shop motor	Bidder proposal is not acceptable.The detailed test requirements shall be discussed & finalised during post award MQP finalisation.
884	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-8 STEAM TURBINE & INTEGRAL AUXILIARIES	Page 18 of 26	1.06.02	1.06.02 Metallic Expansion Bellows (f) Life cycle test, meridional yield rupture test and squirm test to be carried out on a prototype/expansion bellow as per Sec.D clause 3.2 of standards of Expansion joint Manufacturer Association (EJMA). In case these tests have already been accepted by NTPC on a prototype expansion bellow, as defined in Sec.D Clause 3.2 of Expansion Joints Manufacturers Association (EJMA) test reports may be furnished by manufacturer for consideration and approval of Employer.	The type test reports witnessed by NTPC or other customers or third party agencies of Metallic Expansion bellow manufacturers may be submitted in-place of performing actual test	Bidder proposal is not acceptable.The detailed test requirements shall be discussed & finalised during post award MQP finalisation.
885	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-8 STEAM TURBINE & INTEGRAL AUXILIARIES	Page 20 of 26	1.06.03	1.06.03 Rubber Expansion Joint (h) Life cycle test shall be carried out on bellows of each type, design and size. In case these tests have already been accepted by NTPC in earlier projects for the same type / size /design, test certificate for the same may be furnished for approval of Employer.	As per rubber expansion joint manufacturer standard practice, if the higher size of the rubber expansion joint Life cycle test is done then the lower sizes are automatically considered as approved. It is not envisaged to carryout life cycle test of each type, design and size of bellow.	Bidder proposal is not acceptable.The detailed test requirements shall be discussed & finalised during post award MQP finalisation.
886	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-10 CONDENSATE EXTRACTION PUMP SUB SECTION- G-05 STANDARD TYPE TEST PROCEDURE SUB-SECTION-E-12 BOILER FEED PUMP SUB SECTION- G-05 STANDARD TYPE TEST PROCEDURE	Page 2 of 2 Page 12 of 38 Page 2 OF 4 Page 2 of 38	Note 3.03.00 Note (2) 1.03.00	CEP: □ NPSH (R) test shall be carried out on one Condensate Extraction Pump using cold water at pump flows of 25%, 50%, 80%, 100% and 125% of Design Flow at Design Speed. This shall be done at 3% head break by Suction Throttling Procedure / varying suction pressure. Plots will be made for NPSH vs head developed by 1st stage for all flows. From the plots NPSH values corresponding to 1% & 3% head drop will be determined for all the above % flows. Finally, Flow vs NPSH characteristic (1% & 3% head drop) will be drawn & value of NPSH at rated flow corresponding to "Design point" will be the requirement of the pump. BFP: □ NPSH (R) test shall be carried out on one Boiler Feed Pump and one booster pump using cold water at pump flows of 25%, 50%, 80%, 100% and 125% of Design Flow at Design Speed. This shall be done at 3% head break by Suction Throttling Procedure. Plots will be made for NPSH vs head developed by 1st stage for all flows. From the plots NPSH values corresponding to 1% & 3% head drop will be determined for all the above % flows. Finally, Flow vs NPSH characteristic (1% & 3% head drop) will be drawn & value of NPSH at rated flow corresponding to " Design point" will be the requirement of the pump.	□ NPSH(R) test already done for the same model will be submitted for review and acceptance by Customer. If NPSH(R)already done for the same model, it is not envisaged to repeat the test. Bidder understand that, NPSH Test shall be performed at 3% head break by Suction Throttling Procedure. NPSH test at 1% head drop not envisaged	Bidder to refer clause no 12.00.00 Sub-section A-07/ Part-B, Section-VI w.r.t. Type test requirement. Bidder to comply technical specification requirement. Type test procedure shall be finalised during detail engineering
887	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-12 BOILER FEED PUMP	Page 2 of 4	1	(a) Performance Tests on each Boiler Feed Pump to determine the characteristic curve (Head, Capacity, Efficiency & Power) at Design Speed and to ensure compliance with design requirements specified in the specification. Measurement shall be carried out at 10%, 25%, 50%, 65%,80%, 100% & 125% of Design Flow with loop water at design temperature. Performance Test at other specified Conditions shall be carried out on all Boiler Feed Pumps at their respective Speeds at design temperature.	Many manufacturers does not offers / recommend to conduct performance test below recommended flow, therefore performance tests at 10 % , 25 % flow will not be done. It's more like pump running in dry conditions which may damage the pump internals Performance test is performed at reduced speed and temperature meeting HIS guidelines and Note 5 of Sub Section E-12	Bidder proposal is not acceptable.The detailed test requirements shall be discussed & finalised during post award MQP finalisation.
888	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-12 BOILER FEED PUMP	Page 2 of 4	-	BFP; Type tests mentioned (NPSH, Pressure pulsation & Axial thrust measurement in the specification.	BFP; Type tests mentioned (NPSH, Pressure pulsation & Axial thrust measurement) already done for the same model then the reports will be submitted for review.	Bidder to refer clause no 12.00.00 Sub-section A-07/ Part-B, Section-VI w.r.t. Type test requirement. Bidder to comply technical specification requirement.
889	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB SECTION-E-13 RAW WATER SYSTEM (MECHANICAL)	Page 1 & 2 of 12 Page 7 of 12 Page 10 of 12	3) x xo vii ix	.Followings are the testing requirements for fabrication of pipes at site..... Following checks shall be carried out during joining of MS pipes at site by welding	Bidder request to perform RT/UT/ PAUT/TOFD in lieu of Hydraulic Test	Hydraulic test is carried out to test the system design & integrity hence Bidder request to perform RT/UT/PAUT/TOFD in lieu of Hydraulic test is not acceptable .

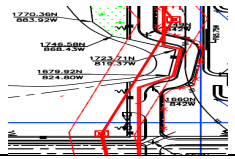
890	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-17 AC AND VENTILATION SYSTEM(MECH	Page 1 of 3	3.04.00	3.00.00 CENTRIFUGAL PUMP: 3.04.00 Standard Running Test i) All pumps shall be tested in the manufacturer's works preferably with contract motor (or as specified in Engg Tech spec) for capacity, efficiency, head and brake horse power.	As per standard Manufacturer practice, pumps will be tested either contract motor or Calibrated shop motor.	Shop test of Centrifugal Pump can be performed with job motor or equivalent rating calibrated Shop motor. However, preferably job motor to be used for testing of pump at Shop.
891	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-E-59 QA Civil Works	Page 5 of 6	A. Fabrication Works B. Erection Works at site	CW LINER/DUCT: NDT by RT in various Options	It is proposed to carryout UT instead of RT	For plates/liners of lower thickness, the defects may not be identified by UT. Hence RT needs to be done. Bidder is requested to follow technicalm specifications
892	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION E-59 CIVIL WORKS	PAGE 4 OF 6	II	(II) CW Liner/ Pipes Fabricated using H.R. coils with spiral weld joints at DPT on root run: 100% DPT for pipes up to 1200mm diameter	Pipes fabricated using HR Coils with Spiral Weld Joints at factory is an automated process of welding and it is not possible to carryout DPT on root run.	For factory fabricated pipes with Spiral weld joints DPT on root run shall not be applicable. The same is already incorporated in TS.
893	TECHNICAL SPECIFICATION SECTION-VI, PART-D	Part D ERECTION CONDITIONS OF CONTRACT	PAGE 2 OF 70	4.01.00	Complete recording of the temperatures through out the stress relieving cycle of the material and the weld subjected to heat treatment shall be made by means of chartless recorder / IIOT sensors duly password protected with a connectivity to remote server /Cloud .	Presently IBR inspectors accept only physical/hardcopy chart Digital Recorders with chartless recorder / IIOT sensors may be used, however Director Boiler need to accept the digital form of recording and issue a directive to all IBR Inspectors to accept the same Hence bidder request to use digital Smart PWHT - Pre-heating, post-heating and post-weld stress relief heat treatment for only P91/P91 materials, as with induction M/c digital data will be available However, if we work this initiative as part of digital journey, 10% of FWS may be used with such system	Bidder's proposal is not acceptable. The chartless recorder for stress relieving of the material are available and being used in the industry. Bidder to comply the specification requirement.
894	TECHNICAL SPECIFICATION SECTION-VI, PART-D	Part D ERECTION CONDITIONS OF CONTRACT	PAGE 41 OF 70	55.00.00	Computed RT shall be used as an advanced Engineering Practice. Main contractor to ensure minimum 10% computed radiography of weld joint to be performed in construction phase for scope agreed in FWS for boiler pressure parts. Main contractor to ensure the transfer & storage of these records in Server	Bidder would like to have exemption for the clause owing to following a) The acceptance from IBR at site for Computed RT shall be taken in to consideration from the boiler board b) In case of other alternative NDT method (such as UT/PAUT) adopted in past project same may also be permitted subject to statutory compliance.	Bidder's proposal is not acceptable. The computed radiography of the weld joints are available and being used in the industry. Bidder to comply the specification requirement.
895	TECHNICAL SPECIFICATION SECTION-VI, PART-D	Part D ERECTION CONDITIONS OF CONTRACT	PAGE 2 OF 70	3.05.00	Welding Equipment for high pressure (Boiler , PCP) - For GTAW process: HF Welding machines to be used. For SMAW process: Inverter based welding machine are to be used.	Welding equipment shall be used as per earlier practice of bidder as there were no impact of use of existing method welding while operation of plant.	Bidder's proposal is not acceptable. The required welding equipment details are clearly specified and the same are useful for control of the welding parameters properly. Bidder to comply the specification requirement.
896		SUB SECTION-A-08 Power Cycle Piping	(c)	PAGE 5 OF 19	2. Supplementary requirement S5: Certificate of conformity "COC" from pipe supplier for microstructure and delta ferrite (to be maintained within 3%max. when measured as per VD TUV 1272). Certificate of conformity "COC" from pipe supplier for microstructure and delta ferrite (to be maintained within 3%max. when measured as per VD TUV 1272).	Bidder would like to use VD TUV 1272/equivalent ASTM standard	Same shall be discussed and finalized during Detailed Engineering.
897	GENERAL TECHNICAL REQUIREMENTS SECTION - VI	QA- Disclaimer of Indicative Vendor list	Page 1 of 2 Page 2 of 2	1.1 1.7	However, in case of error/omission, if any, and represented by the successful bidder this will be addressed during the execution of the contract based on the material evidence available with NTPC / Main Contractor. 1.7 The list of sub-vendors is periodically revised to include new sub-vendors. Such a revision may also see a deletion of certain sub-vendors who may have been disqualified on grounds of inadequate performance or banned in line with NTPC's banning policy. The then current list will be shared with the successful bidder immediately on award	Bidder understand that a) In case vendors who are already approved/have executed various items in NTPC project are not in the indicative vendor list, bidder may consider same b) Bidder request to share the banned vendors as on date, which will help bidder for taking in to consideration. This list shall be part of contract at the time of award or order.	Bidder understanding is not right. a] In case sub vendor is not mentioned in the list , That will be tied up during detailed enginnering in post award. b] The updated banned list of Sub vendors in line with NTPC's banning policy will be shared with the successful bidder immediately on award as mentioned in technical specification.
898	GENERAL TECHNICAL REQUIREMENTS SECTION - VI	QACP (QA Coordination Procedure)	Page 3 of 7	13	13 d) Inspection Calls d) Inspection Calls: Bidder shall give inspection call to the respective Employer QA&I RIO in Windsor-X system. For foreign inspection calls Main Contractor shall give inspection call to Employer QA&I (in Windsor-X system) Coordinators and through email as well, as per following schedule:- i. Supplier of Indian origin : 15 working days	Considering the Project cycle time, considers the following inspection notification time; i. Supplier of Indian origin : 7 working days	Bidder consideration is not right : For doing the proper planning of Inspection activities , it is mentioned as 15 Days for Indian Origin Sub Vendors.
899	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-D-1-10 CIVIL WORKS MATERIAL SPECIFICATION	PAGE 2 OF 4 & Page 3 of 4	10.04.01 10.04.02	10.04.01 Mild Steel & 10.04.02 Medium and High Tensile Steel: All steel plates shall be of Grade designation E250, Quality BR (fully killed), conforming to IS 2062 and shall be tested for impact resistance at room temperature. Plates beyond 12mm thickness and up to 40mm thickness shall be normalized rolled.	Bidder request to perform impact test beyond 12 mm thick as per IS 2062 requirement. In general all the steel mills mentions in the Material Test Certificates as "Hot rolled" instead of Normalized Rolled.	Bidder's proposal is not acceptable. Bidder to comply specification requirements.
900	SECTION - I, II, III, IV & V	EPC PACKAGE SECTION-IV (GCC)	Page 39 of 85	19.4	The Contractor shall not be allowed to sub-contract works to any subcontractor/ sub-vendor from a country which shares a land border with India unless such contractor is registered with the competent Authority. The Competent Authority for the purpose of registration shall be as mentioned in Annexure-IV to SCC. However, the said requirement of registration will not apply to subcontractors from those countries (even if sharing a land border with India) to which the Government of India has extended lines of credit or in which the Government of India is engaged in development projects. The Contractor may apprise itself of the updated lists of such countries available in the website of the Ministry of External Affairs.	Bidder understand that In case vendors who are already approved/have executed various items in NTPC/equivalent project/s are not in the indicative vendor list, bidder may consider same subject to meeting government regulation at the time of ordering	Bidder understanding is not right : Government Circulars are to be followed along with GCC Clasue.
901	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION CIVIL WORKS FOUNDATION SYSTEM	PAGE 3 OF 10	7.03.00	PILE FOUNDATIONS The pile foundation shall be of RCC, Cast-in-situ bored piles as per IS:2911. Pile boring shall be done using Self erecting Crawler mounted Rotary Hydraulic Rigs. Two stage flushing of pile bore shall be ensured by airlift technique duly approved by the Employer	Bidder would like to request to also consider for flushing with air lift technique and tremie method may also be permitted for construction of bored piles.	Bidder's proposal is not acceptable.
902	SECTION – VI, PART-B	SUB-SECTION-D-1-12(B) CIVIL WORKS ANNEX_B_CONSTRUCTION METHODOLOGY	PAGE 1 OF 1	D-1-12(B)	Construction Methodology Pile installation equipment suitable for flushing with air lift technique shall be used for construction of bored piles.	Bidder would like to request to also consider for flushing with air lift technique and tremie method may also be permitted for construction of bored piles.	Bidder's proposal is not acceptable.
903	SECTION-VI, PART-B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	PAGE 55 OF 127	5.17.02.00	REQUIREMENTS FOR CONSTRUCTION MATERIAL Durability of the concrete shall confirm to severe exposure category as per table 19 of IS:456 except noted specifically otherwise. Minimum cement content of all RCC structures shall be 360 kg/Cu. M.	Bidder understand that the exposure category and minimum cement content for concrete shall be as per Table - 5 of IS 456. Owner is requested to confirm the same	Bidder to refer amendment D1-68
904	SECTION-VI, PART-B	SUB-SECTION-D-1-10 CIVIL WORKS MATERIAL SPECIFICATION	PAGE 3 OF 4	10.05.00	Bricks Only fly ash bricks shall be used in all construction, except for elevator shafts, which can be either of burnt clay bricks or RCC construction as per functional / codal provisions.	Bidder understand that use of fly ash bricks as per IS: 13757 or IS: 12894 is depend upon availability of fly ash bricks. However, in case if not available burnt clay bricks meeting requirement of compressive strength 75kg/cm2 an as per IS: 1077 shall be allowed for use. Owner is requested to confirm acceptance.	Bidder's proposal is not acceptable.
905	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	PAGE 31 OF 127	5.10.00	Roads All roads shall be of rigid pavements unless otherwise specified. Rigid pavements shall be constructed with Geopolymer concrete. Concrete road/pavement or rigid pavement, mentioned in specification, shall mean road /pavement constructed with Geopolymer Concrete. All concrete roads shall be unreinforced jointed plain concrete pavement having dowels in transverse joints and tie bars at longitudinal joints.	Bidder would like to clarify that, there is limited exposure in Geopolymer based concrete within India and experiencing in quick setting within 30-40 min with crack development afterwards. This concrete is still under development and establishment stage for its usage in Permanent Road works. Bidder request to consider Cement based Pavement quality concrete road also.	Bidder's proposal is not acceptable.
906	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION-D-1-5 CIVIL WORKS SALIENT FEATURES AND DESIGN CONCEPT	PAGE 32 OF 127	5.10.00.01	Roads The road construction including its shoulders, base, sub base and concrete pavement shall be as per MORTH. The road base shall be with minimum 150 mm thick dry lean concrete over granular sub base. Dry lean concrete shall be laid by a mechanical paver and compacted by vibratory rollers. Concrete pavement of the road shall be done with fully mechanized paver fitted with electronic sensors for construction techniques. Laying /placing of Concrete DLC and PQC manually with hand-guided means or by semi-mechanized methods may be permitted around BTG area provided acceptance criteria as per MORT&H specification is achieved.	Bidder request to consider Cement based Pavement quality concrete road also. In case of laying /placing of Geopolymer concrete DLC and PQC manually with handguided means or by semi-mechanized methods may be permitted considering the quick setting characteristic. Acceptance criteria as per MORT&H specification is achieved'	Bidder's proposal is not acceptable.
907	SECTION-VI, PART-B	SUB-SECTION-D-1-8 CIVIL WORKS GENERAL SPECIFICATION	PAGE 3 OF 20	8.01.02 29	Interlocking concrete block confirming to IS:15658, kerb blocks or concrete block specified for various uses shall be precast blocks made of alkali-activated concrete /Geopolymer concrete as per IS:17452- 2020.	Bidder would like to request that to consider cement concrete based interlocking concrete blocks. Kindly confirm the same	Bidder's proposal is not acceptable.
908	SECTION VI, PART- B	SUB-SECTION-E-59 QA Civil Works	Page 1 of 6	1.0 (A)	SAMPLING AND TESTING OF CONSTRUCTION MATERIALS a) Before execution of any civil work the contractor shall conduct full-scale suitability tests on various construction and building material such as soil, fine and coarse aggregates, cement, construction chemicals, supplementary cementitious materials and construction water to ascertain their suitability for use and the concrete mix designs conducted from reputed institutes such as NCCBM-Ballabgarh, CSMRS-Delhi, selected IIT's as agreed by the Employer……	Bidder would like to request for addition of other reputed institutes for conducting suitability tests and concrete mix design such as NIT's, NTH, Govt. technical universities and NABL accredited laboratories along with NCCBM-Ballabgarh, CSMRS-Delhi, selected IIT's. a) Before execution……concrete mix designs conducted from reputed institutes such as NCCBM-Ballabgarh, CSMRS-Delhi, selected IIT's, NIT's, NTH, Govt. technical universities and NABL accredited laboratories and in-house laboratory at site as agreed by the Employer.	This is as per the prevailing third party lab list circular of NTPC acceptable labs consisting of more than 25 reputed labs/ govt institutes. The same shall be shared with contractor as and when required. Hence Bidder has to follow the Technical Specification reqirements.

909	SECTION VI, PART- B	SUB-SECTION-E-59 QA Civil	Page 1 of 6	2.0	LABORATORY AND FIELD TESTING a) The field laboratory for QA and QC activities shall be established and installed with the adequate facilities to meet the requirement of envisaged day to day tests during execution of the work. Temperature and humidity controls shall be available wherever necessary during testing of samples. The contractor shall furnish a comprehensive list of testing equipment/ instrument required to meet the planned/scheduled tests for the execution of works for EIC acceptance/ approval. The contractor shall establish the requisite laboratory equipment/set up and skilled QA&QC manpower within 30 days from the mobilization date of Main contractor at site.	LABORATORY AND FIELD TESTING a) The field laboratory for QA and QC activities shall be established and installed with the adequate facilities to meet the requirement of envisaged day to day tests during execution of the work. Temperature and humidity controls shall be available wherever necessary during testing of samples. The contractor shall furnish a comprehensive list of testing equipment/ instrument required to meet the planned/scheduled tests for the execution of works for EIC acceptance/ approval. The contractor shall establish the requisite laboratory equipment/set up and mobilize skilled QA&QC manpower progressively according to discipline-wise work progress	Setting up of FQA lab with skilled QA / QC manpower within 30days from mobilization date of main contractor at site is requred for minimizing delays in testing and adversely affecting site work progress. Also well equipped lab and manpower reduces non confirmity from approved quality plans. For discpline wise QA & QC manpower requirement, provision is already envisaged in indicative FQP. Hence Bidder has to follow the Technical Specification reqirements
910	SECTION VI, PART- B	SUB SECTION-B-02 MOTORS	PAGE 3 OF 4	10.01.00	LIST OF TESTS FOR WHICH REPORTS HAVE TO BE SUBMITTED The following type test reports shall be submitted for each type and rating of HT motor (b) Terminal box-fault level withstand test for each type of terminal box of HT motors only.	Not Applicable for elastimold type terminations	Bidder understanding is correct.
911	SECTION VI, PART- B	SUB-SECTION-B-03 VFD	PAGE 10 OF 11	28.02.00	Type test LIST OF TYPE TESTS TO BE CONDUCTED The following type tests shall be conducted under this contract for MV E8) Overall efficiency determination of VFD system including transformer/ Harmonic filters etc at motor full load	Bidder would like to clarify that test may be conducted with regenerative load	Bidder understanding is correct.
912	SECTION VI, PART- B	SUB-SECTION B-04 TRANSFORMERS AND ASSOCIATED MAINTENANCE, MONITORING & TESTING EQUIPMENTS	PAGE 19 OF 36	1.11.02	Type tests criteria for Auxiliary oil filled transformers rated upto 16MVA, 11kV (only type test report has to be submitted) A) The Type Test reports should be of a transformer which is generally similar to the transformer being offered as per IEC 60076-5, Annexure-B and also identical to the offered transformer in the following aspects:…	Bidder would like to clarify that for similarity conditions IEC 600076-5, annexure B will be considered	Bidder understanding is not correct.Specification cl.no. 1.01.02 Sub -Section B-04 Section-VI, Part-B to be followed.
913	SECTION VI, PART- B	SUB-SECTION B-04 TRANSFORMERS AND ASSOCIATED MAINTENANCE, MONITORING & TESTING EQUIPMENTS	PAGE 25 OF 36	1.11.04	ROUTINE / TYPE TESTS ON TRANSFORMERS: vi)**During Infra red thermography test of GT, the temperature of any part of tank shall be limited to 110 deg C.	We would like to clarify that Infra red thermography tests will be conducted for records only	Bidder understanding is not correct.Specification cl.no. 1.11.03 Sub -Section B-04 Section-VI, Part-B to be followed.
914	SECTION VI, PART- B	SUB-SECTION B-04 TRANSFORMERS AND ASSOCIATED MAINTENANCE, MONITORING & TESTING EQUIPMENTS	PAGE 23 OF 36	1.11.04 Sr. No 31	ROUTINE / TYPE TESTS ON TRANSFORMERS: Short duration heat run test (Not applicable for unit on which temperature rise test is performed)	Bidder would like to understand the procedure & acceptance criteria of this test. As this tests is not covered in generally used standards	Short duration heat run test (Not applicable for unit on which temperature rise test is performed) to be performed in line with CEA guideline.

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
915	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION-B-17 SWITCHYARD	21 of 98	3.03.05	The insulator of the isolator shall conform to the requirements stipulated under clause no: 08.00.00 as specified in the specification and shall have a min. cantilever strength of 800 kg for 765kV and 600kg for 132kV.	The clause no. 08.00.00 of SUB-SECTION-B-17 SWITCHYARD corresponds to the REQUIREMENT OF AUXILIARY ITEMS. Bidder understands that the correct clause to be referred is 6.04.00 of SUB-SECTION-B-17 SWITCHYARD. Owner may please confirm.	Bidder understadning is correct . The Bidder refer to clause no: 6.04.00 and also 08.10.00 of B-17 is applicable for post insulator
916	TECHNICAL SPECIFICATION SECTION – VI, PART-A TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS SUB SECTION B-05(B) MV & LV SWGRPROTECTIONS, CONTROL & METERING	4 of 20 10 of 10	1.05.03(g) -	GPS, Time synchronizing equipment & Digital Clocks. -	Separate GPS for Numerical Relay Network is not required in line with drawings 0000-205-POE- A-001. Owner may please confirm.	Bidder understanding is correct. But all numerical relays to be GPS synched through DDCMIS.
917	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-IIB ELECTRICAL SYSTEM / EQUIPMENTS	15 of 20 6 of 20	1.19.00 1.08.00 1.09.01	EMPLOYER'S REQUIREMENT In addition to above, following items required for Employer's use are also included in bidder's scope. These equipment's shall conform to technical specification requirements as stipulated in Part B for respective equipment's. 1. 415V switchgear feeders as indicated below for feeding owner's loads shall be provided (at suitable location to be decided during detailed engineering). (a) 4 Nos. MCCB–125A (b) 4 Nos. MCCB–250A (c) 4 Nos. MCCB-400 A (d) Total 6 Nos. ACB outgoing – 1000 A feeders in unit emergency switchgear and station service switchgear. 2. Following requirements of construction power for employers' office/ construction use: Construction power at 415 V at two locations with total load 100 KVA along with suitable metering arrangement at each location. 3. Two Number 11kV feeders in 11 kV station switchgear, suitable for connection of 1MVA service transformer, for future owners use. **In addition to above, cabling works, if required for Employer's requirement (indicated under clause 1.19.00), shall also be in bidder scope.** **In addition to above, HT power cables, as indicated under Clause 1.19.00, if required for Employer's requirement shall also be in bidder scope**	Bidder understand that only feeders for employer's requirement as indicated in clause no-1.19.00 shall be considered by Bidder. Supply of cable and associated cabling work is not in Bidder's scope of supply. Owner may please confirm.	Bidder understanding is correct regarding the scope of supply of cable & associated cabling for clause no:1.19.00 . Also Bidder refer Amendment No-01 ,Sl. no : EE-68 for clause no: 1.19.00(3)
918	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	8 of 15 9 of 15	3.06.00 (h) (d) 3.06.00 (k)	A spare capacity of about 10 % shall be kept for addition of loads during detail engineering as many of the LT loads cannot be predicted during the Rating selection of the Board. Each of the LV switchboards shall be designed for 1.1 times the required rating as a spare capacity. Further all LV Switchboard shall be provided with spare feeders / modules as specified in relevant clause of Part-A of Technical Specification.	Bidder understands that overall margin of 10% shall be provided while sizing LV Switchgear Busbar, incomers & bus coupler. Owner may please confirm.	Bidder to refer Amendment Sl. No. EE-73
919	TECHNICAL SPECIFICATION SECTION – VI, PART-B	SUB-SECTION B-0 GENERAL ELECTRICAL SPECIFCIATION	10 of 15	3.07.00	The auxiliary contacts of the MCCB shall be fed to the digital inputs available in the numerical relays of Incomer / bus coupler / motor circuit breaker feeders or 61850 Compatible IO Modules, for integration into the numerical relay network/ DCS.	Only ACB & VCB operated feeder breaker auxiliary contact will be wired to respective numerical relay. Owner may please confirm.	Bidder understanding is correct.
920	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB-SECTION B-10 CABLING, EARTHING AND LIGHTNING PROTECTION	2 of 21 4 of 21	2.01.04 3.02.05 (b)	No sub zero level cable vault/trenches shall be provided below control building/ switchgear rooms. Cable trenches shall be provided only in Switchgear/ MCC rooms.	Bidder understands that Cable Trench may be accepted at offsite buildings for CHP area where cable trays layers are limited to 4 layers per row, which is inline with ongoing NTPC Projects. Owner may please accept the same.	Bidder understanding is not correct. Cable trecnhes in switchgear / MCC room in line with cl. no.2.01.04, 3.02.05 (b) Sub -Section B-10 Section-VI, part-B to be followed.
921	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB SECTION B-05(B) MV & LV SWGR PROTECTIONS, CONTROL & METERING SUB SECTION B-06 LT SWITCHGEARS & LT BUSDUCTS	4 of 10 13 of 19	3.03.14 7.00.00	All motor feeders (>30KW) shall have min one no. of 4-20mA analog output (current signal) for use in control logics in DDCMIS or for information in DDCMIS. Each motor/heater feeder shall consist of MPCB/MCCB (with S/C release only), Power contactor & intelligent motor controller (IMC) to ensure Type-2 Co-ordination.	As per Cl.No. 7.00.00, All MCC Motor/heater feeders are with iMCC. Accordingly, Bidder understands that for motors rated (>30kW), required current feedback shall be provided to DDCMIS via Profibus DP interface. Owner may please confirm.	Bidder understanding is not correct. All motor feeders HT/LT fed through ACB, VCB, VCU shall be provided with 4-20 mA analog output. Rest other drives: current shall be monitored through IMC in DDCIMS.
922	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB SECTION B-05(B) MV & LV SWGR PROTECTIONS, CONTROL & METERING	10 of 10	-	Overall architecture of Switchgear Relay Network	Drawing is not legible. Owner is requested to provide a legible copy.	legible copy shall be provided
923	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB-SECTION-B-17 SWITCHYARD	50 of 98	11.03.03	From the field book entries the route plan with route details and level profile shall be plotted and prepared as per approved procedure.	Owner is requested to elaborate the requirement of "approved procedure".	Bidder refer to Amendment , sl. No: EE-27
924	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB-SECTION-B-17 SWITCHYARD	58 of 98	12.02.03	Weight Span	As uplift load is not specified for tower type A (Suspension), hence bidder understand that minimum weight span for Normal condition (NC) and Broken wire conditions (BWC) (i.e. -200m Min for NC and -100m Minimum for BWC) will not be applicable for tower type-A. As per 12.01.03 of the SECTION – VI, PART-B, SUB-SECTION-B-17 SWITCHYARD as well as CBIP manual-323, for uplift load only tension tower can be used. Owner may please confirm.	Bidder refer to Amendment , Sl. no : EE-30
925	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB-SECTION-B-17 SWITCHYARD	82 of 98	14.05.07	The proposed 66 kV transmission line may run parallel for certain distance with the existing Transmission lines which may remain energised during the stringing period.	Bidder understands that any 66kV transmission line is not applicable for this project. Owner may please confirm.	Bidder understadning is correct . Bidder refer to Amendment , Sl. No: EE-34.
926	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	26 of 35	5.14.1	765 KV SWITCHYARD A.The Bidder/Sub Vendor should have designed, constructed / erected, tested and commissioned at least one no (1) of Air Insulated substation/switchyard of 715kV or above voltage class having at least two (2) bays which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: The Bidder/Sub Vendor should have designed, constructed / erected, tested and commissioned at least one no (1) of Air Insulated substation/switchyard of 715kV or above voltage class having at least two (2) bays which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
927	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	26 of 35	5.14.1	765 KV SWITCHYARD B.i) The Bidder/Sub Vendor should have designed, constructed / erected, tested and commissioned at least one no (1) of Air Insulated substation/switchyard of 400kV or above voltage class having at least Six (6) bays, which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Bidder requests Owner to refer Annexure-10 for the same. Therefore, Bidder proposes the clause to be read as . i) The Bidder/Sub Vendor should have designed, constructed / erected, tested and commissioned at least one no (1) of Air Insulated substation/switchyard of 400kV or above voltage class having at least Six (6) bays, which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno Commercial bid opening.~~ Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69

928	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	27 of 35	5.14.1	B.II) The Bidder / sub vendor associates with an organisation who meet the requirement indicated at 5.14.1.A above. The associate will be fully responsible for design, erection, testing and commissioning of the complete switchyard. In such and event the Bidder / sub vendor shall arrange a deed of undertaking to this effect jointly executed by the bidder / sub vendor and its associate as per the format enclosed in the bid document. This Deed of joint Undertaking should be submitted along with the Techno - commercial bid. In case of award the Associate will be required to furnish an on demand bank guarantee for 2% (two percent) of the total contract price in additional to the contract performance security to be provided by the bidder	Bidder understands that there is no relevance of the bank guarantee with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: B.II) The Bidder / sub vendor associates with an organisation who meet the requirement indicated at 5.14.1.A above. The associate will be fully responsible for design, erection, testing and commissioning of the complete switchyard. In such and event the Bidder / sub vendor shall arrange a deed of undertaking to this effect jointly executed by the bidder / sub vendor and its associate as per the format enclosed in the bid document. This Deed of joint Undertaking should be submitted along with the Techno -commercial bid. ~~In case of award the Associate will be required to furnish an on demand bank guarantee for 2% (two percent) of the total contract price in additional to the contract performance security to be provided by the bidder~~	Bidder Proposal Not accepted.
929	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	27 of 35	5.14.1	(I) 765KV CIRCUIT BREAKERS : a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 715 kV or above class which should have been in successful operation for minimum two(2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 715 kV or above class which should have been in successful operation for minimum two(2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
930	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	27 of 35	5.14.1	b) Indian Manufacturers, who have Manufactured and supplied at least five (05) nos, of three phase Circuit Breakers suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening and have manufactured and supplied 715kV or above class Circuit Breakers prior to the date of Techno-Commercial bid opening can also supply 765kV Circuit Breakers provided their collaborator meet the requirement stipulated under 5.14.2.A.I(a) above.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: b) Indian Manufacturers, who have Manufactured and supplied at least five (05) nos, of three phase Circuit Breakers suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid~~ ~~opening~~ and have manufactured and supplied 715kV or above class Circuit Breakers prior to the date of Techno-Commercial bid opening can also supply 765kV Circuit Breakers provided their collaborator meet the requirement stipulated under 5.14.2.A.I(a) above. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
931	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	27 of 35	5.14.1	II. 765kV INSTRUMENT TRANSFORMERS (Current Transformers / Capacitor Voltage Transformers as Applicable): a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening.~~ Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
932	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	28 of 35	5.14.1	b) Indian Manufacturers, who have Manufactured and supplied at least fifteen (15) nos, of Single phase Instrument Transformers suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening and have manufactured and supplied 715kV or above class Instrument Transformers prior to the date of Techno-Commercial bid opening can also supply 765kV instrument Transformers provided their collaborator meet the requirement stipulated under 5.14.2.A.II(a) above.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: b) Indian Manufacturers, who have Manufactured and supplied at least fifteen (15) nos, of Single phase Instrument Transformers suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening~~ and have manufactured and supplied 715kV or above class Instrument Transformers prior to the date of Techno-Commercial bid opening can also supply 765kV instrument Transformers provided their collaborator meet the requirement stipulated under 5.14.2.A.II(a) above. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
933	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	28 of 35	5.14.2	III. 765 kV DISCONNECTORS : (a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(05) nos. of three phase Disconnectors suitable for Air Insulated Substation/Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: (a) The Bidder / Sub-vendor should have Manufactured and supplied minimum five(05) nos. of three phase Disconnectors suitable for Air Insulated Substation/Switchyard of 715kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
934	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	28 of 35	5.14.2	b) Indian Manufacturers, who have Manufactured and supplied at least Five (05) nos, of Three phase Disconnectors suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening and have manufactured and supplied 715kV or above class Disconnectors prior to the date of Techno-Commercial bid opening can also supply 765kV Disconnectors provided their collaborator meet the requirement stipulated under 5.14.2.A. III(a) above.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: b) Indian Manufacturers, who have Manufactured and supplied at least Five (05) nos, of Three phase Disconnectors suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening~~ and have manufactured and supplied 715kV or above class Disconnectors prior to the date of Techno-Commercial bid opening can also supply 765kV Disconnectors provided their collaborator meet the requirement stipulated under 5.14.2.A. III(a) above. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
935	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	28 of 35	5.14.2	IV. 765kV SURGE ARRESTER: a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Surge Arresters suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for a minimum period of two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: a) The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos. of single phase Surge Arresters suitable for Air Insulated Substation/ Switchyard of 715kV or above class which should have been in successful operation for a minimum period of two (2) years ~~prior to the date of Techno-Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
936	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	28 of 35	5.14.2	b) Indian Manufacturers, who have Manufactured and supplied at least Fifteen (15) nos, of Single phase Instrument Transformers suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening and have manufactured and supplied 715kV or above class Surge Arrestors prior to the date of Techno-Commercial bid opening can also supply 765kV instrument Transformers provided their collaborator meet the requirement stipulated under 5.14.2.A.IV(a) above.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: b) Indian Manufacturers, who have Manufactured and supplied at least Fifteen (15) nos, of Single phase Instrument Transformers suitable for Air insulated Substation / switchyard of 400kV or above class, which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno-Commercial bid opening~~ and have manufactured and supplied 715kV or above class Surge Arrestors prior to the date of Techno-Commercial bid opening can also supply 765kV instrument Transformers provided their collaborator meet the requirement stipulated under 5.14.2.A.IV(a) above. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment No:1 , Sl. No: EE-69
937	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	29 of 35	5.14.2	(I)132KV CIRCUIT BREAKERS: The Bidder / Sub-vendor should have Manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 132kV or above class which should have been in successful operation for minimum two(2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: The Bidder / Sub-vendor should have Manufactured and supplied minimum five(5) nos. of three phase circuit breakers suitable for Air Insulated Substation/ Switchyard of 132kV or above class which should have been in successful operation for minimum two(2) years ~~prior to the date of Techno-Commercial bid opening~~ Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69

938	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	29 of 35	5.14.2	II.132kV INSTRUMENT TRANSFORMERS (Current Transformers / Capacitor Voltage Transformers as Applicable): The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos of single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 132kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: The Bidder / Sub-vendor should have Manufactured and supplied minimum fifteen(15) nos of single phase Instrument Transformers suitable for Air Insulated Substation/ Switchyard of 132kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment No:1 , Sl. No: EE-69
939	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	29 of 35	5.14.2	III.132 kV DISCONNECTORS: The Bidder / Sub-vendor should have Manufactured and supplied minimum five(05)nos of three phase Disconnectors suitable for Air Insulated Substation/Switchyard of 132kV or above class which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: The Bidder / Sub-vendor should have Manufactured and supplied minimum five(05)nos of three phase Disconnectors suitable for Air Insulated Substation/Switchyard of 132kV or above class which should have been in successful operation for minimum two (2) years ~~prior to the date of Techno Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
940	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	29 of 35	5.14.2	IV. 132kV SURGE ARRESTER: The Bidder/Sub-vendor should have manufactured and supplied minimum fifteen (15) nos. of single phase Surge Arrestors of 132kV class or above, suitable for Air Insulated Substation/ Switchyard and which must have been in successful operation for a minimum period of two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: The Bidder/Sub-vendor should have manufactured and supplied minimum fifteen (15) nos. of single phase Surge Arrestors of 132kV class or above, suitable for Air Insulated Substation/ Switchyard and which must have been in successful operation for a minimum period of two (2) years ~~prior to the date of Techno Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
941	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	29 of 35	5.16	SUBSTATION AUTOMATION SYSTEM & PROTECTIVE RELAYS: The Substation Automation System offered with distributed architecture should have been in successful operation in at least one (1) Substation/Switchyard of not less than 220 kV class for minimum one (1) year prior to the date of Techno-Commercial bid opening. The Generator Protection Relays, the Bay Protection Units including the Busbar protection and the energy metering System offered should be from manufacturer(s) who have manufactured and supplied the offered type of devices for respective equipment, which must have been in successful operation in a 100 MW or above unit / 220 kV class or above Substation/Switchyard for a minimum period of one (1) year prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: The Substation Automation System offered with distributed architecture should have been in successful operation in at least one (1) Substation/Switchyard of not less than 220 kV class for minimum one (1) year ~~prior to the date of Techno Commercial bid opening~~. The Generator Protection Relays, the Bay Protection Units including the Busbar protection and the energy metering System offered should be from manufacturer(s) who have manufactured and supplied the offered type of devices for respective equipment, which must have been in successful operation in a 100 MW or above unit / 220 kV class or above Substation/Switchyard for a minimum period of one (1) year ~~prior to the date of Techno Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
942	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	30 of 35	5.17	132 EHV POWER CABLES & Cable Accessories: a) The bidder/Sub-vendor should have manufactured and supplied following cables: Atleast 1kms of XLPE insulated power cables of 132kV or higher voltage grade, executed in one or more orders and which must have been in successful operation for a minimum period of two (2) years prior to the date of Techno-Commercial bid opening	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: a) The bidder/Sub-vendor should have manufactured and supplied following cables: At least 1kms of XLPE insulated power cables of 132kV or higher voltage grade, executed in one or more orders and which must have been in successful operation for a minimum period of two (2) years ~~prior to the date of Techno Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
943	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-I-A PROVENNESS	30 of 35	5.17	b) Sub-Qualifying Requirements for 132 kV Cable Accessories The Bidder/Sub-vendor should have manufactured and supplied minimum fifteen (15) nos. of cable Accessories supplied of 132kV grade cable s or above, and which must have been in successful operation for a minimum period of two (2) years prior to the date of Techno-Commercial bid opening.	Bidder understands that there is no relevance of the date of Techno-Commercial bid opening with provenness criteria as per industry standard. Therefore, Bidder proposes the clause to be read as: b) Sub-Qualifying Requirements for 132 kV Cable Accessories The Bidder/Sub-vendor should have manufactured and supplied minimum fifteen (15) nos. of cable Accessories supplied of 132kV grade cable s or above, and which must have been in successful operation for a minimum period of two (2) years ~~prior to the date of Techno Commercial bid opening~~. Owner may please accept.	Bidder Proposal Not accepted. Bidder refer to Amendment , Sl. No: EE-69
944	SECTION – VI, PART-B	B-0	7 of 16	3.06.00, a)	All switchboards shall be of double front, draw out, complete closed-door operation, metal enclosed, indoor, floor-mounted, free-standing type of bolted design.	Bidder proposes to use double front, Fixed type switchgear panel for soot blowers. Please accept.	Bidder proposal is not acceptable. Specification cl. no.3.06.00 (a) Sub -Section B-0 Section-VI, part-B to be followed.
945	SECTION – VI, PART-B	B-0	9 of 16	3.06.00, m,a)	Standard control cable sizes shall preferably be 3CX1.5, 5CX1.5, 7CX1.5 & 10CX1.5mm2,14CX1.5 mm2	Standard control cable sizes shall preferably be 19CX1.5mm2 also may please be accepted on case to case requirement	Bidder proposal is acceptable.
946	SECTION – VI, PART-B	B-02	1 of 4	5.00.00	80 deg. C over inlet cooling water temperature mentioned elsewhere, by resistance method for both thermal class 130(B) & 155(F) insulation	For the water cooled motor class-Y with 90°C insulation is required	For Boiler Re circulation pump motor, specification is clear. Please refer Sec-VI, Part-B,SS-A-02, Steam generator & auxiliaries including ESP, Clause 6.03.00 (iii) Motor specification & (iv) cooling system. Specification requirement to be followed.

947	SECTION – VI, PART-B	B-03	5 of 11	11.03.00	Air cooled VFDs shall be provided with cooling fans mounted integral to the VFD/ enclosure. The VFD shall include air-flow pressure switches and temperature detectors to monitor proper operation of the air cooling system. If the fan fails, the system must generate the alarm/trip for the fan failure.	No. of fan, air flow pressure switches and other accessories shall be provided as per OEM design and system requirement. Please accept the same.	Bidder proposal may be acceptable. However, equipment reliability & safety to be ensured with prpoper protection system and the same shall be decided during detailed engineering.
948	SECTION – VI, PART-B	B-15	5 of 5	7.06.0, c)	Transformer	Control transformer (Rating & Qty) in elevator EOT / Hoist system shall be as per OEM proven design of NTPC approved vendor.	Bidder proposal is acceptable.
949	SECTION – VI, PART-B	B-10	3 of 21	3.02.02	Support system for cable trays shall essentially comprise of the two components i.e. main support channel and cantilever arms. The main support channel shall be of two types : (i) C1:- having provision of supporting cable trays on one side and (ii) C2:-having provision of supporting cable trays on both sides.	Cable trays in boiler & ESP area shall be supported from the boiler and ESP structures. with respect to Clause No 2.01.06., B-10, Page 2 of 21 Kindly confirm.	Bidder proposal is acceptable.
950	SECTION – VI, PART-B	B-02	1 of 4	3.01.00, b)	Continuous duty LT motors upto 50 KW Output rating (at 50 deg.C ambient temperature), shall be super Premium Efficiency class-IE4, 50-200 KW shall be of Premium Efficiency class – IE3, conforming to IS 12615, or IEC:60034-30. HT motors shall have minimum design efficiency of 95 %. However, tolerance on this efficiency value shall be applicable as per IEC 60034	Bidder proposes to consider IE3 Motors instead of IE4 Motors. Owner may please update clause as below: "Continuous duty LT motors upto 50 KW Output rating (at 50 deg.C ambient temperature), shall be super Premium Efficiency class-IE3, 50-200 KW shall be of Premium Efficiency class – IE3, conforming to IS 12615, or IEC:60034-30."	Bidder proposal is not acceptable. Specification cl. no.3.01.00 (b) Sub -Section B-02 Section-VI, part-B to be followed.
951	SECTION – VI, PART-E	General Layout Plan Drg.No.XXXX-999-POC-F-001 Rev.A	-	-	 	Bidder observed that one transmission tower is shown outside plant boundary and the route for its connecting conductors are fouling on encroachment area which is outside plant boundary. Owner may please revise the route for 765kV Interconnection line by elimination encroachment area. Also, please provide route survey report for 765kV Interconnection line.	Bidder Refer to Amendment no, sl. No: Sl. no:47 Annexure-E2(Preliminary Route survey of S/C Line)

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
952	SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	7 of 87	1.05.02 (e)	Austenitic stainless steel, SA- 213 UNS S30432 Shot Peened, or approved equivalent.	Please note that the SA-213 UNS S30432 shot peened material will be used at SH and final RH outlet where the high steam temperature is experienced. The length (straight tube) of the shot peened SA-213 UNS S30432 will be decided by bidder during detail engineering stage based on bidder experience. NTPC may note that the shot peened tube loses its properties once it is undergone with the manufacturing process (Bending). NTPC to kindly confirm.	The criteria for material selection for SG components is based on Design Metal Temperature. For Design metal temperatures Upto & above 610 degree Celcius Austenitic stainless steel, SA- 213 UNS S30432 Shot Peened, TP347H FG or approved equivalent is specified considering excursions and exfoliation issues. Bidder to provide the material in line with the design temperature criteria specified. This is applicable for the entire section based on the specified crtieria. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
953	SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	5 of 87	1.05.01 Note	Minimum number of coal pulverisers to be provided for each steam generator shall not be less than Eight (8)	Bidder would request that the Minimum no of coal pulverisers shall be as per OEM standard proven design.	Bidder's proposal is not acceptable. The minimum number of mills has been specified considering the acceptable level of mill redundancy requirements, reserve margin in each mill and the loss in load due to outage of one mill. Bidder to comply technical specification requirement.
954	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	13 of 67	7.01.01 (3)	2 Meters or maximum soot blowing radius, whichever is lower. Bidder can also provide the higher depth limited to 2.5 m also, only if it's a bidder's proven practice. References shall be provided in support of the same. However it will be limited to maximum soot blower radius.	Bidder understand this clause and technical requirement is also applicable to Economiser also, i.e. 2.5 depth as per bidders proven practise.	The specified requirements are applicable to the heat transfer surfaces against the given clause. For economiser, bidder to comply with the specification requirements.
955	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	14 of 67	7.01.01 (10)	Space Provision Keep provision of space for at least 20% addition of additional economizer and 10% for the reheater surfaces in future. The surface provisioning shall be flue gas upstream section of the economizer. Structure/hanger design shall be suitable for loads due to these additional surfaces (filled with water) also.	NTPC is requested to note that Bidder has achieved the rated RH outlet temperature in all previous installation. Moreover as per bidder design RH temperature is control / achieved by gas biasing damper. Hence there will not be any issue to achieve the rated RH temperature. The requirement of RH additional surface is not applicable for bidders design. NTPC is requested to confirm acceptance.	The requirement of space provision for additional heating surfaces has been specified based on the performance issues faced in the recent units, and also to cater to any future requirements due to variation of fuel characteristics, change in operation regime and degradation of heat pickup surfaces. Bidder to comply technical specification requirement.
956	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	18 of 67	9.01.03	Heating Elements b) Hot end -- Made of carbon steel minimum 0.8 mm thick.	Bidder would request this clause to be modified as follows - b) Hot / **Intermediate end** -- Made of carbon steel minimum 0.8mm thick..	Bidder to refer to Amendment ot technical specification sl. no. SG.22 in this regard
957	SECTION-VI, PART-E	9586-001-POM-A-019	C4-C5	-	Motor operated valve upstream of control valve at flash tank inlet	Bidder would like to clarify that the water separator drain control valve is critical for boiler start up system. Warm up connection is required for instant operation of valve during plant operation. Since the control valve is shown at down stream of the motor operated isolation valve, proper warm up can not be provided to the control valve. Hence, bidder propose to offer motor operated valve at down stream of the control valve instead of upstream as per tender P&ID. Please confirm acceptance.	Detailed aspects w.r.t. the valve location shall be reviewed during detail engineering based on the selected specific equipment/sub-system.
958	SECTION-VI, PART-E	9586-001-POM-A-020 9586-001-POM-A-018	-	-	Scheme for Pulveriser (Vertical Mil) Scheme of Air & Flue Gas Path with Instruments (With Trisector APH)	Bidder have considered the flow measurement as per bidder standard practice as follows: 1. Mill inlet air flow is as per bidder proven practice based on slant orifice flow measurement. This proven OEM design has been successfully executed in Power projects in India. 2. FD/ID/PA fans inlet flow based on Pressure measuring Annular pipes at inlet box opening and inlet cone.	1. Bidder's proposal for mill inlet airflow is acceptable as per standard & proven practice of OEM. 2.Bidder's proposal for inlet flow measurement for fD/ID/PA fans is acceptable. Further,bidder shall comply to the requirements of Tender drawing.
959	SECTION-VI, PART-A	SUB SECITON IB PROJECT INFORMATION Annexure-IV-7(B)		-	HGI of Biomass	HGI of Biomass is not provided, request Owner to provide the same.	Bidder may note that biomass is not a brittle but a fibrous material. That is why HGI is not applicable in the case of biomass. To facilitate the pulverization of fibrous biomass material in coal mills, biomass is first grinded in a hammer mill before pellet manufacturing. In a coal mill, biomass pellets just get broken down to their original particle size and further downsized due to abrasion along with coal.
960	SECTION-VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	5 of 73 7 of 73	1.01.01 (xiii) 1.01.02 (xiii)	LD for 0.1% increase in APH Leakage against the shortfall (as per part-B guarantee condition description). LD for 0.1% increase in APH Leakage (as per part-B guarantee condition description)	Owner is requested to note that as per contract, the boiler efficiency will be calculated as per EN_12952-15-Acceptance tests which include the air heater leakage. It means that LD will be applicable twice for boiler efficiency (plant heat rate) as well as separately for APH leakage. Hence, we request Owner to remove the APH leakage from Category-I guarantee and remove the LD.	APH Leakage is a critical requirement for Air Preheater performance. Therefore, Category-I guarantee has been specified to ensure minimum air preheater leakage. Bidder to comply technical specification requirement.
961	SECTION-VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	6 of 73	1.01.02 (vi)	Coal Pulveriser Wear Parts Warranty Life of Coal Pulveriser wear parts in hours of operation	Bidder would like to clarify in case of Mills wear measurement test- Since 6 mills are mostly running, top & bottom mills running hours criteria is not met even after 3 years of Plant operation. Hence for this case- suitable sunset clause to be included such as- a.If out of 8 Mills- 4 Mills wear measurement test criteria achieved , then other 4 mills wear test to be deemed completed. OR b.Mill wear measurement test also to be inline with Mill Capacity test i.e., only 4 mills out of 8 mills after completion of required operating hours. Please confirm.	Number of mills are dependent on coal quality and unit load. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
962	SECTION-VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES & LIQUIDATED DAMAGES	2 of 73	1.00.01 (i) 2	For Performance / Acceptance tests other than those identified at 1 above: After the conductance of Performance test, the contractor shall submit the test evaluation report of Performance test results to Employer promptly but not later than 7 (seven) days from the date of conductance of Performance test. However, preliminary test reports shall be submitted to the Employer after completing each test run.	Bidder would like to inform that since the coal and ash analysis is in customer scope, test report shall be submitted to customer after 7 days of receipt of this report.	The coal and ash analysis is carried out at site on regular basis and is promptly available. Sufficient time is available with the bidder to submit PG test report after conductance of PG Test. Bidder to comply technical specification requirement.
963	SECTION- VI, PART - B	SUB SECTION- G-04 STANDARD PG TEST PROCEDURE	227 of 227	-	1) PG test should be done at design coal GCV, however for conductance of PG test coal GCV variance can be allowed from -10% to +5% of design coal. Formula for applying correction shall be as per BSEN 12952-15 (2003).	As per bidder understanding the GCV variation given here are for conductance of PG test. However, any correction due to coal analysis shall be as per formula / value indicated in the BS EN 12952-15 (2003) as specified in the tender specification. Please confirm.	The specified criteria of GCV variation has been given in the referred clause are for conductance of PG test. Corrections due to variation in the parameters as specified in BS EN 12952-15 (2003) shall be applicable. The specification requirements are clear in this regard. Bidder to comply technical specification requirement.
964	SECTION- VI, PART - B	SUB SECTION- G-04 STANDARD PG TEST PROCEDURE	227 of 227	-	2) PG test to be done irrespective of any shortfall from rated parameters if it is attributed to design issues.	Bidder would like to know the requirement of this condition for conductance of PG test. As per bidder's understanding, the shortfall from rated parameters will have negative impact on the plant heat rate and hence, PG test conductance will not be suitable in such conditions. Owner is requested to further clarify.	The requirement is intended to complete the PG test as per the scheduled time.

965	SECTION- VI, PART - B	SUB SECTION- G-04 STANDARD PG TEST PROCEDURE	227 of 227	-	Penthouse maximum & minimum MTM temperature difference should be within 40 deg.C. Necessary combustion tuning shall be done to ensure the same.	Owner to kindly clarify requirement of this clause and purpose of same in PG Test Procedure.	The requirement is intended to optimize the performance and contain the temperature variations.
966	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	16 of 67	8.02.00 (d)	Supported by steam or water cooled hanger tubes forming part of Steam circuit with hanger tubes designed for a minimum of 2 times the calculated load so as not to cause any dislocation/damage to the tube banks/setting. Necessary calculations in support of this shall be furnished by the bidder. Structural type hanger support will not be acceptable.	Owner is requested to note that the economiser support by steam or water cooled hanger tubes will be new supporting arrangement for bidder as compare to the previous installation. Bidder would like to clarify once again that Economiser coils are supported by structural arrangement as per proprietary and proven standard design, which will not interfere the normal operation and maintenance of the boiler. Further bidder confirms that the structural support arrangement shall be designed taking care of erosion problems for fly ash. Further the supporting arrangement shall be designed for a minimum of two times the calculated load so as not to cause any dislocation/ damage to tube bank / sections. Hence, we request Owner to accept structural type hange support also.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
967	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	12 of 67	6.04.00	A CFD and FEM analysis to conform to specified cyclic requirements shall be carried out and furnished by the contractor along with the pump data sheet.	Bidder would like to inform that CFD / FEM analysis will be conducted to conform to specified cyclic requirements as applicable to BCP.	Bidder's proposal is not acceptable. CFD and FEM analysis have different functions and are required to be carried out to ensure the desired performance of BCP due to cyclic loading. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
968	SECTION-VI, PART-B	SUB-SECTION-A-22 MILL REJECT HANDLING SYSTEM	2 of 3	2.03.00 (7)	Tensioning arrangement. Hydraulic/pneumatic	Bidder would request to update this clause as per following Tensioning arrangement. Hydraulic/pneumatic or **as per OEM standard and proven practice.**	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
969	SECTION-VI, PART-B	SUB-SECTION-A-22 MILL REJECT HANDLING SYSTEM	2 of 3	2.03.00 (12)	Reliable and proven hydraulic/pneumatic auto take up arrangements, with facility of adjustment of tension. The tension assembly shall be designed to absorb any momentary shock loading.	Bidder would request to update this clause as per following: Reliable and proven hydraulic/pneumatic auto take up arrangements with facility of adjustment of tension **or as per OEM standard and proven Tensioning Arrangement.....**	Bidder's proposal is not acceptable. Bidder to comply Technical specification requirement.
970	SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	11 of 92	1.05.06.01	Rotational speed for drive selection 1 r.p.m. or actual offered whichever is higher	Bidder would request that RAPH speed will be decided by OEM as per standard design. Owner to kindly confirm.	The minimum rpm of the APH has been specified for drive selection which will be optimized at site through VFD based on the actual site conditions and APH performance. The employer intends to have the flexibility of setting up the rotational speed upto 1 rpm or actual offered whichever is higher, based on the actual site conditions and APH performance throught the life of the plant. Hence the same has been specified. Bidder to comply technical specification requirement.
971	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	29 of 67	10.07.13	2 x 100% Scanner Air Fans for all the scanners of one Steam generator unit shall be provided preferably at firing floor and away from Economiser Hopper ash evacuation system to avoid any ash ingress in scanner air fan system.	The scanner air fans shall be located at coal feeder floor as per previous projects with NTPC.	The location of scanner air fan has been specified to avoid any dust ingress. Specification is clear in this regard and Bidder to comply with the specification requirements. Further the exact location details shall be discussed during detail engineering in line with the specifications requirements.
972	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	57 of 67	22.01.01	Full range and full scale performance testing shall be conducted at shop on one number each of the following Fans as per BS 848-1:2007 / BS EN ISO 5801:2008.	Bidder would request for modification of the clause as per below. Full range and full-scale performance testing shall be conducted at shop on one number each of the following Fans as per BS 848-1:2007 or as per latest revision / BS EN ISO 5801:2008 **or as per latest revision.**	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
973	SECTION-VI, PART-E	9586-001-POM-A018	H-9, H-8	-	Suction for emergency air from atmosphere of Scanner Cooling Fan shown after Duplex Air Filter	Bidder would like to clarify that Suction for emergency air from atmosphere shall be before Duplex Air Filter as provided in previous executed NTPC projects.	The specific details shall be discussed during detail engineering in line with the specifications requirements.
974	SECTION-VI, PART-B	SUB SECTION-A-08 Power Cycle Piping	11 of 20	1.08.00	Note 18. Unless otherwise agreed, all valves shall be fitted with the spindle in upright position	Customer is requested to note that valve will be installed in horizontal pipeline with stem upright and in vertical pipeline will have horizontal stem. Customer is requested to kindly confirm acceptance	Bidder's understanding is correct. Bidder to comply the specification requirement.
975	SECTION-VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	25 of 28	2.30.00	Metal temperature measurement shall be done for valves mentioned at point a,b & c and sound monitoring for safety valves & ERVs mentioned at point d.	The requirement of metal temperature measurement of drain and vents is not clear. Kindly elaborate.	The requirement of metal temperature measurement for valves of drains and vents is already covered in the specified clauses to minimize losses. Specification is clear in this regard and bidder to comply with the specification requirements.
976	SECTION-VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	18 of 67 19 of 67	9.01.03 (4) 9.01.03 (6)	ii) The maximum air-in-leakage to flue gas of the Steam Generator with coal shall be guaranteed and demonstrated along with the Boiler PG test. (6) APH Guarantee Condition 1. Air Leakage (at 100% TMCR i.e. 800 MW unit load for design coal) – 10% (Max.) 2. Design Ambient Temperature & Relative Humidity: 25 deg.C& 60% RH 3. Excess Air – 20% 4. The maximum air-in-leakage to flue gas after 3000 hours continuous operation of the Steam Generator with coal shall be guaranteed.	Discrepancy has been observed for RAPH air-in-leakage test condition. As per clause number 9.01.03(4) the test shall be conducted along with boiler PG test i.e. during trial operation whereas as per clause number 9.01.03(6) the test shall be conducted after 3000 hours continuous operation. As per bidder understanding the RAPH air-in-leakage shall be conducted along with boiler PG test and not after 3000 hours continues operation. Owner to confirm.	Bidder to refer Amemdment to technical specification Sl. no. SG.23 in this regard
977	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	Page 7 of 9	4.08.00	Contractor shall prepare 3D design review model (network ready, which shall include visual interference check, walk-through animation, video simulation for major equipment placement and removal, visual effect, photo realism etc), which is extracted from intelligent 3D model, for **employer's review as & when desired by employer**.	Considering Progress of Engineering, Bidder propose total **4 nos. of model review during the engineering of the project**. Schedule of the same can be decided during detail engineering as per mutual discussion with Customer. This is inline with Bidder practice in recently executing projects.	Bidder's request has been reviewed and is not acceptable . Bidder to follow specification requirement .
978	SECTION – VI, PART-C	GENERAL TECHNICAL REQUIREMENTS	Page 16 of 118	8.03.04 (iv)	Contractor shall prepare and provide 3D design review model (network ready, which shall include visual interference check, walk-through animation, video simulation for major equipment placement and removal, visual effect, photo realism etc.), which is extracted from intelligent 3D model and shall make a presentation of the same every 3 months from LOA to enable NTPC to review the progress of engineering or as & when required by employer.	Considering Progress of Engineering, Bidder propose total **4 nos. of model review during the engineering of the project**. Schedule of the same can be decided during detail engineering as per mutual discussion with Customer. This is inline with Bidder practice in recently executing projects.	Bidder's request has been reviewed and is not acceptable . Bidder to follow specification requirement .
979	SECTION – VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 13 of 28	2.15.03 (d)	The coal mill shall be suitable for installation on RCC block type foundations and also at a suitable height in order that complete mill reject system as (described at sub section II A -17 of Part A) should be above the finished floor level of mill area or zero meter whichever is higher. Adequate maintenance space all around the mill zero meter have to be provided. However, **the non drive end part of bucket elevator may be allowed to placed at minus meter with adequate maintenance space.**	Bidder understands that facilities of Mill reject system other than Bucket elevator to be placed above ground level of Boiler. However, **non-drive end of Bucket elevator shall be placed inside pit arrangement with adequate maintenance space.**	Proposal shall be reviewed during detailed engineering based on the layout. In case of pit, bidder to provide sump pumps in the pit.

980	SECTION – VI, PART-B	SUB SECTION- G-03 LAYOUT PHILOSOPHY	Page 13 of 15	1.03.00 (58)	**All facilities of mill reject handling system** specified elsewhere in the specification such as pump, tank, conveyor, piping etc **shall be above ground level in boiler area.**	Bidder understands that facilities of Mill reject system other than Bucket elevator to be placed above ground level of Boiler. However, **non-drive end of Bucket elevator shall be placed inside pit arrangement with adequate maintenance space.**	Bidder's understanding is correct.
981	SECTION – VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 16 of 28	2.16.05A (2)	Suitability of duct between Boiler and future interconnection ofSCR system with minimum modification. Suitable duct tap-offs (including blanking plate) for Flue gas duct sections as indicated below: (a) Connection from Economiser outlet to each SCR reactor inlet. (b) Connection from each SCR reactor outlet to each RAPH (Bi-sector or Trisector, as applicable) inlet ducts to and (c) Connection for Economiser bypass duct from economizer inlet/intermediate position or from other alternative suitable location to SCR inlet for maintaining SCR Inlet flue gas temperature.	NTPC to kindly note that since only Provision for Future Installation of SCR system is applicable, Point b and c of clause 2.16.05A (2) are not applicable and request to kindly delete the same.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
982	SECTION – VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 24 of 28	2.30.00	Following specific elevations of Boiler requiring installation of **vacuum cleaning arrangement** in Boiler Front, Rear, LHS and RHS are also to be covered other than required areas: 1) Penthouse Floor 2) Gooseneck area floor covering both first pass and back pass. 3) Boiler Scaffolding door floor covering both first pass and back pass 4) Top wall blower tier floor covering both first pass and back pass 5) Top burner top floor covering both first pass and back pass 6) Burner bottom floor covering both first pass and back pass 7) S Panel (approx.8.5 to 9M)	Boiler is provided with open grating only, and the possibility of dust accumulation is minimum. Hence, Bidder propose to proceed **without vacuum cleaning system for reduction of Aux.power and thus overall optimisation of the project cost.**	Bidder to comply with the installation of vacuum cleaning arrangements as per the specifications requirement.
983	SECTION – VI, PART-A	SUB-SECTION-IIA-17 MILL REJECT HANDLING SYSTEM SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA SUB-SECTION-A-22 MILL REJECT HANDLING SYSTEM SUB-SECTION-A-22 MILL REJECT HANDLING SYSTEM	Page 1 of 1 Page 87 of 92 Page 1 of 3 Page 1 of 3	1.01.01 4.03.03 1.00.00 2.00.00	**Mechanical feeder including Vibrating Feeder (if applicable)** for mill rejects below each pyrite hopper for feeding at consistent rate to the mill reject conveyor. A vibrating feeder and metallic belt/chain flight conveyor carry mill reject from hopper to subsequent metallic /chain flight conveyor for further conveying to Bucket elevator for final storage at Silo. Mechanical conveying system shall be employed for handling of the mill rejects. Each mill reject discharge hopper shall be fitted with Feeder which shall discharge the mill rejects through Mechanical Conveyors to a storage Silo. Material from pyrite hoppers shall be removed by Mechanical conveyor and fed to main conveyor for further conveying. The main conveyor shall feed to a bucket elevator which in turn will feed to main storage silo.	Bidder understand that vibrating feeder shall be considered if required for the system. However, as per OEM recommendation of Bidder, **vibrating feeder is not required.** Hence, Bidder propose to proceed **without Vibrating feeder.** Also Material from pyrite hoppers shall be removed by **Main Mechanical conveyor** and further fed to a bucket elevator which in turn will feed to main storage silo. Please confirm acceptance.	Technical specifications are clear, bidder to comply.
984	SECTION – VI, PART-B	SUB SECTION- G-03 LAYOUT PHILOSOPHY	Page 6 of 15	1.03.00	Clear head room for material movement at ground level in Boiler Envelop - **5.0m (Minimum) (Unless specified Otherwise)**	First elevator landing level of Boiler has been considered at EL +4.00 mtr where Mill maintenance platform has been considered. Hence, Bidder propose to maintain min. 3.5 mtr headroom at Ground floor considering various sizes of equipment located at Ground floor inside the Boiler envelope wherever required. Remaining areas will be considered with piping, ducting and other boiler facilities at Boiler ground level based on system requirement. However, **for maintenance of Major equipment like Fans, Mill etc.., min. 5 mtr headroom** has been considered inline with executed projects of Bidder.	Specification requirement is clear in this regard. Bidder to follow specification requirement .
985	SECTION – VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 27 of 67	10.05.30	The mill and its motor, gear box foundation bolts shall have adequate maintenance space and accessibility for tightening both from top and bottom side of foundation bolts. Alternatively, **additional minimum four (04) numbers of extra foundation bolt** shall be provided at extreme corners of base plate which can be used in case of failure of existing foundation bolts.	As per Bidder design, entire foundation bolts will be embedded inside the RCC with anchor frame arrangement. Further, foundation bolt sleeves will be filled with grouting and nuts at bottom side of the bolts will be tack welded. Hence, **tightening of bolts from bottom side is not required**. Same design has been followed in all the projects executed by Bidder. **Further additional bolts are also not required considering the above.**	The details shall be decided during detail engineering based on the system offered, in line with the specifications requirements.
986	SECTION – VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 39 of 67	13.01.01	**The CFD modelling shall be carried out in two steps.** **a. First Step:** Single phase flow model to establish the optimized duct layout among different options and the location of flow guides to achieve the criteria mentioned in point 4 above. **b. Second Step:** In the second step of CFD modelling, 2-phase flow model shall be developed for analysing the sensitivity of ash settlement in different segments while considering different ash particle sizes and velocities. The results of the 2-phase CFD model shall be used to locate fly ash hopper location in different duct segments.	Duct layout will be prepared based on CFD recommendations of similar ducting arrangement in executed projects as well as disposition of the equipment in plot plan. Further based on project specific CFD reports, necessary guide vanes and flow splitters will be added inside the ducting during detail engineering. **Hence, preparation of different options for ducting layout is not required** as the equipment location and size is already fixed during development of the plot plan itself.	Bidder's proposal is not acceptable. The bidder shall prepare project specific ducting layout(s) and optimize them based on CFD analysis. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
987	SECTION – VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 40 of 67	13.01.04	All interconnecting gas ducts between the boiler and the ESP shall have a **minimum slope of 45 degree** with respect to horizontal so that any chance of accumulation of ash particles in the duct can be avoided under all normal/abnormal operating conditions.	NTPC to kindly note that no significant ash accumulation has been experienced in interconnecting gas ducting of the Non NTPC projects supplied by bidder without 45 deg slope. Hence, Bidder propose to consider the inter connecting duct **without slope for simplification of the arrangement**.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
988	SECTION – VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 53 of 67	17.01.05	Suitable all round platform for manual operation of all valves, for all dampers , for ash hoppers, APH drives, for all lubricated equipment bearings and equipments requiring access during operation for normal day to day inspection & maintenance shall be provided. Suitable access to these platforms shall also be provided. **Suitable pathway from air preheater to ESP shall be provided in a safe manner.**	Suitable approach for ESP inlet duct and its instruments shall be considered from ESP top platform with suitable ladder/stair approach. As Common duct has been considered in between RAPH & ESP, **continuous platform from APH to ESP is not feasible and not recommended.** However, bidder will provide platform from Air preheater area upto common duct for the approach of Air preheater outlet damper and PG test ports.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
989	SECTION – VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 40 of 67	13.01.05	(a) Minimum 8 mm thick steel plates for gas ducts upstream of ESP and minimum 6 mm thick steel plates for gas ducts downstream of ESP.	Bidder propose to use 6 mm thick for Gas Duct inline with executed reference projects. Employer to confirm the same.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
990	SECTION – VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 42 of 67	13.01.11	The expansion joints shall be tested as per requirements specified elsewhere in the Technical Specification. Each identical type (corresponding to various size, operating/design parameters, material, design etc.) from the given populace shall be selected for representing the identical sets. The number of EJs to be selected for performing tests shall be discussed and finalized. A minimum of **5 expansion joints**, however, shall undergo performance testing.	The expansion joints shall be tested as per OEM's recommendation. A minimum of 3 expansion joints, however, shall undergo performance testing inline with bidders past executed reference. Employer is requested to confirm the same.	Bidder's proposal is not acceptable.The numbers shall be as per the specified criteria. Bidder to comply with the specification requirements.

991	SECTION – VI, PART-A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES	Page 19 of 39	1.22.02	Gates in Flue Gas System of Air Flue gas path of Boiler including FGD. 1. Seals : 1 set of each type and size 2. Actuator : 1 no. of each type	Bidder understands this clause is applicable for FGD gates only and not applicable for Boiler Gates. Kindly confirm that our understanding is correct.	This clause is applicable for Gates in Flue Gas System of Air & Flue gas path of Boiler including FGD. Bidder to refer amendment to technical specification Sl. no. SG.20 in this regard.
992	SECTION – VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	Page 43 of 67	13.02.02	(iv) Flue gas biasing damper in boiler second pass (if applicable). 13.02.05 Damper Gas Tightness Damper at locations Min. Guaranteed Gas tightness Efficiency As per Clause No. Without Seal Air (13.02.01 (e), 13.02.02(ii) 13.02.02 (iii) & 13.02.02(iv)) =99.50% & With Seal Air** =100%	Note that as per clause no 13.02.02 iv) Flue gas biasing damper in boiler second pass is required sealing efficiency of 99.5% on flow. Based on bidder experience and proven practice, flue gas biasing damper in second pass is Pneumatic operated control type damper ,doesn't require any sealing efficiency and the same is inline with bidder executed reference with NTPC projects. Same philosophy is applied for Pneumatic operated control damper of Hot and cold air inlet to each mill. Employer is requested to confirm the same.	Bidder to refer Amendment to technical specification Sl.no. SG.25 in this regard.
993	SECTION – VI, PART-A	SUB-SECTION-I-B	Page 11 of 19	ANNEXURE-IV-2	DOMESTIC COAL CHARACTERISTICS	Ash content in Proximity and Ultimate analysis is not matching in Design Coal. NTPC is requested to provide the corrected values for the same.	Bidder to refer Amendment to technical specification Sl.no. SG.03 in this regard.
994	SECTION - VI , PART – A,	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	28 OF 28	7.00.00	Architectural Features for Steam Generator Enclosure Boiler structure being the heart of the power plant shall be architecturally treated to have an aesthetic appearance and shall be comparable with international buildings of repute. Boiler structure shall be in complete harmony with the main plant building, surrounding structures and environment. Accordingly, to achieve the same following provision (not limited to) shall be applied. 1. Boiler enclosure shall be covered with colour coated metal sheeting. The metal sheet shall display a visually appealing painting (which will be informed later) on outside. The height covered for sheeting will be from boiler roof to Penthouse and 15 m below from penthouse. During Overhauling or repair, the covering should not restrict material movement from Top and Sides of the boiler. Accordingly, removable type sheet shall be provided for such location. Necessary approach and lugs shall be provided for this purpose.	Bidder would request to kindly remove this clause as the bidder is providing suitable boilers casing at the Roof and Penthouse. The additional requirement shall increase the heat and ventilation given in same area may not be suitable, which will create a space where carrying out any online maintenance or inspection work will not be possible.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
995	SECTION - VI , PART – A, SUB SECTION-II A-01	Forced Draft Fans	9 OF 28	2.13.01	Forced Draft Fans Two (2) nos. of axial type, constant speed variable pitch controlled FD fans each with drive motor, base plates, foundation bolts & nuts, inlet bird and trash screen, suitable arrangement to prevent rain water entry to fan motor, coupling and coupling guard and acoustic silencer. Each fan shall be provided with bearing lubrication and hydraulic blade pitch control unit(s) consisting of:	Bidder would like to clarify that the Fan shall be directly placed on the foundation similar to all previous Projects executed for Employer. Thus Base Plate is not required as part of BIDDER'S OEM design. However, drive motor shall have its own base plate. Kindly confirm acceptance.	The details shall be decided during detail engineering based on the equipment/system offered, in line with the specifications requirements.
	SECTION - VI , PART – A, SUB SECTION-II A-01	Induced Draft Fans	9 OF 28	2.13.02	Two (2) nos. two stage ID fans (Axial type, Constant speed, variable pitch controlled) each with drive motor, base plates, foundation bolts and nuts, inlet box, discharge case, coupling, coupling guard and suitable arrangement to prevent rain water entry to fan motor. Each ID fan shall be provided with bearing lubrication and hydraulic blade pitch control unit(s) consisting of.		
	SECTION - VI , PART – A, SUB SECTION-II A-01	Primary Air Fans	13 OF 28	2.15.04	Two (2) numbers of two stage axial PA fans for each steam generator, with hydraulic blade pitch control system each with motor, base plates, foundation bolts, inlet box, inlet bird and trash screen, inlet rain water canopy, inlet cone, diffuser, coupling, coupling guard and silencer.		
996	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Fan balancing	37 OF 67	12.06.00	The fans shall be statically and dynamically balanced before shipment.	Blades will be balanced statically and hubs will be balanced dynamically at manufacturer's workshop. The combination of these will therefore be a balanced rotor.	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
997	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Fan balancing	37 OF 67	12.06.00	Balancing of each fan shall be checked and adjusted at site, if necessary.	Blades and Hub will be balanced separately at the workshop and in view of this site balancing is not required. Bidder will support for site balancing, if necessary.	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
998	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Fan balancing	37 OF 67	12.06.00	Natural frequency of all fan components shall be established by vibration testing to ensure that no part of the wheel is adversely excited by any force generated at operating speeds.	Bidder/its OEM shall carry out natural frequency test for one set of blades for one Hub for the first set of fans as per OEM practice. Natural frequency test is not required for other rotating parts.	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
999	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Fan balancing	37 OF 67	12.06.00	d) The fan blade shall be subjected to natural frequency test. The other components of ID & FD fan wheels need not be subjected to natural frequency test if supplier can prove that these components are very rigid and have very high natural frequency compared to the operating frequency of respective fans giving justification..	Bidder/its OEM shall carry out natural frequency test for one set of blades for one Hub for the first set of fans as per OEM practice. Natural frequency test is not required for other rotating parts.	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
1000	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Fan Casing	38 OF 67	12.10.00	The fan casing shall be split to provide easy removal of the fan hub/impeller for replacement and repairs.	Bidder's design consists of rolling diffuser / inlet box for onsite maintenance, diffuser (in case of single stage and two stage fans) and inlet box (in case of two stage fans only) are mounted on rails for easy maintenance of hubs and blades. However Fan components like inlet box and diffuser will be supplied in split for ease of transportation and handling at site.	Bidder to comply the specifications requirements. Further details shall be discussed during detail engineering in line with the specifications requirements.
1001	SECTION - VI , PART – A, SUB SECTION-II A-01	Regenerative Air Pre-heater (RAPH)	10 OF 28	2.14.01	(1) One (1) peripheral ACVFD drive connected to drive Airheater along with automatic clutching/declutching arrangement. Alternatively, centrally mounted APH ACVFD Drive system having sufficient space for mounting emergency drive and having handling facility with proven experience may also be acceptable.	Bidder's shall provide 1no. Centrally mounted AC VFD Drive, 1 No. air motor drive, mounted on common gear box with automatic clutching/declutching arrangement. Air receiver tank and related accessories shall be in Customer's scope of supply	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02		19 OF 67	9.01.03	Air Heater drive s ys item (i) 1 No. peripheral / centrally mounted AC VFD drive, with gear box and automatic clutching/declutching facility. Alternatively, centrally mounted APH AC VFD Drive system having sufficient space for mounting emergency drive and having handling facility with proven experience may also be acceptable. ii) 1 No. independent air motor drive, with its gear box and automatic clutching, declutching facility for rotation during non availability of A.C. drive system. (iii) An air receiver tank of storage capacity adequate to operate air pre-heater using air motors for 10 minutes (minimum) with no air make-up during this period. Air motor valve for air supply from air receiver tank to APH shall have lock open arrangement.		
1002	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Regenerative Air Pre-heater (RAPH)	11 OF 28	2.14.01	(13) Adequate number of thermocouples or platinum resistance temperature detectors (RTD) for measuring cold and hot end bearing metal temperature for interlock , protection and monitoring shall be provided.	Duplex RTD shall be provided for cold and Hot end for bearing metal temperature	bidders proposal of providing duplex RTD is Noted
1003	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Regenerative Air Pre-heater (RAPH)	11 OF 28	2.14.01	Forced lubrication system for bearing of each air heater shall be provided and shall include two (2) x 100% capacity oil pumps with motor, two (2) x 100% oil coolers and two (2) x 100% oil filters etc.	Oil unit system based on Khurja scheme shall be provided. The scope of instruments shall be furnished separately after detailed review of specifications.	Specification requirement is clear & bidder to comply the technical specification requirements.

1004	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	REGENERATIVE AIR PRE-HEATERS AND STEAM COIL AIR PREHEATERS	18 OF 67	9.01.03	(ii) The maximum air-in-leakage to flue gas of the Steam Generator with coal shall be guaranteed and demonstrated along with the Boiler PG test. The Contractor shall also demonstrate that the drift in air heater leakage (percentage change in air-in-leakage) does not exceed 1%, one year after demonstration of above guaranteed air-in-leakage. Within this period of operation till all air heater leakage demonstrations are completed there will be no need for any shut down for seal replacements or any internal adjustments. The seal design/construction shall be such that the above requirements are satisfied.	1. The air heater sealing system, and thus leakage will be adversely impacted by operating conditions beyond the control of Bidder. For example, operating the air heater with gas flow and little to no air flow (bottle-up) will result in extensive wear and damage to the hot end radial seals, hot end sector plates, hot end circ seal (and possibly its holding bar) and cold end axial and circ seals. 2. Similarly, operation at elevated gas temperature may result in larger than expected rotor capping/turndown, resulting in seal wear and possible damage to the seals and cold end sector plates. 3. Demonstration of guaranteed leakage values is contingent upon the air heater sealing system being in the as-designed condition as called for in the ASME PTC 4.3 test code. The code recommends that the sealing system be inspected, and all necessary repairs carried out, just prior to guarantee testing to ensure that the equipment is suitable for testing. 4. Based on various testing experience in last few scenarios it was noticed that the RAPH is being operated within initial 3000 hours including bottling-up and elevated temperature scenarios as indicated above, which in turn impact the part and thereby the RAPH performance as informed above. 5. Hence, Bidder's OEM does not recommend the leakage guarantee demonstration after 3000 hours of operation and demonstration of drift (% as per tender) one year after the initial demonstration/ operation, unless until all the sealing system and related parts are	Bidder's proposal is not acceptable.The specified requirements are based on the criticality of the equipment as also given the coal & ash type towards the unit performance. Bidder to comply the specifications requirements.
	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02	Air Heater drive system	19 OF 67	9.01.03	APH Guarantee Condition 1. Air Leakage (at 100% TMCR i.e. 800 MW unit load for design coal) – 10% (Max.) 2. Design Ambient Temperature & Relative Humidity: 25 deg.C& 60% RH 3. Excess Air – 20% 4. The maximum air-in-leakage to flue gas after 3000 hours continuous operation of the Steam Generator with coal shall be guaranteed. 5. Contractor shall demonstrate that the air-heater air-in-leakage do not exceed the guaranteed or specified value (whichever is lower) as per description at Sub section-A-01 & A-02, Part-B (Mechanical), of Technical specifications.		
1005	SECTION - VI, Part_B_Mechanical_SUB SECTION-A-02		19 OF 67	9.01.03	(iv) One of the drive of each of the air preheater shall be provided with VFD for speed regulation from full design rotational speed or 1 rpm, whichever is higher, to about 0.3 rpm. The Contractor shall carry out a test after commissioning to detect the optimum speed of the air preheater to maximize gas temperature reduction at its gas side outlet. Optimum rotation speed for 100% TMCR, 80 % TMCR and 60% TMCR unit loads shall be recommended by the contractor based on such tests. The test shall be made by incrementally reducing the speed in steps of 0.1 rpm from its present maximum operating speed onto the minimum specified speed. Suitable soaking time at each speed step shall be given during the test before recording the temperatures and other performance parameters. Test procedure shall be furnished during detail engineering.	APH Rotor rotational speed is decided in such a way to give optimized heat transfer with maximum residual time possible. Reducing the optimized rpm will not have any further improvement in thermal performance. In case testing is to be done, scope of carrying out the test (with or without pre-defined test procedure) shall be by the End-Customer. Further, Bidder's OEM would like to inform that, there is no internationally recognized standard for conducting such a test. Also, it would be very difficult, if not impossible to identify any changes in thermal performance due to the small changes in speed (as defined in tender).	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
1006	SECTION - VI/ Part B	E - 01	Page 1 of 13	1.01.01 (a)	Each plate shall be subjected to a 100% normal ultrasonic at the mill to meet the minimum requirements of EN 10160:1999 / equivalent ASTM standards. Elevated temperature tensile tests shall also be carried out on plate material for each heat.	Bidder clarifies that we normally use forged material as per pressure part schedule and design instead of plate material for water separator as per ASME material specification.	Bidder proposal is not acceptable. Specification requirement of Ultrasonic Testing is clearly specified for this application. Bidder to comply technical specification requirement.
1007	SECTION - VI/ Part B	E - 01	Page 1 of 13	1.01.01 (j)	all butt welds shall be subjected to 100% radiography.	All butt welds shall be subjected to 100% ultrasonic / radiography / PAUT+TOFD examination after stress relief same as mentioned in (h)	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
1008	SECTION - VI/ Part B	E - 1	Page 2 of 13	1.01.02 (b)	All butt welds shall be subjected to RT/PAUT+TOFD examination	All butt welds shall be subjected to 100% ultrasonic testing / radiography/PAUT+TOFD examination after stress relief same as Point (h).	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
1009	SECTION - VI/ Part B	E - 1	Page 2 of 13	1.01.02 (c)	All full penetration nozzle and attachment welds shall be subjected to UT prior to stress relieving	Bidder suggest UT shall be performed considering Nozzle Size ID More than 250 mm. for less than 250 mm ID as per JV partner practices. Bidder would like to clarify that maximum area shall be covered. Some location full coverage not possible due to nearby Stubs, Hole, opening or nozzle.	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
1010	SECTION - VI/ Part B	E - 1	Page 2 of 13	1.01.02 (d)	All nozzles, branches, stubs and load bearing attachment shall be examined by MPI techniques after the toes of the weld have been ground smooth and stress relieved.	Bidder suggest MT/PT shall be performed before PWHT/ SR for CS and alloy steel Gr.11,12 and Gr.22. For Gr.91 , Gr.92 it shall be performed after PWHT considering CSEF material.	The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. This may be discussed during detailed engineering.
1011	SECTION - VI/ Part B	E - 01	Page 2 of 13	1.01.03 (c)	All tubes/panels/coils shall be checked for clearance by steel ball test and for cleanliness by sponge passage	For Steel Ball & Sponge test of Panels, There are constraint due to Y-pieces, Riffle tubes, 3-Dimensional Opening (3D) etc in WW panels. Bidder proposes to carry out Sponge & ball pass only for flat Panel & coils as per Bidder practice.	Bidder proposal is not acceptable. Looking into criticality of component, Steel ball & Sponge test is to check the presence of any foreign material. Bidder to comply technical specification requirement.
1012	SECTION - VI/ Part B	E - 1	Page 2 of 13	1.01.03 (d)	Quantum of RT or UT on shop and field weld butt joints	Bidder proposes for quantum as per design code and IBR with minimum of 20% by RT/UT/PAUT	Bidder proposal is not acceptable. Quantum of NDT is clearly specified. Bidder to comply technical specification requirement.
1013	SECTION - VI/ Part B	E - 1	Page 3 of 13	1.01.03 (f)	Tubes and fabricated panels/coils shall be subjected to hydraulic pressure test including water wall panels, burner panels, preheaters, super heaters & economizers.	Bidder proposes to perform the hydrotest on critical burner panel -100 % and 10 % for other water wall panels, Reheater ,Economiser, super heaters & hydro test shall be excluding loose tubes and coils without butt joints. Bidder perform welding majority through auto Tig (automatic TIG welding) machines which has high accuracy level and defect rate. Bidder has stringent internal quality checks for welding. 10 % Random Hydrotest will improve project schedule.	Bidder proposal is not acceptable. Hydrotest is carried out to vaidate design & strength of the component. Bidder to comply technical specification requirement.
1014	Quantum of RT or U+A32:F32T on shop and field weld butt joints	E - 1	Page 3 of 13	1.01.04 (c)	All bent pipes shall be checked for ovality and thinning by UT on first off lot & on random samples for subsequent pieces. Outer surface of bends shall be subjected to MPI/LPI.	Bidder propose PT/MT on bend area for Hot Bends only as Per its OEM procedure. Bidder does not envisaged PT/MT for Cold bends of pipes. As per Bidder's standard practice & PT/MT performed at extrudes of hot bend pipe to check surface defect like cracks due to hot shortness and tensile forces at the bend extrados portion after S.R.which cannot be sometime visible during visual examination. Based on past executed and all NTPC projects zero indication observed. Bidder propose to check ovality and thinning 100 % of production bend pipes. Eliminate the first off lot for bend piping as bidder has established bending parameters data and system to control the required dimensions.	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Further, the same may be discussed during detailed engineering if required.
1015	SECTION - VI/ Part B	E - 1	Page 3 of 13	1.01.04 (d)	The edge preparation for shop and site welds in stainless steel /alloy steel shall be subjected to dye penetrant check. Non-destructive examination of welds shall be carried out after post weld heat treatment, if any	Bidder have not envisaged PT for the edge preparation for shop and site weld in SS and alloy steel. 100 % MT/PT for all WEP of SS & AS Pipes. Bidder uses 100% UT tested pipes and at shop WEP is carried out at sophisticated CNC machines & followed by visual inspection. WEP of pipes are done through Machining only. Gas cutting and grinding process is not used. In past executed projects, no indication observed on machined WEP of pipes. Therefore bidder request to waive this check which has not much significance in quality of product.	The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. Further, the same may be discussed during detailed engineering if required.
1016	SECTION - VI/ Part B	E - 1	Page 4 of 13	1.01.04 (i)	Wherever SR/PWHT is envisaged for alloy steel, above NDTs shall be after SR/PWHT	Bidder propose that NDE shall be performed before and after PWHT for all Gr.91 and Gr.92 considering CSEF material. For other than Gr.91 /Gr,92 NDE shall be done one time before PWHT.	The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. Further, the same may be discussed during detailed engineering if required.

1017	SECTION - VI/ Part B	E - 1	Page 4 of 13	1.01.06 (b)	Hardened/stellitted valve disc and seat are to be subjected to LPI and hardness	Hardness shall be checked on sample piece and not directly on valve disc and seat	Bidder proposal is not acceptable. LPI & Hardness testing requirements are clearly specified. Bidder to comply technical specification requirement.
1018	SECTION - VI/ Part B	E - 1	Page 4 of 13	1.01.06 (c)	Color matching of valve disc/plug and seat shall be carried out to ensure min. 80% contact and no through passage	Color matching is not emphasised as now a days matching technology has improved a lot, moreover tightness of disc/plug to seat shall be carried out by performing air/water leak test as per standard	Bidder proposal is not acceptable. Blue matching is a critical check for ensureing no leakages during operation. Bidder to follow the technical specification requirements.
1019	SECTION - VI/ Part B	E - 1	Page 8 of 13	1.02.03 (d)	Full range performance test shall be carried out on one fan of each type and size as per BS 848, Part-1.	Please note that BS 848, Part 1 is now withdrawn and replaced by BSEN ISO 5801. Bidder proposes to perform testing as per BSEN ISO 5801 or equivalent.	Please refer E-00 (page 01 of 01) of Part-B regarding applicability of latest revision of Codes & Standards. Bidder to follow the technical specification requirement.
1020	SECTION-VI, PART-B	SUB-SECTION-E-1	Page 8 of 13	1.02.04 (a)	Raw material for shaft, coupling, gears and pinions, top and bottom races and other rotating components shall be subjected to UT. MPI/LPI shall be carried out to check surface soundness.	Forged shafts used in Roller Journal Assembly / Tensioning Parts Assembly shall be subjected to UT & MPI, as applicable, during stages of production. However, Shaft, Coupling, Gears & Pinions, Top & Bottom races and other rotating components are the part of bought-outs viz., Gear Box with Lubrication units, Hydraulic Tilting Device, Roller Loading Device etc. These are compliant to supplier internal quality norms & no reports for UT/MPI/LPI will be produced.	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. Further, the same may be discussed during detailed engineering if required.
1021	SECTION-VI, PART-B	SUB-SECTION-E-1	Page 8 of 13	1.02.04 (b)	Wear-resistant parts shall be UT/ RT tested to check soundness after suitable heat treatment. Check for chemical composition, hardness and microstructure shall be carried out. For ceramic materials check for various properties including hardness, density, wear rate and composition shall be carried out.	Wear resistant parts viz. Roller Liners (Roller Journal Assembly) & Table Liners are composites comprising of SG Iron & Hi chrome material. For such composite material, UT/RT/MPI is technically not feasible. However, LPI shall be conducted to ensure surface integrity. (LPI acceptance norms will be as specified by the supplier specification & approved by Bidder Engg).	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. Further, the same may be discussed during detailed engineering if required.
1022	SECTION-VI, PART-B	SUB-SECTION-E-1	Page 9 of 13	1.02.04 (c)	Butt welds in the tube/ separator /body casing of the mill shall be tested by UT / RT and MPI. All other welds in main tube/separator shall be tested by MPI/LPI for acceptance. The tube shall be statically balanced.	Butt welds shall be subjected to UT and LPI after PWHT, as applicable. LPI is proposed due to positional difficulty.	Bidder proposal is not acceptable.MPI has advantage of detecting both surface & sub-surface discontinuities where as LPI is for checking surface discontinuities. Bidder to follow the technical specification requirements.
1023	SECTION-VI, PART-B	SUB-SECTION-E-1	Page 9 of 13	1.02.04 (d)	All gearboxes shall be run tested for adequate duration to check rise in oil temperature, noise level and vibration. Check for leak tightness of gear case also shall be performed.	Trial run duration shall be as per manufacturer specification (approved by Bidder). Oil leakage shall be checked during no load trial run test at supplier's works.	Bidder to comply the Technical specification requirements. The same may be discussed during detailed engineering
1024	SECTION-VI, PART-B	SUB-SECTION-E-1	Page 9 of 13	1.02.04 (e)	Trail assembly (stacking) of at least one Mill complete with all major components needs to be carried out at shop.	At shop, only one mill will be trial assembled with 01 no. Grinding Table Assembly, 01 no. Roller Journal Assembly, 01 no. Lower Housing Assembly and 01 no. Middle Housing Assembly.	Trail assembly with all major components as per drawing needs to be carried out at shop. Bidder to follow the technical specification requirements.
1025	SECTION-VI, PART-B	SUB-SECTION-E-1	Page 9 of 13	1.02.04 (f)	Fabricated pipe welds should be examined by MPI.	In case of Pulveriser mill, pipe welds are applicable only for Lower housing –seal air piping arrangement. This is a low pressure piping & hence LPI is proposed.	Bidder proposal is not acceptable.MPI has advantage of detecting both surface & sub-surface discontinuities where as LPI is for checking surface discontinuities. Bidder to follow the technical specification requirements.
1026	SECTION - VI/ Part B	E - 1	Page 9 of 13	1.02.06 (c)	All pumps including spare cartridges shall be subjected to performance test at the manufacturer's works under as near site conditions as possible and strip down examination after the test.	Bidder Clarifies that strip test shall be performed only in case there is an abnormal sound during performance test of pump.	Bidder understanding is correct. Further, This may be discussed during detailed engineering if required.
1027	SECTION - VI/ Part B	E - 1	Page 10 of 13	1.02.07 (7.0)	Cross Travel test of cranes at shop	Cross Travel test of cranes shall be applicable and performed at site during commissioning	Cross Travel test of cranes is critical check & to be carried out before dispatch. Bidder to follow the technical specification requirements.
1028	SECTION - VI/ Part B	E - 1	Page 11 of 13	1.02.11 (c ii)	For plates of 25mm < thickness < 32mm - 10% RT/UT and 100% MPI	Bidder proposes to perform MPI/PT in lieu of MPI alone	Bidder proposal is not acceptable.MPI has advantage of detecting both surface & sub-surface discontinuities where as LPI is for checking surface discontinuities. Bidder to follow the technical specification requirements.
1029	SECTION - VI/ Part B	E - 1	Page 11 of 13	1.02.11 (c iv)	All fillet welds of built up plate girders shall be inspected 100% by MPI	Bidder proposes to perform MPI/PT in lieu of MPI alone	Bidder proposal is not acceptable.MPI has advantage of detecting both surface & sub-surface discontinuities where as LPI is for checking surface discontinuities. Bidder to follow the technical specification requirements.
1030	SECTION - VI/ Part B	E - 1	Page 12 of 13	1.02.15 (a)	All the bellows subjected to vacuum service shall be subjected to vacuum test.	NTPC is requested to note that bidder will perform air leak test in place of hydrotest for metallic expansion joint/below. Roof Penetration expansion joint bellow Hydro test is not practical due to lesser thickness and size. As per Manufacturer's practice leak test is applied for small expansion bellows.	Bidder proposal is not acceptable. Air leakage/ Hydrotest is not a substitute for Vacuum test. Bidder to comply the technical specification requirements.
1031	SECTION - VI/ Part B	E - 6	Page 1 of 5	1.01.00 (b)	All pipe lengths under this package, including piping where alloy steel is used shall be subjected to 100 % ultrasonic examination as per material specification standard with acceptable notch depth of 5% of the selected wall thickness (1.5mm maximum) except for the following piping system:	Depth of notch shall be 5% (0.3mm minimum, 1.5mm maximum)	Bidder understanding is correct. Further, This may be discussed during detailed engineering.
1032	SECTION - VI/ Part B	E - 6	Page 1 of 5	1.01.00 (c)	The edge preparation for shop and site welds in stainless steel /alloy steel shall be subjected to dye penetrant check. Non-destructive examination of welds shall be carried out after post weld heat treatment, if any	Bidder have not envisaged PT for the edge preparation for shop and site weld in SS and alloy steel. 100 % MT/PT for all WEP of SS & AS Pipes. Bidder uses 100% UT tested pipes and at shop WEP is carried out at sophisticated CNC machines & followed by visual inspection. WEP of pipes are done through Machining only. Gas cutting and grinding process is not used. in past executed NTPC -Tanda, Khargone, SJVN-Buxar, THDC-Khurja , no indication observed on machined WEP of pipes. Therefore bidder request to waive this check which has not much significance in quality of product.	The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. Further, the same may be discussed during detailed engineering if required.
1033	SECTION - VI/ Part B	E - 6	Page 1 of 5	1.01.00 (d)	Pipe bend shall be checked for ovality and thinning by ultrasonic or other acceptable methods on first off lot & on random samples for subsequent pieces for high pressure applications. Outer surface of bends shall be subjected to magnetic particle examination/LPI.	Bidder propose PT/MT on bend area for Hot Bends only as Per its OEM procedure.. Bidder does not envisaged PT/MT for Cold bends of pipes. As per OEM standard practice & PT/MT performed at extrudes of hot bend pipe to check surface defect like cracks due to hot shortness and tensile forces at the bend extrados portion after S.R.which cannot be sometime visible during visual examination. Based on past executed NTPC projects zero indication observed. Bidder propose to check ovality and thinning 100 % of production bend pipes. Eliminate the first off lot for bend piping as bidder has established bending parameters data and system to control the required dimensions.	Bidder proposal is not acceptable. The requirements of NDT is clearly specified. Bidder to comply technical specification requirement.
1034	SECTION - VI/ Part B	E - 6	Page 2 of 5	1.01.00 (i)	Wherever SR/PWHT is envisaged for alloy steel, above NDTs shall be after SR/PWHT	Bidder propose that NDE shall be performed before and after PWHT for all Gr.91 and Gr.92 considering CSEF material. For other than Gr.91 /Gr,92 NDE shall be done one time before PWHT.	The requirements of NDT is clearly specified. Bidder to comply technical specification requirement. Further, the same may be discussed during detailed engineering if required
1035	SECTION - VI/ Part B	E - 6	Page 3 of 5	1.05.00 (b)	Hardened/stellitted valve disc and seat are to be subjected to LPI and hardness	Hardness shall be checked on sample piece and not directly on valve disc and seat	Bidder proposal is not acceptable. LPI & Hardness testing requirements are clearly specified. Bidder to comply technical specification requirement.

1036	SECTION - VI/ Part B	E - 6	Page 3 of 5	1.05.00 (c)	Color matching of valve disc/plug and seat shall be carried out to ensure min. 80% contact and no through passage	Color matching is not emphasised as now a days matching technology has improved a lot, moreover tightness of disc/plug to seat shall be carried out by performing air/water leak test as per standard	Bidder proposal is not acceptable. Blue matching is a critical check for ensureing no leakages during operation. Bidder to follow the technical specification requirements.
1037	SECTION - VI/ Part B	E - 6	Page 5 of 5	1.07.00 (a)	Hydraulic pressure test shall be carried out on each pipe and expansion bellow	NTPC requested to note that bidder will perform air leak test in place of hydrotest for metallic expansion joint/below. Roof Penetration expansion joint bellow Hydro test is not practical due to lesser thickness and size. As per Manufacturer's practice leak test is applied for small expansion bellows.	Bidder proposal is not acceptable. Air leakage is not a substitute for Hydrotest. Bidder to follow the technical specification requirements.
1038	SECTION - VI/ Part B	E – 37	Page 4 of 4	Note (a)	In case of manufacturers / supplier who have supplied cables in the past through Corporate Centre:- Routine Test of manufacturer internal test report are to be verified by owner and Main Contractor at the time of final inspection. Owner and Main Contractor will also witness routine tests on cables on 10% sample basis.	Bidder proposal for review of Routine Test report at the time of Final Inspection However Acceptance Test will be carried out as per relevant standard and sampling plan	Bidder request is not acceptable. Bidder to follow QA specification indicated in bid document and NTPC approved MQP for the respective type of cables for the applicable standard as well as sampling plan.
1039	SECTION - VI/ Part B	E – 40	Page 3of 3	Note (a)	Routine Test of manufacturer internal test report are to be verified by owner and Main Contractor at the time of final inspection. Owner and Main Contractor will also witness routine tests on cables on 10% sample basis.	Bidder proposal for review of Routine Test report at the time of Final Inspection However Acceptance Test will be carried out as per relevant standard and sampling plan	Bidder request is not acceptable. Bidder to follow QA specification indicated in bid document and NTPC approved MQP for the respective type of cables for the applicable standard as well as sampling plan.
1040	SECTION - VI/ Part B	E – 42	Page 02 of 02	Note 5	For LT Motors, stator core stack length & grade, no load loss and winding resistance w.r.t. type tested motor for IE2/IE3 shall be checked/verified in addition to Compliance of relevant standard IS:12615/IEC requirement. In case actual results are not within the tolerance limit as declared by manufacturer during QP submission, the motor shall be subjected to efficiency test.	Bidder proposal For LT Motor no load loss and winding resistance w.r.t. type tested motor for IE2/IE3 shall be checked/verified in addition to Compliance of relevant standard IS:12615/IEC requirement. In case actual results are not within the tolerance limit as declared by manufacturer during QP submission, the motor shall be subjected to efficiency test.	Bidder request is not acceptable.Bidder to follow QA specification indicated in bid document for the IE2/IE3 motor like certification of core stack length and grade, winding Resistance, No Load loss w.r.t type tested motor, as efficiency test is not the part of Routine Tests as per Relevant Std.
1041	-	-	-	-	Wherever MPI is mentioned and option for PT due to inaccessible areas is not mentioned	Bidder proposes for PT for inaccessible areas. Please confirm acceptance.	Bidder proposal is not acceptable. MPI is for checking surface & sub-surface discontinuties. Air leak test is not a substitute for MPI. Hence Bidder to comply technical specification requirement.
1042	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION- G-06 PRE-COMMISSIONING & COMMISSIONING ACTIVITIES	3.03.10	9 OF 14	**Capabilities of all drives:** After completion of installation of drives, contractor shall demonstrate the capability of all drives as specified elsewhere in Section VI Part B of Technical Specifications.	Demonstration of capabilities of all individual drive is not possible at site. Shop test report will be provided.	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
1043	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION- G-06 PRE-COMMISSIONING & COMMISSIONING ACTIVITIES	3.03.11	9 OF 14	**Margin on Fans:** After completion of installation of fan drives, Fans, inlet and outlet ducting, measuring equipments etc. contractor shall demonstrate the margin on seal air fans, primary fans, Forced draft fans and induced draft fans as specified elsewhere in Section VI Part B of Technical Specifications.	Demonstration of Margins on Fans and other drives are not possible at site. Shop test report will be provided.	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
1044	TECHNICAL SPECIFICATION SECTION-VI, PART-B	SUB-SECTION- G-06 PRE-COMMISSIONING & COMMISSIONING ACTIVITIES	3.03.13 a)	10 OF 15	Performance characteristic of fans (PA/FD/ID fan capacity, head developed, etc.)	NTPC to kindly note that only shop test report will be provided.	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
1045	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	SUB SECTION-II A-01 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	13 of 28	2.15.03 (b)	If lubrication of various bearings of mill gear box is done by common lubricating oil feed line having single flow switch, an additional flow switch with necessary interlock and protection should be provided in input shaft bearing lubricating oil feed line. Oil supply line for input shaft bearing should be taken from side/top of the common line, having a collection chamber at the bottom side to trap debris if any.	Design of Gear box supplier as per their standard practice will be followed for collection chamber.	The detailed aspects shall be reviewed based on the selected mill specific design/scheme. Bidder to comply the specifications requirements.
1046	TECHNICAL SPECIFICATIONS SECTION – VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	14 of 87	1.05.08.03 (a)	The YGP index for the specified coal is indicated in Project Information, Subsection-I-B, Part-A, Section-VI of Technical specification when measured as per BS Standard BS-1016 Part-111. The Bidder shall furnish a curve along with his offer indicating the variation in guaranteed wear life with variation in YGP index of coal fired. Separate curves for different wear elements of mill shall be furnished e.g. for grinding rolls, grinding rings, clearly indicating its relationship with YGP index of coal. The curve shall be subject to Employer's approval.	Separate curves for Roller liners & Table liners only, indicating its relationship with YGP index of coal will be furnished.	Specification requirement is clear & bidder to comply the technical specification requirements.
1047	TECHNICAL SPECIFICATION SECTION– VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	25 of 67	10.05.10	Pulverize Motor Capability: Ensure minimum Pulverizer motor capability to restart the Pulverizer after a trip with Pulverizer full of coal. Such restart shall not call for any emptying of pulverisers.	Restart of Pulveriser when Pulveriser is full of coal is not feasible without emptying. This Clause to be modified accordingly	Bidder's proposal is not acceptable. Specification requirement is clear & bidder to comply the technical specification requirements.
1048	TECHNICAL SPECIFICATION, SECTION– VI, PART-B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	27 of 67	10.05.28	Adequate numbers of hinged access doors/windows with access ladders shall be provided to facilitate access to various parts of Pulverizer. The access doors shall be suitable for on load inspection and maintenance of Pulverizer.	Bidder understands "On load" means "Mill under running condition". In this condition inspection & maintenance of Pulveriser is not feasible because mill is working under pressure. This clause to be modified accordingly.	The requirement is functional towards inspection & maintenance. Specific construction/access details shall be provided by the bidder during detail engineering based on the offered mill type.
1049	SECTION – VI, PART-B	II-B-03 VFD	215/586	5.02.00	The system shall be either Current Source Inverter (CSI) or Voltage Source Inverter (VSI) type with minimum Twelve (12) pulse design / 6 pulse with active frontend harmonic filter.	This clause allows 6Pulse diode VFD with active frontend filter in contrast to clause 1.24.00 of Part-A which mentions only 12 Pulse VFD . Request to accept MRS LV VFD with 6pulse design.	Bidder proposal is not acceptable. Specification cl.no.1.24.00 Sub - Section IIB Section-VI, Part-A and 5.02.00 Sub -Section B-03 Section-VI, Part-B is clear and to be followed.
1050	SECTION – VI, PART-A	IIB ELECTRICAL SYSTEM / EQUIPMENTS	604/953	1.24.00	415 V/690 V LV VFD: The Variable frequency drive (VFD) system shall be of a modern proven design for similar applications in power plants/industry. The system shall be either Current Source Inverter (CSI) or Voltage Source Inverter (VSI) type with minimum Twelve (12) pulse design.	From SECTION – VI, PART-B, SUB-SECTION II-B-03 VFD, point number 5.02.00, we understand that VFD with Six (6) pulse design is acceptable. Hence the MRS VFD will be with Six (6) pulse design.	Bidder proposal is not acceptable. Specification cl.no.1.24.00 Sub - Section IIB Section-VI, Part-A and 5.02.00 Sub -Section B-03 Section-VI, Part-B is clear and to be followed.
1051	SECTION – VI, PART-A	IIC CONTROL & INSTRUMENTATION SYSTEM	609/953	1.06.02	For open loop control of complete main plant and offsite areas fieldbus-based control system, fieldbus based actuators, Profibus DP based IMC in LV SWGR/MCC and fieldbus based PT/DPT/TT shall be provided excluding applications given in Note-A.	It is understood that the PT/DPT/TT shall be of Fieldbus type. If the level transmitter used is Ultrasonic type or Radar type, it will be with HART protocol (4-20mA). Pls clarify	Bidder's understanding is correct
1052	SECTION – VI, PART-B	II-B-02 MOTORS	208/586	3.01.00	Continuous duty LT motors up to 50 KW Output rating (at 50 deg.C ambient temperature), shall be super Premium Efficiency class-IE4, 50-200 KW shall be of Premium efficiency class – IE3, conforming to IS 12615, or IEC:60034-30.	MRS motor of Pulveriser is a 10Pole motor and standard defines efficiency class for motors upto 8pole only. Therefore Efficiency class of MRS motor of Pulveriser will be as per manufacturers standard.	Bidder understanding is correct.
1053	SECTION – VI, PART-B	II-B-03 VFD	216/586	8.00.00	BYPASS ARRANGEMENT (OPTIONAL, IF SPECIFIED)	NTPC to kindly clarify 'IF SPECIFIED' Where would this be specified?	Owner confirms that Bypass arrangement is NOT considered.
1054	SECTION – VI, PART-B	II-B-03 VFD	217/586	9.00.00	STANDBY VFD ARRANGEMENT (OPTIONAL, IF SPECIFIED)	NTPC to kindly clarify 'IF SPECIFIED' Where would this be specified?	Owner confirms that Standby VFD is NOT considered.
1055	SECTION – VI, PART-F	VI - Chapter I SG and Auxiliaries Mandatory spares	767/953	1.06.00 (24)	VFD assembly for dynamic classifier = 4sets	We understand that VFD assembly means VFD module. Therefore, 4nos of VFD module to be supplied as mandatory spare.	Complete VFD Assembly is applicable. Bidder to comply with the specification requirements.

1056	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB SECTION-VMANDATORY SPARES	1 of 3	1.01.00	The list of mandatory spares considered essential by the Employer is indicated in this chapter. The bidder shall indicate the prices for each and very item in the 'Schedule of mandatory Spares' whether or not he considers it necessary for the Employer to have such spares. If the bidder fails to comply with the above or fails to quote the price of any spare item, the cost of such spares shall be deemed to be included in the contract price. The bidder shall furnish the population per unit of each item in the Bid Forms and Price Schedules. Whenever the quantity is mentioned in "sets" the bidder has to give the item details and prices of each item.	Customer to kindly note that many of the items indicated in the spares list here is not applicable and the same has not been considered by the bidder. Bidder has indicated the same in deviation list mentioned below. Further, Bidder shall not provide any rebate for this during contract stage. In case the same is found applicable during detailed engg. Stage the same shall be provided without any cost implication. Further, NTPC to kindly note that the quantities mentioned in the specification are similar to two Boiler requirement. Bidder requests NTPC to have a relook at quantities to optimize the same.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items. Further bidder may also refer respective replies against such listed queries.
1057	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	1 of 38	1.01.00 (A) Economiser	4. Coil Saddle Clamp/Alignment band / Male & Female sliding Spacers / Sliding Hooks /Straight Shields for boiler tubes & Profile Shields for Boiler tube bends/ Tube clamps	As per Bidder standard, Male & Female Casting are applicable. Hence, Bidder has considered spares for Male & Female Casting. Please confirm.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1058	TECHNICAL SPECIFICATION SECTION-VI, PART-A	-	1 of 38	1.01.00C. Low Temperature Super Heater (LTSH)	4. Coil Saddle Clamp/Alignment band / Male & Female sliding Spacers / Sliding Hooks /Straight Shields for boiler tubes & Profile Shields for Boiler tube bends/ Tube clamps	As per Bidder standard, Male & Female Casting are applicable. Hence, Bidder has considered spares for Male & Female Casting. Please confirm.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1059	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	2 of 38	1.01.00 D. Low Temperature Re- Heater	2. Bends 100Nos. of each size, type, thickness, radius and material. 50 Nos supply tubes, bends/offset	Bidder has considered 50 Nos of tube bend of each size, type, thickness, radius and material only. NTPC is requested to clarify the requirement of 50 Nos of supply tubes, bends/offset	Bidder's propoal is not acceptable. Bidder to comply specification requirements.
1060	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	2 of 38	1.01.00 E. Intermediate Temperature Superheater (ITSH) / Platen Super Heater	5. Male & Female connectors, male female couplings spacers and alignment bands	As per Bidder standard, Male & Female Casting are applicable. Hence, Bidder has considered spares for Male & Female Casting. Please confirm.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1061	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	2 of 38	1.01.00 E. Intermediate Temperature Superheater (ITSH) / Platen Super Heater	9 Spacer Tube connectors and stoppers	NTPC is requested to clarify the requirement of Spacer Tube connectors and stoppers the same is not applicable as per the bidder design, hence we have not considered any alternate spares for the same.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1062	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	3 of 38	1.01.00 F. High Temperature Superheater (HTSH)/ Final Superheater	5. Male & Female connectors, male female couplings spacers and alignment bands	As per Bidder standard, Male & Female Casting are applicable. Hence, Bidder has considered spares for Male & Female Casting. Please confirm.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1063	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	3 of 38.	1.01.00 F.High Temperature Superheater (HTSH)/ Final Superheater	9 Spacer Tube connectors and stoppers	NTPC is requested to clarify the requirement of Spacer Tube connectors and stoppers the same is not applicable as per the bidder design, hence we have not considered any alternate spares for the same.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1064	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	3 of 38	1.01.00 G. Reheater	5. Male & Female connectors, male female couplings spacers and alignment bands	As per Bidder standard, Male & Female Casting are applicable. Hence, Bidder has considered spares for Male & Female Casting. Please confirm.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1065	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	3 of 38	1.01.00 G. Reheater	9 Spacer Tube connectors and stoppers	NTPC is requested to clarify the requirement of Spacer Tube connectors and stoppers the same is not applicable as per the bidder design, hence we have not considered any alternate spares for the same.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1066	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	4 of 38	1.04.00 (A) Steam Generator start-up re-circulation pump (for once through boiler)	1. Complete Pump & Motor Assembly	Bidder has considered spares for pump and motor assembly excluding motor cooler. Please confirm.	The specification includes Complete Pump & Motor Assembly including motor cooler and other accessories for complete replacement of the installed pump assembly in boiler. Bidder to comply with the specification requirements.
1067	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	4 of 38	1.04.00 (A) Steam Generator start-up re-circulation pump (for once through boiler)	5. Impeller wear rings	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1068	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	4 of 38	1.04.00 (A) Steam Generator start-up re-circulation pump (for once through boiler)	8. Gland packings	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1069	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	1. Fan rotor assembly (excluding servo motor, blade & coupling)	Please note the bidder offering as - (1 +1) No. Hub & 1 No. Shaft Only without blades	Bidder has to supply Fan rotor assembly, consisting of main bearing assembly & rotor assembly (excluding servo motor, blade & coupling). Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1070	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	4.1 Fan Bearing	Bidder has considered Main bearings only for this item.	All applicable fan bearings as per the bidder's offered fan type shall be provided in line with the specification requirements.
1071	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	4.2 Fan bearing Housing	Please note that the Bearing Housing is not recommended as per the OEM. Hence the same may be deleted.	This is the main bearing housing assembly of fan. Same has to be supplied by bidder. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1072	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	5.4 Metallic rings	Not applicable as per the bidder's design, Hence, not considered.	Bidder to provide applicable equivalent items (such as Snap Ring, Retaining Ring, Securing Ring etc as applicable) against this item. The details shall be finalised during detail engineering.
1073	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	5.5 Intermediate piece (if applicable)	Not applicable as per the bidder's design, Hence, not considered.	Bidder to note that the item has been specified with "if applicable". Accordingly, the applicability of the item shall be as per the bidder's offered type/design of the fan. Also, bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1074	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	6.3 Pressure regulator	2 Nos. Priority Valve Fan side and 1 No. Priority Valve for HT Motor side	Bidder to supply the item as specified, based on the bidder's offered type/design of the fan, which shall be discussed during detail engineering. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1075	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	6.6 Pump Mechanical Seal	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1076	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	9.0 Hydraulic servomotor	Electric Actuators shall be supplied as per the bidders applicable design, Kindly accept the same.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1077	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	9.1 Hydraulic servomotor assembly with link rods	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.

1078	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	9.2 Hydraulic servomotor Seal ring kit(complete)	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1079	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	10.ID fan impeller liner	Not applicable as per the bidder's design, Hence, not considered.	Bidder to refer amendment no SG.18 in this regard.
1080	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	5 Of 38	1.05.00 A . ID Fan	11. ID fan casing liner	Not applicable as per the bidder's design, Hence, not considered.	Bidder to refer amendment no SG.19 in this regard.
1081	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	1. Fan rotor assembly (excluding servo motor,blade & Couplings)	Please note the bidder offering as - (1) No. Hub & 1 No. Shaft Only without blades	Bidder has to supply Fan rotor assembly, consisting of main bearing assembly & rotor assembly (excluding servo motor, blade & coupling). Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1082	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	2.1 Fan bearings including bearing housing	Bidder has considered Main bearings only for this item.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1083	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	2.2 Fan bearing Housing	Please note that bidder is offering for Bearing Housing (Excluding Main Bearings and Shaft)	This is the main bearing housing assmbly of fan. Same has to be supplied by bidder. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1084	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	3.4 Metallic rings	Not applicable as per the bidder's design, Hence, not considered.	Bidder to provide applicable equivalent items (such as Snap Ring, Retaining Ring, Securing Ring etc as applicable) against this item. The details shall be finalised during detail engineering.
1085	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	3.5 Intermediate piece (if applicable)	Not applicable as per the bidder's design, Hence, not considered.	Bidder to note that the item has been specified with "if applicable". Accordingly, the applicability of the item shall be as per the bidder's offered type/design of the fan. Also, bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1086	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	4.3 Pressure regulator	4 Nos. Priority Valve Fan side shall be provided.	Bidder to supply the item as specified, based on the bidder's offered type/design of the fan, which shall be discussed during detail engineering. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1087	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	4.6 Pump Mechanical Seal	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1088	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38		4.4 Filters	4 Nos.Filter Element shall be provided.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1089	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	7 Hydraulic servomotor/ Hydraulic Actuator device	Please note that Electric Actuator shall is Provided.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1090	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 B . FD Fan	8 Hydraulic servomotor Seal ring kit(complete)	Not applicable as per the bidder's design, Hence, not considered.	This item is seal ring kit (O rings, seals, gaskets etc) for servomotor or Hydraulic cylinder assembly or equivalent for blade pitch operation of axial fans. Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1091	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 C . PA Fan	1. Fan rotor assembly (excluding servo motor,	Please note the bidder offering as - (2 +2) No. Hub & 1 No. Shaft Only without blades	Bidder has to supply Fan rotor assembly, consisting of main bearing assembly & rotor assembly (excluding servo motor, blade & coupling). Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1092	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 C . PA Fan	2. Fan Bearings including bearing housing	Please note that bidder is offering Main Bearings- 2 Sets & Bearing Housing (Excluding Main Bearings and Shaft)- 2 Sets	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1093	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 C . PA Fan	2.1 Fan Bearing	Bidder has considered Main bearings only for this item.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1094	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 C . PA Fan	2.2 Fan bearing Housing	Please note that bidder is offering for Bearing Housing (Excluding Main Bearings and Shaft)	This is the main bearing housing assmbly of fan. Same has to be supplied by bidder. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1095	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	6 Of 38	1.05.00 C . PA Fan	5.4 Metallic rings	Not applicable as per the bidder's design, Hence, not considered.	Bidder to provide applicable equivalent items (such as Snap Ring, Retaining Ring, Securing Ring etc as applicable) against this item. The details shall be finalised during detail engineering.
1096	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 Of 38	1.05.00 C . PA Fan	5.5 Intermediate piece (if applicable)	Not applicable as per the bidder's design, Hence, not considered.	Bidder to note that the item has been specified with "if applicable". Accordingly, the applicability of the item shall be as per the bidder's offered type/design of the fan. Also, bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1097	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 Of 38	1.05.00 C . PA Fan	6.3 Pressure regulator	4 Nos. Priority Valve Fan side shall be provided.	Bidder to supply the item as specified, based on the bidder's offered type/design of the fan, which shall be discussed during detail engineering. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.

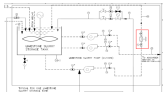
1098	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 Of 38	1.05.00 C . PA Fan	6.4 Filters	4 Nos. Filter Elements shall be provided.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1099	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 Of 38	1.05.00 C . PA Fan	6.6 Pump Mechanical Seal	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1100	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 Of 38	1.05.00 C . PA Fan	7 Hydraulic servomotor/ Hydraulic Actuator device	Not applicable as per the bidder's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1101	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 Of 38	1.05.00 C . PA Fan	8 Hydraulic servomotor Seal ring kit(complete)	Not applicable as per the bidder's design, Hence, not considered.	This item is seal ring kit (O rings, seals, gaskets etc) for servomotor or Hydraulic cylinder assembly or equivalent for blade pitch operation of axial fans. Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1102	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 of 38	1.06.00 (2)	2. Gear box internals (except bearings & seals)	Bidder has considered Following as per its OEM Design. Bevel stage: Gear Wheel & Pinion. Planet stage: Sun pinion, Planet gear & Annulus gear (Ring Gear). Please Confirm.	Gear box internals include Gears, shafts, couplings between shafts, thrust pads etc. This clause include all gear box internal spares except bearings & seals.
1103	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 of 38	1.06.00 (3)	3. Complete Gear Box	Complete gear box (excluding lub oil system, Instruments & coupling) considered	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1104	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 of 38	1.06.00 (7)	7. Liners with brackets & fasteners	Ceramic tiles for classifier, Middle housing, deflector plates considered against this clause	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1105	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 of 38	1.06.00 (9)	9. Multiport outlet & liners	Bidder has considered Outlet port with Ceramic tiles against this clause.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1106	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 of 38	1.06.00 (10)	10. Mill main shaft/yoke	Not applicable & Not considered since offered mill is with Planetary Gear Unit	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1107	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	7 of 38	1.06.00 (11)	11. Spring	Spring is not applicable since offered mill is with Hydraulic Loading Cylinder (Hydraulic loading cylinder considered in sr. no. 13)	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1108	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00 (14)	14. Filter Cartridges	Filter element for Hydraulic loading system considered.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1109	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00 (18)	18. Oil cooler assembly for coal mills	Oil coolers for Hydraulic loading system & Gear Unit Lubrication system considered.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1110	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00 (19)	19. Bearings for gear box	All Antifriction Bearings for Gear Unit considered as given below. 1. Input Pinion Bearings 2. Bevel Gear Bearings 3. Planetary Gear Bearings Thrust pads & radial Bush not considered.	All bearings of gearbox are to be supplied in line with the specification requirements.
1111	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00 (23)	23. Mill lube oil motor	Motor for Gear unit Lubrication system considered	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1112	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00 (25)	25. Mill lower skirt	Lower Air Seal Ring with Gaskets, Retainers & hardware considered	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1113	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00 (26)	26. Labyrinth seal assembly	Upper Air Seal Ring with Gaskets, Retainers & hardware considered. Mill Bottom is already considered in sr. no. 15 4.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1114	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00 (28)	28. Mill Scrapper assembly	Hub Skirt with Scraper Assembly considered	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1115	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.06.00	* One set means one complete replacement of one mill	Unit of measurement of Spares Quantity given in set* (with star mark) & Set (without star mark). Definition given for set* (with star mark), however set (without star mark) definition not given. We have considered the same definition for both. Unit of measurement for set to be corrected in tender document.	Bidder's understanding is not correct. Bidder has to consider the definition of set as per the details given in the specifications.
1116	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.07.00 C . Feeders	4. Counter assembly (complete)	Not applicable as per the OEM's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1117	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.07.00 C . Feeders	8. Worm	Not applicable as per the OEM's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1118	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.07.00 C . Feeders	9. Worm wheel	Not applicable as per the OEM's design, Hence, not considered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.

1119	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	8 of 38	1.07.00 C . Feeders	10. Feeder gate	Please confirm that only 2 Nos of Feeder inlet gate is required. Bidder has currently considered only inlet gates.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1120	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	9 of 38	1.08.00 A . Coal Burners/Coal Pipe Bends (for tangential firing)	1. Coal compartment assembly	Coal Compartment (1 sets) consist of Coal Nozzle castings (as per 10)(d) - 1 sets) and Adjustable Coal Nozzle tips (as per 10)(e) - 1 sets) . As there repetition in10 (d) & 10 (e) need not be considered bidder's scope of supply.	Bidder shall supply each spares seperately as per Specification. Bidder proposal is not acceptable.Bidder to comply with the specification requirements.
1121	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	9 of 38	1.08.00 A . Coal Burners/Coal Pipe Bends (for tangential firing)	5.Coal nozzle castings	Please refer our comment for Sl. 1.08.00 (1) above for repetition. The same is not considered twice. Please accept the same and provide suitable modification.	Bidder shall supply each spares seperately as per Specification. Bidder proposal is not acceptable.Bidder to comply with the specification requirements.
1122	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	9 of 38	1.08.00 A . Coal Burners/Coal Pipe Bends (for tangential firing)	6. Adjustable coal nozzle tips	Please refer our comment for Sl. 1.08.00 (1) above for repetition. The same is not considered twice. Please accept the same and provide suitable modification.	Bidder shall supply each spares seperately as per Specification. Bidder proposal is not acceptable.Bidder to comply with the specification requirements.
1123	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	11 Of 38	1.10.00 B. Trisector RAPH	1. Support Bearing	Bottom bearing only offered against this clause	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1124	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	11 Of 38	1.10.00 B. Trisector RAPH	2. Guide Bearing	Top bearing only offered against this clause	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1125	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	11 Of 38	1.10.00 B. Trisector RAPH	10 Fluid coupling (if NA then other applicable coupling)	Normal coupling shall be supplied against this clause.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1126	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	11 Of 38	1.10.00 B. Trisector RAPH	11 Other couplings with inserts & fasteners	Shrink Disc coupling between shaft and gear box offered against this clause	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1127	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	11 Of 38	1.10.00 B. Trisector RAPH	12 Worm & worm wheels for gear reducer	1 set = 1 no. Geared motor ASSY for hot end and 1 no. geared motor assy. for cold end	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1128	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	11 Of 38	1.10.00 B. Trisector RAPH	12.2 Coupling	Not applicable, Normal coupling shall be supplied.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1129	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	12 Of 38	1.10.00 B. Trisector RAPH	13.Spare kit for rotor stoppage alarm (if applicable)	1 Set = 3 Nos. of only Speed Sensor requirement of one RAPH	Bidder's understanding is correct.
1130	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	12 Of 38	1.10.00 B. Trisector RAPH	14. Bushings for worm gear reducer	Not applicable,. Equivalent item shall be supplied as per OEM design	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1131	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	12 Of 38	1.10.00 B. Trisector RAPH	16. Rack & Pinion Assy	Not applicable as per OEM design. Hence alternatively, Gear Box Assembly will be offered.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1132	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	12 Of 38	1.10.00 B. Trisector RAPH	18 Air preheater guide bearing and support bearing lube oil pump motor (if Applicable)	Noted for each type and rating	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1133	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	12 Of 38	1.10.00 B. Trisector RAPH	20 Air preheater blower motor	One no. Cold end motor only as it can be used for hot end soot blower as well	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1134	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	13 Of 38	1.12.00 HEA Ignitors	2. HEA spark rod (including special cables from exciter)	HEA spark rod without spark tip. Please confirm.	Bidder understanding is correct
1135	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	13 Of 38	1.13.00Soot Blowers	1a Motor for water wall deslagger	Motor already covered in Sl. No. 1, hence deslagger motor not considered separately.	Bidder's understanding is not correct, bidder to comply technical specification requirements
1136	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	13 Of 38	1.13.00Soot Blowers	3 a) Motor for long retractable soot blower	Motor already covered in Sl. No. 9 below, hence long retractable Soot Blower motor not considered separately.	Bidder's understanding is not correct, bidder to comply technical specification requirements
1137	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	13 Of 38	1.13.00Soot Blowers	6.1 Long retractable soot blower	Bearings shall be provided. However, oil seals are not applicable.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1138	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	13 Of 38	1.13.00Soot Blowers	6.2 Water wall deslagger	Bearings shall be provided. However, oil seals are not applicable.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1139	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	14 Of 38	1.13.00Soot Blowers	12. Complete power pack assembly for Long Retractable soot blower	Rotary & insert / retract motion is accomplished by single motor, which is considered in Sl. No. 1.14.09 above, separate Power pack assembly is not applicable hence spare not considered.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1140	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	14 Of 38	1.13.00Soot Blowers	14.1 Set of Gears & shaft (Spur & worm)	Not applicable. OEM is having rack & pinion design and a single motor is capable of both rotary as well as traverse motion.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1141	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	14 Of 38	A.Spares for Steam Separator Safety valves	4.Locking pin set	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1142	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	14 Of 38	A.Spares for Steam Separator Safety valves	6. Safety Valve Spindle	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.

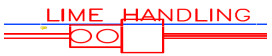
1143	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	14 Of 38	B. Spares for SH Safety Valves	4. Locking pin set	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1144	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	14 Of 38	B. Spares for SH Safety Valves	10. Set of Washer	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1145	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	14 Of 38	C. Spares for Hot RH safety Valves	4. Locking pin set	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1146	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	15 Of 38	C. Spares for Hot RH safety Valves	10. Set of Washer	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1147	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	15 Of 38	D. Spares for Cold RH safety Valves	4. Locking pin set	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1148	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	15 Of 38	D. Spares for Cold RH safety Valves	10. Set of Washer	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1149	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	15 Of 38	E-1. Spares for Electromatic Relief Valves	2.4 Seal bushing for main valve 4 nos. of each type	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1150	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	15 Of 38	E-1. Spares for Electromatic Relief Valves	2.3 Seal ring 4 nos. of each type	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1151	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	15 Of 38	E-1. Spares for Electromatic Relief Valves	2.6 Bushing for pilot valve 4 nos. of each type	Bidder shall supply these spares if applicable as per OEM design	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1152	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	15 Of 38	E-1. Spares for Electromatic Relief Valves	E-2. Spares for Electromatic Ball Valves	Not applicable as per the OEM's design, Hence, not considered.	Bidder to clarify their supply. In case Electromatic Ball Valve (EBV) is only supplied in place of Electromatic Relief Valves (ERV), then additional mandatory spares for EBV as listed in E-2 shall be supplied against E – 1 spares for ERV.
1153	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	16 Of 38	1.17.00 Spares for boiler main steam stop valve	1. Boiler main stop valve assy	complete valve assembly except the valve body, valve actuator will be supplied.	Boiler main stop valve assembly shall include valve body, valve actuator and the assembly to be supplied for complete replacement of installed valve in boiler.
1154	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES		1.18.00 Boiler Feed Check Valve	4. Gland packings	Bidder shall supply these spares if applicable as per OEM design.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1155	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	17 Of 38	1.19.00 Start-up vent valve	3. Body seat rings 4 sets*	Bidder shall supply these spares if applicable as per OEM design.	This is part of detail engineering. Bidder is requested to supply the mandatory spares as specified. Further Bidder to please also refer provisions specified in Mandatory spare chapter sub-section-VI, Part-A/section-VI.
1156	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	24 of 38	2.01.00, OTHER RELATED CONTROL AND INSTRUMENTATION SYSTEMS / EQUIPMENTS	6. Furnace and Flame viewing system	Spares considered under 6.1 & 6.2	Bidder's proposal is not acceptable. Bidder shall comply to specification requirements.
1157	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	24 of 38	2.01.00, OTHER RELATED CONTROL AND INSTRUMENTATION SYSTEMS / EQUIPMENTS	6.1 Flame Cameras	Furnace TV Mandatory Spares: Electronic Modules of Furnace Camera are not user replaceable, hence Camera Electronics is not considered part of Mandatory Spare, however complete Camera is offered as per Mandatory Spare. Accordingly commercial rebate shall not be applicable for such items.	Electronic modules indicated in referred clause pertains to Furnace Flame Viewing system. Bidder shall comply to specification requirements.
1158	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	25 of 38	2.01.00, OTHER RELATED CONTROL AND INSTRUMENTATION SYSTEMS / EQUIPMENTS	8. Acoustic steam Leak Detection system (ASLD) (if applicable)	No spare considered against LOT. Spares considered under 8. (i) & 8. (ii)	Bidder's understanding is correct.
1159	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	25 of 38	2.01.00, OTHER RELATED CONTROL AND INSTRUMENTATION SYSTEMS / EQUIPMENTS	10. Any other instruments (If applicable)	No other Instruments are considered other than that are specifically mentioned	Bidder to refer Amendment No-C-04 in this regard.
1160	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	25 of 38	2.01.00, OTHER RELATED CONTROL AND INSTRUMENTATION SYSTEMS / EQUIPMENTS	11. Any other control system (If applicable)	No other Instruments are considered other than that are specifically mentioned	Bidder to refer Amendment No-C-04 in this regard.
1161	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	25 of 38	2.02.00,MEASURING INSTRUMENTS (for all systems supplied under this chapter including Auxiliary Boiler, FOPH, Dosing System, ECW, Air compressor system, FGD, De-NOx, Skids)	De-NOX Skid	Not Applicable, Since no SCR is envisaged for this plant.	Bidder's understanding is correct.
1162	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	26 of 38	2.05.01, CONTROL VALVES, ACTUATORS & ACCESSORIES (FOR ALL SERVICES UNDER THIS CHAPTER)	-	Excludes control valves covered under Light oil system under 1.11.00/soot b lower under 1.13.00/spray control valves Valves under 1.14.00/Aux PRDS under 1.20.00/Aux boiler under 1.21.00	Bidder's understanding is not correct. Bidder shall comply to specification requirements.
1163	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	26 of 38	2.05.02, PNEUMATICALLY OPERATED ISOLATION / BLOCK VALVES, ACTUATORS & ACCESSORIES	-	Excludes pneumatically operated isolation/block valves covered under Light oil system under 1.11.00/soot b lower under 1.13.00/spray control valves Valves under 1.14.00/Aux PRDS under 1.20.00/Aux boiler under 1.21.00	Bidder's understanding is not correct. Bidder shall comply to specification requirements.

1164	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	28 of 38	3.00.00, Elevator	1. Friction block	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1165	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	28 of 38	2	Guide roller of each type	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1166	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	28 of 38	5	Time device	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1167	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	28 of 38	8	Auxilary Relay	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1168	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	28 of 38	15	Transmitters	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1169	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	28 of 38	21 (a)	Fan	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1170	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	28 of 38	23	Pinion	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1171	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	29 of 38	B (1)	Friction block	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1172	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	29 of 38	B (2)	Guide roller of each type	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1173	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	29 of 38	B (5)	Time device	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1174	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	29 of 38	B (8)	Auxiliary relay	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1175	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	29 of 38	B (15)	Transmitters	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1176	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	29 of 38	B (21)	Fan	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1177	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -1 SG & AUXILIARIES	30 of 38	B (23)	Pinion	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer clause 13.00.00 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1178	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	1 of 4	2.00 Power Cycle Piping	7) Complete gate valves assembly up to the size of 50 NB	Not Applicable, As there are no gate valve below 50 NB	Bidder to please refer note-8 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1179	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	2 of 4	2.00 Power Cycle Piping	13) Gasket for each flanged connection on high pressure steam and feed line. 3 Nos. per unit	Not Applicable there are no flange connection in the high pressure valve.	Bidder to please refer note-8 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1180	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	1 of 4	2.00 Power Cycle Piping	14a) Safety valve up to 50 NB size 02 nos. of each type, material, size & class per unit 14b) Safety valve above 50 NB size 01 no of each type, material, size & class per unit	Safety valves are already covered under 1.14.00	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1181	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	1 of 4	2.00 Power Cycle Piping	15) Steam traps and Y-Strainers	Bidder shall supply these spares if applicable as per OEM design.	Bidder to please refer note-8 of section-VI/Part-A, sub-section-VI Mandatory spares chapter page 3 of 3 regarding not applicable items.
1182	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	PAGE 03 of 04	3 L.P. Chemical dosing system	1) Mandatory spare requirements of Valves and specialties for power cycle piping systems (Sub Section: A-07 of Part-A of Technical Specifications) specified above does not include items/valves/specialties which are already specified/ covered elsewhere in this Technical specification for mandatory spare requirement.	1)Bidder insist if there is one no. valve only of particular type , class and size then only one no. of mandatory Spare shall be supplied. Customer to add this note in the PCP valve	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1183	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	PAGE 03 of 04	3 L.P. Chemical dosing system	2) Wherever complete valve assembly as mandatory spare has been specified above for power cycle piping, it shall include complete gear operator/ box assembly which forms part of original valve assembly/supply.	1)Bidder insist if there is one no. valve only of particular type , class and size then only one no. of mandatory Spare shall be supplied. Customer to add this note in the PCP valve	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1184	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	PAGE 03 of 04	3 L.P. Chemical dosing system	3) Mandatory spares for valve actuators (for Pneumatically, Hydraulically & Electrically operated valves) shall be supplied as per actuator quantity/details specified elsewhere in this technical specification for mandatory spare requirement.	1)Bidder insist if there is one no. valve only of particular type , class and size then only one no. of mandatory Spare shall be supplied. Customer to add this note in the PCP valve	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1185	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	PAGE 03 of 04	3 L.P. Chemical dosing system	4) Mandatory spare requirement for complete valve assembly above 50NB in power cycle piping systems shall include Gate valve, Globe valve, check valve, safety valve, Angle valve, butterfly valve etc.	1)Bidder insist if there is one no. valve only of particular type , class and size then only one no. of mandatory Spare shall be supplied. Customer to add this note in the PCP valve	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1186	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	PAGE 03 of 04	3 L.P. Chemical dosing system	5) In case the quantity of mandatory spares so calculated happens to be a fraction, the same shall be rounded of to next higher whole number. For example 10% of 11 is equal to 1.1, then it should be rounded as 2 instead of 1.	1)Bidder insist if there is one no. valve only of particular type , class and size then only one no. of mandatory Spare shall be supplied. Customer to add this note in the PCP valve	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1187	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	PAGE 03 of 04	3 L.P. Chemical dosing system	6) Mandatory spares for valves above 50NB made of A105 / A216 WCC installed on 15NiCuMoNb5 (EN 1.6368) / ASTM A335 Grade P36 piping shall be supplied with suitable matching pieces (in welded condition with valve ends at valve manufacturing works).	1)Bidder insist if there is one no. valve only of particular type , class and size then only one no. of mandatory Spare shall be supplied. Customer to add this note in the PCP valve	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1188	TECHNICAL SPECIFICATION SECTION-VI, PART-A	SUB-SECTION-VI CHAPTER -6 Piping	PAGE 04 of 04	3 L.P. Chemical dosing system	7) Wherever Mandatory spares are specified as "per unit", Total Mandatory spares quantity shall be arrived by multiplying the specified quantity with number of units under the package.	1)Bidder insist if there is one no. valve only of particular type , class and size then only one no. of mandatory Spare shall be supplied. Customer to add this note in the PCP valve.	Specification requirements are clear in this regard and bidder to comply with the specification requirements.
1189	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES: MANDATORY SPARES	SECTION-VI, PART-A	25 of 39	2.01.00	10. Any other instruments (If applicable) 11. Any other control system (If applicable)	Bidder clarifies that no other Instruments or Control System is considered than the type of Mandatory Spares mentioned in the List.	Bidder to refer Amendment No-C-04 in this regard.
1190	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES: MANDATORY SPARES	SECTION-VI, PART-A	25 of 39	2.01.00	10. Any other instruments (If applicable) 11. Any other control system (If applicable)	Wherever Mandatory Spare quantity is mentioned in Percentage, Bidder is considering the quantity as per percentage on Total Population of the item in one Unit. Please confirm Bidder Understanding is correct.	Bidder to refer General Note at the end of Ch-01 Section VI, Part A Pg 39 of 39 which is reproduced below: "Wherever quantity has been specified as percentage (%), it shall mean percentage (%) of the total population of the item in the station (project), unless specified otherwise and the fraction will be rounded off to the next higher whole number.

1191	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES: MANDATORY SPARES	SECTION-VI, PART-A	25 of 39	2.01.00	10. Any other instruments (If applicable) 11. Any other control system (If applicable)	Spares terminology will depend on OEM as approved by Customer. Customer shall accept as per OEM specific terminology as per Customer approved vendors. Any item not applicable for the OEM design will not be considered and commercial rebate shall not be applicable for such items.	Bidder's understanding is not correct. Further, bidder to refer clause 13.00.00 Sub-Sec VI Part A wherein the details are clearly specified.

S. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
1192	SECTION-VI, PART-A	SUB SECTION-II A-01	27 OF 28	5.00.00	In order to make the plant more efficient and environmentally friendly, provisions shall be provided for capturing carbon di-oxide from the flue gas generated from the plant…. The tap-off duct portion shall be provided with necessary isolation gates in each tap-off. These Gates are to be made of Carbon steel with C276 cladding of sheet of minimum thickness 1.6 mm along with 2x100 % Seal Air fans. Also, seals to be made of Alloy C-276 or better material. Blanking plates shall also be provided in each tap-off duct after isolation gates.	Bidder proposes Carbon steel (STEN-1) material for blades and frame (in contact of flue gas) for carbon capture tapping point damper. However, seal material shall be of C276.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1193	SECTION-VI, PART-A	SUB-SECTION-IIA-04	1 OF 7	2.04.00	Clean gas from the absorber shall be taken to the Chimney through three stage mist eliminators.	The quantity of mist in flue gas in JBR technology is significantly lower as compared to Spray Tower Process as Flue gas does not come in contact with any spray to pick up mist. Hence, bidder request owner to consider 2 stage ME for JBR.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	10 OF 29	5.06.06	Three stage chevron type Mist Eliminators (ME) made of polysulfone or stainless steel shall be provided at the exit of the absorber.		
1194	SECTION-VI, PART-A	SUB-SECTION-IIA-04	2 OF 7	2.04.01	Gates at outlet to Absorber shall also be provided with 2x100 electrical heaters. Further, Quick opening Bi-plane motorized/pneumatic damper along with 2x100% seal air fans & 2x100 electrical heaters shall also be provided by the Contractor in the by-pass	Since the MOC of the dampers (indicated in CL.No:3.03.04 / Section-VI / Part-B / Sub-Section-A05 / Pg 425 of 868) at the Absorber outlet and By-pass duct are suitable for corrosion resistant, bidder is not envisaging any heaters in seal air for the same. Kindly confirm. Further if customer insists for heater at by-pass and Absorber outlet damper, bidder proposes Carbon steel (STEN-1) material for blades and frame with seal material of SS 316L instead of C276.	Bidder's proposal is not acceptable.The requirements w.r.t electrical heaters and gate MoC are clearly specified in the clauses referred by the bidder. Bidder to comply with the specification requirements.
	SECTION-VI, PART-A	SUB-SECTION-IIA-04	3 OF 7	4.01.04	Motorized isolation gates at Absorber gas inlet, Absorber gas outlet along with 2x100 seal air fans for each gate and 2x100 heaters for absorber outlet gate & bypass gate. A bi-plane bypass damper along with 2x100 seal air & 2x100 heaters shall also be provided in the bypass duct.		
	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	5 OF 29	3.03.01	The Gates shall be provided with 2x100% seal air fans. Gates at outlet to Absorber shall also be provided with 2x100 electrical heaters.		
	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	5 OF 29	3.03.02	Quick opening Bi-plane motorized/pneumatic damper along with 2x100% seal air fans & 2x100 electrical heaters shall also be provided in the by-pass duct.		
	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	5 OF 29	3.03.02A	Bidder may provide common seal air skid for FGD Outlet guillotine gate and the bi-plane damper in the FGD bypass duct. Seal air skid (with 2x100% fans + 2x100% heater) shall be sized considering either the requirements of FGD outlet gate (when FGD loop is closed / FGD not in operation) OR for bypass damper (when bypass loop is closed /FGD under operation), whichever is higher.		
	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	5 OF 29	3.03.04	The blade and other components in the gas path, of the bypass damper and gate at Absorber outlet shall be made of Carbon steel with C276 cladding of sheet of minimum thickness 1.6 mm or better material. The seals shall be made of Alloy C-276 or better material.		
1195	SECTION-VI, PART-A	SUB-SECTION-IIA-04	2 OF 7	3.01.05	Limestone slurry piping to each absorber, along with recirculation lines, all isolation and control valves. On/Off type Diaphragm valves in Limestone circulation lines to be provided instead of pinch control valve.	Kindly note, there is discrepancy in the clause and the P&ID for the type of valve to be provided in the re-circulation line of limestone slurry. Bidder request customer to check and update accordingly. As per the bidders past experience of DVC projects, Bidder proposes pneumatic actuated On/Off valves for the re-circulation line.	Bidder to refer Amendment to technical specification Sl. no. SG.42 in this regard
	SECTION – VI, Part-E	-Scheme of FGD Milling System	-	XXXX-001-POM-A-023			
1196	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	1 of 29	1.02.00	The Steam Generators which are designed to burn pulverised coal will use LDO during startup and at low loads for warm up and flame stabilization. Further, the frequency and duration for startup and low loads operation may be quite high during the first year of unit commissioning and operation. The Steam Generator has been designed for cyclic/two shift operation. Expected numbers of Steam Generator start-ups during 25 years of design life shall be as per clause 1.05.00, A-02, Part B The Contractor, shall take into account the entire characteristics of expected combination of fuels to be fired and the expected numbers of Steam Generator start-ups while designing the FGD system.	Bidder recommends to by-pass the FGD system during oil firing.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1197	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	2 of 29	1.03.08	In case of a power failure all items of equipment (e.g. minimum one agitator in absorber and limestone slurry tank, Process water pump & lube oil system of Booster Fan & Ball Mill) which may cause irreversible damage to the FGD System shall be connected to the emergency power supply system to be provided by the Contractor.	For JBR type, the agitator in the absorber is not needed to be connected to the emergency power supply Since the agitator blades will be located well above the slurry settling height and can work even after a long duration shut-down.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1198	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	2 of 29	1.03.09	Draining and flushing for the items in contact with limestone/gypsum slurry (pipes, tanks, pumps etc.) which are required even during short time outages or an emergency shutdown shall be started automatically and by remote control from the Control Room.	As per bidder's standard practice, only critical items in contact with limestone/gypsum slurry shall be provided automatic draining and flushing arrangement.	Avoiding deposition of slurry & its flushing is a critical aspect for the FGD system smooth O&M. Specifications requirements are clear and bidder to comply with the specification requirements.
1199	SECTION-VI, PART-B	SUB-SECTION-A-05 (FGD)	5 OF 29	3.02.04	The duct from Absorber outlet to bypass duct & duct after by pass damper/gate to chimney inlet shall be made of cladded sheet of minimum 2 mm thickness of either Titanium (Grade 2 as per ASME SB265) or C-276 over 7 mm thick (minimum) mild steel base metal. Cladding shall be done to achieve the required quality as per ASTM B 898-11.	As per bidder's Collaborator's proven practise, the duct from Absorber outlet to wet stack shall be made of Carbon steel of minimum 6 mm thickness with flake glass lining of minimum 2 mm thickness. Please confirm.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1200	SECTION-VI, PART-B	SUB-SECTION-A-05	8 OF 29	5.03.02	For Bubbling Type process actual requirement considering choking/ blockage of minimum 10% of the oxidation nozzles / sprayers or minimum 3500 mmwc whichever is higher. Margin on Head: 10% margin on the higher value of above.	In JBR technology head requirement of oxidation blower is much less than 3500 mmWC as per ongoing projects. Hence, minimum head requirement should be as per actual calculation. Also requirement of additional 10% margin on minimum head is not required and 10% margin on frictional loss of actual head will be considered.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1201	SECTION-VI, PART-B	SUB-SECTION-A-05	8 OF 29	5.03.03	Oxidation nozzles / spargers shall have a minimum redundancy of 10% or as per the contractor's proven practice whichever is maximum and justification to be provided during detailed engineering.	For JBR type absorber, oxidation air system shall not be of sparger type. Oxidation air injected in the JBR through pipe without any nozzle. Hence minimum redundancy of 10% on oxidation air nozzles/ spargers is not applicable as per our technical collaborator proven design. Please accept and confirm.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement
1202	SECTION-VI, PART-B	SUB-SECTION-A-05	8 & 9 OF 29	5.04.00	Gypsum Bleed Pump Margins Flow -- 15% Head – 20%	The margin on Flow shall be 10% and on frictional head shall be 15% as per standard design practice. Bidder request owner to accept.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1203	SECTION-VI, PART-B	SUB-SECTION-A-05	9 OF 29	5.06.02	The design of flue gas ducts and inlet and outlet hoods of the FGD as well as [guide vanes and baffle plates shall ensure a homogeneous flue gas flow with respect to the distributions of: (i) temperature (ii) velocity (iii) dust content (iv) slurry injection and distribution. The above shall be proven by two phase Computational Fluid Dynamics simulations (liquid and gas). The scope of modelling shall include flue gas path inside the absorber vessel including inlet and outlet duct.	Since JBR technology is a proven technology worldwide, Bidder will conduct CFD model of the FGD system gas path excluding absorber	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1204	SECTION-VI, PART-B	SUB-SECTION-A-05	9 OF 29	5.06.02	Homogeneity shall be ensured, if the deviation from average is less than +10%.	This requirement is too strict and cannot be met. Homogeneity shall be less than ±30%.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1205	SECTION-VI, PART-B	SUB-SECTION-A-05	10 OF 29	5.06.06	Three stage chevron type Mist Eliminators (ME) made of polysulfone or stainless steel shall be provided at the exit of the absorber.	In addition to the Material mentioned for ME MOC, bidder request owner to include Polypropylene and FRP as per Bidder's proven practice.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1206	SECTION-VI, PART-B	SUB-SECTION-A-05	10 OF 29	5.06.06	The headroom shall have a height of more than 2200 mm.The mist eliminator support beams shall be designed to act as maintenance walkways approximately 300 mm wide and shall allow for a minimum 500 Kg/m2 load.	Bidder understands that the headroom of 2200mm mentioned is between beam to beam clear headroom for maintenance purpose. Please confirm.	Bidder's understanding is not correct. Clear headroom is required. Specification requirement is clear in this regard. Bidder to comply technical specification requirement
1207	SECTION-VI, PART-B	SUB-SECTION-A-05	11 OF 29	5.06.10	The raw gas inlet duct of the absorber shall be equipped with a flushing device of the side walls and the ground, which shall operate continuously as well as intermittently.	Please note that, in the offered JBR type absorber, the gas cooling mechanism which is provided at raw gas inlet duct of the absorber will be continuously operated. Hence, no separate flushing devise is required and envisaged.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1208	SECTION-VI, PART-B	SUB-SECTION-A-05	11 OF 29	5.06.11	The complete absorber vessel (absorber oxidation tank, absorber tower & absorber outlet duct upto absorber outlet flange) shall be made of clad sheet of C276 / Alloy 59 (minimum 2 mm thickness) by explosion bonding or hot rolling, having minimum 7 mm thick carbon steel as base material.	As per the bidders' collaborator experience and proven practice, the complete absorber vessel shall be made of minimum 7 mm thick carbon steel with 3 mm thick flake glass lining. And also all internal members and other bridges shall be lined with 2mm thick flake glass lining. Please confirm.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
	SECTION-VI, PART-B	SUB-SECTION-A-05	11 OF 29	5.06.13	All internal members shall be lined with minimum 2 mm Alloy 59/ C276. All metallic fasteners which are provided inside the absorber/absorber wet-dry interface ducting shall be of Alloy 59/ C276.		
	SECTION-VI, PART-B	SUB-SECTION-A-05	11 OF 29	5.06.15	The other bridges (supports) shall be lined with minimum 2 mm Alloy 59/ C276.		
1209	SECTION-VI, PART-B	SUB-SECTION-A-05	11 OF 29	5.06.14	The absorber wet-dry interface shall be made of solid Alloy 59 or C276 of minimum 6 mm thickness.	As per our Collaborator's proven practise, for JBR we propose to use wet dry interface of CS with 2 mm FLRP lining. Please confirm.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.

1210	SECTION-VI, PART-B	SUB-SECTION-A-05	12 OF 29	5.06.22	For the agitators a flushing system for start ups shall be provided.	For JBR, the impeller of absorber agitators are mounted above the slurry settling zone and can start without flushing system after a long shutdown as per collaborator proven design. Hence, requirement of separate flushing system for agitator is not envisaged.	Avoiding deposition of slurry & its flushing is a critical aspect for the FGD system smooth O&M. Specifications requirements are clear and bidder to comply with the specification requirements.
1211	SECTION-VI, PART-B	SUB-SECTION-A-05	12 OF 29	5.06.24	At the head of the absorber two manholes shall be provided to reduce the draught of the stack during outage.	Kindly note, this clause is applicable only for spray type absorber and hence not considered for JBR.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement
1212	SECTION-VI, PART-B	SUB-SECTION-A-05	16 OF 29	6.07.01	Limestone Slurry Supply Pumps& Piping iv) Margins Heads 15% (minimum)	Bidder understands that the 15% margin on head indicated is on friction head only. Please confirm.	Bidder's understanding is not correct. Bidder to comply the specification requirements.
1213	SECTION-VI, PART-B	SUB-SECTION-A-05	16 OF 29	6.07.03	The slurry pipes shall be lined with replaceable wear resistant natural rubber lining of minimum 6mm thickness. Additional thickness of 2 mm in rubber lining shall be provided at bends.	For JBR, Bidder proposes FRP pipes for all the slurry pipes as per bidder's practice and experience.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
	SECTION-VI, PART-B	SUB-SECTION-A-05	23 OF 29	12.02.00	All the pipes handling slurry shall be provided with replaceable rubber lining of proven quality. The Contractor can provide slurry pipes size up to 400 NB made up of FRP material as per ASTM 2310 and testing as per ASTM B2583(silicon carbide coating on slurry exposed surface) if it has previous experience of providing the same		
1214	SECTION-VI, PART-B	SUB-SECTION-A-05	16 OF 29	7.03.01	The outlet water content in the gypsum shall be as per the requirement of the vacuum belt filters.	Bidder understands that the vacuum belt filter shall be designed as per primary hydro cyclone underflow inlet to VBF maintain gypsum production and moisture content as per the tender condition. Please confirm bidder's understanding.	Bidder's understanding is not correct. The requirement is intended for the design of Primary Cyclone to meet downstream system requirements including Vacuum Belt Filter. Bidder to comply technical specification requirement
1215	SECTION-VI, PART-B	SUB-SECTION-A-05	17 OF 29	7.04.03	The complete frame of the filter and all parts in contact with gypsum shall be made of corrosion resistant material or shall be provided with corrosion resistant liners of proven design.	As the frame for vacuum belt filter shall never come in contact with gypsum slurry, hence shall be made of carbon steel painted with corrosion resistant paint. Bidder request owner to please agree and confirm the same.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1216	SECTION-VI, PART-B	SUB-SECTION-A-05	18 OF 29	7.04.10	A 2 m (min.) wide platform shall be provided around each belt filter.	Platform requirement and width of the platform shall be decided during detail engineering based on the OEM's recommendation and Layout arrangement and the same will be subject to customer's approval.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement
1217	SECTION-VI, PART-B	SUB-SECTION-A-05	18 OF 29	7.05.05	The vacuum receiver and pump internals shall be suitably lined to protect against the corrosive environment	It is not suggested to do the rubber lining on the vacuum receiver/ water separator and pump internals as the liner may fall off after operating for a certain period, which will impact the performance of the pump. The material for casing without liner is acceptable as per our experience and proven practice. Addition to this, we would like to justify that there will be no corrosion since the sealing water is clarified water. Liners were not provided for all our earlier projects of NTPC (Khargone, Lara, Darlipalli and Vindhyachal) and all other state utilities.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1218	SECTION-VI, PART-B	SUB-SECTION-A-05	18 OF 29	7.06.03	The pump shall be capable of pumping of filtrate water with solid concentration of not less than 10% & particle lumps of 6-7mm.	Filtrate pumps handling slurry will have a slurry concentration much less than 10%. Also the filtrate pumps handling slurry will never have a particle size of 6-7 mm. Hence this clause is not applicable. Please clarify the requirement.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1219	SECTION-VI, PART-B	SUB-SECTION-A-05	19 OF 29	7.07.06	2x100% horizontal centrifugal pumps shall be provided for pumping the waste water from waste water tank to the mixing tanks of HCSD system or in any other area with suitable treatment so as to suit/not to disturb the destination fluid quality. The material of Casing shall be rubber lined or Hi-chrome steel. The impeller shall be made of Hi-chrome steel. Shaft shall be of stainless steel 410 and shaft sleeve shall be stainless steel.	As shaft shall never come in contact with the medium of flow, hence, the shaft shall be of EN8 instead of stainless steel 410. Please confirm.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1220	SECTION-VI, PART-B	SUB-SECTION-A-05	20 OF 29	7.07.10	Bucket conveyors shall be provided by the contractor to feed lime to each of the lime storage silos from ground level. The Bucket conveyors shall be sized to completely feed each lime silo within 2hrs. Adequate storage and feeding system required for feeding the lime to the Bucket conveyors is also in the Contractor's scope	As the slacked lime quantity required for lime dosing is very less, hence bucket elevators are not required. For handling of lime a chain pulley arrangement shall be provided. Please confirm.	Bidder's proposal is not acceptable. Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1221	SECTION-VI, PART-B	SUB-SECTION-A-05	20 OF 29	7.08.03	Agitation shall be provided to prevent settlement of slurry by sufficient no. of Top entry agitators or side entry agitators (as per the proven practice of bidder) with emergency flush start system.	In case of JBR technology the impeller of absorber agitators are mounted above the slurry settling zone and can start without flushing system after a long shutdown as per collaborator proven design. Hence, requirement of separate flushing system is not envisaged.	Avoiding deposition of slurry & its flushing is a critical aspect for the FGD system smooth O&M. Specifications requirements are clear and bidder to comply with the specification requirements.
1222	SECTION – VI, Part-E	SCHEME OF FGD - ABSORBER SYSTEM	-	XXXX-001-POM-A-022		Bidder shall consider pneumatic operated valves at suction and discharge of the pumps inline with the tender P&ID (Scheme of FGD-Absorber system)	Bidder to note that the P&ID requirement is already marked with " asterisk" which allows the bidder to provide pneumatic valve as per its proven practice. Bidder to comply technical specification requirement
	SECTION-VI, PART-B	SUB-SECTION-A-05	21 OF 29	8.04.00	All the slurry pumps shall be provided with motorized suction and discharge valves.		
1223	SECTION-VI, PART-B	SUB-SECTION-A-05	21 OF 29	8.05.00	In case of pump with rubber lined casing, the casing should be radially split to allow easy removal of impeller.	Bidder understands that even in case of pump with hi chrome casing, the casing shall be radially split. Please confirm.	Kindly refer the complete clause along with experience requirements as specified. Bidder to comply with the specification requirements.
1224	SECTION-VI, PART-B	SUB-SECTION-A-05	23 OF 29	11.07.00	To prevent mechanical blocking load start-up after standstill of pumps, piping and agitators for slurries shall be applied with C-hose connection.	In case of JBR technology the impeller of absorber agitators are mounted above the slurry settling zone and can start without flushing system after a long shutdown as per collaborator proven design. Hence, requirement of separate flushing system is not envisaged.	Avoiding deposition of slurry & its flushing is a critical aspect for the FGD system smooth O&M. Specifications requirements are clear and bidder to comply with the specification requirements.
1225	SECTION-VI, PART-B	SUB-SECTION-A-05	23 OF 29	12.01.00	The contractor may provide a recirculation line with motorized isolation valve / restriction orifice made of erosion resistant material for the above purpose.	Bidder request owner to include the option of pneumatic operated valves as per proven practice.	Specification requirement is clear in this regard. Bidder to comply technical specification requirement.
1226	SECTION – VI, Part-E	SCHEME OF FGD - ABSORBER SYSTEM	-	1150-001-POM-A-022		As per bidder's collaborator's standard practice and past experience, control valve for gypsum bleed pump shall be placed only in the discharge line and not in recirculation line. Please accept and confirm.	Bidder to refer Amendment no SG.41 in this regard
1227	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	SUB-SECTION-IIA-14 LIMESTONE AND GYPSUM HANDLING PLANT	1 of 5	2.01.01	Limestone will be received to power plant through road by trucks.	Please provide details, type and dimension of trucks with number of maximum wheels.	Bidder to consider all available models of Trucks ranging from 4 to 16 wheels for receipt of Limestone inside Plant.
1228	- TECHNICAL SPECIFICATIONS SECTION – VI, PART-A - SECTION – VI, PART-E -TECHNICAL SPECIFICATIONS SECTION-VI, PART-B	- SUB-SECTION-II A-14 LIMESTONE AND GYPSUM HANDLING PLANT - Drg no : XXXX-001-POM-A-039 (SH-1) -SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	1 of 5 50 of 91 84 of 87	2.01.01 4.04.03	- Limestone shall be conveyed to usage point through single stream conveyors & Bucket Elevators of capacity 100% for conveying. - As per flow diagram, after crusher house to bucket elevator, two stream of conveyors (LBF-1 & 2) are provided. -One working conveying (Conveyors & Bucket Elevators) stream shall be provided for Limestone Handling Plant. 2x100 % (one working + one standby) conveying stream shall be provided for GHP.	Due to contradiction of said clauses, Bidder understand, " Limestone shall be conveyed to usage point through single stream conveyors & Bucket Elevators of capacity 100% for conveying." Accordingly only one no of conveying stream is provided between crusher house discharge to bucket elevator feeding at storage silo, instead of LBF-1 & 2 shown in the flow diagram. Please confirm our understanding	Bidder's understanding is not correct. Limestone conveying system shall be single stream , with 100% stand-by for (Crusher + Belt Feeder) series. Bidder to comply Specification requirement. Bidder may provide additonal Belt Feeder at discharge of LBF-1 & LBF-2, if required.
1229	- TECHNICAL SPECIFICATIONS SECTION – VI, PART-A - SECTION – VI, PART-E	- SUB-SECTION-IIA-14 LIMESTONE AND GYPSUM HANDLING PLANT - Drg no : XXXX-001-POM-A-039 (SH-1)	1 of 5, 50 of 91	2.01.03	- One (1) number Limestone crusher house (CH) complete with all civil, structural, architectural and electrical works etc. accommodating suitable nos. crushers and associated Vibrating screening feeders, passenger cum goods elevator, conveyors, chute work along with **actuator operated flap gates**, monorails & hoists, hoist maintenance platform, external and internal staircases, hand rails and other equipment such as sampling unit, dust extraction system etc. as specified elsewhere. - As per flow diagram, at crusher house rod gate and rack & pinion gate is provided.	Due to contradiction of said clauses, bidder is considering 1 no of flap gate arrangement at crusher house (after discharge chute of LC-1 above vibrating screen) for smooth and quick changeover of the stream path from one stream to another instead of Rod gate & R&P gate arrangement shown in the flow diagram.	Bidder's understanding is correct for Flap Gate arrangement at Limestone Ctusher House. Further, Bidder to refer Amendment MH-22 for revised Limestone Flow Duagram.
1230	- TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	- SUB-SECTION-IIA-14 LIMESTONE AND GYPSUM HANDLING PLANT	4 of 5	3.07.0	Gypsum from storage shed shall be loaded to user's trucks directly from discharge chute or using front end loader/ pay loader.	Please provide exact detail of truck, type of trucks and dimension of trucks.	Bidder to consider all available models of Trucks ranging from 4 to 16 wheels for dispatch of Gypsum from Plant.
1231	- TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	SUB-SECTION-IV FUNCTIONAL GUARANTEES	59 of 73	2.03.07	Output coal/ Limestone size to be sieve analyzed and (-) 20 mm coal/Limestone to be more than 98% for ring granulator type crusher.	Please provide sieve analysis report of incoming limestone	Bidder to consider (-) 250 mm for incoming limestone. Occasionally 1-2% of 400mm may also to be considered.
1232	TECHNICAL SPECIFICATIONS SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	87 of 87	4.04.18	Minimum clear cross section of chute: 800 mm X 600 mm (inside both ways)	For 800mm belt width the required skirt width is ~550mm. For the smaller belt width of 800mm, by providing 550mm skirt width, the clearance from the belt edge to the skirt sealing remains ~50mm, which may cause the material spillage in case of belt sway. To avoid material spillage bidder proposed to provide 800x500mm chute dimension matching the skirt width of 500mm.	Bidder's proposal to provide 800x500mm chute dimension is acceptable for Limestone & Gypsum Handling.

1233	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	5 of 79	4.1.4	Belt Take-up Arrangement	Bidder has considered screw type take upto 60m conveyor length as per IS 11592, considering take up travel length 1.5% of horizontal crs of belt length as per IS 4776 .Please confirm.	Bidder to provide screw takeup arrangmenet for conveyor having length more than 25 m with travel of 4% of the total belt length.
1234	TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	7 of 79	4.3.4	Wire rope shall be of pre-formed type, hemp cored, regular lay 6/36 construction with a breaking strength of 160 -175 kgf/ sq. mm. The reverse bend of ropes is not acceptable. The minimum number of falls of rope shall be four (4). All running shafts and wheels shall be fitted with ball / roller bearings with a rated life of not less than 20 years based on equivalent running time as per IS:3938.	As per manufacturer recommendation, steel cored wire rope is superior than hemp cored and used for hoist applications widely. Bidder requests Owner to accept.	Bidder's proposal is acceptable.
1235	TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO CS-9586-001A-2	SUB-SECTION-A-05 (FGD)	20 of 29	7.07.10	Bucket conveyors shall be provided by the contractor to feed lime to each of the lime storage silos from ground level. The Bucket conveyors shall be sized to completely feed each lime silo within 2hrs. Adequate storage and feeding system required for feeding the lime to the Bucket conveyors is also in the Contractor's scope.	As the lime quantity required for lime dosing is very less, hence bucket elevators are not required. For handling of lime bags hoist shall be provided. Please confirm.	Bidder proposal is not acceptable. Requirement of specifications is clear, bidder to comply.
1236	---	---	---	---	General	Bidder has considered upto 10 meter gypsum stockpile height with three side retaining wall & one side kept open for truck bay for truck loading. Bidder request NTPC to confirm.	Bidder's proposal shall be reviewed during detail engineering.
1237	---	---	---	---	General	Bidder understands that, bidder can optimize the overall FGD layout along with LHP/ GHP as per their system design complying to the technical specification requirements . Bidder shall maintain the functionality of the entire system as per the specifications. This shall include addition/deletion of TPs/ conveyors etc. from the tender flow diagram/ layout (if not applicable as per bidder's layout design).	Bidder's proposal shall be reviewed during detail engineering.
1238	---	---	---	---	General	No any bull dozer, pay loader or trucks are considered in the scope of bidder.	Bidder's understanding is correct.
1239	---	---	---	---	General	Angle of repose to be considered for limestone & gypsum. Kindly provide the same.	Bidder to consider angle of repose as 25 deg and 35 deg for limestone and gysum respectively.
1240	---	---	---	---	General	Please provide maximum surface moisture content for incoming limestone.	Bidder to consider 20% max moisture content.
1241	---	---	---	---	General	Please furnish limestone flow analysis report for silo design. Else Owner is requested to provide following material characteristics & source of limestone for flow analysis: 1) Cohesive strength 2) Wall Friction 3) Compressibility 4) Permeability 5) Segregation Tendency	Bidder to consider the inputs in line with latest executed/ongoing Lot FGD projects.
1242	---	---	---	---	General	Bidder would like to combine different buildings complying with all functional & operational requirement stipulated in NIT document . Bidder requests Owner to accept	Bidder's proposal shall be reviewed during detail engineering.
1243	- SECTION – VI, PART-E	Drg no : XXXX-001-POM-A-039 (SH-2)	51 of 91	---	- As per flow diagram for gypsum conveyor rated capacity is 150TPH.	For 1x800 MW project, generally gypsum generation is ~20 to 25 MT and Gypsum conveyor capacity performance can be conducted inline with the progressive generation of Gypsum & carried out from vacuum belt filter. Bidder propose to consider the Gypsum conveying & associated equipment (i.e. tripper etc) rated capacity similar to the vaccum belt capacity. Please confirm	Bidder's proposal is not accepted. However, rated caapcity for Gypsum conveying system has been revised. Bidder to refer Amendment SI MH-22 for revised Gypsum Flow diagram.
1244	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A	SUB-SECTION-IIA-04 FLUE GAS DESULPHURISATION SYSTEM	6 of 7	9.01.00	One (1) number passenger cum goods elevator of minimum capacity of 1000kgs for each Absorber (to be provided in case height of absorber is higher than 15m) and One (1) number passenger cum goods elevator of minimum capacity of 1000 kgs in each for Limestone Grinding System Building & Gypsum dewatering building irrespective of building height shall be provided for easy access & movement of man/materials. **Passenger Elevator of minimum capacity of 680 kg for MCC cum control room building of FGD plant irrespective of building height.**	Elevator can be considered for MCC room if number of landing levels are 2 or more. Bidder requests Owner to relook the requirement of elevator & confirm.	Bidder proposal is not acceptable. Requirement of specifications is clear, bidder to comply.
1245	TECHNICAL SPECIFICATIONS SECTION-VI, PART B TECHNICAL SPECIFICATIONS SECTION-VI, Part-A	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant SUB SECTION-IIA-14 LIMESTONE AND GYPSUM HANDLING PLANT	13 of 79 4 of 5	4.10.1 3.06.0	Mobile Trippers on Coal bunker conveyors/Gypsum Conveyor along with belt sealing arrangement shall be furnished and erected complete with rails, including necessary supporting structures, approach/ maintenance platforms with ladders and hand railings, **trailing cables with Energy chain arrangement**, all electricals including machine mounted local control panel & control panel on one end of Bunker/Gypsum storage shed. The Mobile tripper on bunker conveyors/Gypsum Conveyor shall be motor driven type. Suitable number of motorized travelling tripper on each feeding conveyor for feeding the gypsum to the covered storage shed. Trippers shall be complete with all mechanical, electrical equipment, rails, chute work, rail supporting structure (along with structural stools, as required), **cables with cable festooning arrangement**, thruster brakes, rail clamps, electric hoist, actuator flap gates etc.	Due to contradictions in the mentioned clauses, the bidder understands that bidder can consider either the cable festooning / CRD /Energy Chain arrangement for travelling tripper. NTPC to confirm.	Bidder's understanding is not correct. Bidder to consider Energy chain arrangement for Travelling Tripper for both Coal & Gypsum handling.
1246	TECHNICAL SPECIFICATIONS SECTION-VI, Part-A	SUB SECTION-IIA-04 LIMESTONE AND GYPSUM HANDLING PLANT	1 of 7	1.02.00	The scope of supply identified for FGD system here are minimum requirements and unless specifically excluded from the contractor's scope in sub-section-V (Terminal Points and Exclusions), any equipment/system not included in this specification but integral to the system offered by the contractor to meet the intent of this specification, shall also be included in the scope of the contractor.	Bidder understands that the scope of work not explicitly mentioned in the specification to be considered additional. NTPC to confirm.	Technical specification is Clear.Bidder to comply stipulations of Technical Specification.
1247	TECHNICAL SPECIFICATION SECTION-VI, PART-B TECHNICAL SPECIFICATIONS SECTION-VI, PART B	SUB-SECTION-A-05 (FGD) SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	26 of 29 81 of 87	14.09.00 4.02.09	Contractor shall provide motorized hoists and trolleys for all items requiring maintenance and weighing 500 kg or more. All auxiliary structures, monorails, runway beams for all lifting tackles, hoists etc., are included in Contractor's scope of supply. Access ladders with suitable platform shall also be provided for approach to all motorized hoists/trolleys mounted on their runway beams for the maintenance of hoists/trolleys. Items weighing more than 50 kg and required to be replaced for maintenance shall be provided with manual hoists/trolleys with runway beams/supporting structure etc/chain pulley block mounting arrangement. -More than 2.0 tonne or more than 10.0 m lift /coming out-side the buildings. except for other hoists including the hoists for handling take up - pulley and take up weight	Due to contradictions in the mentioned clauses, the bidder is considering motor-operated hoists for a lifting capacity greater than 2.0 tons or a lift height exceeding 10.0 meters. For hoists related to GTU and bend pulleys, hand-operated manual hoist blocks for both long travel and lift operations will be provided. For hoists with capacities below the specified limits, hook or chain pulley blocks shall be provided. NTPC to confirm.	The requirement are specified for different equipment/system. Bidder to follow the specified requirements in the two referred clauses for the respective equipment/system.
1248	SECTION – VI, PART-E	- Drg no - XXXX-999-POC-F-001 (SH-1) - - Drg no : XXXX-001-POM-A-039 (SH-1)	90 of 91 50 of 91			Flow diagram and Layout are contradictory, As per plant layout arrangement drawing-XXXX-999-POC-F-001, to fit limestone handling system, pit type bucker elevator is shown in between CRH & Bulk silo Hence, bidder understand to consider either pit type or pitless bucket elevator arrangement as per layout requirements. Kindly confirm.	Bidder's understanding is not correct. Bidder to consider pitless Bucket Elevator.
1249	SECTION – VI, PART-E	- Drg no : XXXX-001-POM-A-039 (SH-1)	50 of 91		The entire Bulk Receiving Unit/ Surface feeder is shown inside the BRU station building	Bidder understands that only discharge portion of BRU station will be covered inside the BRU station, However the equipment will be of a closed type, even though it will be operated in an open area.	Bidder's understanding is correct.
1250	SECTION – VI, PART-A	SUB-SECTION-A-14 LIMESTONE AND GYPSUM HANDLING PLANT	PAGE 4 OF 5	3.03.00	Minimum four (4) Nos. sump pumps in gypsum storage shed complete with motors, local control panel, level switches, individual discharge piping with fittings and valves up to ash disposal slurry sump.	i) In line with specification -SECTION-VI, PART B,SUB-SECTION-A-20 **Coal & Biomass and Limestone & Gypsum Handling Plant,** Clause 4.11.8, page-16 of 79, bidder understands that Sump Pump shall be provided at all locations wherever natural drainage is not possible in Coal & Biomass and Limestone & Gypsum Handling Plant.	i) Bidder's understanding is correct.
	SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 16 of 79	4.11.8	Sump pumps along with level switches & piping upto nearest drain (max upto 50.0 mtrs. From outside the building) shall be provided at all locations wherever natural drainage is not possible.	ii) Bidder also understands that Gypsum storage area where natural drainage system is possible by gravity, Sump pumps is not required. We shall connect this Gypsum storage area drainage line to Dewatering area drainage line for further process.	ii) Bidder's understanding is not correct. Bidder to provide Sump Pumps in Gypsum Storage area, as specifed.
1251	SECTION-VI, PART B	SUB-SECTION-A-20 Coal & Biomass and Limestone & Gypsum Handling Plant	Page 62 of 79	2.01.02 f)	Dust Suppression System (Plain water type) (1) Operation : Water sprayed with fogging nozzle (2) Location of spray : Gypsum storage area (3) Capacity / Pressure at : 2.0 lpm / 2.5 kg/cm2 inlet of spray head	Bidder request to approve alternative Sprinkler spraying arrangement instead of fogging nozzles to cover the total storage zone. Kindly confirm.	Alternate Sprinkler spraying arrangement having superior effectiveness shall be accepted after review during detail engineering.
1252	SECTION-VI, PART E(1)	Gypsum Flow Diagram Drg. No.-XXXX-001-POM-A-039 (SH-2)	Page 51 of 91	Gypsum Flow Diagram Drg. No.-XXXX-001-POM-A-039 (SH-2)		Bidder understands that wet type gypsum shall be fed to GC-1 from Vacume Belt filter. Dust will not be generated from wet material here. In case of DS running here water % of Gypsum will be increased. Hence, we are not considering DS system on GC-1. Bidder request owner to approve the same	Bidder's understanding is correct.Bidder to provide DS system in Gypsum Storage shed. Bidder to refer Amendment SI MH-22 for revised Gypsum Flow Diagram.

1253	SECTION – VI, PART-A	SUB-SECTION-A-14 LIMESTONE AND GYPSUM HANDLING PLANT	PAGE 3 OF 5	2.01.18	Complete dust extraction system for control of fugitive dust in limestone Silos, junction towers, crusher house complete with fans, drives, hoisting arrangements, ducting, piping, valves etc. electrical, accessories, civil, structural and architectural works.	As NIT specification is silence about detail specifications of dust extraction system in FGD area , has considered dry type DE system in line with standard engineering practice & ACGIH guideline. Please confirm.	Technical Specification is clear for Dust Extraction system in Limestone handling plant. Bidder to refer Clause 2.01.02, (c), (ii), Part B, A-20, VI/B.
1254	TECHNICAL SPECIFICATIONS SECTION-VI, PART-B	SUB SECTION-A-01 EQUIPMENT SIZING CRITERIA	PAGE 87 & 87	4.04.15	Dust extraction system Type: Dry type dust extraction system Location: Truck un-loading points, Junction Towers (limestone/ gypsum discharge & receipt points), limestone crusher house (including belt feeder & vibrating screening feeder) and lime stone/gypsum storage Shed/Silo.	There are discrepancies in said two specifications regarding dust control system in Gypsum storage area. Bidder has considered dust suppression system in Gypsum storage area. Please confirm	Bidder's understanding is correct. In this regard, Bidder to refer Amendment Sl. MH 55.
	TECHNICAL SPECIFICATION SECTION – VI, PART-A	SUB-SECTION-A-14 LIMESTONE AND GYPSUM HANDLING PLANT	PAGE 4 OF 5	3.04.00	Complete dust suppression system for control of fugitive dust in gypsum storage shed, complete with pumps, water tanks, drives, hoisting arrangements, ducting, piping, valves etc. electrical, accessories, civil, structural and architectural works.		
1255	SECTION-VI, PART-B --- SECTION-VI, PART-B	SUB SECTION-A-01 --- SUB SECTION-A-01	28 / 87 --- 28 / 87	1.05.22.01 --- 1.05.22.01	The chimney flue liner cladding shall be made of 1.5 mm thick Titanium (Grade 2 as per ASME SB265) or C-276 (ASTM B575, UNS N10276) alloy over 8 mm thick (minimum) mild steel base metal of flue liner. --- The external surface of chimney flue liner projecting over the chimney roof shall be wrapped with 2 mm thick Titanium / C-276 sheet (over insulation for titanium/C-276 lining and without insulation for borosilicate lining.)	There is a ambiguity in the clauses. Please confirm the cladding MOC of the flue liner projected above roof slab.	It is already specified that the external surface of chimney flue liner projecting over the chimney roof shall be wrapped with 2 mm thick Titanium / C-276 sheet over insulation for titanium/C-276 lining and without insulation for borosilicate lining. It is also specified that for Titanium/C-276 lining, the top flue liner above the roof slab shall be made of solid C276 (ASTM B575, UNS N10276) / Titanium (Grade 2 as per ASME SB265) of minimum 10 mm thickness. Specification requirements are clear and bidder to comply with the technical specification requirements.
	SECTION-VI, PART-B	SUB SECTION-A-01	28 / 87	1.05.22.01	The external surface of chimney flue liner projecting over the chimney roof shall be wrapped with 2 mm thick Titanium / C-276 sheet (over insulation for titanium/C-276 lining and without insulation for borosilicate lining.)		
1256	SECTION-VI, PART-B	SUB SECTION-A-01	28 / 87	1.05.22.01	For Borosilicate lining, top portion of the flue can shall be fitted with stop bar of 8 mm thick capping of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining.	The bidder would like to propose **2 mm thick capping** of Titanium / C-276 sheet to avoid any damage in between flue can and borosilicate lining.	Bidder's proposal is not acceptable. Specification requirement is clear and bidder to comply with the technical specification requirement.
1257	SECTION-VI, PART-B	SUB SECTION-A-01	29 / 87	1.05.22.01	However, minimum inside diameter of flue liner shall not be less than 8000 mm	Bidder request owner allow to consider minimum inside diameter as per process requirement.	
1258	SECTION-VI, PART-B	SUB-SECTION-D-1-5	19 / 69	5.03.03	The across wind analysis of the chimney shall be carried out as per the provisions of IS 4998.	The bidder understands that wind shield shall be analyzed and designed for cases with and without flue liner loads as per IS 4998: 2015 using limit state method. Please confirm.	Bidder understanding is correct
1259	SECTION – VI, PART-B	SUB-SECTION-B-17	75 / 98	13.05.02	The chimney portion of the foundation shall be designed as per limit load method described at clause 38.6 of IS-456-1978.	There is a ambiguity in the clauses. The bidder understands that Chimney Foundation shall be designed as per limit state method conforming to IS 4998 : 2015. Kindly confirm.	Bidder's understanding is correct.Bidder to refer Section-VI,PART-B,SUB-SECTION-D-1-5, Cl no 5.03.07 for chimney foundation.
	SECTION-VI, PART-B	SUB-SECTION-D-1-5	20 / 69	5.03.07	The chimney foundation shall be designed as per limit state method as per IS 4998 for the most critical combination of forces and moments,		
1260	SECTION-VI, PART-B	SUB-SECTION-E-4	05 / 05	1.17.00	Borosilicate block shall conform to NTPC data sheet and to be tested as per Relevant applicable standard .	Bidder requests owner to provide detailed technical specifications / data sheet for borosilicate lining over the steel flue.	Borosilicate block shall conform to NTPC approved data sheet and to be tested as per Relevant applicable standard .

Sr. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
1261	SECTION – VI, PART-A	SUB-SECTION-I INTENT OF SPECIFICATION	5 OF 8	4.02.00	The Employer shall issue the following quantities of Fuel oil and Coal per unit for firing up to successful completion of "Initial Operation" (as defined in General Technical Requirements, Part-C, Section-VI of Technical Specification) for each unit free of charge. Unit Size: 800 MW Fuel Oil: 11200 kL Coal: 2.7 lakh MT Fuel oil and coal required for the successful completion of the "Initial Operation", more than the above-specified quantity limits, would be issued by the Employer. However, the Employer shall charge the Contractor the cost of these as per the prevailing landed rates at the site at that time.	Fuel oil and Coal quantities being provided by NTPC for Sipat project is too low. In the recent Lara 2x800 MW (Ph-2) project NTPC is providing 15,300 kL Fuel oil & 3.43 Lakh MT of Coal free of cost to the successfull bidder for each unit. Since there is an variation in the coal properties between Lara & Sipat projects, request NTPC to provide the following corrected values of coal & Fuel oil quantities free of cost to the successfull bidder for Sipat project. Fuel oil : **15,300 kL** per unit (Same as NTPC Lara values) Coal : **3.58 Lakh MT** per unit (Corrcted values from NTPC Lara) Request NTPC to issue suitable amendment in this regard.	The quantities indicated are adequate based on employer's assessment. Bidder to comply with the specification requirements.

S. No.	Section / Part	Sub-Section	Page no.	Clause No.	Bid Specification Stipulation	Statement of Prebid Queries & Clarification	NTPC's Clarification
1262	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant Yard pipig layout drawing to check and estimate the proposed unit interface.	Available drawings will be shared with the successful bidder after award as mentioned in technical specification.
1263	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant Composite trestle layout for pipe and cables, Trestle in Transformer yard area, Gable end of main power house area, C-Row cantilever of main power house (CD- bay pipe rack), Trestle GA from C-Row to ESP control room, Trestle GA from FOPH/Aux boiler to C-Row of power house drawing to check and estimate the proposed unit interface.	Available drawings will be shared with the successful bidder after award as mentioned in technical specification.
1264	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant DM water tank and transfer pump house GA drawing for interconnection and interface with Stage III.	Bidder to refer Amendment SN WS-12
1265	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant Piping composite layout for auxiliary steam piping inside TG building/Dearator Floor drawing for interconnection and interface with Stage III.	Available drawings shall be shared with the successful bidder after award.
1266	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant Railway siding / Line layout drawing to check Fly ash silo placement/feasibilty and its bagging plant for Stage III.	Drawing shall be provided to the successful bidder.
1267	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant Fire water tank and fire water pump house GA alongwith its piping drawing for interconnection and interface with Stage III.	Details (Nos. & Capacity) of existing fire water pumps have been indicated at Annexure-III to Sub-Section-A-18 (FDPS), Part-B of Technical Specification (Section-VI). GA and P&ID of fire water pump house shall be shared during detailed engineering.
1268	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant CSSP area layout and GA & its piping drawing to check and estimate the proposed unit interface with Stage III.	Bidder to refer Amendment SN WS-9
1269	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide existing plant Fuel Oil Piping composite layout to check and estimate the proposed Fuel Oil unit interface with Stage III..	Bidder to refer GLP and further the required drawing shall be shared during detailed engineering.
1270	Part-E1	-	-	Tender Drawings	Tender drawings	Request owner to provide location of existing Oily water separator Pit & GA drawing of the same. The same is required to route the discharge line from Stage-III Fuel oil pump house sump pit.	Bidder to refer GLP and further the required drawing shall be shared during detailed engineering.
1271	Technical Specification SECTION-VI, PART E(Tender Drawings).	Part-E, Tender Drawings (Civil)	84 of 91	--	Maintenance Building: Monorail shown in Sec-X-X of Maintenance Building-Typical Architectural Details	Bidder understand that Hoist is to be considered for the Maintenance Building. Owner is requested to provide Hoist Type (Electrical Hoist /Manual Hoist), Capacity of the Hoist and Travel length of the Hoist.	Maintainance building is not in scope of bidder. Tender drawing no. XXXX-001-POC-A-009 Rev A to be ignored.
1272	SECTION – VI, PART-A	SUB SECTION- IIA-10 WATER TREATMENT PLANT	10 of 12	3.06.00 (4)	C) Interconnection with existing Stage-I (3x660 MW) DM Plant:	Since dedicated DM plant is provided for Stage-III facilities, any interconnection with existing DM water tanks/piping of Stage-I is not envisaged. Owner to confirm Bidder's understanding.	Bidder's understanding is not correct. Interconnection with existing Stage-I DM plant is in Bidder's scope
1273					Material Approach for stage-III facilities. 	Bidder understands that, limited approach road is available for Stage-III facilities. Approach road through Underpass is feasible only for cars and tractor trollies movement. For Material movement only one approach road is feasible i.e. by crossing existing multiple railway lines which may lead to frequent stoppages and causes hindering the project progress. Therefore in addition to this approach, Owner is requested to provide another approach road which can be utilized for material movement. Also bidder understands that necessary shutdown for overhead electrical lines shall be taken by owner to facilitate crossing of ODC consignments.	Bidder may plan the material movement considering the coal rake movement, any major blockage is not apprehended. The clearances for the necessary shutdown of OHE line inside plant will be provided by the Owner.

SL. NO	ENQUIRY SPECIFICATION				SPECIFICATION REQUIREMENT	COMMENTS / CLARIFICATIONS	NTPC Reply
	SEC/ PART	SUBSEC.	PAGE NO.	CLAUSE NO.			
1274	VI/B	G-01	4 of 4	1.06.00	Further, Contractor will share the detailed design documents for establishing the changes done in the design for ensuring continuous operation at 40 % TMCR Load.	Such Design document are proprietor in nature and cannot be shared. NTPC is requested to delete the clause.	40% technical minimum load operation to be ensured in line with latest CEA gazette. Bidder to please note that this is mandatory requirement and is to be ensured by owner. Bidder to comply technical specifications requirements.
1275	VI/B	G-07	3 of 8	2.05.00	Data Sheet: Steam Turbine.	Technical data of Steam Turbine required for operation, maintenance and information purpose shall only be furnished in O&M Manual. Data / information which are proprietary in nature, shall not be furnished.	The data/information sought are not proprietary in nature and these information are provided in past also. Bidder to comply specification requirements.
1276	VI/B	A-07	1 of 25	1.04.00 (d)	Critical speed of composite rotor and blade assembly shall not be within - 10% and +15% of rated speed.	Critical speed of composite rotor and blade assembly shall not be within ± 10% of rated speed. This is as per OEM's in house design guidelines	Bidder's proposal is not acceptable, bidder to comply with tender requirement.
1277	VI/B	G-01	2 of 4	1.01.00 (n) & 1.03.00	Plant Life 25 years with Number of Starts : Hot : 6700, Warm : 1000, Cold : 150. The plant shall be capable of daily 2 load cycling from 100% to 50% & 1 load cycling bellow 50% TMCR which implies 13400 & 6700 cycles in design life.	The requirements of 7850 number of starts along with daily 3 load cycling and stops are not practical. 7850 starts in 25 yrs means 314 starts in a year i.e. One startup in every 1.16 NTPC to reconsider the practicability and clarify the design requirement.	Specification requirements are clear in this regard and based on flexible and two shift operation of plant. Bidder to comply with the specification requirements.
1278	VI/B	A-02	3 of 67	1.05.00	Type of Starts: Hot start (after 8 hours of unit shut down) Warm start (after 36 hours of unit shut down) Cold start (after 72 hours of unit shut down)	For Start up curve preparation, we will consider the following condition as per standrad practice. Hot start (after 8 hours of unit shut down) Warm start (after 48 hours of unit shut down) Cold start (after around 200 hours of unit shut down)	Bidder's proposal is not acceptable, bidder to comply with tender requirement.
1279	VI/A	IV	2 of 73	1.00.01 (i-1)	For Cat-I Performance / Acceptance tests to be conducted along with the initial operation: After the conductance..... The contractor shall submit the detailed test evaluation report of Performance test results to Employer promptly but not later than 7 days from the date of conductance of Performance test.	All the efforts will be made to make unit ready for performance guarantee test before start of Initial Operation, however CAT-1 performance guarantee test shall be conducted after stabilization of Unit as per satisfaction of both parties. Separate report shall be furnished to Customer as per agreement during MOM of TG-PG test.	Cat-I guarantee test shall be conducted along with initial operation. Bidder to also refer clause 1.00.01 f) of Sub sec-tion-IV, Section-VI of technical specification. Bidder to comply specification requirements.
1280	VI/A	IV	50/73	2.02.02	No shutdown shall be allowed for installation of PG test instrument/ flow nozzle etc. Any advanced class instrument system such as those using electronic devices or mass flow technique shall be arranged by the contractor, if required. However, same shall be installed before start of initial operation of unit. For determination of primary flow to the turbine, a calibrated low Beta-ratio throat-tap nozzle assembly shall be installed permanently in condensate line prior to initial operation, same shall be also used for process control. All the instruments including the flow nozzle shall be calibrated by the contractor before initial operation in a reputed international institute. All calibrations reports shall be made available prior to the start of initial operation and calibration certificates in original submitted to Employer. All instruments including flow nozzles as necessary for conductance of PG tests shall be installed prior to the start of initial operation.	PG test instruments are with special accuracy class and shall be calibrated before start of actual PG test and will be installed in running unit. Flow Nozzle shall be installed just before start of TG-PG test to ensure accuracy of flow measurement and its reading will be recorded in separate data logger.	Bidder's proposal is not acceptable, bidder to comply with tender requirement.
1281	VI/A	IV	51/73	2.03.00	The Contractor shall prepare test reports in which the methods followed, instrument readings, graphs, observations, final results obtained online, etc., shall be recorded. Soft copies of each test report shall be submitted to Employer for Approval.	TG-PG test report shall be generated as per standard format and will be submitted to Customer within shortest possible as per agreement during MOM of TG-PG test.	Bidder to refer the clause 1.00.01/(i), sub-section IV, PART-A, SECTION - VI for PG Test report submission schedule. Bidder to comply specification requirements.
1282	VI/B	G-04	9/227	3.4	Condensate flow nozzle (ASME PTC 6) will be installed by vendor Prior to initial operations. Condensate flow data will be available during performance test. Average value of test data of the specified test period will be collected for evaluation purpose. Vendor to ensure calibration validity of all instruments used for PG Test. Calibration certificates of test instruments shall be submitted to Employer at least 15 days before the conductance of performance test. Instrument Calibration to be carried out in a NABL accredited Laboratory.	Flow Nozzle shall be installed just before start of TG-PG test to ensure acuracy of flow measurement and its reading will be recorded in separate data logger.	Bidder's proposal is not acceptable, bidder to comply with tender requirement.

1283	VI A	I-A	12 OF 35	4.19 Ash Handling System	4.19.1 The Bidder/ its Sub- vendor(s) should be supplier of ash handling system(s) and should have executed ash handling system(s) involving design, engineering, manufacturing/got manufactured, supply, erection /supervised erection and commissioning/ supervised commissioning for- (a) (i) Wet Bottom Ash handling system comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or a submerged Scraper Chain Conveyor system designed for pulverized coal fired boilers. (ii) Wet Bottom Ash handling system comprising either a Jet pump system (for Water impounded Bottom Ash Hopper) consisting of Feed Gate, Clinker Grinder, Oil/Air Convertor tank, Water pumping system as a minimum or a Submerged Scraper Chain Conveyor system. The above Wet Bottom Ash handling system under (i) & (ii) shall be designed for the following conveying capacities for pulverized coal fired boilers: Jet Pump System: 50 tonnes/hour (dry ash basis) or more per jet pump. Submerged Scraper: 20 tonnes/hour (dry ash basis) Scrapper Chain Conveyor System or more per Conveyor. The reference Bottom Ash Handling systems should be of the same type i.e. jet pump system or submerged scraper chain conveyor system as is being offered by the Bidder/ its Sub- vendor. In case, Bidder/its sub-vendor qualifies through (a) (ii), the bidder shall engage a design agency who has done design/vetting of design of bottom ash handling system comprising of Jet pump system in conjunction with Water impounded Bottom ash hopper.	4.19.1 The Bidder/ its Sub- vendor(s) should be supplier of ash handling system(s) and should have executed ash handling system(s) involving design, engineering, manufacturing/got manufactured, supply, erection /supervised erection and commissioning/ supervised commissioning for- (a) ~~(i)~~ Wet Bottom Ash handling system comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or a submerged Scraper Chain Conveyor system designed for the following conveying capacities for pulverized coal fired boilers: ~~(ii) Wet Bottom Ash handling system comprising either a Jet pump system (for Water impounded Bottom Ash Hopper) consisting of Feed Gate, Clinker Grinder, Oil/Air Convertor tank, Water pumping system as a minimum or a Submerged Scraper Chain Conveyor system.~~ ~~The above Wet Bottom Ash handling system under (i) & (ii) shall be designed for the following conveying capacities for pulverized coal fired boilers:~~ Jet Pump System: 50 tonnes/hour (dry ash basis) or more per jet pump. Submerged Scraper: 20 tonnes/hour (dry ash basis) Chain Conveyor System or more per Conveyor. The reference Bottom Ash Handling systems should be of the same type i.e. jet pump system or submerged scraper chain conveyor system as is being offered by the Bidder/ its Sub- vendor. ~~In case, Bidder/its sub-vendor qualifies through (a) (ii), the bidder shall engage a design agency who has done design/vetting of design of bottom ash handling system comprising of Jet pump system in conjunction with Water impounded Bottom ash hopper.~~	Refer Amendment Sl. No. MH-06
1284	VI A	I-A	13 OF 35	4.19 Ash Handling System	(b) Pneumatic fly ash handling system for conveying fly ash from ESPs of a single pulverized coal fired boiler unit by either: (i) Pressure conveying system designed for 30 TPH or more conveying capacity. OR (ii) Vacuum conveying system designed for 30 TPH or more conveying capacity per vacuum extractor. The reference fly ash handling systems should be of the same type i.e. pressure system or vacuum system, as is being offered by the Bidder/ its Sub-vendor. An individual boiler unit having its own independent fly ash handling system up to wetting units/ dry dust collection buffer hoppers/intermediate Silos which includes, among others, independent fly ash handling equipment below ESP hoppers, independent ash conveying piping up to wetting units/ dry dust collection buffer hoppers can be considered as a plant for meeting the requirement above. And (c) Pneumatic Fly Ash Transportation System for transporting fly ash from pulverized coal fired boiler unit having capacity of not less than 20 TPH for a conveying distance of not less than 500 meter including fly ash storage silo. Further, a transportation system provided for an individual boiler unit having dedicated transportation vessels below dry dust collection buffer hoppers and dedicated piping from dry dust collection buffer hoppers/ intermediate Silos to storage silos, including storage silos can be considered as a plant for meeting the requirement above.	(b) Pneumatic fly ash handling system for conveying fly ash from ESPs of a single pulverized coal fired boiler unit by either: (i) Pressure conveying system designed for 30 TPH or more conveying capacity. OR (ii) Vacuum conveying system designed for 30 TPH or more conveying capacity per vacuum extractor. The reference fly ash handling systems should be of the same type i.e. pressure system or vacuum system, as is being offered by the Bidder/ its Sub-vendor. An individual boiler unit having its own independent fly ash handling system up to wetting units/ dry dust collection buffer hoppers/intermediate Silos which includes, among others, independent fly ash handling equipment below ESP hoppers, independent ash conveying piping up to wetting units/ dry dust collection buffer hoppers can be considered as a plant for meeting the requirement above. And (c) Pneumatic Fly Ash Transportation System for transporting fly ash from pulverized coal fired boiler unit having capacity of not less than 20 TPH for a conveying distance of not less than 500 meter ~~including fly ash storage silo.~~ Further, a transportation system provided for an individual boiler unit having dedicated transportation vessels below dry dust collection buffer hoppers and dedicated piping from dry dust collection buffer hoppers/ intermediate Silos to storage silos, ~~including storage silos~~ can be considered as a plant for meeting the requirement above.	Refer Amendment Sl. No. MH-07
1285	VI A	I-A	13 OF 35	4.19 Ash Handling System	(d) Complete ash slurry disposal system for handling not less than 40 tons of ash per hour for pulverized coal fired power stations which includes, among others, ash slurry pumps & piping system with associated controls	(d) Complete ash slurry disposal system for handling not less than 40 tons of ash per hour for ~~pulverized~~ coal/lignite fired power stations which includes, among others, ash slurry pumps & piping system with associated controls	For slurry system coal/lignite fired power station to be allowed.	Refer amendment Sl. No. MH-08
1286	VI A	I-A	13 OF 35	4.19 Ash Handling System	Notes to Clause No. 4.19.1	Additional Note (v) to be added. (v) In case bidder is not meeting requirement of water impounded bottom ash hopper referred under clause 4.19.1 (a), then bidder shall engage the design agency for vetting/review/ carrying out the design and Engineering activity of water impounded bottom ash hopper referred under para 4.19.1 (a). Design agency for water impounded bottom ash hopper can be either bottom ash system supplier meeting the qualification of clause 4.19.1 (a) or reputed/renowned Indian Technical Institution (like IIT/IISc).	Refer amendment Sl. No. MH-06
1287	VI A	I-A	13 OF 35	4.19 Ash Handling System	Notes to Clause No. 4.19.1	Additional Note (vi) to be added. (vi) De-packaging can be done by engaging separate sub-vendors for the sub-systems of AHP i.e. Bottom Ash system (4.19.1 (a)) can be ordered to vendor A, fly ash system (4.19.1 (b) & (c)) can be ordered to vendor B & Ash slurry disposal system (4.19.1 (d)) can be ordered to Vendor C.	Refer amendment Sl. No. MH-10
1288	VI A	I-A	13 OF 35	4.19 Ash Handling System	Notes to Clause No. 4.19.1	Additional Note (vii) to be added. (vii) In case the system offered is "Vacuum conveying system" for 1st stage, but the sub-vendor has experience only in "Pressure conveying system", then the sub-vendor shall be qualified, provided the following condition is satisfied: During detail engineering, the design and engineering of vacuum conveying system offered by sub-vendor is to be vetted by reputed institutes (IIT/NIT) / any design agency who has the requisite experience (i.e. 4.19.1 b) for Vacuum conveying system.	Bidder's proposal not accepted, bidder to comply tender specifications'
1289	VI A	I-A	14 OF 35	4.19 Ash Handling System	4.19.2 The Bidder/ its Sub- vendor who is a supplier of ash handling systems but does not meet the requirements under clause 4.19.1 in part or in full can also participate provided it has executed at least the following systems of ash handling plant involving design, engineering, manufacturing/got manufactured, supply, erection/supervised erection and commissioning/ supervised commissioning: a) Bottom ash handling system comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or submerged scrapper chain conveyor system. b) Fly Ash Handling System for conveying fly ash from ESPs in dry form involving pneumatic conveying systems of vacuum or pressure type. The systems mentioned at 4.19.2 (a) and 4.19.2 (b) above should have been in successful operation in at least one (1) plant for two (2) years and should have been installed for pulverized coal fired boiler units generating not less than 40 TPH of ash per boiler. And collaborates/ associates with party(ies) who meet(s) either the total requirement or the balance part under 4.19.1 (a), (b), (c) & (d) above which the Bidder/ its Sub- vendor itself is not able to meet. In such a case, the Bidder/its sub-vendor shall be required to furnish a 'letter of support' from Collaborator/Associates for successful performance of the relevant system valid for a period of seven (7) years or up to the end of defect liability period of the contract whichever is later, as per the format enclosed with the bidding documents. The 'letter of support' should be submitted at the time of placement of order on the approved sub-vendor.	4.19.2 The Bidder/ its Sub- vendor who has executed ash handling systems but does not meet the requirements under clause 4.19.1 in part or in full can also participate provided it has executed at least the following systems of ash handling plant involving design, engineering, manufacturing/got manufactured, supply, erection/supervised erection and commissioning/ supervised commissioning: a) Bottom ash handling system comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or submerged scrapper chain conveyor system. b) Fly Ash Handling System for conveying fly ash from ESPs in dry form involving pneumatic conveying systems of vacuum or pressure type. The systems mentioned at 4.19.2 (a) and 4.19.2 (b) above should have been in successful operation in at least one (1) plant for two (2) years and should have been installed for pulverized coal fired boiler units generating not less than 40 TPH of ash per boiler. And collaborates/ associates with party(ies) who meet(s) either the total requirement or the balance part under 4.19.1 (a), (b), (c) & (d) above which the Bidder/ its Sub-vendor itself is not able to meet. In such a case, the Bidder/its sub-vendor shall be required to furnish a 'letter of support' from Collaborator/Associates for successful performance of the relevant system valid for a period of seven (7) years or up to the end of defect liability period of the contract whichever is later, as per the format enclosed with the bidding documents. The 'letter of support' should be submitted at the time of placement of order on the approved sub-vendor.	Bidder's proposal not accepted, bidder to comply tender specifications'

1290	VI A	I-A	14 OF 35	4.19 Ash Handling System	**4.19.3 EPC organization in Collaboration with QAHPM** EPC organization in Collaboration with QAHPM (Qualified Ash Handling Plant Manufacturer): The Bidder/Bidder's sub-vendor should be an Engineering, Procurement and Construction (EPC) organization and should have executed, in the last 10 years, industrial projects on EPC basis (with or without civil works) in the area of Power, Steel, Oil & Gas, Petro-chemical, Fertilizer, Flue Gas Desulphurization and/or any other process industry with the total value of such projects being INR 4,000 million or more. At least one of such projects should have a contract value of INR 1,600 million or more. These projects shall be in successful operation for a period of not less than one (1) year. (a) The Bidder/Bidder's sub-vendor should also have a valid ongoing collaboration and technology transfer/Licensing agreement with a QAHPM meeting requirements of clause 4.19.1 on its own, valid minimum up to the end of the defect liability period of the contract. In such a case, Bidder/Bidder's sub-vendor can either source the AHP System from such manufacturer or manufacture/get manufactured the AHP System as per the design and manufacturing drawings released by such QAHPM. (b) Bidder shall be required to furnish a letter of support (Refer Annexure- LETTER OF SUPPORT4.19.3) from Collaborator/ Licensor/Technology provider for successful performance of the AHP system valid up to the end of defect liability period of the contract as per the format enclosed in the bidding document, at the time of placement of order on the approved sub-vendor. Notes for Clause 4.19.3 i. QAHPM (Qualified Ash Handling Plant Manufacturer) means a manufacture meeting requirement stipulated at 4.19.1 ii. Technology Transfer/Licensing agreement The Technology transfer/Licensing agreement between the Bidder, Bidder's sub vendor & QAHPM shall necessarily cover transfer/licensing of technological knowhow for AHP system in the form of transfer/licensing of design dossier, design software's, drawings and documentation, quality system manuals and imparting relevant personnel training to the Bidder/Bidder's sub vendor.	**4.19.3 EPC organization in Collaboration with QAHPM(s)** EPC organization in Collaboration with QAHPM (Qualified Ash Handling Plant Manufacturer(s)): (Alternate route for Bidder/ its Sub- vendor who does not meet the requirements under clause 4.19.1 or 4.19.2) The Bidder/Bidder's sub-vendor should be an Engineering, Procurement and Construction (EPC) organization and should have executed, in the last 10 years, industrial projects on EPC basis (with or without civil works) in the area of Power, Steel, Oil & Gas, Petro-chemical, Fertilizer, Flue Gas Desulphurization and/or any other process industry with the total value of such projects being INR 4,000 million or more. At least one of such projects should have a contract value of INR ~~1,600~~ 800 million or more. These projects shall be in successful operation for a period of not less than one (1) year. (a) The Bidder/Bidder's sub-vendor should also have a valid ongoing collaboration ~~and~~/ technology transfer/ Licensing agreement with QAHPM(s) meeting requirements of clause 4.19.1 (a) and/or 4.19.1 (b), (c) and/or 4.19.1 (d) on its own, valid minimum up to the end of the defect liability period of the contract. In such a case, Bidder/Bidder's sub-vendor can either source the AHP System from such manufacturer(s) or manufacture/get manufactured the AHP System as per the design and manufacturing drawings released by such QAHPM(s). (b) Bidder shall be required to furnish a letter of support (Refer Annexure- LETTER OF SUPPORT4.19.3) from Collaborator(s)/Licensor(s)/ Technology provider(s) for successful performance of the AHP system valid up to the end of defect liability period of the contract as per the format enclosed in the bidding document, at the time of placement of order on the approved sub-vendor. Notes for Clause 4.19.3 i. QAHPM(s) (Qualified Ash Handling Plant Manufacturers) means a manufacturer meeting requirement stipulated at 4.19.1 (a) and/or 4.19.1 (b), (c) and/or 4.19.1 (d) ii. Technology Transfer/Licensing agreement The Technology transfer/Licensing agreement between the Bidder/ Bidder's sub vendor & QAHPM(s) shall necessarily cover transfer/licensing of technological knowhow for AHP system in the form of transfer/licensing of design dossier, design software's, drawings and documentation, quality system manuals and imparting relevant personnel training to the Bidder/Bidder's sub vendor.	Bidder's proposal not accepted, bidder to comply tender specifications'
1291	VI A	I-A	15 OF 35	4.20 COAL HANDLING PLANT	4.20.1 The Bidder/ its Sub-vendor should have designed, engineered / got engineered, manufactured/ got manufactured, erected/supervised erection and commissioned/ supervised commissioning at least one (1) number integrated bulk material handling plant (essentially comprising of conveying) including all associated structural steel works and electrical works of 1000 Metric tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity which should have been in successful operation for at least one (1) year. Note:- In case the Bidder/its Sub-vendor has not carried out the engineering activity by himself in respect of the System of the reference installation(s) (against which the bidder is seeking qualification), then the engineering of the package shall be carried out by an engineering firm, meeting the following stipulations: Engineering firm should be an organization who has engineered at least one (1) number integrated bulk material handling plant (essentially comprising of conveying by Trough Conveyors) including all associated structural steel works and electrical works of 1000 Metric Tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity, involving activities which include preparation of Flow diagrams, Layout & General arrangement drawings, Design & sizing Calculations document, Fabrication (as applicable) and Erection drawings, etc. and such systems must be in successful operation prior to the date of Techno-commercial bid opening.	4.20.1 The Bidder/ its Sub-vendor should have designed, ~~engineered / got engineered~~, manufactured/ got manufactured, erected/supervised erection and commissioned/ supervised commissioning at least one (1) number integrated bulk material handling plant (essentially comprising of conveying) including all associated structural steel works and electrical works of 1000 Metric tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity which should have been in successful operation for at least one (1) year. ~~Note:- In case the Bidder/its Sub-vendor has not carried out the engineering activity by himself in respect of the System of the reference installation(s) (against which the bidder is seeking qualification), then the engineering of the package shall be carried out by an engineering firm, meeting the following stipulations:~~ ~~Engineering firm should be an organization who has engineered at least one (1) number integrated bulk material handling plant (essentially comprising of conveying by Trough Conveyors) including all associated structural steel works and electrical works of 1000 Metric Tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity, involving activities which include preparation of Flow diagrams, Layout & General arrangement drawings, Design & sizing Calculations document, Fabrication (as applicable) and Erection drawings, etc. and such systems must be in successful operation prior to the date of Techno-commercial bid opening.~~	Refer Amendment Sl. No. MH-13
1292	VI A	I-A	16 of 35	4.25.1	The Bidder or Bidder's sub-vendor should have designed, engineered, supplied, erected/supervised erection and commissioned/supervised commissioning of at least one (1) no. of wet limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than 23,00,000 Nm3/hr, with desulphurisation efficiency of at least 90 %, operating in a pulverised coal fired power plant.	We kindly request that the customer consider relaxing the QR (Qualification Requirement) criteria as outlined below: " The Bidder or Bidder's sub-vendor should have designed, engineered, supplied, erected/supervised erection and commissioned/supervised commissioning of at least one (1) no. of wet limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than 22,00,000 Nm3/hr, with desulphurisation efficiency of at least 90 %, operating in a pulverised coal fired power plant."	Bidder's proposal not accepted, bidder to comply tender specifications'
1293	VI A	I-A	29 of 35	5.15	The Bidder/ sub vendor should have designed, fabricated, erected and commissioned at least 30 Km transmission line of 400 kV or above voltage class on towers.	The scope of transmission line is limited to approximately 1KM only. Also the actual scope is interconnection of 765kV GT Bay with Generator Transformer. Hence It is requested to remove the PQR scope. or we request the Owner to please remove 765kV Transmission line from the SCOPE of the Bidder.	Bidder's proposal not accepted, bidder to comply tender specifications'
1294	VI A	I-A			As per the tender, for qualification of agitator supplier, experience specified is in "Wet limestone based FGD application in coal fired power plant".	Request NTPC to revise the PQR as "Agitator rating not less than that supplied for 500 MW or higher size unit for similar application supplied in wet limestone based FGD application in coal fired power plant OR Any other process application with a specific gravity of 1.2 (min) or with a slurry concentration (min) of 20% (wt) Further, the specs should allow Bidder either meet PQR based on its own credentials or through collaboration / licensing agreement with qualified equipment manufacturer.	Bidder's proposal not accepted, bidder to comply tender specifications'

ERRATA
TO
SECTION VI
TECHNICAL SPECIFICATIONS

FOR

EPC PACKAGE FOR

SIPAT -III(1X800 MW)

BIDDING DOCUMENT NO.: CS-8003-001-2

(AMENDMENTS 1 TO 11)

Section VI (Parts A, B, C, D & E) shall be read along with these Errata (Amendments 1 to 11)

Amendment 01 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	WS-1 to WS-11	1-2
2	TG-1 to TG-15	3-7
3	MH-1 to MH-5	8-9
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9	Annexures to Amendment 01	

Amendment 01 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
WS-1	B	A-15	18/40	4.08.00	Main header…Two (02) nos **manually operated butterfly valves** of suitable size shall be provided in branch pipe…	Main header shall be branched into two (02) nos for feeding to each section of cooling tower. Two (02) **nos motor operated inching type butterfly valves** of suitable size shall be provided in branch pipe of each cooling tower. These valves shall be in the **horizontal** section of hot water piping and shall be overground. **After branch header isolation valves, the hot water pipe running along the air inlet side of CT shall be underground with suitable wrapping & coating.**
WS-2	B	A-15	12/40	3.17.00	For design of Cooling tower, CT outlet temperature shall be considered as 32 deg C.	**Deleted**
WS-3	B	A-15	13/40	4.00.00 Table - SL No (18)	Any other hardware...in direct contact with water - Stainless steel conforming to AISI:304 or equivalent	Any other hardware...in direct contact with water – **SS 316**
WS-4	B	A-15	39/40	5.00.00 (b)	Pumps shall be able to pass through solids up to 100 mm and capable of handling wastewater which may contain, sludge, plastic solids etc.	Pumps shall be able to pass through solids up to **60 mm** and capable of handling wastewater which may contain, sludge, plastic solids etc.
WS-5	B	A-15	4/40	2.02.01	Constructional features (a) Suction bell/Casing - 2% Ni Cast Iron, IS:210 Grade FG 260; S-0.1% max. P-0.15% max.	Constructional features (a) Suction bell/Casing - **CF8M**
WS-6	B	A-14	32/36	21.00.00 (A)	(1) No of UF trains - 2x60%	(1) No of UF trains - **2x100%**
WS-7	A	IIA-20	2/2	2.04.00 (j)	**One (01)** number of DM water storage tank for CPU regenerations system.	**Two (02)** number of DM water storage tank for CPU regenerations system.
WS-8	A	VI	27/29	3.00.00 ClO2 system	ClO2 system- Mandatory Spares for Blowers Mandatory Spares for Agitators	ClO2 system- **Deleted**
WS-9	E	Tender drawing		New	-	Existing CSSP Layout drawing

Amendment 01 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
WS-10	VI/A	IIA-22	2/3	1.00.00	d) To meet that above requirement, RCC Area pit(s) / sump(s) and associated submersible pumps, piping, fitting, valves etc., as per requirements given below, to discharge the effluent/ wash water/ blow downs etc. from RCC pit/ sump to Liquid Effluent Treatment Plant (LETP)/ WSWS/CSSP/ Ash Slurry Sump or tank (as the case may be) are to be provided, supplied and installed by the bidder.	d) To meet that above requirement, RCC Area pit(s) / sump(s) and associated submersible pumps **/ Centrifugal pumps (Horizontal or vertical)**, piping, fitting, valves etc., as per requirements given below, to discharge the effluent/ wash water/ blow downs etc. from RCC pit/ sump to Liquid Effluent Treatment Plant (LETP)/ WSWS/CSSP/ Ash Slurry Sump or tank (as the case may be) are to be provided, supplied and installed by the bidder.
WS-11	VI/A	I-B	8/19	Annexure-IIIA	Raw water analysis	Updated Raw water analysis

Amendment 01 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No.	Clause No.		
TG-1.	VI/A	IIA-06	10 of 10	16.00.00 /New Clause added	-	**16.00.00:** **Steam Turbine Generator & Auxiliaries and associated systems shall be designed for 40% Technical Minimum Load (TML); for meeting this mandatory requirement and ensuring the design life of Turbine including its auxiliaries, necessary changes in design to be made. Design changes to be considered shall include but not limited to the following.** **1. Changes required in LP Turbine last stage and second last stage blades (as applicable) to take care of increased flow separation at 40% TML.** **2. Bidder shall consider state of art design with respect to blade metallurgy and effective moisture separation methodology to avoid blade erosion & failures at 40% load continuous operation of Turbine. Bidder shall submit thermal stress analysis report of Turbine components at 40% TML operation.** **3. Increased thermal stress in Turbine stages: To enable continuous operation of turbine at 40% load, Bidder shall take care of the increased stresses (due to ventilation) in turbine design and ensure that design life of turbine and its components is not reduced.** **Further, turbine and auxiliaries shall also be designed for complying the requirements related to flexibilization as mentioned in CEA (Flexible Operation of Coal based Thermal Power Generating Units) Regulations, 2023 in addition to the requirements specified elsewhere in the technical specifications.**
TG-2.	VI/A	IV	9 of 73	1.01.03	UNIT HEAT RATE Following tests…… ……independently: (i)…… (ii)…….. (iii) Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C at 77 mmHg(abs)	UNIT HEAT RATE Following tests…… ……independently: (i)…… (ii)…….. (iii) Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C **(as selected)** at 77 mmHg(abs) Condenser pressure with zero

Amendment 01 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No.	Clause No.		
					Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load) with one TDBFP in operation. (iv) Efficiency of the Steam Generator at 440 MW unit load (i.e. 55 % of rated load) …….(i.e. 100% of rated load): = THR (100%)/ SG_EFF (100%) Unit Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg. C /610 deg. C at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load): = THR (55%)/ SG_EFF (55%) Where, THR(100%)…… …… SG_EFF(100%)…… …… THR (55%): Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load). (To be calculated as per clause 1.01.03.01 of this sub-section) SG_EFF(55%)…… ……	make up at 440 MW unit load (i.e. 55 % of rated load) with one TDBFP in operation. (iv) Efficiency of the Steam Generator at 440 MW unit load (i.e. 55 % of rated load) …….(i.e. 100% of rated load): = THR (100%)/ SG_EFF (100%) Unit Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg. C / **600 to** 610 deg. C **(as selected)** at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load): = THR (55%)/ SG_EFF (55%) Where, THR(100%)…… …… SG_EFF(100%)…… THR (55%): Turbine Cycle Heat rate in kcal/kWhr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C **(as selected)** at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load). (To be calculated as per clause 1.01.03.01 of this sub-section) SG_EFF(55%)……
TG-3.	VI/A	VI/Chapter-02 Mandatory Spares	34 of 34	General Note	---	**11. Wherever servomotor is mentioned, it means servomotor/complete actuator along with yoke & its control.**

Amendment 01 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No.	Clause No.		
TG-4.	VI/B	G-02	5 of 5	11.0	---	**In case when both the CEP's are running, the other CEP will be in Stand-by mode. In case when one CEP trips, runback shall be initiated to the operating load at that point or 75% Load (Adjustable) whichever is lower.** **Simultaneously command to stand by CEP shall be issued in Auto. If CEP ON feedback is not received within 10 sec (adjustable) then runback set point shall be changed to 60% Load. In this case one CEP will cater the demand. However, if Stand-by CEP comes in service then run back command will be stopped and two CEP will cater the load demand at that point.**
TG-5.	B	SUB-SECTION A-01, EQUIPMENT SIZING CRITERIA	44 of 87	2.08.00 (d)	HP-LP bypass operation under rated steam conditions with bypass valve open to full capacity and turbine on house load (5% of rated load).	HP-LP bypass operation under rated steam conditions with bypass valve open to full capacity and turbine on house load ~~(5% of rated load)~~ **(50 MW)**.
TG-6.	B	SUB SECTION G-05, STANDARD TYPE TEST PROCEDURE	2 of 37	1.03.00	NPSH(R) Test Acceptance Criteria: 2. NPSH(R) (3% head drop) at Design point shall not be less than the NPSH(R) determined by the suction specific of 8000 US unit and 9500 US unit for main pump and booster pump respectively calculated with the flow of Design point with Inter-stage closed.	NPSH(R) Test Acceptance Criteria: 2. NPSH(R) (3% head drop) at Design point shall not be less than the NPSH(R) determined by the suction specific of ~~8000~~ **10000** US unit and 9500 US unit for main pump and booster pump respectively calculated with the flow of Design point with Inter-stage closed.
TG-7.	E	XXXX-999-POM-A-006			XXXX-999-POM-A-006, Rev.-A	XXXX-999-POM-A-006, **Rev.-B** **Refer Annexure-TG-1 to the Amendment-01**
TG-8.	A	SUB-SECTION-IIA-06 TURBINE GENERATOR	2-3 of 10	2.02.04	Steam turbine control fluid and its purification system along with its conditioning system shall be complete with control fluid tank, control fluid pumps with drive motors, strainers, accumulator, control fluid coolers, waste fluid tank, purification	Steam turbine control fluid and its purification system along with its conditioning system shall be complete with control fluid tank, control fluid pumps with drive motors, strainers/Filters **(as per standard practice)**, accumulator, control fluid coolers, waste fluid tank **(If required)**, purification equipment including fluid circulation pumps with drive motors……

Amendment 01 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No.	Clause No.		
		AND AUXI-LARIES			equipment including fluid circulation pumps with drive motors…….	
TG-9.	A	SUB-SEC-TIONVI/ MAN SPARES, CHAPTER-02 STEAM TUR-BINE GENERATOR	2 of 34	A/6	Aux oil pump/startup oil complete assembly for Main Turbine along with complete coupling (Mounted on oil tank)	Aux oil pump**/Main oil pump**/startup oil (**as applicable**) complete assembly for Main Turbine along with complete coupling (Mounted on oil tank)
TG-10.	B	SUB-SECTION A-07 STEAM TUR-BINE AND AUXILIA-RIES	8 of 25	2.01.00/ New clause (h) & (i) added	Condenser: (a) Easily… (b) …. (c) … …… (g)…. from LP bypass alongwith all accessories and instrumentation.	Condenser: (a) Easily… (b) …. (c) … …… (g)…. from LP bypass alongwith all accessories and instrumentation. **(h) Shell material carbon steel as per ASTMA-285 Gr.C or IS 2062 E250BR, welded construction and 16mm minimum wall thickness. Hot well of material same as shell material, shall be longitudinally divided with proper drainage provision.** **(i) Water box, tube plates and support plates material carbon steel as per ASTMA-285 Gr.C or ASTM A-516 GR 70 and suitable for intended duty. Water side of tube plates coated with epoxy resin of 0.25 mm minimum thickness.**
TG-11.	A	SUB-SECTION-VI/MAN SPARES, CHAP-TER-02 STEAM TURBINE GEN-ERATOR	8 of 34	V/ (7)	DRIVE TURBINE OF BFP 7. One set of Journal bearings and Thrust bearing (complete assembly) with carrier, Collar and pads	DRIVE TURBINE OF BFP 7. One set of Journal bearings and Thrust bearing (complete assembly) with carrier, Collar **(If applicable)** and pads

Amendment 01 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No.	Clause No.		
TG-12.	B	SUB-SECTION A-07 STEAM TURBINE AND AUXILIARIES	4 of 25	1.16.00/ (c)	Provide separate oil system with 100% redundant pumps, motors, accumulators and control cubicles etc. for both HP and LP bypass systems. ……	Provide separate oil system with 100% redundant pumps, motors, accumulators and **control** ~~cubicles~~ **System** etc. for both HP and LP bypass systems. ……
TG-13.	A	SUB-SECTION-VI/MAN SPARES, CHAPTER-02 STEAM TURBINE GENERATOR	15 of 34	11a/(vi)	Set of filter elements / cartridges, O-rings, gaskets for Duplex Lube oil filter for both MDBFP & TDBFP	Set of filter elements / cartridges, O-rings, gaskets for Duplex Lube oil filter for ~~both MDBFP &~~ **TDBFP**
TG-14.	A	SUB-SECTION-VI/MAN SPARES, CHAPTER-02 STEAM TURBINE GENERATOR	16 of 34	12/(vi)	Set of filter elements / cartridges, O-rings, gaskets for Duplex Lube oil filter for both MDBFP & TDBFP	Set of filter elements / cartridges, O-rings, gaskets for Duplex Lube oil filter for ~~both~~ **MDBFP** ~~& TDBFP~~
TG-15.	A	SUB-SECTION A-22 SEPARATION OF PLANT DRAINS	2 of 3	1.01.00/ (a)	The effluent from the TG Area pit(s) /sump(s) shall be pumped to Waste Service Water Sump (WSWS) located in WTP area. Portable type oil skimmer(s) & portable oil centrifuge shall be provided in the TG Area pit(s) /sump(s)and purified oil shall be used either in non-critical units for lubrication purpose or the same shall be disposed of.	The effluent from the TG Area pit(s) /sump(s) shall be pumped to Waste Service Water Sump (WSWS) located in WTP area. ~~Portable type oil skimmer(s) & portable oil centrifuge shall be provided in the TG Area pit(s) /sump(s)and purified oil shall be used either in non-critical units for lubrication purpose or the same shall be disposed of.~~

Amendment 01 to Technical Specifications (Section VI)

SL. NO.	SPECIFICATION REFERENCE				Existing	Read as
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
MH-01	VI/A	IA	11 of 35	4.13	**Mill Reject Handling System** Mill reject handling system offered by the Bidder/its Sub-Vendor shall be only from such manufacturer/supplier who has previous experience of manufacturing/got manufactured and supplying metallic belt conveyor type or chain flight conveyor type handling systems of capacity 1.5 MTPH or higher for any industrial installations which are in successful operation in at least one (1) plant for a period not less than one (1) year. The reference **mill reject** handling systems should be of the same type i.e. metallic belt conveyor system or chain flight conveyor system as is being offered by the Bidder/ its Sub-vendor.	**Mill Reject Handling System** Mill reject handling system offered by the Bidder/its Sub-Vendor shall be only from such manufacturer/supplier who has previous experience of manufacturing/got manufactured and supplying metallic belt conveyor type or chain flight conveyor type handling systems of capacity 1.5 MTPH or higher for any industrial installations which are in successful operation in at least one (1) plant for a period not less than one (1) year. The reference handling systems should be of the same type i.e. metallic belt conveyor system or chain flight conveyor system as is being offered by the Bidder/ its Sub- vendor.
MH-02	VI/A	IIA-14	4 of 5	5.00.01	All electrical actuators used in this package like for Flap gates, Scoop coupling, Pump house, Dust extraction etc. shall be non- intrusive, fieldbus based integral actuators meeting requirements specified in Electrical actuators, Part-B, Section-VI.	All electrical actuators used in this package shall necessarily be of non-intrusive field bus based integral actuators like Flap Gates, RPG, Dampers, Valves meeting requirements specified in Electrical Actuator referred in C&I section Part – B, section-VI of the specification, except for skid mounted / operated through only PLC / local control panel systems like scoop coupling, tripper, paddle feeder, LSU where it is not possible to have above non-intrusive type actuators, the Contractor shall provide Electrical Actuators as per Standard practice.
MH-03	VI/B	A-20	64 of 79	4.01.00	**Existing Coal Handling Plant Main Control Room** Overall, operation of the following equipment of Coal Conveying plant, Biomass Handling plant shall be controlled from the main CHP control room. Overall, operation of the following equipment of **Limestone &** Gypsum handling plant shall be controlled from the main FGD control room. ……..	**Existing Coal Handling Plant Main Control Room** Overall, operation of the following equipment of Coal Conveying plant, **Limestone handling plant,** Biomass Handling plant shall be controlled from the main CHP control room. Overall, operation of the following equipment of Gypsum handling plant shall be controlled from the main FGD control room. …….

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MH-04	VI/B	A-20	33/79	2.7.4	**Chute bock switches**….. …….. One number trip indicator **panel** per conveyor, which shall display the exact number of safety switches (pull chord or belt sway switches) operated in a loop of conveyor considering 10 % spare switches. It shall also monitor the condition of field cable connecting the switches in series and generate signal, if field cable is found broken or short. The trip indicator panel shall display the operated switch number. The same indication shall also be available in DDCMIS OWS/ SR PLC. Panel shall have Modbus/TCP IP/OPC redundant interfacing with concerned DDCMIS/PLC for monitoring and diagnostic purpose only. Trip Indicator **panel** shall be separate for PCS and BSS respectively. Complete software shall also be provided by bidder. Redundant power supply shall be provided with each trip indicator. LCD display shall be provided with each trip indicator for details like fault location, fault indication etc. Trip Indicator shall be provided with dual digital outputs, which shall be hardwired in control system. Each event/Trip shall be recorded in the trip indicator and DDCMIS.	**Chute bock switches**….. One number trip indicator per conveyor, which shall display the exact number of safety switches (pull chord or belt sway switches) operated in a loop of conveyor considering 10 % spare switches. **Maximum 31 switches can be wired to a trip indicator. However, If any conveyor length requires more than 31 switches(including 10% spares) the additional trip indicator shall be provided. These trip indicators shall be suitably mounted in a panel (IP-55) located in nearest /respective MCC**. It shall also monitor the condition of field cable connecting the switches in series and generate signal, if field cable is found broken or short. The trip indicator shall display the operated switch number. The same indication shall also be available in DDCMIS SR PLC. **Trip indicator system** shall have Modbus/TCP IP/OPC redundant interfacing with concerned DDCMIS/PLC for monitoring and diagnostic purpose only. Trip Indicator shall be separate for PCS and BSS respectively. Complete software shall also be provided by bidder. Redundant power supply shall be provided with each trip indicator. LCD display shall be provided with each trip indicator for details like fault location, fault indication etc. Trip Indicator shall be provided with dual digital outputs, which shall be hardwired in control system. Each event/Trip shall be recorded in the trip indicator and DDCMIS.
MH-05	VI/B	A-20	65 of 79	4.02.00	…..(i) Hydraulic scoop coupling. All the above local control panels shall be accessible and located near their respective equipment and shall be complete with all the required controls, interlocks, annunciation's etc. However, for items (h) and (i) above, controls shall be through Employer's DDCMIS/ **contractor's** PLC as applicable. Further, necessary controls, indications and annunciations for all the above equipment shall also be provided at main CHP Control Room as described under relevant clause.	…..(i) Hydraulic scoop coupling. All the above local control panels shall be accessible and located near their respective equipment and shall be complete with all the required controls, interlocks, annunciation's etc. However, for items (h) and (i) above, controls shall be through Employer's DDCMIS / PLC as applicable. Further, necessary controls, indications and annunciations for all the above equipment shall also be provided at main CHP Control Room as described under relevant clause.

Amendment 01 to Technical Specifications (Section VI)

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Sec/ Part	Sub Sec-tion	Clause No.	Page No.		
PU 1.0	VI/A	A-12	4.00.00 c)	5 of 11	2) Various transformers of rating 10 MVA and above or in case of oil filled transformers with oil capacity of more than 2000 liters within plant boundary.	2) Various transformers of 10 MVA or reactors of 10 MVAR and above rating within plant boundary.
PU 2.0	VI/A	A-12	5.00.00	11 of 11	…… NIL…….	Following has been added: viii. Suitable acoustic enclosures (if required for equipment like diesel engines, etc.) shall be provided to meet noise level as per specification.
PU 3.0	VI/A	VI Mand. Spares Ch.-07	1.03.00	2 of 16	…… NIL…….	Following has been added: **8.** Desiccant for Air Dryer: one complete fill for both towers of one dryer
PU 4.0	VI/A	VI Mand. Spares Ch.-07	1.08.00	3 of 16	…… NIL…….	Following has been added: Desiccant for Air Dryer: one complete fill of one dryer
PU 5.0	VI/A	VI Mand. Spares Ch.-07	1.00.00, 4.0	4 of 16	…… NIL…….	Following has been added: **4.5** Fills: 20% of total population
PU 6.0	VI/B	A-17	4.01.01	2 of 30	Each chilling unit ……..valves, instrumentation, microprocessor / PLC based Control panel, etc. Chilling unit shall have stepless capacity control. The screw/centrifugal compressor based chilling unit …….. certified (if applicable).	Each chilling unit ……..valves, instrumentation, microprocessor / PLC based Control panel, etc. Chilling unit shall have stepless capacity control. The screw compressor based chilling unit …….. certified (if applicable).
PU 7.0	VI/B	A-17	6.05.04 c)	13 of 30	The ducts routed inside the buildings with larger side greater than 2250 mm shall be supported by 16mm MS rods and 50x50x3 mm MS double Angles while those below 2250 mm shall be supported by 10mm MS Rods and 40x40x3 MS angles. The duct supports shall be at a distance of not more than 2000 mm for A/C system. The MS rods for these …….. provided by the bidder.	The ducts routed inside the buildings with larger side greater than 2250 mm shall be supported by 16mm MS rods and 50x50x3 mm MS double Angles while those below 2250 mm shall be supported by 10mm MS Rods and 40x40x3 MS angles. The duct supports shall be at a distance of not more than 2000 mm for A/C & Ventilation system. The MS rods for these …….. provided by the bidder.

Amendment 01 to Technical Specifications (Section VI)

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Sec/ Part	Sub Sec-tion	Clause No.	Page No.		
PU 8.0	VI/B	A-17	7.04.00 a)	21 of 30	Inside room temperature and humidity shall be maintained by controlling the chilled water flow by means of motor operated three way modulating valve and by varying the flow by means of VFD driven AHU's which shall get its signal from the Control system for main plant A/C system and ESP/FGD control rooms A/C system.	Inside room temperature and humidity shall be maintained by controlling the chilled water flow by means of motor operated three way modulating valve which shall get its signal from the Control system for main plant A/C system and ESP/FGD control rooms A/C system.
PU 9.0	VI/B	A-18	8.01.00	11 of 14	i) Mild steel as per IS:1239 (Part-I) **medium** grade (up to 150 NB) & as per IS:3589 Gr 410 (above 200 NB) or Equivalent for pipes normally filled with water. ii) Mild steel as per IS:1239 (Part-I) **medium** grade (up to 150 NB) & as per IS:3589 Gr.410 (above 200 NB) or Equivalent and galvanized as per IS:4736 for pipes normally empty and periodically charged with water and foam system application. iv) Pipe thickness: a) For Pipe sizes up to 150 NB: As per IS:1239 Part-I **medium** grade.	i) Mild steel as per IS:1239 (Part-I) **heavy** grade (up to 150 NB) & as per IS:3589 Gr 410 (above 200 NB) or Equivalent for pipes normally filled with water. ii) Mild steel as per IS:1239 (Part-I) **heavy** grade (up to 150 NB) & as per IS:3589 Gr.410 (above 200 NB) or Equivalent and galvanized as per IS:4736 for pipes normally empty and periodically charged with water and foam system application. iv) Pipe thickness: a) For Pipe sizes up to 150 NB: As per IS:1239 Part-I **heavy** grade.

Amendment 01 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
LA-1	Part B	G-03	10 of 15	39(VII)	A walkway of 600mm (minimum width) with hand-rails & toe guards shall be provided all along length of the gallery of pipe & cable trestle for maintenance of cables where the height of trestle is more than 3 m, ladders for approach to these platforms shall be provided near roads, passage ways and turning points. In the tier of trestle, wherever fly ash handling pipes are routed, grating platform all along the length and for full width of the gallery and trestle of that tier shall be provided. Further, one walkway of 600mm clear width shall also be ensured on the tier meant for routing the fly ash handling pipes.	A walkway of 600mm (minimum width) with handrails & toe guards shall be provided all along length of the gallery of pipe & cable trestle for maintenance of cables where the height of trestle is more than 3 m, ladders for approach to these platforms shall be provided near roads, passage ways and turning points. In the tier of trestle, wherever ash handling pipes are routed, grating platform all along the length and for full width of the gallery and trestle of that tier shall be pro-vided. Further, one walkway of 600mm clear width shall also be ensured on the tier meant for routing the ash handling pipes.

Amendment 01 to Technical Specifications (Section VI)

	Specification Reference				Existing	Read as
	Part	**Sub Sec**	**Page No**	**Clause No**		
C-01	VI/A	IIC Annexure C to IIC Contract quantity	5 of 21	2.04.07	**Air Compressor Block** This block shall include Air compressors (IAC/PAC), **Air compressor for Mill reject system.** If the controller …....., overall control and monitoring shall be through Stand Alone DDCMIS.	**Air Compressor Block** This block shall include Air compressors (IAC/PAC). If the controller …..... , overall control and monitoring shall be through Stand Alone DDCMIS.
C-02	VI/A	IIC Annexure C to IIC Contract quantity	17 of 21	1.22	Portable Testing and Commissioning tool-Ref Clause no. **15.00.00**, Sub-section IIIC-02, Part-B, Section VI for technical specification.	Portable Testing and Commissioning tool-Ref Clause no. **32.00.00**, Sub-section IIIC-02, Part-B, Section VI for technical specification.
C-03	VI/A	VI Chapter-8 WATER SYSTEM	11 of 29		18) C&I :MEASURING INSTRUMENTS**(As Applicable)**	18) C&I :MEASURING INSTRUMENTS(**CW, ACW, ECW, RAW WATER, CT , WTP AREA)**
C-04	VI/A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES: MANDATORY SPARES	25 of 39	2.01.00	10. Any other instruments (If applicable) 11. Any other control system (If applicable)	DELETED
C-05	VI/A	IIC CONTROL & INSTRUMENTATION SYSTEM	3 of 18	1.06.02	**Notes:** A. The control system and devices (Actuators, instruments) shall be conventional for following areas/ application: I. MFT II. TG Integral : a. STG Integral Control and Protection System.	**Notes:** A The control system and devices (Actuators, instruments) shall be conventional for following areas/ application: I. MFT / BPS / BMS comprising of MFT block, Boiler common function block. (detailed out in clause no 2.01.01, Annexure C to IIC Contract quantity, Part-A) II. TG Integral : a. Steam Turbine and Generator (STG) C&I system comprising of Turbine Protection System Function (TPS), Turbine Electro-hydraulic Governing system, Turbine Stress Evaluation / Control System (TSCS), Gland steam pressure control, Turbine oil system for Main Turbine, Automatic online Turbine Testing (ATT), Automatic Turbine Run up/Shut down System (ATRS),

Amendment 01 to Technical Specifications (Section VI)

					b. Protection and governing controls of BFP Turbine. c. HP/LP Bypass system controls and protection. III. Instruments used for PG test .	Vacuum system, Turbine -Generator control system for Seal oil, primary water, Generator gas temperature control, Turbine Extraction NRV control, Miscellaneous turbine related start Up Drain and vents control. b. Protection, governing controls, OLCS and CLCS of Complete TDBFP and its auxiliaries. c. HP/LP Bypass system controls and protection III. Instruments used for PG test .
C-06	VI/B	SUB SECTION-A-02 STEAM GENERATOR & AUXILIARIES INCLUDING ESP	64 of 67	8.07.00	Each dust hopper (**except first field** ESP hoppers) shall be provided with a high level and a low level dust level monitor …… …….. for each ESP Hopper in the First Three Fields shall be provided complying with requirements indicated in Sub-Section-IIIC-03 Main Equipment Related Control and Instrumentation System, Part-B, Section-VI of Technical Specifications.	Each dust hopper (**except first three fields** ESP hoppers) shall be provided with a high level and a low level dust level monitor …… …… for each ESP Hopper in the First Three Fields shall be provided complying with requirements indicated in Sub-Section-IIIC-03 Main Equipment Related Control and Instrumentation System, Part-B, Section-VI of Technical Specifications
C-07	VI/A	SUB-SECTION-VI CHAPTER -01 SG & AUXILIARIES: MANDATORY SPARES	25 of 39	2.01.00	9. level monitoring system for Coal bunker, fly ash silo and ESP hopper **(first field)**	9. level monitoring system for Coal bunker, fly ash silo and ESP hopper.
C-08	VI/B	SUB-SECTION-IIIC-02 DDCMIS	6 of 17	21.00.00	Modulating Controls / Closed Loop Control System (CLCS) Functions 1. CLCS shall continuously act on valves, dampers or other mechanical modulating devices such as hydraulic couplings etc. The system shall be designed to give stable control action in steady state condition and for load changes in step/ramp over the load range of **60% to 100% MCR**	Modulating Controls / Closed Loop Control System (CLCS) Functions 1. CLCS shall continuously act on valves, dampers or other mechanical modulating devices such as hydraulic couplings etc. The system shall be designed to give stable control action in steady state condition and for load changes in step/ramp over the load range of **40% to 100% MCR.**
C-09	VI/A	Annexure C to IIC Contract quantity	16 of 21	H 1.02.00	**LIST OF OTHER FLUE GAS ANALYSERS FOR BOILER SYSTEM:** 1. O2 ANALYSER AT PLATTEN SH OUTLET (L) 2. O2 ANALYSER AT PLATTEN SH OUTLET (R)	**LIST OF OTHER FLUE GAS ANALYSERS FOR BOILER SYSTEM:** 1. O2 ANALYSER AT PLATTEN SH OUTLET 2. O2 ANALYSER AT PLATTEN SH OUTLET 3. O2 ANALYSER AT ECO OUTLET (L)

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					3. O2 ANALYSER AT ECO OUTLET (L) 4. O2 ANALYSER AT ECO OUTLET (L) 5. O2 ANALYSER AT ECO OUTLET (R) 6. O2 ANALYSER AT ECO OUTLET (R) 7. CO ANALYSER AT ECO OUTLET- ECO-3 O/L 8. CO ANALYSER AT ECO OUTLET- ECO-3 O/L NOTES: 1. These are per unit quantities. 2. The O2 Analyzer quantities (except for CEMS system) shall be as per mentioned above and same shall prevail as mentioned here irrespective of indicated elsewhere in the specification including tender drawings.	4. O2 ANALYSER AT ECO OUTLET (L) 5. O2 ANALYSER AT ECO OUTLET (R) 6. O2 ANALYSER AT ECO OUTLET (R) 7. PAH-A GAS O/L O2 * 8. PAH-A GAS O/L O2 * 9. SAH-A GAS O/L O2 * 10. SAH-A GAS O/L O2 * 11. PAH-B GAS O/L O2 * 12. PAH-B GAS O/L O2 * 13. SAH-B GAS O/L O2 * 14. SAH-B GAS O/L O2 * 15. CO ANALYSER AT ECO OUTLET- ECO-3 O/L 16. CO ANALYSER AT ECO OUTLET- ECO-3 O/L NOTES: 1. These are per unit quantities. 2. 2 * These O2 Analyzer quantities are w.r.to Bi-sector RAPH. However, for total quantity of O2 Analysers for Tri-sector type RAPH outlet refer tender Drawing 9585-001-POM-A-018b.
C-10	VI/B	SUB-SECTION-IIIC-04	2 of 36	2.01.00	Transmitter shall have weatherproof IP-67 metallic housing with durable corrosion resistant coating, integral digital display with self-indicating diagnostics, Plug and socket type electrical connection for HART and ½ “NPT (F) for Fieldbus type Transmitter, calibration using HART/Fieldbus calibrator, 2/3/5 Valve non integral manifold and rack with canopy. For HART transmitter SIL 2 certification is required.	Transmitter shall have weatherproof IP-67 metallic housing with durable corrosion resistant coating, integral digital display with self-indicating diagnostics, Plug and socket type electrical connection for HART and ½ “NPT (F) for Fieldbus type Transmitter, calibration using HART/Fieldbus calibrator, 2/3/5 Valve non integral manifold and rack with canopy. For HART transmitter SIL 2 certification is required. **Overpressure shall be 150% of max. operating pressure.**
C-11	VI/A	VI Chapter-8 WATER SYSTEM	25 of 29		CONTROL & INSTRUMENTATION- RO SYSTEM	CONTROL & INSTRUMENTATION- **(Chemical Storage, dosing &** RO SYSTEM)

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<table>
<tr>
<td>C-12</td>
<td>VI/A</td>
<td>VI
Chapter-04
COAL HANDLING PLANT</td>
<td>9 of 13</td>
<td></td>
<td>B) CONVEYORS
1. Belt sway switch assy.
2. Pull cord switch assy.
3
4
5
6
7
8. Motor terminal block with studs for all motors</td>
<td>B) CONVEYORS
1. Belt sway switch assy.
2. Pull cord switch assy.
3
4
5
6
7
8. Motor terminal block with studs for all motors
9. Belt watch Trip indicators: 20% (min 01 no.) of each type</td>
</tr>
<tr>
<td>C-13</td>
<td>VI/A</td>
<td>Annexure C to IIC Contract quantity</td>
<td>13 of 21</td>
<td>2.05.00</td>
<td>New clause added.</td>
<td>Additional cameras (PTZ) to be provided for the following areas (location to be decided during detailed engg)
1. Unit area: 50 nos. per unit
2. Common Plant Areas -Other than Coal Handling plant/LHP/GHP and distant plants: 30 nos.
Common Plant Areas - Coal Handling Plant/Lime Stone Handling Plant/Gypsum Handling Plant: 30 nos.</td>
</tr>
<tr>
<td>C-14</td>
<td>VI/A</td>
<td>Annexure C to IIC Contract quantity</td>
<td>14 of 21</td>
<td>3.00.00</td>
<td>Fixed Cameras (High Definition-HD) along with housings:
<table>
<tr><th>SN</th><th>Locations</th><th>No. of Cam-eras</th></tr>
<tr><td>1</td><td>Outside furnace (one each on left and right side water-wall) at about 12 M eleva-tion (Refer Note-1)</td><td>02</td></tr>
<tr><td>2</td><td>Outside bottom ash hopper at about 2 M elevation (Re-fer Note-2)</td><td>04</td></tr>
</table></td>
<td>Fixed Cameras (High Definition-HD) along with housings:
<table>
<tr><th>SN</th><th>Locations</th><th>No. of Cam-eras</th></tr>
<tr><td>1</td><td>Outside furnace (one each on left and right side waterwall) at about 12 M ele-vation (Refer Note-1)</td><td>02</td></tr>
<tr><td>2</td><td>Outside bottom ash hopper at about 2 M elevation (Refer Note-2)</td><td>06</td></tr>
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C-15	VI/B	SUB-SECTION-IIIC-04	11 of 36	6.01.00	9. **Compliance to standards** **USEPA, TUV, MCERTS or equivalent standards**	9. **Certification** **As per EN15267and EN14181 by reputed international agencies like TUV/MCERTS or as per Indian Certification Scheme for CEMS inline with CPCB guidelines**
C-16	VI/B	SUB-SECTION-IIIC-04	22 of 35	12.00.00	**SPECIFICATION FOR CORIOLIS FLOW TRANSMITTER** Material of Wetted Parts 316 SS **Process** Temperature range 0-200 degree Celsius	**SPECIFICATION FOR CORIOLIS FLOW TRANSMITTER** Material of Wetted Parts 316 SS or better **Hastelloy C-276 or better for slurry application** **Instrument** Temperature range 0-200 degree Celsius **0-150 degree Celsius for applications having process temperature upto 100 degree Celsius**
C-17	VI/B	IIIC-07 INSTRUMENTA-TION CABLES	1-6/6	1.01.00	**DETAIL SPECIFICATION OF INSTRUMENTATION AND POWER SUPPLY CABLES**	**DETAIL SPECIFICATION OF INSTRUMENTATION AND POWER SUPPLY CABLES** **Chapter Revised**

Amendment 01 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">Sl. No.</th><th colspan="4">Specification Reference</th><th rowspan="2">Existing</th><th rowspan="2">Read as</th></tr>
<tr><th>Part</th><th>Sub Sec</th><th>Page No</th><th>Clause No</th></tr>
<tr><td>C-18</td><td>VI/A</td><td>VI
Chapter-12
Control & Instrumentation</td><td>9 of 10</td><td></td><td>New clause 9.00.00 added

Note: 1. Refer……
2. In case the main population of any item is only one no., then the spare quantity shall also be one no., overriding requirements indicated in clause 1.00.00 to 8.00.00 above.
3. Wherever the quantity …….shall be treated as 1 only.
4. C&I mandatory spares ……. required to be repeated.</td><td>9.00.00 In addition to the mandatory spares of electric actuators indicated in all the chapters of sub section VI, Part-A of technical specification the below clause is also applicable (also refer Note-4 below)
<table><tr><td>Sl. No.</td><td>ITEM</td><td>QUANTITY</td></tr><tr><td>(i)</td><td>Electronic PCB of all types</td><td>10% of each type & model</td></tr><tr><td>(ii)</td><td>Absolute Encoder (replaceable part)</td><td>5% of each type & model</td></tr><tr><td>(iii)</td><td>Electronic Torque sensor</td><td>5% of each type & model</td></tr><tr><td>(iv)</td><td>Electrical Actuator</td><td>1 no. of each type, class, size and model</td></tr></table>
Note: 1. Refer……
2. In case the main population of any item is only one no., then the spare quantity shall also be one no., overriding requirements indicated in clause 1.00.00 to 9.00.00 above.
3. Wherever the quantity …….shall be treated as 1 only.
4. C&I mandatory spares ……. required to be repeated.</td></tr>
<tr><td>C-19</td><td>VI/A</td><td>VI
Chapter-8
WATER SYSTEM</td><td>28 of 29</td><td>3.00.00</td><td>Table for Control & Instrumentation (CLO2 System)</td><td><table><tr><td colspan="3">CONTROL & INSTRUMENTATION- (CLO2 SYSTEM)</td></tr><tr><td>Sl. No.</td><td>ITEM</td><td>QUANTITY</td></tr><tr><td>1.00.00</td><td>MEASURING INSTRUMENTS</td><td></td></tr><tr><td>1)</td><td>Electronic Transmitters</td><td></td></tr><tr><td>(i)</td><td>Transmitters of all types and model. (for the measurement of</td><td>2 Nos. of each type and model</td></tr></table></td></tr>
</table>

								Pressure, differential pressure, flow, level, etc.) including local indication (if applicable)		
							2)	Temperature elements		
							(i)	Temperature Transmitter	2 Nos. of each type and model	
							(ii)	RTD's*	1 no. of each type	
							(iii)	Thermo well	1 no. of each type	
								* (With head assembly, terminal block and nipple)	** (to be divided into various i nsertion lengths in proportion to main population)	
							3)	Local Indicators (Non-Electrical type) -As applicable for the package as per the following items		
							(i)	Temperature gauges	1 no. of each range and type	
							(ii)	Pressure gauges	1 no. of each range and type	
							(iii)	Differential Pressure Gauges,	1 no. of each range and type	
							(iv)	Level gauges	1 no. of each range and type	
							(v)	Flow gauges excluding Rota meters	1 no. of each range and type	
							(vi)	All types of Rota meters	1 no. of each range and type.	
							4)	Process Actuated Switch Devices -As		

								applicable for this package, as per the following items	
							(i)	Temperature switches	1 no. of each range and type
							(ii)	Pressure switches	1 no. of each range and type
							(iii)	Differential Pressure switches	1 no. of each range and type
							(iv)	level switches	1 no. of each range and type
							(v)	Flow switches	1 no. of each range and type
							5)	Solenoid Valves	2 Nos. of each type and model
							6)	Limit Switches (for Pneumatic Valves and Manual valves)	2 no. of each type
							7)	ANALYSERS	
							1)	Complete PH Analyzer (including Flow Through type cell and Electrode, Electronic Transmitter unit, Pre-fabricated cable with connector as mini-mum)	1 Set of each type
							2)	Complete Residual Chlorine Analyzer (in-cluding sensing unit, Electronic Transmitter unit, Pre-fabricated ca-ble with connector as minimum)	1 Set of each type
							3)	Leak detector	2 set of each type
C-20	NOT USED								

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-1	VI/B	B-0	7 of 15	3.06.00 (a)	a) All switchboards shall be of double front, draw out, complete closed-door operation, metal enclosed, indoor, floor-mounted, free-standing type of bolted design. Entire bus bar system shall be insulated with PVC sleeves (UL 224). Cable terminations located in cable alley shall be designed to meet the Form IVb Type 7 (as per IEC 60439) for safety purpose.	a) All switchboards shall be of double front, draw out, complete closed-door operation, metal enclosed, indoor, floor-mounted, free-standing type of bolted design. Entire bus bar system shall be insulated with PVC sleeves (UL 224). Cable terminations located in cable alley shall be designed to meet the Form IVb Type 7 (as per IEC 60439) for safety purpose. Soot blower MCC/switchboard (with IP 55 protection) on the boiler platform shall be acceptable.
EE-2	VI/B	B-09	3 of 13	4.10.00	The DG set shall be capable of starting largest size of emergency 415 V drive (motor) having starting KVA/rated KW ratio of 8 (higher if starting current is more than 8) and starting power factor of 0.2 with terminal voltage drop being restricted to 15%. Generator loading before starting of this motor shall be considered as 50% of generator rating.	The DG set shall be capable of starting largest size of emergency 415 V drive (motor) having starting KVA/rated KW ratio of 8 (higher if starting current is more than 8) and starting power factor of 0.2 with terminal voltage drop being restricted to 15%. Generator loading before starting of this motor shall be considered as 50% of generator rating. However, actual motor parameters may be used if available.
EE-3	VI/B	B-0	2 of 15	1.11.00	Transformer voltage ratios, taps, impedances and tolerances thereon, shall be optimized so that the auxiliary system voltages under various grid and loading conditions are always within permissible limits and equipment are not subjected to unacceptable voltages during operation and starting of motors such as MDBFP, ID fans etc. The vector groups of the transformers shall be so selected that all the buses of particular voltage level shall have same vector within the plant. Locked rotor MVA of ID Fan and MDBFP motors shall be restricted to 75 MVA.	Transformer voltage ratios, taps, impedances and tolerances thereon, shall be optimized so that the auxiliary system voltages under various grid and loading conditions are always within permissible limits and equipment are not subjected to unacceptable voltages during operation and starting of motors such as MDBFP, ID fans etc. The vector groups of the transformers shall be so selected that all the buses of particular voltage level shall have same vector within the plant. Locked rotor MVA of ID Fan and MDBFP motors shall be restricted to 90 MVA.

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-4	VI/B	B-10	10 of 21	4.04.15	... No of cores in cable cores — No of spare 2C,3C — NIL 5C — 1 7C-10C — 2 14C and above — 3	... No of cores in cable cores — No of spare 2C,3C,5C — 1 7C-10C — 2 14C and above — 3
EE-5	VI/B	B-05(B)	10 of 10	-	Drg.no. 0000-205-POE-A-001	Updated drawing no 0000-205-POE-A-001
EE-6	VI/A	IIB	8 of 20	1.15.00(iv)	The Bidder shall extend supply from these 11 kV Construction power feeders to meet the construction power requirements by employing suitable number of 11/0.415KV Packaged sub-station (PSS) / pole mounted / Pad mounted transformers with proper fencing arrangements and associated switch-gears (if required) (meeting the safety requirements as per IE Rules) at the required location for meeting the construction power requirements of **stage-II** at the various locations in-cluded in the bidder's scope.	The Bidder shall extend supply from these 11 kV Construction power feeders to meet the construction power requirements by employing suitable number of 11/0.415KV Packaged substation (PSS) / pole mounted / Pad mounted transformers with proper fencing arrangements and associated switchgears (if required) (meeting the safety requirements as per IE Rules) at the required location for meeting the construction power requirements of **stage-III** at the various locations included in the bidder's scope.
EE-7	VI/B	IIB	14 of 20	1.19.00	3. Two Number 11kV feeders in 11 kV station switchgear, suitable for connection of 1MVA service transformer, for future owners use.	3) i) Four Number of 11kV feeders in 11 kV station switchgear, suitable for connection of 1MVA service transformer, for future owners use. ii) Two Number of 11kV feeders in 11 kV Unit switchgear, suitable for connection of 1MVA service transformer, for future owners use
EE-8	VI/A				Tender Drawing no : 9500-999-POE-J-002 AT Station swtichgear 6SA : - @ ADDITIONAL INCOMER 1250Amp SUITABLE FOR CABLE TERMINATION FOR OWNER'S USE. - # FEEDER FOR EXCITATION TESTING IF APPLICABLE iii)AT Station swtichgear 6SB : - @ ADDITIONAL INCOMER 1250Amp SUITABLE FOR CABLE TERMINATION FOR OWNER'S USE	At station switchgear 6SA & 6SB : i) @ ADDITIONAL INCOMER 1250 Amp SUITABLE FOR CABLE TERMINATION FOR OWNER'S USE. - # owner use 1MVA service Transformer, for future use ii)Bidder to Provide 11KV feeders as per Clause no:1.19.00 (3)

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					- # FEEDER FOR EXCITATION TESTING IF APPLICABLE	
EE-9	VI/B	B-0	6 of 15	3.05.00 (e)	DAF- Motor Feeder with Differential Protection : MV Motor Feeder >2MW	DAF-Motor Feeder with Differential Protection : Motor Feeder :>=2MW
EE-10	VI/B	B-0	7 of 15	3.05.00 (e)	DBF- Transformer feeder with Differential Protection : Transformer Feeder >5MW	DBF- Transformer feeder with Differential Protection : Transformer Feeder >=5MW
EE-11	VI/B	B-0	9 of 15	3.06.00.m	f. At least one spare core shall be made available in each of the control cable	f. The spare cores shall be made available in each of the control cable as specified in clause no: 4.04.15 of chapter B-10.
EE-12	VI/B	B-0	10 of 15	3.07.00	The earthing system for plant shall be designed for a life expectancy of at least forty (40) years, for a system fault current of 63 kA for 1.0 sec	The earthing system for plant shall be designed for a life expectancy of at least forty (40) years, for a system fault current of 50 kA for 1.0 sec
EE-13	VI/B	B-17	E-1 of 98	1.01.05	All equipment shall be supplied with suitable terminal connectors.. The terminal connectors shall be well coordinated with type/size of conductor and equipment to be connected. The conductor terminations for equipment shall be either rigid or expansion type suitable for horizontal or vertical take off suitable for tube/quadruple/twin/single moose conductor. For Jack Bus Line side Quad ACSR Moose and rest Twin ACSR Moose shall be used. The sub conductor spacing for quadruple and twin moose ACSR conductor / AAC Bull conductor shall be 450 mm for 765kV and 250mm for twin AAC Bull conductor for 132kV. The terminal pads shall preferably be capable of taking the required conductor span under normal, short circuit and meteorological conditions, without effecting the performance of the equipment.	All equipment shall be supplied with suitable terminal connectors.. The terminal con-nectors shall be well coordinated with type/size of conductor and equipment to be connected .The conductor terminations for equipment shall be either rigid or expansion type suitable for horizontal or vertical take off suitable for IPS tube/twin / Quad AAC Bull.. For Jack Bus Line side Quad AAC Bull shall be used. The sub conductor spacing for quadruple and twin moose ACSR conductor / AAC Bull conductor shall be 450 mm for 765kV and 250mm for twin AAC Bull conductor for 132kV. The terminal pads shall preferably be capable of taking the required conductor span under normal, short circuit and meteorological conditions, without effecting the performance of the equipment.
EE-14	VI/B	B-17	E-2 of 98	1.01.14	i)_The towers and gantries shall be suitable for a normal conductor tension of minimum 2T/conductor in case of **twin moose** and 1.5T/conductor in case of **quad moose** conductor. 0.8T/conductor in case of ground wire. The foundations and structures etc. shall be designed accordingly.	The towers and gantries shall be suitable for a normal conductor tension of minimum 2T/conductor in case of **AAC Bull** and 1.5T/conductor in case of **quad AAC Bull** conductor. 0.8T/conductor in case of ground wire. The foundations and structures etc. shall be designed accordingly.

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-15	VI/B	B-17	E-2 of 98	1.01.14	Minimum height of 765KV AIS equipment level shall be 14Mt from the plinth level. The gantry width for 765kV AIS shall be min. 54mt or as required to meet the specified clearances	Minimum height of 765KV AIS equipment level shall be 14Mt from the plinth level. The **Bay** width for 765kV AIS shall be min. 54mt or as required to meet the specified clearances
EE-16	VI/B	B-17	E-4 of 98	1.01.27	Complete Direct Stroke Lightning Protection using Lightning Mast and/or shield wire and its connection to earth mat as required of 400kV switchyard of resent scope of Bays ,Transformer yard.	Complete Direct Stroke Lightning Protection using Lightning Mast and/or shield wire and its connection to earth mat as required of **765kV & 132kV** switchyard of present scope of Bays ,Transformer yard.
EE-17	VI/B	B-17	E-4 of 98	1.02.00	**CLEARANCES :** The minimum clearances for 765kV AIS shall be as given below: 765kV / 132kV Phase to earth clearance(Conductor to conductor) 4900mm 1300mm Phase to earth clearance (rod to structure) 6400mm Phase to Phase clearance (Conductor to conductor) 7600mm 1300mm Phase to Phase clearance (rod to structure) 9400mm	i)Phase to earth clearance (Conductor -Structure): 4900mm ii)Phase to phase clearance :Rod to conductor :9400mm
EE-18	VI/B	B-17	E-9 of 98	2.02.02	The circuit breaker shall be capable for breaking the steady & transient magnetizing current corresponding to 765/132 kV transformers up to 1000 MVA	The circuit breaker shall be capable for breaking the steady & transient magnetizing current corresponding to 765kV transformers up to 1000 MVA
EE-19	VI/B	B-17	E-16 of 98	2.12.01.a	Minimum: 3150A/2000A at rated ambient temperature current capacity as per the SLD.	Min.3150A at rated ambient temperature .
EE-20	VI/B	B-17			New clause : 2.12.01.B	132kV Class Circuit Breakers (AIS) a) Rated continuous current Minimum: /2000A at rated ambient temperature b Rated out-of-phase breaking :7.8kA rms c) Rated line charging breaking current (voltage factor of 1.4) : As per IEC d) First pole to clear factor 1.5 f) Rated break time As per IEC g) Short time current carrying capability : 31.5kA rms @ 1sec.

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-21	VI/B	B-17	E-17 of 98	2.13.00	Mandatory Maintenance equipments : 1.SF6 Gas handling plant 2.SF6 Gas leak detector	Deleted
EE-22	VI/B	B-17	E-23 of 98	3.07.01.a	Minimum: 3150A/2000A at rated ambient temperature current capacity as per the SLD.	Min.3150A at rated ambient temperature
EE-23	VI/B	B-17	E-23 of 98	3.07.01.1	132KV isolator Minimum 2000/1250 A at rated ambient temperature as per the Single line diagram	Min.2000A at rated ambient temperature
EE-24	VI/B	B-17	E34 of 98	8.04.03	Insulator String: 765KV f) Electro mechanical strength : 120KN	Insulator String: 765KV f) Electro mechanical strength : 210KN
EE-25	VI/B	B-17	E37 of 98 & E41 of 98	8.16.02 & 09.09.02	Rigid conduits shall be flow-coat metal conduits of Nagarjuna Coated Tubes or equivalent make. The outer surface of the conduits shall be coated with hot-dip zinc and chromate conversion coatings. The inner surface shall have silicone epoxy ester coating for easy cable pulling. Mild steel pipes shall be hot-dip galvanised. All rigid conduits/ pipes shall be of a reputed make	Rigid conduits shall be flow-coat metal conduits Tubes or equivalent make. The outer surface of the conduits shall be coated with hot-dip zinc and chromate conversion coat-ings. The inner surface shall have silicone epoxy ester coating for easy cable pulling. Mild steel pipes shall be hot-dip galvanised. All rigid con-duits/ pipes shall be of a reputed make
EE-26	VI/B	B-17	E-49 of 98	11.02.01	To evaluate and tabulate the trees and bushes coming within **26** meters on either side of the central line alignment, the trees will be numbered and marked with quality paint serially from angle point 1 onwards and the corresponding number will be painted on the stem of trees at a height of one meter from ground level. The trees list should contain the following:	To evaluate and tabulate the trees and bushes coming within **35** meters on either side of the central line alignment, the trees will be numbered and marked with quality paint serially from angle point 1 onwards and the corresponding number will be painted on the stem of trees at a height of one meter from ground level. The trees list should contain the following:
EE-27	VI/B	B-17	E-50 of 98	11.03.03	Profile Plotting & Tower Spotting: From the field book entries the route plan with route details and level profile shall be plotted and prepared as per approved procedure-------	Profile Plotting & Tower Spotting: From the field book entries the route plan with route details and level profile shall be plotted and prepared -------

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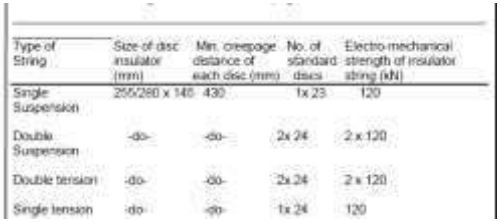
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<tr><th rowspan="2">S.No</th><th colspan="4">Specification Reference</th><th rowspan="2">Existing</th><th rowspan="2">Read as</th></tr>
<tr><th>Part</th><th>Sub Sec</th><th>Page No</th><th>Clause No</th></tr>
<tr><td>EE-28</td><td>VI/B</td><td>B-17</td><td>E-52 of 98</td><td>11.06.00</td><td>Electrical System Data</td><td>a)Nominal Volage: 765KV,
b)Highest system Voltage: 800KV
c)Lightning impulse :+-2400kVp
d)Switching impulse :+-1550kVp
e)Power frequency with stand Voltage:830kV rms</td></tr>
<tr><td>EE-29</td><td>VI/B</td><td>B-17</td><td>E-57 of 98</td><td>12.02.01</td><td>The normal ruling span of the line shall be 400 meters for 400 KV towers.</td><td>The normal ruling span / Design of the line shall be 400 meters for 765 KV towers</td></tr>
<tr><td>EE-30</td><td>VI/B</td><td>B-17</td><td>E-58 of 98</td><td>12.02.03</td><td>The Weight Span :
<table><tr><td>Tower type</td><td colspan="2">Normal Condition</td><td colspan="2">Broken wire condition</td></tr><tr><td></td><td>Min (m)</td><td>Max (m)</td><td>Min (m)</td><td>Max (m)</td></tr><tr><td>A</td><td>600</td><td>-200</td><td>360</td><td>-100</td></tr><tr><td>B,C</td><td>600</td><td>0</td><td>360</td><td>-200</td></tr><tr><td>D</td><td>600</td><td>0</td><td>360</td><td>-300</td></tr></table></td><td><table><tr><td>Tower type</td><td colspan="2">Normal Condition</td><td colspan="2">Broken wire condition</td></tr><tr><td></td><td>Min (m)</td><td>Max (m)</td><td>Min (m)</td><td>Max (m)</td></tr><tr><td>A</td><td>600</td><td>200</td><td>360</td><td>100</td></tr><tr><td>B,C</td><td>600</td><td>0</td><td>360</td><td>-200</td></tr><tr><td>D</td><td>600</td><td>0</td><td>360</td><td>-300</td></tr></table>Bidder to refer CBIP Manual-323 for ruling span, wind span , weight span etc</td></tr>
<tr><td>EE-31</td><td>VI/B</td><td>B-17</td><td>E-60 of 98</td><td>12.04.02</td><td>Design Temperature :

c)Max.Temperature of conductor : 75Deg.cen</td><td>c)Max.Temperature of conductor : 85Deg.cen</td></tr>
<tr><td>EE-32</td><td>VI/B</td><td>B-17</td><td>E-74 of 98</td><td>13.05.02 .C</td><td>The chimney portion of the foundation shall be designed as per limit load method described at clause 38.6 of IS-456-1978, or as per any other international standard, considering the chimney as a column subjected to axial loads (down thrust loads) and biaxial bending moments resulting from side thrust forces. The passive earth pressure (as per Rankine's formula) shall be considered for the design of chimney against side thrust. If uplift and down thrust are computed in</td><td>The chimney portion of the foundation shall be designed as per limit load method described at clause 38.6 of IS-456 of latest addition or as per any other international standard, considering the chimney as a column subjected to axial loads (down thrust loads) and biaxial bending moments resulting from side thrust forces. The passive earth pressure (as per Rankine's formula) shall be considered for the design of chimney against side thrust. If uplift and down thrust are computed in vertical direction for the foundation design, full resultant horizontal shear shall be taken at footing tip for design of the footing to resist side thrust.</td></tr>
</table>

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					vertical direction for the foundation design, full resultant horizontal shear shall be taken at footing tip for design of the footing to resist side thrust.	
EE-33	VI/B	B-17	E-75 of 98	13.06.02	All the properties of concrete regarding its strength under compression tension, shear, punching and bend etc. as well as workmanship will conform to IS:456-1978	All the properties of concrete regarding its strength under compression tension, shear, punching and bend etc. as well as workmanship will conform to IS:456 of latest addition
EE-34	VI/B	B-17	E-82 of 98	14.05.07	The proposed 66 kV transmission line may run parallel for certain distance with the existing Transmission lines which may remain energised during the stringing period.	Deleted
EE-35	VI/B	B-17	E-85 of 98	15.01.01	All the equipment shall be of the latest design and conform to the best modern practice adopted in the extra high voltage field. The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for 400 kV AC Double circuit transmission with quad moose conductor and will give continued good performance.	All the equipment shall be of the latest design and conform to the best modern practice adopted in the extra high voltage field. The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for 765 kV AC Single circuit transmission line with Quad AAC Bull conductor or equivalent and will give continued good performance.
EE-36	VI/B	B-17	E-86 of 98	15.02.02	a) Size (strands & wire diameter) : 7/3.15 mm (b) Overall diameter :9.45 mm (c) Stranded weight :428 Kg/km (d) Minimum ultimate tensile strength : 56 kN	a) Size (strands & wire diameter) : 7/3.66 mm (b) Overall diameter :10.98 mm (c) Stranded weight :583 Kg/km (d) Minimum ultimate tensile strength : 68 kN
EE-37	VI/B	B-17	E-86 of 98	15.03.02	Parameters of the conductor: a) Code and standard: IS 398 b) Name :MOOSE ACSR c) Overall diameter 31.77 mm d) Weight 2.004 kg/m e) Ultimate tensile strength 161.2 kN minimum f) Strands and wire diameter of - Aluminium 54 / 3.53 mm - Steel 7 / 3.53 mm	Typical Parameters of the conductor: a) Code and standard: IS 398 b) Name : Quad “Bull” AAC or equivalent c) Overall diameter :38.25 mm d) Weight :2.4 kg/m e) Ultimate tensile strength :139 kN minimum f) Strands and wire diameter of - Aluminium 61 /4.25 mm

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-38	VI/ B	B-17	E-88 of 98	15.05.02	**Vibration Damper For Earthwire** Refer Clause 16.04.04 detailed above	**Vibration Damper For Earthwire** Refer Clause 15.04.04 detailed above
EE-39	VI/B	B-17	E-89 of 98	15.07.01	 Type of String / Size of disc insulator (mm) / Min. creepage distance of each disc (mm) / No. of standard discs / Electro-mechanical strength of insulator string (kN) Single Suspension: 255/280 x 146 / 430 / 1x 23 / 120 Double Suspension: -do- / -do- / 2x 24 / 2 x 120 Double tension: -do- / -do- / 2x 24 / 2 x 120 Single tension: -do- / -do- / 1x 24 / 120	Size of Disc Insulator :280X170mm Electro-Mechanical strength : 210KN No of Standard discs : 47nos Min.Creepage distance of : 430mm
EE-40	VI/B	B-23	6 of 10	2.02.00	The design ambient air temperature for cable shall be 50 deg C, when laid in air. The design ambient ground temperature for cables shall be 40 deg C. Cables shall be installed in air, in built up concrete trenches and/or directly buried in soil	The design ambient air temperature for cable shall be 50 deg C, when laid in air. The design ambient ground temperature for cables shall be 40 deg C. Cables shall be installed in air, in built up concrete trenches .
EE-41	VI/B	B-23	7 of 10	7.07.00	Construction of buried cable trench shall include excavation, preparation of sieved sand bedding, riddled soil cover, supply and installation of concrete protective covers, back filling and compacting,supply and installation of route markers. Bidder shall furnish the details for burying the cable in groun	Deleted
EE-42	VI/B	B-13	3 of 49	1.17.00	Bidder shall offer the Bay Level Units for the EHV system (each circuit breaker with associated dis-connector, Earth switches and instrument transformer shall comprise one bay) complete with Bay Control Units (BCUs) and Bay Protection Units (BPUs). Bay Level Units, common panels like bus bar protection, PLCC panels/communication panels of transmission lines, RTCC panels of transformers etc. shall be housed in existing Switchyard Control Room in Switchyard. Network Controllers,	Bidder shall offer the Bay Level Units for the EHV system (each circuit breaker with associated dis-connector, Earth switches and instrument transformer shall comprise one bay) complete with Bay Control Units (BCUs) and Bay Protection Units (BPUs). Bay Level Units, common panels like bus bar protection, PLCC panels/communication panels of transmission lines, etc. shall be housed in existing Switchyard Control Room in Switchyard.

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-43	VI/B	B-13	21 of 49	09.02.03(iv)	Individual group of protection systems shall be connected to independent set of SCUs.	Individual group of protection systems shall be connected to independent set of hand reset trip relays.
EE-44	VI/E	-	-	-	-	System Architecture for existing SAS - **Annexure-I**
EE-45	VI/E	-	7,9 of 127	-	Protection SLD for GT bay (xxxx-999-POE-J-005) Protection SLD for TIE bay (xxxx-999-POE-J-009)	Updated Protection SLD for GT bay (xxxx-999-POE-J-005) Updated Protection SLD for TIE bay (xxxx-999-POE-J-009)
EE-46	VI/E	-	11 of 127	-	Typical section of cable tray arrangement in trestle 9500-999-POE-J-004	Updated Typical section of cable tray arrangement in trestle 9500-999-POE-J-004
EE-47	VI/A	IIB	-	-	-	Annexure E2 (Preliminary route survey of 765KV SC line to bidder) added.
EE-48	VI/B	B-04	4 of 33	1.03.01(g)	… Outdoor oil filled transformers shall have ratings as indicated in tender SLD,2500kVA rating is not acceptable. For indoor DTT, 2500 kVA rating is acceptable. ….	… Outdoor oil filled transformers shall have ratings as indicated in tender SLD. ….

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<table>
<tr><th rowspan="2">S.No</th><th colspan="4">Specification Reference</th><th rowspan="2">Existing</th><th rowspan="2">Read as</th></tr>
<tr><th>Part</th><th>Sub Sec</th><th>Page No</th><th>Clause No</th></tr>
<tr><td>EE-49</td><td>VI/B</td><td>B-0</td><td>13 of 15</td><td>6.00.00</td><td>….<table><tr><td></td><td colspan="2">WINDING</td><td colspan="2">BUSHING</td></tr><tr><td>Highest System Voltage</td><td>Rated Power Freq.with-stand Voltage(K Vrms)</td><td>Rated lightning impulse withstand voltage)K Vp)</td><td>Rated Power Freq.with-stand Voltage(K Vrms</td><td>Rated lightning impulse withstand voltage)K Vp)</td></tr><tr><td>…… 800 KV</td><td>…… 830/38*</td><td>…… 1950**</td><td>…… 880</td><td>…… 2100***</td></tr></table>….</td><td>….<table><tr><td></td><td colspan="2">WINDING</td><td colspan="2">BUSHING</td></tr><tr><td>Highest System Voltage</td><td>Rated Power Freq.with-stand Voltage(K Vrms)</td><td>Rated lightning impulse withstand voltage)K Vp)</td><td>Rated Power Freq.with-stand Voltage(K Vrms</td><td>Rated lightning impulse withstand voltage)K Vp)</td></tr><tr><td>…… 800 KV</td><td>…… 830/38*</td><td>…… 2050/2255**</td><td>…… 970</td><td>…… 2100</td></tr></table>….</td></tr>
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<table>
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<tr><td>EE-50</td><td>VI/B</td><td>B-04</td><td>1 of 33</td><td>1.01.00 (ix)</td><td>….
<table><tr><td>Sr. No.</td><td>TRANS-FORMER</td><td>Genera-tor Trans-former(GT)</td><td>….</td></tr><tr><td>….</td><td>….</td><td>….</td><td>….</td></tr><tr><td>ix)</td><td>Permissible Temperature rise over an am-bient of 50 deg C (irrespective of tap)</td><td></td><td></td></tr><tr><td></td><td>a) Top Oil by thermometer</td><td>40 deg.C</td><td>….</td></tr><tr><td></td><td>b) Winding by resistance</td><td>45 deg.C</td><td>…..</td></tr></table>….</td><td>….
<table><tr><td>Sr. No.</td><td>TRANS-FORMER</td><td>Genera-tor Trans-former(GT)</td><td>….</td></tr><tr><td>….</td><td>….</td><td>….</td><td>….</td></tr><tr><td>ix)</td><td>Permissible Temperature rise over an am-bient of 50 deg C (irrespective of tap)</td><td></td><td></td></tr><tr><td></td><td>a) Top Oil by thermometer</td><td>35 deg.C</td><td>….</td></tr><tr><td></td><td>b) Winding by resistance</td><td>40 deg.C</td><td>…..</td></tr></table>….</td></tr>
<tr><td>EE-51</td><td>VI/B</td><td>B-04</td><td>2 of 33</td><td>1.01.00 (x)</td><td>….
<table><tr><td>Insulation level</td><td>As per chapter B-0, Part-B</td></tr></table>….</td><td>….
<table><tr><td>Insulation level</td><td>As per chapter B-0, B-04 Part-B</td></tr></table>….</td></tr>
</table>

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-52	VI/B	B-04	2 of 33	1.03.01 (b)(i)	…. Generator Transformers:- GT (including Spare GT) cooling shall be effected by use of a number of detachable type unit coolers. Capacity of each unit cooler shall be limited to maximum of 33 % of the total cooling requirements. At least one standby cooler of rating equal to that of Main cooler shall be provided. The coolers shall be tank mounted. There shall not be flow of directed air towards tank body. The orientation of coolers shall be subject to Employer's approval. Total capacity of unit coolers furnished for each transformer shall be minimum 132% of actual requirements. All oil pumps (cooler) shall be located at the cooler outlet pipe connected at the bottom of the tank. ….	…. Generator Transformers:- GT (including Spare GT) cooling shall be effected by use of a number of detachable type unit coolers. Capacity of each unit cooler shall be limited to maximum of 20 % of the total cooling requirements. At least one standby cooler of rating equal to that of Main cooler shall be provided. The coolers shall be tank mounted. There shall not be flow of directed air towards tank body. The orientation of coolers shall be subject to Employer's approval. Total capacity of unit coolers furnished for each transformer shall be minimum 120% of actual requirements. All oil pumps (cooler) shall be located at the cooler outlet pipe connected at the bottom of the tank. ….
EE-53	VI/B	B-04	3 of 33	1.03.01 (c)	….	…. iii) Phase to Earth clearances (765 KV): 5800 mm. ….
EE-54	VI/B	B-04	7 of 33	1.04.07	….	…. l.) Bushings above 420 kV class shall be oil filled condenser (OIP) / RIP (Resin Impregnated Paper). ….

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<table>
<tr>
<td>EE-55</td>
<td>VI/B</td>
<td>B-04</td>
<td>7 of 33</td>
<td>1.04.07 (2)</td>
<td>….
2. STATION TRANSFORMER
<table>
<tr><th colspan="7">Winding Details</th></tr>
<tr><th>S.No.</th><th>Parameter</th><th>Unit</th><th>HV</th><th>HVN</th><th>LV1 & LV2</th><th>LV1N & LV2N</th></tr>
<tr><td>1.</td><td>Lightning impulse withstand voltage</td><td>kVp</td><td>145</td><td>-</td><td>12</td><td>-</td></tr>
<tr><td>2.</td><td>CW Lightning impulse withstand voltage</td><td>kVp</td><td>650</td><td>95</td><td>75</td><td>75</td></tr>
<tr><td>3.</td><td>One min power frequency with</td><td>kV</td><td>275</td><td>38</td><td>28</td><td>28</td></tr>
</table></td>
<td>….
2. STATION TRANSFORMER
<table>
<tr><th colspan="7">Winding Details</th></tr>
<tr><th>S.No.</th><th>Parameter</th><th>Unit</th><th>HV</th><th>HVN</th><th>LV1 & LV2</th><th>LV1N & LV2N</th></tr>
<tr><td>1.</td><td>Lightning impulse withstand voltage</td><td>kVp</td><td>650</td><td>95</td><td>75</td><td>75</td></tr>
<tr><td>2.</td><td>CW Lightning impulse withstand voltage</td><td>kVp</td><td>715</td><td>105</td><td>82.5</td><td>82.5</td></tr>
<tr><td>3.</td><td>One min power frequency with</td><td>kV</td><td>275 /38*</td><td>38</td><td>28</td><td>28</td></tr>
</table></td>
</tr>
</table>

Amendment 01 to Technical Specifications (Section VI)

<table>
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<table>
<tr><td></td><td>stand voltage</td><td></td><td></td><td></td><td></td><td></td></tr>
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</td><td>
<table>
<tr><td></td><td>stand voltage</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
….
* In case of non-uniformly insulated.
….
</td></tr>
<tr><td>EE-56</td><td>VI/B</td><td>B-04</td><td>14 of 33</td><td>1.09.01</td><td>….</td><td>….
(d.) Tank Vacuum and Pressure test (For UT and Auxiliary Transformers)
….</td></tr>
<tr><td>EE-57</td><td>VI/B</td><td>B-04</td><td>16 of 33</td><td>1.09.03(I)(18)</td><td>….
I) ROUTINE TEST
….
<table>
<tr><td>S.N.</td><td>Trans-former Type</td><td>….</td><td>ST(3-ph)</td><td>….</td></tr>
<tr><td>18.</td><td>LTAC test as IEC 60076-3 (also refer Table given below)</td><td>….</td><td>X</td><td>….</td></tr>
</table>
….</td><td>….
I) ROUTINE TEST
….
<table>
<tr><td>S.N.</td><td>Trans-former Type</td><td>….</td><td>ST(3-ph)</td><td>….</td></tr>
<tr><td>18.</td><td>LTAC test as IEC 60076-3 (also refer Table given below)</td><td>….</td><td>√</td><td>….</td></tr>
</table>
….</td></tr>
<tr><td>EE-58</td><td>VI/B</td><td>B-04</td><td>18 of 33</td><td>1.09.03(II)(1)</td><td>….
I) TYPE TEST (#)
….</td><td>….
I) TYPE TEST (#)
….</td></tr>
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<table>
<tr><td>S.N.</td><td>Trans-former Type</td><td>….</td><td>ST(3-ph)</td><td>….</td></tr>
<tr><td>1.</td><td>LTAC test as IEC 60076-3 (also refer Table given below)</td><td>….</td><td>√</td><td>….</td></tr>
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….
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<table>
<tr><td>S.N.</td><td>Trans-former Type</td><td>….</td><td>ST(3-ph)</td><td>….</td></tr>
<tr><td>1.</td><td>LTAC test as IEC 60076-3 (also refer Table given below)</td><td>….</td><td>X</td><td>….</td></tr>
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</td></tr>
<tr><td>EE-59</td><td>VI/B</td><td>B-04</td><td>19 of 33</td><td>1.09.03(II)(10,11)</td><td>
….
I) TYPE TEST (#)
….
<table>
<tr><td>S.N.</td><td>Trans-former Type</td><td>GT(1-PH)</td><td>….</td></tr>
<tr><td>10.</td><td>Meas-ure-ment of trans-ferred surge on tertiary due to HV light-ning</td><td>X</td><td>….</td></tr>
</table>
</td><td>
….
I) TYPE TEST (#)
….
<table>
<tr><td>S.N.</td><td>Trans-former Type</td><td>GT(1-PH)</td><td>….</td></tr>
<tr><td>10.</td><td>Meas-ure-ment of trans-ferred surge on LV due to HV light-ning im-pulse</td><td>√</td><td>….</td></tr>
</table>
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</table>

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<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td></td><td>im-pulse and IV light-ning im-pulse</td><td></td><td></td></tr>
<tr><td>11.</td><td>Meas-ure-ment of trans-ferred surge on tertiary due to HV Switch ing im-pulse and IV Switch ing im-pulse</td><td>X</td><td>….</td></tr>
</table>
….
</td><td>
<table>
<tr><td>11.</td><td>Meas-ure-ment of trans-ferred surge on LV due to HV Switch ing im-pulse</td><td>√</td><td>….</td></tr>
</table>
….
</td></tr>
<tr><td>EE-60</td><td>VI/B</td><td>B-04</td><td>20 of 33</td><td>1.09.03 NOTE</td><td>….</td><td>….
Table-2
(Test Voltage for LTAC)</td></tr>
</table>

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<table>
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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td>Highest System Voltage (Um) for 765 kv class</td><td>800 KV</td></tr>
<tr><td>U1(LTAC Voltage level)</td><td>830 KV</td></tr>
</table>
….
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<tr><td>EE-61</td><td>VI/B</td><td>B-04</td><td>22 of 33</td><td>2.00.00 (i)</td><td>….
<table>
<tr><td>Sr.No.</td><td>PARAME-TERS</td><td>INDOOR TRANS-FORMER</td></tr>
<tr><td>I)</td><td>Type</td><td>Epoxy cast resin/resin encapsulated</td></tr>
</table>
….</td><td>….
<table>
<tr><td>Sr.No.</td><td>PARAME-TERS</td><td>INDOOR TRANS-FORMER</td></tr>
<tr><td>I)</td><td>Type</td><td>Epoxy cast resin.
All windings shall be epoxy Resin Casted.</td></tr>
</table>
….</td></tr>
<tr><td>EE-62</td><td>VI/B</td><td>B-04</td><td>25 of 33</td><td>2.05.02</td><td>….
All routine tests in accordance with IS: 11171 shall be carried out on each
transformer.
….</td><td>….
All routine tests in accordance with IS: 2026 part-11 shall be carried out on each
transformer.
….</td></tr>
<tr><td>EE-63</td><td>VI/B</td><td>B-04</td><td>25,26 of 33</td><td>3.00.00(1,11)</td><td>….
<table>
<tr><td>1.</td><td>On Line DGA</td><td>Online monitor-ing sys-tem of</td><td>7 Nos.</td></tr>
</table>
</td><td>….
<table>
<tr><td>1.</td><td>On Line DGA</td><td>Online monitor-ing sys-tem of</td><td>4 Nos.</td></tr>
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<table>
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<tr><td></td><td></td><td></td><td></td><td></td><td>
<table>
<tr><td></td><td></td><td>dissolved gases for GTs</td><td></td></tr>
<tr><td>11.</td><td>On Line Moisture Removal System</td><td>(One for each 3 phase GT Bank)</td><td>2 Sets</td></tr>
</table>
….
</td><td>
<table>
<tr><td></td><td></td><td>dissolved gases for GTs</td><td></td></tr>
<tr><td>11.</td><td>On Line Moisture Removal System</td><td>(One for each 3 phase GT Bank)</td><td>1 Sets</td></tr>
</table>
….
</td></tr>
<tr><td>EE-64</td><td>VI/A</td><td>IIB</td><td>2 of 20</td><td>1.04.00(1)(vi)</td><td>
….
<table>
<tr><td>S.No</td><td>Equip-ment Name</td><td>Rat-ing/Pa-rameters</td><td>Quantity</td></tr>
<tr><td>vi)</td><td>INDOOR Trans-formers (Epoxy cast resin/ resin encapsu-lated)</td><td colspan="2">as per SLD & System Requirement</td></tr>
</table>
….
</td><td>
….
<table>
<tr><td>S.No</td><td>Equip-ment Name</td><td>Rat-ing/Pa-rameters</td><td>Quantity</td></tr>
<tr><td>vi)</td><td>INDOOR Trans-formers (Epoxy cast resin)</td><td colspan="2">As per SLD & Sys-tem Requirement</td></tr>
</table>
….
</td></tr>
<tr><td>EE-65</td><td>VI/A</td><td>VI CHAP TER-11</td><td>7 of 14</td><td>2.</td><td>
….
LIST OF MANDATORY SPARES for oil filled transform-ers/reactor
<table>
<tr><td>S.No</td><td>ITEMS DE-SCRIP TION</td><td>GT</td><td>ST</td><td>UT</td><td>Aux. Trans. (for each</td><td>RE-AC-TOR</td></tr>
</table>
</td><td>
….
LIST OF MANDATORY SPARES for oil filled transformers.
<table>
<tr><td>S.No</td><td>ITEMS DE-SCRIP TION</td><td>GT</td><td>ST</td><td>UT</td><td>Aux. Trans. (for each</td></tr>
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</td></tr>
</table>

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					rat-ing) ….	rat-ing) ….
EE-66	VI/E				…. Drawing no.0000-501-POE-A-002 ….	…. Drawing no.0000-501-POE-A-002 updated. ….
EE-67	VI/E				-	…. Drawing no. 0000-501-POE-A-006 is attached. ….

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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
D1-1	VI/A	IID				**1.00.04** The scope of work of the successful bidder includes: - (a) To interact, discuss with Owner / Proof Checking (PC) agency for the modalities, schedule, and design parameters, loading to be considered in line with the Owner's specifications. (b) To submit the drawings and design calculations as per the project schedule sequentially as per the sequence below. (c) Incorporate all the comments/observations/suggestions furnished by the PC on the drawings and design documents. (d) After review of the drawings and design documents by PC the same shall be submitted to the Owner for consent. In case of further observation by Owner the same is also to be incorporated. Sequence of submission of documents: - 1) Design basis which will include all design philosophy, seismic and wind criteria as per specification, foundation type along with bearing capacity as per Geotechnical Report, materials of construction, loading details, finishing schedule etc. 2) Architectural details/General Arrangement drawings for buildings, facilities, equipment including the elevations and cross sections. 3) Design calculation along with the STAAD/ANSYS/SAP 2000 models and/or computer work sheets or any other software model as mutually agreed with Owner. 4) Foundation drawings.

						5) Superstructure drawings sequentially as per construction sequence or material projection, as applicable.
D1-2	**VI/B**	D-1-5	5.17.00.02	36 & 37 of 69	(a) The design of all liquid retaining/conveying structures of cooling tower like C.W. basin, sump, hot water distribution channel/basin, sludge drain and pits shall be designed **by working stress method as outlined in Clause 4.5 of IS 3370 (Part 2) : 2009**. These structures shall be designed for following conditions 1. Water filled inside upto the designed level and no earth outside. 2. Earth pressure plus 2.0 T / M2 surcharge (Vertical direction) plus ground water table at Finished Graded ground Level (FGL) outside and no water inside.	(a) The design of all liquid retaining/conveying structures of cooling tower like C.W. basin, sump, hot water distribution channel/basin, sludge drain and pits shall be designed **as per IS 3370 with limiting crack width to 0.1mm**. These structures shall be designed for following conditions 1. Water filled inside upto the designed level and no earth outside. 2. Earth pressure plus 2.0 T / M2 surcharge (Vertical direction) plus ground water table at Finished Graded ground Level (FGL) outside and no water inside.
D1-3	VI/B	D-1-5	5.17.00.02	37 of 69	(b) The design of all structures other than liquid retaining/conveying structures of cooling tower above CW basin slab such as columns, beams, fins, walkways, slabs, cladding/partition wall, fan stack, precast beams etc. as applicable shall be carried out **by limit state method as outlined in Clause 4.4 of IS: 3370 (Part 2): 2009.** Further, for limiting the crack width, the stress for the reinforcement steel shall be limited to 130 MPa (on all faces) as per clause 4.4.3.1 of **IS: 3370 (Part 2): 2009** using the partial safety factor for serviceability condition as per clause 4.4.1.3. Wherever, the foundation raft of cooling tower is same as CW basin slab, the foundation shall be designed by working stress method as **outlined in Clause 4.5 of IS 3370 (Part 2): 2009** (all faces). However, if the cooling tower foundation is not the same as the CW basin slab and a separate foundation for the cooling tower is provided below the CW basin slab due to founding level requirements, the basin slab shall be designed as a structural slab resting on grid of beams taking support	(b) The design of all structures other than liquid retaining/conveying structures of cooling tower above CW basin slab such as columns, beams, fins, walkways, slabs, cladding/partition wall, fan stack, precast beams etc. as applicable shall be carried out **as per IS 3370 with limiting crack width to 0.2mm**. Further, for limiting the crack width, the stress for the reinforcement steel shall be limited to 130 MPa (on all faces) as per clause 4.4.3.1 of **IS: 3370** using the partial safety factor for serviceability condition as per clause 4.4.1.3. Wherever, the foundation raft of cooling tower is same as CW basin slab, the foundation shall be designed by working stress method as **per IS 3370 with limiting crack width to 0.1mm** (all faces)**.** However, if the cooling tower foundation is not the same as the CW basin slab and a separate foundation for the cooling tower is provided below the CW basin slab due to founding level requirements, the basin slab shall be designed as a structural slab resting on grid of beams taking support from columns or as a flat slab taking support from columns. Arrangement with providing walls between the columns and the periphery to support the structural basin slab is not permitted. The CW basin slab (both faces, including beams at CW basin slab level) shall be designed as structural slab **as per IS 3370 with limiting crack width to 0.1** and the structures below CW basin slab shall be designed as per IS:456 (2000).

					from columns or as a flat slab taking support from columns. Arrangement with providing walls between the columns and the periphery to support the structural basin slab is not permitted. The CW basin slab (both faces, including beams at CW basin slab level) shall be designed as structural slab **by working stress method as outlined in Clause 4.5 of IS 3370 (Part 2): 2009** and the structures below CW basin slab shall be designed as per IS:456 (2000). However, the size of the column below CW basin slab upto foundation shall be maintained same as the size of the columns just above CW basin slab.	However, the size of the column below CW basin slab upto foundation shall be maintained same as the size of the columns just above CW basin slab
D1-4	VI/B	D-1-5	5.17.00.01	35 & 36 of 69	**k) Coating** All concrete surfaces in direct contact with water/ water spray/moist air shall be applied with Moisture Compatible Corrosion Resistant Coating System or its equivalent as specified in Annexure-G. All concrete surfaces subject to water/ water spray/moist air upto and including Fan Deck slab level including basin slab, inner faces of peripheral walls, all faces of cell partition wall, all faces of columns, all faces of beams (both cast in situ and precast), bottom surface of fandeck slab for counter flow tower and both surface of fandeck slab for cross flow tower, inner face of fanstack, all faces of hot water basin (for cross flow tower), etc as applicable shall receive the said coating after cleaning and drying of the concrete surface. The detailed specification of the coating system on concrete surfaces is given in Annexure- G. External surfaces of Cooling tower peripheral walls and fanstack shall be painted with two	**k) Coating** All concrete surfaces subject to water/ water spray/moist air including cold water basin, inner faces of peripheral walls, all faces of cell partition wall, all faces of columns, all faces of beams (both cast in situ and precast), bottom surface of fandeck slab for counter flow tower and both surface of fandeck slab for cross flow tower, inner face of fanstack, all faces of hot water basin (for cross flow tower), etc. **except exterior surface** shall be applied with High build heavy duty polyurethane coating having formulation of 100 % solids, solvent free over proper cleaned and complete dried concrete surface. Thickness of polyurethane coating shall be 2.0 mm. Suitable primer as per standard Practice/manufacturers' recommendation shall be used. The detailed specification of polyurethane coating is given in **ANNEXURE-III**. **Exterior surfaces** of cooling tower shall be coated with one coat of High Performance Moisture Compatible Corrosion Resistant Coating System of minimum 150 micron as per **Annexure-G** followed by finish coat of two pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT.

					or more coats of waterproof cement paint of approved shade, make and color.	
D1-5	VI/B	D-1-12	-	-	**-**	**ANNEXURE-I** "SPECIFICATIONS FOR 100% SOLIDS, HIGH BUILD, ELASTOMERIC POLYURETHANE COATING FOR CONCRETE" added
D1-6	VI/B	D-1-5	5.19.01.05	47 of 69	All liquid retaining and conveying structures shall be designed by working stress method as **given in clause 4.5 of IS 3370(Part2):2009**.	All liquid retaining and conveying structures shall be designed by working stress method as **per IS 3370 with limiting crack width to 0.1.**
D1-7	**VI/B**	**G-07**				**3.00.00** All civil, structural, RCC and architectural drawings will be in approval category irrespective of them being categorised as 'AA'/ 'A' in MDL. Category (AA/A) of any new drawing added in the MDL at later stage shall be decided during addition of drawing in MDL. In accordance with IS: 18299 all Good For Construction (GFC) drawings have to be Proof Checked. NTPC has the discretion to carry out the Proof Checking itself or by appointing Proof Checker (PC). It would be the responsibility of the successful bidder to get the drawings and designs proof checked, within the stipulated time frame.
D1-8	**VI/A**	**IID**	**1.00.00**		2. Geo-technical Investigation.	2. Geo-technical Investigation. (additional data wherever required beyond details as provided)
D1-9	**VI/A**	**IID**	**1.00.00**		3. Site clearance including cutting of trees of girth less than 30 centimeters. Cutting of trees of girth more than 30cm shall be done by the Owner, however, removal and disposal of roots, trees of girth less than 30cm and other vegetation is in Bidder's scope.	3. Site clearance including cutting of trees of girth less than 30 centimeters. Cutting of trees of girth more than 30cm shall be done by the Owner after finalization of GLP. However, removal and disposal of roots of trees of all girths (including trees of girth less than 30cm or more) and other vegetation is in Bidder's scope.
D1-10	**VI/A**	**IID**	**1.00.00**		7. k. Area Paving and miscellaneous foundations in entire area enclosed within the peripheral roads of the entire plant area from edge of drain along peripheral road beyond transformer yard upto road beyond **Ash handling facilities area** bound by peripheral	7. k. Area Paving and miscellaneous foundations in entire area enclosed within the peripheral roads of the entire main-plant area from edge of drain along peripheral road beyond transformer yard upto road beyond **chimney** bound by peripheral roads in orthogonal directions, including heavy duty passages, sump pits, drains, culverts, cable slits, fire water

					roads in orthogonal directions, including heavy duty passages, sump pits, drains, culverts, cable slits, fire water trench, including, rail/ road/ drain crossing of fire water trench & pipes etc. (as shown in tender drawing).	trench, including, rail/ road/ drain crossing of fire water trench & pipes etc. (as shown in tender drawing).
D1-11	**VI/A**	**IID**	**1.00.00**		8. Civil, structural, architectural works of all facilities associated with complete Flue gas desulfurization (FGD) including Gypsum and limestone handling system **and DeNOx system**.	8. Civil, structural, architectural works of all facilities associated with complete Flue gas desulfurization (FGD) including Gypsum and limestone handling system.
D1-12	**VI/A**	**IID**	**1.00.00**		26. Sheds for O&M/Workers, including food serving kiosk and bio Toilet Blocks for ladies and gents, in adequate numbers to cater to the workers working in each work area. The sheds should be easily accessible to workers by foot. Minimum 06 numbers of shed in different areas shall be provided. Drinking water facility and maintenance of toilet and shed shall be the responsibility of the bidder till COD of all the units.	26. **Sheds for Construction workers and O&M Workers,** including food serving kiosk and bio Toilet Blocks for ladies and gents to cater to the workers working in each work area. The sheds should be easily accessible to workers by foot. Minimum 06 numbers of shed in different areas shall be provided. Drinking water facility and maintenance of toilet and shed shall be the responsibility of the bidder till COD of all the units**. The sheds shall be constructed at start of the project construction**
D1-13	**VI/A**	**IID**	**1.00.00**		10. Use of ash and ash based products. In line with Gazette Notification on Ash Utilization issued by Ministry of Environment & Forest and its amendments, Bidder shall use ash and ash based products in all construction. He shall furnish a compliance report along with all details of use of ash and ash based products along with each bill. The above requirements shall be applicable to his sub-vendors also and Contractor shall be responsible for enforcing the same on his sub-vendors Fly ash is available within plant boundary. Bidder to procure Fly ash. Bidder to collect and transport the same meeting environmental norms/ local regulations at his own cost as per operation schedule for fly ash collection. A **nominal** amount of shall be charged.	10. Use of ash and ash based products. In line with Gazette Notification on Ash Utilization issued by Ministry of Environment & Forest and its amendments, Bidder shall use ash and ash based products in all construction. He shall furnish a compliance report along with all details of use of ash and ash based products along with each bill. The above requirements shall be applicable to his sub-vendors also and Contractor shall be responsible for enforcing the same on his sub-vendors Fly ash is available within plant boundary. Bidder to procure Fly ash. Bidder to collect and transport the same meeting environmental norms/ local regulations at his own cost as per operation schedule for fly ash collection. **A nominal amount of Re 1 per metric tonne shall be charged.**
D1-14	**VI/A**	**IID**	**2.03.01**		a. Site clearance including cutting of trees **of girth less than 30 centimeters.**	a. Site clearance including cutting of trees **as specified elsewhere in this specification.**

Amendment 01 to Technical Specifications (Section VI)

D1-15	**VI/B**	**D-1-1**	**1.01.00**		This specification is to cover, survey works,…… **Preliminary** geotechnical investigation in the proposed area has been carried out by the Owner and the bore-log data is furnished in Annexure 'C' …… …… The Bidder shall make the layout and levels of all structures from the general grid of the plot and the nearest GSI benchmark or other acceptable benchmark of Government de-part- ment…… …….	This specification is to cover, survey works,…… **Detailed** geotechnical investigation in the proposed area has been carried out by the Owner and the bore-log data is furnished in Annexure 'C'. …… The Bidder shall make the layout and levels of all structures from the general grid of the plot and the nearest GSI benchmark or other acceptable benchmark of Government department **/ NTPC Ltd**……..
D1-16	**VI/B**	**D-1-3**	**3.07.00**		"As-built" drawings in AutoCad & PDF format shall be prepared and submitted to owner by the Contractor after completion of construction / erection, incorporating changes, if any.	"As-built" drawings in AutoCad & PDF format shall be prepared and submitted to owner by the Contractor after completion of construction / erection, incorporating changes, if any. **Final executed quantities of RCC and structural Steel shall be incorporated in the As-Built drawing.**
D1-17	**VI/B**	**D-1-4**	**4.03.10**		Filling upto the specified formation level shall extend at least 2.0 m beyond the outside face of boundary wall/fence. Thereafter, it shall be finished at a suitable slope (not steeper than 1 Vertical: 2 Horizontal).	Filling upto the specified formation level shall extend at least 2.0 m beyond the outside face of boundary wall/fence. Thereafter, it shall be finished at a suitable slope (not steeper than 1 Vertical: 2 Horizontal) **with Rip-Rap**. **For slope steeper than 1:2 encountered anywhere, slope protection shall be provided at slope with gabion wall/RCC retaining wall as per the requirement.**
D1-18	**VI/B**	**D-1-5**	5.23.18		The scope for pota- ble…… …… Minimum size of main bar of steel grating (Galvanised to 610 gm/m^2) shall be **25 mm** x 5mm and cross bars 6mm**……** Galvanizing shall be as per IS: 4736. The minimum mass of zinc coating shall not be less than 360 gms/sq.m. as per IS:6745. The zinc coating shall be smooth and shall be subjected to testing as per IS: 2633, for uniformity of coating. The zinc coating shall be free from all defects as per IS: 2629.	The scope for pota- ble……. Minimum size of main bar of steel grating (Galvanised to 610 gm/m^2) shall be 40mm x 5mm and cross bars 6mm…… ~~**Galvanizing shall be as per IS: 4736. The minimum mass of zinc coating shall not be less than 360 gms/sq.m. as per IS:6745. The zinc coating shall be smooth and shall be subjected to testing as per IS: 2633, for uniformity of coating. The zinc coating shall be free from all defects as per IS: 2629.**~~ All rain water down…… …….

Amendment 01 to Technical Specifications (Section VI)

					All rain water down…..…… …… ….	
D1-19	**VI/B**	**D-1-8**	**8.02.01**		c) The minimum grades of concrete….	c) The minimum grades of concrete…. Refer Annexure AC-1
D1-20	**VI/B**	**D-1-9**	**9.17.00**	**19 of 36**	Table A Interior finishing Schedule Table B Exterior finishing schedule	Revised Table A B attached as annexure sl no AC-2 'D-1-9 - Table A and Table B'
D1-21	**VI/B**	**D-1-5**	**5.06.01**		The civil works for fgd system shall comprise of civil, structural and architectural works below and above ground level of ball mill building, ball mill foundations, fgd control room building, slurry re-circulating pumps & oxidation blowers building, tank foundations, absorber tower foundation, mcc building, gypsum dewatering building, transformer foundation, equipment foundations, pipe & cable gallery/ trestles, drainage, sanitation, water supply (from terminal points to various buildings/facilities) and all other civil, structural and architectural works associated with the complete fgd system specified elsewhere in this specification. Bidder may also refer terminal points & exclusions in this regard.	The civil works for FGD system shall comprise of civil, structural and architectural works below and above ground level of ball mill building, ball mill foundations, FGD control room building, slurry re-circulating pumps & oxidation blowers shed, tank foundations, absorber tower foundation, mcc building, gypsum dewatering building, transformer foundation, equipment foundations, pipe & cable gallery/ trestles, drainage, sanitation, water supply (from terminal points to various buildings/facilities) and all other civil, structural and architectural works associated with the complete FGD system specified elsewhere in this specification. Bidder may also refer terminal points & exclusions in this regard.
D1-22	**VI/A**	**IID**	**1.00.00**		4(c) Packaged type Sewerage treatment plant (3 nos. as indicated in tender drawing General Layout Plan) and sewage pumping station including sewage pump, sump & house and connection up to sewage treatment plants **(either of owner or bidder); connection of sewage lines of all buildings under Bidder's scope to the nearest sewerage system.**	4(c) Packaged type Sewerage treatment plant (3 nos. as indicated in tender drawing General Layout Plan) and sewage pumping station including sewage pump, sump & house and connection up to sewage treatment plants**. Storage or handling of effluent after tertiary treatment is excluded from bidder's scope of work.**

Amendment 01 to Technical Specifications (Section VI)

D1-23	**VI/B**	**D-1-9**	9.07.04	**7 of 33**	For ESP Control Room Building, wall shall be of Autoclaved Aerated Concrete Block. Autoclaved Aerated Concrete (AAC) block masonry shall be with blocks having dimensions of 625 mm x 250 mm. thickness ranging from 100 mm to 300 mm conforming to I.S. :2185(part III).The jointing cement sand mortar in the composition of 1: 6 (Cement: sand) shall be used with suitable plasticizer(optional). Sand having modulus of fineness 1.1 shall be used. The horizontal and vertical joint thickness shall be approximately 10 mm. In case of partition walls (100 mm /125 mm thk.) the joint reinforcement i.e. 1 number of 6-8 mm diameter bars shall be placed at every alternate course to be anchored properly with the main structure. All other structural requirements like stiffening of masonry, joint reinforcement etc. in the AAC masonry work strictly be carried out as per instructions laid down in IS 6041 – 1985, IS - 1905. For control room , control equipment room in MPH Building , walls shall be of factory made composite modular light weight aerated concrete panels,(minimum 2 hours of fire rating) consisting of 2 fiber reinforced cement sheets (minimum 4 mm thick) on either side of light weight concrete core, having minimum compressive strength of 35 Kg / Cm2 and the density in the range of 700-900 Kg. / cu.m. of the thickness and fire rating as specified below, to provide external wall and internal partition at all levels, capable of sustaining wind pressure of 3.00 M height (H) within limiting deflection of span/250, fixed in position in tongue and groove jointing system by screwing the panels to top and bottom U channels, (channels minimum 1.25 mm thick and galvanised to grade 180 (minimum) as per IS : 277), fixing U profiled top and bottom channels to concrete / primary steel members which are placed at the maximum vertical	For ESP Control Room Building, wall shall be of Autoclaved Aerated Concrete Block. Autoclaved Aerated Concrete (AAC) block masonry shall be with blocks having dimensions of 625 mm x 250 mm. thickness ranging from 100 mm to 300 mm conforming to I.S. :2185(part III).The jointing cement sand mortar in the composition of 1: 6 (Cement: sand) shall be used with suitable plasticizer(optional). Sand having modulus of fineness 1.1 shall be used. The horizontal and vertical joint thickness shall be approximately 10 mm. In case of partition walls (100 mm /125 mm thk.) the joint reinforcement i.e. 1 number of 6-8 mm diameter bars shall be placed at every alternate course to be anchored properly with the main structure. All other structural requirements like stiffening of masonry, joint reinforcement etc. in the AAC masonry work strictly be carried out as per instructions laid down in IS 6041 – 1985, IS - 1905. For control room , control equipment room in MPH Building, **where dry wall construction is envisaged,** the walls shall be constructed of factory made composite modular light weight aerated concrete panels,(minimum 2 hours of fire rating) consisting of 2 fiber reinforced cement sheets (minimum 4 mm thick) on either side of light weight concrete core, having minimum compressive strength of 35 Kg / Cm2 and the density in the range of 700-900 Kg. / cu.m. of the thickness and fire rating as specified below, to provide external wall and internal partition at all levels, capable of sustaining wind pressure of 3.00 M height (H) within limiting deflection of span/250, fixed in position in tongue and groove jointing system by screwing the panels to top and bottom U channels, (channels minimum 1.25 mm thick and galvanised to grade 180 (minimum) as per IS : 277), fixing U profiled top and bottom channels to concrete / primary steel members which are placed at the maximum vertical spacing of 4.5m with the help of galvanised steel expansion fasteners, filling the joints from both faces with silicon acrylic paste and making the same water tight by covering with fibre glass tape (minimum 50 mm wide and minimum 0.5 mm thick) or by any other suitable material, so as to ensure that the entire construction done with the light weight aerated concrete panels are weather proof and panel surfaces are flush for painting, creating opening for doors / windows /ventilators / ducts / pipes/fans/AC etc. and finishing the opening face with the same U profiled galvanized steel

					spacing of 4.5m with the help of galvanised steel expansion fasteners, filling the joints from both faces with silicon acrylic paste and making the same water tight by covering with fibre glass tape (minimum 50 mm wide and minimum 0.5 mm thick) or by any other suitable material, so as to ensure that the entire construction done with the light weight aerated concrete panels are weather proof and panel surfaces are flush for painting, creating opening for doors / windows /ventilators / ducts / pipes/fans/AC etc. and finishing the opening face with the same U profiled galvanized steel channel which is used at the top and bottom.	channel which is used at the top and bottom. **The Outer wall of control room, control equipment room in MPH Building shall be made of aerated concrete panels over that 50 mm thick mineral wool insulation and metal sheeting on outside.**
D1-24	**VI/E**			**Tender Drawing**	XXXX-999-POC-A-020 WORKER'S RESTROOM	XXXX-999-POC-A-020 **Sheds for Construction workers and O&M Workers**
D1-25	**VI/B**	**D-1-9**	9.10.09	**12 of 33**	All internal paints shall be of low VOC (Less than 50 g /L) content conforming to GRIHA rating for reduction of VOC content	**All internal paints shall be of low VOC (Less than 50 g /L) content.**
D1-26	**VI/B**	**D-1-8**				**8.10.00 Controlled Low Strength Material (CLSM)** Bidder to refer Annexure-AC-3
D1-27	**VI/E**	**Tender drawing**	**1**		GENERAL LAYOUT PLAN XXXX-999-POC-F-001	GENERAL LAYOUT PLAN XXXX-999-POC-F-001 Rev B
D1-28	**VI/B**	**D-1-9**	**9.03.02**	**2 of 33**	Each Toilet block shall have the following minimum facilities. Unless specified all the fittings shall be of Chromium plated brass (fancy decorative type) (Jaquar / Hindware/ equivalent) . a) One number wall mounted coloured glazed vitreous China European water closet and dual flushing valve system, water faucet, health Faucet (Jaquar / Hindware/ equivalent) toilet paper holder as per IS:2556	Each Toilet block shall have the following minimum facilities. Unless specified all the fittings shall be of Chromium plated brass (decorativetype).(Jaquar / Hindware/ equivalent) a) One number wall mounted coloured glazed vitreous China European water closet and flushing valve system, water faucet, toilet paper holder as per IS:2556. (Jaquar / Hindware/ equivalent) b) One number colour glazed ceramic oval shaped wash basin 450x 550 mm (pprox..) mounted under the counter with18mm thick granite beveled edge counter fitted with photo-voltaic control system for water controls, bottle trap as

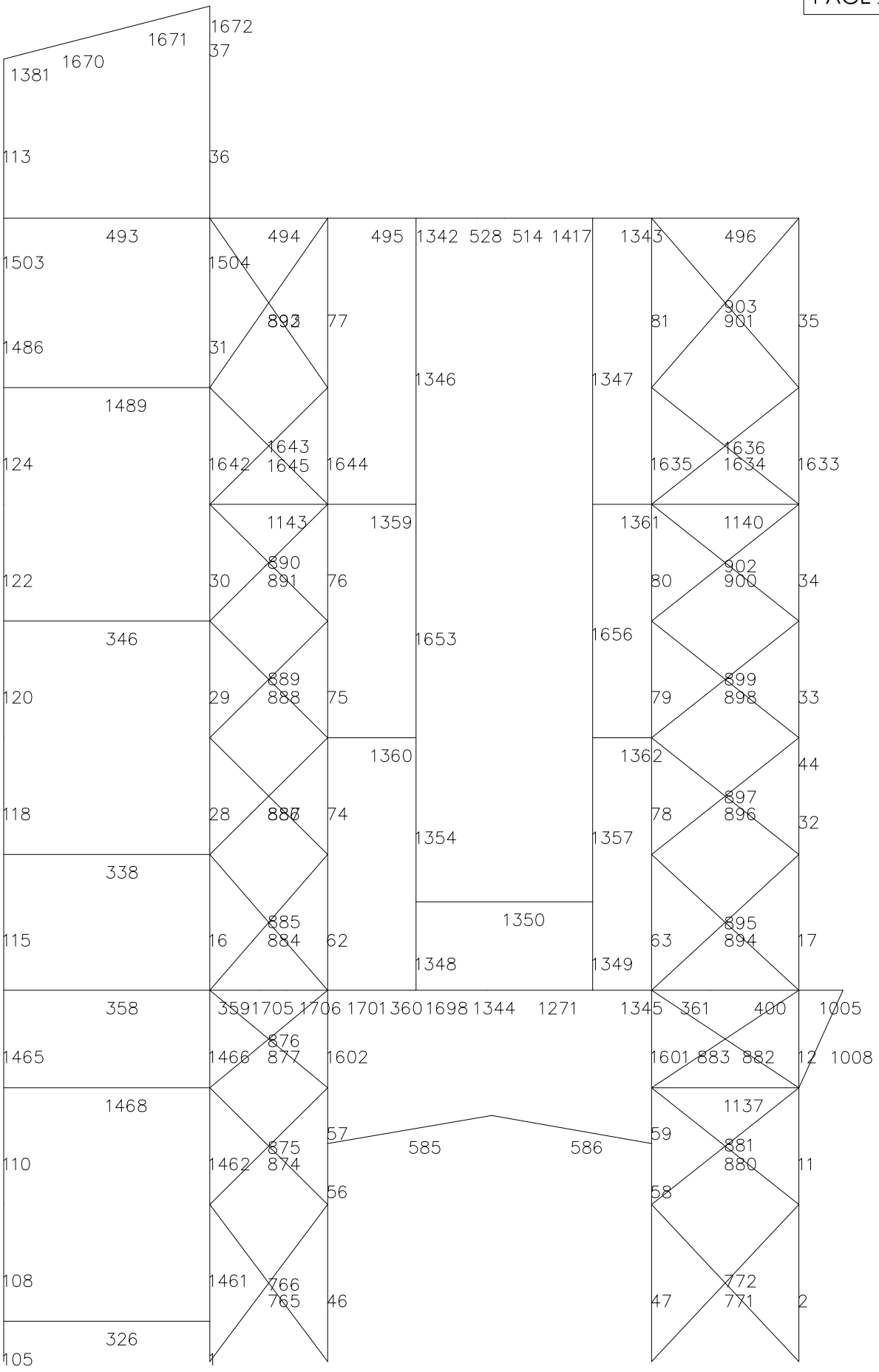
					b) One number colour glazed ceramic oval shaped wash basin 450x 550 mm (approx.) mounted over under the counter with 18mm thick granite beveled edge counter fitted with photo-voltaic control system for water controls, bottle trap as per IS:2556. For common toilets, number of washbasins shall be as per requirement. However, for Pump Houses the same shall be provided without photo voltaic control system for water control. c) For Male Toilets Urinal as per requirements, with all fittings with photovoltaic control flushing system as per IS: 2556. d) One number looking mirror 600 x 900 x 6 mm (jaquar / Hindware / Asahi) , edge mounted with teak beading / SS studs and minimum 12 mm thick plywood backing, one number stainless towel rail 600 x 20 mm, one number liquid soap dispenser per wash basin. e) One toilet with required facilities shall be provided for physically challenged persons as per National Building Code requirements f) Janitor Space & space for drinking water cooler. g) Electric operated hand dryer with photo voltaic control. h) The pantry shall consist of one number stainless steel pantry sink, as per IS : 13983, of size 610 x 510 mm, bowl depth 200 mm with drain board of at least 450 mm length with coupling , CP bottle trap, hot and cold water mixer, one number geyser of 25 liters capacity, with inlet and outlet connections, one number over head water storage tank, as per IS : 12701 and of minimum 500 liters capacity, complete with float valve, overflow drainage pipe arrangement, GI concealed water supply pipe of minimum 12 mm diameter of medium class, cast iron sanitary pipe (with lead joints) of minimum 75 mm diameter, floor trap with Stainless	per IS:2556. For common toilets, number of washbasins shall be as per requirement. However, for Pump Houses the same shall be provided without photo voltaic control system for water control. c) For Male Toilets Urinal as per requirements, with all fittings with photovoltaic control flushing system as per IS: 2556. d) One number looking mirror 600 x 900 x 6 mm, edge mounted with teak beading and minimum 12 mm thick plywood backing or mounted with SS Studs, one number stainless towel rail 600 x 20 mm, one number liquid soap dispenser. (Jaquar / Hindware/ Asai/ Saingobain /equivalent) **e) One toilet with required facilities shall be provided for physically challenged persons on Ground floor of Main Power House Building,** **f)** Janitor Space & space for drinking water cooler. g) Electric operated hand dryer with photo voltaic control. **h) The pantry shall consist of one number stainless steel pantry sink, as per IS : 13983, of size 610 x 510 mm, bowl depth 200 mm with drain board of at least 450 mm length withcoupling , CP bottle trap, hot and cold water mixer, one number geyser of 25 liters capacity, with inlet and outlet connections, one number over head water storage tank, as per IS : 12701 and of minimum 500 liters capacity, complete with float valve, overflow drainage pipe arrangement, CPVC concealed water supply pipe of minimum 12 mm diameter, CPVC sanitary pipe (with lead joints) of minimum 75 mm diameter, floor trap with Stainless Steel grating, inlet and outlet connections for supply and drainage, with all bends, tees, junctions, sockets, etc., as are necessary for the commissioning and efficient functioning of the pantry (all sanitary fittings shall be heavy duty chrome plated brass, unless noted otherwise)** One number of pantry shall be provided on Control Room floor of ESP control room building and One number of pantry shall be provided in Buildings having Control Room .. i) Laboratory sink shall be of white vitreous china of size 600x400x200 mm conforming to IS: 2556 (Part-5)with single 15 mm C.P. brass pillar taps with elbow operated levers ISI Marked.

					Steel grating, inlet and outlet connections for supply and drainage, with all bends, tees, junctions, sockets, etc., as are necessary for the commissioning and efficient functioning of the pantry (all sanitary fittings shall be heavy duty chrome plated brass, unless noted otherwise) One number of pantry shall be provided on Control Room floor of ESP control room building and One number of pantry shall be provided in Buildings having Control Room . i) Laboratory sink shall be of white vitreous china of size 600x400x200 mm conforming to IS: 2556 (Part-5) with single 15 mm C.P. brass pillar taps with elbow operated levers ISI Marked. j) In addition, adequate number of portable toilet units with adequate plumbing and sanitary arrangement, shall be provided during construction stage for workers. k) Adequate number of toilet units with adequate necessary plumbing and sanitary arrangement, shall be provided for workers (O&M workers).	j) In addition, adequate number of portable toilet units with adequate plumbing and sanitary arrangement, shall be provided during construction stage for workers. k) Adequate number of toilet units with adequate plumbing and sanitary arrangement, shall be provided for workers (O&M workers).
D1-29	**VI/B**	**D-1-9**	**9.02.01**	**1 of 33**	a) Minimum 1000 mm high (from floor/ roof level) hand railing shall be provided around all floor/roof openings, projections/balconies, walkways, platforms, steel stairs, etc., wherever the height of the building is more than 12m, railing height shall be 1.2m. All handrails and ladder pipes (except at operating floors) shall be 32 mm nominal bore MS pipes (medium class) conforming to IS: 1161 and shall be galvanised as per IS: 4736 and finished with suitable paint. All rungs and ladders shall also be galvanised. Minimum weight of galvanising shall be 610 g/sqm. The spacing of vertical posts shall be maximum 1500mm. Two number of horizontal rails shall be provided including the top member. In addition, toe guard/ kick plate of min size 100x6th shall be provided	a) Minimum 1000 mm high (from floor/ roof level) hand railing shall be provided around all floor/roof openings, projections/balconies, walkways, platforms, steel stairs, etc., wherever the height of the building is more than 12m, railing height shall be 1.2m. All handrails and ladder pipes (except at operating floors) shall be 32 mm nominal bore MS pipes (medium class) conforming to IS: 1161 and **shall finished with suitable paint**. All rungs and ladders shall also be **finished with suitable paint**. The spacing of vertical posts shall be maximum 1500mm. Two number of horizontal rails shall be provided including the top member. In addition, toe guard/ kick plate of min size 100x6th shall be provided above the floor level.

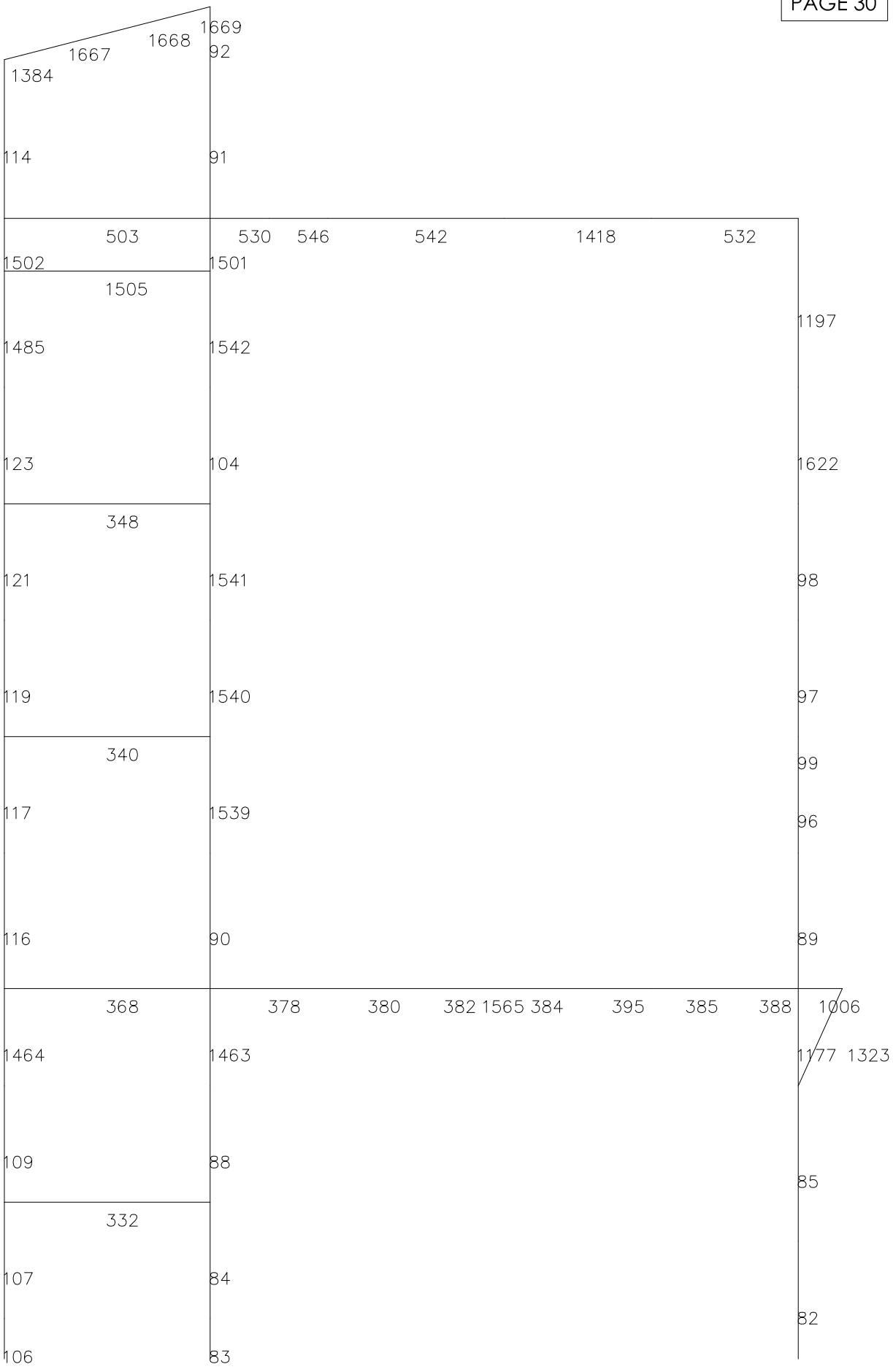
					above the floor level. For handrailing at operating floors of Main Power House including RCC stairs (for one flight above and below operating floor level), passages, around all floor openings shall be Stainless Steel (SS) pipes shall be used. For SS handrail 32NB/50NB/60NB (polished) stainless steel pipe shall be provided. The spacing of vertical posts shall not be more than 1500mm. Two number of horizontal rails shall be provided including the top member. SS Toe guard, knee guard and kick plate shall be provided above the floor level. b) All stairs shall have a maximum riser height of 175mm and a minimum tread width of 275 mm. Minimum clear width of stair shall be 1200 mm unless specified otherwise.	For handrailing at operating floors of Main Power House including RCC stairs (for one flight above and below operating floor level), passages, around all floor openings shall be Stainless Steel (SS) pipes shall be used. For SS handrail 32NB/50NB/60NB (polished) stainless steel **pipe with wall thickness 1.65 mm (minimum)** shall be provided. The spacing of vertical posts shall not be more than 1500mm. Two number of horizontal rails shall be provided including the top member. SS Toe guard, and knee guard **(100 mm wide and 6 mm thick)** shall be provided above the floor level. **b) All stairs shall have a maximum riser height of 150mm and a minimum tread width of 300 mm. Minimum clear width of stair shall be 1500 mm unless specified otherwise. The width of staircase shall meet the National Building Code requirements.**
D1-30	**VI/B**	**D-1-9**	**9.10.13**	**12 of 33**	**Exterior Painting on Wall (Premium Acrylic Smooth Exterior Paint with Silicone Additives)** The paint shall be (premium acrylic smooth exterior paint with silicone additives) of approved brand and manufacture. This paint shall be brought to the site of work by the contractor in its original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The materials shall be kept in the joint custody of the contractor and the Engineer-in-Charge. The empty containers shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge. Preparation of Surface	**Exterior Painting on Wall (Premium Acrylic SmoothExterior Paint with Silicone Additives)** The paint shall be (premium acrylic smooth exterior paint with silicone additives) of approved brand and manufacture. This paint shall be brought to the site of work by the contractor in its original containers in sealed condition. The material shall be brought in at a time in adequate quantities to suffice for the whole work or at least a fortnight's work. The materials shall be kept in the joint custody of the contractor and the Engineer-in-Charge. The empty containers shall not be removed from the site of work till the relevant item of work has been completed and permission obtained from the Engineer-in-Charge. Preparation of Surface For new work, the surface shall be thoroughly cleaned off all mortar dropping, dirt dust, algae, fungus or moth, grease and other foreign matter of brushing and washing, pitting in plaster shall make good, surface imperfections such as cracks, holes etc. should be repaired using white cement. The pre-

					For new work, the surface shall be thoroughly cleaned off all mortar dropping, dirt dust, algae, fungus or moth, grease and other foreign matter of brushing and washing, pitting in plaster shall make good, surface imperfections such as cracks, holes etc. should be repaired using white cement. The prepared surface shall have received the approval of the Engineer in charge after inspection before painting is commenced. Application of Base Coat Base coat shall be of water proofing cement paint. Preparation of Mix for Base Coat Cement Paint shall be mixed in such quantities as can be used up within an hour of its mixing as otherwise the mixture will set and thicken, affecting flow and finish. Cement Paint shall be mixed with water in two stages. The first stage shall comprise of 2 parts of cement Paint and one part of water stirred thoroughly and allowed to stand for 5 minutes. Care shall be taken to add the cement Paint gradually to the water and not vice versa. The second stage shall comprise of adding further one part of water to the mix and stirring thoroughly to obtain a liquid of workable and uniform consistency. In all cases the manufacturer's instructions shall be followed meticulously. The lids of cement Paint drums shall be kept tightly closed when not in use, as by exposure to atmosphere the cement Paint rapidly becomes air set due to its hygroscopic qualities. In case of cement Paint brought in gunny bags, once the bag is opened, the contents should be consumed in full on the day of its opening. If the same is not likely to	pared surface shall have received the approval of the Engineer in charge after inspection before painting is commenced. **Textured base coat** **Exterior wall Texture-New work (Two or more coats applied @ 6.5kg/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm). High Quality Exterior Acrylic Modified resin and special quality Silica Quartz with Trowel Texture (Asian / Dulux/ Nerolac/ Berger/ Equivalent) as per selection…….**

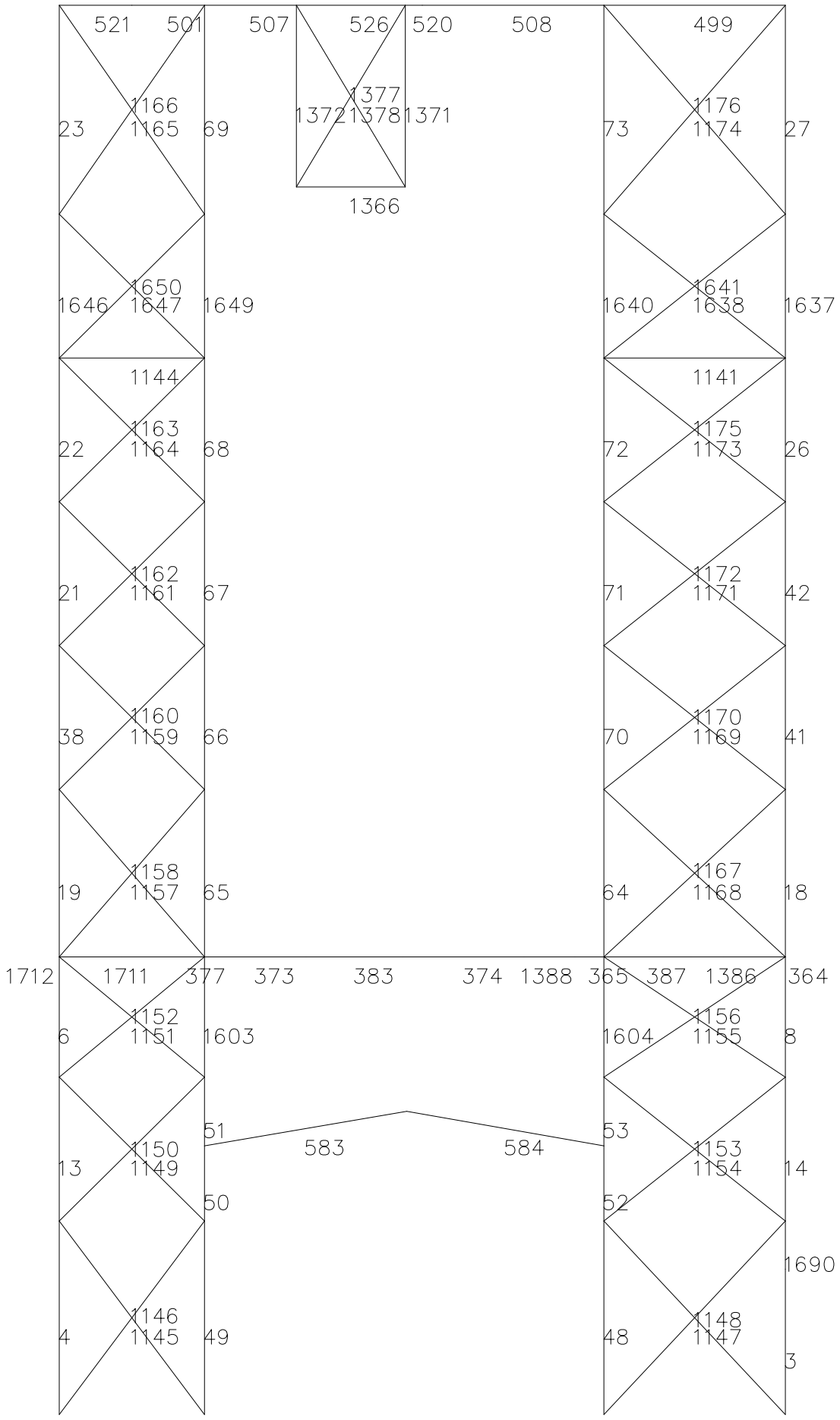
					be consumed in full, the balance quantity should be transferred and preserved in an airtight container to avoid its exposure to atmosphere. Application of Base Coat The solution shall be applied on the clean and wetted surface with brushes or spraying machine. The solution shall be kept well stirred during the period of application. It shall be applied on the surface which is on the shady side of the building so that the direct heat of the sun on the surface is avoided. The method of application of cement Paint shall be as per manufacturer's specification. The completed surface shall be watered after the day's work. The second coat shall be applied after the first coat has been set for at least 24 hours. Before application of the second or subsequent coats, the surface of the previous coat shall not be wetted. For new work, the surface shall be treated with three or more coats of water proof cement Paint as found necessary to get a uniform shade. Precaution Water proof cement Paint shall not be applied on surfaces already treated with white wash, colour wash, distemper dry or oil bound, varnishes, Paints etc. It shall not be applied on gypsums, wood and metal surfaces. If water proofing cement is required to be applied on existing surface, previously treated with white wash, colour wash etc., the surface shall be thoroughly cleaned by scrapping off all the white wash, colour wash etc. completely. Thereafter, a coat of cement primer shall be applied followed by two or	



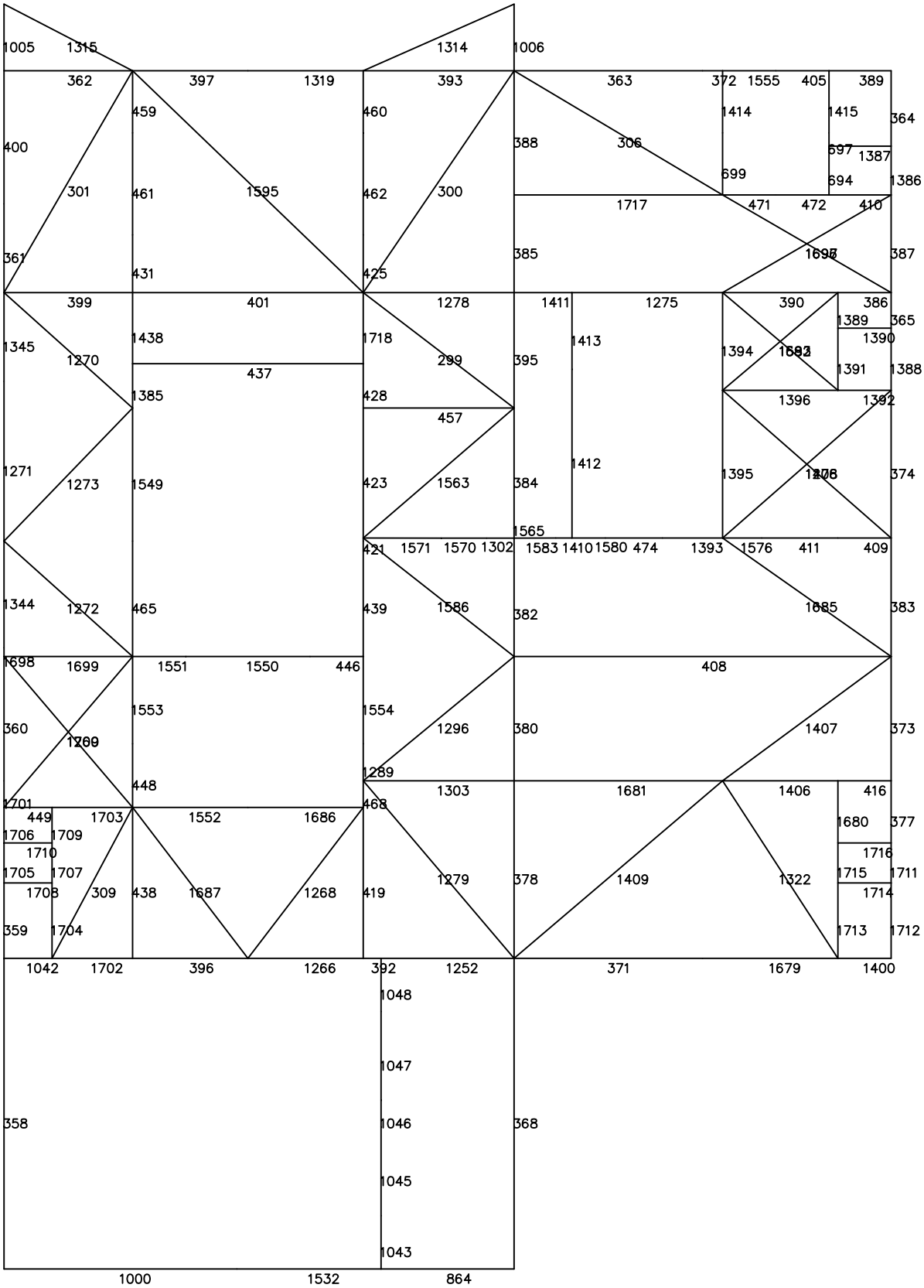
MEMBER NUMBER OF BEAM ALONG GRID-A



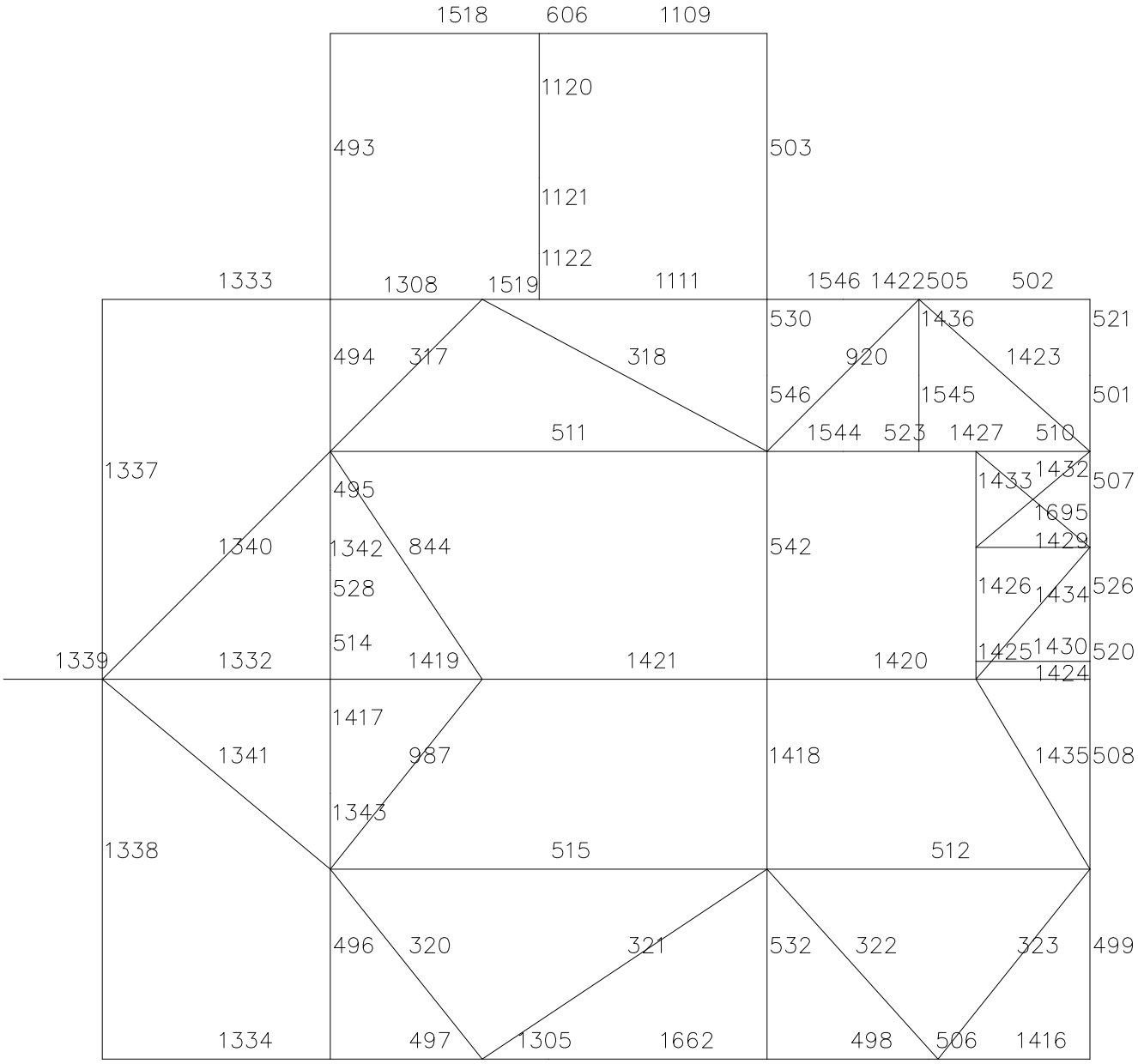
MEMBER NUMBER OF BEAM ALONG GRID - B



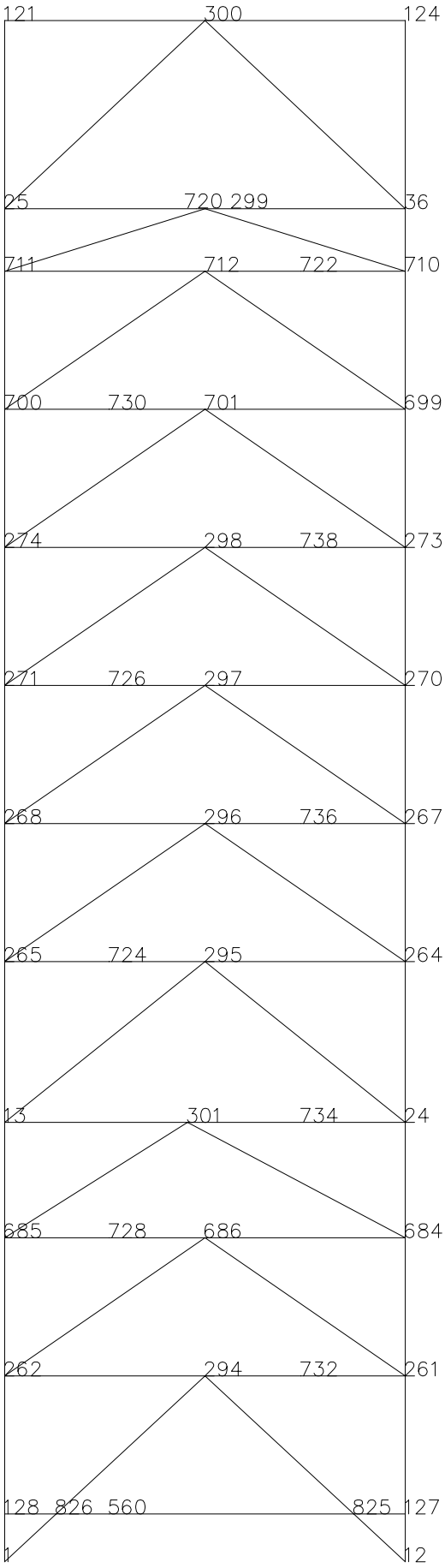
MEMBER NUMBER OF BEAM ALONG GRID-C



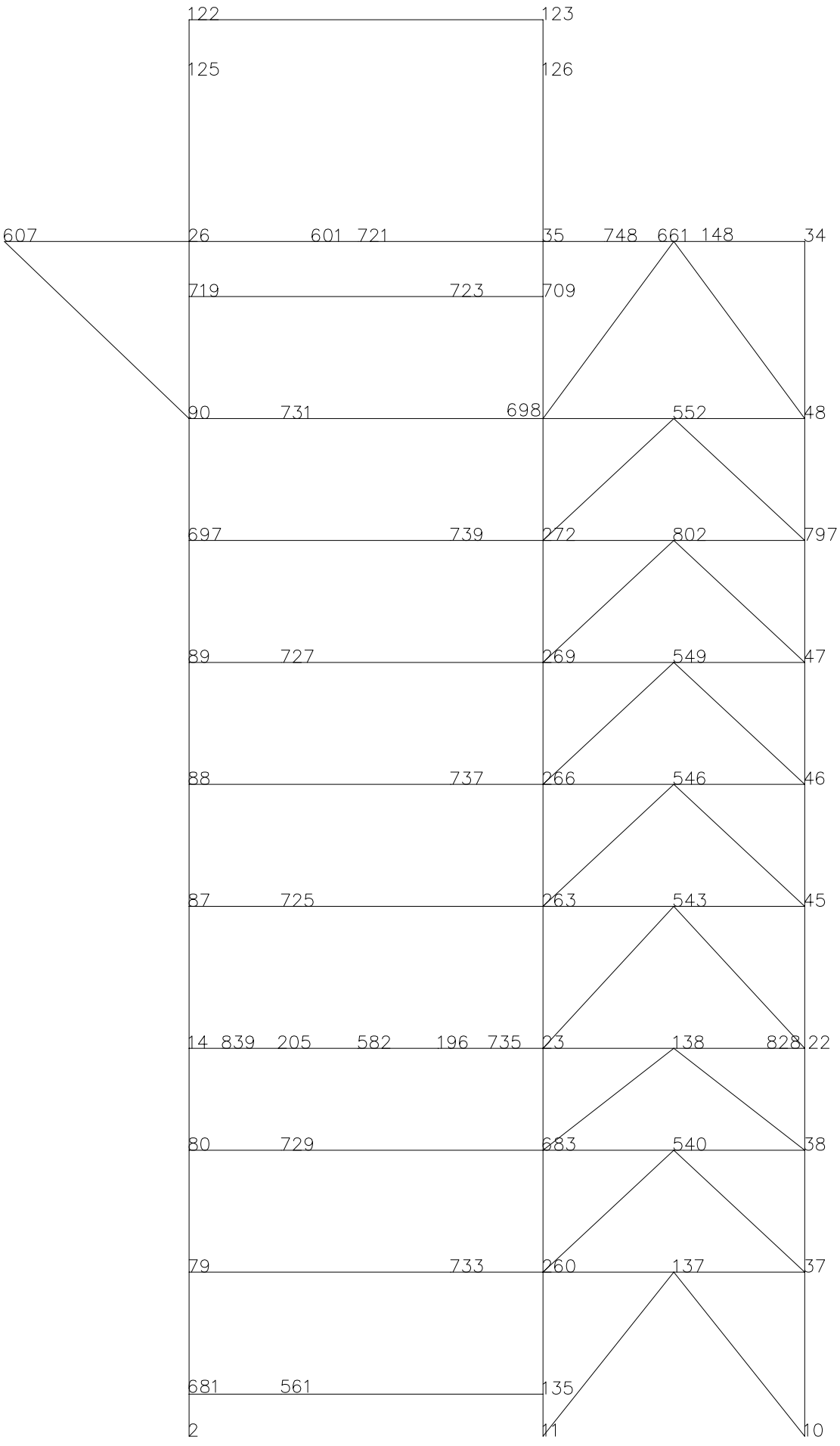
MEMBER NUMBER OF BEAM ALONG 6.6M FLOOR LVL.



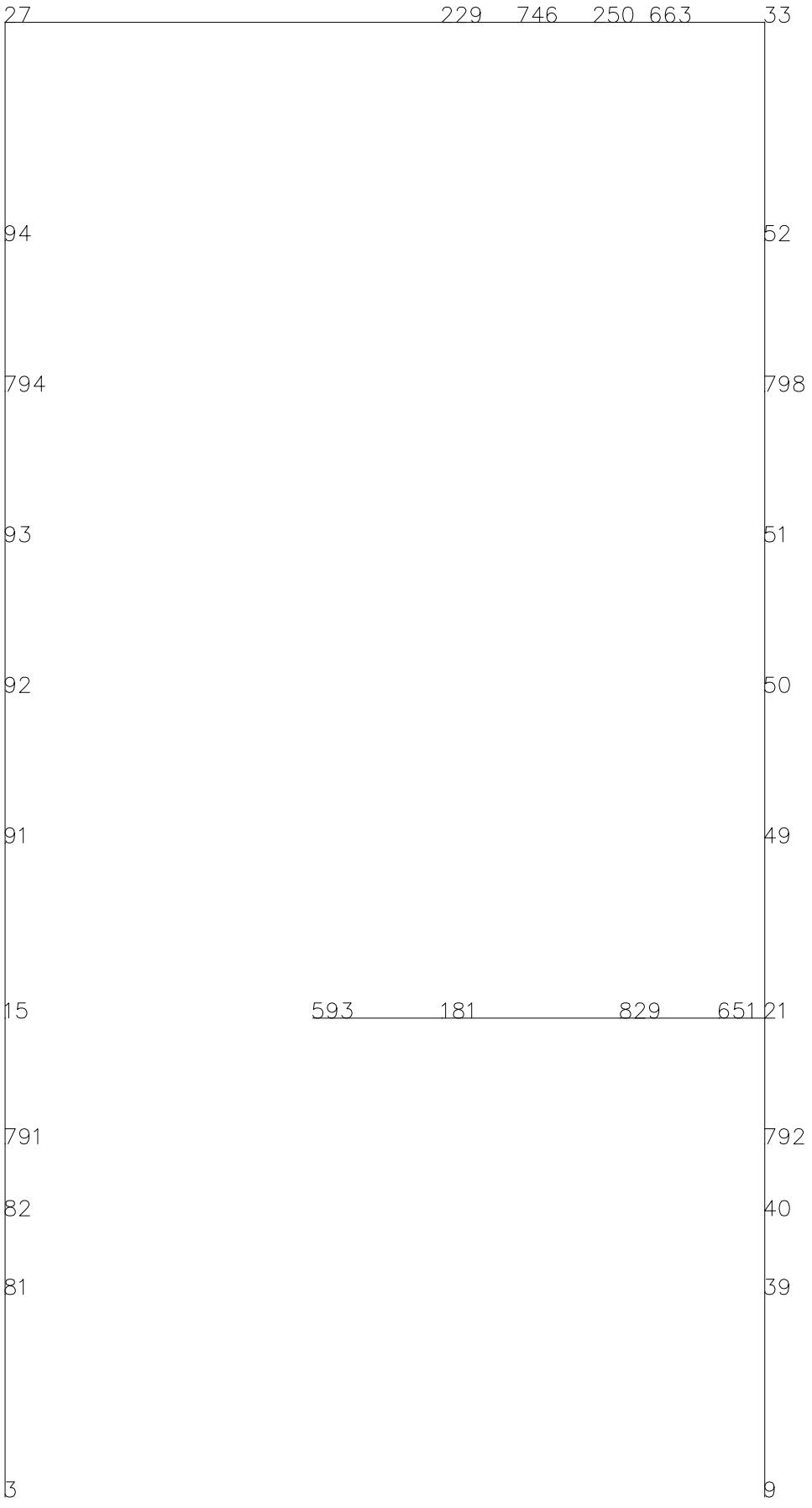
MEMBER NUMBER OF BEAM AT 20.00M FLOOR LVL.'



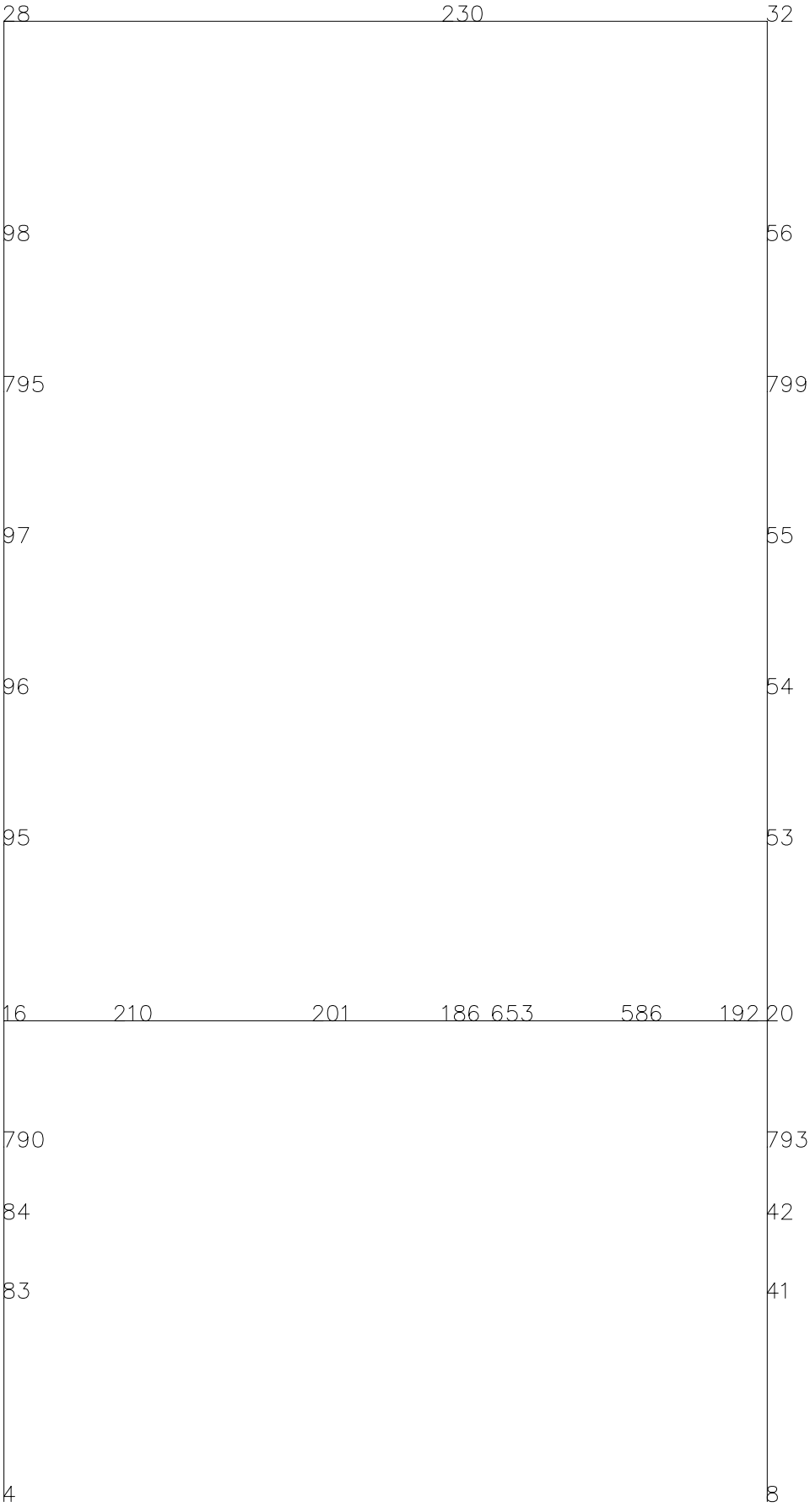
NODE NUMBER OF BEAM ALONG GRID - 1'



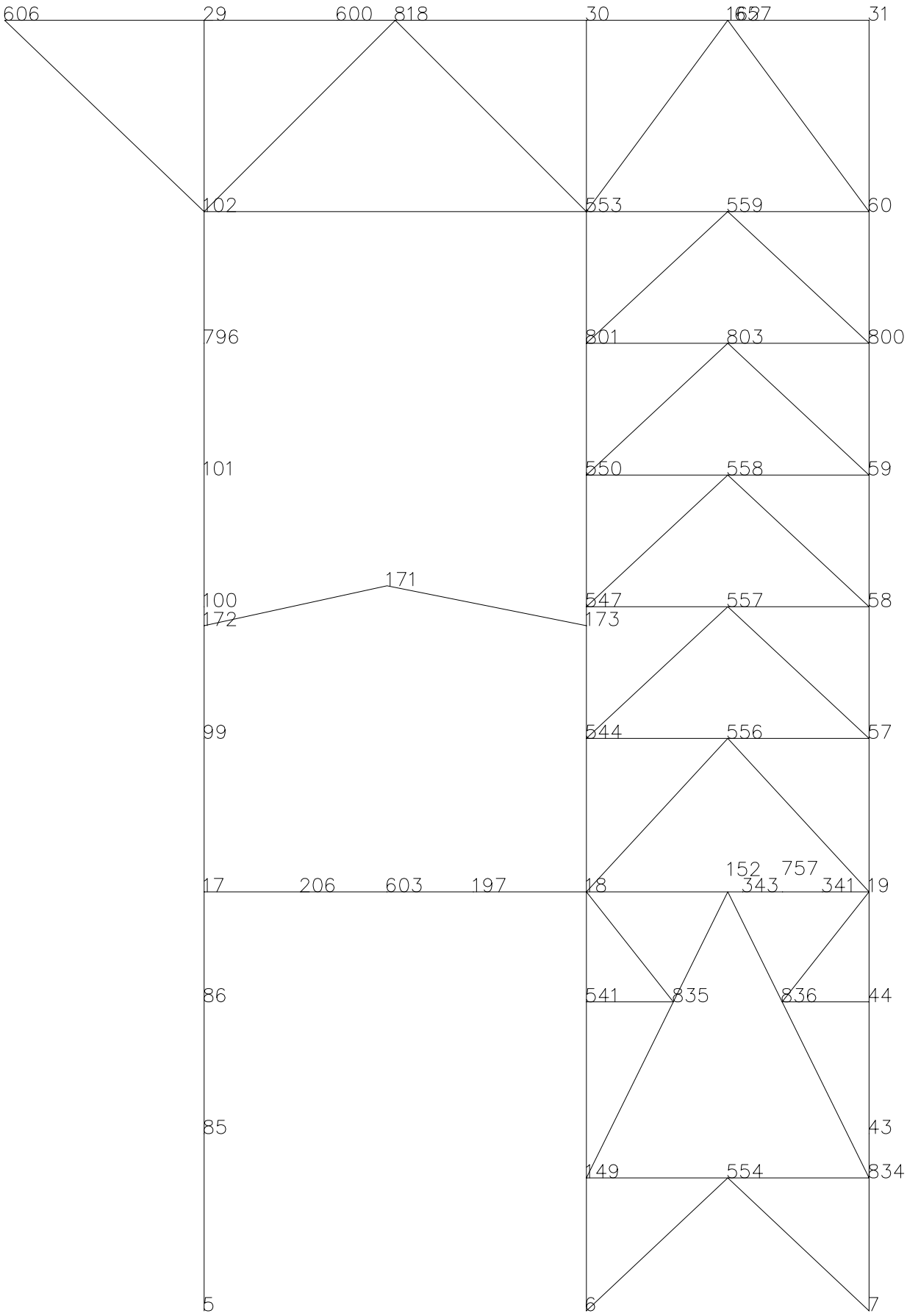
NODE NUMBER OF BEAM ALONG GRID - 1



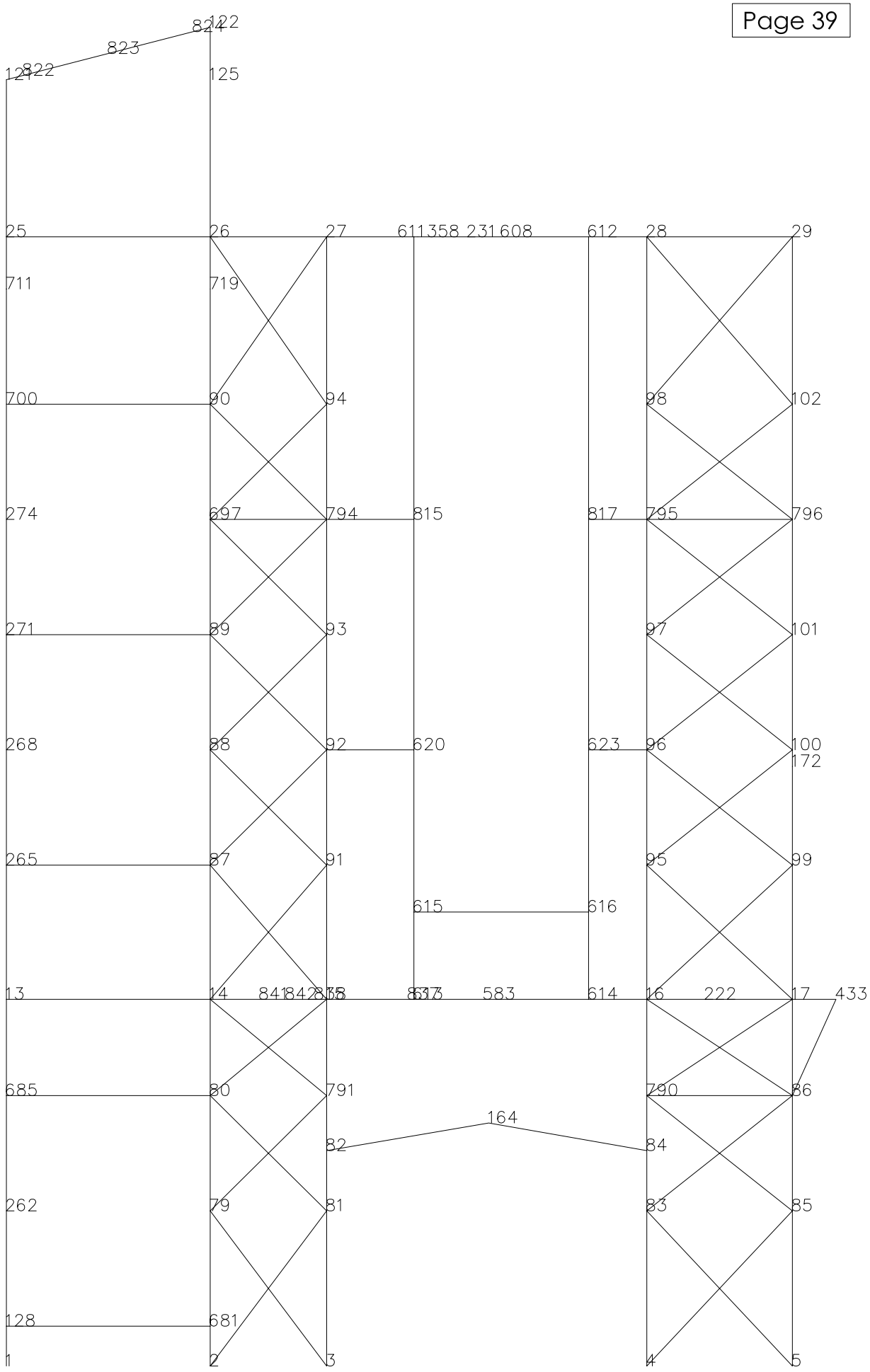
NODE NUMBER OF BEAM ALONG GRID - 2



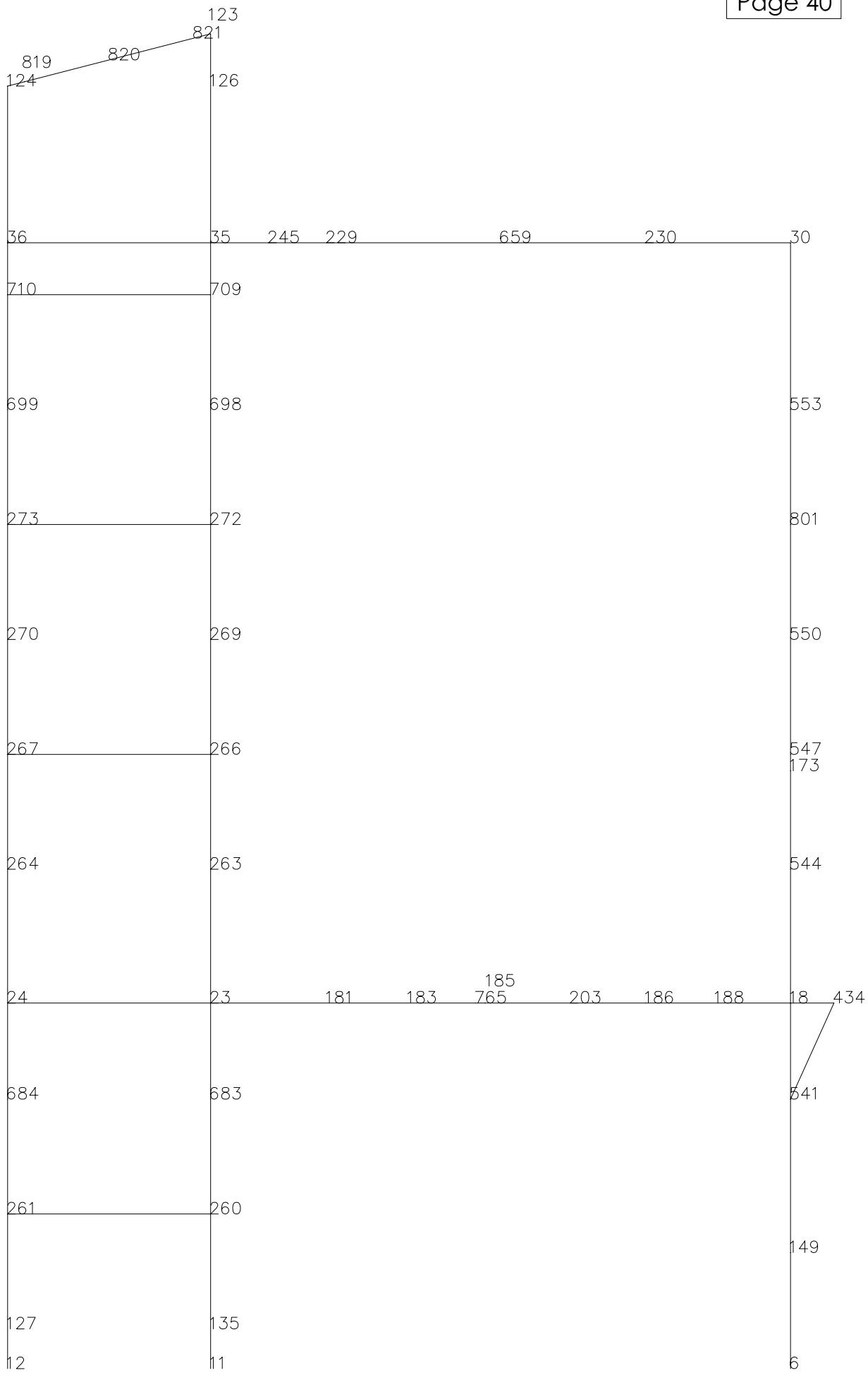
NODE NUMBER OF BEAM ALONG GRID - 3



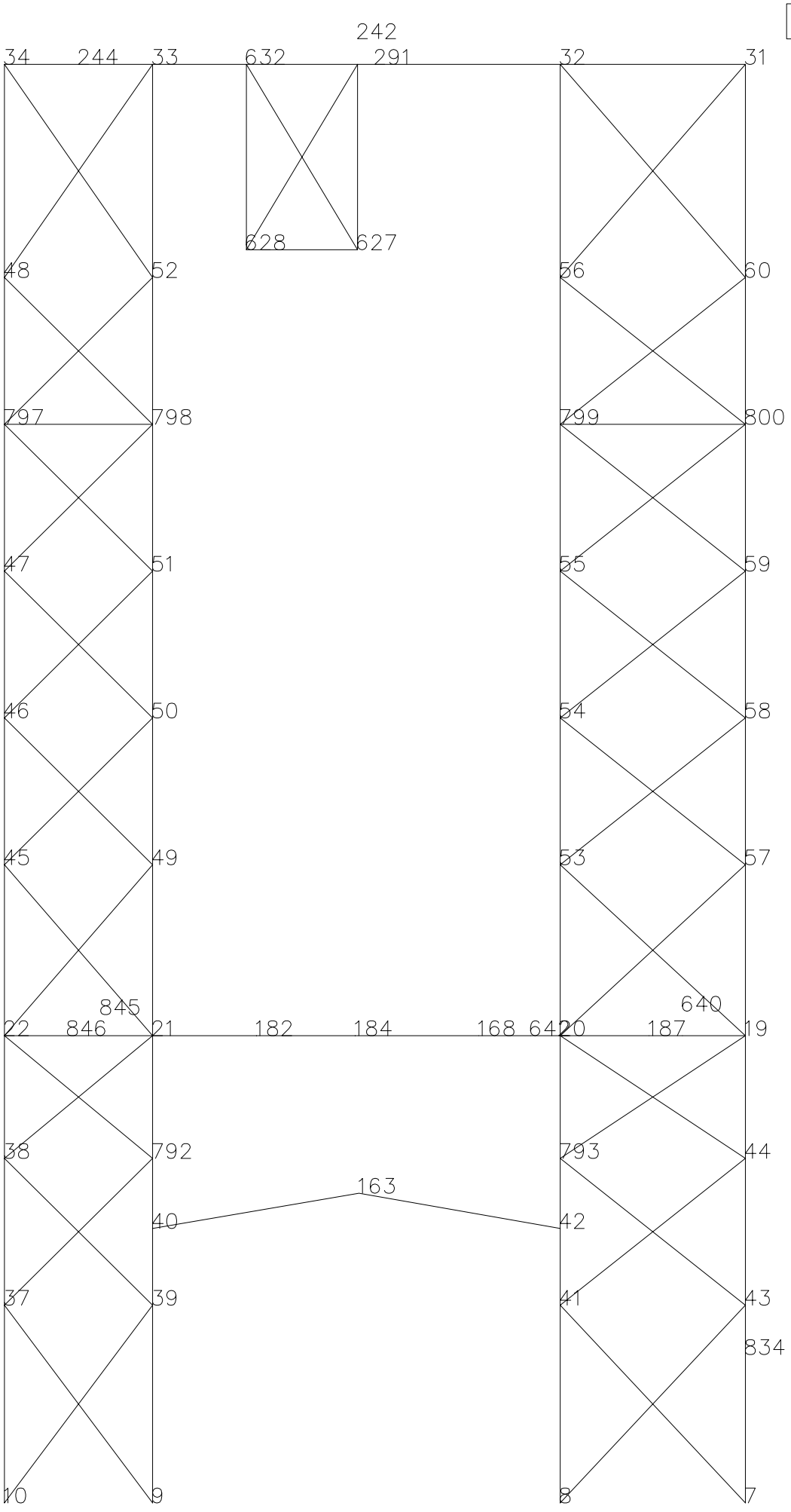
NODE NUMBER OF BEAM ALONG GRID - 4



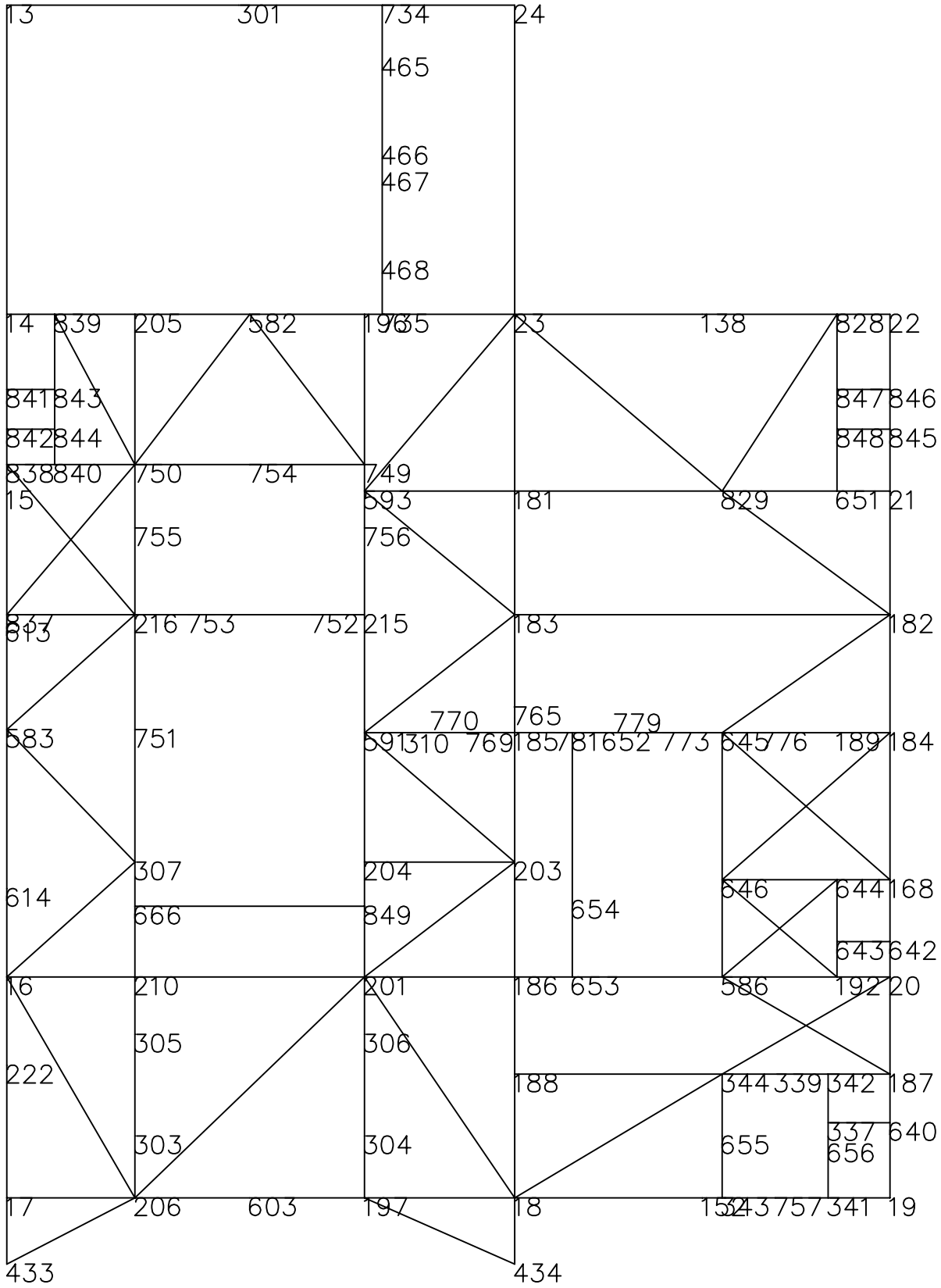
NODE NUMBER OF BEAM ALONG GRID-A



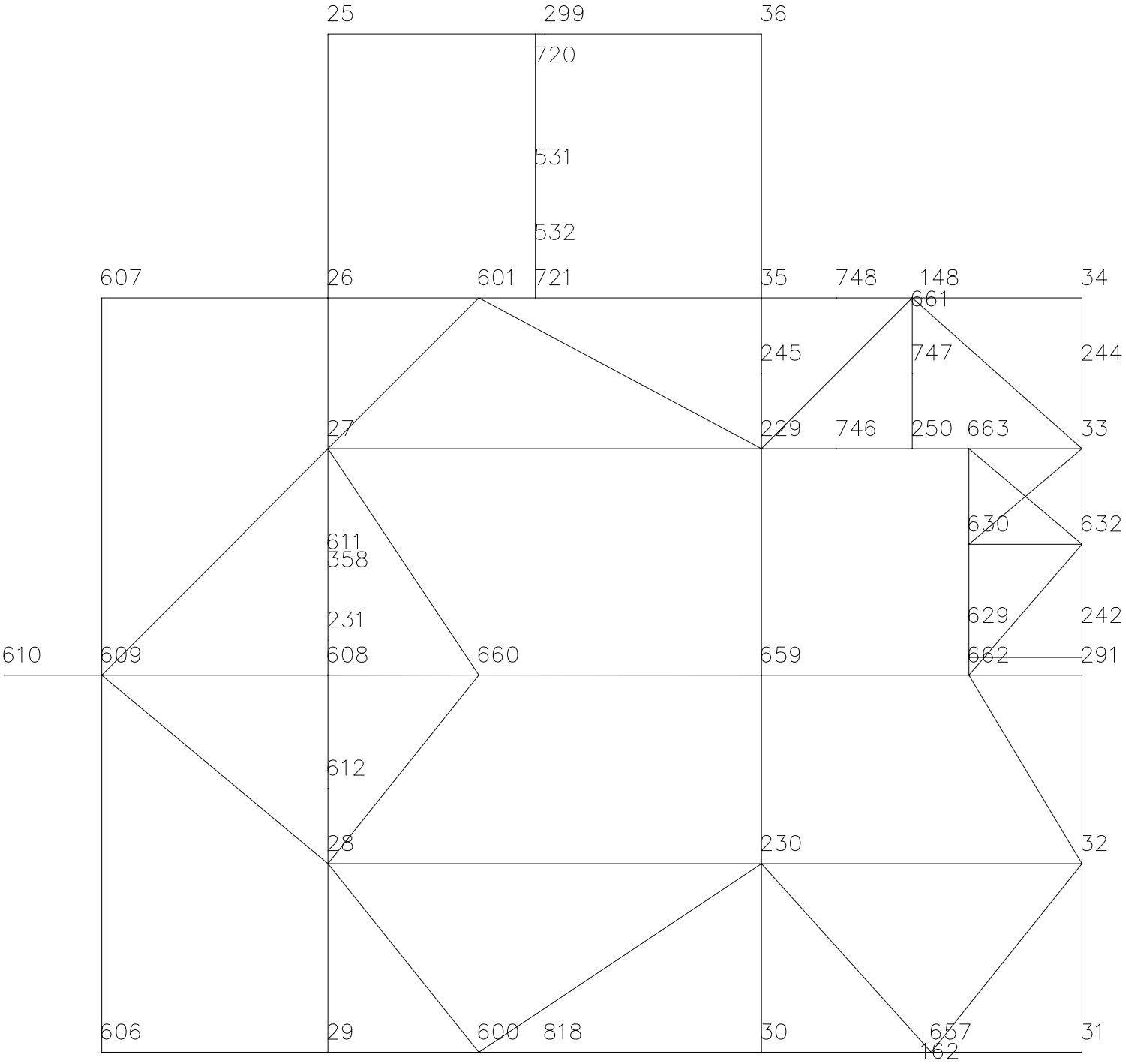
NODE NUMBER OF BEAM ALONG GRID-B



NODE NUMBER OF BEAM ALONG GRID-C



NODE NUMBER OF BEAM AT 6.6M LVL.



NODE NUMBER OF BEAM AT 20.00M FLOOR LVL.

STAAD SPACE
START JOB INFORMATION
JOB NAME SIPAT II SUPER THERMAL FOR NTPC
JOB CLIENT THYSSENKRUPP INDUSTRIES INDIA
ENGINEER NAME MAHA
CHECKER NAME METHA
APPROVED NAME VENU
ENGINEER DATE 14-FEB-05
CHECKER DATE 15-FEB-05
END JOB INFORMATION
INPUT WIDTH 79
UNIT METER KG

JOINT COORDINATES

1	0.000	0.300	0.000
2	0.000	0.300	3.500
3	0.000	0.300	5.500
4	0.000	0.300	11.000
5	0.000	0.300	13.500
6	5.750	0.300	13.500
7	10.000	0.300	13.500
8	10.000	0.300	11.000
9	10.000	0.300	5.500
10	10.000	0.300	3.500
11	5.750	0.300	3.500
12	5.750	0.300	0.000
13	0.000	6.600	0.000
14	0.000	6.600	3.500
15	0.000	6.600	5.500
16	0.000	6.600	11.000
17	0.000	6.600	13.500
18	5.750	6.600	13.500
19	10.000	6.600	13.500
20	10.000	6.600	11.000
21	10.000	6.600	5.500
22	10.000	6.600	3.500
23	5.750	6.600	3.500
24	5.750	6.600	0.000
25	0.000	19.700	0.000
26	0.000	19.700	3.500
27	0.000	19.700	5.500
28	0.000	19.700	11.000
29	0.000	19.700	13.500
30	5.750	19.700	13.500
31	10.000	19.700	13.500
32	10.000	19.700	11.000
33	10.000	19.700	5.500
34	10.000	19.700	3.500
35	5.750	19.700	3.500
36	5.750	19.700	0.000
37	10.000	2.965	3.500
38	10.000	4.945	3.500
39	10.000	2.965	5.500
40	10.000	4.000	5.500
41	10.000	2.965	11.000
42	10.000	4.000	11.000
43	10.000	2.965	13.500
44	10.000	4.945	13.500
45	10.000	8.905	3.500
46	10.000	10.885	3.500
47	10.000	12.865	3.500
48	10.000	16.825	3.500
49	10.000	8.905	5.500
50	10.000	10.885	5.500
51	10.000	12.865	5.500
52	10.000	16.825	5.500
53	10.000	8.905	11.000
54	10.000	10.885	11.000
55	10.000	12.865	11.000
56	10.000	16.825	11.000
57	10.000	8.905	13.500
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59	10.000	12.865	13.500
60	10.000	16.825	13.500
79	0.000	2.965	3.500
80	0.000	4.945	3.500
81	0.000	2.965	5.500
82	0.000	4.000	5.500
83	0.000	2.965	11.000
84	0.000	4.000	11.000
85	0.000	2.965	13.500
86	0.000	4.945	13.500
87	0.000	8.905	3.500
88	0.000	10.885	3.500
89	0.000	12.865	3.500
90	0.000	16.825	3.500
91	0.000	8.905	5.500
92	0.000	10.885	5.500
93	0.000	12.865	5.500
94	0.000	16.825	5.500
95	0.000	8.905	11.000
96	0.000	10.885	11.000
97	0.000	12.865	11.000
98	0.000	16.825	11.000

99	0.000	8.905	13.500
100	0.000	10.885	13.500
101	0.000	12.865	13.500
102	0.000	16.825	13.500
121	0.000	22.400	0.000
122	0.000	23.300	3.500
123	5.750	23.300	3.500
124	5.750	22.400	0.000
125	0.000	22.400	3.500
126	5.750	22.400	3.500
127	5.750	0.985	0.000
128	0.000	0.985	0.000
135	5.750	0.985	3.500
137	7.875	2.965	3.500
138	7.875	6.600	3.500
148	7.875	19.700	3.500
149	5.750	2.300	13.500
152	7.875	6.600	13.500
162	7.875	19.700	13.500
163	10.000	4.475	8.285
164	0.000	4.475	8.285
168	10.000	6.600	9.900
171	2.750	11.200	13.500
172	0.000	10.600	13.500
173	5.750	10.600	13.500
181	5.750	6.600	5.500
182	10.000	6.600	6.900
183	5.750	6.600	6.900
184	10.000	6.600	8.235
185	5.750	6.600	8.234
186	5.750	6.600	11.000
187	10.000	6.600	12.100
188	5.750	6.600	12.100
189	9.400	6.600	8.235
192	9.400	6.600	11.000
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206	1.450	6.600	13.500
210	1.450	6.600	11.000
215	4.050	6.600	6.900
216	1.450	6.600	6.900
222	0.000	6.600	12.000
229	5.750	19.700	5.500
230	5.750	19.700	11.000
231	0.000	19.700	8.035
242	10.000	19.700	8.265
244	10.000	19.700	4.500
245	5.750	19.700	4.500
250	7.750	19.700	5.500
260	5.750	2.965	3.500
261	5.750	2.965	0.000
262	0.000	2.965	0.000
263	5.750	8.905	3.500
264	5.750	8.905	0.000
265	0.000	8.905	0.000
266	5.750	10.885	3.500
267	5.750	10.885	0.000
268	0.000	10.885	0.000
269	5.750	12.865	3.500
270	5.750	12.865	0.000
271	0.000	12.865	0.000
272	5.750	14.845	3.500
273	5.750	14.845	0.000
274	0.000	14.845	0.000
291	10.000	19.700	8.500
294	2.875	2.965	0.000
295	2.875	8.905	0.000
296	2.875	10.885	0.000
297	2.875	12.865	0.000
298	2.875	14.845	0.000
299	2.875	19.700	0.000
300	2.875	22.400	0.000
301	2.625	6.600	0.000
303	1.450	6.600	12.800
304	4.050	6.600	12.800
305	1.450	6.600	11.650
306	4.050	6.600	11.650
307	1.450	6.600	9.700
310	4.050	6.600	8.200
337	9.300	6.600	12.650
339	8.700	6.600	12.100
341	9.300	6.600	13.500
342	9.300	6.600	12.100
343	8.100	6.600	13.500
344	8.100	6.600	12.100
358	0.000	19.700	7.065
433	0.000	6.600	14.250
434	5.750	6.600	14.250
441	1.500	0.985	0.600
442	1.500	0.985	1.600
443	1.500	0.985	1.900
444	1.500	0.985	2.900
457	4.250	2.965	0.600
458	4.250	2.965	1.600
459	4.250	2.965	1.900
460	4.250	2.965	2.900
465	4.250	6.600	0.600
466	4.250	6.600	1.600
467	4.250	6.600	1.900
468	4.250	6.600	2.900
481	1.500	8.905	0.600
482	1.500	8.905	1.600
483	1.500	8.905	1.900
484	1.500	8.905	2.900
489	4.250	10.885	0.600
490	4.250	10.885	1.600

491	4.250	10.885	1.900
492	4.250	10.885	2.900
505	1.500	12.865	0.600
506	1.500	12.865	1.600
507	1.500	12.865	1.900
508	1.500	12.865	2.900
513	4.250	14.845	0.600
514	4.250	14.845	1.600
515	4.250	14.845	1.900
516	4.250	14.845	2.900
531	2.750	19.700	1.900
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540	7.875	4.945	3.500
541	5.750	4.945	13.500
543	7.875	8.905	3.500
544	5.750	8.905	13.500
546	7.875	10.885	3.500
547	5.750	10.885	13.500
549	7.875	12.865	3.500
550	5.750	12.865	13.500
552	7.875	16.825	3.500
553	5.750	16.825	13.500
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557	7.875	10.885	13.500
558	7.875	12.865	13.500
559	7.875	16.825	13.500
560	1.500	0.985	0.000
561	1.500	0.985	3.500
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583	0.000	6.600	8.200
586	8.100	6.600	11.000
591	4.050	6.600	8.235
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600	2.000	19.700	13.500
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603	2.750	6.600	13.500
606	-3.000	19.700	13.500
607	-3.000	19.700	3.500
608	0.000	19.700	8.500
609	-3.000	19.700	8.500
610	-4.300	19.700	8.500
611	0.000	19.700	7.000
612	0.000	19.700	10.000
613	0.000	6.600	7.000
614	0.000	6.600	10.000
615	0.000	8.100	7.000
616	0.000	8.100	10.000
620	0.000	10.885	7.000
623	0.000	10.885	10.000
625	8.500	17.200	8.265
626	8.500	17.200	6.765
627	10.000	17.200	8.265
628	10.000	17.200	6.765
629	8.500	19.700	8.265
630	8.500	19.700	6.765
632	10.000	19.700	6.765
640	10.000	6.600	12.650
642	10.000	6.600	10.600
643	9.400	6.600	10.600
644	9.400	6.600	9.900
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646	8.100	6.600	9.900
651	9.400	6.600	5.500
652	6.403	6.600	8.235
653	6.403	6.600	11.000
654	6.403	6.600	10.135
655	8.100	6.600	12.800
656	9.300	6.600	12.800
657	8.000	19.700	13.500
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663	8.500	19.700	5.500
666	1.450	6.600	10.200
667	1.450	4.350	6.900
668	4.050	4.350	6.900
669	1.450	4.350	10.200
670	4.050	4.350	10.200
671	4.050	4.350	8.500
672	1.450	4.350	8.500
673	4.050	4.350	9.175
674	1.450	4.350	9.175
675	4.050	4.350	7.825
676	1.450	4.350	7.825
677	1.725	4.350	7.825
678	3.775	4.350	7.825
679	1.725	4.350	9.175
680	3.775	4.350	9.175
681	0.000	0.985	3.500
683	5.750	4.945	3.500
684	5.750	4.945	0.000
685	0.000	4.945	0.000
686	2.875	4.945	0.000
687	1.500	4.945	0.600
688	1.500	4.945	1.600
689	1.500	4.945	1.900
690	1.500	4.945	2.900
697	0.000	14.845	3.500
698	5.750	16.825	3.500
699	5.750	16.825	0.000
700	0.000	16.825	0.000
701	2.875	16.825	0.000
702	1.500	16.825	0.600
703	1.500	16.825	1.600
704	1.500	16.825	1.900
705	1.500	16.825	2.900
709	5.750	18.805	3.500
710	5.750	18.805	0.000

711	0.000	18.805	0.000
712	2.875	18.805	0.000
713	4.250	18.805	0.600
714	4.250	18.805	1.600
715	4.250	18.805	1.900
716	4.250	18.805	2.900
719	0.000	18.805	3.500
720	2.750	19.700	0.000
721	2.750	19.700	3.500
722	4.250	18.805	0.000
723	4.250	18.805	3.500
724	1.500	8.905	0.000
725	1.500	8.905	3.500
726	1.500	12.865	0.000
727	1.500	12.865	3.500
728	1.500	4.945	0.000
729	1.500	4.945	3.500
730	1.500	16.825	0.000
731	1.500	16.825	3.500
732	4.250	2.965	0.000
733	4.250	2.965	3.500
734	4.250	6.600	0.000
735	4.250	6.600	3.500
736	4.250	10.885	0.000
737	4.250	10.885	3.500
738	4.250	14.845	0.000
739	4.250	14.845	3.500
746	6.750	19.700	5.500
747	7.750	19.700	4.500
748	6.750	19.700	3.500
749	4.050	6.600	5.200
750	1.450	6.600	5.200
751	1.450	6.600	8.200
752	3.450	6.600	6.900
753	2.050	6.600	6.900
754	2.750	6.600	5.200
755	1.450	6.600	5.917
756	4.050	6.600	5.917
757	8.700	6.600	13.500
758	2.750	4.350	7.825
759	1.725	4.350	8.500
760	2.750	4.350	9.175
761	3.775	4.350	8.500
765	5.750	6.600	8.070
769	5.440	6.600	8.234
770	4.930	6.600	8.234
773	7.422	6.600	8.235
776	8.542	6.600	8.235
779	6.780	6.600	8.235
781	6.220	6.600	8.235
790	0.000	4.945	11.000
791	0.000	4.945	5.500
792	10.000	4.945	5.500
793	10.000	4.945	11.000
794	0.000	14.845	5.500
795	0.000	14.845	11.000
796	0.000	14.845	13.500
797	10.000	14.845	3.500
798	10.000	14.845	5.500
799	10.000	14.845	11.000
800	10.000	14.845	13.500
801	5.750	14.845	13.500
802	7.875	14.845	3.500
803	7.875	14.845	13.500
815	0.000	14.845	7.000
817	0.000	14.845	10.000
818	2.875	19.700	13.500
819	5.750	22.475	0.291
820	5.750	22.850	1.750
821	5.750	23.225	3.209
822	0.000	22.475	0.291
823	0.000	22.850	1.750
824	0.000	23.225	3.209
825	5.011	0.985	0.000
826	0.739	0.985	0.000
828	9.400	6.600	3.500
829	8.100	6.600	5.500
834	10.000	2.300	13.500
835	7.057	4.945	13.500
836	8.693	4.945	13.500
837	0.000	6.600	6.900
838	0.000	6.600	5.200
839	0.542	6.600	3.500
840	0.542	6.600	5.200
841	0.000	6.600	4.350
842	0.000	6.600	4.800
843	0.542	6.600	4.350
844	0.542	6.600	4.800
845	10.000	6.600	4.800
846	10.000	6.600	4.350
847	9.400	6.600	4.350
848	9.400	6.600	4.800
849	4.050	6.600	10.200

MEMBER INCIDENCE

1	2	681	70	53	54
2	5	85	71	54	55
3	7	834	72	55	799
4	10	37	73	56	32
6	38	22	74	91	92
8	44	19	75	92	93
11	85	86	76	93	794
12	86	17	77	94	27
13	37	38	78	95	96
14	43	44	79	96	97
16	14	87	80	97	795
17	17	99	81	98	28
18	19	57	82	6	149
19	22	45	83	11	135
21	46	47	84	135	260
22	47	797	85	149	541
23	48	34	88	260	683
26	59	800	89	18	544
27	60	31	90	23	263
28	87	88	91	35	126
29	88	89	92	126	123
30	89	697	96	544	173
31	90	719	97	547	550
32	99	172	98	550	801
33	100	101	99	173	547
34	101	796	104	272	698
35	102	29	105	1	128
36	26	125	106	12	127
37	125	122	107	127	261
38	45	46	108	128	262
41	57	58	109	261	684
42	58	59	110	262	685
44	172	100	113	25	121
46	3	81	114	36	124
47	4	83	115	13	265
48	8	41	116	24	264
49	9	39	117	264	267
50	39	40	118	265	268
51	40	792	119	267	270
52	41	42	120	268	271
53	42	793	121	270	273
56	81	82	122	271	274
57	82	791	123	273	699
58	83	84	124	274	700
59	84	790	255	11	137
62	15	91	256	137	10
63	16	95	257	260	540
64	20	53	258	540	37
65	21	49	259	23	543
66	49	50	260	543	22
67	50	51	263	546	263
68	51	798	264	546	45
69	52	33	267	269	802

268	802	47	399	16	210
271	698	148	400	222	17
272	48	148	401	201	210
299	201	203	405	341	757
300	201	18	408	182	183
301	16	206	409	184	189
306	18	344	410	187	342
309	750	839	411	189	776
317	27	601	416	21	651
318	601	229	419	196	749
320	28	600	421	310	591
321	600	230	423	591	204
322	230	657	425	201	306
323	657	32	428	204	849
326	681	128	431	210	305
329	79	733	437	849	666
332	261	260	438	205	750
335	87	725	439	215	310
338	265	87	446	215	752
339	88	737	448	750	755
340	266	267	449	838	840
343	89	727	457	203	204
346	271	89	459	303	206
348	272	273	460	304	197
357	123	122	461	305	303
358	13	14	462	306	304
359	14	841	465	216	751
360	15	837	468	749	593
361	16	222	471	339	344
362	17	206	472	342	339
363	18	152	474	773	779
364	19	640	493	25	26
365	20	642	494	26	27
368	23	24	495	27	611
371	138	23	496	28	29
372	152	343	497	29	600
373	182	21	498	30	162
374	168	184	499	31	32
377	21	845	501	33	244
378	23	181	502	34	148
380	181	183	503	35	36
382	183	765	505	148	661
383	184	182	506	162	657
384	185	203	507	632	33
385	186	188	508	32	291
386	20	192	510	33	663
387	187	20	511	229	27
388	188	18	512	32	230
389	341	19	514	231	608
390	192	586	515	230	28
392	196	735	520	242	291
393	197	18	521	244	34
395	203	186	523	250	746
396	205	582	526	242	632
397	206	603	528	358	231

530	35	245	883	86	16
532	230	30	884	14	91
542	229	659	885	15	87
546	245	229	886	87	92
583	40	163	887	91	88
584	163	42	888	88	93
585	82	164	889	92	89
586	164	84	890	89	794
587	173	171	891	93	697
588	171	172	892	90	27
606	299	720	893	94	26
609	12	825	894	16	99
610	294	826	895	17	95
611	261	686	896	95	100
612	686	262	897	99	96
613	24	295	898	96	101
614	295	13	899	100	97
615	264	296	900	97	796
616	296	265	901	102	28
617	267	297	902	101	795
618	297	268	903	98	29
619	270	298	920	229	661
620	298	271	987	28	660
621	699	712	989	300	121
622	700	712	991	549	266
623	36	300	992	138	683
624	300	25	993	137	260
694	337	342	1000	301	13
697	337	656	1005	17	433
699	344	655	1006	18	434
765	2	81	1008	433	86
766	3	79	1011	128	826
771	4	85	1013	681	561
772	5	83	1014	560	441
844	660	27	1017	441	442
848	267	736	1018	442	443
850	273	738	1019	443	444
851	124	300	1020	444	561
853	549	46	1025	294	732
854	138	38	1028	733	260
855	37	137	1030	732	457
863	732	261	1035	457	458
864	24	734	1036	458	459
865	295	724	1037	459	460
866	297	726	1038	460	733
867	298	274	1042	14	839
868	296	268	1043	734	465
869	560	825	1045	465	466
874	79	791	1046	466	467
875	81	80	1047	467	468
876	80	15	1048	468	735
877	791	14	1053	264	295
880	83	86	1058	724	481
881	85	790	1063	481	482
882	790	17	1064	482	483

1065	483	484	1171	54	59
1066	484	725	1172	58	55
1071	736	489	1173	55	800
1073	489	490	1174	60	32
1074	490	491	1175	59	799
1075	491	492	1176	56	31
1076	492	737	1177	541	18
1081	270	297	1178	38	540
1086	726	505	1180	540	683
1091	505	506	1183	45	543
1092	506	507	1185	543	263
1093	507	508	1188	46	546
1094	508	727	1190	546	266
1097	697	739	1193	47	549
1099	738	513	1195	549	269
1101	513	514	1197	553	30
1102	514	515	1198	48	552
1103	515	516	1200	552	698
1104	516	739	1201	6	554
1109	36	299	1202	554	7
1111	35	721	1203	149	835
1120	720	531	1204	834	836
1121	531	532	1205	18	556
1122	532	721	1206	556	19
1137	790	86	1207	557	544
1140	796	795	1208	557	57
1141	800	799	1209	550	803
1143	697	794	1210	803	59
1144	797	798	1211	553	162
1145	10	39	1212	60	162
1146	9	37	1213	558	58
1147	8	43	1214	19	836
1148	7	41	1215	834	554
1149	37	792	1216	558	547
1150	39	38	1217	18	835
1151	38	21	1218	554	149
1152	792	22	1219	44	836
1153	41	44	1221	57	556
1154	43	793	1222	556	544
1155	793	19	1223	58	557
1156	44	20	1224	557	547
1157	22	49	1225	59	558
1158	21	45	1226	558	550
1159	45	50	1227	60	559
1160	49	46	1228	559	553
1161	46	51	1242	561	135
1162	50	47	1243	294	262
1163	47	798	1245	724	265
1164	51	797	1247	726	271
1165	48	33	1252	735	23
1166	52	34	1254	737	266
1167	20	57	1256	739	272
1168	19	53	1261	820	823
1169	53	58	1263	821	824
1170	57	54	1265	819	822

1266	582	196	1373	627	626
1268	582	749	1374	625	628
1269	838	216	1375	626	629
1270	307	16	1376	625	630
1271	583	614	1377	628	242
1272	216	583	1378	627	632
1273	583	307	1381	121	822
1275	586	653	1384	124	819
1276	184	646	1385	307	666
1278	186	201	1386	640	187
1279	593	23	1387	337	640
1289	593	756	1388	642	168
1296	183	593	1389	643	192
1302	185	769	1390	642	643
1303	181	593	1391	644	643
1305	600	818	1392	168	644
1308	601	26	1393	645	773
1314	434	197	1394	586	646
1315	206	433	1395	646	645
1319	603	197	1396	644	646
1322	828	829	1400	22	828
1323	434	541	1406	651	829
1332	608	609	1407	182	829
1333	26	607	1408	168	645
1334	29	606	1409	829	23
1335	607	90	1410	652	781
1336	606	102	1411	653	186
1337	607	609	1412	652	654
1338	609	606	1413	654	653
1339	609	610	1414	655	343
1340	27	609	1415	656	341
1341	609	28	1416	657	31
1342	611	358	1417	608	612
1343	612	28	1418	659	230
1344	613	583	1419	608	660
1345	614	16	1420	659	662
1346	611	815	1421	660	659
1347	612	817	1422	661	748
1348	615	613	1423	661	33
1349	616	614	1424	662	291
1350	615	616	1425	629	662
1354	620	615	1426	629	630
1357	623	616	1427	663	250
1359	794	815	1429	630	632
1360	92	620	1430	629	242
1361	795	817	1432	33	630
1362	96	623	1433	630	663
1365	625	627	1434	662	632
1366	627	628	1435	662	32
1367	628	626	1436	661	747
1368	626	625	1438	666	210
1369	625	629	1439	216	667
1370	626	630	1440	666	669
1371	627	242	1442	215	668
1372	628	632	1443	667	668

1444	667	676	1507	712	711
1445	669	670	1509	719	723
1446	670	673	1510	722	713
1447	671	675	1511	713	714
1448	672	674	1512	714	715
1449	673	671	1513	715	716
1450	674	669	1514	716	723
1451	675	668	1515	723	709
1452	676	672	1516	710	299
1453	676	677	1517	299	711
1454	674	679	1518	720	25
1455	677	758	1519	721	601
1456	678	675	1520	722	712
1457	679	760	1523	725	263
1458	677	759	1525	727	269
1459	680	673	1527	729	683
1460	678	761	1529	731	698
1461	681	79	1532	734	301
1462	79	80	1534	736	296
1463	683	23	1536	738	298
1464	684	24	1539	263	266
1465	685	13	1540	266	269
1466	80	14	1541	269	272
1467	80	729	1542	698	709
1468	685	80	1544	746	229
1469	686	728	1545	747	250
1470	684	686	1546	748	35
1472	728	687	1549	751	307
1473	687	688	1550	752	753
1474	688	689	1551	753	216
1475	689	690	1552	754	750
1476	690	729	1553	755	216
1477	728	685	1554	756	215
1478	684	301	1555	757	343
1479	301	685	1556	758	678
1485	699	710	1557	759	679
1486	700	711	1558	760	680
1488	90	731	1559	761	680
1489	700	90	1563	203	591
1490	273	701	1565	765	185
1491	701	274	1570	769	770
1492	701	730	1571	770	591
1493	699	701	1576	776	645
1494	730	702	1580	779	652
1495	702	703	1583	781	185
1496	703	704	1586	591	183
1497	704	705	1593	192	646
1498	705	731	1595	206	201
1499	730	700	1601	790	16
1501	709	35	1602	791	15
1502	710	36	1603	792	21
1503	711	25	1604	793	20
1504	719	26	1622	801	553
1505	709	710	1623	272	802
1506	710	722	1624	801	803

1625	802	797	1698	837	613
1626	803	800	1699	216	837
1627	272	552	1700	837	750
1629	801	559	1701	838	15
1633	796	102	1702	839	205
1634	796	98	1703	840	750
1635	795	98	1704	839	843
1636	795	102	1705	841	842
1637	800	60	1706	842	838
1638	800	56	1707	843	844
1639	800	559	1708	841	843
1640	799	56	1709	844	840
1641	799	60	1710	842	844
1642	697	90	1711	845	846
1643	697	94	1712	846	22
1644	794	94	1713	847	828
1645	794	90	1714	846	847
1646	797	48	1715	848	847
1647	797	52	1716	845	848
1648	797	552	1717	344	188
1649	798	52	1718	849	201
1650	798	48	1719	670	849
1653	815	620	1720	669	849
1656	817	623			
1657	216	668			
1658	667	215			
1660	670	666			
1661	102	553			
1662	818	30			
1663	102	818			
1664	553	818			
1667	819	820			
1668	820	821			
1669	821	123			
1670	822	823			
1671	823	824			
1672	824	122			
1673	825	294			
1674	826	1			
1675	825	127			
1676	826	560			
1679	828	138			
1680	651	848			
1681	829	181			
1682	644	586			
1685	645	182			
1686	749	754			
1687	750	582			
1690	834	43			
1691	835	152			
1692	836	152			
1694	835	541			
1695	663	632			
1696	586	187			
1697	344	20			

START USER TABLE

TABLE 1 PAG832X400
TABLE 2 PAG982X425
TABLE 3 PAG782X300
END

DEFINE MATERIAL START

ISOTROPIC STEEL
E 2.09042e+010
POISSON 0.3
DENSITY 7833.41
ALPHA 1.2e-005
DAMP 0.03
ISOTROPIC MATERIAL1
POISSON 0.45
DAMP 5.7886e-030
END DEFINE MATERIAL

MEMBER PROPERTY INDIAN
1373 1374 TABLE ST ISA75X75X6
299 TO 301 306 309 1268 TO 1270 1272 1273 1276 1279 1296 1314 1315 1322 1407 -
1408 TO 1409 1563 1586 1593 1595 1682 1685 1687 1696 1697 -
1700 TABLE ST ISA130X130X10
317 318 320 TO 323 844 920 987 1423 1432 1434 1435 1695 TABLE ST ISA100X100X10
609 TO 624 1375 TO 1378 1478 1479 1490 1491 1516 1517 1657 1658 1660 1673 -
1674 1720 TABLE SD ISA75X75X6 SP 0.01
259 260 263 264 267 268 271 272 853 884 TO 903 991 1157 TO 1176 1205 TO 1213 -
1216 1340 1341 1627 1629 1634 1636 1638 1639 1641 1643 1645 1647 1648 1650 -
1663 1664 TABLE SD ISA110X110X10 SP 0.01
255 TO 258 765 766 771 772 854 874 TO 877 880 TO 883 992 1008 1145 TO 1156 -
1201 TO 1204 1214 1217 1219 1323 1335 1336 1691 1692 -
1694 TABLE SD ISA130X130X10 SP 0.01
694 697 699 1387 1389 TO 1392 1394 TO 1396 1412 TO 1415 1680 1704 -
1707 TO 1710 1713 TO 1716 TABLE ST ISMC150
449 1261 1263 1265 1359 TO 1362 1365 TO 1368 1429 1430 1436 1443 1445 1453 -
1454 TO 1460 1545 1556 TO 1559 1699 1703 TABLE ST ISMC200
1346 TO 1349 1354 1357 1653 1656 TABLE ST ISMC300
MEMBER PROPERTY EUROPEAN
360 365 373 374 383 409 411 474 1271 1344 1345 1388 1393 1410 1576 1580 1583 -
1698 TABLE ST IPE400
1 TO 4 6 8 11 TO 14 16 TO 19 21 TO 23 26 TO 38 41 42 44 46 TO 53 56 TO 59 -
62 TO 81 362 392 393 396 397 399 401 419 421 423 428 438 439 448 465 468 -
1005 1006 1042 1252 1266 1278 1289 1319 1333 1334 1385 1420 1424 1438 1461 -
1462 1466 1504 1549 1553 1554 1601 TO 1604 1633 1635 1637 1640 1642 1644 -
1646 1649 1690 1702 1718 TABLE ST IPE500
82 TO 85 88 TO 92 96 TO 99 104 495 507 508 514 520 526 528 1177 1197 1332 -
1339 1342 1343 1417 1419 1421 1463 1501 1539 TO 1542 1622 TABLE ST IPE600
MEMBER PROPERTY BRITISH
326 332 338 340 346 348 358 359 361 364 368 377 387 400 437 446 457 493 494 -
496 499 501 503 521 1302 1303 1369 TO 1372 1381 1384 1386 1425 1426 1433 -
1439 1440 1442 1468 1489 1505 1550 TO 1552 1570 1571 1667 TO 1672 1686 1701 -
1705 1706 1711 1712 1719 TABLE ST UB203X133X25
105 TO 110 113 TO 124 329 335 339 343 357 363 371 372 386 389 390 405 408 -

410 416 471 472 498 502 505 506 606 848 850 851 855 863 TO 869 989 993 1000 -
1011 1013 1014 1017 TO 1020 1025 1028 1030 1035 TO 1038 1043 1045 TO 1048 -
1053 1058 1063 TO 1066 1071 1073 TO 1076 1081 1086 1091 TO 1094 1097 1099 -
1101 TO 1104 1109 1120 TO 1122 1137 1140 1141 1143 1144 1178 1180 1183 1185 -
1188 1190 1193 1195 1198 1200 1215 1218 1221 TO 1228 1242 1243 1245 1247 -
1254 1256 1275 1400 1406 1411 1416 1422 1444 1446 TO 1452 1464 1465 1467 -
1469 1470 1472 TO 1477 1485 1486 1488 1492 TO 1499 1502 1503 1506 1507 1509 -
1510 TO 1515 1518 1520 1523 1525 1527 1529 1532 1534 1536 1546 1555 -
1623 TO 1626 1661 1675 1676 1679 1681 1717 TABLE ST UB254X146X37
425 431 459 TO 462 497 510 TO 512 515 523 583 TO 588 1111 1305 1308 1350 1427 -
1519 1544 1662 TABLE ST UB305X165X46
MEMBER PROPERTY INDIAN
378 380 382 384 385 388 395 1565 UPTABLE 1 PAG832X400
530 532 542 546 1418 UPTABLE 2 PAG982X425
1337 1338 UPTABLE 3 PAG782X300

CONSTANTS

****

BETA 345.58 MEMB 1261 1263 1265
BETA 45 MEMB 299 TO 301 306 309 317 318 320 TO 323 844 920 987 1268 TO 1270 -
1272 1273 1276 1279 1296 1314 1315 1322 1340 1341 1373 1374 1407 TO 1409 -
1423 1432 1434 1435 1563 1586 1593 1595 1682 1685 1687 1696 1697 1700
BETA 90 MEMB 82 TO 85 88 TO 92 96 TO 99 104 TO 110 113 TO 124 1177 1197 1439 -
1440 1442 1463 TO 1465 1485 1486 1501 TO 1503 1539 TO 1542 1622 1719
BETA 180 MEMB 1346 1348 1354 1653

MATERIAL STEEL ALL

START GROUP DEFINITION

****

MEMBER
_COL_GRD_14_1 1 TO 4 6 8 11 TO 14 1461 1462 1466 1690
_COL_GRD_14_2 16 TO 19 21 TO 23 26 TO 38 41 42 44 1504 1633 1637 1642 1646
_COL_GRD_23_1 46 TO 53 56 TO 59 1601 TO 1604
_COL_GRD_23_2 62 TO 81 1635 1640 1644 1649
_COL_GRD_B_1 82 TO 85 88 1177 1463
_COL_GRD_B_2 89 TO 92 96 TO 99 104 1197 1501 1539 TO 1542 1622
_COL_STR_1 105 TO 110 1464 1465
_COL_STR_2 113 TO 124 1485 1486 1502 1503
_BRAC_GRD_C_1 1145 TO 1156
_BRAC_GRD_C_2 1157 TO 1176 1638 1641 1647 1650
_BRAC_GRD_A_1 765 766 771 772 874 TO 877 880 TO 883
_BRAC_GRD_A_2 884 TO 903 1634 1636 1643 1645
_BRAC_GRD_1_1 255 TO 258 854 992
_BRAC_GRD_1_2 259 260 263 264 267 268 271 272 853 991 1627 1648
_BRAC_GRID_4_2 1205 TO 1213 1216 1629 1639 1663 1664
_BRAC_BE_GR_4 855 993 1178 1180 1183 1185 1188 1190 1193 1195 1198 1200 1221 -
1222 TO 1228 1623 TO 1626
_PLAN_BRAC_6.9 299 TO 301 306 309 1268 TO 1270 1272 1273 1276 1279 1296 1314 -
1315 1322 1407 TO 1409 1563 1586 1593 1595 1682 1685 1687 1696 1697 1700
_ROOF_BRAC 317 318 320 TO 323 844 920 987 1340 1341 1423 1432 1434 1435
_STAIR_BRAC_1 609 TO 612 1478 1479 1673 1674
_STAIR_BRAC_2 613 TO 624 1490 1491 1516 1517
_MA_BEAM_STR_1 326 329 332 863 869 1011 1013 1025 1028 1242 1243 1467 TO 1470 -
1477 1527 1675 1676

_MA_BEAM_STR_2 335 338 TO 340 343 346 348 493 503 848 850 865 TO 868 1053 -
1081 1097 1109 1111 1245 1247 1254 1256 1308 1488 1489 1492 1493 1499 1505 -
1506 TO 1507 1509 1515 1518 TO 1520 1523 1525 1529 1534 1536
_MA_BEAM_STR_HE 357 851 989 1381 1384 1667 TO 1672
_L6_9_FLR_MA_BE 358 TO 365 368 371 TO 374 377 378 380 382 TO 390 392 393 395 -
396 TO 397 399 400 405 864 1000 1042 1266 1271 1275 1278 1319 1344 1345 1386 -
1388 1400 1411 1532 1555 1565 1679 1698 1701 1702 1705 1706 1711 1712
_L6_9_FLR_SE_BE 408 TO 411 416 419 421 423 425 428 431 437 TO 439 446 448 -
449 457 459 TO 462 465 468 471 472 474 1289 1385 1389 1391 1393 1406 1410 -
1438 1549 TO 1554 1576 1580 1583 1681 1686 1703 1718
_RO_MA_BE 493 TO 499 501 TO 503 505 TO 508 510 TO 512 514 515 520 521 523 -
526 528 606 1109 1111 1305 1308 1333 1334 1342 1343 1416 1417 1422 1427 1518 -
1519 1544 1546
_RO_SE_BE 530 532 542 546 1418
_RO_MO_RAIL 1332 1339
_RO_BRAK 1333 TO 1336
_RO_TRUSS 583 TO 588
_MO_RAIL_DOOR 1346 TO 1350 1354 1357 1653 1656
_L6_9_OPEN_BE 694 697 699 1414 1415
_HOIST_PLAT 1365 TO 1368
_HOISTING_BRAC 1375 TO 1378
_HANGERS 1369 TO 1372
_DOOR_PO_RES 1359 TO 1362
_STAIR_BRACE2 613 TO 624 1490 1491 1516 1517
_CANTI_BEAM 1337 1338
_GALLERY_BRACKET 1005 1006
_TEST 1145 TO 1148
_HANGERS4.5ML 1439 1440 1442
_BEAM@4.5ML 1443 TO 1460 1556 TO 1559
_PLATFORM@6.9ML 446 1439 1440 1442 TO 1460 1550 1551 1556 TO 1559 1657 1658 -
1660 1719 1720
END GROUP DEFINITION

****

MEMBER RELEASE

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326 329 332 335 338 TO 340 343 346 348 357 TO 365 368 377 378 386 399 408 -
409 TO 410 416 419 425 431 437 438 446 449 457 493 TO 499 501 TO 503 508 510 -
511 TO 512 515 530 699 848 850 851 855 864 1011 1013 1014 1030 1042 1043 1053 -
1058 1071 1081 1086 1097 1099 1109 1111 1120 1178 1183 1188 1193 1198 1215 -
1221 1223 1225 1227 1261 1263 1265 1278 1302 1303 1337 1365 TO 1368 1387 -
1390 TO 1392 1394 1400 1412 1419 1420 1429 1430 1436 1443 TO 1446 1453 1454 -
1458 1460 1467 1468 1470 1472 1488 1489 1493 1494 1505 1506 1509 1510 1623 -
1624 1661 1680 1686 1699 1704 1708 1710 1714 1716 START MY MZ
326 332 338 340 346 348 357 358 368 371 373 387 TO 389 393 400 408 437 457 -
459 460 493 494 496 499 503 507 511 512 515 521 532 694 863 867 868 989 993 -
1000 1020 1028 1038 1048 1066 1076 1094 1104 1122 1180 1185 1190 1195 1200 -
1218 1222 1224 1226 1228 1242 1243 1245 1247 1252 1254 1256 1261 1263 1265 -
1303 1308 1338 1343 1345 1365 TO 1368 1387 1389 1390 1395 1396 1411 1413 -
1414 TO 1416 1421 1424 1425 1429 1430 1433 1438 1443 1445 1450 1451 1456 1459 -
1468 1476 1477 1489 1498 1499 1505 1507 1514 1515 1518 1523 1525 1527 1529 -
1544 TO 1546 1551 1552 1557 1559 1571 1583 1625 1626 1661 1662 1675 1681 -
1699 1701 1703 1708 TO 1710 1712 TO 1714 1716 TO 1718 END MY MZ
1346 1347 START FY

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SUPPORTS
1 TO 12 PINNED
*13 TO 36 PINNED

MEMBER TRUSS
255 TO 260 263 264 267 268 271 272 299 TO 301 306 309 317 318 320 TO 323 609 -
610 TO 624 765 766 771 772 844 853 854 874 TO 877 880 TO 903 920 987 991 992 -
1008 1145 TO 1176 1201 TO 1214 1216 1217 1219 1268 TO 1270 1272 1273 1276 -
1279 1296 1314 1315 1322 1323 1335 1336 1340 1341 1373 TO 1378 1407 TO 1409 -
1423 1432 1434 1435 1478 1479 1490 1491 1516 1517 1563 1586 1593 1595 1627 -
1629 1634 1636 1638 1639 1641 1643 1645 1647 1648 1650 1657 1658 1660 1663 -
1664 1673 1674 1682 1685 1687 1691 1692 1694 TO 1697 1700 1720

****

***DETAILS OF EARTHQUAKE ANALYSIS BY RESPONCE SPECTRUM METHOD**
CUT OFF MODE SHAPE 100
LOAD 1 (EARTHQUAKE LOAD IN X DIRECTION)
****

JOINT LOAD
1 FX 2446.712
2 FX 2420.746
3 FX 1020.941
4 FX 4129.907
5 FX 2738.576
6 FX 5158.549
7 FX 1937.762
8 FX 1011.061
9 FX 1001.07
10 FX 1323.643
11 FX 2607.412
12 FX 1819.872
13 FX 5046.654
14 FX 20219.957
15 FX 6775.972
16 FX 22525.657
17 FX 27226.382
18 FX 57522.363
19 FX 6450.528
20 FX 13730.368
21 FX 13160.801
22 FX 5441.838
23 FX 43362.763
24 FX 5132.581
25 FX 4437.717
26 FX 11803.625
27 FX 13421.666
28 FX 13702.927
29 FX 7360.354
30 FX 33893.823
31 FX 5087.153
32 FX 11284.368
33 FX 11463.078
34 FX 4619.185
35 FX 40802.064
36 FX 4035.841

JOINT LOAD
1 FY 2446.712
2 FY 2420.746
3 FY 1020.941
4 FY 4129.907
5 FY 2738.576
6 FY 5158.549
7 FY 1937.762
8 FY 1011.061
9 FY 1001.07
10 FY 1323.643
11 FY 2607.412
12 FY 1819.872
13 FY 5046.654
14 FY 20219.957
15 FY 6775.972
16 FY 22525.657
17 FY 27226.382
18 FY 57522.363
19 FY 6450.528
20 FY 13730.368
21 FY 13160.801
22 FY 5441.838
23 FY 43362.763
24 FY 5132.581
25 FY 4437.717
26 FY 11803.625
27 FY 13421.666
28 FY 13702.927
29 FY 7360.354
30 FY 33893.823
31 FY 5087.153
32 FY 11284.368
33 FY 11463.078
34 FY 4619.185
35 FY 40802.064
36 FY 4035.841
JOINT LOAD
1 FZ 2446.712
2 FZ 2420.746
3 FZ 1020.941
4 FZ 4129.907
5 FZ 2738.576
6 FZ 5158.549
7 FZ 1937.762
8 FZ 1011.061
9 FZ 1001.07
10 FZ 1323.643
11 FZ 2607.412
12 FZ 1819.872
13 FZ 5046.654
14 FZ 20219.957
15 FZ 6775.972
16 FZ 22525.657
17 FZ 27226.382

18 FZ 57522.363
19 FZ 6450.528
20 FZ 13730.368
21 FZ 13160.801
22 FZ 5441.838
23 FZ 43362.763
24 FZ 5132.581
25 FZ 4437.717
26 FZ 11803.625
27 FZ 13421.666
28 FZ 13702.927
29 FZ 7360.354
30 FZ 33893.823
31 FZ 5087.153
32 FZ 11284.368
33 FZ 11463.078
34 FZ 4619.185
35 FZ 40802.064
36 FZ 4035.841
*BASE SHEAR FROM MANUAL CALCS. REF DESIGN CALCULATION (PAGE 14 & 15) = 26654.9kg
*FROM STAAD WITH FACTOR 0.037 = 26040.50kg
*FACTOR 0.037 IS THEREFORE MULTIPLIED BY THE RATIO 26654.9/26040.5 = 1.02359
*GIVING 0.037872975 FOR THE FINAL ANALYSIS.
SPECTRUM CQC X 0.037872975 ACC SCALE 9.81 DAMP 0.02 MIS 0.1
****
0.04 0.9859; 0.05 1.1392; 0.06 1.3192; 0.07 1.5944; 0.08 1.9571; 0.09 2.6591;
0.1 3.1526; 0.12 3.6907; 0.14 4.0499; 0.16 4.2566; 0.18 4.4118; 0.2 4.5035;
0.22 4.5652; 0.24 4.5942; 0.26 4.5793; 0.28 4.554; 0.3 4.4231; 0.4 3.5701;
0.5 2.8761; 0.6 2.4215; 0.7 2.0885; 0.8 1.851; 0.9 1.6892; 1 1.5844;
1.1 1.4899; 1.2 1.3955; 1.3 1.3104; 1.4 1.2281; 1.5 1.1551; 1.6 1.0887;
1.7 1.0176; 1.8 0.9587; 1.9 0.9044; 2 0.8567; 2.1 0.8118; 2.2 0.7772;
2.3 0.7389; 2.4 0.709; 2.5 0.6744; 2.75 0.6014; 3 0.5406; 3.25 0.4798;
3.5 0.4302; 3.75 0.391; 4 0.3564;

LOAD 2 (EARTHQUAKE LOAD IN Z DIRECTION)
****
*BASE SHEAR FROM MANUAL CALCS. REF DESIGN CALCULATION (PAGE 14 & 15)= 26654.9kg
*FROM STAAD WITH FACTOR 0.037 = 22635.86kg
*FACTOR 0.037 IS THEREFORE MULTIPLIED BY THE RATIO 26654.9/22635.86 = 1.17755
*GIVING 0.043569416 FOR THE FINAL ANALYSIS.
SPECTRUM CQC Z 0.043569416 ACC SCALE 9.81 DAMP 0.02 MIS 0.1
****
0.04 0.9859; 0.05 1.1392; 0.06 1.3192; 0.07 1.5944; 0.08 1.9571; 0.09 2.6591;
0.1 3.1526; 0.12 3.6907; 0.14 4.0499; 0.16 4.2566; 0.18 4.4118; 0.2 4.5035;
0.22 4.5652; 0.24 4.5942; 0.26 4.5793; 0.28 4.554; 0.3 4.4231; 0.4 3.5701;
0.5 2.8761; 0.6 2.4215; 0.7 2.0885; 0.8 1.851; 0.9 1.6892; 1 1.5844;
1.1 1.4899; 1.2 1.3955; 1.3 1.3104; 1.4 1.2281; 1.5 1.1551; 1.6 1.0887;
1.7 1.0176; 1.8 0.9587; 1.9 0.9044; 2 0.8567; 2.1 0.8118; 2.2 0.7772;
2.3 0.7389; 2.4 0.709; 2.5 0.6744; 2.75 0.6014; 3 0.5406; 3.25 0.4798;
3.5 0.4302; 3.75 0.391; 4 0.3564;

LOAD 3 DEAD LOAD
****
SELFWEIGHT Y -1
*DL OF ROOF 150 THK.SLAB + 125 THK.
* WEARTHERING COURSE 685 kg/sq.m(REFER CL:NO:2.1.4 PAGE 4)

*FOR LOAD CACULATION REFER (PAGE 23)OF DESIGN CALCULATION
MEMBER LOAD
511 1111 1308 1519 UNI GY -685
495 514 528 542 1342 UNI GY -513.75
511 1419 1421 UNI GY -759.46
497 515 1305 1419 1421 1662 UNI GY -856.25
515 UNI GY -856.25
530 546 1436 1545 UNI GY -342.5
523 1422 1544 1546 UNI GY -380.56
501 521 1436 1545 UNI GY -342.5
502 505 510 1427 UNI GY -342.5
523 1420 1427 1544 UNI GY -470.94
542 1425 1426 1433 UNI GY -510.18
507 1433 UNI GY -216.63
510 1429 UNI GY -250.57
1429 1430 UNI GY -256.88
526 1426 UNI GY -256.88
1424 1430 UNI GY -80.49
499 508 532 1418 UNI GY -428.13
498 506 512 1416 1420 1424 UNI GY -604.41
512 UNI GY -604.41
*DEAD LOAD OF STAIRCASE ROOF @ 50kg/sq.m
MEMBER LOAD
1263 1265 UNI GY -45
1261 UNI GY -75
357 851 989 UNI GY -7.5
*DEAD LOAD OF WATERTANK 3T (FOR LOAD CACULATION REFER:Drg. No. M070 H25 000 001 - 0)
JOINT LOAD
245 746 TO 748 FY -750
*DL ROOF(500mm)PROJECTION OF SLAB (685 kg/sq.m *0.5)AS UDL ON PERIPHERAL BEAMS
MEMBER LOAD
494 TO 499 501 502 505 TO 508 514 520 521 526 528 1111 1305 1308 1342 1343 -
1416 1417 1422 1519 1546 1662 UNI GY -342.5
*DEAD LOAD OF RCC PARAPET WALL(900mm HIGH)
494 TO 499 501 502 505 TO 508 514 520 521 526 528 1111 1305 1308 1342 1343 -
1416 1417 1422 1519 1546 1662 UNI GY -225
*DEAD LOAD OF FLOOR 200 THK.SLAB + 50 THK. FLOOR FINISH (600 kg/sq.m)
*FOR LOAD CACULATION REFER (PAGE 21 & 22)OF DESIGN CALCULATION
1042 1708 UNI GY -81.3
359 1704 UNI GY -110.76
1706 1709 UNI GY -60
449 1710 UNI GY -75.72
1702 1703 UNI GY -136.2
438 1704 1707 1709 UNI GY -199.65
449 1699 1703 UNI GY -217.5
360 448 1553 1701 UNI GY -249.49
465 1271 1344 1345 1385 1438 1549 UNI GY -435
362 399 UNI GY -217.5
361 400 431 459 461 UNI GY -308.85
419 438 UNI GY -255
396 1266 1552 1686 UNI GY -343.27
401 437 UNI GY -240
425 431 459 TO 462 UNI GY -375
397 401 1319 UNI GY -389.42
392 1252 1303 UNI GY -255

378 419 468 UNI GY -293.25
1302 1303 1570 1571 UNI GY -255
380 382 439 1289 1554 1565 UNI GY -351.5
384 423 UNI GY -219.75
457 1302 1570 1571 UNI GY -250.13
395 428 1718 UNI GY -195
457 1278 UNI GY -240.88
393 1278 UNI GY -255
385 388 425 460 462 UNI GY -336.6
378 1680 1713 1715 UNI GY -300
371 1406 1679 1681 UNI GY -435.62
1400 1714 UNI GY -90
1712 1713 UNI GY -116.47
416 1716 UNI GY -90
377 1680 UNI GY -102.86
408 416 1406 1681 UNI GY -420
408 409 411 474 1393 1410 1576 1580 1583 UNI GY -400.5
384 395 1412 1413 UNI GY -195.9
474 1275 1393 1580 UNI GY -254.55
1394 1395 1412 1413 UNI GY -352.87
374 1395 UNI GY -249.75
409 411 1392 1396 1576 UNI GY -280.64
1389 1391 1394 UNI GY -165
390 1396 UNI GY -190.38
365 1389 UNI GY -60
386 1390 UNI GY -80
386 390 410 471 472 1275 1411 1717 UNI GY -330
388 699 1414 UNI GY -210
363 372 1717 UNI GY -294.13
389 1387 UNI GY -105
364 697 1415 UNI GY -123.53
*DEAD LOAD OF BRICK WALL(300mm HIGH)
358 TO 365 368 371 TO 374 377 383 387 389 393 397 400 405 864 1000 1271 1319 -
1344 1345 1386 1388 1400 1532 1555 1679 1698 1701 1705 1706 1711 -
1712 UNI GY -138
*DEAD LOAD OF STAIRCASE FLOOR @ 50 kg/sq.m
JOINT LOAD
443 444 FY -32.8
467 468 483 484 FY -43.3
531 532 715 716 FY -11.8
441 442 457 TO 460 465 466 481 482 489 TO 492 505 TO 508 513 TO 516 -
687 TO 690 702 TO 705 713 714 FY -42.4
MEMBER LOAD
1308 1518 1519 UNI GY -34.38
493 1120 TO 1122 UNI GY -41.74
31 326 332 338 340 346 348 368 1014 1017 TO 1020 1030 1035 TO 1038 1043 1045 -
1046 TO 1048 1058 1063 TO 1066 1071 1073 TO 1076 1086 1091 TO 1094 1099 1101 -
1102 TO 1104 1468 1472 TO 1476 1489 1494 TO 1498 1504 1505 1510 TO 1513 -
1514 UNI GY -37.5
*DEAD LOAD OF SINGLE CONVEYOR GALLERY
JOINT LOAD
434 FX 1000 FY -10000
433 FX -1000 FY -10000
*DEAD LOAD OF HOISTING PLATFORM CHAQD PLATE SELF WEIGHT @ 60 kg/sq.m
*FOR LOAD CACULATION REFER (PAGE 23)OF DESIGN CALCULATION

MEMBER LOAD
1365 1367 UNI GY -22.5
1366 1368 UNI GY -22.5
*DEAD LOAD OF SIDE CLADDING & RUNNERS @ 32 kg/sq.m
MEMBER LOAD
1 16 28 TO 31 36 37 1461 1462 1466 1504 1642 UNI GY -124
4 6 13 19 21 TO 23 38 1646 UNI GY -100
82 TO 85 88 TO 92 96 TO 99 104 1177 1197 1463 1501 1539 TO 1542 -
1622 UNI GY -160
46 49 TO 51 56 57 62 65 TO 69 74 TO 77 1602 1603 1644 1649 UNI GY -120
47 48 52 53 58 59 63 64 70 TO 73 78 TO 81 1601 1604 1635 1640 UNI GY -128
3 8 14 18 26 27 41 42 1637 1690 UNI GY -108
2 11 12 17 32 TO 35 44 1633 UNI GY -132

LOAD 4 FLOOR LIVE LOAD
****

*LIVE LOAD OF FLOOR SLAB 500kg/m2
*FOR LOAD CACULATION REFER (PAGE 21 & 22)OF DESIGN CALCULATION
MEMBER LOAD
1042 1708 UNI GY -67.75
359 1704 UNI GY -92.3
1706 1709 UNI GY -50
449 1710 UNI GY -63.1
1702 1703 UNI GY -113.5
438 1704 1707 1709 UNI GY -166.38
449 1699 1703 UNI GY -181.25
360 448 1553 1701 UNI GY -207.9
465 1271 1344 1345 1385 1438 1549 UNI GY -362.5
362 399 UNI GY -181.25
361 400 431 459 461 UNI GY -257.38
419 438 UNI GY -212.5
396 1266 1552 1686 UNI GY -286.06
401 437 UNI GY -200
425 431 459 TO 462 UNI GY -312.5
397 401 1319 UNI GY -324.52
392 1252 1303 UNI GY -212.5
378 419 468 UNI GY -244.38
1302 1303 1570 1571 UNI GY -212.5
380 382 439 1289 1554 1565 UNI GY -292.92
384 423 UNI GY -183.13
457 1302 1570 1571 UNI GY -208.44
395 428 1718 UNI GY -162.5
457 1278 UNI GY -200.74
393 1278 UNI GY -212.5
385 388 425 460 462 UNI GY -280.5
378 1680 1713 1715 UNI GY -250
371 1406 1679 1681 UNI GY -363.01
1400 1714 UNI GY -75
1712 1713 UNI GY -97.06
416 1716 UNI GY -75
377 1680 UNI GY -85.71
408 416 1406 1681 UNI GY -350
408 409 411 474 1393 1410 1576 1580 1583 UNI GY -333.75
384 395 1412 1413 UNI GY -163.25
474 1275 1393 1580 UNI GY -212.13

1394 1395 1412 1413 UNI GY -294.06
374 1395 UNI GY -208.13
409 411 1392 1396 1576 UNI GY -233.87
1389 1391 1394 UNI GY -137.5
390 1396 UNI GY -158.65
365 1389 UNI GY -50
386 1390 UNI GY -66.67
386 390 410 471 472 1275 1411 1717 UNI GY -275
388 699 1414 UNI GY -175
363 372 1717 UNI GY -245.74
389 1387 UNI GY -87.5
364 697 1415 UNI GY -102.94
*LIVE LOAD OF STAIRCASE FLOORS 500kg/sq.m
JOINT LOAD
443 444 FY -327.5
467 468 483 484 FY -433.1
531 532 715 716 FY -118
441 442 457 TO 460 465 466 481 482 489 TO 492 505 TO 508 513 TO 516 -
687 TO 690 702 TO 705 713 714 FY -423.8
MEMBER LOAD
1308 1518 1519 UNI GY -343.75
493 1120 TO 1122 UNI GY -417.41
31 326 332 338 340 346 348 368 1014 1017 TO 1020 1030 1035 TO 1038 1043 1045 -
1046 TO 1048 1058 1063 TO 1066 1071 1073 TO 1076 1086 1091 TO 1094 1099 1101 -
1102 TO 1104 1468 1472 TO 1476 1489 1494 TO 1498 1504 1505 1510 TO 1513 -
1514 UNI GY -375
*LIVE LOAD OF SINGLE CONVEYOR GALLERY
JOINT LOAD
434 FX 2000 FY -20000
433 FX -2000 FY -20000
*LIVE LOAD OF HOISTING PLATFORM CHEQD.PLATE FLOOR 400kg/sq.m
*FOR LOAD CACULATION REFER (PAGE 23)OF DESIGN CALCULATION
MEMBER LOAD
1365 1367 UNI GY -150
1366 1368 UNI GY -150

*FOR THE PURPOSE OF CALCULATING THE EQ LD. ROOF LIVE LOAD IS GIVEN SEPRATELY
LOAD 5 ROOF LIVE LOAD
****
*ROOF LIVE LOAD OF ACCESSIDLE ROOF SLAB 150kg/Sq.m + DUST LD 150kg/Sq.m
*FOR LOAD CACULATION REFER (PAGE 23)OF DESIGN CALCULATION
MEMBER LOAD
511 1111 1308 1519 UNI GY -300
495 514 528 542 1342 UNI GY -225
511 1419 1421 UNI GY -332.61
497 515 1305 1419 1421 UNI GY -375
515 UNI GY -375
530 546 1436 1545 UNI GY -150
523 1422 1544 1546 UNI GY -166.67
501 521 1436 1545 UNI GY -150
502 505 510 1427 UNI GY -150
523 1420 1427 1544 UNI GY -206.25
542 1425 1426 1433 UNI GY -223.44
507 1433 UNI GY -94.88
510 1429 UNI GY -109.74

1429 1430 UNI GY -112.5
526 1426 UNI GY -112.5
1424 1430 UNI GY -35.25
499 508 532 1418 UNI GY -187.5
498 506 512 1416 1420 1424 UNI GY -264.71
512 UNI GY -264.71
*LIVE LOAD ON ROOF SLAB PROJECTION 300kg/sq.m (LL+DUST LD)

494 TO 499 501 502 505 TO 508 514 520 521 526 528 1111 1305 1308 1342 1343 -
1416 1417 1422 1519 1546 UNI GY -150
*LIVE LOAD ON STAIRCASE ROOF 75kg/sq.m + DUST LD 150kg/sq.m
MEMBER LOAD
1263 1265 UNI GY -202.5
1261 UNI GY -337.5
357 851 989 UNI GY -33.75
****

***WIND LOAD IN +VE X-DIRECTION &+CPI**
LOAD 6 WIND LOAD 0DEG (+X&+CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN + X
JOINT LOAD
434 FX 3800 FY 4000
433 FX 1900 FY 8000
MEMBER LOAD
*REFER PAGE 11 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX 225
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 562.5
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -975
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 975
*WIND LOAD ON STAIRCACE
1 16 28 TO 31 36 37 105 108 110 113 115 118 120 122 124 1461 1462 1465 1466 -
1486 1503 1504 1642 UNI GX 210
****

***WIND LOAD IN +VE X-DIRECTION &-CPI**
LOAD 7 WINDLOAD 0DEG (+X&-CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN + X
JOINT LOAD
434 FX 3800 FY 4000
433 FX 1900 FY 8000
MEMBER LOAD
*REFER PAGE 11 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX 975
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX -187.5
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -225
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4

2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 225
*WIND LOAD ON STAIRCACE
1 16 28 TO 31 36 37 105 108 110 113 115 118 120 122 124 1461 1462 1465 1466 -
1486 1503 1504 1642 UNI GX 210

****

***WIND LOAD IN -VE X-DIRECTION &+CPI**
LOAD 8 WIND LOAD 180DEG (-X&+CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN - X
JOINT LOAD
434 FX -3800 FY 4000
433 FX -1900 FY 8000
MEMBER LOAD
*REFER PAGE 11 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -562
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX -225
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -975
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 975
*WIND LOAD ON STAIRCACE
83 84 88 90 TO 92 104 106 107 109 114 116 117 119 121 123 1463 1464 1485 1501 -
1502 1539 TO 1542 UNI GX -210

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***WIND LOAD IN -VE X-DIRECTION &-CPI**
LOAD 9 WIND LOAD 180DEG (-X&-CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN - X
JOINT LOAD
434 FX -3800 FY 4000
433 FX -1900 FY 8000
MEMBER LOAD
*REFER PAGE 11 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX 187.5
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX -975
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -225
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 225
*WIND LOAD ON STAIRCACE
83 84 88 90 TO 92 104 106 107 109 114 116 117 119 121 123 1463 1464 1485 1501 -
1502 1539 TO 1542 UNI GX -210

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***WIND LOAD IN +VE Z-DIRECTION &+CPI**
LOAD 10 WIND LOAD 90DEG (+Z&+CPI)
MEMBER LOAD
*REFER PAGE 11 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4

1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -975
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 975
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ 225
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 562.5
*WIND LOAD ON STAIRCACE
105 TO 110 113 TO 124 1464 1465 1485 1486 1502 1503 UNI GZ 345

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***WIND LOAD IN +VE Z-DIRECTION &-CPI**
LOAD 11 WIND LOAD 90DEG (+Z-CPI)
MEMBER LOAD
*REFER PAGE 11 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -225
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 225
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ 975
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ -187.5
*WIND LOAD ON STAIRCACE
105 TO 110 113 TO 124 1464 1465 1485 1486 1502 1503 UNI GZ 345

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***WIND LOAD IN -VE Z-DIRECTION &+CPI**
LOAD 12 WIND LOAD 270DEG (-Z+CPI)
MEMBER LOAD
*REFER PAGE 11 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -975
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 975
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -562.5
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ -225

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***WIND LOAD IN -VE Z-DIRECTION &-CPI**
LOAD 13 WIND LOAD 270DEG (-Z-CPI)
MEMBER LOAD
*REFER PAGE 12 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -225
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 225
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ 187.5

*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ -975

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***WIND LOAD IN +VE 0.707X & -VE 0.707Z WITH +CPI**
LOAD 14 WIND LOAD 315DEG (+VE 0.707X & -VE 0.707Z WITH +CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN + X
JOINT LOAD
433 FX 2686.6 FY 4000
434 FX 1343.3 FY 8000
MEMBER LOAD
*REFER PAGE 12 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -530.25
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 1087
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -1087
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 530.25

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***WIND LOAD IN +VE 0.707X & -VE 0.707Z WITH -CPI**
LOAD 15 WIND LOAD 315DEG (+VE 0.707X & -VE 0.707Z WITH -CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN + X
JOINT LOAD
433 FX 2686.6 FY 4000
434 FX 1343.3 FY 8000
MEMBER LOAD
*REFER PAGE 12 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX 530.25
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 26.51
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -26.51
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ -530.25

****

***WIND LOAD IN -VE 0.707X & -VE 0.707Z WITH +CPI**
LOAD 16 WIND LOAD 225DEG (-VE 0.707X & -VE 0.707Z WITH +CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN - X
JOINT LOAD
433 FX -2686.6 FY 4000
434 FX -1343.3 FY 8000
MEMBER LOAD
*REFER PAGE 12 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -1087
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 530.25
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1

1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -1087
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 530.25

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***WIND LOAD IN -VE 0.707X & -VE 0.707Z WITH -CPI**
LOAD 17 WIND LOAD 225DEG (-VE 0.707X & -VE 0.707Z WITH -CPI)
*WIND LOAD OF SINGLE CONVEYOR GALLERY IN - X
JOINT LOAD
433 FX -2686.6 FY 4000
434 FX -1343.3 FY 8000
MEMBER LOAD
*REFER PAGE 13 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -26.513
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX -530.25
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -26.513
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ -530.25

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***WIND LOAD IN +VE 0.707X & +VE 0.707Z WITH +CPI**
LOAD 18 WIND LOAD 45DEG (+VE 0.707X & +VE 0.707Z WITH +CPI)
MEMBER LOAD
*REFER PAGE 14 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -530.25
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 1087
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -530.25
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 1087
*WIND LOAD ON STAIRCACE
1 16 28 TO 31 36 37 105 108 110 113 115 118 120 122 124 1461 1462 1465 1466 -
1486 1503 1504 1642 UNI GX 148.47
105 TO 110 113 TO 124 1464 1465 1485 1486 1502 1503 UNI GZ 243.915

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***WIND LOAD IN +VE 0.707X & +VE 0.707Z WITH -CPI**
LOAD 19 WIND LOAD 45DEG (+VE 0.707X & +VE 0.707Z WITH -CPI)
MEMBER LOAD
*REFER PAGE 14 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX 530.25
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 25.51
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ 530.25
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4

2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 26.51
*WIND LOAD ON STAIRCACE
1 16 28 TO 31 36 37 105 108 110 113 115 118 120 122 124 1461 1462 1465 1466 -
1486 1503 1504 1642 UNI GX 148.47
105 TO 110 113 TO 124 1464 1465 1485 1486 1502 1503 UNI GZ 243.915

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***WIND LOAD IN -VE 0.707X & +VE 0.707Z WITH +CPI**
LOAD 20 WIND LOAD 135DEG (-VE 0.707X & +VE 0.707Z WITH +CPI)
MEMBER LOAD
*REFER PAGE 15 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -1087
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX 530.25
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ -530.25
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 1087
*WIND LOAD ON STAIRCACE
83 84 88 90 TO 92 104 106 107 109 114 116 117 119 121 123 1463 1464 1485 1501 -
1502 1539 TO 1542 UNI GX -148.47
105 TO 110 113 TO 124 1464 1465 1485 1486 1502 1503 UNI GZ 243.915

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***WIND LOAD IN -VE 0.707X & +VE 0.707Z WITH -CPI**
LOAD 21 WIND LOAD 135DEG (-VE 0.707X & +VE 0.707Z WITH -CPI)
MEMBER LOAD
*REFER PAGE 15 OF DESIGN CALCULATION
*WIND LOAD ON FACE A UDL ON COLUMN A1&A4
1 2 11 12 16 17 28 TO 37 44 1461 1462 1466 1504 1633 1642 UNI GX -26.51
*WIND LOAD ON FACE B UDL ON COLUMN C1&C4
3 4 6 8 13 14 18 19 21 TO 23 26 27 38 41 42 1637 1646 1690 UNI GX -530.25
*WIND LOAD ON FACE C UDL ON COLUMN A1&C1
1 4 6 13 16 19 21 TO 23 28 TO 31 36 TO 38 1461 1462 1466 1504 1642 -
1646 UNI GZ 530.25
*WIND LOAD ON FACE D UDL ON COLUMN A4&C4
2 3 8 11 12 14 17 18 26 27 32 TO 35 41 42 44 1633 1637 1690 UNI GZ 26.51
*WIND LOAD ON STAIRCACE
83 84 88 90 TO 92 104 106 107 109 114 116 117 119 121 123 1463 1464 1485 1501 -
1502 1539 TO 1542 UNI GX -148.47
105 TO 110 113 TO 124 1464 1465 1485 1486 1502 1503 UNI GZ 243.915
***EQUIPMENT LOAD +X DIRECTION**
LOAD 22 LOADTYPE DEAD TITLE LOAD CASE 10 EQUIPMENT LOAD +X

****

JOINT LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P1
749 750 FX -750 MZ 285
*EQUIPMENT LOAD OF FOUNDATION MARK P2
204 307 FX -1000 MZ 380
*EQUIPMENT LOAD OF FOUNDATION MARK P3
305 306 FX -1000 MZ 380
*EQUIPMENT LOAD OF FOUNDATION MARK P4
*NO HORIZONDAL LOAD

*EQUIPMENT LOAD OF FOUNDATION MARK P5
303 304 FX -150 MZ 57
*EQUIPMENT LOAD OF FOUNDATION MARK P6
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P7
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P8
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P9
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P10
*NO HORIZONDAL LOAD
*MONORAIL LOAD OF 1.5T CAPACITY TAKEN AS 2000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD
*MONORAIL LOAD OF 15T CAPACITY TAKEN AS 20000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD
***EQUIPMENT LOAD -X DIRECTION**
LOAD 23 LOADTYPE DEAD TITLE LOAD CASE 10 EQUIPMENT LOAD -X

****
JOINT LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P1
749 750 FX 750 MZ -285
*EQUIPMENT LOAD OF FOUNDATION MARK P2
204 307 FX 1000 MZ -380
*EQUIPMENT LOAD OF FOUNDATION MARK P3
305 306 FX 1000 MZ -380
*EQUIPMENT LOAD OF FOUNDATION MARK P4
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P5
303 304 FX 150 MZ -57
*EQUIPMENT LOAD OF FOUNDATION MARK P6
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P7
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P8
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P9
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P10
*NO HORIZONDAL LOAD
*MONORAIL LOAD OF 1.5T CAPACITY TAKEN AS 2000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD
*MONORAIL LOAD OF 15T CAPACITY TAKEN AS 20000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD
***EQUIPMENT LOAD Y DIRECTION**
LOAD 24 LOADTYPE DEAD TITLE LOAD CASE 11 EQUIPMENT LOAD Y

****
JOINT LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P1
749 750 FY -4500

*EQUIPMENT LOAD OF FOUNDATION MARK P2
204 307 FY 8000
*EQUIPMENT LOAD OF FOUNDATION MARK P3
305 306 FY -9000
*EQUIPMENT LOAD OF FOUNDATION MARK P4
310 751 TO 753 FY -3000
*EQUIPMENT LOAD OF FOUNDATION MARK P5
303 304 FY -1500
*EQUIPMENT LOAD OF FOUNDATION MARK P6
773 776 779 781 FY -3125
769 770 FY -1250
*EQUIPMENT LOAD OF FOUNDATION MARK P7
754 TO 756 FY -1000
*EQUIPMENT LOAD OF FOUNDATION MARK P8
339 655 656 757 FY -750
*EQUIPMENT LOAD OF FOUNDATION MARK P9
654 FY -200
*EQUIPMENT LOAD OF FOUNDATION MARK P10
758 TO 761 FY -2500
*MONORAIL LOAD OF 1.5T CAPACITY TAKEN AS 2000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
672 FY -2000
*MONORAIL LOAD OF 15T CAPACITY TAKEN AS 20000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
291 608 609 659 FY -20000
*MEMBER LOAD
*1421 CON GY -20000 0.875 0
*1420 CON GY -20000 2.125 0
***EQUIPMENT LOAD +Z DIRECTION**
LOAD 25 LOADTYPE DEAD TITLE LOAD CASE 12 EQUIPMENT LOAD +Z

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JOINT LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P1
749 750 FZ 1000 MX 380
*EQUIPMENT LOAD OF FOUNDATION MARK P2
204 307 FZ 7500 MX 2850
*EQUIPMENT LOAD OF FOUNDATION MARK P3
305 306 FZ 3000 MX 1140
*EQUIPMENT LOAD OF FOUNDATION MARK P4
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P5
303 304 FZ 150 MX 57
*EQUIPMENT LOAD OF FOUNDATION MARK P6
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P7
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P8
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P9
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P10
*NO HORIZONDAL LOAD
*MONORAIL LOAD OF 1.5T CAPACITY TAKEN AS 2000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD

*MONORAIL LOAD OF 15T CAPACITY TAKEN AS 20000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD
***EQUIPMENT LOAD -Z DIRECTION**
LOAD 26 LOADTYPE DEAD TITLE LOAD CASE 13 EQUIPMENT LOAD -Z

****
JOINT LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P1
749 750 FZ -1000 MX -380
*EQUIPMENT LOAD OF FOUNDATION MARK P2
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P3
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P4
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P5
303 304 FZ -150 MX -57
*EQUIPMENT LOAD OF FOUNDATION MARK P6
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P7
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P8
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P9
*NO HORIZONDAL LOAD
*EQUIPMENT LOAD OF FOUNDATION MARK P10
*NO HORIZONDAL LOAD
*MONORAIL LOAD OF 1.5T CAPACITY TAKEN AS 2000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD
*MONORAIL LOAD OF 15T CAPACITY TAKEN AS 20000 kg TO CATER FOR
*IMPACT EFFECTS & WEIGHT OF TROLLY
*NO HORIZONDAL LOAD

****
***LOAD COMBINATIONS**
****
*LOAD COMB 27 (DL + 0.5LL + EQUIP. LD)
*3 1.0 4 0.5 24 1.0
*LOAD COMB 28 (1.2DL)
*3 1.2
*LOAD COMB 29 (1.2LL)
*4 1.2 5 1.2
*LOAD COMB 30 (1.2EQUIP. LD Y)
*24 1.2
*LOAD COMB 31 (1.2EQUIP. LD +X)
*22 1.2
*LOAD COMB 32 (1.2EQUIP. LD -X)
*23 1.2
*LOAD COMB 33 (1.2EQUIP. LD +Z)
*25 1.2
*LOAD COMB 34 (1.2EQUIP. LD -Z)
*26 1.2
*LOAD COMB 35 (1.2WL(+VEX & +CPI))

*6 1.2
*LOAD COMB 36 (1.2WL(+VEX & -CPI))
*7 1.2
*LOAD COMB 38 (1.2WL(-VEX & +CPI))
*8 1.2
*LOAD COMB 39 (1.2WL(-VEX & -CPI))
*9 1.2
*LOAD COMB 40 (1.2WL(+VEZ & +CPI))
*10 1.2
*LOAD COMB 41 (1.2WL(+VEZ & -CPI))
*11 1.2
*LOAD COMB 42 (1.2WL(-VEZ & +CPI))
*12 1.2
*LOAD COMB 43 (1.2WL(-VEZ & -CPI))
*13 1.2
*LOAD COMB 44 (1.2WL(+VEX0.707 & -VEZ0.707 WITH +CPI))
*14 1.2
*LOAD COMB 45 (1.2WL(+VEX0.707 & -VEZ0.707 WITH -CPI))
*15 1.2
*LOAD COMB 46 (1.2WL(-VEX0.707 & -VEZ0.707 WITH +CPI))
*25 1.2
*LOAD COMB 47 (1.2WL(-VEX0.707 & -VEZ0.707 WITH -CPI))
*17 1.2
*LOAD COMB 48 (1.2WL(+VEX0.707 & +VEZ0.707 WITH +CPI))
*18 1.2
*LOAD COMB 49 (1.2WL(+VEX0.707 & +VEZ0.707 WITH -CPI))
*19 1.2
*LOAD COMB 50 (1.2WL(-VEX0.707 & +VEZ0.707 WITH +CPI))
*20 1.2
*LOAD COMB 51 (1.2WL(-VEX0.707 & +VEZ0.707 WITH -CPI))
*21 1.2
*LOAD COMB 52 (1.2EL X)
*1 1.2
*LOAD COMB 53 (1.2EL Z)
*2 1.2

****

***NORMAL CONDITION**

****

LOAD COMB 27 (DL+LL+EQUIPMENT LOAD Y)
3 1.0 4 1.0 5 1.0 24 1.0
LOAD COMB 28 (DL+LL+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 29 (DL+LL+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 30 (DL+LL+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 31 (DL+LL+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 23 1.0 24 1.0 26 1.0

****

***WIND/EARTHQUAKE CONDITION**

****

LOAD COMB 32 (DL+LL+WL(+X&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 6 1.0 22 1.0 24 1.0 25 1.0

LOAD COMB 33 (DL+LL+WL(+X&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 6 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 34 (DL+LL+WL(+X&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 6 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 35 (DL+LL+WL(+X&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 6 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 36 (DL+LL+WL(+X&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 7 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 37 (DL+LL+WL(+X&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 7 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 38 (DL+LL+WL(+X&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 7 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 39 (DL+LL+WL(+X&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 7 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 40 (DL+LL+WL(-X&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 8 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 41 (DL+LL+WL(-X&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 8 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 42 (DL+LL+WL(-X&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 8 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 43 (DL+LL+WL(-X&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 8 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 44 (DL+LL+WL(-X&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 9 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 45 (DL+LL+WL(-X&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 9 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 46 (DL+LL+WL(-X&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 9 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 47 (DL+LL+WL(-X&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 9 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 48 (DL+LL+WL(+Z&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 10 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 49 (DL+LL+WL(+Z&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 10 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 50 (DL+LL+WL(+Z&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 10 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 51 (DL+LL+WL(+Z&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 10 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 52 (DL+LL+WL(+Z&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 11 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 53 (DL+LL+WL(+Z&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 11 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 54 (DL+LL+WL(+Z&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 11 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 55 (DL+LL+WL(+Z&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 11 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 56 (DL+LL+WL(-Z&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 12 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 57 (DL+LL+WL(-Z&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 12 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 58 (DL+LL+WL(-Z&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 12 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 59 (DL+LL+WL(-Z&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 12 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 60 (DL+LL+WL(-Z&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)

3 1.0 4 1.0 5 1.0 13 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 61 (DL+LL+WL(-Z&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 13 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 62 (DL+LL+WL(-Z&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 13 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 63 (DL+LL+WL(-Z&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 13 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 64 (DL+LL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 14 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 65 (DL+LL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 14 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 66 (DL+LL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 14 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 67 (DL+LL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 14 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 68 (DL+LL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 15 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 69 (DL+LL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 15 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 70 (DL+LL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 15 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 71 (DL+LL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 15 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 72 (DL+LL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 16 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 73 (DL+LL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 16 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 74 (DL+LL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 16 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 75 (DL+LL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 16 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 76 (DL+LL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 17 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 77 (DL+LL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 17 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 78 (DL+LL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 17 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 79 (DL+LL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 17 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 80 (DL+LL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 18 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 81 (DL+LL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 18 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 82 (DL+LL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 18 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 83 (DL+LL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 18 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 84 (DL+LL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 19 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 85 (DL+LL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 19 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 86 (DL+LL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 19 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 87 (DL+LL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 19 1.0 23 1.0 24 1.0 26 1.0

LOAD COMB 88 (DL+LL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 89 (DL+LL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 90 (DL+LL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 91 (DL+LL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 92 (DL+LL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 93 (DL+LL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 94 (DL+LL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 95 (DL+LL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 1.0 5 1.0 20 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 96 (DL+0.5LL+EQL(+X)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 1 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 97 (DL+0.5LL+EQL(+X)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 1 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 98 (DL+0.5LL+EQL(+X)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 1 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 99 (DL+0.5LL+EQL(+X)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 1 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 100 (DL+0.5LL+EQL(+Z)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 2 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 101 (DL+0.5LL+EQL(+Z)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 2 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 102 (DL+0.5LL+EQL(+Z)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 2 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 103 (DL+0.5LL+EQL(+Z)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 2 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 104 (DL+0.5LL+EQL(-X)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 1 -1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 105 (DL+0.5LL+EQL(-X)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 1 -1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 106 (DL+0.5LL+EQL(-X)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 1 -1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 107 (DL+0.5LL+EQL(-X)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 1 -1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 108 (DL+0.5LL+EQL(-Z)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 2 -1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 109 (DL+0.5LL+EQL(-Z)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 2 -1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 110 (DL+0.5LL+EQL(-Z)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 4 0.5 5 0.5 2 -1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 111 (DL+0.5LL+EQL(-Z)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 4 0.5 5 0.5 2 -1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 112 (DL+WL(+X&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 6 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 113 (DL+WL(+X&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 6 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 114 (DL+WL(+X&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 6 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 115 (DL+WL(+X&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)

3 1.0 6 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 116 (DL+WL(+X&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 7 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 117 (DL+WL(+X&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 7 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 118 (DL+WL(+X&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 7 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 119 (DL+WL(+X&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 7 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 120 (DL+WL(-X&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 8 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 121 (DL+WL(-X&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 8 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 122 (DL+WL(-X&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 8 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 123 (DL+WL(-X&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 8 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 124 (DL+WL(-X&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 9 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 125 (DL+WL(-X&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 9 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 126 (DL+WL(-X&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 9 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 127 (DL+WL(-X&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 9 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 128 (DL+WL(+Z&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 10 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 129 (DL+WL(+Z&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 10 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 130 (DL+WL(+Z&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 10 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 131 (DL+WL(+Z&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 10 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 132 (DL+WL(+Z&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 11 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 133 (DL+WL(+Z&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 11 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 134 (DL+WL(+Z&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 11 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 135 (DL+WL(+Z&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 11 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 136 (DL+WL(-Z&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 12 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 137 (DL+WL(-Z&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 12 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 138 (DL+WL(-Z&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 12 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 139 (DL+WL(-Z&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 12 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 140 (DL+WL(-Z&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 13 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 141 (DL+WL(-Z&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 13 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 142 (DL+WL(-Z&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 13 1.0 23 1.0 24 1.0 25 1.0

LOAD COMB 143 (DL+WL(-Z&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 13 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 144 (DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 14 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 145 (DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 14 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 146 (DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 14 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 147 (DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 14 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 148 (DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 15 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 149 (DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 15 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 150 (DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 15 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 151 (DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 15 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 152 (DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 16 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 153 (DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 16 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 154 (DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 16 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 155 (DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 16 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 156 (DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 17 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 157 (DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 17 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 158 (DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 17 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 159 (DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 17 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 160 (DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 18 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 161 (DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 18 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 162 (DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 18 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 163 (DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 18 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 164 (DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 19 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 165 (DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 19 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 166 (DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 19 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 167 (DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 19 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 168 (DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 20 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 169 (DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 20 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 170 (DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)

3 1.0 20 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 171 (DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 20 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 172 (DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 21 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 173 (DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 21 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 174 (DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 21 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 175 (DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 21 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 176 (DL+EQL(+X)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 1 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 177 (DL+EQL(+X)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 1 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 178 (DL+EQL(+X)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 1 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 179 (DL+EQL(+X)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 1 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 180 (DL+EQL(+Z)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 2 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 181 (DL+EQL(+Z)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 2 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 182 (DL+EQL(+Z)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 2 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 183 (DL+EQL(+Z)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 2 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 184 (DL+EQL(-X)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 1 -1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 185 (DL+EQL(-X)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 1 -1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 186 (DL+EQL(-X)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 1 -1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 187 (DL+EQL(-X)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 1 -1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 188 (DL+EQL(-Z)+EQUIPMENT LOAD +X,Y & +VE Z)
3 1.0 2 -1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 189 (DL+EQL(-Z)+EQUIPMENT LOAD +X,Y & -VE Z)
3 1.0 2 -1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 190 (DL+EQL(-Z)+EQUIPMENT LOAD -X,Y & +VE Z)
3 1.0 2 -1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 191 (DL+EQL(-Z)+EQUIPMENT LOAD -X,Y & -VE Z)
3 1.0 2 -1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 192 (0.8DL+WL(+X&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 6 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 193 (0.8DL+WL(+X&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 6 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 194 (0.8DL+WL(+X&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 6 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 195 (0.8DL+WL(+X&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 6 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 196 (0.8DL+WL(+X&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 7 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 197 (0.8DL+WL(+X&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 7 1.0 22 1.0 24 1.0 26 1.0

LOAD COMB 198 (0.8DL+WL(+X&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 7 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 199 (0.8DL+WL(+X&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 7 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 200 (0.8DL+WL(-X&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 8 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 201 (0.8DL+WL(-X&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 8 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 202 (0.8DL+WL(-X&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 8 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 203 (0.8DL+WL(-X&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 8 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 204 (0.8DL+WL(-X&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 9 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 205 (0.8DL+WL(-X&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 9 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 206 (0.8DL+WL(-X&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 9 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 207 (0.8DL+WL(-X&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 9 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 208 (0.8DL+WL(+Z&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 10 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 209 (0.8DL+WL(+Z&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 10 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 210 (0.8DL+WL(+Z&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 10 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 211 (0.8DL+WL(+Z&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 10 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 212 (0.8DL+WL(+Z&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 11 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 213 (0.8DL+WL(+Z&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 11 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 214 (0.8DL+WL(+Z&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 11 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 215 (0.8DL+WL(+Z&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 11 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 216 (0.8DL+WL(-Z&+CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 12 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 217 (0.8DL+WL(-Z&+CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 12 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 218 (0.8DL+WL(-Z&+CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 12 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 219 (0.8DL+WL(-Z&+CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 12 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 220 (0.8DL+WL(-Z&-CPI)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 13 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 221 (0.8DL+WL(-Z&-CPI)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 13 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 222 (0.8DL+WL(-Z&-CPI)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 13 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 223 (0.8DL+WL(-Z&-CPI)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 13 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 224 (0.8DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 14 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 225 (0.8DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)

3 0.8 14 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 226 (0.8DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 14 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 227 (0.8DL+WL(+X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 14 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 228 (0.8DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 15 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 229 (0.8DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 15 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 230 (0.8DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 15 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 231 (0.8DL+WL(+X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 15 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 232 (0.8DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 16 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 233 (0.8DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 16 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 234 (0.8DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 16 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 235 (0.8DL+WL(-X &-Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 16 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 236 (0.8DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 17 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 237 (0.8DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 17 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 238 (0.8DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 17 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 239 (0.8DL+WL(-X &-Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 17 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 240 (0.8DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 18 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 241 (0.8DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 18 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 242 (0.8DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 18 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 243 (0.8DL+WL(+X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 18 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 244 (0.8DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 19 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 245 (0.8DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 19 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 246 (0.8DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 19 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 247 (0.8DL+WL(+X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 19 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 248 (0.8DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 20 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 249 (0.8DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 20 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 250 (0.8DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 20 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 251 (0.8DL+WL(-X &+Z WITH +CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 20 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 252 (0.8DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 21 1.0 22 1.0 24 1.0 25 1.0

LOAD COMB 253 (0.8DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 21 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 254 (0.8DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 21 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 255 (0.8DL+WL(-X &+Z WITH -CPI))+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 21 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 256 (0.8DL+EQL(+X)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 1 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 257 (0.8DL+EQL(+X)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 1 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 258 (0.8DL+EQL(+X)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 1 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 259 (0.8DL+EQL(+X)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 1 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 260 (0.8DL+EQL(+Z)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 2 1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 261 (0.8DL+EQL(+Z)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 2 1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 262 (0.8DL+EQL(+Z)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 2 1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 263 (0.8DL+EQL(+Z)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 2 1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 264 (0.8DL+EQL(-X)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 1 -1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 265 (0.8DL+EQL(-X)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 1 -1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 266 (0.8DL+EQL(-X)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 1 -1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 267 (0.8DL+EQL(-X)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 1 -1.0 23 1.0 24 1.0 26 1.0
LOAD COMB 268 (0.8DL+EQL(-Z)+EQUIPMENT LOAD +X,Y & +VE Z)
3 0.8 2 -1.0 22 1.0 24 1.0 25 1.0
LOAD COMB 269 (0.8DL+EQL(-Z)+EQUIPMENT LOAD +X,Y & -VE Z)
3 0.8 2 -1.0 22 1.0 24 1.0 26 1.0
LOAD COMB 270 (0.8DL+EQL(-Z)+EQUIPMENT LOAD -X,Y & +VE Z)
3 0.8 2 -1.0 23 1.0 24 1.0 25 1.0
LOAD COMB 271 (0.8DL+EQL(-Z)+EQUIPMENT LOAD -X,Y & -VE Z)
3 0.8 2 -1.0 23 1.0 24 1.0 26 1.0

****

***LOAD COMBINATION FOR FOUNDATION BOLT DESIGN AT THE TIME ERECTION**

****

LOAD COMB 272 (0.8DL+WL(+X&+CPI))
3 0.8 6 1.0
LOAD COMB 273 (0.8DL+WL(+X&-CPI))
3 0.8 7 1.0
LOAD COMB 274 (0.8DL+WL(-X&+CPI))
3 0.8 8 1.0
LOAD COMB 275 (0.8DL+WL(-X&-CPI))
3 0.8 9 1.0
LOAD COMB 276 (0.8DL+WL(+Z&+CPI))
3 0.8 10 1.0
LOAD COMB 277 (0.8DL+WL(+Z&-CPI))
3 0.8 11 1.0
LOAD COMB 278 (0.8DL+WL(-Z&+CPI))

3 0.8 12 1.0
LOAD COMB 280 (0.8DL+WL(-Z&-CPI))
3 0.8 13 1.0
LOAD COMB 281 (0.8DL+WL(+X &-Z WITH +CPI))
3 0.8 14 1.0
LOAD COMB 282 (0.8DL+WL(+X &-Z WITH -CPI))
3 0.8 15 1.0
LOAD COMB 283 (0.8DL+WL(-X &-Z WITH +CPI))
3 0.8 16 1.0
LOAD COMB 284 (0.8DL+WL(-X &-Z WITH -CPI))
3 0.8 17 1.0
LOAD COMB 285 (0.8DL+WL(+X &+Z WITH +CPI))
3 0.8 18 1.0
LOAD COMB 286 (0.8DL+WL(+X &+Z WITH -CPI))
3 0.8 19 1.0
LOAD COMB 287 (0.8DL+WL(-X &+Z WITH +CPI))
3 0.8 20 1.0
LOAD COMB 288 (0.8DL+WL(-X &+Z WITH -CPI))
3 0.8 21 1.0
LOAD COMB 290 (0.8DL+EQL(+X))
3 0.8 1 1.0
LOAD COMB 291 (0.8DL+EQL(+Z))
3 0.8 2 1.0
LOAD COMB 292 (0.8DL+EQL(-X))
3 0.8 1 -1.0
LOAD COMB 293 (0.8DL+EQL(-Z))
3 0.8 2 -1.0
PERFORM ANALYSIS PRINT STATICS CHECK
*PRINT ANALYSIS RESULTS
STEEL TAKE OFF ALL

****

***DESIGN OF FLOOR BEAM**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1387
CHECK CODE MEMB 1387
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1387
CHECK CODE MEMB 1387

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1390 1708 1710 1714 1716
CHECK CODE MEMB 1390 1708 1710 1714 1716
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1390 1708 1710 1714 1716
CHECK CODE MEMB 1390 1708 1710 1714 1716

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**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 694 697 699 1414 1415
CHECK CODE MEMB 694 697 699 1414 1415
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 694 697 699 1414 1415
CHECK CODE MEMB 694 697 699 1414 1415
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1680 1704 1707 1709 1713 1715
CHECK CODE MEMB 1680 1704 1707 1709 1713 1715
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1680 1704 1707 1709 1713 1715
CHECK CODE MEMB 1680 1704 1707 1709 1713 1715
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1389 1391
CHECK CODE MEMB 1389 1391
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1389 1391
CHECK CODE MEMB 1389 1391
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1394 1395 1412 1413
CHECK CODE MEMB 1394 1395 1412 1413
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1394 1395 1412 1413
CHECK CODE MEMB 1394 1395 1412 1413
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1392 1396
CHECK CODE MEMB 1392 1396
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1392 1396
CHECK CODE MEMB 1392 1396
```

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**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 408 410 471 472 1717
CHECK CODE MEMB 408 410 471 472 1717
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 408 410 471 472 1717
CHECK CODE MEMB 408 410 471 472 1717
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 386 390 416 1275 1406 1411 1681
CHECK CODE MEMB 386 390 416 1275 1406 1411 1681
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 386 390 416 1275 1406 1411 1681
CHECK CODE MEMB 386 390 416 1275 1406 1411 1681
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 409 411 474 1393 1410 1576 1580 1583
CHECK CODE MEMB 409 411 474 1393 1410 1576 1580 1583
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 409 411 474 1393 1410 1576 1580 1583
CHECK CODE MEMB 409 411 474 1393 1410 1576 1580 1583
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 425 431 459 TO 462
CHECK CODE MEMB 425 431 459 TO 462
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 425 431 459 TO 462
CHECK CODE MEMB 425 431 459 TO 462
**************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 419 421 423 428 438 439 448 465 468 1289 1385 1438 1549 1553 -
1554 1718
CHECK CODE MEMB 419 421 423 428 438 439 448 465 468 1289 1385 1438 1549 1553 -
1554 1718
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
```

RATIO 1.33 MEMB 419 421 423 428 438 439 448 465 468 1289 1385 1438 1549 1553 -
1554 1718
CHECK CODE MEMB 419 421 423 428 438 439 448 465 468 1289 1385 1438 1549 1553 -
1554 1718
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 399 401 1278
CHECK CODE MEMB 399 401 1278
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 399 401 1278
CHECK CODE MEMB 399 401 1278
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 457 1302 1303 1570 1571
CHECK CODE MEMB 457 1302 1303 1570 1571
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 457 1302 1303 1570 1571
CHECK CODE MEMB 457 1302 1303 1570 1571
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 437 446 1550 TO 1552 1686
CHECK CODE MEMB 437 446 1550 TO 1552 1686
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 437 446 1550 TO 1552 1686
CHECK CODE MEMB 437 446 1550 TO 1552 1686
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 449 1699 1703
CHECK CODE MEMB 449 1699 1703
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 449 1699 1703
CHECK CODE MEMB 449 1699 1703
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 361 364 387 400 1386
CHECK CODE MEMB 361 364 387 400 1386
LOAD LIST 32 TO 271

PARAMETER
CODE INDIAN
RATIO 1 MEMB 361 364 387 400 1386
CHECK CODE MEMB 361 364 387 400 1386
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 360 365 373 374 383 1271 1344 1345 1388 1698
CHECK CODE MEMB 360 365 373 374 383 1271 1344 1345 1388 1698
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 360 365 373 374 383 1271 1344 1345 1388 1698
CHECK CODE MEMB 360 365 373 374 383 1271 1344 1345 1388 1698
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 359 377 1701 1705 1706 1711 1712
CHECK CODE MEMB 359 377 1701 1705 1706 1711 1712
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 359 377 1701 1705 1706 1711 1712
CHECK CODE MEMB 359 377 1701 1705 1706 1711 1712
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 362 392 393 396 397 1042 1252 1266 1319 1702
CHECK CODE MEMB 362 392 393 396 397 1042 1252 1266 1319 1702
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 362 392 393 396 397 1042 1252 1266 1319 1702
CHECK CODE MEMB 362 392 393 396 397 1042 1252 1266 1319 1702
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 363 371 372 389 405 1400 1555 1679
CHECK CODE MEMB 363 371 372 389 405 1400 1555 1679
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 363 371 372 389 405 1400 1555 1679
CHECK CODE MEMB 363 371 372 389 405 1400 1555 1679
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 378 380 382 384 385 388 395 1565
CHECK CODE MEMB 378 380 382 384 385 388 395 1565
LOAD LIST 32 TO 271

PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 378 380 382 384 385 388 395 1565
CHECK CODE MEMB 378 380 382 384 385 388 395 1565

****

***DESIGN OF ROOF BEAM**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 511 515
CHECK CODE MEMB 511 515
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 511 515
CHECK CODE MEMB 511 515

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1419 1421
CHECK CODE MEMB 1419 1421
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1419 1421
CHECK CODE MEMB 1419 1421

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1436 1545
CHECK CODE MEMB 1436 1545
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1436 1545
CHECK CODE MEMB 1436 1545

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1425 1426 1433
CHECK CODE MEMB 1425 1426 1433
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1425 1426 1433
CHECK CODE MEMB 1425 1426 1433

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN

RATIO 1 MEMB 510 512 523 1427 1544
CHECK CODE MEMB 510 512 523 1427 1544
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 510 512 523 1427 1544
CHECK CODE MEMB 510 512 523 1427 1544
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1420 1424
CHECK CODE MEMB 1420 1424
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1420 1424
CHECK CODE MEMB 1420 1424
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 494 501 521
CHECK CODE MEMB 494 501 521
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 494 501 521
CHECK CODE MEMB 494 501 521
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 495 507 508 514 520 526 528 1342 1343 1417
CHECK CODE MEMB 495 507 508 514 520 526 528 1343 1417
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 495 507 508 514 520 526 528 1343 1417
CHECK CODE MEMB 495 507 508 514 520 526 528 1343 1417
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 496 499
CHECK CODE MEMB 496 499
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 496 499
CHECK CODE MEMB 496 499
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN

RATIO 1 MEMB 498 502 505 506 1416 1422 1546
CHECK CODE MEMB 498 502 505 506 1416 1422 1546
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 498 502 505 506 1416 1422 1546
CHECK CODE MEMB 498 502 505 506 1416 1422 1546
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 497 1111 1305 1308 1519 1662
CHECK CODE MEMB 497 1111 1305 1308 1519 1662
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 497 1111 1305 1308 1519 1662
CHECK CODE MEMB 497 1111 1305 1308 1519 1662
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 530 532 542 546 1418
CHECK CODE MEMB 530 532 542 546 1418
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 530 532 542 546 1418
CHECK CODE MEMB 530 532 542 546 1418
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1337 1338
CHECK CODE MEMB 1337 1338
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1337 1338
CHECK CODE MEMB 1337 1338
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1429 1430
CHECK CODE MEMB 1429 1430
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1429 1430
CHECK CODE MEMB 1429 1430

****
*DESIGN OF COLUMN
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 105 TO 110 1464 1465
CHECK CODE MEMB 105 TO 110 1464 1465
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 105 TO 110 1464 1465
CHECK CODE MEMB 105 TO 110 1464 1465
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 113 TO 124 1485 1486 1502 1503
CHECK CODE MEMB 113 TO 124 1485 1486 1502 1503
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 113 TO 124 1485 1486 1502 1503
CHECK CODE MEMB 113 TO 124 1485 1486 1502 1503
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1 TO 4 6 8 11 TO 14 1461 1462 1466 1690
CHECK CODE MEMB 1 TO 4 6 8 11 TO 14 1461 1462 1466 1690
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1 TO 4 6 8 11 TO 14 1461 1462 1466 1690
CHECK CODE MEMB 1 TO 4 6 8 11 TO 14 1461 1462 1466 1690
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 16 TO 19 21 TO 23 26 TO 38 41 42 44 1504 1633 1637 1642 1646
CHECK CODE MEMB 16 TO 19 21 TO 23 26 TO 38 41 42 44 1504 1633 1637 1642 1646
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 16 TO 19 21 TO 23 26 TO 38 41 42 44 1504 1633 1637 1642 1646
CHECK CODE MEMB 16 TO 19 21 TO 23 26 TO 38 41 42 44 1504 1633 1637 1642 1646
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 46 TO 53 56 TO 59 1601 TO 1604
CHECK CODE MEMB 46 TO 53 56 TO 59 1601 TO 1604
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN

RATIO 1.33 MEMB 46 TO 53 56 TO 59 1601 TO 1604
CHECK CODE MEMB 46 TO 53 56 TO 59 1601 TO 1604
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 62 TO 81 1635 1640 1644 1649
CHECK CODE MEMB 62 TO 81 1635 1640 1644 1649
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 62 TO 81 1635 1640 1644 1649
CHECK CODE MEMB 62 TO 81 1635 1640 1644 1649
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 82 TO 85 88 1177 1463
CHECK CODE MEMB 82 TO 85 88 1177 1463
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 82 TO 85 88 1177 1463
CHECK CODE MEMB 82 TO 85 88 1177 1463
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 89 TO 92 96 TO 99 104 1197 1501 1539 TO 1542 1622
CHECK CODE MEMB 89 TO 92 96 TO 99 104 1197 1501 1539 TO 1542 1622
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 89 TO 92 96 TO 99 104 1197 1501 1539 TO 1542 1622
CHECK CODE MEMB 89 TO 92 96 TO 99 104 1197 1501 1539 TO 1542 1622
****
***DESIGN OF VERTICAL BRACING**
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 765 766 771 772 874 TO 877 880 TO 883 1145 TO 1156
CHECK CODE MEMB 765 766 771 772 874 TO 877 880 TO 883 1145 TO 1156
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1 MEMB 765 766 771 772 874 TO 877 880 TO 883 1145 TO 1156
CHECK CODE MEMB 765 766 771 772 874 TO 877 880 TO 883 1145 TO 1156
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 884 TO 903 1157 TO 1176 1634 1636 1638 1641 1643 1645 1647 1650
CHECK CODE MEMB 884 TO 903 1157 TO 1176 1634 1636 1638 1641 1643 1645 1647 1650
LOAD LIST 32 TO 271

PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 884 TO 903 1157 TO 1176 1634 1636 1638 1641 1643 1645 1647 1650
CHECK CODE MEMB 884 TO 903 1157 TO 1176 1634 1636 1638 1641 1643 1645 1647 1650
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 255 TO 258 854 992 1201 TO 1204 1214 1217 1219 1691 1692 1694
CHECK CODE MEMB 255 TO 258 854 992 1201 TO 1204 1214 1217 1219 1691 1692 1694
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 255 TO 258 854 992 1201 TO 1204 1214 1217 1219 1691 1692 1694
CHECK CODE MEMB 255 TO 258 854 992 1201 TO 1204 1214 1217 1219 1691 1692 1694
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 259 260 263 264 267 268 271 272 853 991 1205 TO 1213 1216 1627 -
1629 1639 1648 1663 1664
CHECK CODE MEMB 259 260 263 264 267 268 271 272 853 991 1205 TO 1213 1216 -
1627 1629 1639 1648 1663 1664
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 259 260 263 264 267 268 271 272 853 991 1205 TO 1213 1216 -
1627 1629 1639 1648 1663 1664
CHECK CODE MEMB 259 260 263 264 267 268 271 272 853 991 1205 TO 1213 1216 -
1627 1629 1639 1648 1663 1664
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 609 TO 612 1478 1479 1673 1674
CHECK CODE MEMB 609 TO 612 1478 1479 1673 1674
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 609 TO 612 1478 1479 1673 1674
CHECK CODE MEMB 609 TO 612 1478 1479 1673 1674
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 613 TO 624 1490 1491 1516 1517
CHECK CODE MEMB 613 TO 624 1490 1491 1516 1517
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 613 TO 624 1490 1491 1516 1517
CHECK CODE MEMB 613 TO 624 1490 1491 1516 1517
****
LOAD LIST 27 TO 31
PARAMETER

CODE INDIAN
RATIO 1 MEMB 1375 TO 1378
CHECK CODE MEMB 1375 TO 1378
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1375 TO 1378
CHECK CODE MEMB 1375 TO 1378
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1657 1658 1660 1720
CHECK CODE MEMB 1657 1658 1660 1720
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1657 1658 1660 1720
CHECK CODE MEMB 1657 1658 1660 1720
****
***DESIGN OF PLAN BRACING**
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 299 TO 301 306 309 1268 TO 1270 1272 1273 1276 1279 1296 1314 -
1315 1322 1407 TO 1409 1563 1586 1593 1595 1682 1685 1687 1696 1697 1700
CHECK CODE MEMB 299 TO 301 306 309 1268 TO 1270 1272 1273 1276 1279 1296 1314 -
1315 1322 1407 TO 1409 1563 1586 1593 1595 1682 1685 1687 1696 1697 1700
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 299 TO 301 306 309 1268 TO 1270 1272 1273 1276 1279 1296 1314 -
1315 1322 1407 TO 1409 1563 1586 1593 1595 1682 1685 1687 1696 1697 1700
CHECK CODE MEMB 299 TO 301 306 309 1268 TO 1270 1272 1273 1276 1279 1296 1314 -
1315 1322 1407 TO 1409 1563 1586 1593 1595 1682 1685 1687 1696 1697 1700
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 317 318 320 TO 323 844 920 987 1340 1341 1423 1432 1434 1435 1695
CHECK CODE MEMB 317 318 320 TO 323 844 920 987 1340 1341 1423 1432 1434 1435 -
1695
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 317 318 320 TO 323 844 920 987 1340 1341 1423 1432 1434 1435 -
1695
CHECK CODE MEMB 317 318 320 TO 323 844 920 987 1340 1341 1423 1432 1434 1435 -
1695
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1373 1374

CHECK CODE MEMB 1373 1374
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1373 1374
CHECK CODE MEMB 1373 1374
****

***DESIGN OF STAIRCASE BRACING**

****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 329 335 339 343 357 606 848 850 851 863 TO 869 989 1000 1011 -
1013 1025 1028 1053 1081 1097 1109 1242 1243 1245 1247 1254 1256 1467 1469 -
1470 1477 1488 1492 1493 1499 1506 1507 1509 1515 1518 1520 1523 1525 1527 -
1529 1532 1534 1536 1675 1676
CHECK CODE MEMB 329 335 339 343 357 606 848 850 851 863 TO 869 989 1000 1011 -
1013 1025 1028 1053 1081 1097 1109 1242 1243 1245 1247 1254 1256 1467 1469 -
1470 1477 1488 1492 1493 1499 1506 1507 1509 1515 1518 1520 1523 1525 1527 -
1529 1532 1534 1536 1675 1676
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 329 335 339 343 357 606 848 850 851 863 TO 869 989 1000 1011 -
1013 1025 1028 1053 1081 1097 1109 1242 1243 1245 1247 1254 1256 1467 1469 -
1470 1477 1488 1492 1493 1499 1506 1507 1509 1515 1518 1520 1523 1525 1527 -
1529 1532 1534 1536 1675 1676
CHECK CODE MEMB 329 335 339 343 357 606 848 850 851 863 TO 869 989 1000 1011 -
1013 1025 1028 1053 1081 1097 1109 1242 1243 1245 1247 1254 1256 1467 1469 -
1470 1477 1488 1492 1493 1499 1506 1507 1509 1515 1518 1520 1523 1525 1527 -
1529 1532 1534 1536 1675 1676
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 326 332 338 340 346 348 358 368 493 503 1468 1489 1505
CHECK CODE MEMB 326 332 338 340 346 348 358 368 493 503 1468 1489 1505
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 326 332 338 340 346 348 358 368 493 503 1468 1489 1505
CHECK CODE MEMB 326 332 338 340 346 348 358 368 493 503 1468 1489 1505
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1014 1017 TO 1020 1030 1035 TO 1038 1043 1045 TO 1048 1058 1063 -
1064 TO 1066 1071 1073 TO 1076 1086 1091 TO 1094 1099 1101 TO 1104 -
1120 TO 1122 1472 TO 1476 1494 TO 1498 1510 TO 1514
CHECK CODE MEMB 1014 1017 TO 1020 1030 1035 TO 1038 1043 1045 TO 1048 1058 -
1063 TO 1066 1071 1073 TO 1076 1086 1091 TO 1094 1099 1101 TO 1104 -
1120 TO 1122 1472 TO 1476 1494 TO 1498 1510 TO 1514
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN

RATIO 1.33 MEMB 1014 1017 TO 1020 1030 1035 TO 1038 1043 1045 TO 1048 1058 -
1063 TO 1066 1071 1073 TO 1076 1086 1091 TO 1094 1099 1101 TO 1104 -
1120 TO 1122 1472 TO 1476 1494 TO 1498 1510 TO 1514
CHECK CODE MEMB 1014 1017 TO 1020 1030 1035 TO 1038 1043 1045 TO 1048 1058 -
1063 TO 1066 1071 1073 TO 1076 1086 1091 TO 1094 1099 1101 TO 1104 -
1120 TO 1122 1472 TO 1476 1494 TO 1498 1510 TO 1514

****

***DESIGN OF BRACKET @20.000mL**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1333 1334
CHECK CODE MEMB 1333 1334
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1333 1334
CHECK CODE MEMB 1333 1334

****

***DESIGN OF BRACKET @6.900mL**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1005 1006
CHECK CODE MEMB 1005 1006
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1005 1006
CHECK CODE MEMB 1005 1006

****

***DESIGN OF BRACKET CONNECTING BRACING @20.000mL**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1335 1336
CHECK CODE MEMB 1335 1336
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1335 1336
CHECK CODE MEMB 1335 1336

****

***DESIGN OF BRACKET CONNECTING BRACING @6.900mL**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1008 1323
CHECK CODE MEMB 1008 1323
LOAD LIST 32 TO 271

PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1008 1323
CHECK CODE MEMB 1008 1323
****

***DESIGN OF TIE BEAM**

****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 855 993 1178 1180 1183 1185 1188 1190 1193 1195 1198 1200 1215 -
1218 1219 1221 TO 1228 1623 TO 1626 1661 1694
CHECK CODE MEMB 855 993 1178 1180 1183 1185 1188 1190 1193 1195 1198 1200 -
1215 1218 1219 1221 TO 1228 1623 TO 1626 1661 1694
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 855 993 1178 1180 1183 1185 1188 1190 1193 1195 1198 1200 -
1215 1218 1219 1221 TO 1228 1623 TO 1626 1661 1694
CHECK CODE MEMB 855 993 1178 1180 1183 1185 1188 1190 1193 1195 1198 1200 -
1215 1218 1219 1221 TO 1228 1623 TO 1626 1661 1694
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1137 1140 1141 1143 1144
CHECK CODE MEMB 1137 1140 1141 1143 1144
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1137 1140 1141 1143 1144
CHECK CODE MEMB 1137 1140 1141 1143 1144
****

***DESIGN OF HANGING PLATFORM BEAM @20.000mL**

****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1365 1367
CHECK CODE MEMB 1365 1367
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1365 1367
CHECK CODE MEMB 1365 1367
****
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1366 1368
CHECK CODE MEMB 1366 1368
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1366 1368
CHECK CODE MEMB 1366 1368

```
**********************************************************************************
*DESIGN OF HANGERS @20.000mL
**********************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1369 TO 1372
CHECK CODE MEMB 1369 TO 1372
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1369 TO 1372
CHECK CODE MEMB 1369 TO 1372
**********************************************************************************
*DESIGN OF HANGING PLATFORM BEAM @6.900mL
**********************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1443 1445
CHECK CODE MEMB 1443 1445
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1443 1445
CHECK CODE MEMB 1443 1445
**********************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1444 1446 TO 1452
CHECK CODE MEMB 1444 1446 TO 1452
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1444 1446 TO 1452
CHECK CODE MEMB 1444 1446 TO 1452
**********************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1453 TO 1457 1459 1556 1558
CHECK CODE MEMB 1453 TO 1457 1459 1556 1558
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1453 TO 1457 1459 1556 1558
CHECK CODE MEMB 1453 TO 1457 1459 1556 1558
**********************************************************************************
LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1458 1460 1557 1559
CHECK CODE MEMB 1458 1460 1557 1559
LOAD LIST 32 TO 271
```

PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1458 1460 1557 1559
CHECK CODE MEMB 1458 1460 1557 1559

****

***DESIGN OF HANGERS @6.900mL**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1439 1440 1442 1719
CHECK CODE MEMB 1439 1440 1442 1719
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1439 1440 1442 1719
CHECK CODE MEMB 1439 1440 1442 1719

****

***DESIGN OF RAFTER BEAM**

****

LOAD LIST 27 TO 31
PARAMETER
CODE INDIAN
RATIO 1 MEMB 1381 1384 1667 TO 1672
CHECK CODE MEMB 1381 1384 1667 TO 1672
LOAD LIST 32 TO 271
PARAMETER
CODE INDIAN
RATIO 1.33 MEMB 1381 1384 1667 TO 1672
CHECK CODE MEMB 1381 1384 1667 TO 1672
PRINT MAXFORCE ENVELOPE LIST 105 TO 110 1464 1465
FINISH

STAAD
Output Details



Designed by : ThyssenKrupp Industries India

Analysis Output of Critical Floor Beams

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
1387	27	0	3.23	12.792	0	73.10
1387	32	0	7.14	12.792	0	73.10
1710	30	0.23	69.2	-5.5	0	42.05
1710	102	0	306.05	4.54	0	33.50
1414	31	0	6.59	-360.8	0	655.95
1414	35	0	14.46	-360.8	0	655.95
1713	28	0	701.89	-384.5	-0.2	783.90
1707	110	0.45	92.2	-114.2	84.07	385.45
1389	30	0	181.73	-62.9	-2.4	243.15
1389	110	0	367.51	-49.4	-5.02	190.64
1395	31	0	69.43	-1574.5	-0.5	1936.00
1395	71	0	224.68	-1574.5	-0.32	1963.00
1392	30	0.6	1.88	-389.5	7.15	871.09
1396	33	0.32	477.17	-431	-2.64	871.09
1717	28	0	1469.85	-3566.6	-11.16	3033.00
408	67	2.12	1303.21	-3479.7	0	3275.10
1275	30	0	4432.4	-4934.3	-106.91	4260.00
1275	54	0	6565.35	-4934.3	-155.33	4260.00
1393	28	0.17	920.51	-12366.8	-180.05	12657.00
1393	52	0	735.73	-12238.1	-271.47	12657.00
462	28	0	1352.5	-6242.8	-508.3	8289.00
462	36	0	2978.5	-6242.8	-508.3	8289.00
1554	30	0.98	2118.24	-25629	-202.78	12490.00
468	108	0.3	2829.93	-19888.6	968.73	12490.00
1278	30	1.7	4885.42	-29530.3	78.97	18830.00
1278	50	1.7	6238.56	-29530.1	111.48	18830.00
1571	28	0	929.14	-1074.3	0.45	2478.00
1571	80	0	1456.82	-1074.3	0.7	2478.00
1550	31	0.58	393.85	-1821	0	3033.00
1550	183	0	1443.61	-1815	0	3033.00
1703	30	0	2215.11	-310	-20.96	726.38
1703	42	0	2682.58	-309.9	-32.32	726.27
387	28	0	576.28	-2072	19.45	1973.30
1386	35	0.55	7779.58	-2070.4	-10.54	1973.30
374	28	1.66	706.38	-15920.6	53.59	7720.80
374	52	1.66	6752.67	-15920.8	81.08	7720.80
1706	30	0.4	6592.69	-283	64.23	470.48
1706	102	0.37	7093.73	-234.4	333.95	470.48

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
1266	30	1.3	6204.94	-24578.2	-116.69	15380.00
1266	38	1.3	9017.74	-24578.1	-136.97	15380.00
363	30	2.12	3054.68	1072.3	-0.59	2054.00
363	38	2.12	17973.33	1070.5	-1.74	2054.00
384	30	0	3583.93	-89605.1	67.96	33826.00
384	42	0	4677.67	-89605.3	198.79	33826.00

Analysis Output of Critical Roof Beams

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
515	28	2.88	131.45	-10367	0	7212
515	91	2.88	293.57	-10367	0	7212
1421	29	0.94	198.49	38276.74	120.43	27060
1421	41	0.94	246.21	38276.74	409.55	27060
1545	29	0	575.43	-878.5	0	1382.1
1545	41	0	1968.28	-878.5	0	1382.1
1433	29	0	489.09	-1983.1	1.4	2740
1433	86	0	648.81	-1984.2	-2.44	2740
1427	29	0	1110.12	-5747.4	243.89	4685
1427	41	0	2146.67	-5746.8	829.38	4685
1420	29	2.06	252.95	26083.91	185.68	24630
1420	41	2.06	327.3	26086.13	555.39	24630
501	29	1	572.46	-617.5	0	1235
494	54	1	6237.6	-371.2	0	1235
508	28	2.5	2882.99	-39879.4	9.78	17770
508	52	2.5	7425.02	-39880.1	26.18	17770
499	28	1.25	638.21	-1061	0	1698
499	52	1.25	3117.98	-1061	0	1698
505	28	0	9727.61	952.8	2.74	1938
505	104	0	19832.52	851.9	-4.84	1751
1111	28	3	7947.26	-9514.4	-1.03	6398.4
1111	72	3	12707.48	-9514.4	3.04	6398.4
542	27	3	816.44	-118334.2	16.35	33450
542	85	3	13.21	-118334.4	-50.57	33450
1338	29	0	0.24	-52899.9	117.38	10910
1338	41	0	0.77	-52903.8	261.18	10910
1429	29	0.75	87.07	-211.4	0	563.41
1429	82	0.75	115.45	-211.4	0	563.41

Analysis Output of Critical Staircase Beams

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
1529	27	0	7943.76	-2023.1	-0.27	1377
1529	36	0	8675	-2023.2	-0.41	1377
1505	29	1.75	305.28	-670	0	765.742
493	53	1.75	3055.85	-741.4	0	765.742
1063	27	1	0.11	-1719.1	0	1733
1064	32	0.15	0.16	-1725.1	0	1733

Analysis Output of Critical Hoisting Platform Beams

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
1365	27	0.75	6.4	-54.7	0	145.9
1365	52	0.75	8.38	-54.7	0	145.9
1366	27	0.75	4.36	-54.7	0	145.9
1366	32	0.75	38.42	-54.7	0	145.9

Analysis Output of Critical Hoisting Platform Hangers

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
1370	27	2.5	244	-2.5	193.45
1370	84	2.5	285.7	-2.3	193.19

Analysis Output of Critical Beams at level 4.500m

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
1443	28	1.3	477.27	-18.6	0	28.727
1443	88	1.3	512.46	-18.6	0	28.727
1448	29	0	693.96	-4174.7	-1.1	4712
1448	33	0	694.76	-4174.7	-1.15	4712
1457	27	1.02	0.53	-1991.5	0.44	2544
1457	32	1.02	0.45	-1991.5	0.41	2544
1460	27	0.67	1.62	-848.7	0	1265
1460	32	0.67	1.4	-848.7	0	1265

Analysis Output of Critical Hangers supporting the 4.500m Beams

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
1440	31	0	3154.09	1511.6	-318.66
1440	75	0	3134.75	1513.5	-318.68

Analysis Output of Critical Vertical Bracing

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
766	30	0	11893.73	0	0
766	54	0	23202.84	0	0
1165	29	0	3153.32	0	0
885	53	0	12349.14	0	0
854	31	2.69	4190.54	0	0
256	119	3.41	20854.85	0	0
1663	29	0	15926.4	0	0
1663	97	0	20989.62	0	0
1478	27	0	1786.21	0	0
1478	32	0	3930.54	0	0
1517	27	3.01	2518.86	0	0
614	40	3.68	3130.79	0	0

Analysis Output of Critical Hoisting Platform Vertical Bracing

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
1375	27	2.92	177.36	0	0
1375	41	2.92	235.28	0	0

Analysis Output of Critical Vertical Bracing at level 4.500m

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
1657	28	0	768.13	0	0
1657	108	0	875.28	0	0

Analysis Output of Critical PLan Bracing

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
1409	28	0	7560.64	0	0
1409	100	0	14467.58	0	0
321	29	0	206.202	0	0
321	109	0	3236.625	0	0

Analysis Output of Critical Hoisting Platform Plan Bracing

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
1373	27	0	10.73	0	0
1373	40	0	14.04	0	0

Analysis Output of Critical Tie Beam

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
1661	30	2.88	1340.06	-152.8	0	106.299
1661	198	2.88	9514.56	-122.2	0	106.299
1140	30	2.5	200.72	1179.9	-3.56	622.96
1140	54	2.5	241.82	2002.6	-2.94	622.96

Analysis Output of Critical Column

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
108	30	0	16504.48	-140.9	-77.37
108	42	0	24123.16	-560.1	-77.17
115	30	0	12222.39	106	-1.6
113	34	0	2442.47	1868.5	130.43
2	30	2.67	87867.91	-313.1	-137.86
2	48	2.67	142771	3235.4	335.35
17	31	0	26957.87	-907.8	-499.8
1504	154	0.89	4257.63	-4309.4	-1887.24
46	30	2.67	60900.2	-343.7	-147.1
57	54	0	95168.7	-580.9	1479.06
78	30	1.98	29046.98	-374.6	-1053.62
78	110	1.82	40019.89	-639.9	-1233.25
85	31	2.65	105578.6	-12823.4	-607.17
85	55	2.65	114058.7	-14111.3	-680.31
89	28	0	35025.23	6060.9	362.91
90	91	0	83493.33	-3419.6	-154.12

Analysis Output of Critical Bracket

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)	F_y(kg)
1334	29	0	11014.84	1667.8	-0.73	398.06
1333	119	0	10224.76	3972.9	1.4	398.06
1006	28	0	10058.91	3730.1	-2.17	4758
1006	56	0	9741.65	4255.2	-2.25	4758

Analysis Output of Critical Bracket Connecting Bracing

MEMBER	LOAD CASE	LOCATION	AF(kg)	M_Z(kg.m)	M_Y(kg.m)
1335	27	4.16	15767.76	0	0
1335	88	4.16	17282.24	0	0
1008	28	1.82	31995.29	0	0
1008	48	1.82	33008.12	0	0

Design of Columns



Designed by : ThyssenKrupp Industries India

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

Design of Column

Location	COL. Mkd.	STAAD Member No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)			DESIGN PARAMETERS								CHECK FOR STRESSES							Remark
					Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio	
Below +6.900m	A1' & B1'	108	LC30	UB 254X146X37	16504.5	140.9	77.4	3.960	1.98	1.00	1.00	396.0	198.0	36.56	56.93	1285.21	349.67	1514.25	32.54	1682.47	99.19	0.35	safe
		108	LC42	UB 254X146X37	24123.2	560.1	77.2	3.960	1.98	1.00	1.00	396.0	198.0	36.56	56.93	1709.33	511.08	2013.95	129.35	2239.02	98.94	0.40	safe
Above +6.900m	A1' & B1'	115	LC30	UB 254X146X37	12222.4	106.0	1.6	2.31	2.31	1.00	1.00	230.5	230.7	21.28	66.33	1188.69	258.95	1450.50	24.48	1682.47	2.05	0.23	safe
		113	LC34	UB 254X146X37	2442.5	1868.5	130.4	2.70	2.70	1.00	1.00	270.0	270.0	24.93	77.63	1417.94	51.75	1821.10	431.52	2239.02	167.22	0.35	safe
Below +6.900m	A1 A4 C1 C4	2	LC30	IPE 500	87867.9	313.1	137.9	6.60	2.67	1.00	1.00	660.0	266.5	32.38	62.02	1233.98	757.48	1465.46	16.24	1682.47	64.42	0.67	safe
		2	LC48	IPE 500	142771.0	3235.4	335.4	6.60	2.67	1.00	1.00	660.0	267.0	32.38	62.13	1639.59	1230.78	1947.88	167.81	2239.02	156.71	0.93	safe
Above +6.900m	A1 A4 C1 C4	17	LC31	IPE 500	26957.9	907.8	499.8	4.00	2.31	1.00	1.00	400.0	230.5	19.62	53.64	1316.55	232.40	1526.09	47.09	1682.47	233.55	0.33	safe
		1504	LC154	IPE 500	4257.6	4309.4	1887.2	1.98	2.88	1.00	1.00	198.0	287.5	9.71	66.90	1572.77	36.70	1898.36	223.52	2239.02	881.89	0.53	safe
Below +6.900m	A2,A3,C2 & C3	46	LC30	IPE 500	60900.2	343.7	147.1	6.60	2.67	1.00	1.00	660.0	266.5	32.38	62.02	1233.98	525.00	1465.46	17.83	1682.47	68.74	0.48	safe
		57	LC54	IPE 500	95168.7	580.9	1479.1	6.60	1.98	1.00	1.00	660.0	198.0	32.38	46.08	1838.01	820.42	2093.22	30.13	2239.02	691.15	0.76	safe
Above +6.900m	A2,A3,C2 & C3	78	LC30	IPE 500	29047.0	374.6	1053.6	13.10	1.98	1.00	1.00	1310.0	198.0	64.27	46.08	1210.54	250.41	1573.85	19.43	1682.47	492.35	0.48	safe
		78	LC110	IPE 500	40019.9	639.9	1233.3	13.10	1.98	1.00	1.00	1310.0	198.0	64.27	46.08	1610.02	345.00	2093.22	33.19	2239.02	576.29	0.46	safe
Below +6.900m	B1 & B4	85	LC31	IPE 600	105578.6	12823.4	607.2	6.600	2.645	1.00	1.00	660.0	264.5	27.17	56.76	1286.79	676.79	1503.98	417.84	1682.47	197.13	0.89	safe
		85	LC55	IPE 600	114058.7	14111.3	680.3	6.600	2.645	1.00	1.00	660.0	264.5	27.17	56.76	1711.44	731.15	2000.29	459.80	2239.02	220.88	0.73	safe
Above +6.900m	B1 & B4	89	LC28	IPE 600	35025.2	6060.9	362.9	13.10	2.31	1.00	1.00	1310.0	230.5	53.92	49.47	1313.95	224.52	1553.19	197.49	1682.47	117.83	0.35	safe
		90	LC91	IPE 600	83493.3	3419.6	154.1	4.29	2.31	1.00	1.00	428.5	230.5	17.64	49.47	1800.69	535.21	2065.74	111.42	2239.02	50.04	0.36	safe

Design of Base Plates and HD Bolts

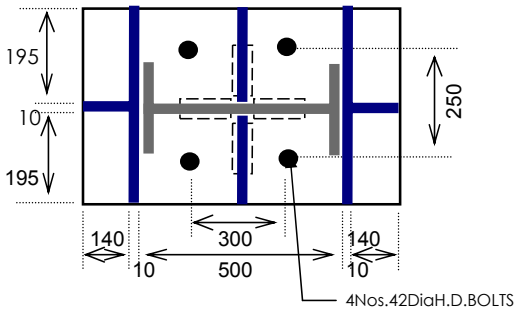


Designed by : ThyssenKrupp Industries India

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW) Design of Base Plate	DOC NO : 1605 C 216 A SHEET NO : Page 108 REVISION : A

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

DESIGN OF BASE PLATE & H D BOLTS FOR COLUMNS MKD. A1 A4,C1, C4



Design Loads:- (Refer STAAD output)

Max. Vertical Load	=	1346.5 kN	Load Case 54
Max. Uplift	=	572.6 kN	Load Case 214
Max. Shear	=	129.5 kN	Load Case 45

SELECTION OF SIZES & NUMBERS

Size of Base Plate	=	800 mm X 400 mm
Size of H.D.Bolts	=	42 Dia H.D.BOLTS
No. of Bolts	=	4

DESIGN CHECKS

Check for H.D.BoltS:

Maximum Uplift		=	573 kN	
Tension / Bolt		=	143 kN	
Tension Capacity Of	**M 42 Dia Bolt**	=	178 kN	**Safe**

Design of Base Plate

Check for Base Pressure:-

Max. Upward Pressure (q) = = F/ L XB

= 42.08 **< 50 Kg/Sq.cm**

Hence OKAY

Computation of Moment due to Base Pressure:-

(Refer Design of Metal Structures by Mukhanov Page 359, Table 8-11)

Plate support at three edges

$M_3 = \alpha_3 q d_1^{\,2}$

$\frac{a1}{d1} = \frac{19.5 \text{ cm}}{24.5 \text{ cm}}$

$\frac{a1}{d1} = 0.7959$

$\alpha_3 = \mathbf{0.097}$

$M_3 = 2450.0$ kg.cm/cm

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW) Design of Base Plate	DOC NO : 1605 C 216 A SHEET NO : Page 109 REVISION : A

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

Computation of Moment due to H.D.Bolts Tension

Moment at the face of the Gusset Plate due ti H.D.Bolt Tension = 0.0 kg.cm/cm

Thickess of Base Plate Required

$$T_{plate} = \sqrt{\frac{6M}{s}}$$

= 2.7 cm

Provide **32mm THK. Base Plate**

Design of Shear Key :-

Size of Shear Key 400mm X 100mm

Max. Bearing Pressure (q)

= 33 kg/cm^2

Max. Bending Moment = 1650 kg.cm/cm

Thickness reqd (t) (6 M / s) $^{0.5}$ = 2.2 cm

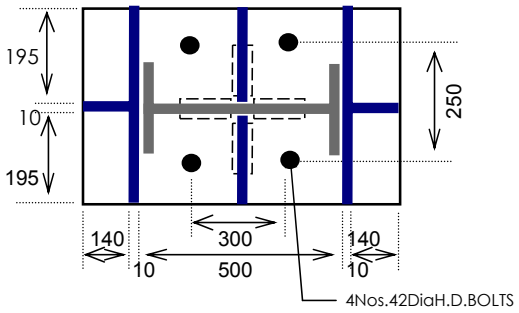
Provide **25** mm Thk. Plate for Shear Key in cruciform fashion

Provide Shear Key of size = 400mm X 100mm X 25mm

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW) Design of Base Plate	DOC NO : 1605 C 216 A SHEET NO : Page 110 REVISION : A

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

DESIGN OF BASE PLATE & H D BOLTS FOR COLUMNS MKD. A2 A3,C2, C3



Design Loads:- (Refer STAAD output)

Max. Vertical Load	=	1068.6 kN	Load Case 54
Max. Uplift	=	484.8 kN	Load Case 214
Max. Shear	=	120.6 kN	Load Case 54

SELECTION OF SIZES & NUMBERS

Size of Base Plate	=	800 mm X 400 mm
Size of H.D.Bolts	=	42 Dia H.D.BOLTS
No. of Bolts	=	4

DESIGN CHECKS

Check for H.D.BoltS:

Maximum Uplift	=	485 kN	
Tension / Bolt	=	121 kN	
Tension Capacity Of **M 42 Dia Bolt**	=	178 kN	**Safe**

Design of Base Plate

Check for Base Pressure:-

Max. Upward Pressure (q) = = F/ L XB

= 33.39 **< 50 Kg/Sq.cm**

Hence OKAY

Computation of Moment due to Base Pressure:-

(Refer Design of Metal Structures by Mukhanov Page 359, Table 8-11)

Plate support at three edges

$M_3 = \alpha_3 q d_1^{\,2}$

$\frac{a1}{d1} = \frac{19.5 \text{ cm}}{24.5 \text{ cm}}$

$\frac{a1}{d1} = 0.7959$

$\alpha_3 = \mathbf{0.097}$

$M_3 = 1944.4$ kg.cm/cm

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

Computation of Moment due to H.D.Bolts Tension

Moment at the face of the Gusset Plate due ti H.D.Bolt Tension = 0.0 kg.cm/cm

Thickess of Base Plate Required

$$T_{plate} = \sqrt{\frac{6M}{s}}$$

= 2.4 cm

Provide **32mm THK. Base Plate**

Design of Shear Key :-

Size of Shear Key 400mm X 100mm

Max. Bearing Pressure (q)

= 31 kg/cm^2

Max. Bending Moment = 1550 kg.cm/cm

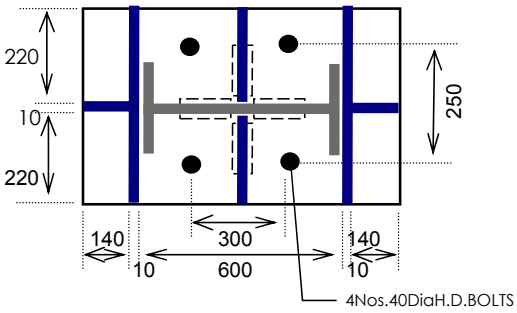
Thickness reqd (t) (6 M / s) $^{0.5}$ = 2.13 cm

Provide **25** mm Thk. Plate for Shear Key in cruciform fashion

Provide Shear Key of size = 400mm X 100mm X 25mm

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

DESIGN OF BASE PLATE & H D BOLTS FOR COLUMNS MKD. B1,B4



Design Loads:- (Refer STAAD output)

Max. Vertical Load	=	1651.5 kN	Load Case 41
Max. Uplift	=	153.3 kN	Load Case 273
Max. Shear	=	126.5 kN	Load Case 39

SELECTION OF SIZES & NUMBERS

Size of Base Plate	=	900 mm X 450 mm
Size of H.D.Bolts	=	40 Dia H.D.BOLTS
No. of Bolts	=	4

DESIGN CHECKS

Check for H.D.BoltS:

Maximum Uplift		=	153 kN	
Tension / Bolt		=	38 kN	
Tension Capacity Of	**M 40 Dia Bolt**	=	162 kN	**Safe**

Design of Base Plate

Check for Base Pressure:-

Max. Upward Pressure (q) = = F/ L XB

= 40.78 **< 50 Kg/Sq.cm**

Hence OKAY

Computation of Moment due to Base Pressure:-

(Refer Design of Metal Structures by Mukhanov Page 359, Table 8-11)

Plate support at three edges

$M_3 = \alpha_3 q d_1^{\,2}$

a1 = 22.0 cm

d1 = 29.5 cm

$\frac{a1}{d1} = 0.7458$

$\alpha_3 =$ **0.0925**

$M_3 =$ 3282.5 kg.cm/cm

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

Computation of Moment due to H.D.Bolts Tension

Moment at the face of the Gusset Plate due ti H.D.Bolt Tension = 0.0 kg.cm/cm

Thickess of Base Plate Required

$$T_{plate} = \sqrt{\frac{6M}{s}}$$

= 3.1 cm

Provide **32mm THK. Base Plate**

Design of Shear Key :-

Size of Shear Key 500mm X 100mm

Max. Bearing Pressure (q)

= 26 kg/cm^2

Max. Bending Moment = 1300 kg.cm/cm

Thickness reqd (t) $(6 M / s)^{0.5}$ = 1.95 cm

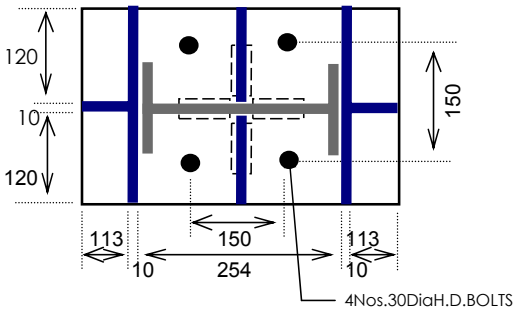
Provide **25** mm Thk. Plate for Shear Key in cruciform fashion

Provide Shear Key of size = 500mm X 100mm X 25mm

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW) Design of Base Plate	DOC NO : 1605 C 216 A SHEET NO : Page 114 REVISION : A

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

DESIGN OF BASE PLATE & H D BOLTS FOR COLUMNS MKD. A1',B1'



Design Loads:- (Refer STAAD output)

Max. Vertical Load	=	269.7 kN	Load Case 41
Max. Uplift	=	37.3 kN	Load Case 206
Max. Shear	=	45.6 kN	Load Case 35

SELECTION OF SIZES & NUMBERS

Size of Base Plate	=	500 mm X 250 mm
Size of H.D.Bolts	=	30 Dia H.D.BOLTS
No. of Bolts	=	4

DESIGN CHECKS

Check for H.D.BoltS:

Maximum Uplift		=	37 kN	
Tension / Bolt		=	9 kN	
Tension Capacity Of	**M 30 Dia Bolt**	=	91 kN	**Safe**

Design of Base Plate

Check for Base Pressure:-

Max. Upward Pressure (q) = = F/ L XB

= 21.58 **< 50 Kg/Sq.cm**

Hence OKAY

Computation of Moment due to Base Pressure:-

(Refer Design of Metal Structures by Mukhanov Page 359, Table 8-11)

Plate support at three edges

$M_3 = \alpha_3 q d_1^{\,2}$

$\frac{a1}{d1} = \frac{12.0}{12.2}$ cm

$\frac{a1}{d1} = 0.9836$

$\alpha_3 =$ **0.111**

$M_3 =$ 356.5 kg.cm/cm

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW) Design of Base Plate	DOC NO : 1605 C 216 A SHEET NO : Page 115 REVISION : A

CLAUSE NO.	DESIGN CALCULATIONS	REFERENCE

Computation of Moment due to H.D.Bolts Tension

Moment at the face of the Gusset Plate due ti H.D.Bolt Tension = 0.0 kg.cm/cm

Thickess of Base Plate Required

$$T_{plate} = \sqrt{\frac{6M}{s}}$$

= 1.0 cm

Provide **32mm THK. Base Plate**

Design of Shear Key :-

Size of Shear Key 200mm X 75mm

Max. Bearing Pressure (q)

= 31 kg/cm^2

Max. Bending Moment = 871.88 kg.cm/cm

Thickness reqd (t) $(6 M / s)^{0.5}$ = 1.6 cm

Provide **25** mm Thk. Plate for Shear Key in cruciform fashion

Provide Shear Key of size = 200mm X 75mm X 25mm

Design of Floor Beams



Designed by : ThyssenKrupp Industries India

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

DOC NO : 1605 C 216 A
SHEET NO : Page 116
REVISION : A

Design of Floor Beam

Location	BEAM Mark	STAAD Memb. No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)				DESIGN PARAMETERS								CHECK FOR BENDING STRESS							Remark	CHECK FOR SHEAR STRESS		Remark	CHECK FOR DEFLECTION		Remark
					Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	Shear Force F_Y (kg)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio		τ_{va}	Ratio		δ_{actual}	$\delta_{permissible}$	
Floor at +6.900m	1B1*	1387	LC27	ISMC 150	3.23	12.79	0.00	73.10	0.700	0.07	1.00	1.00	70.0	7.0	11.51	3.18	1526.10	0.15	1682.42	12.18	1682.47	0.00	0.01	safe	9.72	0.01	safe	0.00	0.22	safe
		1387	LC32	ISMC 150	7.14	12.79	0.00	73.10	0.700	0.07	1.00	1.00	70.0	7.0	11.51	3.18	2029.71	0.34	2237.61	12.18	2237.69	0.00	0.01	safe	9.72	0.01	safe	0.00	0.22	safe
Floor at +6.900m	1B2,1B3,1B4,1B5* & 1B6	1710	LC30	ISMC 150	69.20	5.50	0.00	42.05	0.542	0.05	1.00	1.00	54.2	5.4	8.91	2.46	1527.85	3.25	1682.44	5.24	1682.47	0.00	0.01	safe	5.59	0.01	safe	0.00	0.17	safe
		1710	LC102	ISMC 150	306.05	4.54	0.00	33.50	0.542	0.05	1.00	1.00	54.2	5.4	8.91	2.46	2032.04	14.37	2237.65	4.32	2237.69	0.00	0.01	safe	4.45	0.00	safe	0.00	0.17	safe
Floor at +6.900m	1B7* & 1B8	1414	LC31	ISMC 150	6.59	360.80	0.00	655.95	1.30	0.13	1.00	1.00	130.0	13.0	21.37	5.91	1510.41	0.31	1682.16	343.62	1682.47	0.00	0.20	safe	87.18	0.09	safe	0.04	0.40	safe
		1414	LC35	ISMC 150	14.46	360.80	0.00	655.95	1.30	0.13	1.00	1.00	130.0	13.0	21.37	5.91	2008.84	0.68	2237.27	343.62	2237.69	0.00	0.15	safe	87.18	0.09	safe	0.04	0.40	safe
Floor at +6.900m	1B9* & 1B10	1713	LC28	ISMC 150	701.89	384.50	0.20	783.90	2.00	0.20	1.00	1.00	200.0	20.0	32.88	9.09	1467.82	32.95	1681.44	366.19	1682.47	1.03	0.24	safe	104.19	0.10	safe	0.09	0.62	safe
		1707	LC110	ISMC 150	92.20	114.20	84.07	385.45	2.00	0.20	1.00	1.00	200.0	20.0	32.88	9.09	1952.21	4.33	2236.32	108.76	2237.69	431.13	0.24	safe	51.23	0.05	safe	0.03	0.62	safe
Floor at +6.900m	1B11*	1389	LC30	ISMC 150	181.73	62.90	2.40	243.15	1.10	0.11	1.00	1.00	110.0	11.0	18.09	5.00	1517.48	8.53	1682.28	59.90	1682.47	12.31	0.05	safe	32.32	0.03	safe	0.00	0.34	safe
		1389	LC110	ISMC 150	367.51	49.40	5.02	190.64	1.10	0.11	1.00	1.00	110.0	11.0	18.09	5.00	2018.25	17.25	2237.43	47.05	2237.69	25.74	0.04	safe	25.34	0.02	safe	0.00	0.34	safe
Floor at +6.900m	1B12 & 1B13*	1395	LC31	ISMC 150	69.43	1574.50	0.50	1936.00	2.77	0.28	1.00	1.00	276.5	27.7	45.46	12.57	1386.83	3.26	1679.94	1499.52	1682.47	2.56	0.90	safe	257.31	0.25	safe	0.73	0.85	safe
		1395	LC71	ISMC 150	224.68	1574.50	0.32	1963.00	2.77	0.28	1.00	1.00	276.5	27.7	45.46	12.57	1844.48	10.55	2234.33	1499.52	2237.69	1.64	0.68	safe	260.90	0.26	safe	0.73	0.85	safe
Floor at +6.900m	1B14*	1392	LC30	ISMC 150	1.88	389.50	7.15	871.09	1.90	0.19	1.00	1.00	190.0	19.0	31.24	8.64	1475.73	0.09	1681.58	370.95	1682.47	36.67	0.24	safe	115.78	0.11	safe	0.08	0.58	safe
		1396	LC33	ISMC 150	477.17	431.00	2.64	871.09	1.90	0.19	1.00	1.00	190.0	19.0	31.24	8.64	1962.72	22.40	2236.50	410.48	2237.69	13.54	0.20	safe	115.77	0.11	safe	0.09	0.58	safe
Floor at +6.900m	1B15* & 1B18	1717	LC28	UB 254X146X37	1469.85	3566.60	11.16	3033.00	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1431.34	31.14	1679.43	823.70	1682.47	14.31	0.52	safe	205.56	0.20	safe	0.55	1.31	safe
	1B15* & 1B18*	408	LC67	UB 254X146X37	1303.21	3479.70	0.00	3275.10	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1903.68	27.61	2233.64	803.63	2237.69	0.00	0.37	safe	221.97	0.22	safe	0.54	1.31	safe
Floor at +6.900m	1B16* & 1B19	1275	LC30	UB 254X146X37	4432.40	4934.30	106.91	4260.00	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1431.34	93.91	1679.43	1139.56	1682.47	137.06	0.83	safe	288.72	0.28	safe	0.77	1.31	safe
		1275	LC54	UB 254X146X37	6565.35	4934.30	155.33	4260.00	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1903.68	139.10	2233.64	1139.56	2237.69	199.14	0.67	safe	288.7	0.28	safe	0.77	1.31	safe
Floor at +6.900m	1B17*	1393	LC28	IPE 400	920.51	12366.80	180.05	12657.00	4.250	0.43	1.00	1.00	425.0	42.5	25.69	10.76	1497.85	10.89	1680.33	1069.79	1682.47	123.32	0.72	safe	394.57	0.39	safe	0.46	1.31	safe

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

DOC NO : 1605 C 216 A
SHEET NO : Page 117
REVISION : A

Design of Floor Beam

Location	BEAM Mark	STAAD Memb. No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)				DESIGN PARAMETERS								CHECK FOR BENDING STRESS							Remark	CHECK FOR SHEAR STRESS		Remark	CHECK FOR DEFLECTION		Remark
					Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	Shear Force F_Y (kg)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio		τ_{va}	Ratio		δ_{actual}	$\delta_{permissible}$	
		1393	LC52	IPE 400	735.73	12238.10	271.47	12657.00	4.250	0.43	1.00	1.00	425.0	42.5	25.69	10.76	1992.15	8.71	2234.84	1058.66	2237.69	185.94	0.56	safe	394.57	0.39	safe	0.46	1.31	safe
Floor at +6.900m	1B20 & 1B21*	462	LC28	UB 305X165X46	1352.50	6242.80	508.30	8289.00	2.500	0.25	1.00	1.00	250.0	25.0	19.25	6.40	1515.20	23.04	1681.97	966.38	1682.47	470.65	0.87	safe	437.16	0.43	safe	0.19	0.77	safe
		462	LC36	UB 305X165X46	2978.50	6242.80	508.30	8289.00	2.500	0.25	1.00	1.00	250.0	25.0	19.25	6.40	2015.22	50.74	2237.02	966.38	2237.69	470.65	0.67	safe	437.16	0.43	safe	0.19	0.77	safe
Floor at +6.900m	1B22 & 1B23*	1554	LC30	IPE 500	2118.24	25629.00	202.78	12490.00	7.500	0.75	1.00	1.00	750.0	75.0	36.79	17.45	1446.48	18.26	1674.26	1329.30	1682.47	94.76	0.86	safe	261.65	0.26	safe	1.42	2.31	safe
		468	LC108	IPE 500	2829.93	19888.60	968.73	12490.00	7.500	0.75	1.00	1.00	750.0	75.0	36.79	17.45	1923.82	24.40	2226.77	1031.57	2237.69	452.68	0.68	safe	261.65	0.26	safe	1.11	2.31	safe
Floor at +6.900m	1B24*	1278	LC30	IPE 500	4885.42	29530.30	78.97	18830.00	5.750	0.58	1.00	1.00	575.0	57.5	28.21	13.38	1488.67	42.12	1678.54	1531.65	1682.47	36.90	0.96	safe	394.46	0.39	safe	0.96	1.77	safe
		1278	LC50	IPE 500	6238.56	29530.10	111.48	18830.00	5.750	0.58	1.00	1.00	575.0	57.5	28.21	13.38	1979.93	53.78	2232.46	1531.64	2237.69	52.09	0.74	safe	394.46	0.39	safe	0.96	1.77	safe
Floor at +6.900m	1B25,1B26* & 1B27	1571	LC28	UB 203X133X25	929.14	1074.30	0.45	2478.00	1.700	0.17	1.00	1.00	170.0	17.0	19.88	5.48	1513.87	29.04	1682.15	467.09	1682.47	0.97	0.30	safe	231.74	0.23	safe	0.06	0.52	safe
		1571	LC80	UB 203X133X25	1456.82	1074.30	0.70	2478.00	1.700	0.17	1.00	1.00	170.0	17.0	19.88	5.48	2013.45	45.53	2237.25	467.09	2237.69	1.52	0.23	safe	231.74	0.23	safe	0.06	0.52	safe
Floor at +6.900m	1B28,1B29,1B30* &1B31	1550	LC31	UB 203X133X25	393.85	1821.00	0.00	3033.00	2.600	0.26	1.00	1.00	260.0	26.0	30.40	8.38	1479.50	12.31	1681.41	791.74	1682.47	0.00	0.48	safe	283.64	0.28	safe	0.25	0.80	safe
		1550	LC183	UB 203X133X25	1443.61	1815.00	0.00	3033.00	2.600	0.26	1.00	1.00	260.0	26.0	30.40	8.38	1967.73	45.11	2236.27	789.13	2237.69	0.00	0.38	safe	283.64	0.28	safe	0.25	0.80	safe
Floor at +6.900m	1B32 & 1B33*	1703	LC30	ISMC 150	2215.11	310.00	20.96	726.38	1.450	0.15	1.00	1.00	145.0	14.5	23.84	6.59	1503.71	104.00	1682.05	295.24	1682.47	107.49	0.31	safe	96.54	0.09	safe	0.04	0.45	safe
		1703	LC42	ISMC 150	2682.58	309.90	32.32	726.27	1.450	0.15	1.00	1.00	145.0	14.5	23.84	6.59	1999.93	125.94	2237.13	295.14	2237.69	165.74	0.27	safe	96.53	0.09	safe	0.04	0.45	safe
Floor at +6.900m	1B34 & 1B41*	387	LC28	UB 203X133X25	576.28	2072.00	19.45	1973.30	2.500	0.25	1.00	1.00	250.0	25.0	29.24	8.06	1484.52	18.01	1681.52	900.87	1682.47	42.10	0.57	safe	184.54	0.18	safe	0.26	0.77	safe
		1386	LC35	UB 203X133X25	7779.58	2070.40	10.54	1973.30	2.500	0.25	1.00	1.00	250.0	25.0	29.24	8.06	1974.41	243.11	2236.42	900.17	2237.69	22.81	0.54	safe	184.54	0.18	safe	0.26	0.77	safe
Floor at +6.900m	1B35 & 1B40*	374	LC28	IPE 400	706.38	15920.60	53.59	7720.80	5.500	0.55	1.00	1.00	550.0	55.0	33.24	13.93	1466.00	8.36	1678.08	1377.21	1682.47	36.71	0.85	safe	240.69	0.24	safe	0.99	1.69	safe
		374	LC52	IPE 400	6752.67	15920.80	81.08	7720.80	5.500	0.55	1.00	1.00	550.0	55.0	33.24	13.93	1949.78	79.91	2231.85	1377.23	2237.69	55.53	0.68	safe	240.69	0.24	safe	0.99	1.69	safe
Floor at +6.900m	1B36* & 1B39	1706	LC30	UB 203X133X25	6592.69	283.00	64.23	470.48	2.000	0.20	1.00	1.00	200.0	20.0	23.39	6.45	1505.03	206.02	1681.96	123.04	1682.47	139.03	0.29	safe	44.00	0.04	safe	0.02	0.62	safe
		1706	LC102	UB 203X133X25	7093.73	234.40	333.95	470.48	2.000	0.20	1.00	1.00	200.0	20.0	23.39	6.45	2001.69	221.68	2237.01	101.91	2237.69	722.84	0.48	safe	44.00	0.04	safe	0.02	0.62	safe

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

Design of Floor Beam

Location	BEAM Mark	STAAD Memb. No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)				DESIGN PARAMETERS								CHECK FOR BENDING STRESS							Remark	CHECK FOR SHEAR STRESS		Remark	CHECK FOR DEFLECTION		Remark
					Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	Shear Force F_Y (kg)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio		τ_{va}	Ratio		δ_{actual}	$\delta_{permissible}$	
Floor at +6.900m	1B37* & 1B43	1266	LC30	IPE 500	6204.94	24578.20	116.69	15380.00	5.750	0.58	1.00	1.00	575.0	57.5	28.21	13.38	1488.67	53.49	1678.54	1274.80	1682.47	54.53	0.83	safe	322.19	0.32	safe	0.80	1.77	safe
		1266	LC38	IPE 500	9017.74	24578.10	136.97	15380.00	5.750	0.58	1.00	1.00	575.0	57.5	28.21	13.38	1979.93	77.74	2232.46	1274.80	2237.69	64.00	0.64	safe	322.19	0.32	safe	0.80	1.77	safe
Floor at +6.900m	1B38 & 1B42*	363	LC30	UB 254X146X37	3054.68	1072.30	0.59	2054.00	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1431.34	64.72	1679.43	247.64	1682.47	0.76	0.19	safe	139.21	0.14	safe	0.17	1.31	safe
		363	LC38	UB 254X146X37	17973.33	1070.50	1.74	2054.00	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1903.68	380.79	2233.64	247.23	2237.69	2.23	0.30	safe	139.21	0.14	safe	0.17	1.31	safe
Floor at +6.900m	1B44*	384	LC28	PG 832X400	3583.93	89605.10	67.96	33826.00	10.000	1.00	1.00	1.00	1000.0	100.0	29.11	11.45	1485.03	16.00	1679.91	1410.44	1682.47	7.96	0.86	safe	352.35	0.35	safe	1.61	3.08	safe
		384	LC40	PG 832X400	4677.67	89605.30	198.79	33826.00	10.000	1.00	1.00	1.00	1000.0	100.0	29.11	11.45	1975.09	20.88	2234.29	1410.44	2237.69	23.28	0.65	safe	352.35	0.35	safe	1.61	3.08	safe

Design of Roof Beams



Designed by : ThyssenKrupp Industries India

Design of Roof Beam

Location	BEAM Mkd.	STAAD Beam No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)				DESIGN PARAMETERS								CHECK FOR BENDING STRESS							Remark	CHECK FOR SHEAR STRESS		Remark	CHECK FOR DEFLECTION		Remark
					Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	F_Y (kg)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio		τ_{va}	Ratio		δ actual	δ permissible	
Floor at +20.00m	2B1 & 2B3*	515	LC28	UB 305X165X46	131.45	10367.00	0.00	7212.00	5.750	0.58	1.00	1.00	575.0	57.5	44.28	14.72	1395.92	2.24	1677.37	1604.80	1682.47	0.00	0.96	safe	380.36	0.37	safe	1.65	1.77	safe
		515	LC91	UB 305X165X46	293.57	10367.00	0.00	7212.00	5.750	0.58	1.00	1.00	575.0	57.5	44.28	14.72	1856.57	5.00	2230.90	1604.80	2239.02	0.00	0.72	safe	380.36	0.37	safe	1.65	1.77	safe
Floor at +20.00m	2B2*	1421	LC29	IPE 600	198.49	38276.74	120.43	27060.00	5.750	0.58	1.00	1.00	575.0	57.5	23.67	12.34	1504.22	1.27	1679.33	1247.21	1682.47	77.20	0.79	safe	401.25	0.39	safe	0.65	1.77	safe
		1421	LC41	IPE 600	246.21	38276.74	409.55	27060.00	5.750	0.58	1.00	1.00	575.0	57.5	23.67	12.34	2000.61	1.58	2233.51	1247.21	2239.02	132.97	0.62	safe	401.25	0.39	safe	0.65	1.77	safe
Floor at +20.00m	2B4*	1545	LC29	ISMC 150	575.43	878.50	0.00	1382.10	2.000	0.20	1.00	1.00	200.0	20.0	32.88	9.09	1467.82	27.02	1681.44	836.67	1682.47	0.00	0.52	safe	183.69	0.18	safe	0.21	0.62	safe
		1545	LC41	ISMC 150	1968.28	878.50	0.00	1382.10	2.000	0.20	1.00	1.00	200.0	20.0	32.88	9.09	1952.21	92.41	2236.32	836.67	2239.02	0.00	0.42	safe	183.69	0.18	safe	0.21	0.62	safe
Floor at +20.00m	2B5*	1433	LC29	UB 203X133X25	489.09	1983.10	1.40	2740.00	3.000	0.30	1.00	1.00	300.0	30.0	35.08	9.67	1456.26	15.28	1680.88	862.22	1682.47	3.03	0.53	safe	256.24	0.25	safe	0.36	0.92	safe
		1433	LC86	UB 203X133X25	648.81	1984.20	2.44	2740.00	3.000	0.30	1.00	1.00	300.0	30.0	35.08	9.67	1936.82	20.28	2235.57	862.70	2239.02	5.28	0.40	safe	256.24	0.25	safe	0.36	0.92	safe
Floor at +20.00m	2B6* & 2B8	1427	LC29	UB 305X165X46	1110.12	5747.40	243.89	4685.00	4.250	0.43	1.00	1.00	425.0	42.5	32.73	10.88	1468.59	18.91	1680.27	889.69	1682.47	225.82	0.68	safe	247.09	0.24	safe	0.50	1.31	safe
		1427	LC41	UB 305X165X46	2146.67	5746.80	829.38	4685.00	4.250	0.43	1.00	1.00	425.0	42.5	32.73	10.88	1953.23	36.57	2234.75	889.60	2239.02	767.94	0.76	safe	247.09	0.24	safe	0.50	1.31	safe
Floor at +20.00m	2B7*	1420	LC29	IPE 500	252.95	26083.91	185.68	24630.00	4.250	0.43	1.00	1.00	425.0	42.5	20.85	9.89	1511.67	2.18	1680.78	1352.90	1682.47	86.77	0.86	safe	515.96	0.51	safe	0.47	1.31	safe
		1420	LC41	IPE 500	327.30	26086.13	555.39	24630.00	4.250	0.43	1.00	1.00	425.0	42.5	20.85	9.89	2010.52	2.82	2235.43	1353.02	2239.02	259.53	0.72	safe	515.96	0.51	safe	0.47	1.31	safe
Floor at +20.00m	2B9* & 2B16	501	LC29	UB 203X133X25	572.46	617.50	0.00	1235.00	2.000	0.20	1.00	1.00	200.0	20.0	23.39	6.45	1505.03	17.89	1681.96	268.48	1682.47	0.00	0.17	safe	115.49	0.11	safe	0.05	0.62	safe
		494	LC54	UB 203X133X25	6237.60	371.20	0.00	1235.00	2.000	0.20	1.00	1.00	200.0	20.0	23.39	6.45	2001.69	194.93	2237.01	161.39	2239.02	0.00	0.17	safe	115.49	0.11	safe	0.03	0.62	safe
Floor at +20.00m	2B10* & 2B15	508	LC28	IPE 600	2882.99	39879.40	9.78	17770.00	5.50	0.55	1.00	1.00	550.0	55.0	22.64	11.80	1507.13	18.48	1679.70	1299.43	1682.47	3.18	0.79	safe	263.49	0.26	safe	0.62	1.69	safe
		508	LC52	IPE 600	7425.02	39880.10	26.18	17770.00	5.50	0.55	1.00	1.00	550.0	55.0	22.64	11.80	2004.48	47.60	2234.00	1299.45	2239.02	8.50	0.61	safe	263.49	0.26	safe	0.62	1.69	safe
Floor at +20.00m	2B11* & 2B14	499	LC28	UB 203X133X25	638.21	1061.00	0.00	1698.00	2.500	0.25	1.00	1.00	250.0	25.0	29.24	8.06	1484.52	19.94	1681.52	461.30	1682.47	0.00	0.29	safe	158.79	0.16	safe	0.13	0.77	safe

Design of Roof Beam

Location	BEAM Mkd.	STAAD Beam No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)				DESIGN PARAMETERS								CHECK FOR BENDING STRESS							Remark	CHECK FOR SHEAR STRESS		Remark	CHECK FOR DEFLECTION		Remark
					Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	F_Y (kg)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio		τ_{va}	Ratio		δ_{actual}	$\delta_{permissible}$	
		499	LC52	UB 203X133X25	3117.98	1061.00	0.00	1698.00	2.500	0.25	1.00	1.00	250.0	25.0	29.24	8.06	1974.41	97.44	2236.42	461.30	2239.02	0.00	0.26	safe	158.79	0.16	safe	0.13	0.77	safe
Floor at +20.00m	2B12 & 2B18*	505	LC28	UB 254X146X37	9727.61	952.80	2.74	1938.00	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1431.34	206.09	1679.43	220.05	1682.47	3.51	0.28	safe	131.35	0.13	safe	0.15	1.31	safe
		505	LC104	UB 254X146X37	19832.52	851.90	4.84	1751.00	4.250	0.43	1.00	1.00	425.0	42.5	39.24	12.22	1903.68	420.18	2233.64	196.74	2239.02	6.21	0.30	safe	118.67	0.12	safe	0.13	1.31	safe
Floor at +20.00m	2B13 & 2B17*	1111	LC28	UB 305X165X46	7947.26	9514.40	1.03	6398.40	5.750	0.58	1.00	1.00	575.0	57.5	44.28	14.72	1395.92	135.39	1677.37	1472.82	1682.47	0.95	0.98	safe	337.45	0.33	safe	1.51	1.77	safe
		1111	LC72	UB 305X165X46	12707.48	9514.40	3.04	6398.40	5.750	0.58	1.00	1.00	575.0	57.5	44.28	14.72	1856.57	216.48	2230.90	1472.82	2239.02	2.81	0.78	safe	337.45	0.33	safe	1.51	1.77	safe
Floor at +20.00m	2B19*	542	LC27	PG 982X425	816.44	118334.20	16.35	33450.00	10.000	1.00	1.00	1.00	1000.0	100.0	25.83	11.85	1497.37	2.83	1679.66	1346.08	1682.47	1.69	0.80	safe	220.07	0.22	safe	1.31	3.08	safe
		542	LC85	PG 982X425	13.21	118334.40	50.57	33450.00	10.000	1.00	1.00	1.00	1000.0	100.0	25.83	11.85	1991.50	0.05	2233.94	1346.09	2239.02	5.24	0.60	safe	220.07	0.22	safe	1.31	3.08	safe
Floor at +20.00m	2B20*	1338	LC29	PG 782X300	0.24	52899.90	117.38	10910.00	10.000	5.00	1.00	1.00	1000.0	500.0	31.17	77.02	1072.73	0.00	1317.13	1175.29	1682.47	24.45	0.91	safe	145.47	0.14	safe	1.43	3.08	safe
		1338	LC41	PG 782X300	0.77	52903.80	261.18	10910.00	10.000	5.00	1.00	1.00	1000.0	500.0	31.17	77.02	1426.73	0.00	1751.78	1175.38	2239.02	54.41	0.70	safe	145.47	0.14	safe	1.43	3.08	safe
Floor at +20.00m	2B21* & 2B22	1429	LC29	ISMC 150	87.07	211.40	0.00	563.41	1.500	0.15	1.00	1.00	150.0	15.0	24.66	6.82	1501.19	4.09	1682.01	201.33	1682.47	0.00	0.12	safe	74.88	0.07	safe	0.03	0.46	safe
		1429	LC82	ISMC 150	115.45	211.40	0.00	563.41	1.500	0.15	1.00	1.00	150.0	15.0	24.66	6.82	1996.59	5.42	2237.07	201.33	2239.02	0.00	0.09	safe	74.88	0.07	safe	0.03	0.46	safe

Design of Staircase Beams

Designed by : ThyssenKrupp Industries India

Design of Staircase Beam & Tie Beam

Location	BEAM Mkd.	STAAD Beam No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)				DESIGN PARAMETERS								CHECK FOR BENDING STRESS							Remark	CHECK FOR SHEAR STRESS		Remark
					Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	F_Y (kg)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio		τ_{va}	Ratio	
Along 1' & 1 Grid	STB4	1529	LC27	UB 254x146x37	7943.76	2023.10	0.27	1377.00	5.75	4.25	1.00	1.00	575.0	425.0	53.09	122.19	646.07	168.30	1068.83	467.23	1682.47	0.35	0.65	safe	93.33	0.09	safe
		1529	LC36	UB 254x146x37	8675.0	2023.20	0.41	1377.00	5.75	4.25	1.00	1.00	575.0	425.0	53.09	122.19	859.27	183.79	1421.54	467.25	2239.02	0.53	0.51	safe	93.33	0.09	safe
Staircase Mid-landing	STB2	1063	LC27	UB 254x146x37	0.110	1719.1	0.00	1733.0	3.50	3.50	1.00	1.00	350.0	350.0	32.31	100.628	828.37	0.00	1205.59	397.02	1682.47	0.00	0.33	safe	117.45	0.12	safe
		1064	LC32	UB 254x146x37	0.166	1725.1	0.0	1733.0	3.50	3.50	1.00	1.00	350.0	350.0	32.31	100.628	1101.73	0.00	1603.43	398.41	2239.02	0.00	0.25	safe	117.45	0.12	safe
Along A & B grid	STB1 STB3	1505	LC29	UB 203X133X25	305.28	670.0	0.00	765.7	3.50	3.50	1.00	1.00	350.0	350.0	40.93	112.815	719.788	9.54	1099.95	291.30	1682.47	0.00	0.28	safe	71.61	0.07	safe
		493	LC53	UB 203X133X25	3056	741.4	0.00	765.7	3.50	3.50	1.00	1.00	350.0	350.0	40.93	112.815	957.32	95.50	1462.93	322.35	2239.02	0.00	0.32	safe	71.61	0.07	safe

Design of Tie Beam

Along 1 & 4 Grid		1661	LC30	UB 254x146x37	1340.1	152.8	0.0	106.3	5.750	5.750	1.00	1.00	575.0	575.0	53.09	165.32	403.51	28.39	856.37	35.29	1682.47	0.00	0.11	safe	7.20	0.01	safe
		1661	LC198	UB 254x146x37	9514.6	122.2	0.0	106.3	5.750	5.750	1.00	1.00	575.0	575.0	53.09	165.32	536.66	201.58	1138.97	28.22	2239.02	0.00	0.40	safe	7.20	0.01	safe
Along A & C Grid		1140	LC30	UB 254x146x37	200.7	1179.9	3.6	623.0	2.500	2.500	1.00	1.00	250.0	250.0	23.08	71.88	1128.83	4.25	1410.94	272.49	1682.47	4.56	0.20	safe	42.22	0.04	safe
		1140	LC54	UB 254x146x37	241.8	2002.6	2.9	623.0	2.500	2.500	1.00	1.00	250.0	250.0	23.08	71.88	1501.34	5.12	1876.55	462.49	2239.02	3.77	0.25	safe	42.22	0.04	safe

Design of Bracket

AT LEVEL +20.000m		1334	LC29	IPE 500	11014.8	1667.8	0.7	398.1	3.000	3.000	1.00	1.00	300.0	300.0	14.72	69.81	1151.23	94.96	1403.97	86.50	1682.47	0.34	0.14	safe	8.34	0.01	safe
		1334	LC119	IPE 500	10224.8	3972.9	1.4	398.1	3.000	3.000	1.00	1.00	300.0	300.0	14.72	69.81	1531.13	88.14	1867.28	206.06	2239.02	0.65	0.17	safe	8.34	0.01	safe
AT LEVEL +6.900m		1006	LC28	IPE 500	10058.9	3730.1	2.2	4758.0	0.750	0.750	1.00	1.00	75.0	75.0	3.68	17.45	1518.61	86.71	1674.26	193.47	1682.47	1.01	0.17	safe	99.67	0.10	safe
		1006	LC56	IPE 500	9741.7	4255.2	2.3	4758.0	0.750	0.750	1.00	1.00	75.0	75.0	3.68	17.45	2019.75	83.98	2226.77	220.71	2239.02	1.05	0.14	safe	99.67	0.10	safe

Design of Bracings



Designed by : ThyssenKrupp Industries India

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

DOC NO : 1605 C 216 A
SHEET NO : Page 122
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DESIGN OF VERTICAL BRACING

ALONG GRID	Memb No.	Load Case	Length	Axial Force	Section Provided					Unsupp length abt. xaxis (Lxx)	Unsupp length abt. yaxis (Lyy)	Eff length abt. xaxis (Lexx)	Eff length abt. yaxis (Leyy)	Controlling λ	Axial Stress		Stress Ratio	Remarks
															σ_{ac},cal	σ_{ac}		
			(m)	(kg)						(m)	(m)	(m)	(m)		(kg/cm^2)	(kg/cm^2)		
GRID - A & C UP TO EL(+) 6.900 M LVL.	766	LC 30	3.33	11893.7	2	ISA	130	X	130 X 10	1.67	3.33	1.42	3.33	58.82	237	1254.27	0.19	OK
	766	LC 54	3.33	23202.8	2	ISA	130	X	130 X 10	1.67	3.33	1.42	3.33	58.82	463	1668.19	0.28	OK
GRID - A & C ABOVE EL(+) 6.900 M LVL.	1165	LC 29	3.50	3153.3	2	ISA	110	X	110 X 10	1.75	3.50	1.49	3.50	72.12	75	1114.29	0.07	OK
	885	LC 53	3.00	12349.1	2	ISA	110	X	110 X 10	1.50	3.00	1.28	3.00	61.81	293	1628.71	0.18	OK
GRID - 1 & 4 UP TO EL(+) 6.900 M LVL.	854	LC 31	2.69	4190.5	2	ISA	130	X	130 X 10	2.69	2.69	2.29	2.69	56.92	84	1270.69	0.07	OK
	256	LC 119	3.41	20854.9	2	ISA	130	X	130 X 10	3.41	3.41	2.90	3.41	72.07	416	1482.61	0.29	OK
GRID - 1 & 4 ABOVE EL(+) 6.900 M LVL.	1663	LC 29	4.06	15926.4	2	ISA	110	X	110 X 10	4.06	4.06	3.45	4.06	102.32	378	796.78	0.48	OK
	1663	LC 97	4.06	20989.6	2	ISA	110	X	110 X 10	4.06	4.06	3.45	4.06	102.32	498	1059.72	0.47	OK
GRID - 1' UP TO EL(+) 6.900 M LVL.	1478	LC 27	3.50	1786.2	2	ISA	75	X	75 X 6	3.50	3.50	2.98	3.50	129.51	104	589.59	0.18	OK
	1478	LC 32	3.50	3930.5	2	ISA	75	X	75 X 6	3.50	3.50	2.98	3.50	129.51	227	784.16	0.29	OK

THYSSENKRUPP INDUSTRIES INDIA

DESIGN CALCULATION FOR STRUCTURAL WORK OF	DOC NO :	1605 C 216 A
SIPAT SUPER THERMAL POWER PROJECT NTPC	SHEET NO :	Page 123
Stage - II (2X500XMW)	REVISION :	A

DESIGN OF VERTICAL BRACING

ALONG GRID	Memb No.	Load Case	Length (m)	Axial Force (kg)	Section Provided					Unsupp length abt. xaxis (Lxx) (m)	Unsupp length abt. yaxis (Lyy) (m)	Eff length abt. xaxis (Lexx) (m)	Eff length abt. yaxis (Leyy) (m)	Controlling λ	Axial Stress σ_{ac},cal (kg/cm^2)	Axial Stress σ_{ac} (kg/cm^2)	Stress Ratio	Remarks
GRID - 1' ABOVE EL(+) 6.900 M LVL.	1517	LC 27	3.01	2518.9	2	ISA	75	X	75 X 6	3.01	3.01	2.56	3.01	111.49	146	722.05	0.21	OK
	614	LC 40	3.68	3130.8	2	ISA	75	X	75 X 6	3.68	3.68	3.13	3.68	136.17	181	725.45	0.25	OK

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

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Design of Plan Bracings

Location	STAAD Critical Memb No.	Load Case	Length (m)	Axial Force (kg)	Section Provided					Unsupp length abt. xaxis (Lxx) (m)	Unsupp length abt. yaxis (Lyy) (m)	Eff length abt. xaxis (Lexx) (m)	Eff length abt. yaxis (Leyy) (m)	Controlling λ	Axial Stress σ_{ac} cal (kg/cm^2)	Axial Stress σ_{ac} (kg/cm^2)	Stress Ratio	Remarks
AT EL(+) 6.900 M LVL.	1409	LC 28	3.09	7560.6	1	ISA	130	X	130 X 10	3.09	3.09	2.63	3.09	120.23	302	651.05	0.47	OK
	1409	LC 100	3.09	14467.6	1	ISA	130	X	130 X 10	3.09	3.09	2.63	3.09	120.23	577	865.89	0.67	OK
AT EL(+) 20.00 M LVL.	321	LC29	4.56	206.2	1	ISA	100	X	100 X 10	4.56	4.56	3.88	4.56	235.05	11	211.50	0.06	OK
	321	LC 109	4.56	3236.6	1	ISA	100	X	100 X 10	4.56	4.56	3.88	4.56	235.05	171	281.30	0.61	OK

Design of Hoist Maintenance Platform Members

Designed by : ThyssenKrupp Industries India

Design of Hangers(For Hoisting maintanances Platform)

Design Loads:- (Refer STAAD output)

Description			Load Case LC27	Load Case LC84
Critical Member Number in STAAD			**1370**	**1370**
Design Axial force	P	=	**244.0** kg	**285.7** kg
Design Momemt	MX	=	**2.5** kgm	**2.3** kgm
Design Shear	FY	=	**1.1** kg	**1.1** kg
Design Momemt	MY	=	**193.5** kgm	**193.2** kgm
Design Shear	FZ	=	**78.0** kg	**78.0** kg
Length of the Member	L	=	**2500.0** mm	**2500.0** mm

The section chosen is UB 203X133X25

Properties

A	=	**32** cm^2	KL_{xx}	=	**250.00**	
I_{xx}	=	**2340.0** cm^4	KL_{yy}	=	**250.00**	
I_{yy}	=	**308.0** cm^4	λ_{xx}	=	**29.24**	
Z_{xx}	=	**230.0** cm^3	λ_{yy}	=	**80.58**	
Z_{yy}	=	**46.2** cm^3	r_{xx}	=	**8.6** cm	
fy	=	**2549.2** kg/cm^2	r_{yy}	=	**3.1** cm	

K_{XX} = **1.0** K_{YY} = **1.0**

Design Check

Critical Slenderness Ratio = λ_{yy} = **80.58**

< **400**

HENCE OKAY

				LC27	LC84
σ_{at}	=	0.6fy	=	**1529.52**	**2034.26**
$\sigma_{at,cal}$			=	**7.63**	**8.93**
σ_{btx}	=	0.66fy	=	**1682.47**	**2237.69**
$\sigma_{btx,cal}$			=	**1.09**	**1.00**
σ_{btY}	=	0.66fy	=	**1682.47**	**2237.69**
$\sigma_{btY,cal}$			=	**418.72**	**418.16**

Interaction formula

$$\frac{\sigma_{at,cal}}{0.6fy} + \frac{\sigma_{btx,cal}}{0.66fy} + \frac{\sigma_{bty,cal}}{0.66fy} =$$

LC27	LC84
0.25	**0.19**
<1.00 HENCE OK	**<1.00 HENCE OK**

Design of Hangers(For Platform at 4.500m level)

Design Loads:- (Refer STAAD output)

Description			Load Case LC31	Load Case LC75
Critical Member Number in STAAD			**1440**	**1440**
Design Axial force	P	=	**4154.1** kg	**4134.8** kg
Design Momemt	MX	=	**1511.6** kgm	**1513.5** kgm
Design Shear	FY	=	**679.4** kg	**680.3** kg
Design Momemt	MY	=	**318.7** kgm	**318.7** kgm
Design Shear	FZ	=	**135.5** kg	**135.5** kg
Length of the Member	L	=	**2250.0** mm	**2250.0** mm

The section chosen is UB 203X133X25

Properties

A	=	**32** cm^2	KL_{xx}	=	**225.00**	
I_{xx}	=	**2340.0** cm^4	KL_{yy}	=	**225.00**	
I_{yy}	=	**308.0** cm^4	λ_{xx}	=	**26.31**	
Z_{xx}	=	**230.0** cm^3	λ_{yy}	=	**72.52**	
Z_{yy}	=	**46.2** cm^3	r_{xx}	=	**8.6** cm	
fy	=	**2549.2** kg/cm^2	r_{yy}	=	**3.1** cm	

K_{XX} = **1.0** K_{YY} = **1.0**

Design Check

Critical Slenderness Ratio = λ_{yy} = **72.52**

< **400**

HENCE OKAY

				LC31	LC75
σ_{at}	=	0.6fy	=	**1529.52**	**2034.26**
$\sigma_{at,cal}$			=	**129.82**	**129.21**
σ_{btx}	=	0.66fy	=	**1682.47**	**2237.69**
$\sigma_{btx,cal}$			=	**657.22**	**658.04**
σ_{btY}	=	0.66fy	=	**1682.47**	**2237.69**
$\sigma_{btY,cal}$			=	**689.74**	**689.78**

Interaction formula

$$\frac{\sigma_{at,cal}}{0.6fy} + \frac{\sigma_{btx,cal}}{0.66fy} + \frac{\sigma_{bty,cal}}{0.66fy} =$$

LC31	LC75
0.89	**0.67**
<1.00 HENCE OK	**<1.00 HENCE OK**

DESIGN CALCULATION FOR STRUCTURAL WORK OF
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Design of Platform Beam

Location	STAAD Beam No.	Load Case	Section	DESIGN FORCES (STAAD OUTPUT)				DESIGN PARAMETERS								CHECK FOR BENDING STRESS							Remark	CHECK FOR SHEAR STRESS		Remark
				Axial Force (kg)	M_{xx} (Kg-m)	M_{yy} (Kg-m)	F_Y (kg)	Lx (m)	Ly (m)	kx	ky	Lex (cm)	Ley (cm)	λx	λy	σ_{ac} (kg/cm^2)	$\sigma_{ac,cal}$ (kg/cm^2)	σ_{bcx} (kg/cm^2)	$\sigma_{bcx,cal}$ (kg/cm^2)	σ_{bcy} (kg/cm^2)	$\sigma_{bcy,cal}$ (kg/cm^2)	Stress Ratio		τ_{va}	Ratio	
BEAM AT +17.000m	1365	LC27	ISMC 200	6.40	54.70	0.00	145.90	1.50	1.50	1.00	1.00	150.0	150.0	18.72	67.44	1176.83	0.22	1470.34	29.89	1682.47	0.00	0.02	safe	13.28	0.01	safe
	1365	LC52	ISMC 200	8.38	54.70	0.00	145.90	1.50	1.50	1.00	1.00	150.0	150.0	18.72	67.44	1565.18	0.29	1955.56	29.89	2239.02	0.00	0.02	safe	13.28	0.01	safe
	1366	LC27	ISMC 200	4.36	54.70	0.00	145.90	1.50	1.50	1.00	1.00	150.0	150.0	18.72	67.44	1176.83	0.15	1470.34	29.89	1682.47	0.00	0.02	safe	13.28	0.01	safe
	1365	LC32	ISMC 200	38.42	54.70	0.00	145.90	1.50	1.50	1.00	1.00	150.0	150.0	18.72	67.44	1565.18	1.35	1955.56	29.89	2239.02	0.00	0.02	safe	13.28	0.01	safe
BEAM AT +4.500m	1443	LC28	ISMC 200	477.27	18.60	0.00	28.73	2.60	2.60	1.00	1.00	260.0	260.0	32.45	116.89	686.69	16.75	1187.15	10.16	1682.47	0.00	0.03	safe	2.61	0.00	safe
	1443	LC88	ISMC 200	512.46	18.60	0.00	28.73	2.60	2.60	1.00	1.00	260.0	260.0	32.45	116.89	913.29	17.98	1578.91	10.16	2239.02	0.00	0.03	safe	2.61	0.00	safe
	1448	LC29	UB 254X146X37	693.96	4174.70	1.10	4712.00	3.30	1.35	1.00	1.00	330.0	135.0	30.47	38.81	1434.07	14.70	1614.38	964.13	1682.47	1.41	0.61	safe	319.36	0.31	safe
	1448	LC33	UB 254X146X37	694.76	4174.70	1.15	4712.00	3.30	1.35	1.00	1.00	330.0	135.0	30.47	38.81	1907.31	14.72	2147.13	964.13	2239.02	1.47	0.46	safe	319.36	0.31	safe
	1457	LC27	ISMC 200	0.53	1991.50	0.44	2544.00	2.60	2.05	1.00	1.00	260.0	205.0	32.45	92.17	911.76	0.02	1323.22	1088.25	1682.47	1.67	0.82	safe	231.56	0.23	safe
	1457	LC32	ISMC 200	0.45	1991.50	0.41	2544.00	2.60	2.05	1.00	1.00	260.0	205.0	32.45	92.17	1212.64	0.02	1759.88	1088.25	2239.02	1.55	0.62	safe	231.56	0.23	safe
	1460	LC27	ISMC 200	1.62	848.70	0.00	1265.00	1.35	1.35	1.00	1.00	135.0	135.0	16.85	60.69	1247.57	0.06	1509.54	463.77	1682.47	0.00	0.31	safe	115.14	0.11	safe
	1460	LC32	ISMC 200	1.40	848.70	0.00	1265.00	1.35	1.35	1.00	1.00	135.0	135.0	16.85	60.69	1659.27	0.05	2007.68	463.77	2239.02	0.00	0.23	safe	115.14	0.11	safe

THYSSENKRUPP INDUSTRIES INDIA

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
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Design of Hanging Platform & Platfom at 4.5m level Bracing

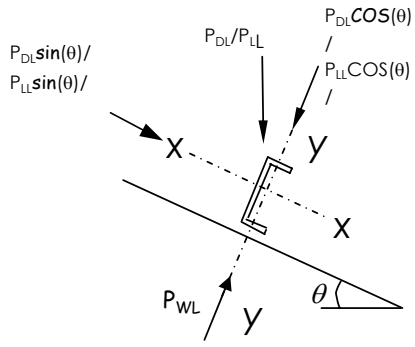
LOCATION	Memb No.	Load Case	Length	Axial Force	Section Provided					Unsupp length abt. xaxis (Lxx)	Unsupp length abt. yaxis (Lyy)	Eff length abt. xaxis (Lexx)	Eff length abt. yaxis (Leyy)	Controlling λ	Axial Stress		Stress Ratio	Remarks
															$\sigma_{ac,cal}$	σ_{ac}		
			(m)	(kg)						(m)	(m)	(m)	(m)		(kg/cm^2)	(kg/cm^2)		
VERTICAL BRACING for Hoisting Platform	1375	LC 28	2.91	177.4	2	ISA	75	X	75 X 6	1.46	2.91	1.24	2.91	86.46	11.00	960.74	0.02	OK
	1375	LC 41	2.91	235.3	2	ISA	75	X	75 X 6	1.46	2.91	1.24	2.91	86.46	14.00	1277.78	0.02	OK
PLAN BRACING for Hoisting platform	1373	LC 27	2.12	10.7	1	ISA	75	X	75 X 6	1.06	2.12	0.90	2.12	145.21	2.00	493.50	0.01	OK
	1373	LC 40	2.12	14.4	1	ISA	75	X	75 X 6	1.06	2.12	0.90	2.12	145.21	2.00	656.35	0.01	OK
VERTICAL BRACING of 4.50m Level platform	1657	LC 28	3.44	768.1	2	ISA	75	X	75 X 6	1.72	3.44	1.46	3.44	102.20	45.00	797.77	0.06	OK
	1657	LC 108	3.44	875.3	2	ISA	75	X	75 X 6	1.72	3.44	1.46	3.44	102.20	51.00	1061.03	0.05	OK
Bracket connecting bracing at 20.000m LVL	1335	LC 27	4.20	15767.7	2	ISA	130	X	130 X 10	4.20	4.20	3.57	4.20	88.87	315.00	934.86	0.34	OK
	1335	LC 88	4.20	17282.2	2	ISA	130	X	130 X 10	4.20	4.20	3.57	4.20	88.87	345.00	1243.36	0.28	OK
Bracket connecting bracing at 6.900m LVL	1008	LC 28	1.82	31995.3	2	ISA	130	X	130 X 10	1.82	1.82	1.55	1.82	38.51	638.00	1424.18	0.45	OK
	1008	LC 48	1.82	33008.1	2	ISA	130	X	130 X 10	1.82	1.82	1.55	1.82	38.51	658.00	1894.16	0.35	OK

Design of Purlins



Designed by : ThyssenKrupp Industries India

Design of Purlin



Design data

Slope of roof (to horizontal)	θ	=	14.42	^{o}
Span of purlin	l	=	5.75	m
Spacing of purlins	s	=	1.51	m
Yield strength of steel	f_y	=	2549.20	kg/cm^2

Dead Load

Roofing sheet & accessories load	P_{DL-1}	=	15	kg/m^2
Dead weight of purlin	P_{DL-2}	=	15	kg/m^2
Total	P_{DL}	=	30	kg/m^2

Live Load + Dust Load(75 + 150) P_{LL} = 225 kg/m^2

Wind Load

Wind Pressure	p	=	150	kg/m^2	
Wind Pressure Coefficient	Cpe	=	-2.0		Table 6
(Local Coefficient)					IS 875 Part 3 - 1987
Internal Pressure	Cpi	=	+/-0.50		
Total Pressure Coefficient		=	-2.5		
Wind Load on Purlin	P_{WL}	=	-375	kg/m^2	

(-ve sign indictes upward force acting normal to the Roof)

Design

Load Combination DL+ LL

UDL on Purlin due to DL +LL = 373 kg/m
(Vertically Downward)

Applied moment at mid span of purlin

$M_{xx} = [P_{DL}\cos(\theta)+P_{LL}\cos(\theta)]*l^2/8$ = 1492.7 kgm

$M_{yy} = [P_{DL}\sin(\theta)+P_{LL}\sin(\theta)]*(l/2)^2/8$ = 96.0 kgm

Note:
Sag rods are provided at mid span of every purlin. Hence, connection point of sag rod to purlin will act as a support in y-y axis of purlin and the effective length in y-y axis will be 0.5 times the spacing of truss

Max. Shear Force in Purlin = 1038.4 kg

Load case II
Load combination DL+WL

UDL on Purlin due to DL + WL = -524 kg/m
(Normal to Roof)
(-ve sign indictes upward force

Applied moment at mid span of purlin

$M_{xx} = [P_{DL}\cos(\theta)+P_{WL}]*l^2/8$ = 2164.6 kgm

$M_{yy} = [P_{DL}\sin(\theta)]*(l/2)^2/8$ = 11.29 kgm

Max. Shear Force in Purlin = -1505.8 kg

The section chosen is ISMC 200

Properties

A	=	**28.5** cm^2	KL_{xx}	=	**575.00** cm
I_{xx}	=	**1830.0** cm^4	KL_{yy}	=	**287.50** cm
I_{yy}	=	**141.0** cm^4	λ_{xx}	=	**71.76**
z_{xx}	=	**183.0** cm^3	λ_{yy}	=	**129.26**

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Purlin Design	

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z_{yy} = **26.4** cm^3 — f_{cc} = **1240.56** kg/cm^2

r_{xx} = **8.0** cm — Y = **1617.37** kg/cm^2

r_{yy} = **2.2** cm — X = **3116.98** kg/cm^2

fy = **2549.2** kg/cm^2 — f_{cb} = **3116.98** kg/cm^2

E = **2100000.0** kg/cm^2 — T = **1.14** cm

K_{XX} = **1.0** L_{XX} = **575.0** — D = **20** cm

K_{YY} = **1.0** L_{YY} = **287.5** — t_w = **0.62** cm

k_1 = **1.0** k_2 = **0.0** — D/T = **17.54**

C_2/C_1 = **1.0** — f_{ccx} = **4025.22** kg/cm^2

f_{ccy} = **1240.56** kg/cm^2

Design Check

$\sigma_{bcx} = 0.66\frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}}$	=	**1125.97**	**1497.54**
$\sigma_{bcx,cal}$	=	**815.66**	**1182.84**
$\sigma_{bcY} = 0.66\frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}}$	=	**1682.47**	**2237.69**
$\sigma_{bcY,cal}$	=	**363.45**	**42.76**

Interaction formula

$$\frac{\sigma_{ac,cal}}{\sigma_{ac}} + \frac{\sigma_{bcx,cal}}{\sigma_{bcx}} + \frac{\sigma_{bcy,cal}}{\sigma_{bcy}} =$$

0.94	**0.81**
<1.00 HENCE OK	**<1.00 HENCE OK**

Check for Shear Stress

Average Shear Stress on Web(τ_{va}) $= \frac{FY}{dt_w}$	=	94.51	137.06
Allowable Shear Stress	= 0.4xfy	1019.68	1019.68
		0.09	0.13
		Safe	**Safe**

Check for Deflection

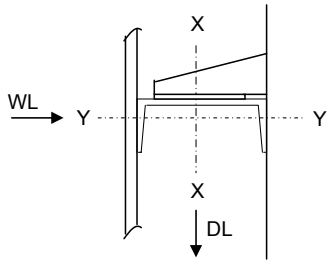
Max. Deflection	=	$\frac{5wL^4}{384EI}$	$\frac{5wL^4}{384EI}$
	=	1.338 cm	1.94 cm
Allowable Deflection	=	(L/250)	(L/250)
	=	2.30 cm	2.30 cm
		Hence Safe	**Hence Safe**

Design of Siderails



Designed by : ThyssenKrupp Industries India

DESIGN OF SIDE RUNNERS MKD. SR-1



Basic Data

Span of Runners = **2.000 m**
Providing c/c spacing of Side Runners = **1.25 m**

Loading Data

Dead Load on the runners:

DL Intensity of Sheeting = 12 kg/ m^2 = **12.0 kg/m^2**
UDL on Runner due to Self Wt. Of Sheeting = **15.0 kg/m**
DL Intensity of Runners = 20 kg/m^2 = **20.0 kg/m^2**
UDL on Runner due to Self Wt. Of Runner = **25.0 kg/m**
Total DL = 40.0 kg/m

Wind Load on the runners:

Wind Pressure Coefficient = **1.3**
Wind Pressure = **150 kg/m^2**
Wind Load = 1.25 x 150 x 1.3
Total WL = 243.8 kg/m

Desgin

Bending Moment About X-X Axis = 243.75 x 2 x 2 / 8
= **121.88 kg.m**
Bending Moment About Y-Y axis = 40 x 2 x 2 / 8
= **20.00 kg.m**

The section chosen ISMC 100

Properties

A	=	**12.2**	cm^2	KL_{xx}	=	**200.00**	cm
I_{xx}	=	**192.0**	cm^4	KL_{yy}	=	**200.00**	cm
I_{yy}	=	**26.7**	cm^4	λ_{xx}	=	**50.41**	
Z_{xx}	=	**38.4**	cm^3	λ_{yy}	=	**135.19**	
Z_{yy}	=	**7.7**	cm^3	f_{cc}	=	**1133.99**	kg/cm^2
r_{xx}	=	**4.0**	cm	Y	=	**1478.43**	kg/cm^2
r_{yy}	=	**1.5**	cm	X	=	**3745.50**	kg/cm^2
fy	=	**2549.2**	kg/cm^2	f_{cb}	=	**3745.50**	kg/cm^2
E	=	**2100000.0**	kg/cm^2	T	=	**0.77**	cm
K_{XX}	= **1.0**	L_{XX}	= **200.0**	D	=	**10**	cm
K_{YY}	= **1.0**	L_{YY}	= **200.0**	t_w	=	**0.5**	cm
k_1	= **1.0**	k_2	= **0.0**	D/T	=	**12.99**	
C_2/C_1	= **1.0**			f_{ccx}	=	**8154.56**	kg/cm^2
				f_{ccy}	=	**1133.99**	kg/cm^2

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Design Of Siderail	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Design Check

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1611.43}$$

$\sigma_{bcx,cal}$ = **317.38**

$$\sigma_{bcY} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{2237.69}$$

$\sigma_{bcY,cal}$ = **259.40**

Interaction formula

$$\frac{\sigma_{ac,cal}}{\sigma_{ac}} + \frac{\sigma_{bcx,cal}}{\sigma_{bcx}} + \frac{\sigma_{bcy,cal}}{\sigma_{bcy}} = \mathbf{0.31}$$

<1.00 HENCE OK

Check for Deflection :

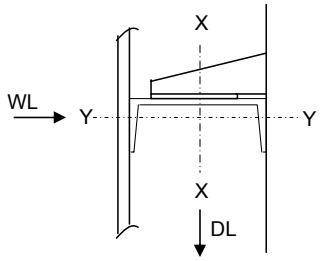
Deflection Due to Wind Load = $(5\ w\ L^4)/384EI$

= 0.13 cm

Permscible Deflection (span/250) = 0.80 cm

Hence Safe

DESIGN OF SIDE RUNNERS MKD. SR-2



Span of Runners = **2.500 m**

Providing c/c spacing of Side Runners = **1.25 m**

Dead Load on the runners:

DL of sheeting = 12 kg/ m^2 = **12.0 kg/m^2**

= **15.0 kg/m**

DL of Runners = 20 kg/m^2 = **20.0 kg/m^2**

= **25.0 kg/m**

Total DL = 40.0 kg/m

Wind Load on the runners:

Max wind pressure coefficient = **1.3**

Hence, Wind Pressure (Calculated as shown in the load calculation chapter) = **150 kg/m^2**

Wind Load = 1.25 x 150 x 1.3

Total WL = 243.75 kg/m

Bending Moment About X-X Axis = 243.75 x 2.5 x 2.5 / 8

= **190.43 kg.m**

Bending Moment About Y-Y axis = 40 x 2.5 x 2.5 / 8

= **31.25 kg.m**

The section chosen is ISMC 100

Properties

A	=	**12.2**	cm^2	KL_{xx}	=	**250.00**	cm
I_{xx}	=	**192.0**	cm^4	KL_{yy}	=	**250.00**	cm
I_{yy}	=	**26.7**	cm^4	λ_{xx}	=	**63.02**	
Z_{xx}	=	**38.4**	cm^3	λ_{yy}	=	**168.99**	
Z_{yy}	=	**7.7**	cm^3	f_{cc}	=	**725.76**	kg/cm^2
r_{xx}	=	**4.0**	cm	Y	=	**946.20**	kg/cm^2
r_{yy}	=	**1.5**	cm	X	=	**2911.15**	kg/cm^2
fy	=	**2549.2**	kg/cm^2	f_{cb}	=	**2911.15**	kg/cm^2
E	=	**2100000.0**	kg/cm^2	T	=	**0.77**	cm
K_{XX}	= **1.0**	L_{XX} = **250.0**		D	=	**10**	cm
K_{YY}	= **1.0**	L_{YY} = **250.0**		t_w	=	**0.5**	cm
k_1	= **1.0**	k_2 = **0.0**		D/T	=	**12.99**	
C_2/C_1	= **1.0**			f_{ccx}	=	**5218.92**	kg/cm^2
				f_{ccy}	=	**725.76**	kg/cm^2

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 135 REVISION : A
Design Of Siderail	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Design Check

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1453.02}$$

$$\sigma_{bcx,cal} = \mathbf{495.91}$$

$$\sigma_{bcY} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{2237.69}$$

$$\sigma_{bcY,cal} = \mathbf{405.32}$$

Interaction formula

$$\frac{\sigma_{ac,cal}}{\sigma_{ac}} + \frac{\sigma_{bcx,cal}}{\sigma_{bcx}} + \frac{\sigma_{bcy,cal}}{\sigma_{bcy}} = \mathbf{0.52}$$

<1.00 HENCE OK

Check for Deflection :

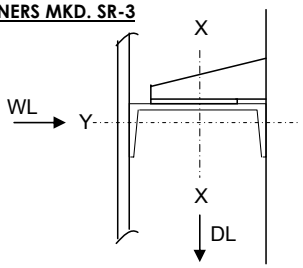
Deflection Due to Wind Load = $(5\ w\ L^4)/384EI$

= 0.31 **cm**

Permscible Deflection (span/250) = 1.00 **cm**

Hence Safe

DESIGN OF SIDE RUNNERS MKD. SR-3



Span of Runners Lxx = **4.250 m**

Span of Runners Lyy = **2.125 m**

Providing c/c spacing of Side Runners = **1.25 m**

Dead Load on the runners:

DL of sheeting = 12 kg/ m^2 = **12.0 kg/m^2**

= **15.0 kg/m**

DL of Runners = 20 kg/m^2 = **20.0 kg/m^2**

= **25.0 kg/m**

Total DL = 40.0 kg/m

Wind Load on the runners:

Max wind pressure coefficient = **1.3**

Hence, Wind Pressure (Calculated as shown in the load calculation chapter) = **150 kg/m^2**

Wind Load = 1.25 x 150 x 1.3

Total WL = 243.75 kg/m

Bending Moment About X-X Axis = 243.75 x 4.25 x 4.25 / 8

= **550.34 kg.m**

Bending Moment About Y-Y axis = 40 x 2.125 x 2.125 / 8

= **22.578 kg.m**

The section chosen is ISMC 150

Properties

A	=	**21.3**	cm^2	KL_{xx}	=	**425.00**	cm
I_{xx}	=	**788.0**	cm^4	KL_{yy}	=	**212.50**	cm
I_{yy}	=	**103.0**	cm^4	λ_{xx}	=	**69.87**	
Z_{xx}	=	**105.0**	cm^3	λ_{yy}	=	**96.63**	
Z_{yy}	=	**19.5**	cm^3	f_{cc}	=	**2219.52**	kg/cm^2
r_{xx}	=	**6.1**	cm	Y	=	**2893.67**	kg/cm^2
r_{yy}	=	**2.2**	cm	X	=	**4737.91**	kg/cm^2
fy	=	**2549.2**	kg/cm^2	f_{cb}	=	**4737.91**	kg/cm^2
E	=	**2100000.0**	kg/cm^2	T	=	**0.9**	cm
K_{XX}	= **1.0**	L_{XX}	= **425.0**	D	=	**15**	cm
K_{YY}	= **1.0**	L_{YY}	= **212.5**	t_w	=	**0.57**	cm
k_1	= **1.0**	k_2	= **0.0**	D/T	=	**16.67**	
C_2/C_1	= **1.0**			f_{ccx}	=	**4245.10**	kg/cm^2
				f_{ccy}	=	**2219.52**	kg/cm^2

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 137 REVISION : A
Design Of Siderail	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Design Check

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1741.98}$$

$\sigma_{bcx,cal}$ = **524.14**

$$\sigma_{bcY} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{2237.69}$$

$\sigma_{bcY,cal}$ = **115.79**

Interaction formula

$$\frac{\sigma_{ac,cal}}{\sigma_{ac}} + \frac{\sigma_{bcx,cal}}{\sigma_{bcx}} + \frac{\sigma_{bcy,cal}}{\sigma_{bcy}} = \mathbf{0.35}$$

<1.00 HENCE OK

Check for Deflection :

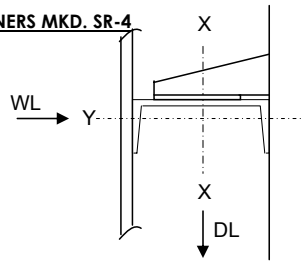
Deflection Due to Wind Load = $(5\ w\ L^4)/384EI$

= 0.63 cm

Permscible Deflection (span/250) = 1.70 cm

Hence Safe

DESIGN OF SIDE RUNNERS MKD. SR-4



Span of Runners = **5.750 m**

Span of Runners along XX = **2.875 m**

Providing c/c spacing of Side Runners = **1.25 m**

Dead Load on the runners:

DL of sheeting = 12 kg/ m^2 = **12.0 kg/m^2**

= **15.0 kg/m**

DL of Runners = 20 kg/m^2 = **20.0 kg/m^2**

= **25.0 kg/m**

Total DL = 40.0 kg/m

Wind Load on the runners:

Max wind pressure coefficient = **1.3**

Hence, Wind Pressure (Calculated as shown in the load calculation chapter) = **150 kg/m^2**

Wind Load = 1.25 x 150 x 1.3

Total WL = 243.75 kg/m

Bending Moment About X-X Axis = 243.75 x 5.75 x 5.75 / 8

= **1007.4 kg.m**

Bending Moment About Y-Y axis = 40 x 2.875 x 2.875 / 8

= **41.328 kg.m**

The section chosen is ISMC 150

Properties

A	=	**21.3**	cm^2	KL_{xx}	=	**575.00**	cm
I_{xx}	=	**788.0**	cm^4	KL_{yy}	=	**287.50**	cm
I_{yy}	=	**103.0**	cm^4	λ_{xx}	=	**94.54**	
Z_{xx}	=	**105.0**	cm^3	λ_{yy}	=	**130.74**	
Z_{yy}	=	**19.5**	cm^3	f_{cc}	=	**1212.55**	kg/cm^2
r_{xx}	=	**6.1**	cm	Y	=	**1580.85**	kg/cm^2
r_{yy}	=	**2.2**	cm	X	=	**3191.89**	kg/cm^2
fy	=	**2549.2**	kg/cm^2	f_{cb}	=	**3191.89**	kg/cm^2
E	=	**2100000.0**	kg/cm^2	T	=	**0.9**	cm
K_{XX}	= **1.0**	L_{XX}	= **575.0**	D	=	**15**	cm
K_{YY}	= **1.0**	L_{YY}	= **287.5**	t_w	=	**0.57**	cm
k_1	= **1.0**	k_2	= **0.0**	D/T	=	**16.67**	
C_2/C_1	= **1.0**			f_{ccx}	=	**2319.16**	kg/cm^2
				f_{ccy}	=	**1212.55**	kg/cm^2

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 139 REVISION : A
Design Of Siderail	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Design Check

$$\sigma_{bcx} = 0.66\frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1512.77}$$

$\sigma_{bcx,cal}$ = **959.40**

$$\sigma_{bcY} = 0.66\frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{2237.69}$$

$\sigma_{bcY,cal}$ = **211.94**

Interaction formula

$$\frac{\sigma_{ac,cal}}{\sigma_{ac}} + \frac{\sigma_{bcx,cal}}{\sigma_{bcx}} + \frac{\sigma_{bcy,cal}}{\sigma_{bcy}} = \mathbf{0.73}$$

<1.00 HENCE OK

Check for Deflection :

Deflection Due to Wind Load = $(5\ w\ L^4)/384EI$

= 2.10 **cm**

Permscible Deflection (span/250) = 2.30 **cm**

Hence Safe

Design of Monorails



Designed by : ThyssenKrupp Industries India

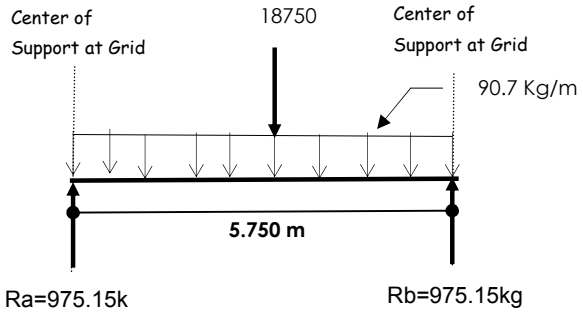
Design of Monorail Beam at Level +19.000m(TOS)

(Based on Material Handling Equipment by M.P.Alexandrov Page 388 to 390)

Load Data(Load at Mid of Largest Span(5.750m)

Capacity of monorail (load lifted)	=	15000.0 kg
Add 25%for impact	=	3750.0 kg
Total Load		18750 kg

Assuming the section as **IPE 500** @ 90.7 kg/m



The section chos IPE 500

Properties

A	=	**116**	cm^2	KL_{yy}	=	**575.00**	cm
I_{xx}	=	**48200.0**	cm^4	λ_{yy}	=	**133.81**	
I_{yy}	=	**2142.0**	cm^4	f_{cc}	=	**1157.56**	kg/cm^2
z_{xx}	=	**1928.0**	cm^3	Y	=	**1509.16**	kg/cm^2
z_{yy}	=	**214.0**	cm^3	X	=	**2089.38**	kg/cm^2
r_{xx}	=	**20.4**	cm	f_{cb}	=	**2507.25**	kg/cm^2
r_{yy}	=	**4.3**	cm	T	=	**1.6**	cm
fy	=	**2549.2**	kg/cm^2	b	=	**20**	cm
E	=	**2100000.0**	kg/cm^2	D	=	**50**	cm
K_{YY}	=	**1.0**		t_w	=	**1.02**	cm
k_1	=	**1.0**	k_2 = **0.0**	D/T	=	**31.25**	
C_2/C_1	=	**1.0**	r = 0.76	f_{ccx}	=	**1157.56**	kg/cm^2

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1016.96}$$

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 141 REVISION : A
Design of Monorails	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Check for Longitudinal Bending :

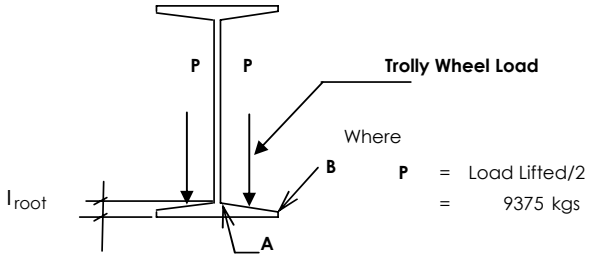
Max. Bending Moment = **27328.0 Kg.m**

σ_{yb} = **1417.4 kg/cm²**

$\sigma_{bc\ permissible}$ = **1016.96 kg/cm²**

Revise

Check for Local Bending of Flange:



Local Bending Stress in the Transverse Direction

$\sigma_x = K_1 x P/t^2_{root}$

K_1 = 1.7 — Ref. Fig 10 of Page 389

$t_{root} = T_f + r$ = 2.36

σ_x = 1.70 x 9375.0 / 2.36^2

σ_x = 2861.5 kg/cm²

Local Bending Stress in the Longitudinal Direction

$\sigma_y = K_2 x P/t^2_{root}$

K_2 = 0.5 — Ref. Fig 10 of Page 389

$t_{root} = T_f + r$ = 2.36

σ_y = 0.50 x 9375.0 / 2.36^2

σ_y = 841.6 kg/cm²

Combined Stress at Tip of Flange at point B $\sigma_B = \sigma_{yb} + \sigma_{free}$

= 1417.4 kg/cm²

<1800 kg/cm²

Hence Safe

Combined Stress at root of Flange at point A $\sigma_A = \sqrt{\sigma_x^2 + (\sigma_y + \sigma_{yb})^2 - \sigma_x(\sigma_y + \sigma_{yb})}$

σ_A = 2612.90 kg/cm²

< 2000.00 kg/cm³

Revise

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE
	Check for Shear Stress Max. Shear Force in the Web = 9510.6 kg Shear Stress Developed = 186.5 kg/cm^2 < 1020.0 kg/cm^2 **Hence Safe** **Check for Deflection:** Actual deflection = $WL^3/(48EI)+5WL^3/(384EI)$ = 0.74 cm Permissible Deflection = (l/500) = 1.150 cm **Hence Safe**	

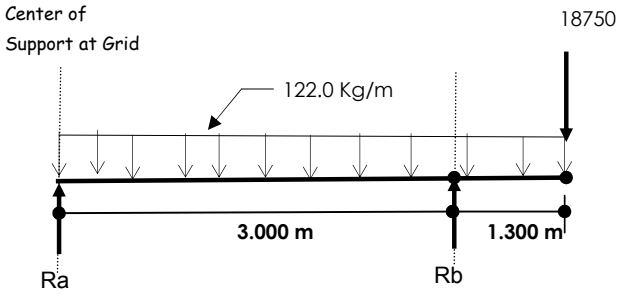
Design of Monorail Beam at Level +19.00m(TOS)

(Based on Material Handling Equipment by M.P.Alexandrov Page 388 to 390)

Load Data(Load at Tip of the Cantilever Span)

Capacity of monorail (load lifted)	=	15.00	MT
Add 25%for impact	=	3.75	MT
Total Load		18.75	MT

Assuming the section as **IPE 600** @ 122 kg/m



Ra + Rb = 19274.6 kg

Taking Moments @ A, **Rb** = 27251.0 kg

Ra = -7976.4 kg

The section chosen is IPE 600

Properties

A	=	**156**	cm^2	KL_{yy}	=	**300.00**	cm
I_{xx}	=	**92080.0**	cm^4	λ_{yy}	=	**64.38**	
I_{yy}	=	**3387.0**	cm^4	f_{cc}	=	**4999.97**	kg/cm^2
z_{xx}	=	**3069.0**	cm^3	Y	=	**6518.65**	kg/cm^2
z_{yy}	=	**308.0**	cm^3	X	=	**7164.11**	kg/cm^2
r_{xx}	=	**24.3**	cm	f_{cb}	=	**8596.93**	kg/cm^2
r_{yy}	=	**4.7**	cm	T	=	**1.9**	cm
fy	=	**2549.2**	kg/cm^2	b	=	**22**	cm
E	=	**2100000.0**	kg/cm^2	D	=	**60**	cm
K_{YY}	=	**1.0**		t_w	=	**1.2**	cm
k_1	=	**1.0**	k_2 = **0.0**	D/T	=	**31.58**	
C_2/C_1	=	**1.0**	r = 2.1	f_{ccx}	=	**4999.97**	kg/cm^2

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1492.76}$$

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Check for Longitudinal Bending :

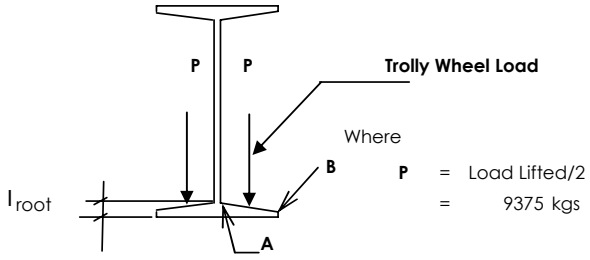
Max. Bending Moment = **24478.1 Kg.m**

σ_{yb} = **797.6 kg/cm²**

$\sigma_{bc\ permissible}$ = **1492.76 kg/cm²**

Hence Safe

Check for Local Bending of Flange:



Local Bending Stress in the Transverse Direction

$\sigma_x = K_1 x P/t^2_{root}$

K_1 = 1.7 — Ref. Fig 10 of Page 389

$t_{root} = T_f + r/4$

σ_x = 1.70 x 9375.0 / 4^2

σ_x = 996.1 kg/cm²

Local Bending Stress in the Longitudinal Direction

$\sigma_y = K_2 x P/t^2_{root}$

K_2 = 0.5 — Ref. Fig 10 of Page 389

$t_{root} = T_f + r/4$

σ_y = 0.50 x 9375.0 / 4^2

σ_y = 293.0 kg/cm²

Combined Stress at Tip of Flange at point B $\sigma_B = \sigma_{yb} + \sigma_{free}$

= 797.6 kg/cm²

<1800 kg/cm²

Hence Safe

Combined Stress at root of Flange at point A $\sigma_A = \sqrt{\sigma_x^2 + (\sigma_y + \sigma_{yb})^2 - \sigma_x(\sigma_y + \sigma_{yb})}$

σ_A = 1046.53 kg/cm²

< 2000.00 kg/cm³

Hence Safe

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 145 REVISION : A
Design of Monorails	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Check for Shear Stress

Max. Shear Force in the Web = 18750 kg

Shear Stress Developed = 260.4 kg/cm^2

< 1020.0 kg/cm^2

Hence Safe

Check for Deflection:

Actual deflection = $WL^3/(3EI)+WL^4/(8EI)$

= 0.071 cm

Permissible Deflection = (l/250) = 0.520 cm

Hence Safe

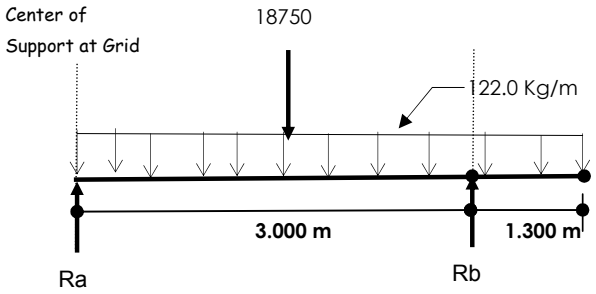
Design of Monorail Beam at Level +19.00m(TOS)

(Based on Material Handling Equipment by M.P.Alexandrov Page 388 to 390)

Load Data(Load at Mid of Largest Span(3.00m)

Capacity of monorail (load lifted)	=	15.00	MT
Add 25%for impact	=	3.75	MT
Total Load		18.75	MT

Assuming the section as **IPE 600** @ 122 kg/m



Ra + Rb = 19274.6 kg

Taking Moments @ A, **Rb** = 27251.0 kg

Ra = -7976.4 kg

The section chos IPE 600

Properties

A	=	**156**	cm^2	KL_{yy}	=	**300.00**	cm
I_{xx}	=	**92080.0**	cm^4	λ_{yy}	=	**64.38**	
I_{yy}	=	**3387.0**	cm^4	f_{cc}	=	**4999.97**	kg/cm^2
z_{xx}	=	**3069.0**	cm^3	Y	=	**6518.65**	kg/cm^2
z_{yy}	=	**308.0**	cm^3	X	=	**7164.11**	kg/cm^2
r_{xx}	=	**24.3**	cm	f_{cb}	=	**8596.93**	kg/cm^2
r_{yy}	=	**4.7**	cm	T	=	**1.9**	cm
fy	=	**2549.2**	kg/cm^2	b	=	**22**	cm
E	=	**2100000.0**	kg/cm^2	D	=	**60**	cm
K_{YY}	=	**1.0**		t_w	=	**1.2**	cm
k_1	=	**1.0**	k_2 = **0.0**	D/T	=	**31.58**	
C_2/C_1	=	**1.0**	r = 2.1	f_{ccx}	=	**4999.97**	kg/cm^2

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1492.76}$$

Check for Longitudinal Bending :

Max. Bending Moment = **14199.8 Kg.m**

σ_{yb} = **462.7 kg/cm²**

$\sigma_{bc\ permissible}$ = **1492.76 kg/cm²**

Hence Safe

By inspection it can be seen that the Load at Larger Span Governs the Design

Check for Deflection:

Actual deflection = $WL^3/(3EI)+WL^4/(8EI)$

= 0.055 cm

Permiscible Deflection = (l/500) = 0.600 cm

Hence Safe

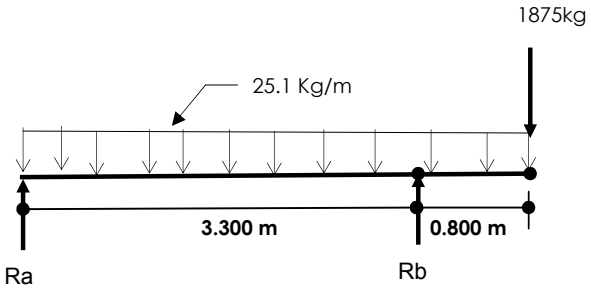
Design of Monorail Beam at Level +4.500m(TOS)

(Based on Material Handling Equipment by M.P.Alexandrov Page 388 to 390)

Load Data(Load at Tip of the Cantilever Span)

Capacity of monorail (load lifted)	=	1500.00 kg
Add 25%for impact	=	375.00 kg
Total Load		1875 kg

Assuming the section as **UB 203X133X25** @ 25.1 kg/m



Ra + Rb = 1977.9 kg

Taking Moments @ A, **Rb** = 2393.5 kg

Ra = -415.6 kg

The section chosen is UB 203X133X25

Properties

A	=	**32**	cm^2	KL_{yy}	=	**160.00**	cm
I_{xx}	=	**2340.0**	cm^4	λ_{yy}	=	**51.57**	
I_{yy}	=	**308.0**	cm^4	f_{cc}	=	**7792.55**	kg/cm^2
z_{xx}	=	**230.0**	cm^3	Y	=	**10159.46**	kg/cm^2
z_{yy}	=	**46.2**	cm^3	X	=	**11110.34**	kg/cm^2
r_{xx}	=	**8.6**	cm	f_{cb}	=	**13332.41**	kg/cm^2
r_{yy}	=	**3.1**	cm	T	=	**0.78**	cm
fy	=	**2549.2**	kg/cm^2	b	=	**13.32**	cm
E	=	**2100000.0**	kg/cm^2	D	=	**20.32**	cm
K_{YY}	=	**1.0**		t_w	=	**0.57**	cm
k_1	=	**1.0**	k_2 = **0.0**	D/T	=	**26.05**	
C_2/C_1	=	**1.0**	r = 0.76	f_{ccx}	=	**7792.55**	kg/cm^2

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1573.12}$$

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 149 REVISION : A
Design of Monorails	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

Check for Longitudinal Bending :

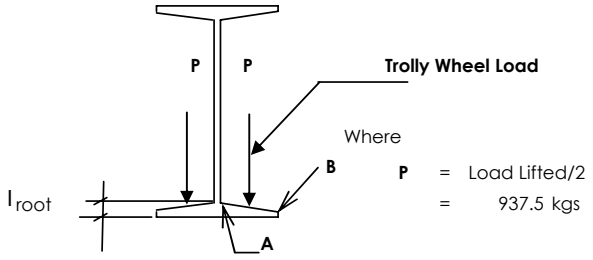
Max. Bending Moment = **1508.0 Kg.m**

σ_{yb} = **655.7 kg/cm²**

$\sigma_{bc\ permissible}$ = **1573.12 kg/cm²**

Hence Safe

Check for Local Bending of Flange:



Local Bending Stress in the Transverse Direction

$\sigma_x = K_1 x P/t^2_{root}$

K_1 = 1.7 — Ref. Fig 10 of Page 389

$t_{root} = T_f + r$ 1.54

σ_x = 1.70 x 937.50 / 1.54^2

σ_x = 672.0 kg/cm²

Local Bending Stress in the Longitudinal Direction

$\sigma_y = K_2 x P/t^2_{root}$

K_2 = 0.5 — Ref. Fig 10 of Page 389

$t_{root} = T_f + r$ 1.54

σ_y = 0.50 x 937.50 / 1.54^2

σ_y = 197.7 kg/cm²

Combined Stress at Tip of Flange at point B

$\sigma_B = \sigma_{yb} + \sigma_{free}$

= 655.7 kg/cm²

<1800 kg/cm²

Hence Safe

Combined Stress at root of Flange at point A

$\sigma_A = \sqrt{\sigma_x^2 + (\sigma_y + \sigma_{yb})^2 - \sigma_x(\sigma_y + \sigma_{yb})}$

σ_A = 778.66 kg/cm²

< 2000.00 kg/cm³

Hence Safe

Check for Shear Stress

Max. Shear Force in the Web = 1875 kg

Shear Stress Developed = 161.9 kg/cm^2

< 1020.0 kg/cm^2

Hence Safe

Check for Deflection:

Actual deflection = $WL^3/(3EI)+WL^4/(8EI)$

= 0.065 cm

Permiscible Deflection = (l/250) = 0.320 cm

Hence Safe

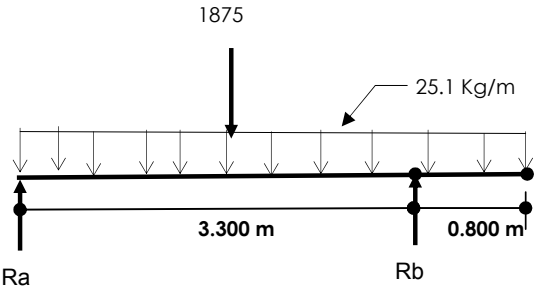
Design of Monorail Beam at Level +4.50m(TOS)

(Based on Material Handling Equipment by M.P.Alexandrov Page 388 to 390)

Load Data(Load at Mid of Span 3.30m)

Capacity of monorail (load lifted)	=	1.50	MT
Add 25%for impact	=	0.38	MT
Total Load		1.875	MT

Assuming the section as **UB 203X133X25** @ 25.1 kg/m



Ra + Rb = 1977.9 kg

Taking Moments @ A, **Rb** = 2393.5 kg

Ra = -415.6 kg

The section chos UB 203X133X25

Properties

A	=	**32**	cm^2	KL_{yy}	=	**330.00**	cm
I_{xx}	=	**2340.0**	cm^4	λ_{yy}	=	**106.37**	
I_{yy}	=	**308.0**	cm^4	f_{cc}	=	**1831.86**	kg/cm^2
z_{xx}	=	**230.0**	cm^3	Y	=	**2388.27**	kg/cm^2
z_{yy}	=	**46.2**	cm^3	X	=	**3233.93**	kg/cm^2
r_{xx}	=	**8.6**	cm	f_{cb}	=	**3880.72**	kg/cm^2
r_{yy}	=	**3.1**	cm	T	=	**0.78**	cm
fy	=	**2549.2**	kg/cm^2	b	=	**13.32**	cm
E	=	**2100000.0**	kg/cm^2	D	=	**20.32**	cm
K_{YY}	=	**1.0**		t_w	=	**0.57**	cm
k_1	=	**1.0**	k_2 = **0.0**	D/T	=	**26.05**	
C_2/C_1	=	**1.0**	r = 2.1	f_{ccx}	=	**1831.86**	kg/cm^2

$$\sigma_{bcx} = 0.66 \frac{fcb\ fy}{\left(fcb^{1.4} + fy^{1.4}\right)^{1/1.4}} = \mathbf{1227.29}$$

Check for Longitudinal Bending :

Max. Bending Moment = **1581.0 Kg.m**

σ_{yb} = **687.4 kg/cm²**

$\sigma_{bc\ permissible}$ = **1227.29 kg/cm²**

Hence Safe

By inspection it can be seen that the Load at Cantilever Tip Governs the Design

Check for Deflection:

Actual deflection = $WL^3/(3EI)+WL^4/(8EI)$

= 0.286 cm

Permiscible Deflection = (l/500) = 0.660 cm

Hence Safe

COAL HANDLING PLANT FOR SIPAT STAGE –II (2 X 500 MW) FOR NTPC

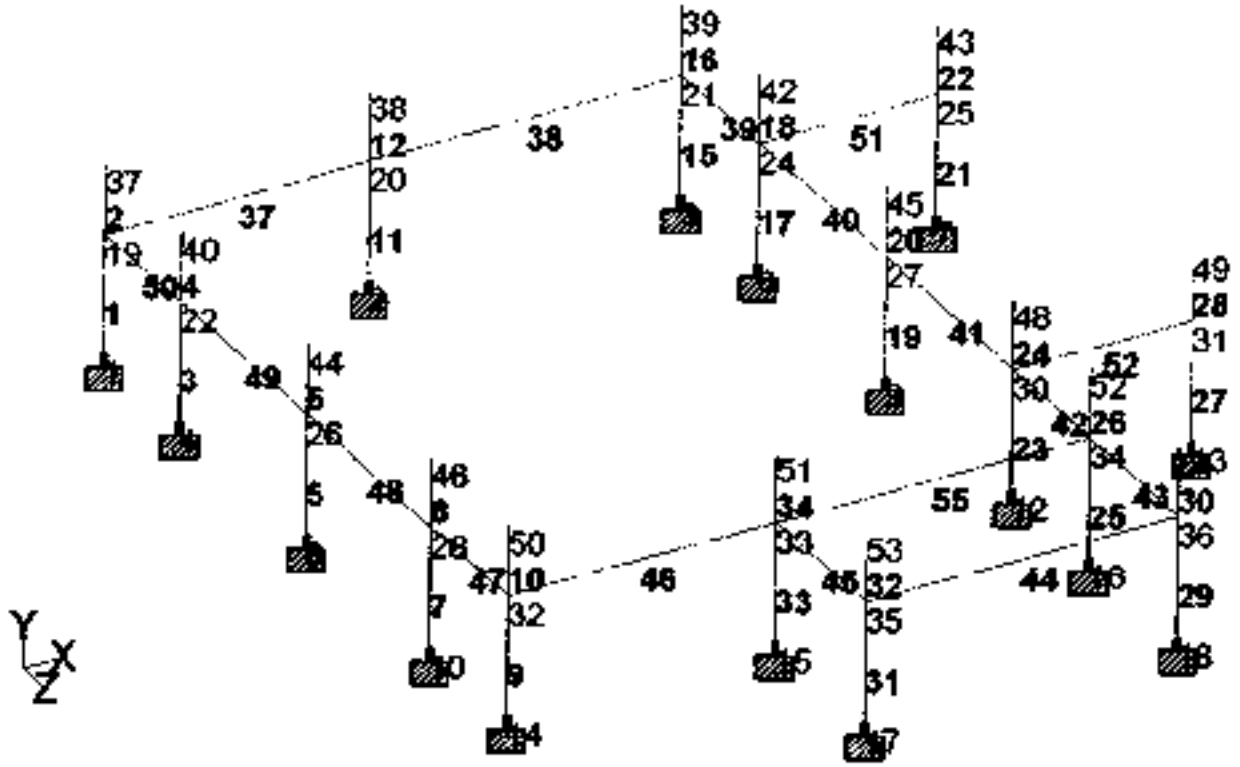
DESIGN CALCULATION FOR FOUNDATION OF TP17

CUSTOMER	NATIONAL THERMAL POWER CORPORATION LTD		
CONSULTANTS	NATIONAL THERMAL POWER CORPORATION LTD		
MAIN CONTRACROR	M/S THYSSENKRUPP INDUSTRIES INDIA PVT. LTD.		
Document No.	M070 CVL TP17 DC 13	REV	2
		DATE	14.09.05

NTPC Document No.

Software licensed to SIMPLEX CONCRETE PILES (INDIA) Limited	Job No	Sheet No 1	Rev
Job Title		Part	
		Ref	
Client		By	Date 06-MAY-2005 Chd
		File final tp1 / final r-b2.std	Date/Time 13-Sep-2005 14:09

COLUMN, BEAM & NODE MARKING



PROJECT :-
TITLE :

REFERENCE .

COLUMN DETAILS

COL. MKD	GRID MKD	SIZE (MM x MM)	$(A_s)_{req}$ (cm^2)	R/F PROVIDED	LINKS & SPACING	
1.	C1	1000 x 1000	121.0	16 - 32ϕ	8ϕ @ 250 c/c	
3.	C2	800 x 1000	33.32	4-25ϕ + 8-16ϕ	8ϕ @ 250 c/c	
5	S2	500 x 600	5.05	8 - 16ϕ	8ϕ @ 250 c/c	
7.	C3	800 x 1000	25.0	4-20ϕ + 8-16ϕ	8ϕ @ 250 c/c	
9	C4	1000 x 1000	119.8	16 - 32ϕ	8ϕ @ 300 c/c	
11.	E1	700 x 1000	68.23	16 - 25ϕ	8ϕ @ 300 c/c	⇐ REV. 2
13	A1	1000 x 1000	58.8	12 - 32ϕ	8ϕ @ 250 c/c	
19.	S1	900 x 600	13.15	12 - 16ϕ	8ϕ @ 250 c/c	
21.	A2	900 x 600	11.13	8 - 16ϕ	8ϕ @ 250 c/c	
23.	A3	800 x 1000	29.07	8-20ϕ + 4-16ϕ	8ϕ @ 250 c/c	⇐ REV. 2
25.	A4	1000 x 1000	80.0	12 - 32ϕ	8ϕ @ 300 c/c	
27.	A3	900 x 600	15.04	12 - 16ϕ	8ϕ @ 250 c/c	
29	A5	700 x 100	30.22	4-25ϕ + 8-16ϕ	8ϕ @ 250 c/c	
31.	B5	700 x 1000	10.35	4-20ϕ + 8-16ϕ	8ϕ @ 250 c/c	
33.	B4	1000 x 1000	25.3	12 - 20ϕ	8ϕ @ 300 c/c	
B2/B3	B2/B3	700 x 1000	9.24	12 - 16ϕ	8ϕ @ 250 c/c	
17.	A2	800 x 1000	52.1	8-25ϕ + 8-20ϕ	8ϕ @ 250 c/c	

SIMPLEX CONCRETE PILES (INDIA) LIMITED

DOC. NO. :
JOB NO. :

SHEET 2 OF

PROJECT :-

TITLE :

REFERENCE :

Design of foundation Mark F_5 for joint 1 & 16

Critical Load Case for bottom reinforcement - Load-23.

for joint-1. (Ref excel sheet).

Design of Slab.

Maximum bending moment at beam face

$$= \frac{28 \times 1^2}{2} + \frac{1}{2} \times 9 \times 1 \times \frac{2}{3} \times 1 - 1.8 \times 2.95 \times \frac{1^2}{2} - 2.5 \times .550 \times \frac{1^2}{2}$$

$$= 13.65 \text{ TM/M}$$

$$d = 550 - 50 - 10 = 490 \text{ MM}$$

$$\frac{Mu}{bd^2} = \frac{1.5 \times 1365 \times 10^3}{10^3 \times 490^2}$$

$$= .85 \text{ N/MM}^2$$

$P_t = .296$

Ast required = 1353 MM²

Spacing for 20 ϕ = 232.08 MM c/c.

Providing 20 ϕ @ 200 MM c/c (MAIN REINFORCEMENT)

Providing 16 ϕ @ 250 MM c/c (DISTRIBUTION REINFORCEMENT) } Bottom

Providing 12 ϕ @ 200 MM c/c along shorter direction & @ 250 along longer direction.

Check for one way shear

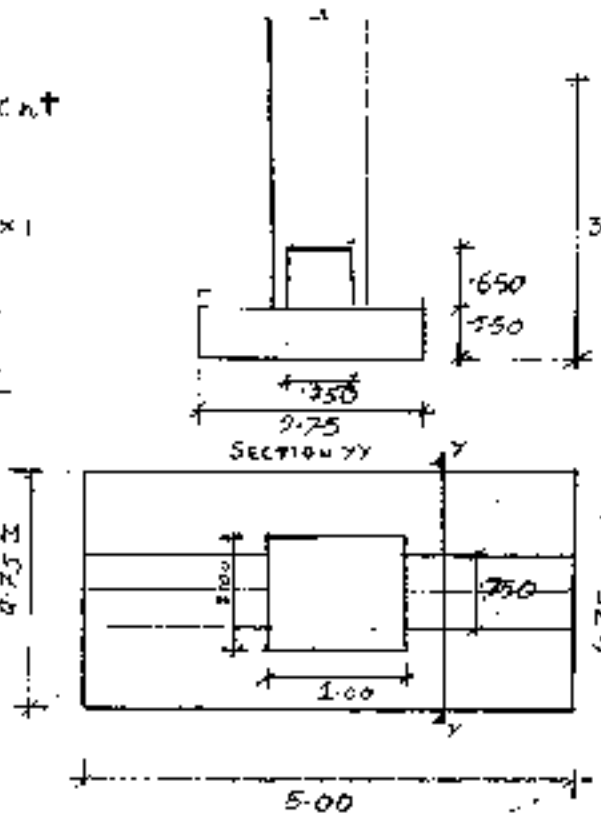
Critical section at distance 490 MM from beam face.

$$V = \left(\frac{8743}{2}\right) \times .51 - 1.8 \times 2.95 \times .51 - 2.5 \times .550 \times .51$$

$$= 14.45 \text{ T/M}$$

$$\tau_v = \frac{1.5 \times 14.45 \times 10^4}{10^3 \times 490}$$

$$= .44 \text{ N/MM}^2$$



Ast provided = 1570 MM²

$\frac{100 Ast}{bd} = 1.32$

$\tau_c = .39$ N/MM².

Providing Shear links 10 ϕ @ 400 MM C/C in one direction & other spacing for

Shear $V_{us} = 1.5 \times 14.45 \times 10^4 - .39 \times 1000 \times 490$

$= 25650$ N

$S_v = \frac{.87 \times 415 \times 490 \times 196.25}{25650}$

$= 1353.58$

Providing 10 ϕ @ 250 MM C/C in other direction.

Design of beam.

Maximum bending moment at col face

$M = \left(\frac{37+12}{2}\right) \times 2.75 \times \frac{2^2}{2} - \frac{1.8 \times 2.32 \times 2^2}{2} - .550 \times 2.5 \times \frac{2^2}{2}$

$= 123.72$ TM

$d = 1200 - 50 - 20 - 16$

$= 1114$ MM

$\frac{M_u}{bd^2} = \frac{1.5 \times 123.72 \times 10^7}{750 \times 1114^2}$

$= 2.00$ N/MM²

$P_t = .618$

Ast required $= 5163.4$ MM²

7 - 32 ϕ bottom reinforcement
4 - 20 ϕ Top reinforcement.

check for one way shear.

Critical Section at distance 1114 MM from col. face.

$V = 47.37 \times .886 - 1.8 \times 2.50 \times .886$

$- .550 \times 2.5 \times .886$

$= 54.30$ T

$\tau_v = \frac{1.5 \times 54.80 \times 10^4}{750 \times 1114.}$

$= .98$ N/MM²

$\frac{100 A_{st}}{bd} = .67$

τ_c for Provided $A_{st} = .54$ N/MM².

$V_{us} = 1.5 \times 54.8 \times 10^4 - .54 \times 1114 \times 750$

$= 370.830$ N

Providing 4-ℓ 10 ϕ @

$S_v \leq \frac{.87 \times 415 \times 1114 \times 314.00}{370\,830}$

≤ 340 MM c/c

Providing 4ℓ 10ϕ @ 300 MM c/c

PROJECT :

TITLE :

REFERENCE :

Design of foundation F_1 for J-9, J-6

foundation size (2.25 x 4.25 x .5)m

taking bearing pressure = 55 T/M²

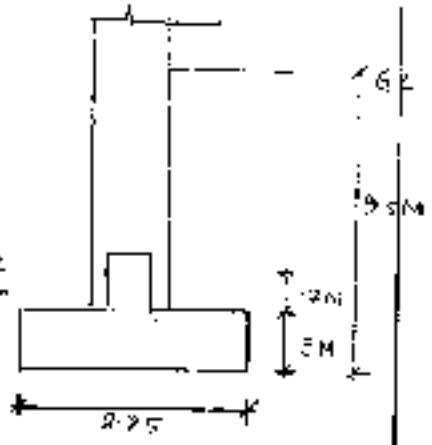
Maximum bending moment

at beam face.

$= (55 - 3 \times 1.8 - .5 \times 2.5) \times \frac{1.025^2}{2}$

$= 48.35 \times \frac{1.025^2}{2}$

$= 25.4$ TM/M

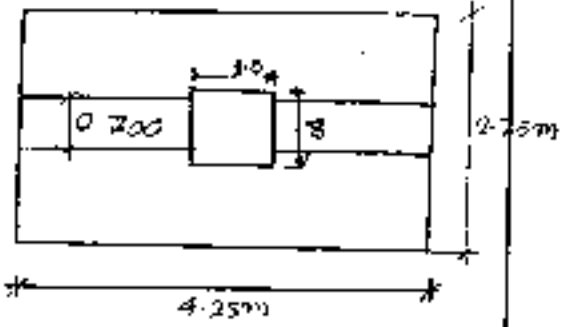


$d = 500 - 50 - 10$

$= 440$ MM

$\frac{M_{u}}{bd^2} = \frac{1.5 \times 25.4 \times 10^7}{10^3 \times 440^2}$

$= 1.96$



$P_t = .604$ (Sp-16 Table-3)

$A_{st\,req} = 2657.6$ MM²

Spacing for 25 Φ = 184.62 MM c/c

$\simeq$ 180 MM c/c.

Providing 25 Φ @ 180 MM c/c (Main reinforcement bottom)

16 Φ @ 360 MM c/c (Distribution reinforcement bottom)

Check for One Way Shear.

Critical section at distance d = 440 MM from Beam face

$V = 48.35 \times .585$ T/M

$= 28.3$ T/M.

$$V_c = \frac{1.5 \times 28.3 \times 10^4}{10^3 \times 940}$$

$$= .96 \ N/MM^2$$

$A_{st_p} = 0.725\%$

$$\frac{100 A_{st}}{bd} = .62$$

$$\tau_c = .52 \ N/MM^2.$$

$$V_{us} = 1.5 \times 28.3 \times 10^4 - .52 \times 1000 \times 440$$

$$= 195700 \ N.$$

Providing shear like 12 ϕ @ 360 MM c/c in one direction in other direction.

$$S_v \leq \frac{.87 \times 415 \times 440 \times 2 \times 400}{195700}$$

$$\leq 254.80 \ MM \ c/c.$$

$$\simeq 150 \ MM \ c/c.$$

Providing 12 ϕ @ 160 MM c/c in other direction.

Design of beam

Maximum bending moment at col face.

$$= 98.35 \times 2.75 \times \frac{1.625^2}{2}$$

$$= 175.55 \ TM.$$

$$d = 1200 - 50 - 25 - 16.$$

$$= 1109 \ MM$$

$$\frac{M_u}{bd^2} = \frac{1.5 \times 175.55 \times 10^7}{700 \times 1109^2}$$

$= 3.05$ N/MM^2.

$P_t = 1.018$ (SP - 16 Table - 3)

$A_{sf} = 7902.73$ MM^2

6 - 36 ⌀ & 4 - 25 ⌀

A_{sf} provided $= 8070.6$ MM^2

$\frac{100 A_{sf}}{bd} = 1.09$

Check for One Way Shear.

Critical section at distance d from Col. face. which is 1109 MM.

$V = 48.35 \times 2.75 \times .516$

$= 68.60$ T

$\tau_v = \frac{1.5 \times 68.60 \times 10^4}{700 \times 1109}$

$= 1.32$.

$\tau_c = .65$ N/MM^2

$V_{us} = 1.5 \times 68.60 \times 10^4 - .65 \times 700 \times 1109$

$= 524405$ N

Providing 4-L 10 ⌀ @

$S_v \leq \frac{.87 \times 415 \times 1109 \times 314}{524405}$

≤ 239.75.

Providing 220 MM c/c.

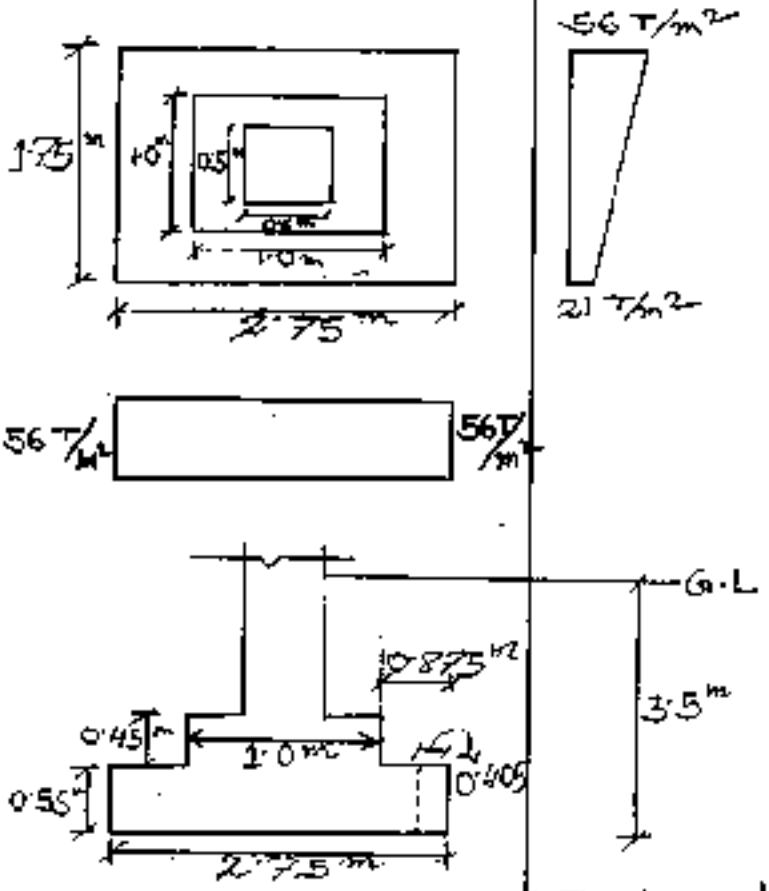
Design of footing F2 for J8, J9, J13

size of footing = $(2.75 \times 1.75 \times 0.55)^m$

Short column size = $(0.5 \times 0.6)^m$

pedestal size = $(1.0 \times 1.0)^m$

$d = (550 - 50 - 20 - 10) = 470\ mm$



UDL for soil/m
$= 2.95 \times 1.8$
$= 5.31\ T/m^2$

UDL for slab/m
$= 0.55 \times 2.5$
$= 1.375\ T/m^2$

Longer Side

Moment at the face of pedestal
$= (56 - 5.31 - 1.375) \times 0.875^2/2$
$= 18.88\ T-m$

$$\frac{M_u}{bd^2} = \frac{1.5 \times 18.88 \times 10^7}{1000 \times 470^2} = 1.282\ N/mm^2$$

from SP-16, $P_t = 0.38$

$A_{st(reqd.)} = \frac{0.38 \times 1000 \times 470}{100} = 1786 \text{ mm}^2$

for 20 Ø bar, spacing reqd.,

$$\frac{1000 \times 314}{1786}$$

$= 175.81$ mm

Provide 20 Ø bar @ 175 c/c in longer direction

$A_{st(prov.)} = 1794.28 \text{ mm}^2$

Check for shear

Shear at a distance 'd' from the pedestal face,

$V = (56 - 5.31 - 1.375) \times 0.405 = 19.973$ T

$\tau_v = \frac{1.5 \times 19.973 \times 10^4}{1000 \times 470} = 0.637 \text{ N/mm}^2$

$\frac{100 A_{st}}{bd} = \frac{100 \times 1794.28}{1000 \times 470} = 0.382$

from IS 456 : 2000; $\tau_c = 0.43 \text{ N/mm}^2$

$V_{us} = (1.5 \times 19.973 \times 10^4) - (0.43 \times 1000 \times 470)$

$= 97495$ N

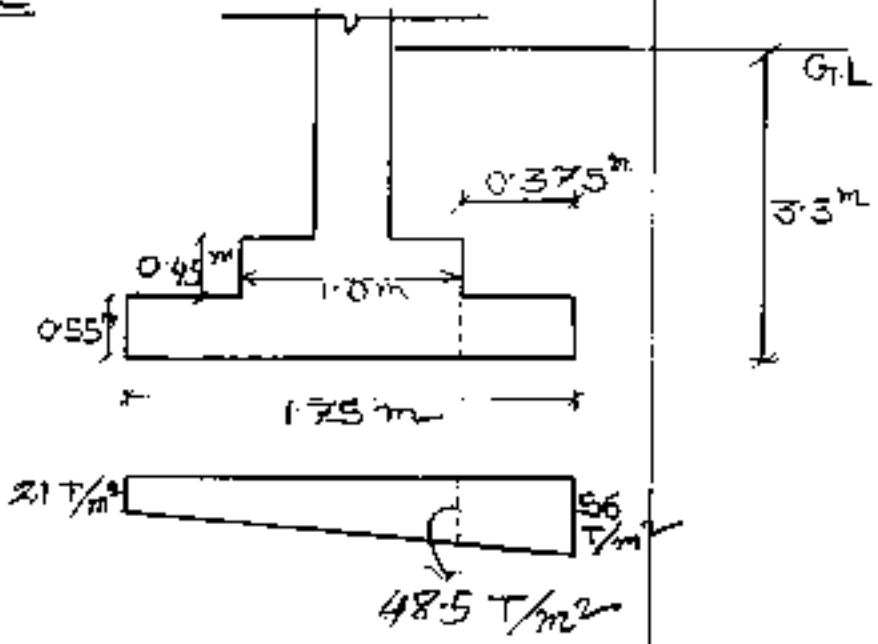
Providing 10 Ø stirrup @ 350 c/c in one direction, spacing in these direction

$A_{sv(prov.)} = \frac{78.5 \times 10^3}{350} = 224.3 \text{ mm}^2$

$S_v \leq \frac{0.87 \times 415 \times 224.3 \times 470}{97495}$

$i.e \leq 390.4$ mm

Shorter Side



Moment at the face of the pedestal

$$= 48 \times \frac{0.375^2}{2} + \frac{1}{2} \times 7.5 \times \frac{2 \times 0.375^2}{3} - 5.31 \times \frac{0.375^2}{2} - 1.375 \times \frac{0.375^2}{2}$$

$$= 3.26 \text{ T-m}$$

$$\frac{M_u}{bd^2} = \frac{1.5 \times 3.26 \times 10^7}{1000 \times 470^2} = 0.221 \text{ N/mm}^2$$

from SP-16, $p_t = 0.084$

$$A_{st}(\text{reqd.}) = \frac{.084 \times 1000 \times 470}{100} = 394.8 \text{ mm}^2$$

Using 12 ϕ bar, Spacing reqd.

$$\frac{1000 \times 113.1}{394.8} = 286.5 \text{ mm}$$

Provide 12 ϕ @ 250 c/c at shorter side.

PROJECT :
TITLE :

REFERENCE :

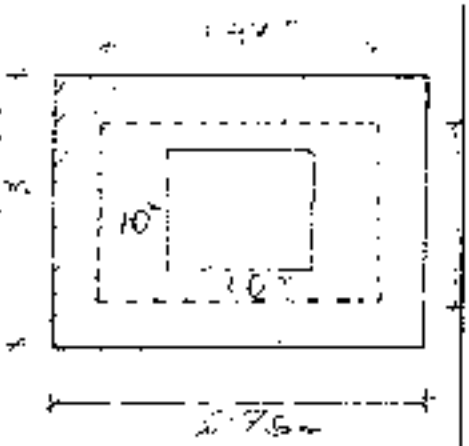
Check for one way shear

Since, the critical section is at d/2 of the slab.

Hence safe

Two way shear check

Considering uniform bearing pressure of T/m^2



$= [(2.75 \times 1.75) - (1.47 \times 1.47)] \times (54.63 - 1.375)$ per m

$= 130.76\ T$

$$\tau_v = \frac{1.2 \times 130.76 \times 10^4}{5180 \times 470}$$

$= 0.563\ N/mm^2$

$\tau_a = K_s \tau_c = 1 \times 0.25\sqrt{25} = 1.25\ N/mm^2$

$> \tau_v$

Hence safe.

Top Reinforcement

Area required for Top reinforcement,

$= \frac{0.6 \times 1000 \times 500}{300}$

$= 1000\ mm^2$

Using 12 Ø bars, spacing provided $= \frac{1000 \times 113}{1000}$

$= 113\ mm$

Provide 12 Ø @ 175 c/c in long side and 12 Ø @ 250 c/c in shorter side.

PROJECT :-
TITLE :

REFERENCE :

Design of footing F3 for J4 ; J18 ; J2 :

Size of footing : $(3.0 \times 2.75 \times 0.5)^m$

Pedestal size : $(1.25 \times 1.0 \times .45)^m$

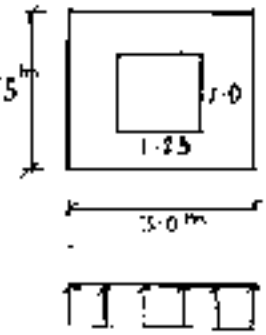
$d = 550 - 50 - 20 - 8 = 472\ mm$

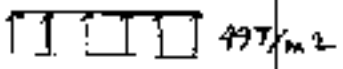
Moment at the face of pedestal

$= (49 - 5.31 - 1.375) \times \frac{0.875^2}{2}\ T\text{-}m$

$= 42.315 \times 0.3828\ T\text{-}m$

$= 16.2\ T\text{-}m$

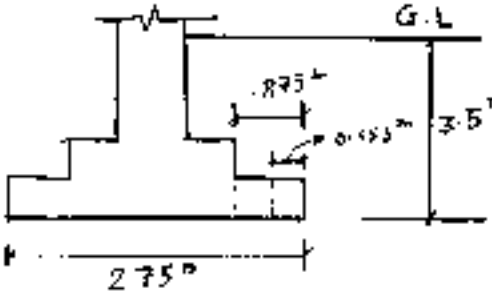




$\frac{Mu}{bd^2} = \frac{1.5 \times 16.21 \times 10^7}{1000 \times 472^2} = 1.091\ N/mm^2$

from Sp-16 ,

$P_t = 0.319$



UDL for soil/m
$= 2.95 \times 1.8$
$= 5.31\ T/m^2$

UDL for slab/m
$= 0.55 \times 2.5$
$= 1.375\ T/m^2$

$(A_{st})_{req} = \frac{0.319 \times 1000 \times 472}{100}$

$= 1505.68\ mm^2$

for 20 ϕ bar, Spacing req. $= \frac{1000 \times 314}{1505.68}\ mm$

$= 208.5\ mm$

Provide 20 ϕ bar @ 200 mm c/c in both direction.

Check for Shear :

Shear at a distance d from the pedestal force

$V = (49 \times 0.453) - (5.31 \times 0.453) - (1.375 \times 0.453)$

$= 19.17\ T$

$\tau_v = \frac{1.5 \times 19.17 \times 10^4}{1000 \times 472} = 0.62\ N/mm^2$

$\frac{100 A_{st}}{bd} = \frac{100 \times 1570}{1000 \times 472} = 0.332$

$(A_{st})_{prov} = 1570\ mm^2$

from IS 456-2000 ; $\tau_c = 0.403\ N/mm^2$

$V_{us} = (1.5 \times 19.17 \times 10^4) - (0.403 \times 1000 \times 472)$

$= 97334\ N$

Provide 10ϕ stirrup @ 400 mm c/c in one direction, Spacing in other direction -

$S_v \leq \frac{0.87 \times 415 \times 196.25 \times 472}{97334} \leq 343.6\ mm$

$A_{sv} = \frac{78.5 \times 1000}{400} = 196.25\ mm$

provide shear reinforcement

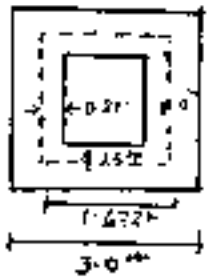
10ϕ @ 200 mm c/c in both dirn.

Two way shear check :

considering uniform bearing press = 49 T/m²

$V_1 = (3.0 \times 2.75 - 1.672 \times 1.922) \times (49 - 5.31 - 1.375)\ T$

$= 248.49\ T$



$$\tau_v = \frac{1.5 \times 248.4 \times 10^4}{6188 \times 472} = 1.2\ N/mm^2$$

$$K_s \tau_c = 1 \times 0.25\sqrt{25} = 1.25\ N/mm^2 > \tau_v$$

Hence Safe

Top Reinforcement :

$$\text{Area of Top steel} = \frac{0.06 \times 1000 \times 550}{100}$$

$$= 330\ mm^2$$

Using 12 ϕ bar, Spacing req $= \frac{1000 \times 113}{330}$

$$= 342.42\ mm$$

Provide 12 ϕ bar @ 200 c/c in both direction.

PROJECT :

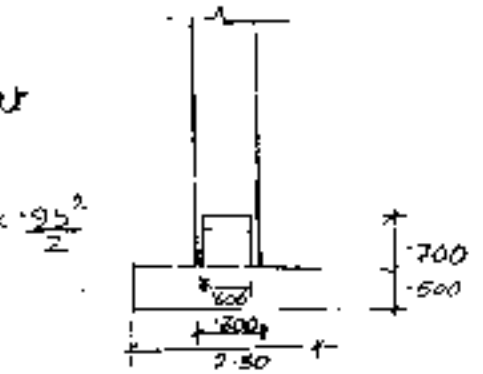
TITLE :

REFERENCE :

Design of foundation mark Fq for joint 10, 12, 15

Design of Slab

Taking uniform bearing Pressure = 54 T/M²



Maximum bending Moment at Beam face

$= (54 - 1.8 \times 5 - 2.5 \times .5) \times \frac{.95^2}{2}$

$= 47.35 \times \frac{.95^2}{2}$

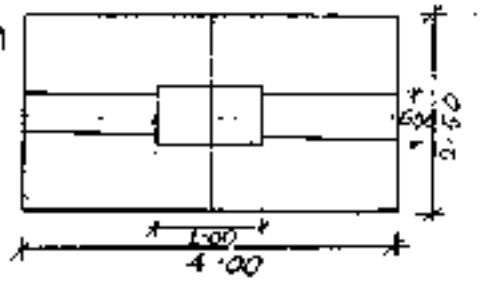
$= 21.37$ T/M.

$d = 500 - 50 - 10 = 440$ MM

$\frac{M_u}{bd^2} = \frac{1.5 \times 21.37 \times 10^7}{10^3 \times 440^2}$

$= 1.65$ N/MM²

$P_t = .499$



$A_{st\,req} = 2195.6$ MM²

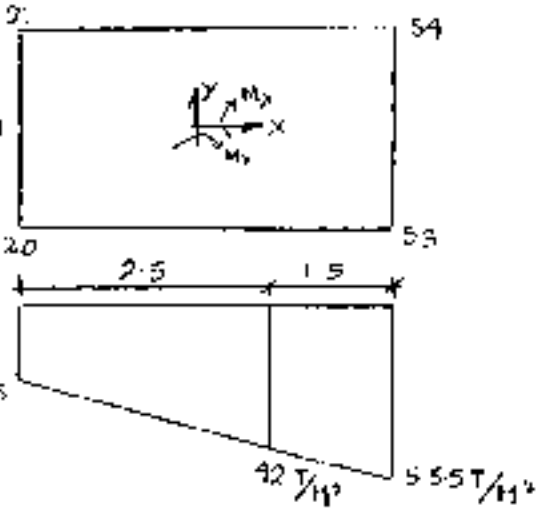
Spacing for 25ϕ = 223.45

$\simeq$ 220 MM c/c (Main) B

16 ϕ @ 220 MM c/c in longer direction (Distribution) B

12 ϕ @ 220 MM c/c in both direction (Top)

Bearing Pressure distribution for critical Load case 20 for Joint - 15 :



check for one way shear.

critical section at distance 440 MM from beam face

$V = 47.35 \times .51$

$= 24.15$ T

$\tau_v = \frac{1.5 \times 24.15 \times 10^4}{10^3 \times 440} = .82$ N/MM²

Ast provided = 2230.12 MM²

$\frac{100 A_{st}}{bd}$ = .50.

τ_c for Provided Ast = .49

V_{us} = 1.5 x 24.15 x 10⁹ − .49 x 1000 x 440

= 146650 N

Providing 12ϕ @ 440 MM c/c in one direction

in other direction

$S_\theta \leq \frac{.87 \times 415 \times 440 \times 256.9}{146650}$

$\leq$ 278.29 MM.

Providing 12ϕ @ 220 MM c/c in other direction.

Design of Beam.

Max bending moment at col face.

$M = \left(\frac{42+535}{2}\right) \times 3.50 \times \frac{1.5^2}{2} - 1.8 \times 3.5 \times 6 \times \frac{1.5^2}{2}$

$- 2.5 \times .5 \times .6 \times \frac{1.5^2}{2}$

= 130.65 KM

d = 1200 − 50 − 25 − 12.5

= 1112.5 MM.

$\frac{M_u}{bd^2} = \frac{1.5 \times 130.65 \times 10^7}{10^3 \times 1112.5^2}$

= 1.58 N

P_t = .488

A_{st} = 3257.4 MM²

Provide 7 – 25 ϕ Bottom.
3 – 20 ϕ Top.

Check for One way shear.

A_{st} provided = 3134.37 MM²

$\frac{100 A_{st}}{bd} = .51$

τ_c for provided $A_{st} = .49$

$V = \left(\frac{53.5 + 50}{2}\right) \times 2.50 \times .387 - 1.8 \times 2.3 \times .6 \times .387 - 2.5 \times .5 \times .4 \times .387.$

$= 49.20$ T

$\tau_v = \frac{1.5 \times 49.2 \times 10^4}{600 \times 1125}$

$= 1.10$

$V_{us} = 1.5 \times 49.20 \times 10^4 - .49 \times 600 \times 1125$

$= 410925$ N

$\frac{A_{sv}}{s} \leq \frac{.87 \times 415 \times 1125 \times 314.2}{410925}$

≤ 306.93

Providing 10 ϕ @ 300 MM c/c.

PROJECT -

TITLE :

REFERENCE

Design of foundation for F_6.

Taking uniform bearing capacity 22 T/M²

Maximum Bending at beam.

$$\text{free} = (32 - 2.9\times1.8 - .6\times2.5)\times\frac{1.25^2}{2}$$

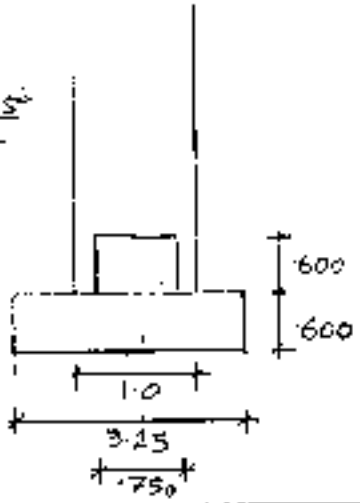
$$= 15.3\times\frac{1.25^2}{2}$$

$$= 12 \text{ TM/M}$$

$$d = 600 - 50 - 10 = 540 \text{ MM}$$

$$\frac{M_u}{bd^2} = \frac{1.5\times12\times10^7}{103\times540^2}$$

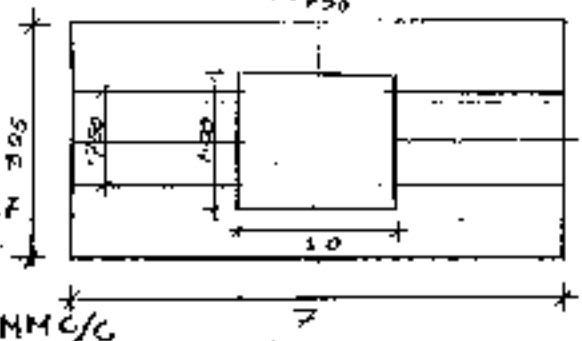
$$= .62$$



$P_t = .177$

$A_{st} = 1062 \text{ MM}^2$

Spacing for 20ϕ = 295.67 MM



Providing 20ϕ @ 250 MM c/c (Main Reinforcement)

Providing 16ϕ @ 250 MM c/c (Distribution Reinforcement)

Providing 16ϕ @ 250 MM c/c Both ways (Top reinforcement)

Check for one way shear.

Critical section at distance 540 MM from beam face.

$$V = 15.3\times.71$$

$$= 10.86 \text{ T/M}$$

$$\tau_v = \frac{1.5\times10.86\times10^4}{10^3\times540}$$

$$= .30 \text{ N/MM}^2$$

Ast provided = 1256 MM²

$$\frac{100A_{st}}{bd} = .23$$

τ_c for Ast. Provided

$= .34 \text{ N/MM}^2$

$\tau_v < \tau_c$ Hence Safe

Design of beam.

Maximum bending moment at col. face

$M = 15.3 \times 3.25 \times \frac{1.125^2}{2}$

$= 31.5 \text{ T M}$

$d = 1200 - 50 - 20 - 12.5$
$= 1117.5 \text{ MM}$

$\frac{Mu}{bd^2} = \frac{1.5 \times 31.5 \times 10^7}{750 \times 1117.5^2}$

$= .50 \text{ N/MM}^2$

$p_t = .142$

$Ast = 1190.13 \text{ MM}^2$

4 - 20ϕ bottom reinforcement
3 - 20ϕ at top reinforcement

Check for one way shear.

Critical section at distance d from col. face

$V = 15.3 \times 3.25 \times .75$

$= 37.30 \text{ T}$

$\tau_v = \frac{1.5 \times 37.30 \times 10^4}{750 \times 1117.5}$

$= .67 \text{ N/MM}^2$

Ast Provided $= 1256 \text{ MM}^2$

$\frac{100 Ast}{bd} = .15$

$\tau_c = .29 \text{ N/MM}^2$

$V_{us} = 1.5 \times 37.30 \times 10^4 - .39 \times 250 \times 1117.5$

$= 316443.75$ N

$V_s \leq \frac{.87 \times 415 \times 1117.5 \times 314.00}{316443.75}$

≤ 400.35 MM.

Providing 4-10 ϕ @ 350 MM c/c.

PROJECT :-
TITLE :

REFERENCE :

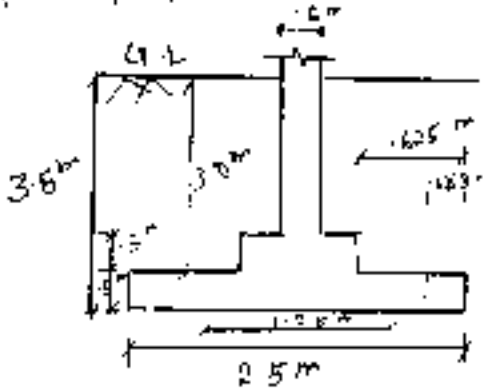
DESIGN OF FOOTING. F2C for J1 (2) REV-2

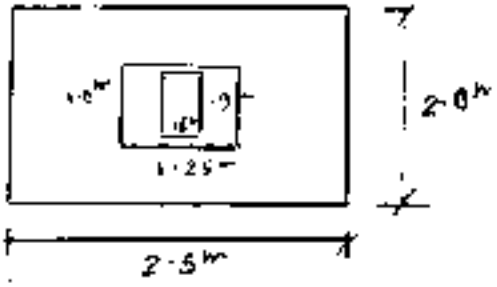
Size of footing = (2.5m x 2m x .5m)

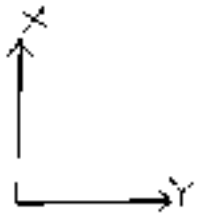
Col. Size = (.9m x .6m)

Pedestal size = (1.25m x 1.0m x .50m)

Depth of fdn = 3.5m







Design along longer side

moment at the pedestal face,

$M = (47.26 - 1.8 \times 3 - .5 \times 2.5) \times .625^2/2$ t m

$= 40.61 \times .625^2/2$ t m

$= 7.93$ t m

(Assuming uniform bearing pr.)

$\frac{Mu}{bd^2} = \frac{1.5 \times 7.43 \times 10^7}{1000 \times 442^2}$ N/mm²

$= 0.61$ N/mm²

$d = 500 - 50 - 16/2$
$= 442$ mm

from SP-16 ; $f_{ck} = 25$ N/mm²

$P_t = 0.178$; Ast reqd $= \frac{0.178 \times 1000 \times 442}{100}$ mm²

$= 786.8$ mm²

Spacing reqd for 16ϕ bar $= \frac{1000 \times 201}{786.8}$ mm

$= 255.5$ mm

Hence provide 16ϕ @ 230 c/c.

- check for one way shear -

S.F at the 'd' distance from pedestal face $= 40.61 \times 0.182$ T

$= 7.43$ T

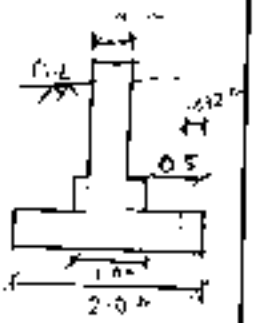
$\tau_v = \frac{1.5 \times 7.43 \times 10^3}{1000 \times 442}$ N/mm² $= 0.252$ N/mm²

$\frac{100 A_{st}}{bd} = \frac{100 \times 873.9}{1000 \times 442} = 0.18$

$A_{st} = 873.9$

from IS-456 ; $\tau_c = 0.311$ N/mm²

$> \tau_v$, so ok



Design along shorter dirn.

Let us, considering uniform bearing pr.

moment at the pedestal face

$= 40.61 \times .5^2/2$ T-M

$= 5.1$ T-M

$\frac{Mu}{bd^2} = \frac{1.5 \times 5.1 \times 10^7}{1000 \times 428^2}$ N/mm² $= 0.42$ N/mm²

d = (500 − 50 − 16 − 8) mm

= 428 mm

From SP-16 ; fck = 25 N/mm²

$P_t = 0.12$, Ast req $= \frac{0.12 \times 1000 \times 428}{100}$ mm²

$= 513.6$ mm²

Spacing for 12 ϕ bar $= \frac{1000 \times 113}{513.6}$ mm

$= 220.01$ mm

Let us provide 12 ϕ @ 200 c/c.

check for one way shear.

S.F at the 'd' from the pedestal face $= 40.61 \times 0.072$ T

$= 2.92$ T

$\tau_v = \frac{1.5 \times 2.92 \times 10^4}{1000 \times 428}$ N/mm²

$= 0.102$ N/mm²

$\frac{100 A_{st}}{bd} = \frac{100 \times 565}{1000 \times 428} = 0.132$

$A_{st} = 565 \text{ mm}^2$

From Sp-16, $\tau_c = 0.29 \text{ N/mm}^2$.

$> \tau_v$

Hence safe.

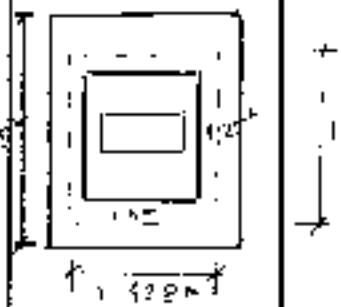


• Two way shear check

Critical punching shear at the 'd/2' distance from pedestal face

$V = 40.61 \times (2 \times 2.5 - 1.428 \times 1.428)$

$= 105.74 \text{ T}$



$\tau_v = \frac{1.5 \times 105.74 \times 10^4}{3106 \times 428} \text{ N/mm}^2$

$= 1.193 \text{ N/mm}^2$

$K_s \tau_c = (0.5 + \beta_c) \tau_c \simeq \tau_c = 0.25\sqrt{25} \text{ N/mm}^2$; $\beta = \frac{b}{a} = 1.7$

$= 1.25 \text{ N/mm}^2 > \tau_v$; Hence safe

• Top reinforcement.

min^m area of top reif. $= \frac{0.06 \times 1000 \times 492}{150} \text{ mm}^2$

$= 265.2 \text{ mm}^2$

Spacing for 10 Φ bar $= \frac{78.5 \times 1000}{265.2} \text{ mm}$

$= 296.0 \text{ mm}$

Provide 10 Φ @ 250 c/c in both side

COLUMN MKD		LOAD COMBINATION	V	HX	HY
B2/B3	1	DL+LL	174	0	0
	2	DD+LL+EQP LOAD	242	0	0
	3	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)	242	1	0
	4	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(WIND ALONG +X)	242	2	0
	5	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(WIND ALONG -X)	242	1	0
	6	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(WIND ALONG +Y)	242	1	0
	7	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(WIND ALONG -Y)	242	1	0
	8	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(SEISMIC ALONG +X)	242	2	0
	9	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(SEISMIC ALONG -X)	242	2	0
	10	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(SEISMIC ALONG +Y)	242	1	0
	11	DD+LL+EQP LOAD +(EQP LOAD +X)+(EQP LOAD +Y)+(SEISMIC ALONG -Y)	242	1	0

For B_2/B_3 Design same as F_3.

$V = 242$ T $\quad M_y = 7.6$ TM

Self wt of footing, Col. & Soil Mass.

$= 57.12$

$P = 299.12$ T $\quad My = 7.6$ TM.

Bearing Pressure.

$$= \frac{P}{A} \pm \frac{6 \times My}{LB^2}$$

$$= \frac{299.12}{2.75 \times 3} \pm \frac{6 \times 7.60}{2.75 \times 3^2}$$

$$= 36.26 \pm 1.85$$

$$= 38.11,\ 34.41\ T/M^2$$

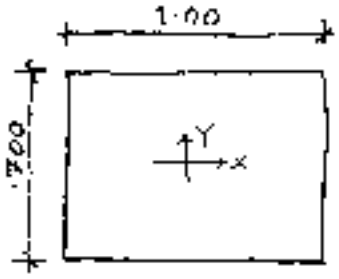
Design of Pedestal for B_2 & B_3

$V = 242\ T \quad MY = 7.6\ TM$

Self wt of Pedestal

$= 1 \times 700 \times 325 \times 25$

$= 5.68\ T$



$P = 247.68 \quad MY = 7.6$

$d' = 50 + 12.5$

$= 62.5\ MM$

$\frac{d'}{D} = \frac{62.5}{1000}$

$= .06$

Use $\frac{d'}{D} = 0.10$

$\frac{P_u}{f_{ck} b D} = \frac{1.5 \times 247.68 \times 10^3}{25 \times 700 \times 1000}$

$= .21$

$\frac{M_u}{f_{ck} b D^2} = \frac{1.5 \times 7.6 \times 10^7}{25 \times 700 \times 1000^2}$

$= 6.51 \times 10^{-3}$

As per IS:456 Min reinforcement .8 % is provided since cross sectional area is large effective cross sectional area.

$= \frac{1000 \times 700}{6}$

$= 116666.67\ MM^2$

$A_{st\ req} = 933.34\ MM^2$

Determination of size of foundation for conveyor TP 17

Depth of Foundation bottom below GL= 3.5 m
Height of pedestal above GL= 0.3 m
Total Height= 3.8 m
Average Thickness of Foundation Slab= 0.55 m

Average size of Column= 0.7 m x 1 m J2/17/16
1 mx 1 m J13/14 /16
1 mx 0.8 m J4/5/10/12
0.8 mx 0.5 m J8/9
0.8 mx 0.6 m J7/13

Net Bearing Capacity as per Soil Report= 40 T/sqm

So, Gross Bearing Capacity = 40+3.5x1.8= 46.30 T/sqm

For wind & Seismic case Gross B. C. (add 40x1.25+3.5x1 56.30 T/sqm

COLN	LOAD	FORCE-Y	MOM-X	MOM -Y	Wt of Soil & foundation	Total P	L	B	P/A	6My/L^2 B	6Mz/B^{2}L	Bearing Pressure				ex	ez	Corr. for Mx	Corr for Mz	Corrctd B. Pr. (Max)	Remarks	Uplift
1	14	102.87	-0.1	-0.47	94.73	197.70	2.75	5.00	14.39	0.02	0.04	14.44	14.40	14.35	14.32	0.00	0.00	0.02	0.04	14.44	OK,<46.3	Safe against Uplift
	15	109.36	5.13	22.77	94.73	198.09	2.75	5.00	14.41	0.97	1.99	17.37	15.42	12.39	11.45	0.11	0.03	0.97	1.99	17.37	OK,<56.3	Safe against Uplift
	16	66.7	5.31	97.38	94.73	161.43	2.75	5.00	11.74	1.00	5.87	18.61	16.61	6.87	4.87	0.42	0.04	1.00	5.87	18.61	OK,<56.3	Safe against Uplift
	17	114.7	9.07	1.41	94.73	209.43	2.75	5.00	15.23	0.96	0.12	16.32	14.38	16.07	14.15	0.01	0.03	0.86	0.12	16.32	OK,<56.3	Safe against Uplift
	18	52.16	-11.74	22.6	94.73	146.91	2.75	5.00	10.68	3.45	1.99	16.12	9.22	12.14	5.24	0.16	0.15	3.45	1.99	16.12	OK,<56.3	Safe against Uplift
	19	154.68	.34	22.74	94.73	249.28	2.75	5.00	18.13	5.40	1.98	25.51	14.72	21.54	10.75	0.09	0.14	5.40	1.98	25.51	OK,<56.3	Safe against Uplift
	20	-27.32	5.8	141.43	94.73	67.41	2.75	5.00	4.90	1.05	12.34	18.29	16.20	-5.39	-8.49	2.10	0.10	1.05	35.75	41.70	OK,<56.3	Safe against Uplift
	21	234.05	5.66	-66.9	94.73	328.78	2.75	5.00	23.91	0.90	8.37	33.18	31.38	16.44	14.64	0.28	0.02	0.90	8.37	33.18	OK,<56.3	Safe against Uplift
	22	-38.6	-40.63	22.35	94.73	57.83	2.75	5.00	4.21	9.65	1.95	15.81	-3.60	11.91	-7.40	0.39	1.05	19.66	1.95	25.61	OK,<56.3	Safe against Uplift
	23	243.63	73.09	23.18	94.73	338.36	2.75	5.00	24.61	11.60	2.02	38.23	15.03	34.18	10.98	0.07	0.22	11.60	2.02	38.23	OK,<56.3	Safe against Uplift
2	14	82.68	-0.09	-0.9	57.12	139.80	2.75	3.00	18.16	0.02	0.07	18.25	18.21	18.11	18.08	0.00	0.00	0.02	0.07	18.25	OK,<46.3	Safe against Uplift
	15	104.37	0.6	13.04	57.12	161.49	2.75	3.00	19.57	0.16	3.16	22.89	22.56	16.57	16.25	0.06	0.00	0.16	3.16	22.89	OK,<56.3	Safe against Uplift
	16	111.66	0.62	38.01	57.12	168.67	2.75	3.00	20.44	0.16	9.29	29.90	29.57	11.32	10.99	0.23	0.00	0.16	9.29	29.90	OK,<56.3	Safe against Uplift
	17	101.74	0.55	1.13	57.12	158.86	2.75	3.00	19.28	0.16	0.27	19.68	19.98	19.14	18.83	0.01	0.00	0.16	0.27	19.68	OK,<56.3	Safe against Uplift
	18	95.11	-8.24	13.13	57.12	152.23	2.75	3.00	18.45	2.44	3.16	24.06	19.19	17.71	12.83	0.09	0.06	2.44	3.16	24.06	OK,<56.3	Safe against Uplift
	19	113.63	10.44	12.98	57.12	170.75	2.75	3.00	20.70	2.78	3.14	26.60	21.08	20.32	14.79	0.06	0.05	2.78	3.14	26.60	OK,<56.3	Safe against Uplift
	20	122.44	0.57	81.01	57.12	179.56	2.75	3.00	21.76	0.15	19.64	41.55	41.25	2.28	1.98	0.45	0.00	0.15	19.64	41.55	OK,<56.3	Safe against Uplift

	21	66.29	0.63	-54.92	57.12	143.41	2.75	3.00	17.36	0.17	13.31	30.86	30.53	4.24	3.90	0.38	0.00	0.17	13.31	30.86	OK,<56.3	Safe against Uplift
	22	84.69	-9.37	13.92	57.12	141.80	2.75	3.00	17.19	2.21	9.13	22.53	16.11	16.27	11.84	0.09	0.06	2.21	9.13	22.53	OK,<56.3	Safe against Uplift
	23	124.05	9.57	18.17	57.12	181.17	2.75	3.00	21.96	2.53	9.19	27.68	22.62	21.30	16.24	0.07	0.05	2.53	9.19	27.68	OK,<56.3	Safe against Uplift
3	14	99.17	-0.37	0.48	80.95	180.12	2.75	4.25	15.41	0.07	0.06	16.54	15.40	15.42	15.28	0.00	0.00	0.07	0.06	16.54	OK,<46.3	Safe against Uplift
	15	174.61	11.36	23.72	80.95	255.76	2.75	4.25	21.86	2.12	2.87	26.87	22.62	21.14	16.89	0.09	0.04	2.12	2.87	26.87	OK,<56.3	Safe against Uplift
	16	219.2	11.49	68.11	80.95	394.15	2.75	4.25	25.17	2.14	8.23	35.54	31.25	19.03	14.80	0.23	0.04	2.14	8.23	35.54	OK,<56.3	Safe against Uplift
	17	164.15	11.36	2.59	80.95	245.10	2.75	4.25	20.97	2.12	0.31	23.41	19.16	22.78	18.53	0.01	0.06	2.12	0.31	23.41	OK,<56.3	Safe against Uplift
	18	100.48	-21.57	24.04	80.95	181.41	2.75	4.25	15.52	4.03	2.90	22.46	14.40	16.64	8.59	0.13	0.12	4.03	2.90	22.45	OK,<56.3	Safe against Uplift
	19	249.16	44.32	23.41	80.95	330.10	2.75	4.25	28.24	8.27	2.83	39.35	22.80	33.69	17.14	0.07	0.13	8.27	2.83	39.35	OK,<56.3	Safe against Uplift
	20	256.68	11.66	142.01	80.95	336.58	2.75	4.25	28.50	2.16	17.15	48.13	43.78	13.62	9.47	0.42	0.03	2.16	17.15	48.13	OK,<56.3	Safe against Uplift
	21	69.99	11.09	-84.57	80.95	174.94	2.75	4.25	14.97	2.07	11.42	28.46	24.32	5.62	1.47	0.54	0.08	2.07	11.42	28.46	OK,<56.3	Safe against Uplift
	22	0.4	-30.09	23.81	80.95	81.35	2.75	4.25	6.96	9.34	2.85	19.15	0.47	13.46	-5.23	0.29	0.61	9.83	2.85	19.64	OK,<56.3	Safe against Uplift
	23	349.22	73.79	23.69	80.95	430.17	2.75	4.25	36.81	13.59	2.88	53.27	28.10	47.52	20.34	0.06	0.17	13.59	2.88	53.27	OK,<56.3	Safe against Uplift
4	14	140.49	0.38	0.09	57.40	197.88	2.75	3.00	23.99	0.07	0.02	24.08	23.93	24.04	23.89	0.00	0.00	0.07	0.02	24.08	OK,<46.3	Safe against Uplift
	15	147.9	4.04	4.9	57.40	205.30	2.75	3.00	24.88	1.07	1.19	27.14	26.00	24.77	22.63	0.02	0.02	1.07	1.19	27.14	OK,<56.3	Safe against Uplift
	16	196.66	4.37	19.61	57.40	194.06	2.75	3.00	23.52	1.13	4.80	29.45	27.20	19.85	17.59	0.10	0.02	1.13	4.80	29.45	OK,<56.3	Safe against Uplift
	17	149.99	3.96	-5.16	57.40	207.39	2.75	3.00	25.14	1.05	1.25	27.44	26.34	24.93	22.84	0.02	0.02	1.05	1.25	27.44	OK,<56.3	Safe against Uplift
	18	183.37	-12.29	5	57.40	240.77	2.75	3.00	29.19	3.26	1.21	33.65	27.15	31.22	24.72	0.02	0.05	3.25	1.21	33.65	OK,<56.3	Safe against Uplift
	19	112.42	20.37	4.8	57.40	169.82	2.75	3.00	20.58	5.39	1.16	27.13	18.39	24.61	14.03	0.09	0.12	5.39	1.16	27.13	OK,<56.3	Safe against Uplift
	20	87.66	4.88	24.44	57.40	126.26	2.75	3.00	15.18	1.24	5.92	22.35	19.97	16.50	8.02	0.20	0.04	1.24	5.92	22.35	OK,<56.3	Safe against Uplift
	21	227.94	9.4	-14.84	57.40	285.34	2.75	3.00	34.59	0.90	3.55	39.03	37.24	31.94	30.14	0.05	0.01	0.90	3.55	39.03	OK,<56.3	Safe against Uplift
	22	264.23	-36.19	6.24	57.40	321.63	2.75	3.00	38.99	9.31	1.27	49.58	30.95	47.02	28.41	0.02	0.11	9.31	1.27	49.58	OK,<56.3	Safe against Uplift
	23	31.56	49.27	4.87	57.40	88.96	2.75	3.00	10.78	11.44	1.11	23.33	0.45	21.12	-1.77	0.05	0.49	11.46	1.11	23.36	OK,<56.3	Safe against Uplift
5	14	129.18	0.69	-0.18	80.36	209.58	2.75	4.25	17.93	0.11	0.02	18.06	17.94	18.02	17.80	0.00	0.00	0.11	0.02	18.06	OK,<46.3	Safe against Uplift
	15	134.07	7.4	2.25	80.36	214.48	2.75	4.25	18.35	1.36	0.27	20.00	17.24	19.46	16.70	0.01	0.03	1.36	0.27	20.00	OK,<56.3	Safe against Uplift
	16	137.52	7.29	10.57	80.36	218.00	2.75	4.25	18.65	1.38	1.28	21.31	18.65	18.76	16.00	0.05	0.03	1.38	1.28	21.31	OK,<56.3	Safe against Uplift
	17	138.27	7.42	-3.88	80.36	218.65	2.75	4.25	18.45	1.39	0.47	20.31	17.59	19.37	16.60	0.02	0.03	1.39	0.47	20.31	OK,<56.3	Safe against Uplift
	18	209.56	-9.49	0.7	80.36	289.94	2.75	4.25	24.61	1.77	0.06	26.66	23.12	26.49	22.95	0.00	0.03	1.77	0.06	26.66	OK,<56.3	Safe against Uplift
	19	58.58	24.79	3.79	80.36	138.96	2.75	4.25	11.69	4.53	0.46	16.68	7.61	15.97	6.90	0.03	0.17	4.53	0.46	16.88	OK,<56.3	Safe against Uplift
	20	165.02	7.46	10.66	80.36	282.40	2.75	4.25	22.45	1.39	1.31	25.16	22.37	22.53	19.76	0.04	0.03	1.39	1.31	25.18	OK,<56.3	Safe against Uplift
	21	86.12	7.38	-6.38	80.36	166.50	2.75	4.25	14.25	1.37	0.77	16.39	13.64	14.85	12.10	0.04	0.04	1.37	0.77	16.39	OK,<56.3	Safe against Uplift
	22	297.74	-27.54	0.62	80.36	378.12	2.75	4.25	32.35	5.14	0.06	37.56	27.27	37.49	27.15	0.00	0.07	5.14	0.06	37.56	OK,<56.3	Safe against Uplift
	23	-29.89	42.34	3.97	80.36	50.79	2.75	4.25	4.35	7.90	0.48	12.73	-3.08	11.77	-4.04	0.06	0.69	10.37	0.48	15.20	OK,<56.3	Safe against Uplift
6	14	94.02	-0.05	0.31	34.95	128.97	2.50	2.00	25.79	0.09	0.19	26.01	25.85	25.84	25.58	0.00	0.00	0.09	0.19	26.01	OK,<46.3	Safe against Uplift
	15	108.44	3.42	1.91	34.95	140.38	2.50	2.00	28.08	1.64	1.15	30.87	27.69	28.57	25.29	0.01	0.02	1.64	1.15	30.87	OK,<56.3	Safe against Uplift
	16	108.29	3.24	7.22	34.95	143.24	2.50	2.00	28.65	1.56	4.33	34.54	31.42	25.67	22.79	0.06	0.02	1.56	4.33	34.54	OK,<56.3	Safe against Uplift
	17	103.05	3.42	-1.91	34.95	136.03	2.50	2.00	27.61	1.64	1.15	30.39	27.11	28.10	24.82	0.01	0.02	1.64	1.15	30.39	OK,<56.3	Safe against Uplift
	18	81.9	-20.09	1.21	34.95	116.85	2.50	2.00	23.97	9.62	0.73	33.72	14.47	32.27	13.02	0.01	0.17	9.62	0.73	33.72	OK,<56.3	Safe against Uplift

	19	128.95	26.89	2.61	34.95	163.90	2.50	2.00	32.79	12.91	1.57	47.26	21.44	44.13	18.91	0.02	0.16	12.91	1.57	47.26	OK,<56.3	Safe against Uplift
	20	107.45	2.44	7.88	34.95	142.41	2.50	2.00	28.48	1.17	4.61	34.26	31.62	25.05	22.70	0.05	0.02	1.17	4.61	34.26	OK,<56.3	Safe against Uplift
	21	103.43	44	-3.88	34.95	138.38	2.50	2.00	27.66	2.11	2.32	32.10	27.68	27.47	23.25	0.03	0.03	2.11	2.32	32.10	OK,<56.3	Safe against Uplift
	22	106.19	0.5	1.18	34.95	141.14	2.50	2.00	28.23	0.24	0.71	29.18	28.70	27.76	27.28	0.01	0.00	0.24	0.71	29.18	OK,<56.3	Safe against Uplift
	23	104.69	0.34	2.64	34.95	139.64	2.50	2.00	27.93	9.04	1.58	32.56	26.47	29.39	23.90	0.02	0.05	9.04	1.58	32.56	OK,<56.3	Safe against Uplift
6	14	47.36	0	0	27.17	74.53	2.25	1.75	18.63	0.00	0.00	18.93	18.93	18.93	18.93	0.00	0.00	0.00	0.00	18.93	OK,<46.3	Safe against Uplift
	15	57.32	1.02	0.16	27.17	84.50	2.25	1.75	21.46	0.69	0.16	22.31	20.93	21.98	20.61	0.00	0.01	0.69	0.16	22.31	OK,<56.3	Safe against Uplift
	16	58.28	1.08	5.11	27.17	86.45	2.25	1.75	21.70	0.72	4.45	26.87	25.43	17.97	16.53	0.06	0.01	0.72	4.45	26.87	OK,<56.3	Safe against Uplift
	17	56.34	1	-4.56	27.17	83.51	2.25	1.75	21.21	0.68	3.97	25.86	24.50	17.92	16.56	0.05	0.01	0.68	3.97	25.86	OK,<56.3	Safe against Uplift
	18	57.43	-3.28	0.18	27.17	84.59	2.25	1.75	21.48	2.21	0.18	23.85	19.43	23.53	19.12	0.00	0.04	2.21	0.18	23.85	OK,<56.3	Safe against Uplift
	19	57.24	5.29	0.18	27.17	84.41	2.25	1.75	21.44	3.58	0.18	25.18	18.01	24.89	17.70	0.00	0.06	3.58	0.18	25.18	OK,<56.3	Safe against Uplift
	20	56.88	1.16	0.2	27.17	84.05	2.25	1.75	21.35	0.79	0.28	22.39	20.82	21.97	20.30	0.00	0.01	0.79	0.28	22.39	OK,<56.3	Safe against Uplift
	21	57.79	0.87	0.09	27.17	84.95	2.25	1.75	21.57	0.59	0.05	22.22	21.04	22.11	20.93	0.00	0.01	0.59	0.05	22.22	OK,<56.3	Safe against Uplift
	22	62.1	-9.62	0.16	27.17	89.27	2.25	1.75	22.67	6.52	0.16	29.34	16.31	29.03	16.00	0.00	0.11	6.52	0.16	29.34	OK,<56.3	Safe against Uplift
	23	52.56	11.66	0.16	27.17	79.73	2.25	1.75	20.25	7.90	0.16	28.30	12.51	27.99	12.20	0.00	0.16	7.90	0.16	28.30	OK,<56.3	Safe against Uplift
8	14	100.9	-0.01	0.03	27.17	128.07	2.25	1.75	32.59	0.01	0.03	32.58	32.55	32.61	32.49	0.00	0.00	0.01	0.03	32.58	OK,<46.3	Safe against Uplift
	15	124.66	1.7	-0.03	27.17	151.73	2.25	1.75	38.53	1.15	0.03	39.71	37.41	39.68	37.38	0.00	0.01	1.15	0.03	39.71	OK,<56.3	Safe against Uplift
	16	125.62	1.72	4.29	27.17	152.69	2.25	1.75	38.78	1.16	3.74	43.68	41.35	36.21	33.88	0.03	0.01	1.16	3.74	43.68	OK,<56.3	Safe against Uplift
	17	123.61	1.69	-4.4	27.17	150.78	2.25	1.75	38.29	1.14	3.83	43.27	40.98	36.61	33.32	0.03	0.01	1.14	3.83	43.27	OK,<56.3	Safe against Uplift
	18	124.18	-3.19	-0.03	27.17	151.33	2.25	1.75	38.43	2.16	0.03	40.62	36.30	40.57	36.25	0.00	0.02	2.16	0.03	40.62	OK,<56.3	Safe against Uplift
	19	124.66	5.58	-0.04	27.17	152.13	2.25	1.75	38.64	4.48	0.03	43.13	34.21	43.08	34.15	0.00	0.04	4.48	0.03	43.13	OK,<56.3	Safe against Uplift
	20	124.89	1.72	-0.69	27.17	152.06	2.25	1.75	38.62	1.16	0.46	40.24	37.92	39.32	36.99	0.00	0.01	1.16	0.46	40.24	OK,<56.3	Safe against Uplift
	21	124.23	1.67	0.40	27.17	151.40	2.25	1.75	38.45	1.13	0.40	39.98	37.72	39.18	36.92	0.00	0.01	1.13	0.40	39.98	OK,<56.3	Safe against Uplift
	22	129.7	-7.74	0.07	27.17	156.87	2.25	1.75	39.84	5.24	0.06	45.14	34.66	45.02	34.54	0.00	0.06	5.24	0.06	45.14	OK,<56.3	Safe against Uplift
	23	118.42	11.14	-0.13	27.17	146.59	2.25	1.75	37.23	7.54	0.11	44.89	29.60	44.66	29.57	0.00	0.08	7.54	0.11	44.89	OK,<56.3	Safe against Uplift
10	14	140.46	-0.29	0.1	69.10	209.56	2.50	4.00	20.95	0.06	0.02	21.03	20.91	21.00	20.88	0.00	0.00	0.06	0.02	21.03	OK,<46.3	Safe against Uplift
	15	150.24	0.26	6.13	69.10	219.34	2.50	4.00	22.93	0.78	0.02	24.64	23.07	22.60	21.23	0.03	0.01	0.78	0.02	24.64	OK,<56.3	Safe against Uplift
	16	144.73	3.23	20.24	69.10	213.83	2.50	4.00	21.96	0.78	3.04	25.19	23.64	19.12	17.57	0.09	0.02	0.78	3.04	25.19	OK,<56.3	Safe against Uplift
	17	169.48	3.26	-1.89	69.10	232.58	2.50	4.00	23.26	0.79	0.30	24.34	22.77	23.75	22.17	0.01	0.01	0.79	0.30	24.34	OK,<56.3	Safe against Uplift
	18	124.99	-13.07	5.96	69.10	194.09	2.50	4.00	19.41	3.14	0.89	23.44	17.15	21.65	15.36	0.03	0.07	3.14	0.89	23.44	OK,<56.3	Safe against Uplift
	19	195.5	19.95	8.31	69.10	264.60	2.50	4.00	26.46	4.70	0.95	32.11	22.70	30.22	20.81	0.02	0.07	4.70	0.95	32.11	OK,<56.3	Safe against Uplift
	20	100.34	3.23	18.79	69.10	169.44	2.50	4.00	16.94	0.77	2.82	20.53	18.99	14.89	13.36	0.11	0.02	0.77	2.82	20.53	OK,<56.3	Safe against Uplift
	21	220.15	0.32	-6.83	69.10	289.25	2.50	4.00	28.93	0.60	0.98	30.70	29.11	28.74	27.16	0.02	0.01	0.60	0.98	30.70	OK,<56.3	Safe against Uplift
	22	37.95	-35.93	5.74	69.10	107.05	2.50	4.00	10.71	8.62	0.86	20.19	2.94	18.47	1.22	0.05	0.94	8.62	0.86	20.19	OK,<56.3	Safe against Uplift
	23	282.53	42.45	6.52	69.10	351.63	2.50	4.00	35.16	10.19	0.98	46.33	25.85	44.37	24.00	0.02	0.12	10.19	0.98	46.33	OK,<56.3	Safe against Uplift
	14	127.22	-0.89	-0.17	69.10	196.32	2.50	4.00	19.63	0.15	0.03	19.81	19.51	19.76	19.46	0.00	0.00	0.15	0.03	19.81	OK,<46.3	Safe against Uplift
	15	195.61	5.23	1.95	69.10	264.71	2.50	4.00	26.47	1.25	0.29	28.01	25.91	27.44	24.93	0.01	0.02	1.25	0.29	28.01	OK,<56.3	Safe against Uplift
	16	200.41	5.3	6.49	69.10	269.51	2.50	4.00	26.95	1.27	1.29	29.45	26.91	26.89	24.45	0.03	0.02	1.27	1.29	29.45	OK,<56.3	Safe against Uplift

12	17	195.37	5.24	-1.55	69.10	264.47	2.50	4.00	26.45	1.26	0.25	27.95	25.44	27.46	24.94	0.01	0.02	1.26	0.25	27.95	OK, <58.3	Safe against Uplift
	18	129.22	-9.12	3.36	69.10	198.32	2.50	4.00	19.83	2.21	0.50	22.55	19.12	21.54	17.12	0.02	0.05	2.21	0.50	22.55	OK, <58.3	Safe against Uplift
	19	261.99	19.65	0.48	69.10	331.09	2.50	4.00	33.11	4.72	0.07	37.90	29.46	37.76	28.32	0.00	0.06	4.72	0.07	37.90	OK, <58.3	Safe against Uplift
	20	230.9	5.5	7.66	69.10	299.40	2.50	4.00	29.94	1.32	1.15	32.41	29.77	30.11	27.47	0.03	0.02	1.32	1.15	32.41	OK, <58.3	Safe against Uplift
	21	160.92	4.94	-3.81	69.10	230.02	2.50	4.00	23.00	1.19	0.57	24.76	22.99	23.62	21.24	0.02	0.02	1.19	0.57	24.76	OK, <58.3	Safe against Uplift
	22	46.88	-29.7	3.65	69.10	115.98	2.50	4.00	11.60	5.69	0.55	17.83	5.46	16.74	5.36	0.03	0.20	5.69	0.55	17.83	OK, <58.3	Safe against Uplift
	23	344.33	34.13	0.19	69.10	413.43	2.50	4.00	41.34	8.19	0.03	49.56	33.18	49.51	33.12	0.00	0.08	8.19	0.03	49.56	OK, <58.3	Safe against Uplift
13	14	93.02	0.06	0.92	27.84	2.00	2.25	1.75	0.61	0.04	0.28	0.83	0.75	0.27	0.19	0.16	0.09	0.04	0.28	0.83	OK, <46.3	Safe against Uplift
	15	107.64	3.63	1.9	27.84	130.68	2.25	1.75	39.19	2.59	1.65	37.44	32.25	34.13	28.94	0.01	0.03	2.59	1.65	37.44	OK, <56.3	Safe against Uplift
	16	103.23	3.06	6.23	27.84	191.07	2.25	1.75	39.29	2.70	5.44	41.43	36.03	30.55	25.14	0.05	0.03	2.70	5.44	41.43	OK, <56.3	Safe against Uplift
	17	103.06	3.62	-0.6	27.84	130.89	2.25	1.75	33.24	2.59	0.52	36.35	31.18	35.31	30.13	0.00	0.03	2.59	0.52	36.35	OK, <56.3	Safe against Uplift
	18	124.44	-19.33	2.58	27.84	152.28	2.25	1.75	38.07	13.09	2.23	53.99	27.81	49.54	23.35	0.02	0.13	13.09	2.23	53.99	OK, <56.3	Safe against Uplift
	19	81.24	29.99	1.24	27.84	109.08	2.25	1.75	27.70	18.27	1.08	47.05	10.51	44.90	8.35	0.01	0.25	18.27	1.08	47.05	OK, <56.3	Safe against Uplift
	20	104.17	4.42	5.69	27.84	132.01	2.25	1.75	33.63	2.89	4.95	41.47	35.49	31.57	25.58	0.04	0.03	2.89	4.95	41.47	OK, <56.3	Safe against Uplift
	21	101.51	3.29	-1.69	27.84	129.38	2.25	1.75	32.66	2.19	1.65	36.68	32.31	33.39	29.02	0.01	0.02	2.19	1.65	36.68	OK, <56.3	Safe against Uplift
	22	105.15	-5.04	2.65	27.84	133.99	2.25	1.75	34.03	3.41	2.31	39.75	32.92	35.14	28.31	0.02	0.04	3.41	2.31	39.75	OK, <56.3	Safe against Uplift
	23	99.54	12.7	1.16	27.84	127.38	2.25	1.75	32.36	8.60	1.00	41.95	24.75	39.95	22.75	0.01	0.10	8.60	1.00	41.95	OK, <56.3	Safe against Uplift
14	14	100	0.15	-0.34	164.90	264.90	3.25	7.00	11.20	0.01	0.01	11.23	11.21	11.20	11.18	0.00	0.00	0.01	0.01	11.23	OK, <46.3	Safe against Uplift
	15	58.81	6.48	22.01	164.90	213.71	3.25	7.00	9.39	0.53	0.83	10.75	9.70	9.09	8.04	0.10	0.03	0.53	0.83	10.75	OK, <56.3	Safe against Uplift
	16	-13.79	6.71	66.31	164.90	142.14	3.25	7.00	8.25	0.54	2.50	9.29	8.20	4.29	3.21	0.47	0.05	0.54	2.50	9.29	OK, <56.3	Safe against Uplift
	17	83.68	6.4	0.16	164.90	238.45	3.25	7.00	10.49	0.52	0.01	11.01	9.97	11.00	9.96	0.00	0.03	0.52	0.01	11.01	OK, <58.3	Safe against Uplift
	18	110.68	-20.83	22.01	164.90	265.56	3.25	7.00	11.67	1.69	0.83	14.19	10.81	12.53	9.15	0.06	0.06	1.69	0.83	14.19	OK, <56.3	Safe against Uplift
	19	5.97	33.79	22.02	164.90	181.87	3.25	7.00	7.12	2.74	0.83	10.69	5.20	9.03	3.54	0.14	0.21	2.74	0.83	10.69	OK, <56.3	Safe against Uplift
	20	-126.71	7.15	89.46	164.90	28.19	3.25	7.00	1.24	0.56	3.75	5.57	4.41	-1.93	-3.09	3.53	0.25	0.56	0.83	2.65	OK, <56.3	Safe against Uplift
	21	244.34	5.8	-35.45	164.90	399.24	3.25	7.00	17.55	0.47	2.09	20.11	19.17	15.83	14.99	0.14	0.01	0.47	2.09	20.11	OK, <56.3	Safe against Uplift
	22	180.42	-60.92	22.31	164.90	345.32	3.25	7.00	15.16	4.84	0.84	20.96	11.08	19.28	9.36	0.06	0.18	4.84	0.84	20.96	OK, <56.3	Safe against Uplift
	23	-72.78	73.87	21.72	164.90	92.11	3.25	7.00	3.61	5.89	0.82	10.42	-1.57	8.79	-3.20	0.26	0.90	7.17	0.82	11.60	OK, <56.3	Safe against Uplift
15	14	127.84	0.89	-0.24	89.67	197.51	2.50	4.00	19.75	0.21	0.04	20.00	19.58	19.93	19.50	0.00	0.00	0.21	0.04	20.00	OK, <46.3	Safe against Uplift
	15	163.04	1.99	21.84	89.67	262.71	2.50	4.00	25.27	0.47	3.28	29.02	28.08	22.47	21.52	0.09	0.01	0.47	3.28	29.02	OK, <56.3	Safe against Uplift
	16	244.61	3.02	67.09	89.67	314.28	2.50	4.00	31.43	0.72	10.05	42.21	40.76	32.10	30.66	0.21	0.01	0.72	10.05	42.21	OK, <56.3	Safe against Uplift
	17	169.66	1.6	-1.2	89.67	239.33	2.50	4.00	23.93	0.98	0.18	24.50	23.73	24.14	23.37	0.01	0.01	0.98	0.18	24.50	OK, <56.3	Safe against Uplift
	18	196.67	-0.44	21.72	89.67	256.34	2.50	4.00	25.63	0.11	3.26	29.00	28.79	22.46	22.27	0.08	0.00	0.11	3.26	29.00	OK, <56.3	Safe against Uplift
	19	179.41	4.36	21.96	89.67	249.08	2.50	4.00	24.91	1.05	3.29	29.25	27.16	22.66	20.57	0.09	0.02	1.05	3.29	29.25	OK, <56.3	Safe against Uplift
	20	299.25	3.85	100.6	89.67	366.92	2.50	4.00	36.69	0.82	15.09	52.91	51.05	22.79	20.96	0.27	0.01	0.92	15.09	52.91	OK, <56.3	Safe against Uplift
	21	66.83	0.07	-66.82	89.67	136.50	2.50	4.00	13.65	0.02	8.54	22.20	22.17	5.13	5.10	0.42	0.00	0.02	8.54	22.20	OK, <56.3	Safe against Uplift
	22	280.69	-2.69	22.06	89.67	320.38	2.50	4.00	32.04	0.64	3.31	35.99	34.70	28.37	28.09	0.07	0.01	0.64	3.31	35.99	OK, <56.3	Safe against Uplift
	23	315.39	6.6	21.63	89.67	186.06	2.60	4.00	18.61	1.58	3.24	23.33	20.17	16.85	13.58	0.12	0.04	1.58	3.24	23.33	OK, <56.3	Safe against Uplift
	14	103.38	0.5	0.51	84.79	188.11	2.75	5.00	14.41	0.08	0.05	14.54	14.38	14.43	14.28	0.00	0.00	0.08	0.05	14.54	OK, <46.3	Safe against Uplift

16	15	112.93	10.73	22.37	94.73	207.66	2.75	5.00	15.10	1.70	1.95	18.76	15.35	14.85	11.45	0.11	0.05	1.70	1.85	18.75	OK, <56.3	Safe against Uplift
	16	133.8	10.8	88.95	94.73	228.53	2.75	5.00	16.62	1.71	5.78	24.09	20.66	12.58	9.15	0.29	0.05	1.71	5.78	24.09	OK, <56.3	Safe against Uplift
	17	109.34	10.7	0.81	94.73	204.07	2.75	5.00	14.84	1.70	0.05	16.59	13.20	16.49	13.09	0.00	0.05	1.70	0.05	16.59	OK, <56.3	Safe against Uplift
	18	174.34	-15.81	22.07	94.73	289.07	2.75	5.00	19.97	2.48	1.93	23.97	19.02	20.12	15.17	0.06	0.06	2.48	1.93	23.97	OK, <56.3	Safe against Uplift
	19	51.52	37.08	22.67	94.73	146.25	2.75	5.00	10.64	5.99	1.99	10.60	8.73	14.54	2.78	0.18	0.25	5.88	1.99	18.50	OK, <56.3	Safe against Uplift
	20	166.97	10.78	97.81	94.73	261.70	2.75	5.00	19.03	1.71	8.54	29.28	25.66	12.20	8.75	0.37	0.04	1.71	8.54	29.28	OK, <56.3	Safe against Uplift
	21	58.68	10.68	-53.07	94.73	153.62	2.75	5.00	11.17	1.70	4.63	17.50	14.11	8.24	4.84	0.35	0.07	1.70	4.63	17.50	OK, <56.3	Safe against Uplift
	22	254.82	-41.71	22.5	94.73	349.25	2.75	5.00	25.40	6.62	1.96	33.98	20.75	30.05	16.82	0.06	0.12	6.62	1.96	33.98	OK, <56.3	Safe against Uplift
	23	-28.66	83.15	22.24	94.73	66.07	2.75	5.00	4.81	10.02	1.94	16.77	-3.28	12.89	-7.16	0.34	0.96	16.22	1.94	22.96	OK, <56.3	Safe against Uplift
17	14	49.58	0.22	-1.03	28.29	77.87	2.25	1.75	19.78	0.16	0.90	20.82	20.52	19.03	18.73	0.01	0.00	0.15	0.90	20.82	OK, <56.3	Safe against Uplift
	15	45.22	0.97	2.48	28.29	73.51	2.25	1.75	18.67	0.66	2.16	21.49	20.17	17.17	15.85	0.03	0.01	0.66	2.16	21.49	OK, <56.3	Safe against Uplift
	16	26.06	1.64	17.17	28.29	54.35	2.25	1.75	13.80	1.11	14.95	29.86	27.64	-0.04	-2.26	0.32	0.03	1.11	15.00	29.81	OK, <56.3	Safe against Uplift
	17	60.07	0.78	-9.71	28.29	88.36	2.25	1.75	22.44	0.51	7.58	30.54	29.91	15.37	14.34	0.10	0.01	0.51	7.58	30.54	OK, <56.3	Safe against Uplift
	18	46.86	-2.1	2.43	28.29	75.17	2.25	1.75	19.09	0.74	2.12	21.95	20.46	17.72	16.23	0.03	0.01	0.74	2.12	21.95	OK, <56.3	Safe against Uplift
	19	43.55	3.04	2.93	28.29	71.84	2.25	1.75	18.25	2.06	2.20	22.51	18.39	18.10	13.98	0.04	0.04	2.06	2.20	22.51	OK, <56.3	Safe against Uplift
	20	33.83	2.21	8.77	28.29	62.12	2.25	1.75	15.76	1.50	7.64	24.91	21.92	9.64	6.64	0.14	0.04	1.50	7.64	24.91	OK, <56.3	Safe against Uplift
	21	56.8	-0.27	-3.61	28.29	84.89	2.25	1.75	21.56	0.18	3.32	25.06	24.69	18.42	18.06	0.04	0.00	0.18	3.32	25.06	OK, <56.3	Safe against Uplift
	22	63.66	-2.7	2.39	28.29	92.26	2.25	1.75	20.89	1.83	2.08	24.80	21.14	20.64	16.98	0.03	0.03	1.83	2.08	24.80	OK, <56.3	Safe against Uplift
	23	38.47	4.65	2.57	28.29	64.78	2.25	1.75	16.45	3.15	2.24	21.83	15.54	17.36	11.06	0.04	0.07	3.15	2.24	21.83	OK, <56.3	Safe against Uplift
18	14	47.35	0.29	0.96	57.12	104.47	2.75	3.00	12.68	0.08	0.29	12.95	12.83	12.49	12.37	0.01	0.00	0.08	0.23	12.98	OK, <46.3	Safe against Uplift
	15	41.05	7.41	4.62	57.12	98.17	2.75	3.00	11.90	1.96	1.10	14.95	11.04	12.76	8.84	0.05	0.08	1.96	1.10	14.95	OK, <56.3	Safe against Uplift
	16	60.68	7.4	19.64	57.12	117.80	2.75	3.00	14.26	1.88	4.76	21.00	17.08	11.47	7.56	0.17	0.06	1.86	4.76	21.00	OK, <56.3	Safe against Uplift
	17	29.13	7.39	-7.06	57.12	83.25	2.75	3.00	10.09	1.95	1.71	13.75	9.85	10.34	6.43	0.08	0.09	1.95	1.71	13.75	OK, <56.3	Safe against Uplift
	18	47.22	-10.75	4.46	57.12	104.34	2.75	3.00	12.65	2.84	1.09	16.57	10.89	14.40	8.73	0.04	0.10	2.84	1.08	16.57	OK, <56.3	Safe against Uplift
	19	34.89	26.64	4.67	57.12	92.01	2.75	3.00	11.15	6.75	1.11	19.01	5.51	16.80	3.29	0.05	0.29	6.75	1.11	19.01	OK, <56.3	Safe against Uplift
	20	42.58	7.3	11.86	57.12	99.70	2.75	3.00	12.06	1.93	2.82	16.84	12.98	11.19	7.33	0.12	0.07	1.93	2.82	16.84	OK, <56.3	Safe against Uplift
	21	39.53	7.51	-2.82	57.12	96.65	2.75	3.00	11.72	1.99	0.64	14.34	10.36	13.07	9.09	0.03	0.09	1.99	0.64	14.34	OK, <56.3	Safe against Uplift
	22	58.87	-30.06	4.41	57.12	116.89	2.75	3.00	14.06	7.96	1.07	23.08	7.17	20.95	6.04	0.04	0.26	7.96	1.07	23.08	OK, <56.3	Safe against Uplift
	23	23.24	44.9	4.83	57.12	80.36	2.75	3.00	9.74	11.87	1.12	22.74	-1.01	20.49	-3.26	0.06	0.56	12.14	1.12	23.00	OK, <56.3	Safe against Uplift

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*                                                   *
*           STAAD.Pro                               *
*           Version  2006    Bld 1091.India         *
*           Proprietary Program of                  *
*           Research Engineers, Intl.               *
*           Date=    SEP 19, 2005                   *
*           Time=    14:18:16                       *
*                                                   *
*      USER ID: SIMPLEX CONCRETE PILES (INDIA) L    *
*****************************************************
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     1. STAAD SPACE
INPUT FILE: final kpl7 final r-b2.STD
     2. START JOB INFORMATION
     3. ENGINEER DATE 06-MAY-2005
     4. END JOB INFORMATION
     5  ***** TP-17 SIPAT THERMAL POWER PROJECT *******
     6. UNIT METER KNS
     7. JOINT COORDINATES
     8. 1 0  0 0; 2 6  0 0; 3 12  0 0; 4 0 -3 0; 5 12  0 0; 6 0 -6 0;
     9. 7 12 -6 0; 8 0 -9 0; 9 12 -9 0; 10 0 -12 0; 11 12 -12 0; 12 0 -15 0;
    10. 13 12 -15 0; 14 0 -18 0; 15 12 -18 0; 16 0 -21 0; 17 12 -21 0; 18 0 -24 0
    11. 19 12 -24 0; 20 0 -27 0; 21 12 -27 0; 22 0 -30 0; 23 12 -30 0; 24 0 -33 0
    12. 25 12 -33 0; 26 0 -36 0; 27 12 -36 0; 28 0 -39 0; 29 12 -39 0; 30 0 -42 0
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41. 21 22 27 28 PRIS YD 0.9 ZD 0.4
42. MEMBER PROPERTY INDIAN
43. 37 38 45 55 PRIS YD 0.9 ZD 0.45
44. 39 70 45 47 TO 52 PRIS YD 0.8 ZD 0.4
45. SUPPORTS
46. 1 TO 4  7 TO 10 12 TO 18 FIXED
47. LOAD 1 DL
48. SELFWEIGHT Y -1
49. JOINT LOAD
50. 37 FY -52
51. 40 FY -59
52. 46 FY -65
53. 50 FY -49
54. 10 FY -12
55. 51 FY -68
56. 53 FY -17
57. 39 FY -50
58. 42 FY -15
59. 48 FY -45
60. 52 FY -67
61. 54 FY -16
62. 43 FY -45
63. 49 FY -45
64. 44 FY  -3
65. 45 FY -55
66. LOAD 2 LL
67. JOINT LOAD
68. 37 FY -16
69. 38 FY -61
70. 16 FY -62
71. 30 FY -36
72. 38 FY -27
73. 53 FY -42
74  53 FY -27
75. 34 FY -24
76. 42 FY -61
77. 38 FY -29
78. 52 FY -62
79. 54 FY -29
80. 43 FY -42
81. 49 FY  41
82. 44 FY -25
83. 45 FY -40
84. LOAD 3 EQUIPMENT LOAD
85. *****EQUIPMENT LOAD VERTICAL******
86. JOINT LOAD
87. 37 FY -15
88. 40 FY -26
89. 46 FY  24
90. 50 FY -16
91. 38 FY -4
92. 51 FY -6
93. 53 FY -1.
94. 39 FY -16
95. 42 FY -32
96. 48 FY -36
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 97. 52 FY -19
 98. 5: FY -1.
 99. 46 FY -8
100  47 FY -16
101. 48 FY -24
102  49 FY -25
103  LOAD 4 EQUIPMENT LOAD ALONG X BELT TENSION*******
104. JOINT LOAD
105  37 FX 15 FY 25
106. 41 FX 0.5 FY 9
107. 49 FX 1 FY 12
108. 50 FX 5.5 FY 44
109. 38 FX 8 FY  4
110  51 FX 15 FY -48
111  53 FX 1 FY 4
112. 39 FX 11 FY -36
113. 42 FX 0.5 FY -5
114  43 FX 1 FY -5
115. 52 FX 6 FY -35
116. 54 FX 1 FY -4
117. LOAD 5 EQUIPMENT LOAD ALONG Y BELT TENSION
118  JOINT LOAD
119  37 FY -8 FZ +7
120. 40 FY 1 FZ -2
121. 45 FY +7 FZ +2
122. 51 FY 9 FZ -7
123. 38 FY -3
124. 51 FY +1.
125. 51 FY 1
126. 37 FY  25 FZ  4
127. 41 FY 30 FZ -4
128. 48 FY -27 FZ -3
129. 50 FY 27 FZ -4
130. 54 FY 20 FZ -1.
131. 43 FY +1 FZ +1.
132. 49 FY 2 FZ -1.
133. 49 FY 1 FZ -1.
134. LOAD 6 WLX
135. JOINT LOAD
136. 37 FX 21 FY 32
137. 40 FX 2 FY 11
138. 46 FX 2 FY 15
139. 50 FX 13 FY 56
140. 38 FX 1 FY -6
141. 51 FX 26 FY -61
142. 53 FX 6 FY 17
143. 39 FX 29 FY -25
144. 42 FX 2 FY +5
145. 48 FX 2 FY -6
146. 52 FX 12 FY -26
147. 54 FX 5 FY -17
148. 43 FX 1 FY -1.
149. 49 FY 1
150. 44 FX 3 FY -1.
151. 45 FX 2 FY -1.
152. LOAD 7 WLZ
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153. JOINT LOAD
154. 37 FY 44 FZ 3
155. 40 FY -30 FZ 9
156. 46 FY 30 FZ 8
157  50 FY -45 FZ 9
158. 38 FY 7 FZ 2
159. 51 FY -4 FZ 3
160. 52 FY -2.
161. 39 FY 66 FZ 6
162. 42 FY -70 FZ 14
163. 41 FY 63 FZ 9
164. 53 FY -51 FZ 9
165. 54 FY -5 FZ 1
166. 47 FY 24 FZ 7
167. 45 FY -22 FZ 7
168. 45 FY 3 FZ 1
169. 44 FZ 1
170. LOAD 8 EQK
171. JOINT LOAD
172. 37 FX 58 FY 118
173. 38 FX 2 FY -15
174. 39 FX 54 FY -71
175. 40 FX 1 FY 80
176. 43 FX 1 FY -50
177. 46 FX 1 FY 53
178. 49 FX 1 FY -30
179. 50 FX 97 FY 196
180. 51 FX 46 FY -115
181. 52 FX 21 FY -66
182. 53 FX 2 FY 12
183. LOAD 9 EQL
184. JOINT LOAD
185. 37 FY 126 FZ 23
186. 40 FY -104 FZ 22
187. 44 FY 210 FZ 20
188. 50 FY -115 FZ 21
189. 38 FY 18 FZ 1
190. 51 FY -69 FZ 1
191. 53 FY -7 FZ 1
192. 39 FY 150 FZ 22
193. 42 FY -154 FZ 22
194. 52 FY  141 FZ 20
195. 54 FY -7 FZ 1
196. 48 FY -2 FZ 1
197. 49 FY -3 FZ 1
198. 46 FY -5 FZ 2
199. 45 FY +5 FZ 2
200. 48 FY 142 FZ 22
201. LOAD COMB 14 DL+LL
202. 1 1.0 2 1.0
203. LOAD COMB 15 DL+LL+EQPTLOAD+BELTTENSIONX+BELTTENSIONZ
204. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0
205. LOAD COMB 16 DL+LL+EQPTLOAD+BELTTENSIONX-BELTTENSIONZ+WLX
206. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 6 1.0
207. LOAD COMB 17 DL+LL+EQPTLOAD-BELTTENSIONX+BELTTENSIONZ-WLX
208. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 6 -1.0
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219. LOAD COMB 19 DL+LL+EQPTLOAD+BELTTENSIONX+BELTTENSIONY+WLZ
220. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 7 1.0
221. LOAD COMB 15 DL+LL+EQPTLOAD+BELTX+BELTY+WLZ
222. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 7 -1.0
223. LOAD COMB 20 DL+LL+EQPTLOAD+BELTTENSIONX+BELTTENSIONY+EQX
224. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 8 1.0
225. LOAD COMB 21 DL+LL+EQPTLOAD+BELTTENSIONX+BELTY-EQX
226. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 8 -1.0
227. LOAD COMB 22 DL+LL+EQPTLOAD+BELTTENSIONX+BELTTENSIONY+EQZ
228. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 9 1.0
229. LOAD COMB 23 DL+LL+EQPTLOAD+BELTX+BELTY-EQZ
230. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 9 -1.0
231. LOAD COMB 24 1.5(DL+LL)
232. 1 1.5 2 1.5
233. LOAD COMB 25 1.5(DL+LL+EQPTLOAD+BLX+BLY)
234. 1 1.5 2 1.5 3 1.5 4 1.5 5 1.5
235. LOAD COMB 26 1.2(DL+LL+EQPTLOAD+BLX+BLY+WLX)
236. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 6 1.2
237. LOAD COMB 27 1.2(DL+LL+EQPTLOAD+BLX+BLY-WLX)
238. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 6 -1.2
239. LOAD COMB 28 1.2(DL+LL+EQPTLOAD+BLX+BLY+WLZ)
240. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 7 1.2
241. LOAD COMB 29 1.2(DL+LL+EQPTLOAD+BLX+BLY-WLZ)
242. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 7 -1.2
243. LOAD COMB 30 1.2(DL+LL+EQPTLOAD+BLX+BLY+EQX)
244. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 8 1.2
245. LOAD COMB 31 1.2(DL+LL+EQPTLOAD+BLX+BLY-EQX)
246. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 8 -1.2
247. LOAD COMB 32 1.2(DL+LL+EQPTLOAD+BLX+BLY+EQZ)
248. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 9 1.2
249. LOAD COMB 33 1.2(DL+LL+EQPTLOAD+BLX+BLY-EQZ)
250. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 9 -1.2
251. PERFORM ANALYSIS PRINT STATICS CHECK
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 48/ 49/ 16
ORIGINAL/FINAL BAND-WIDTH= 26/ 9/ 42 DOF
TOTAL PRIMARY LOAD CASES = 9, TOTAL DEGREES OF FREEDOM = 192
SIZE OF STIFFNESS MATRIX = 9 DOUBLE KILO-WORDS
REQD/AVAIL. DISK SPACE = 12.2/ 5058.3 MB

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 1
LL

***TOTAL APPLIED LOAD (MTON METE) SUMMARY (LOADING 1)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -979.50
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 9691.69 MY= 0.00 MZ= -7791.16

***TOTAL REACTION LOAD(MTON METE) SUMMARY (LOADING)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 979.50
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -8691.69 MY= 0.00 MZ= 7791.16

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 1)
MAXIMUM AT NODE
X = -6.67753E-03 56
Y = -1.79147E-01 46
Z = +3.42352E-01 48
RX= -1.71101E-05 38
RY= 1.00500E-06 42
RZ= 3.61170E-05 36

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 2
LL

***TOTAL APPLIED LOAD (MTON METE) SUMMARY (LOADING 2)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 616.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 5552.50 MY= 0.00 MZ= -4993.00

***TOTAL REACTION LOAD(MTON METE) SUMMARY (LOADING 2)
SUMMATION FORCE X = 0.00
SUMMATION FORCE-Y = 616.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -5552.50 MY= 0.00 MZ= 4993.00

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 2)

	MAXIMUM	AT NODE
X =	7.51760E-04	49
Y =	-2.57082E-02	45
Z =	1.72667E-03	43
RX=	8.07841E-06	42
RY=	3.15809E-04	31
RZ=	-2.57508E-06	31

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 3
EQUIPMENT LOAD

***TOTAL APPLIED LOAD (MTON METS) SUMMARY (LOADING 3)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -250.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 2096.00 MY= 0.00 MZ= -2093.00

***TOTAL REACTION LOAD (MTON METS) SUMMARY (LOADING 3)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 250.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -2093.00 MY= 0.00 MZ= 2093.00

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 3)

	MAXIMUM	AT NODE
X =	-1.28163E-03	49
Y =	-1.69852E-02	45
Z =	-1.28597E-03	46
RX=	-6.05036E-06	48
RY=	4.23505E-07	52
RZ=	4.64583E-06	31

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 4
EQUIPMENT LOAD ALONG X BELT TENSION*******

***TOTAL APPLIED LOAD (MTON METS) SUMMARY (LOADING 4)
SUMMATION FORCE-X = 52.50
SUMMATION FORCE-Y = 15.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 201.00 MY= 476.00 MZ= -1176.25

***TOTAL REACTION LOAD(MTON METE) SUMMARY (LOADING 4)
SUMMATION FORCE-X = -52.50
SUMMATION FORCE-Y = 15.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -791.79 MY= -476.25 MZ= 1176.25

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 4)
MAXIMUMS AT NODE
X = 8.54394E-02 39
Y = -9.14311E-02 51
Z = -2.91808E-03 53
RX= -1.00279E-05 53
RY= -3.44021E-05 42
RZ= -3.08142E-04 29

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 5
EQUIPMENT LOAD ALONG Y BELT TENSION

***TOTAL APPLIED LOAD (MTON METE) SUMMARY (LOADING 5)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 9.00
SUMMATION FORCE-Z = -27.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -550.10 MY= 255.00 MZ= 130.00

***TOTAL REACTION LOAD(MTON METE) SUMMARY (LOADING 5)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -9.00
SUMMATION FORCE-Z = 27.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 550.00 MY= -255.00 MZ= -130.00

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 5)
MAXIMUMS AT NODE
X = 2.15987E-03 43
Y = 7.53699E-03 42
Z = -6.42153E-02 43
RX= -2.23904E-04 43
RY= 1.99991E-05 49
RZ= 7.62946E-04 25

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 6
MIX

***TOTAL APPLIED LOAD (MTON METE) SUMMARY (LOADING 6)
SUMMATION FORCE-X = 126.00
SUMMATION FORCE-Y = -7.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 47.00 MY= 1113.50 MZ= 1722.00

***TOTAL REACTION LOAD(MTON METE) SUMMARY (LOADING 6)
SUMMATION FORCE-X = -126.00
SUMMATION FORCE-Y = 7.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 47.00 MY= 1113.50 MZ= 1722.00

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 6)
MAXIMUM AT NODE
X = 1.52243E-01 44
Y = 1.24937E-02 50
Z = -6.51754E-04 52
RX= -1.15271E-05 50
RY= -1.85230E-05 21
RZ= -5.47168E-04 44

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 7
WL2

***TOTAL APPLIED LOAD (MTON METE) SUMMARY (LOADING 7)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = 3.00
SUMMATION FORCE-Z = 96.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 1012.80 MY= -815.00 MZ= 32.00

***TOTAL REACTION LOAD(MTON METE) SUMMARY (LOADING 7)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -3.00
SUMMATION FORCE-Z = -96.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -1012.80 MY= 815.00 MZ= -32.00

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 7)

	MAXIMUMS	AT NODE
X =	-7.595903E+03	43
Y =	1.782568E 02	42
Z =	4.11119E-01	43
RX=	1.456139E-03	43
RY=	-2.118258E-04	31
RZ=	2.63349E-05	25

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 8
EQX

***TOTAL APPLIED LOAD (MTON METE) SUMMARY (LOADING 8)
SUMMATION FORCE-X = 209.00
SUMMATION FORCE-Y = 111.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= -943.50 MY= 1511.00 MZ= -3042.70

***TOTAL REACTION LOAD(MTON METE) SUMMARY (LOADING 8)
SUMMATION FORCE-X = -209.00
SUMMATION FORCE-Y = -111.00
SUMMATION FORCE-Z = 0.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 943.50 MY= -1511.00 MZ= 3042.70

MAXIMUM DISPLACEMENTS (CM /RADIANS) (LOADING 9)

	MAXIMUMS	AT NODE
X =	4.349641E-01	37
Y =	1.693715E-02	50
Z =	1.176328E-03	43
RX=	3.27636E-05	25
RY=	-1.856998E-04	22
RZ=	-1.570988E-03	37

STATIC LOAD/REACTION/EQUILIBRIUM SUMMARY FOR CASE NO. 9
EQZ

***TOTAL APPLIED LOAD (MTON METE) SUMMARY (LOADING 9)
SUMMATION FORCE-X = 0.00
SUMMATION FORCE-Y = -56.00
SUMMATION FORCE-Z = 183.00

SUMMATION OF MOMENTS AROUND THE ORIGIN-
MX= 3706.90 MY= -1235.00 MZ= -475.00

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***TOTAL REACTION LOAD( MTOW MEME ) SUMMARY (LOADING      9 )
     SUMMATION FORCE-X =        0.00
     SUMMATION FORCE-Y =       56.00
     SUMMATION FORCE-Z =     -1103.00

   SUMMATION OF MOMENTS AROUND THE ORIGIN
   MX=       -3775.90  MY=        1235.00  MZ=         775.00


MAXIMUM DISPLACEMENTS (  CM  /RADIANS; (LOADING      9)
          MAXIMUMS     AT NODE
   X = -9.995408E-03       63
   Y = -5.984902E-02       42
   Z =  2.172028E-01       46
   RX=  7.692148E-04       19
   RY=  9.992228E-05       25
   RZ=  3.621608E-05       19


************** END OF DATA FROM INTERNAL STORAGE **************

243. LOAD LIST 14 TO 23
244. PRINT SUPPORT REACTION
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SUPPORT REACTIONS -UNIT MTON METR STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	14	1.10	101.91	0.54	-0.10	0.00	-0.47
	15	-4.72	101.21	2.83	0.21	1.19	22.61
	16	-15.81	66.70	3.05	0.31	2.84	67.28
	17	0.65	114.70	2.74	0.07	0.56	1.43
	18	-4.5.	52.19	-6.45	-21.74	0.98	22.80
	19	4.03	154.91	12.08	24.0%	1.91	22.74
	20	33.69	-23.32	3.22	0.00	-0.76	144.44
	21	24.01	234.05	2.43	5.00	4.58	95.96
	22	-0.15	-26.96	+19.42	-60.74	-0.16	22.35
	23	-5.28	240.62	25.24	72.59	2.57	13.19
2	14	0.35	92.68	-0.01	+0.00	0.10	+0.30
	15	+8.64	104.27	0.12	0.50	+0.18	15.04
	16	-25.50	111.55	0.12	0.62	-0.35	38.31
	17	-0.79	101.74	0.11	.17	-0.11	1.13
	18	-8.70	96.11	-0.14	-0.24	-0.1	.3.17
	19	-8.57	153.62	3.30	10.44	-0.14	14.50
	20	+56.36	172.44	0.10	1.87	0.02	81.71
	21	37.09	86.24	0.77	1.79	0.17	-54.52
	22	-8.55	84.66	-1.79	+5.37	-0.50	13.97
	23	-8.72	124.06	2.03	6.50	0.14	13.17
3	14	-1.48	99.17	0.28	-0.37	-0.04	0.39
	15	-6.67	174.01	3.95	11.38	1.06	23.72
	16	-17.84	213.20	3.79	11.49	3.21	68.11
	17	1.30	164.15	4.02	11.76	0.01	0.59
	18	-7.19	100.46	-7.59	-21.57	2.24	24.24
	19	-8.55	209.15	11.47	31.37	0.94	27.42
	20	+35.91	255.63	3.97	11.66	2.84	142.01
	21	22.46	93.99	3.93	11.09	+5.71	-54.57
	22	+7.22	0.40	-14.58	-50.03	2.13	23.61
	23	-8.52	319.22	22.18	72.76	-0.20	22.03
4	14	-0.01	140.48	0.61	0.28	0.22	0.09
	15	-1.00	147.90	2.36	4.94	2.05	8.90
	16	-5.05	136.66	2.62	6.27	1.00	29.81
	17	1.17	149.99	2.06	3.56	1.06	5.16
	18	+1.33	103.37	-4.58	-10.39	1.08	5.60
	19	-1.26	112.42	9.28	20.37	1.63	4.80
	20	-6.79	67.86	3.02	6.68	6.75	21.44
	21	4.19	227.94	3.65	2.40	+4.65	-11.64
	22	+1.42	264.23	-16.17	+35.19	1.13	5.24
	23	-1.17	31.56	18.89	42.27	0.97	4.57
5	14	0.42	129.10	1.09	0.59	-0.05	-0.18
	15	-0.27	136.07	3.85	7.10	0.03	2.25
	16	-2.90	137.82	3.71	7.76	1.90	10.57
	17	1.73	135.27	3.30	7.42	2.61	-3.68
	18	-0.01	209.56	+1.26	-9.49	3.09	0.70
	19	-0.53	58.59	8.76	24.29	-1.35	3.79
	20	+3.16	182.02	3.71	7.45	5.29	10.88
	21	2.61	80.12	.3.99	7.35	-4.63	-6.38

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
	12	-0.16	297.74	-9.75	-27.54	-0.71	0.59
	13	-0.38	-39.59	37.45	42.24	1.97	3.97
1	14	-0.38	94.02	0.00	-0.06	0.00	0.31
	15	-3.24	105.64	0.79	3.42	-0.30	1.41
	16	-3.08	108.29	0.71	3.26	-0.26	1.32
	17	0.54	103.38	0.79	3.42	-0.32	-0.91
	18	-1.30	91.90	-4.70	-20.05	0.49	1.21
	19	-1.17	179.98	6.38	26.89	0.00	0.61
	20	-4.69	107.46	0.38	2.44	-0.57	2.58
	21	2.22	103.41	1.20	4.60	0.03	-3.06
	22	-1.49	106.19	0.05	0.50	-1.03	1.18
	23	-0.92	101.69	1.54	6.34	1.03	2.68
9	14	0.00	97.38	0.00	0.00	0.00	0.00
	15	0.00	97.33	0.74	1.02	-0.01	0.13
	16	1.32	98.20	0.80	1.06	-0.02	0.1
	17	1.11	96.34	0.76	1.00	-0.04	-0.06
	18	0.00	97.42	-2.43	-3.26	-0.35	0.13
	19	0.00	97.24	1.52	5.1	-0.77	1.10
	20	0.17	96.98	0.90	1.19	-0.02	0.30
	21	-0.39	97.78	0.65	0.87	-0.02	0.06
	22	0.00	92.10	-7.25	-9.57	-0.02	0.19
	23	0.00	92.56	2.90	11.56	-0.02	0.18
8	14	0.00	100.90	-0.01	-0.01	0.00	0.03
	15	0.04	126.56	1.24	1.70	0.01	-0.02
	16	-0.90	126.52	1.25	1.72	0.02	4.28
	17	1.07	120.61	1.24	1.69	-0.01	-1.48
	18	0.05	124.18	-2.50	-3.19	-0.14	-0.03
	19	0.06	124.96	4.89	6.58	0.15	-0.04
	20	0.37	124.89	1.25	1.72	-0.02	-0.53
	21	-0.26	124.23	1.22	1.67	0.04	0.46
	22	0.01	129.70	-5.97	-7.78	0.00	0.07
	23	0.10	119.42	8.46	11.14	0.02	-0.14
10	14	-0.02	140.45	-0.50	-0.26	-0.02	0.10
	15	-1.57	180.24	0.44	3.26	-0.82	6.23
	16	-5.16	144.73	0.36	3.23	-1.47	20.24
	17	0.46	163.46	0.25	3.28	-1.01	-1.98
	18	-1.51	124.99	-6.57	-13.07	-0.17	5.95
	19	-1.54	255.50	7.84	19.60	-2.87	6.31
	20	-5.13	100.34	0.60	3.20	-4.10	18.19
	21	1.98	220.15	1.28	3.32	2.46	-6.53
	22	-1.43	37.95	15.46	-35.93	-0.72	5.74
	23	-1.77	287.53	16.53	42.65	0.02	6.52
12	14	0.42	127.22	-1.09	-0.63	0.05	-0.17
	15	-0.27	195.61	1.17	5.22	-1.02	1.92
	16	-1.96	200.41	1.29	5.30	-1.93	8.19
	17	0.85	195.27	1.18	5.24	-0.00	-1.82
	18	-0.54	129.22	-3.78	-9.22	1.24	3.36
	19	-0.01	261.99	6.83	19.66	-3.29	0.48

SUPPORT REACTIONS -UNIT METRIC MTON STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
	21	-2.37	230.30	1.41	5.50	-0.75	7.65
	22	1.72	150.32	0.92	4.34	2.24	-5.81
	23	-0.42	46.86	-0.56	-23.70	-1.14	3.65
	24	-0.13	244.22	10.93	34.12	-0.91	0.19
12	14	-0.36	95.07	0.00	0.00	0.00	0.32
	15	-1.51	102.84	0.92	3.83	-0.21	1.30
	16	-4.00	103.22	0.24	1.09	-0.15	0.20
	17	0.00	102.66	0.51	3.82	0.21	-0.50
	18	-1.47	124.44	-1.51	-19.33	2.62	5.56
	19	-1.55	91.24	0.74	26.09	-3.03	1.24
	20	-3.79	194.17	1.16	4.42	0.00	5.69
	21	0.77	101.51	0.47	3.23	-0.41	-1.39
	22	-3.29	196.35	-1.19	-5.24	-0.39	2.65
	23	1.71	95.54	3.02	12.72	-0.02	1.15
14	14	1.05	109.09	-0.24	0.17	-0.02	-0.34
	15	-7.33	59.01	1.32	6.49	-0.65	22.01
	16	-23.42	-12.79	1.10	6.71	-2.11	66.31
	17	0.00	93.65	0.47	3.42	0.02	0.15
	18	-1.49	110.66	-1.71	-26.52	+1.78	99.71
	19	-7.18	6.97	30.25	33.78	-0.83	22.32
	20	-34.65	-116.71	0.95	7.15	+4.11	99.48
	21	10.91	254.34	1.68	5.94	2.98	-55.45
	22	-7.68	190.42	-31.32	+90.91	-2.25	22.31
	23	-6.59	-72.79	23.96	79.97	0.96	21.72
15	14	0.46	107.84	0.23	0.05	-0.01	-0.24
	15	-5.77	103.04	0.50	1.97	0.56	22.81
	16	-20.89	246.61	0.87	3.02	0.95	67.05
	17	2.53	169.56	0.49	1.69	0.75	+1.20
	18	-5.92	196.67	0.07	-0.44	0.36	21.92
	19	-6.03	170.41	0.52	1.16	0.77	22.56
	20	-31.84	299.25	0.76	3.85	3.16	100.60
	21	19.92	66.22	0.25	0.07	+2.02	-56.82
	22	6.11	250.69	-0.94	-0.58	-0.12	22.05
	23	-5.84	125.39	1.93	6.60	1.26	21.43
16	14	-1.52	103.36	-0.04	0.50	0.04	0.61
	15	-10.07	112.93	3.80	10.73	-0.58	99.37
	16	-25.84	133.80	3.94	10.80	+2.25	65.55
	17	-2.82	109.14	3.70	10.70	0.64	2.61
	18	-9.77	174.36	-7.24	-15.61	-0.10	22.07
	19	-10.37	51.52	44.83	37.06	-0.78	22.67
	20	-37.73	166.97	3.65	10.76	-1.92	94.81
	21	17.59	56.89	3.95	10.10	0.76	-53.07
	22	-4.92	254.52	-16.53	-41.71	0.33	22.50
	23	-10.22	-28.66	24.12	63.16	-1.49	92.04
17	14	1.37	49.58	-0.37	0.22	-0.01	-1.63
	15	-0.91	45.22	-0.29	0.97	0.40	2.48
	16	-5.34	36.05	-0.36	1.64	0.59	11.17
	17	2.98	60.07	-0.24	0.76	0.69	-0.71

SUPPORT REACTIONS -UNIT KNON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM-Z
	10	0.03	46.89	-1.36	-1.37	0.58	2.45
	11	-0.04	43.54	0.70	1.04	0.21	2.50
	20	-2.05	33.83	-0.27	0.81	3.58	8.77
	21	2.08	56.60	-0.30	-0.71	-1.73	-3.81
	22	0.06	50.95	-0.03	-0.76	0.82	2.49
	23	-0.07	36.47	1.44	1.05	-2.53	-1.54
18	14	-1.35	47.35	-0.06	0.78	-0.01	0.96
	15	-7.79	41.05	3.69	7.41	0.37	4.72
	16	-9.91	50.65	3.04	7.47	0.60	14.69
	17	1.80	26.12	2.33	1.19	0.60	-3.05
	19	-2.76	47.23	-8.30	-10.72	0.94	8.45
	19	-2.83	36.80	10.35	25.54	0.21	6.57
	20	-6.25	42.58	7.33	9.70	2.55	11.65
	21	0.07	29.53	3.14	4.11	-1.24	-2.62
	22	-7.72	58.87	10.11	-27.39	0.72	4.41
	23	-7.87	33.24	10.39	26.96	0.39	6.53

********** END OF LATEST ANALYSIS RESULT **********

244. LOAD LIST 20 TO 33
245. START CONCRETE DESIGN
246. CODE INDIAN
247. FC 2549.11 ALL
248. CLEAR 0.05 MEMB 37 TO 52 55
249. DESIGN BEAM 37 TO 52 55

B E A M N O. 37 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 6000.0 mm SIZE: 450.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1500.0 mm	3000.0 mm	4500.0 mm	6000.0 mm
TOP REINF.	1707.42 (Sq. mm)	909.48 (Sq. mm)	777.90 (Sq. mm)	777.90 (Sq. mm)	1651.13 (Sq. mm)
BOTTOM REINF.	2429.06 (Sq. mm)	1448.15 (Sq. mm)	775.06 (Sq. mm)	776.04 (Sq. mm)	845.49 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1500.0 mm	3000.0 mm	4500.0 mm	6000.0 mm
TOP REINF.	16-25\ 2 layer(s)	9-25\ 1 layer(s)	7-25\ 1 layer(s)	7-25\ 1 layer(s)	10-25\ 2 layer(s)
BOTTOM REINF.	6-25\ 1 layer(s)	3-25\ 2 layer(s)	3-25\ 1 layer(s)	3-25\ 1 layer(s)	7-25\ 2 layer(s)
SHEAR REINF.	2 legged 8\ @ 200 mm c/c	2 legged 8\ @ 200 mm c/c	2 legged 8\ @ 200 mm c/c	2 legged 8\ @ 200 mm c/c	2 legged 8\ @ 200 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1369.0 mm AWAY FROM START SUPPORT
VY = -165.03 MX = -0.84 LD= 30
Provide 2 Legged 8\ @ 200 mm c/c

SHEAR DESIGN RESULTS AT 1190.0 mm AWAY FROM END SUPPORT
VY = -205.37 MX = -0.84 LD= 30
Provide 2 Legged 8\ @ 200 mm c/c

B E A M N O. 38 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 7000.0 mm SIZE: 450.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1750.0 mm	3500.0 mm	5250.0 mm	7000.0 mm
TOP REINF.	1067.66 (Sq. mm)	710.87 (Sq. mm)	710.87 (Sq. mm)	1209.45 (Sq. mm)	2391.81 (Sq. mm)
BOTTOM REINF.	1180.24 (Sq. mm)	710.87 (Sq. mm)	710.87 (Sq. mm)	960.77 (Sq. mm)	1369.11 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1750.0 mm	3500.0 mm	5250.0 mm	7000.0 mm
TOP REINF.	6-16\$ 3 layer(s)	4-16\$ 1 layer(s)	4-16\$ 1 layer(s)	7-16\$ 1 layer(s)	12-16\$ 2 layer(s)
BOTTOM REINF.	16-20\$ 2 layer(s)	12-16\$ 1 layer(s)	10-16\$ 1 layer(s)	11-16\$ 2 layer(s)	17-16\$ 2 layer(s)
SHEAR REINF.	2 legged @ 200 mm c/c	2 legged @ 200 mm c/c	2 legged @ 200 mm c/c	2 legged @ 200 mm c/c	2 legged @ [illegible] mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1350.0 mm AWAY FROM START SUPPORT
VY = 121.79 MZ = 2.25 LD= 31
Provide 2 Legged @ c 200 mm c/c

SHEAR DESIGN RESULTS AT 1340.0 mm AWAY FROM END SUPPORT
VY = -163.68 MZ = 2.49 LD= 30
Provide 2 Legged @ @ 200 mm c/c

B E A M N O. 59 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3000.0 mm SIZE: 600.0 mm X 800.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	1398.64 (Sq. mm)	702.00 (Sq. mm)	696.33 (Sq. mm)	609.54 (Sq. mm)	614.05 (Sq. mm)
BOTTOM REINF.	856.32 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	1240.02 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	7-16ϕ 1 layer(s)	6-16ϕ 1 layer(s)	4-16ϕ 2 layer(s)	4-16ϕ 1 layer(s)	5-16ϕ 2 layer(s)
BOTTOM REINF.	6-12ϕ 1 layer(s)	6-12ϕ 1 layer(s)	6-12ϕ 1 layer(s)	6-12ϕ 1 layer(s)	6-12ϕ 1 layer(s)
SHEAR REINF.	2 legged 10ϕ @ 240 mm c/c	2 legged 10ϕ @ 190 mm c/c	2 legged 10ϕ @ 190 mm c/c	2 legged 10ϕ @ 190 mm c/c	2 legged 10ϕ @ 240 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1240.0 mm AWAY FROM START SUPPORT
VY = 36.81 KN Z = -54.27 LC= 20
Provide 2 Legged 10ϕ @ 190 mm c/c

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM END SUPPORT
VY = 31.24 KN Z = 56.27 LC= 20
Provide 2 Legged 10ϕ @ 190 mm c/c

B E A M NO. 49 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5000.0 mm SIZE: 400.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	989.80 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	0.00 (Sq. mm)	606.27 (Sq. mm)
BOTTOM REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	5-16ϕ 1 layer(s)	4-16ϕ 1 layer(s)	4-16ϕ 2 layer(s)	4-16ϕ 1 layer(s)	4-16ϕ 1 layer(s)
BOTTOM REINF.	3-20ϕ 1 layer(s)	3-20ϕ 1 layer(s)	3-20ϕ 1 layer(s)	3-20ϕ 1 layer(s)	3-20ϕ 1 layer(s)
SHEAR REINF.	2 legged 8ϕ @ 220 mm c/c	2 legged 8ϕ @ 220 mm c/c	2 legged 8ϕ @ 220 mm c/c	2 legged 8ϕ @ 220 mm c/c	2 legged 8ϕ @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM START SUPPORT
VY = 81.45 MX = -1.64 LD= 33
Provide 2 Legged 10i @ 240 mm c/c

SHEAR DESIGN RESULTS AT 990.0 mm AWAY FROM END SUPPORT
VY = 55.49 MX = -1.64 LD= 31
Provide 2 Legged 10i @ 240 mm c/c

B E A M N O. 41 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5000.0 mm SIZE: 400.0 mm X 840.0 mm COVER: 50.0 mm.

SUMMARY OF REINF AREA (Sq.mm.)

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	671.33 (Sq. mm)
BOTTOM REINF.	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	671.14 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	6-12i 1 layer(s)	6-12i 1 layer(s)	6-12i 1 layer(s)	6-12i 1 layer(s)	6-12i 1 layer(s)
BOTTOM REINF.	6-12i 1 layer(s)	6-12i 1 layer(s)	6-12i 1 layer(s)	6-12i 1 layer(s)	6-12i 1 layer(s)
SHEAR REINF.	2 legged 8i @ 220 mm c/c	2 legged 8i @ 220 mm c/c	2 legged 8i @ 220 mm c/c	2 legged 8i @ 220 mm c/c	2 legged 8i @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 990.0 mm AWAY FROM START SUPPORT
VY = 66.92 MX = 0.00 LD= 33
Provide 2 Legged 10i @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM END SUPPORT
VY = -58.79 MX = 1.39 LD= 32
Provide 2 Legged 10i @ 240 mm c/c

BEAM NO. 42 DESIGN RESULTS

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3000.0 mm SIZE: 400.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	1063.78 (Sq. mm)	610.36 (Sq. mm)	610.36 (Sq. mm)	610.36 (Sq. mm)	690.76 (Sq. mm)
BOTTOM REINF.	711.35 (Sq. mm)	699.54 (Sq. mm)	699.54 (Sq. mm)	699.54 (Sq. mm)	861.09 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	16-16Φ 2 layer(s)	8-16Φ 1 layer(s)	8-20Φ 1 layer(s)	8-20Φ 1 layer(s)	8-16Φ 1 layer(s)
BOTTOM REINF.	16-16Φ 2 layer(s)	8-16Φ 1 layer(s)	8-16Φ 1 layer(s)	8-20Φ 1 layer(s)	11-16Φ 2 layer(s)
SHEAR REINF.	2 legged 8Φ @ 240 mm c/c	2 legged 8Φ @ 240 mm c/c	2 legged 8Φ @ 240 mm c/c	2 legged 8Φ @ 240 mm c/c	2 legged 8Φ @ 240 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM START SUPPORT
VY = 158.99 MX = 5.35 LD= 33
Provide 2 Legged 16Φ @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1240.0 mm AWAY FROM END SUPPORT
VY = 151.38 MX = 5.35 LD= 33
Provide 2 Legged 16Φ @ 240 mm c/c

BEAM NO. 43 DESIGN RESULTS

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3500.0 mm SIZE: 400.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	875.0 mm	1750.0 mm	2625.0 mm	3500.0 mm
TOP REINF.	1194.44 (Sq. mm)	607.90 (Sq. mm)	901.90 (Sq. mm)	601.90 (Sq. mm)	719.18 (Sq. mm)
BOTTOM REINF.	791.05 (Sq. mm)	606.21 (Sq. mm)	606.21 (Sq. mm)	606.21 (Sq. mm)	941.36 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	875.0 mm	1750.0 mm	2625.0 mm	3500.0 mm
TOP REINF.	5-16Ø 1 layer(s)	4-16Ø 1 layer(s)	4-16Ø 1 layer(s)	4-16Ø 1 layer(s)	4-16Ø 1 layer(s)
BOTTOM REINF.	3-20Ø 1 layer(s)	3-20Ø 1 layer(s)	3-20Ø 1 layer(s)	3-20Ø 1 layer(s)	3-20Ø 1 layer(s)
SHEAR REINF.	2 legged @ 200 mm c/c	2 legged @ 200 mm c/c	2 legged @ 220 mm c/c	2 legged @ 220 mm c/c	2 legged @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1246.0 mm AWAY FROM START SUPPORT
VY = 151.91 MZ = 2.60 LD= 33
Provide 2 Legged 10Ø @ 200 mm c/c

SHEAR DESIGN RESULTS AT 1246.0 mm AWAY FROM END SUPPORT
VY = 144.53 MZ = -3.50 LD= 33
Provide 2 Legged 10Ø @ 240 mm c/c

B E A M N O. 44 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 7000.0 mm SIZE: 400.0 mm X 800.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1750.0 mm	3500.0 mm	5250.0 mm	7000.0 mm
TOP REINF.	847.09 (Sq. mm)	609.54 (Sq. mm)	0.00 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)
BOTTOM REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	875.0 mm	1750.0 mm	2625.0 mm	3500.0 mm
TOP REINF.	6-12t 1 layer(s)	6-12t 1 layer(s)	2-12t 1 layer(s)	6-12t 1 layer(s)	6-12t 1 layer(s)
BOTTOM REINF.	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)
SHEAR REINF.	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1050.0 mm AWAY FROM START SUPPORT
VY = 60.58 KN, MZ = 0.41 KN-M
Provide 2 Legged 8t @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1050.0 mm AWAY FROM END SUPPORT
VY = 45.71 KN, MZ = 1.03 KN-M
Provide 2 Legged 8t @ 240 mm c/c

B E A M N O. 45 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3500.0 mm SIZE: 450.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	875.0 mm	1750.0 mm	2625.0 mm	3500.0 mm
TOP REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)
BOTTOM REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	875.0 mm	1750.0 mm	2625.0 mm	3500.0 mm
TOP REINF.	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)
BOTTOM REINF.	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)	3-20t 1 layer(s)
SHEAR REINF.	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c	2 legged 8t @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1240.0 mm AWAY FROM START SUPPORT
VY = 19.73 MX = -21.95 LD= 30
Provide 2 Legged 10i @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1340.0 mm AWAY FROM END SUPPORT
VY = 10.51 MX = -21.95 LD= 30
Provide 2 Legged 10i @ 240 mm c/c

BEAM NO. 40 DESIGN RESULTS

Fck Fy=415 (Main) Fy=415 (Sec.)

LENGTH: 9000.0 mm SIZE: 450.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1500.0 mm	3000.0 mm	4500.0 mm	6000.0 mm
TOP REINF.	1924.92 (Sq. mm)	867.60 (Sq. mm)	777.90 (Sq. mm)	777.90 (Sq. mm)	1124.... (Sq. mm)
BOTTOM REINF.	799.26 (Sq. mm)	777.90 (Sq. mm)	777.90 (Sq. mm)	810.96 (Sq. mm)	1560.8 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1500.0 mm	3000.0 mm	4500.0 mm	6000.0 mm
TOP REINF.	4-25i 1 layer(s)	3-25i 1 layer(s)	3-25i 1 layer(s)	3-25i 1 layer(s)	3-25i 1 layer(s)
BOTTOM REINF.	5-12i 1 layer(s)	7-12i 1 layer(s)	7-12i 1 layer(s)	8-12i 1 layer(s)	14-12i 2 layer(s)
SHEAR REINF.	2 legged 8i @ 200 mm c/c	2 legged 8i @ 200 mm c/c	2 legged 8i @ 200 mm c/c	2 legged 8i @ 200 mm c/c	2 legged 8i @ 200 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1340.0 mm AWAY FROM START SUPPORT
VY = 180.20 MX = -1.54 LD= 30
Provide 2 Legged 10i @ 280 mm c/c

SHEAR DESIGN RESULTS AT 1340.0 mm AWAY FROM END SUPPORT
VY = 142.18 MX = -1.54 LD= 30
Provide 2 Legged 10i @ 280 mm c/c

B E A M N O. 47 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3000.0 mm SIZE: 400.0 mm X 800.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	1043.75 (Sq. mm)	931.08 (Sq. mm)	630.36 (Sq. mm)	610.36 (Sq. mm)	1275.71 (Sq. mm)
BOTTOM REINF.	1719.45 (Sq. mm)	650.78 (Sq. mm)	610.36 (Sq. mm)	610.36 (Sq. mm)	1141.10 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	16-16¢ 2 layer(s)	8-16¢ 1 layer(s)	8-16¢ 1 layer(s)	8-16¢ 1 layer(s)	16-16¢ 2 layer(s)
BOTTOM REINF.	16-16¢ 2 layer(s)	8-16¢ 1 layer(s)	8-16¢ 1 layer(s)	8-16¢ 1 layer(s)	16-16¢ 2 layer(s)
STIRR. REINF.	2 legged 8¢ @ 220 mm c/c	2 legged 8¢ @ 220 mm c/c	2 legged 8¢ @ 220 mm c/c	2 legged 8¢ @ 220 mm c/c	2 legged 8¢ @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1210.0 mm AWAY FROM START SUPPORT
Vr = -201.28 MX = 4.49 LD= 31
Provide 2 Legged 10¢ @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM END SUPPORT
Vr = -206.89 MX = 4.49 LD= 33
Provide 2 Legged 10¢ @ 240 mm c/c

B E A M N O. 48 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5000.0 mm SIZE: 400.0 mm X 800.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	785.28 (Sq. mm)
BOTTOM REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	9-10| 1 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)
BOTTOM REINF.	10-10| 2 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)
SHEAR REINF.	2 legged @ 2 @ 250 mm c/c	2 legged @ 2 @ 250 mm c/c	2 legged @ 2 @ 250 mm c/c	2 legged @ 2 @ 250 mm c/c	2 legged @ 2 @ 250 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM START SUPPORT
VY = 59.11 MZ = 1.13 LD= 22
Provide 2 legged 10@ @ 260 mm c/c

SHEAR DESIGN RESULTS AT 930.0 mm AWAY FROM END SUPPORT
VY = -73.82 MZ = 1.36 LD= 11
Provide 2 legged 10@ @ 260 mm c/c

B E A M N O. 49 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5000.0 mm SIZE: 600.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	609.54 (Sq. mm)	785.28 (Sq. mm)
BOTTOM REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1250.0 mm	2500.0 mm	3750.0 mm	5000.0 mm
TOP REINF.	8-10| 1 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)	8-10| 1 layer(s)	10-10| 2 layer(s)
BOTTOM REINF	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)
SHEAR REINF.	2 legged @| @ 220 mm c/c	2 legged @| @ 220 mm c/c	2 legged @| @ 220 mm c/c	2 legged @| @ 220 mm c/c	2 legged @| @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 690.0 mm AWAY FROM START SUPPORT
VY = 62.31 MX = -0.94 LD= 32
Provide 2 Legged (8) @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM END SUPPORT
VY = -65.29 MX = -0.78 LD= 31
Provide 2 Legged (8) @ 240 mm c/c

B E A M NO. 59 D E S I G N R E S U L T S

MEMB Fe415 (Main) Fe415 (Sec.)

LENGTH: 3000.0 mm SIZE: 400.0 mm X 600.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	1017.24 (Sq. mm)	763.67 (Sq. mm)	603.90 (Sq. mm)	603.90 (Sq. mm)	1040.34 (Sq. mm)
BOTTOM REINF.	1039.35 (Sq. mm)	687.90 (Sq. mm)	603.90 (Sq. mm)	690.18 (Sq. mm)	1365.99 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	750.0 mm	1500.0 mm	2250.0 mm	3000.0 mm
TOP REINF.	5-20| 2 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	4-20| 1 layer(s)
BOTTOM REINF.	6-16| 1 layer(s)	4-16| 1 layer(s)	4-16| 1 layer(s)	4-16| 1 layer(s)	3-16| 1 layer(s)
SHEAR REINF.	2 legged @| @ 220 mm c/c	2 legged @| @ 180 mm c/c	2 legged @| @ 180 mm c/c	2 legged @| @ 180 mm c/c	2 legged @| @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1240.0 mm AWAY FROM START SUPPORT
VY = 219.15 MX = -7.84 LD= 35
Provide 2 Legged 10 @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1140.0 mm AWAY FROM END SUPPORT
VY = 196.52 MX = -7.81 LD= 33
Provide 2 Legged 10 @ 240 mm c/c

B E A M N O. 61 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 4000.0 mm SIZE: 600.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1000.0 mm	2000.0 mm	3000.0 mm	4000.0 mm
TOP REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)
BOTTOM REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1000.0 mm	2000.0 mm	3000.0 mm	4000.0 mm
TOP REINF.	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)
BOTTOM REINF.	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)	3-20| 1 layer(s)
SHEAR REINF.	2 legged @| @ 220 mm c/c	2 legged @| @ 200 mm c/c	2 legged @| @ 200 mm c/c	2 legged @| @ 200 mm c/c	2 legged @| @ 220 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1240.0 mm AWAY FROM START SUPPORT
VY = 8.44 MX = 33.84 LD= 29
Provide 2 Legged 10@ @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1190.0 mm AWAY FROM END SUPPORT
VY = -5.78 MX = 33.84 LD= 29
Provide 2 Legged 10@ @ 240 mm c/c

B E A M N O. 52 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 4000.0 mm SIZE: 400.0 mm X 600.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1000.0 mm	2000.0 mm	3000.0 mm	4000.0 mm
TOP REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)
BOTTOM REINF.	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)	606.27 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1000.0 mm	2000.0 mm	3000.0 mm	4000.0 mm
TOP REINF.	3-20$ 1 layer(s)	3-20$ 1 layer(s)	3-20$ 1 layer(s)	3-20$ 1 layer(s)	3-20$ 1 layer(s)
BOTTOM REINF.	3-20$ 1 layer(s)	3-20$ 1 layer(s)	3-20$ 1 layer(s)	3-20$ 1 layer(s)	3-20$ 1 layer(s)
SHEAR REINF.	2 legged 8$ @ 200 mm c/c	2 legged 8$ @ 250 mm c/c	2 legged 8$ @ 190 mm c/c	2 legged 8$ @ 190 mm c/c	2 legged 8$ @ 200 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1240.0 mm AWAY FROM START SUPPORT
VY = 6.39 MX = 34.62 LD= 29
Provide 2 Legged 10$ @ 240 mm c/c

SHEAR DESIGN RESULTS AT 1150.0 mm AWAY FROM END SUPPORT
VY = -20.59 MX = 34.62 LD= 29
Provide 2 Legged 10$ @ 240 mm c/c

B E A M N O. 55 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 7000.0 mm SIZE: 450.0 mm X 900.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1750.0 mm	3500.0 mm	5250.0 mm	7000.0 mm
TOP REINF.	1049.46 (Sq. mm)	777.90 (Sq. mm)	0.00 (Sq. mm)	777.90 (Sq. mm)	1178.71 (Sq. mm)
BOTTOM REINF.	1525.47 (Sq. mm)	871.39 (Sq. mm)	774.22 (Sq. mm)	774.22 (Sq. mm)	774.22 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1750.0 mm	3500.0 mm	5250.0 mm	7000.0 mm
TOP REINF.	10-1 layer(s)	7-12 1 layer(s)	3-12 1 layer(s)	7-12 1 layer(s)	16-12 2 layer(s)
BOTTOM REINF.	5-20 1 layer(s)	3-20 1 layer(s)	3-20 1 layer(s)	3-20 1 layer(s)	3-20 1 layer(s)
SHEAR REINF.	2 legged 8l @ 200 mm c/c	2 legged 8l @ 200 mm c/c	2 legged 8l @ 200 mm c/c	2 legged 8l @ 200 mm c/c	2 legged 8l @ 200 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 1340.0 mm AWAY FROM START SUPPORT
VY = 106.03 MT = 1.31 LD= 30
Provide 2 legged 8@ @ 200 mm c/c

SHEAR DESIGN RESULTS AT 1340.0 mm AWAY FROM END SUPPORT
VY = -156.10 MT = 2.11 LD= 30
Provide 2 legged 8@ @ 200 mm c/c

**********END OF BEAM DESIGN RESULTS**********

250. CLEAR 0.05 MEMB 1 TO 12 15 TO 34
251. DESIGN COLUMN 1 TO 12 15 TO 34

C O L U M N N O. 1 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 30 END JOINT: 1 SHORT COLUMN

REQD. STEEL AREA : 12108.78 Sq.mm.
REQD. CONCRETE AREA: 987891.25 Sq.mm.
MAIN REINFORCEMENT : Provide 40 - 20 dia. (1.26%, 12566.37 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. Rectangular ties @ 300 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 19245.75 Muz : 1742.18 Muy : 1742.18

INTERACTION RATIO: 1.00 (as per cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS MET)

WORST LOAD CASE: 30
END JOINT: 1 Pu : 13360.42 Mux : 1803.71 Muy : 1801.71 CR: 0.97

C O L U M N N O. 4 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 30 END JOINT: 19 SHORT COLUMN

REQD. STEEL AREA : 9265.12 Sq.mm.
REQD. CONCRETE AREA: 978736.88 Sq.mm.
MAIN REINFORCEMENT : Provide 84 - 12 dia. (0.95%, 9950.10 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 12483.52 Muz1 : 1341.51 Muy1 : 1341.51

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 33
END JOINT: 19 Puz : 12546.52 Muz : 1374.22 Muy : 1374.22 IR: 1.07

< C O L U M N N O. 3 D E S I G N R E S U L T S

Fe415 (Main) Fe415 (Sec.

LENGTH: 3700.0 mm CROSS SECTION: 300.0 mm X 1000.0 mm COVER: 40.0 mm

** GOVERNING LOAD CASE: 33 END JOINT: 4 SHORT COLUMN

REQD. STEEL AREA : 3331.23 Sq.mm.
REQD. CONCRETE AREA: 416403.66 Sq.mm.
MAIN REINFORCEMENT : Provide 32 - 12 dia. (0.45%, 3619.11 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 9099.37 Muz1 : 709.94 Muy1 : 551.86

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 33
END JOINT: 4 Puz : 10085.73 Muz : 741.19 Muy : 584.08 IR: 0.94

C O L U M N N O. 4 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 cm CROSS SECTION: 800.0 mm X 1300.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 33 END JOINT: 22 SHORT COLUMN

REQD. STEEL AREA : 2190.40 Sq.mm.
REQD. CONCRETE AREA: 281299.50 Sq.mm.
MAIN REINFORCEMENT : Provide 20 - 12 dia. (0.28%, 2261.95 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 150 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 9735.11 Muz1 : 586.74 Muy1 : 487.58

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 33
END JOINT: 22 Puz : 9678.58 Muz : 588.52 Muy : 448.95 IR: 0.99

C O L U M N N O. 5 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 cm CROSS SECTION: 500.0 mm X 600.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 25 END JOINT: 8 SHORT COLUMN

REQD. STEEL AREA : 605.07 Sq.mm.
REQD. CONCRETE AREA: 35033.93 Sq.mm.
MAIN REINFORCEMENT : Provide 8 - 12 dia. (0.30%, 904.78 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 3556.52 Muz1 : 230.39 Muy1 : 190.61

INTERACTION RATIO: 0.16 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 33
END JOINT: 26 Puz : 3646.43 Muz : 219.57 Muy : 180.03 IR: 0.06

C O L U M N N O. 6 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3500.0 mm CROSS SECTION: 600.0 mm X 700.0 mm COVER 40.0 mm

** GIVING LOAD CASE: 35 END JOINT: 26 SHORT COLUMN

REQD. STEEL AREA : 539.00 Sq.mm.
REQD. CONCRETE AREA: 69462.99 Sq.mm.
MAIN REINFORCEMENT : Provide 8 - 12 dia. (0.30%, 904.78 Sq.mm.
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 3645.43 Muz1 : 0.00 Muy1 : 0.00

INTERACTION RATIO: 0.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 33
END JOINT: 26 Puz : 3646.43 Muz : 210.27 Muy : 172.81 IR: 0.28

C O L U M N N O. 7 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 900.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 32 END JOINT: 10 SHORT COLUMN

REQD. STEEL AREA : 2499.59 Sq.mm.
REQD. CONCRETE AREA: 312448.47 Sq.mm.
MAIN REINFORCEMENT : Provide 24 - 12 dia. (0.34%, 2714.34 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 9769.82 Muz1 : 504.45 Muy1 : 475.61

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 32
END JOINT: 10 Pur : 9814.30 Muz : 536.54 Muy : 502.31 IR: 0.95

C O L U M N N O. 8 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3000.0 mm CROSS SECTION: 600.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 33 END JOINT: 28 SHORT COLUMN

REQD. STEEL AREA : 2212.81 Sq.mm.
REQD. CONCRETE AREA: 276600.62 Sq.mm.
MAIN REINFORCEMENT : Provide 10 - 12 dia. (0.26%, 2261.95 Sq.mm)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 195 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 9685.84 Muz1 : 1251.30 Muy1 : 994.08

INTERACTION RATIO: 0.44 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 33
END JOINT: 28 Puz : 9678.58 Muz : 1252.01 Muy : 959.47 IR: 0.44

C O L U M N N O. 9 D E S I G N R E S U L T S

MEMB Fails (Main) Fails (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDED LOAD CASE: 30 END JOINT: 14 TENSION COLUMN

REQD. STEEL AREA : 11977.01 Sq.mm.
REQD. CONCRETE AREA: 988522.94 Sq.mm.
MAIN REINFORCEMENT : Provide 60 - 16 dia. (1.21%, 12063.72 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 305 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 13310.66 Muz1 : 1255.67 Muy1 : 1255.67

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 30
END JOINT: 14 Puz : 13233.68 Muz : 1275.00 Muy : 1275.00 IR: 0.98

C O L U M N N O. 10 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm. CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 30 END JOINT: 32 TENSION COLUMN

REQD. STEEL AREA : 7680.74 Sq.mm.
REQD. CONCRETE AREA: 961000.00 Sq.mm.
MAIN REINFORCEMENT : Provide 60 - 12 dia. (0.77%, 7696.62 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 6 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 13080.97 Muz : 595.96 Muy : 595.96

INTERACTION RATIO: 0.99 (as per Cl. 39.7, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 30
END JOINT: 32 Puz : 12061.47 Muz : 600.27 Muy : 600.13 SR: 0.99

C O L U M N N O. 11 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 700.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 30 END JOINT: 2 SHORT COLUMN

REQD. STEEL AREA : 6523.13 Sq.mm.
REQD. CONCRETE AREA: 633176.88 Sq.mm.
MAIN REINFORCEMENT : Provide 36 - 16 dia. (1.03%, 7238.23 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 255 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 9921.94 Muz : 1459.47 Muy : 996.19

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 30
END JOINT: 2 Puz : 10016.47 Muz : 1521.67 Muy : 1032.05 IR: 0.96

COLUMN NO. 12 DESIGN RESULTS

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 700.0 mm X 1400.0 mm COVER: 50.0 mm

** GOVERNING LOAD CASE: 25 END JOINT: 20 SHORT COLUMN

REQD. STEEL AREA : 975.38 Sq.mm.
REQD. CONCRETE AREA: 126137.38 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 32 dia. (0.19%, 9651.31 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 9382.15 Muz : 0.00 Muy : 0.00

INTERACTION RATIO: 0.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 25
END JOINT: 20 Puz : 7363.79 Muz : 0.00 Muy : 0.00 IR: 0.19

C O L U M N N O. 19 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2100.0 mm CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 20 END JOINT: 3 SHORT COLUMN

REQD. STEEL AREA : 5027.01 Sq.mm.
REQD. CONCRETE AREA: 729451.25 Sq.mm.
MAIN REINFORCEMENT : Provide 52 - 12 dia. (0.59%, 5801.06 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Pur : 13998.29 Mud : 1800.99 Muy : 1800.99

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 3C
END JOINT: 4 Puc : 13014.32 Mux : 1806.77 Muy : 1806.77 UR: 0.99

C O L U M N N O. 15 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 3C END JOINT: 21 SHORT COLUMN

REQD. STEEL AREA : 3349.04 Sq.mm.
REQD. CONCRETE AREA: 419675.96 Sq.mm.
MAIN REINFORCEMENT : Provide 32 - 12 dia. (0.36%, 3619.11 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 10897.71 Muz1 : 506.56 Muy1 : 946.46

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 22
END JOINT: 21 Puz : 10978.10 Muz : 509.59 Muy : 949.93 IR: 0.93

C O L U M N NO. 17 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 800.0 mm X 1000.0 mm COVER: 50.0 mm.

** GUIDING LOAD CASE: 33 END JOINT: 7 TENSION COLUMN

REQD. STEEL AREA : 3208.77 Sq.mm.
REQD. CONCRETE AREA: 619606.19 Sq.mm.
MAIN REINFORCEMENT : Provide 48 - 12 dia. (0.59%, 5428.67 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 9396.23 Muz1 : 689.16 Muy1 : 560.56

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 33
END JOINT: 6 Puz : 9455.16 Muz : 723.99 Muy : 568.02 IR: 0.94

C O L U M N N O. 15 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 900.0 MM X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 33 END JOINT: 30 TENSION COLUMN

REQD. STEEL AREA : 4823.90 Sq.mm.
REQD. CONCRETE AREA: 901987.12 Sq.mm.
MAIN REINFORCEMENT : Provide 24 - 16 dia. (0.60%, 4825.49 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 255 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Pur : 9293.05 Muz1 : 937.25 Muy1 : 501.1

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 31
END JOINT: 24 Puz : 9293.47 Muz : 938.05 Muy : 501.05 IR: 1.00

C O L U M N N O. 19 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 900.0 mm X 600.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 25 END JOINT: 9 SHORT COLUMN

REQD. STEEL AREA : 1314.65 Sq mm.
REQD. CONCRETE AREA: 161331.17 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.45%, 3357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 3769.40 Muz : 309.10 Muy : 253.81

INTERACTION RATIO: 0.13 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 25
END JOINT: 9 Puz : 3369.79 Muz : 0.00 Muy : 0.00 IR: 0.04

C O L U M N NO. 20 D E S I G N R E S U L T S

BEAM Field (Main) Field (Sec.)

LENGTH: 1800.0 mm CROSS SECTION: 600.0 mm X 600.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 25 END JOINT: 21 SHORT COLUMN

REQD. STEEL AREA : 1268.13 Sq.mm.
REQD. CONCRETE AREA: 150515.77 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.45%, 3357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 3755.45 Muz : 310.09 Muy : 254.60

INTERACTION RATIO: 0.11 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 25
END JOINT: 21 Puz : 3363.79 Muz : 0.00 Muy : 0.00 IR: 0.13

C O L U M N N O. 2: D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 600.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 25 END JOINT: 7 SHORT COLUMN

REQD. STEEL AREA : 1312.87 Sq.mm.
REQD. CONCRETE AREA: 539100.00 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.25%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 4400.80 Muz : 618.23 Muy : 430.31

INTERACTION RATIO: 0.18 (as per Cl. 39.6, IS:456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 25
END JOINT: 7 Puz : 6487.15 Muz : 660.78 Muy : 494.00 IR: 0.79

C O L U M N N O. 22 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1000.0 mm CROSS SECTION: 600.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 25 END JOINT: 25 SHORT COLUMN

REQD. STEEL AREA : 1056.22 Sq.mm.
REQD. CONCRETE AREA: 130028.06 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.25%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 6391.67 Muz1 : 616.29 Muy1 : 406.01

INTERACTION RATIO: 0.14 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 24
END JOINT: 25 Puz : 6687.15 Muz : 649.63 Muy : 426.45 IR: 0.41

COLUMN NO. 28 DESIGN RESULTS

M15 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3700.0 mm GROSS SECTION: 900.0 mm X 3000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 33 END JOINT: 12 SHORT COLUMN

REQD. STEEL AREA : 2907.35 Sq.mm.
REQD. CONCRETE AREA: 363418.25 Sq.mm.
MAIN REINFORCEMENT : Provide 28 - 12 dia. (0.43%, 3166.73 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 9973.20 Muz1 : 1309.51 Muy1 : 1191.66

INTERACTION RATIO: 0.31 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 33
END JOINT: 30 Puz : 9848.84 Muz : 0.00 Muy : 0.00 IR: 0.45

C O L U M N N O. 24 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 800.0 mm X 1000.0 mm COVER: 50.0 mm

** GOVERNING LOAD CASE: 33 END JOINT: 30 SHORT COLUMN

REQD. STEEL AREA : 2761.60 Sq.mm.
REQD. CONCRETE AREA: 345202.12 Sq.mm.
MAIN REINFORCEMENT : Provide 28 - 12 dia. (0.40%, 3166.72 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 150 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Pu : 9020.43 Mux1 : 1370.91 Muy1 : 1081.28

INTERACTION RATIO: 0.78 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 33
END JOINT: 49 Pud : 8848.84 Mux : 0.00 Muy : 0.00 [R: 0.0]

C O L U M N N O. 25 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GOVERNING LOAD CASE: 33 END JOINT: 16 TENSION COLUMN

REQD. STEEL AREA : 7193.23 Sq.mm.
REQD. CONCRETE AREA: 999153.25 Sq.mm.
MAIN REINFORCEMENT : Provide 64 - 32 dia. (0.795, 7238.23 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Pur : 11929.15 Muz : 3098.91 Muy : 1008.22

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 33
END JOINT: 16 Pur : 11960.21 Muz : 1015.94 Muy : 1015.96 IR: 0.99

C O L U M N N O. 26 D E S I G N R E S U L T S

MEMB Pedis (Main) Pedis (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 1000.0 mm x 1000.0 mm COVER: 50.0 mm

** GOVERNING LOAD CASE: 33 END JOINT: 34 TENSION CRITICAL

REQD. STEEL AREA : 5063.80 Sq.mm.
REQD. CONCRETE AREA: 992974.69 Sq.mm.
MAIN REINFORCEMENT : Provide 48 - 32 dia. (0.595, 5428.67 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Pur : 11357.35 Muz : 600.74 Muy : 600.74

INTERACTION RATIO: 0.97 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 33
END JOINT: 34 Pur : 11455.16 Muz : 660.66 Muy : 660.66 IR: 0.98

C O L U M N N O. 27 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 600.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 29 END JOINT: 11 SHORT COLUMN

REQD. STEEL AREA : 1305.36 Sq.mm.
REQD. CONCRETE AREA: 562923.97 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.25%, 1357.17 Sq.mm
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 6466.00 Muz1 : 523.64 Muy1 : 342.78

INTERACTION RATIO: 0.9= (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 29
END JOINT) 11 Puz : 5482.15 Muz : 513.19 Muy : 349.00 SR: 0.97

C O L U M N N O. 28 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1000.0 mm CROSS SECTION: 600.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 25 END JOINT: 31 SHORT COLUMN

REQD. STEEL AREA : 1024.56 Sq.mm.
REQD. CONCRETE AREA: 129079.21 Sq.mm.
MAIN REINFORCEMENT : Prov.de 12 - 12 dia. (0.55%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 6382.37 Muz1 : 601.59 Muy1 : 397.71

INTERACTION RATIO: 0.15 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 39
END JOINT: 31 Puz : 6682.35 Muz : 919.91 Muy : 336.89 IR: 0.82

C O L U M N N O. 29 D E S I G N R E S U L T S

MEM Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 700.0 mm X 1000.0 mm COVER: [illegible] mm

** GOVERNING LOAD CASE: 33 END JOINT: 29 SHORT COLUMN

REQD. STEEL AREA : 3021.55 Sq.mm.
REQD. CONCRETE AREA: 177658.26 Sq.mm.
MAIN REINFORCEMENT : Provide 28 - 12 dia. (0.45% 3166.73 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)
Puz : 8781.41 Muz1 : 609.17 Muy1 : 414.86

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)
WORST LOAD CASE: 33
END JOINT: 29 Puz : 8825.02 Muz : 629.52 Muy : 429.01 IR: 0.97

C O L U M N N O. 30 D E S I G N R E S U L T S

M24 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 700.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 26 END JOINT: 34 SHORT COLUMN

REQD. STEEL AREA : 629.00 Sq.mm.
ADDL. CONCRETE AREA: 10360.43 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.19%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 7083.40 Muz1 : 141.71 Muy1 : 237.12

INTERACTION RATIO: 0.54 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 27
END JOINT: 16 Puz : 8282.15 Muz : 316.44 Muy : 216.33 IR: 0.70

C O L U M N N O. 31 D E S I G N R E S U L T S

M24 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 700.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 26 END JOINT: 17 SHORT COLUMN

REQD. STEEL AREA : 1034.18 Sq.mm.
REQD. CONCRETE AREA: 129271.95 Sq.cm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.19%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 8195.25 Muz1 : 313.49 Muy1 : 216.91

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 26
END JOINT: 17 Puz : 8282.15 Muz : 366.18 Muy : 252.00 ER: 0.96

C o l u m n N o. 34 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1500.0 mm CROSS SECTION: 700.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 26 END JOINT- 35 SHORT COLUMN

REQD. STEEL AREA : 532.03 Sq.mm.
REQD. CONCRETE AREA: 66503.39 Sq.cm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.19%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 8934.01 Muz1 : 199.92 Muy1 : 139.65

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 26
END JOINT: 35 Puz : 8282.15 Muz : 331.95 Muy : 228.98 ER: 0.60

C O L U M N N O. 33 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2700.0 mm CROSS SECTION: 2000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 30 END JOINT: 15 SHORT COLUMN

REQD. STEEL AREA : 2526.69 Sq.mm.
REQD. CONCRETE AREA: 935000.44 Sq.mm.
MAIN REINFORCEMENT : Provide 24 - 12 dia. (0.27%, 2714.34 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 180 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz = 12000.01 Mux) = 1490.33 Muy) = 1490.33

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 31
END JOINT: 15 Pud = 12064.30 Mux = 782.02 Muy = 782.02 IR: 0.90

C O L U M N N O. 34 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1600.0 mm CROSS SECTION: 1000.0 mm X 1000.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 30 END JOINT: 33 SHORT COLUMN

REQD. STEEL AREA : 2396.61 Sq.mm,
REQD. CONCRETE AREA: 299573.97 Sq.mm,
MAIN REINFORCEMENT : Provide 12 - 16 dia. (0.746, 2412.74 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 240 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 11948.99 Muz1 : 1646.44 Muy1 : 1646.44

INTERACTION RATIO: 0.83 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST (/0): CASE: 2)
END JOINT: 33 Puz : 11973.87 Muz : 676.34 Muy : 676.34 IR: 0.59

**********END OF COLUMN DESIGN RESULT**********

222. END CONCRETE DESIGN
223. FINISH

********** END OF THE STAAD.Pro RUN **********

**** DATE= SEP 13,2005 TIME= 10:27:13 ****

For questions on STAAD.Pro, please Contact :
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Information about the key files in the current distribution

Modification Date	CRC	Size (Bytes)	File Name
07/12/2005	0xaf01	11636736	AstroStaad.exe
12/16/2004	0xea01	04550848	AstroStaadOtl.exe
01/23/2001	0x9b40	00073728	[illegible]Gen.dll
09/19/2003	0x25c0	00081920	[illegible]Mesh.dll
09/26/2003	0x6340	00704512	MeshEngine.dll
09/27/2003	0xce00	00069632	QuadPlateEngine.dll
06/26/2006	0x91c1	00139264	SurfMesh.dll
07/11/2005	0xc7c0	02396160	dbSectionInterface.dll
06/23/2005	0x4e01	00493568	aiscsections.mdb
01/05/2005	0x19c1	00319488	aiscsections_all_editions.mdb
01/05/2005	0xdb81	01810432	aiscsteeljoists.mdb
01/05/2005	0xcac1	03651584	asj-timbersections.mdb
01/27/2005	0xeb01	00552960	australiansections.mdb
01/05/2005	0xcd01	00163840	austrailiansections.mdb
01/05/2005	0x6a01	00229376	britishsections.mdb
07/20/2005	0x3d41	00434176	bscoldformedsections.mdb
06/20/2005	0x8201	00327680	butlercoldformedsections.mdb
01/05/2005	0xaba1	00202144	canadiansections.mdb
05/31/2005	0x9e61	00450560	canadiantimbersections.mdb
05/05/2005	0x7f80	00409880	chinesesections.mdb
01/05/2005	0xd6c0	00600064	dutchsections.mdb
01/05/2005	0x1a09	00354304	europeansections.mdb
01/05/2005	0xd301	00202752	frenchsections.mdb
01/05/2005	0x11c1	00213472	germansections.mdb
01/05/2005	0x3c40	00268192	indiansections.mdb
01/05/2005	0xd540	00180224	ipcoldformedsections.mdb
02/03/2005	0x5c01	00202752	japanesesections.mdb
01/05/2005	0xb749	00134080	koreansections.mdb
02/03/2005	0xda00	00096256	lysaghtcoldformedsections.mdb
02/07/2005	0x9a00	00243712	mexicansteeltables.mdb
02/03/2005	0x9b40	00307200	russiansections.mdb
01/05/2005	0x0061	00206848	southafricansections.mdb
01/06/2005	0x9361	00196560	spanishsections.mdb
06/23/2005	0x2900	00204800	uscoldformedsections.mdb
01/05/2005	0x2ac0	00349504	usersectiontemplate.mdb
01/05/2005	0x9d41	00141312	venezuelansections.mdb

COAL HANDLING PLANT FOR SIPAT STAGE –II (2 X 500 MW) FOR NTPC

DESIGN CALCULATION OF FOUNDATION FOR TP-25

CUSTOMER	**NATIONAL THERMAL POWER CORPORATION LTD**		
CONSULTANTS	**NATIONAL THERMAL POWER CORPORATION LTD**		
MAIN CONTRACROR	**M/S THYSSENKRUPP INDUSTRIES INDIA PVT. LTD.**		
Document No.	**M070 CVL TP25 DC 20**	REV	1
		DATE	20.07.06

NTPC Document No. 9545-156-PVC-U-259-01

PROJECT :-
TITLE :

REFERENCE :

REINFORCEMENT DETAILS OF COLUMN

COLUMN GRID MARK.	COLUMN NODE MARK	SIZE	$(A_{st})_{req.}$ (mm^2)	RE-BAR PROV	LINKS
A1	7/C1	900 x 500	7200	16-25 ϕ	8 ϕ @ 300 c/c
A2	6/C2	900 x 500	2354	12-16 ϕ	8 ϕ @ 250 c/c
A3	4/C1	900 x 500	6485	16-25 ϕ	8 ϕ @ 300 c/c
A4	1/C2	900 x 300	1865	12-16 ϕ	8 ϕ @ 250 c/c
B1	10/C3	1000 x 550	1935	12-16 ϕ	8 ϕ @ 250 c/c
B4	2/C3	1000 / 550	1755	12-16 ϕ	8 ϕ @ 250 c/c
C1	5/C4	900 x 500	4685	12-25 ϕ	8 ϕ @ 300 c/c
C2	8/C5	900 x 500	3605	12-20 ϕ	8 ϕ @ 300 c/c
C3	5/C5	900 x 500	3965	12-20 ϕ	8 ϕ @ 300 c/c
C4	3/C5	900 x 500	3605	12-20 ϕ	8 ϕ @ 300 c/c
A'1	C6	600 x 350	1680	4-20 + 4-12 ϕ	8 ϕ @ 190 c/c
B'1	C6	600 x 350	1680	4-20 ϕ + 4-12 ϕ	8 ϕ @ 190 c/c

Determination of size of foundation for TP 25

Depth of Foundation bottom below below GL= 2 m
Height of pedestal above GL= 0.6 m
Total Height= 2.6 m
Average Thickness of Foundation Slab= 0.55 m

Average size of Column= 0.8 mx 0.5 m A4,A5,C4,C5,B4,B5,A2,C2,C1

1 mx 0.55 m B4,B1

Net Bearing Capacity as per Soil Report= 40 T/sqm

So, Gross Bearing Capacity = 40+2x1.8= 43.60 T/sqm

For wind & Seismic case Gross B. C. (add 25%)= 40x1.25+2x1.8= 53.60 T/sqm

POINT	LOAD	FORCE-V	MOM-X	MOM -Y	Wt of Soil & foundation	Total P	L	B	P/A	$6Mx/L^2B$	$6My/LB^2$	Bearing Pressure				ex	ez	Corrected Mx	Corrected My	Corrected Pr (Max)	Remarks
B4(1)	10	105.66	-11.29	2.7	25.72	131.38	2.25	3.00	19.48	4.48	0.80	24.72	19.80	23.2	14.20	0.02	0.09	4.48	0.80	24.72	OK,<43.6
	11	88.69	-11.28	24.71	25.72	114.41	2.25	3.00	16.96	4.48	7.72	29.73	19.82	14.09	5.17	0.22	0.70	4.48	7.72	29.70	OK,<53.6
	12	122.62	-11.3	-19.8	25.72	148.34	2.25	3.00	21.98	4.48	5.72	32.16	23.23	20.77	11.79	0.13	0.08	4.48	5.72	32.16	OK,<53.6
	13	163.69	-31.31	8.14	25.72	209.41	2.25	3.00	31.02	12.37	0.53	44.32	19.59	42.46	17.72	0.01	0.15	12.37	0.80	44.32	OK,<53.6
	14	27.69	8.74	2.25	25.72	53.35	2.25	3.00	7.90	3.45	0.67	12.02	8.12	10.68	3.75	0.04	0.16	3.45	0.67	12.02	OK,<53.6
	15	96.47	-11.29	15.17	25.72	122.19	2.25	3.00	18.10	4.48	4.49	27.06	18.14	18.07	9.15	0.12	0.08	4.48	4.49	27.06	OK,<53.6
	16	114.64	-11.29	-9.77	25.72	140.36	2.25	3.00	20.82	4.48	2.89	25.18	19.26	22.39	13.47	0.07	0.08	4.48	2.89	28.18	OK,<53.6
	17	148.38	-21.85	2.7	25.72	174.06	2.25	3.00	25.79	8.67	0.60	35.26	17.91	33.66	16.31	0.02	0.13	8.67	0.60	35.56	OK,<53.6
	18	62.86	-0.63	2.7	25.72	88.70	2.25	3.00	13.14	0.25	0.80	14.19	12.89	12.50	12.09	0.09	0.01	0.25	0.80	14.19	OK,<53.6
B4(2)	10	152.9	-0.33	2.28	29.88	170.80	2.80	3.25	30.91	0.14	1.07	32.12	31.84	28.98	28.70	0.01	0.00	0.14	1.07	32.12	OK,<53.6
	11	88.35	-0.95	16.69	29.88	118.31	2.80	3.25	21.51	0.15	8.88	30.22	29.93	12.50	12.23	0.16	0.00	0.15	8.88	30.22	OK,<53.6
	12	201.65	-0.91	-14.18	29.88	228.43	2.80	3.25	40.81	0.13	6.71	47.45	47.19	34.39	33.79	0.06	0.00	0.13	6.71	47.45	OK,<53.6
	13	169.92	-1.08	2.58	29.88	184.92	2.80	3.25	32.97	0.46	1.22	34.58	33.63	32.11	31.16	0.01	0.01	0.46	1.27	34.58	OK,<53.6
	14	141.88	0.41	1.84	29.88	162.85	2.80	3.25	29.05	0.17	0.82	30.05	28.70	28.21	27.68	0.01	0.00	0.17	0.82	30.09	OK,<53.6
	15	107.35	-0.95	13.22	29.88	128.33	2.80	3.25	22.91	0.15	6.27	29.23	28.93	16.70	16.40	0.10	0.00	0.15	6.27	29.23	OK,<53.6
	16	198.48	-0.32	8.09	29.88	228.44	2.80	3.25	39.91	0.14	4.12	49.27	46.88	36.39	34.76	0.04	0.00	0.14	4.12	49.27	OK,<53.6
	17	162.82	-1.87	2.28	29.88	193.82	2.80	3.25	32.49	0.80	1.07	34.56	33.67	32.42	30.67	0.01	0.01	0.80	1.07	34.56	OK,<53.6
	18	142.69	1.2	2.25	29.88	173.87	2.80	3.25	29.19	0.64	1.07	30.72	29.69	28.67	27.65	0.01	0.01	0.51	1.07	30.72	OK,<53.6
C4(3)	10	55.53	-4.94	5.07	21.24	76.66	2.25	2.50	13.61	2.34	2.16	18.12	15.43	13.79	9.11	0.07	0.06	2.34	2.16	18.12	OK,<43.6
	11	95.11	-4.93	42.02	21.24	117.35	2.25	2.50	20.85	2.34	17.93	41.13	36.45	5.27	0.60	0.36	0.04	2.34	17.93	41.13	OK,<53.6
	12	14.62	-4.94	-31.69	21.24	35.76	2.25	2.50	6.35	2.34	13.61	22.31	17.62	-4.91	-9.59	0.88	0.19	2.34	23.22	31.92	OK,<53.6
	13	109.67	-19.38	5.88	21.24	129.91	2.25	2.50	23.10	8.18	2.36	34.65	16.30	29.89	11.54	0.04	0.15	8.18	2.36	34.65	OK,<53.6
	14	1.97	8.48	4.55	21.24	23.21	2.25	2.50	4.13	4.48	1.94	10.55	1.97	6.88	2.31	0.20	0.41	4.51	1.94	10.55	OK,<53.6
	15	88.03	-4.94	30.62	21.24	109.27	2.25	2.50	19.43	2.34	13.06	34.83	29.45	9.70	4.02	0.28	0.05	2.34	13.06	34.83	OK,<53.6
	16	22.6	-4.93	-30.46	21.24	43.84	2.25	2.50	7.79	2.34	8.74	18.87	14.20	1.09	-3.29	0.47	0.18	2.34	8.90	16.94	OK,<53.6
	17	88.69	13.34	5.07	21.24	110.13	2.25	2.50	19.58	8.18	2.16	30.07	15.62	23.74	11.09	0.05	0.12	8.32	2.16	28.17	OK,<53.6
	18	21.74	3.45	5.07	21.24	42.98	2.25	2.50	7.64	1.64	2.16	11.44	9.16	7.12	3.84	0.17	0.08	1.64	2.16	11.44	OK,<53.6

A3(4)	10	37.64	-11.43	3.06	39.17	76.81	2.25	4.50	7.59	3.01	0.01	10.00	4.98	10.03	4.97	0.00	0.15	3.01	0.01	10.00	OK,<40.6
	11	32.52	-11.43	3.35	39.17	71.69	2.25	4.50	7.09	3.01	0.44	10.00	4.61	9.56	3.66	0.05	0.16	3.01	0.44	10.00	OK,<40.6
	12	42.76	-11.44	-3.24	39.17	81.93	2.25	4.50	8.00	3.01	0.43	11.53	5.51	10.60	4.65	0.04	0.14	3.01	0.43	11.53	OK,<40.6
	13	-32.59	-31.82	3.04	39.17	6.84	2.25	4.50	0.48	8.41	0.01	5.07	-7.75	2.06	-7.76	0.01	4.80	-0.39	0.01	0.27	OK,<40.6
	14	107.6	9.05	3.07	39.17	146.87	2.25	4.50	14.52	2.38	0.06	16.91	12.14	15.89	12.17	0.00	0.06	2.38	0.01	16.91	OK,<40.6
	15	27.64	-11.44	0.87	39.17	66.81	2.25	4.50	6.80	3.01	0.12	9.73	3.71	9.49	3.47	0.01	0.17	3.01	0.12	9.73	OK,<40.6
	16	47.64	-11.43	-0.79	39.17	86.81	2.25	4.50	8.57	3.01	0.10	11.69	5.67	11.49	5.46	0.01	0.13	3.01	0.10	11.69	OK,<40.6
	17	-4.24	-22.14	0.04	39.17	34.93	2.25	4.50	3.45	5.83	0.01	9.29	-2.38	9.28	-2.38	0.00	0.03	7.09	0.01	10.54	OK,<40.6
	18	79.51	-0.73	0.07	39.17	118.68	2.25	4.50	10.72	0.19	0.01	11.92	11.54	11.90	11.52	0.00	0.01	0.19	0.01	11.92	OK,<40.6
C3(4)	10	31.68	-5.1	0.16	25.72	57.41	2.25	3.00	8.81	2.01	0.05	10.57	6.54	10.47	6.44	0.00	0.08	2.01	0.05	10.57	OK,<40.6
	11	47.73	-5.09	2.84	25.72	73.45	2.25	3.00	10.68	2.01	0.84	13.73	9.71	12.05	8.03	0.04	0.07	2.01	0.84	13.73	OK,<40.6
	12	16.85	-5.11	-2.59	25.72	41.37	2.25	3.00	6.13	2.02	0.75	8.90	4.88	7.40	3.36	0.06	0.12	2.02	0.75	8.90	OK,<40.6
	13	-21.64	-16.68	0.2	25.72	4.16	2.25	3.00	0.62	7.77	0.06	6.45	-7.10	6.34	-7.21	0.05	4.70	4.36	0.06	0.32	OK,<40.6
	14	64.92	9.48	0.11	25.72	110.64	2.25	3.00	16.38	3.75	0.03	20.17	12.68	20.11	12.61	0.00	0.03	3.75	0.03	20.17	OK,<40.6
	15	46.22	-5.1	0.82	25.72	78.84	2.25	3.00	10.50	2.01	0.27	13.24	9.21	12.70	8.67	0.24	0.07	2.01	0.27	13.24	OK,<40.6
	16	15.18	-5.09	-0.6	25.72	40.89	2.25	3.00	6.08	2.01	0.18	8.25	4.22	7.60	3.57	0.21	0.12	2.01	0.18	8.25	OK,<40.6
	17	-0.86	-13.53	2.14	25.72	24.77	2.25	3.00	3.47	5.95	0.05	9.07	-1.62	8.96	-1.73	0.01	0.55	5.84	0.05	9.66	OK,<40.6
	18	64.33	3.24	0.14	25.72	90.06	2.25	3.00	13.94	1.82	0.04	14.70	13.06	14.62	11.98	0.00	0.04	1.82	0.04	14.70	OK,<40.6
[illegible]	10	79.09	-10.95	0.17																	
	11	64.83	-10.94	3.55																	
	12	95.41	-10.96	-3.32																	
	13	146.68	-41.77	0.16																	
	14	11.38	8.67	0.09																	
	15	71.02	-10.95	2.34																	
	16	87.09	-10.93	-0.9																	
	17	112.9	-21.25	0.14																	
	18	45.16	-0.84	0.1																	
[illegible]	10	23.64	-10.95	2.14																	
	11	7.87	-10.64	20.46																	
	12	98.4	-10.96	-16.17																	
	13	-50.98	30.33	2.13																	
	14	96.16	9.72	2.15																	
	15	14.47	-10.55	13.77																	
	16	82.81	-10.55	-9.49																	
	17	-10.93	-20.29	2.13																	
	18	61.2	-0.81	2.15																	
[illegible]	10	47.51	-4.6	0.17																	
	11	76.28	-4.6	3.21																	
	12	18.75	-4.6	-2.69																	
	13	97.62	-19.16	0.13																	
	14	-2.9	9.57	0.22																	
	15	77.52	-4.61	7.31																	
	16	-7.5	-4.78	-0.98																	
	17	76.37	-12.69	0.16																	
	18	18.04	9.29	0.2																	

COMBINED FOOTING

COMBINED FOOTING

C1(8)	10	20.48	-4.76	3.94																
	11	69.86	-4.76	38.84																
	12	-28.98	-4.76	-81.95																
	13	-33.83	-19.55	3.91																
	14	7.81	9.04	3.94																
	15	53.78	-4.77	27.67																
	16	-12.9	-4.74	-18.78																
	17	-9.6	-12.65	3.94																
	18	48.79	9.04	3.95																
B1(10)	10	135.2	-0.3	1.78	20.99	157.16	2.50	2.25	27.84	0.13	0.84	28.91	26.66	27.23	26.97	0.01	0.02	0.13	0.84	28.91	OK,<53.6
	11	67.34	-0.27	17.91	20.99	88.33	2.50	2.25	-5.70	0.12	9.30	24.12	23.69	7.04	7.25	0.20	0.00	0.12	9.30	24.12	OK,<53.6
	12	205.06	-0.33	-18.04	20.99	226.03	2.50	2.25	40.16	0.14	8.81	46.93	46.85	33.72	33.40	0.08	0.00	0.14	8.81	46.93	OK,<53.6
	13	122.07	-1.02	1.78	20.99	149.05	2.50	2.25	25.43	0.44	0.84	26.71	25.84	25.00	24.15	0.01	0.01	0.44	0.84	28.71	OK,<53.6
	14	150.32	0.42	1.79	20.96	171.30	2.50	2.25	30.45	0.15	0.84	31.48	31.12	28.79	28.43	0.01	0.00	0.15	0.84	31.48	OK,<53.6
	15	77.57	-0.28	11.96	20.95	98.55	2.50	2.25	17.62	0.12	5.67	23.31	23.07	11.97	11.73	0.12	0.00	0.12	5.67	23.31	OK,<53.6
	16	184.53	-0.32	-6.4	20.93	216.81	2.50	2.25	36.37	0.14	3.96	42.49	42.21	34.52	34.25	0.04	0.00	0.14	3.96	42.49	OK,<53.6
	17	147.16	-2.06	1.79	20.88	168.16	2.50	2.25	29.80	0.88	0.84	31.62	29.86	29.93	28.17	0.01	0.01	0.88	0.84	31.62	OK,<53.6
	18	125.22	-1.48	1.78	20.93	146.20	2.50	2.25	25.89	0.62	0.84	27.48	26.41	25.71	24.62	0.01	0.01	0.62	0.84	27.48	OK,<53.6

PROJECT :
TITLE :

REFERENCE :

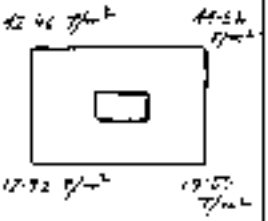
Design of foundation for column A4 & C3 :

Foundation marked : F1

Size of footing : (2.25 × 3.0 × 0.55) m

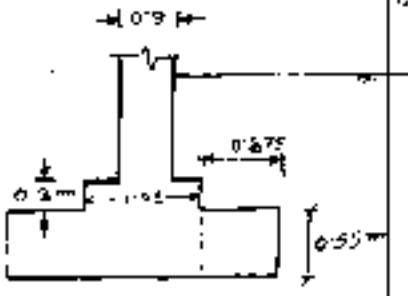
Size of column : (0.5 × 0.9) m

Size of Pedestal : (0.65 × 1.25 × 0.30)



For Longer Side :

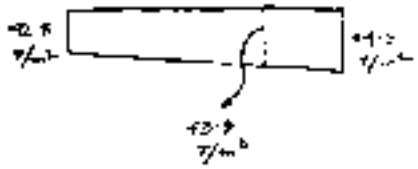
d = 630 - 50 - 10 = 490 mm



Moment at the face of Pedestal

$= 43.9 \times \frac{0.675^2}{2} + \frac{1}{2} \times 0.675 \times (44.5 - 43.9) \times \frac{2}{3} \times 0.675$

$= 2.61 \times \frac{0.675^2}{2} + 1.375 \times \frac{0.675^2}{2}$



= 15.43 TM

$\frac{M_u}{bd^2} = \frac{1.5 \times 15.43 \times 10^7}{1000 \times 490^2} = 0.96 \text{ N/mm}^2$

From SP-16 ; $f_{ck} = 25 \text{ N/mm}^2$

$\frac{p}{f} = 0.279 \Rightarrow (A_{st})_{req.} = \frac{0.279 \times 1000 \times 490}{100} = 1367.1 \text{ mm}^2$

Using 20 ϕ bar, Spacing reqd. : $\frac{1000 \times 314}{1367.1} = 229.7 \text{ mm}$

Providing 20 ϕ @ 140 c/c along longer direction

UDL on 2.45 m due to soil / m
= 1.15 × 1.8
= 2.61 T/m

UDL due to 5kN/m²
= .55 × 2.5
= 1.375 T/m

$(A_{st})_{prov.} = 2242.87 \text{ mm}^2$

Check for one-Way Shear :

Shear at a distance 'd' from the pedestal -

$V = (43.9 \times 0.325) + (44.5 - 43.9) \times 0.325 \times \frac{1}{2} - (2.61 \times 0.325) - (1.375 \times 2.45)$

$\Rightarrow V = 15.6$

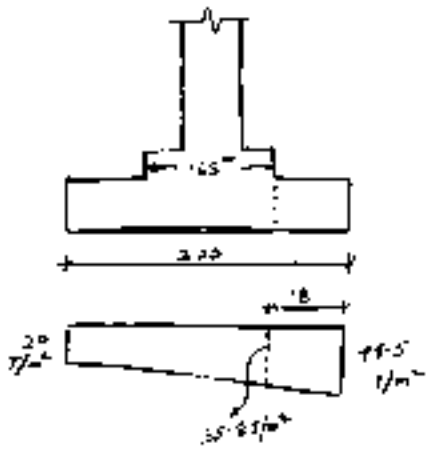
$\tau_v = \frac{1.5 \times 15.6 \times 10^3}{1000 \times 490} = 0.47 \text{ N/mm}^2$

$\frac{100 A_{st}}{bd} = \frac{100 \times 2242.87}{1000 \times 490} = 0.46$

From IS : 456 - 2000 ; $\tau_c = 0.477 \text{ N/mm}^2 > \tau_v$ OK

For Shorter Side :

$d = 550 - 50 - 20 - 8 = 472 \text{ mm}$



Moment at the face of pedestal -

$= 35.8 \times \frac{0.8^2}{2} + \frac{1}{2} \times 8.8 \times \left(44.5 - 35.8\right) \times \frac{2}{3} \times 8$

$- 2.61 \times \frac{.8^2}{2} - 1.375 \times \frac{.8^2}{2}$

$= 12.04 \text{ T-m}$

$\frac{M_u}{bd^2} = \frac{1.5 \times 12.04 \times 10^7}{1000 \times 472^2} = 0.81 \text{ N/mm}^2$

From SP-16 ; $f_{ck} = 25 \text{ N/mm}^2$

$\frac{p}{f_{ck}} = 0.235 \Rightarrow (A_{st})_{req} = \frac{0.235 \times 1000 \times 472}{100} = 1109.2 \text{ mm}^2$

Using 20ϕ bar, spacing reqd. $= \frac{1000 \times 314}{1109.2} = 283.1 \text{ mm}$

Provide 20ϕ @ 180 c/c along shorter direction $(A_{st})_{prov.} = 1744.4 \text{ mm}^2$

Check for One-Way Shear :

Shear at a distance 'd' from the pedestal face -

$V = \left(35.8 \times 0.328\right) + \frac{1}{2}\left(44.5 - 35.8\right) \times .328 - \left(2.6 \times .328\right) - \left(1.375 \times .328\right)$
$\times 13.3 \text{ T}$

$\tau_v = \frac{1.5 \times 13.3 \times 10^4}{1000 \times 472} = 0.42 \ N/mm^2$

$\frac{100\ A_{st}}{bd} = \frac{100 \times 1744.4}{1000 \times 472} = 0.37$

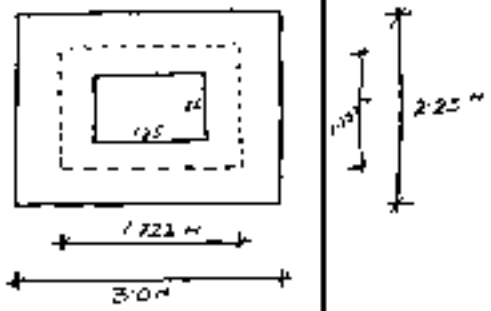
From IS : 456-2000 ; $\tau_c = 0.422 \ N/mm^2 > \tau_v$ OK

Check for Two-Way Shear :

Shear at a distance d/2 from pedestal face -

$= (3 \times 2.25 - 1.722 \times 1.122) \times (94.5 - 24 - 1.125)$

$= 195.2 \ T$



$\tau_v = \frac{1.5 \times 195.2 \times 10^4}{5588 \times 472} = 1.09 \ N/mm^2$

$K_s \tau_c = 1 \times 0.25 \sqrt{f_{ck}} = 1 \times 0.25 \sqrt{25} = 1.25 N/mm^2 > \tau_v$ OK

Top reinforcement :

Area of top reinforcement $= \frac{0.06 \times 1000 \times 550}{100} = 330 \ mm^2$

Using 10 ϕ bar, Spacing $= \frac{1000 \times 785}{330} = 237.87 \ mm$

Provide 10 ϕ bar @ 230 c/c in both Direction.

PROJECT :-
TITLE :

REFERENCE :

Design of foundation for Column B4, C4, B2 :

Foundation marked : F2

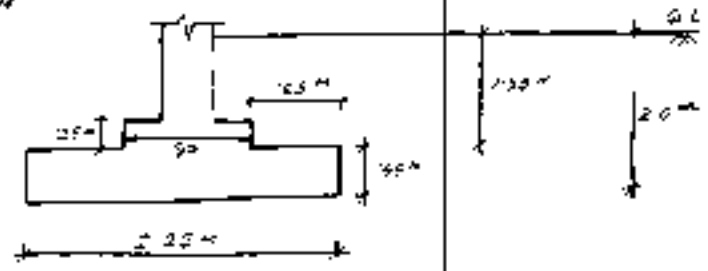
Size of footing : $(2.25 \times 2.5 \times .45)^m$

Size of Pedestal : $(0.55 \times 1.2 \times 0.35)^m$

Min.^{m} Column Size : $(0.5 \times 0.5)^m$

From Excel Sheet, Max.^{m} bearing pressure = 47.5 T/m^2

Effective depth, $d = 450 - 50 - 8 = 392$ mm



Max.^{m} moment at the face of pedestal :

$= (47.5 - 2.79 - 1.125) \times \frac{0.65^2}{2} = 5.21$ T-m.

U.D.L on slab due to soil/m
$= 1.35 \times 1.8 = 2.79$ T/m

UDL due to slab/m
$= .45 \times 2.5 \times 1.125$ T/m

$\frac{M_u}{bd^2} = \frac{1.5 \times 5.21 \times 10^7}{1000 \times 392^2} = 0.9$ N/mm^2

From SP-16 ; $f_{ck} = 25$ N/mm^2

$\frac{p}{2} = 0.241 \Rightarrow (A_{st})_{req} = \frac{0.241 \times 1000 \times 392}{100} = 1023.12$ mm^2

Using 16 ϕ bar, Spacing reqd $= \frac{1000 \times 201}{1023.12} = 196.46$ mm

$(A_{st})_{prov} = 1488.6$ mm^2

Providing 16 ϕ bar @ 190 c/c in both direction.

Check for One-Way Shear :

Shear force at a distance 'd' from pedestal face -

$V = (47.5 \times 0.258) - (2.79 \times 0.258) - (1.125 \times 0.258)$

$= 11.24$ T.

$\tau_v = \frac{1.5 \times 11.24 \times 10^4}{1000 \times 392} = 0.43\ N/mm^2$

$\frac{100 A_{st}}{bd} = \frac{100 \times 1483.6}{1000 \times 392} = 0.38$

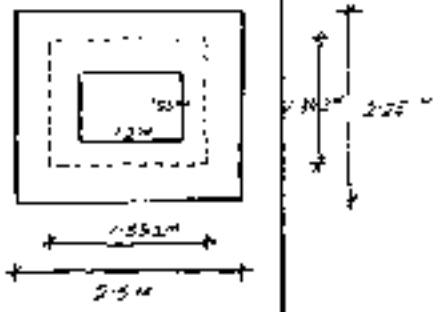
from IS : 456 - 2000 ; $\tau_c = 0.43\ N/mm^2$

Check for Two-Way Shear :

Shear at a Distance d/2 for Column face

$= (2.5 \times 2.25 - 1.592 \times 1.342) \times (415 \times 2.79 \times 1.125)$

$= 152.04\ T$



$\tau_v = \frac{1.5 \times 152.04 \times 10^4}{5868 \times 392} = 0.99\ N/mm^2$

$\tau_c = 0.25\sqrt{f_{ck}} = 0.25\sqrt{25} = 1.25\ N/mm^2$

$k_s \tau_c = 1 \times 1.25 = 1.25\ N/mm^2 > \tau_v$

Hence OK

Top reinforcement :

Area of Top reinforcement $= \frac{0.06 \times 1000 \times 450}{100}$

$= 270\ mm^2$

Using 10 ϕ bar, Spacing $= \frac{1000 \times 78.5}{270} = 290.74\ mm$

Provide 10 ϕ Bar @ 270 c/c in both Directions.

PROJECT :-
TITLE :

REFERENCE :

Design of foundation for column A3 :

Foundation marked : F3

Size of footing : $(2.25 \times 4.5 \times 0.6)^M$

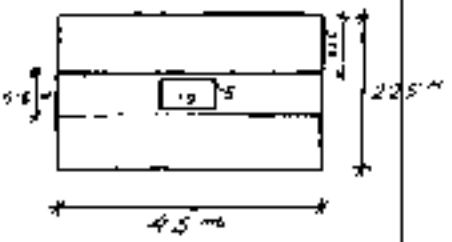
Size of pedestal : $(500 \times 900)^{MM}$

Taking safe bearing pressure = 17 T/m²

$d = 600 - 50 - 10 = 590$ mm

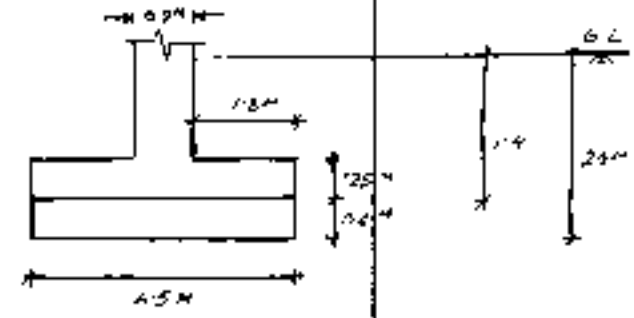
Moment at the face of pedestal

$= (17 - 2.52 \times 1.5) \times \frac{1.8^2}{2} = 21.03$ T-M



$\frac{M_u}{bd^2} = \frac{1.5 \times 21.03 \times 10^7}{1000 \times 540^2}$

$= 1.08$ N/mm²



From SP-16 ; for $f_{ck} = 25$ N/mm²

$p_t = 0.316$

$(A_{st})_{req.} = \frac{0.316 \times 1000 \times 540}{100}$

$= 1706.4$ mm²

Using 20ϕ bar, spacing reqd $= \frac{1000 \times 314}{1706.4} = 184.01$ mm.

Provide 20ϕ @ 140 c/c along longer direction.

LOL on each dia of col f^m

$= 1.4 \times 1.8 = 2.52$ T/m

LOL due to slab/m

$= 6 \times 2.5 = 15$ T/m

$(A_{st})_{prov} = 2242.86$ mm²

Shear Check :

Shear force at a Distance "d" from column face.

$V = (17 \times 1.26) + (2.52 \times 1.26) - (1.5 \times 1.26) = 16.35$ T

$$\tau_v = \frac{1.5 \times 11.33 \times 10^4}{1000 \times 540} = 0.45 \text{ N/mm}^2$$

$$\frac{100 A_{st}}{bd} = \frac{100 \times 2242.86}{1000 \times 540} = 0.42$$

From IS : 456 - 2000, $\tau_c = .46 \text{ N/mm}^2 > \tau_v$ OK

For Shorter Side :

Moment at the face of beam $= (12 - 2.52 - 1.5) \times \frac{2.52^2}{2}$

$= 4.42$ T.M.

d = 600 - 50 - 20 - 10 = 520 mm

$$\frac{M_u}{bd^2} = \frac{1.5 \times 4.42 \times 10^7}{1000 \times 520^2} = 0.25 \text{ N/mm}^2$$

From SP:16 ; for $f_{ck} = 25 \text{ N/mm}^2$

$p = 0.084$ & $(A_{st})_{req} = \frac{0.084 \times 1000 \times 520}{100} = 436.8 \text{ mm}^2$

Using 12 ϕ bar. Spacing req. $= \frac{1000 \times 113}{436.8} = 258.69$ mm

Provide 12 ϕ @ 210 c/c along shorter direction.

$(A_{st})_{prov.} = 538 \text{ mm}^2$

Shear Check :

Shear force at a Distance 'd' from beam face.

$V = (12 \times 0.305) - (2.52 \times 0.305) - (1.5 \times 0.305) = 3.96$ T

$$\tau_v = \frac{1.5 \times 3.96 \times 10^4}{1000 \times 520} = 0.114 \text{ N/mm}^2$$

$$\frac{100 A_{st}}{bd} = \frac{100 \times 538}{1000 \times 520} = 0.10$$

From IS : 456 : 2000 ; $\tau_c = 0.29 \text{ N/mm}^2 > \tau_v$ OK

Top reinforcement :

Area of top reinforcement = $\frac{0.06 \times 1000 \times 200}{100}$ = 360 mm²

Using 10 ϕ bars, Spacing = $\frac{1000 \times 78.5}{360}$ = 218.05 mm

Provide top reinforcement 10 ϕ @ 210 c/c in both dirn.

Design of Beam :

Max^m bending moment at the column face

= $\left(17 \times 2.25 \times \frac{1.8^2}{2}\right) - \left(1.8 \times 1.0 \times 0.7 \times \frac{1.8^2}{2}\right) - \left(1.6 \times 1.4 \times 0.7 \times \frac{1.8^2}{2}\right)$

= 58.97 T-M

d = 1000 - 50 - 20 - 6 = 924 mm

$\frac{M_u}{bd^2} = \frac{1.5 \times 58.97 \times 10^7}{700 \times 924^2}$ = 1.48 N/mm².

From SP-16 ; for f_{ck} = 25 N/mm²

p_t = 0.443

$(A_{st})_{req.} = \frac{0.443 \times 700 \times 924}{100}$ = 2865.3 mm².

Providing 6-25 ϕ at bottom.

3-12 ϕ at top

Check for One-Way Shear :

Shear at a distance 'd' from column face -

V = (17 × 2.25 × 0.876) - (1.8 × 1 × 0.7 × 0.876) - (1.6 × 1.4 × 0.7 × 0.876)

= 31.89 T

$\tau_v = \frac{1.5 \times 31.89 \times 10^4}{700 \times 924}$ = 0.73 N/mm².

PROJECT :-
TITLE :

REFERENCE :

$\frac{100\ A_{st}}{bd} = \frac{100 \times 2944}{700 \times 924} = 0.46$

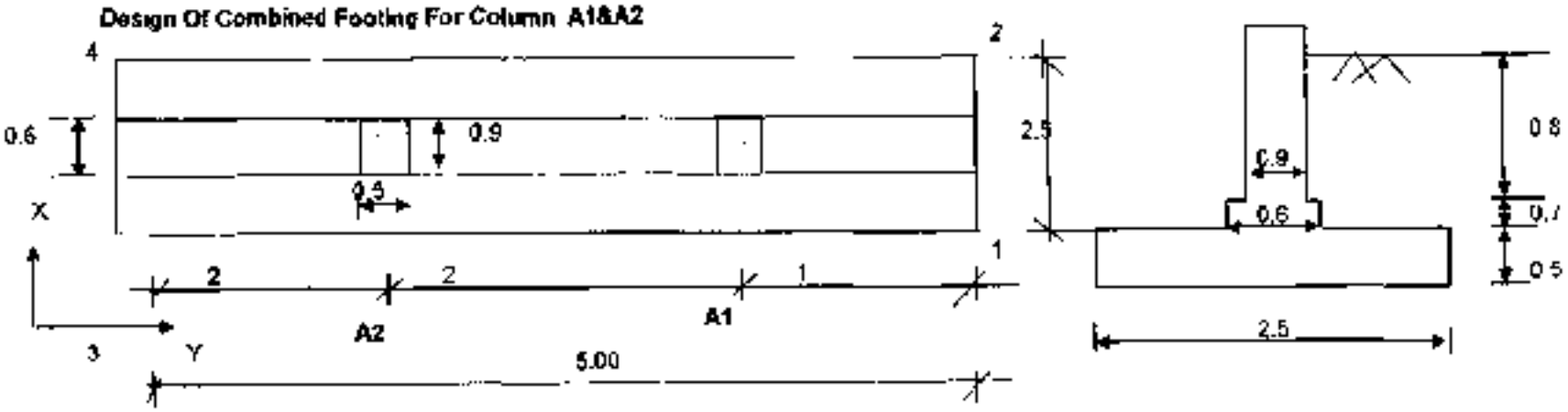
from IS 456-2000 $\tau_c = 0.47\ N/mm^2$

$V_{us} = (1.5 \times 3189 \times 10^3) - (0.47 \times 700 \times 924) = 174354\ N$

2-V - 10 ϕ Stirrups @ $\frac{2.87 \times 415 \times 2 \times 785 \times 924}{174354} = 300.4\ mm$

Provide 2-V - 10 ϕ @ 280 c/c.

Design Of Combined Footing For Column A1&A2



Depth of Foundation bottom below below GL=	2 m		
Height of pedestal above GL=	0.6 m		
Total Height=	2.6 m		
Thickness of Foundation Slab=	0.5	m To	0.5 m
Size Of Foundation Beam=	0.6	m x	1.2 m
Average size of Column=	0.9	m x	0.5 m
Weight of Soil & Dead Load of Foundation=			53.00 T
Net Bearing Capacity as per Soil Report=			40 T/sqm
So, Gross Bearing Capacity =			43.6 T/sqm
For wind & Seismic case Gross B. C. (add 25%)=			53.60 T/sqm

Load combination	column no. A2			column no. A1			C. G. of Load from left	Eccentricity	Combined Load				
	P	Mx	My	P	Mx	My			P	S/W of Footing	Total P	Mx	My
DL+WL(Y)	79.03	-10.95	0.12	23.64	-10.58	2.14	2.461	-0.039	102.67	53.00	155.67	-25.555	2.26
DL+WL(-Y)	64.63	-10.94	3.55	7.87	-10.54	20.46	2.217	-0.283	72.5	53.00	125.50	-41.99	24
DL+WL(X)	93.43	-10.96	-3.32	39.4	-10.56	-16.17	2.593	0.093	132.83	53.00	185.83	-9.135	-19.49
DL+WL(-X)	146.68	-31.77	0.16	-50.88	-30.32	2.13	0.937	-1.563	95.79	53.00	148.79	-211.765	2.29
DL+LL+WL(Y)	1' 38	9.87	0.06	96.16	9.22	2.16	3.792	1.292	108.54	53.00	162.54	160.64	2.23
DL+LL+WL(-Y	71.02	-10.95	1.14	14.47	-10.56	13.77	2.339	-0.161	85.49	53.00	138.49	-35.305	14.91
DL+LL+WL(X	87.03	-10.96	-0.9	32.81	-10.55	-9.49	2.548	0.048	119.84	53.00	172.84	-19.8	-10.39
DL+LL+WL(-X	1'12.9	-21.25	0.14	-13.93	-20.29	2.13	1.719	-0.761	98.97	53.00	151.97	-118.885	2.27
DL+LL+WL(-X	45.16	-0.84	0.1	61.2	-0.81	2.15	3.151	0.651	106.36	53.00	159.36	67.77	2.25

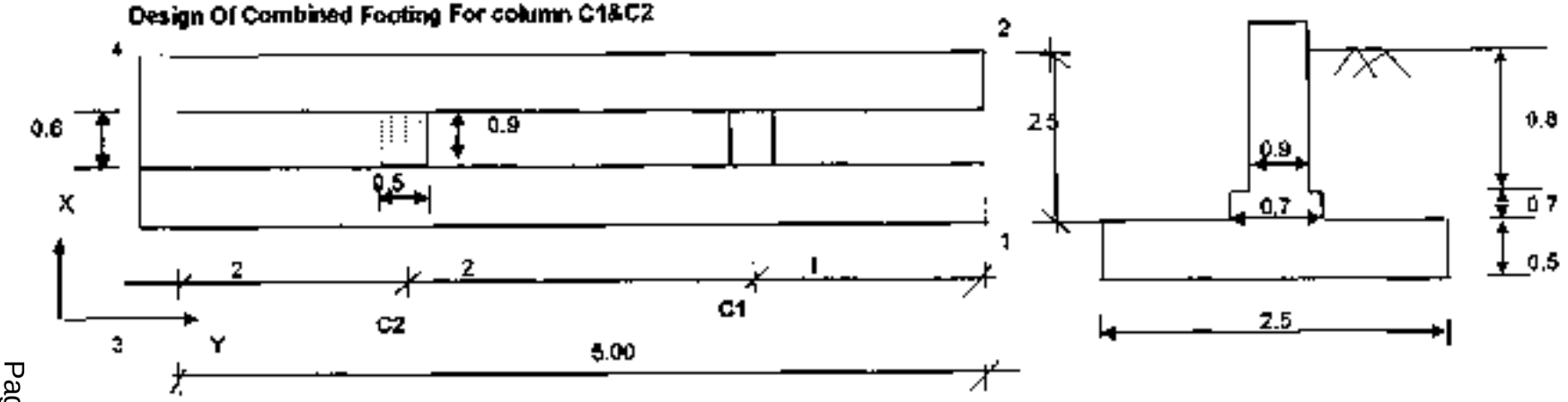
Load combination		P/A	6Mx/LB^2	6My/L^{2}B	Bearing Pressure			
					1	2	3	4
DL+WL(Z)		12.45	2.45	0.43	15.34	10.43	14.47	9.57
DL+WL(-Z)		10.04	4.03	4.61	18.68	10.62	9.46	1.40
DL+WL(X)		14.67	0.88	3.74	19.49	17.73	12.00	10.25
DL+WL(-X)		11.90	20.33	0.44	32.67	-7.99	31.79	-8.87
DL+LL+WL(Z)		13.00	15.42	0.43	28.85	-1.99	28.00	-2.85
DL+LL+WL(-Z)		11.08	3.39	2.86	17.33	10.55	11.61	4.83
DL+LL+WL(X)		13.83	1.52	1.99	17.34	14.31	13.35	10.32
DL+LL+WL(-X)		12.16	11.41	0.22	23.79	0.96	23.35	0.53

FOR DESIGN –

from STAAD. file :

- M_{max} = 137.794 t-m
- Shear at a Distance 'd' from the Column face = 84.501 t

Design Of Combined Footing For column C1&C2



Depth of Foundation bottom below below GL=	2 m		
Height of pedestal above GL=	0.8 m		
Total Height=	2.8 m		
Thickness of Foundation Slab=	0.5	m To	0.5 m
Size Of Foundation Beam=	0.7	m x	1.2 m
Average size of Column=	0.9	m x	0.5 m
Weight of Soil & Dead Load of Foundation=			53.00 T
Net Bearing Capacity as per Soil Report=			40 T/sqm
So, Gross Bearing Capacity =			43.6 T/sqm
For wind & Seismic case Gross B. C. (add 25%)=			53.60 T/sqm

Load combination	column no. C2			column no. C1			C. G. of Load from left	Eccentricity	Combined Load				
	P	Mx	My	P	Mx	My			P	S/W of Footing	Total P	Mx	My
DL+WL(Y)	47.51	-4.8	0.17	20.48	-4.78	3.94	2.603	0.103	68	53.00	121.00	-2.58	4.11
DL+WL(-Y)	76.26	-4.8	3.23	69.96	-4.78	38.84	2.957	0.457	146.22	53.00	199.22	57.26	43.07
DL+WL(X)	19.75	-4.8	-2.69	-28.98	-4.78	-31.95	7.666	5.166	-10.23	53.00	42.77	-62.405	-34.84
DL+WL(-X)	97.92	-19.16	0.12	-33.83	-18.56	3.95	0.944	-1.556	64.09	53.00	117.09	-137.415	4.07
DL+LL+WL(Y)	-2.8	9.67	0.22	74.61	9.04	3.94	4.081	1.581	71.81	53.00	124.81	132.275	4.16
DL+LL+WL(-Y	77.52	-4.81	1.31	53.78	-4.77	27.67	2.819	0.319	131.3	53.00	184.30	32.33	28.98
DL+LL+WL(X)	17.5	-4.76	-0.99	-12.6	-4.74	-19.78	-3.447	-5.947	4.7	53.00	57.70	-37.47	-20.76
DL+LL+WL(-X	76.37	-12.89	0.14	-8.3	-12.95	3.94	1.740	-0.760	67.57	53.00	120.57	-76.825	4.08
DL+LL+WL(-X	16.64	3.29	0.2	49.73	3.04	3.95	3.455	0.955	66.43	53.00	121.43	71.695	4.15

Load combination		P/A	6Mx/LB^2	6My/L^{2}B	Bearing Pressure			
					1	2	3	4
DL+WL(Z)		9.66	0.25	0.79	10.72	10.22	9.14	8.64
DL+WL(-Z)		10.94	5.50	6.27	29.70	18.71	13.17	2.17
DL+WL(X)		3.42	5.99	6.68	16.10	4.12	2.72	-9.26
DL+WL(-X)		9.37	13.19	0.78	23.34	-3.04	21.78	-4.61
DL+LL+WL(Z)		9.89	12.70	0.60	23.49	-1.91	21.89	-3.50
DL+LL+WL(-Z)		14.74	3.10	5.56	23.41	17.20	12.26	6.08
DL+LL+WL(X)		4.62	3.60	3.99	12.20	5.00	4.23	-2.97
DL+LL+WL(-X)		9.55	7.38	0.76	17.80	3.05	16.24	1.48

PROJECT :
TITLE :

REFERENCE :

Foundation marked : F4

Design of footing slab for Column A1 & A2 & C1 & C2 :

Taking maximum uniform bearing pressure 33 T/M²

Max bending moment at beam face

$= (33 - 1.8 \times 1.5 - 2.5 \times .5) \times \frac{.95^2}{2}$

$= 29.05 \times \frac{.95^2}{2}$

$= 13.11 \text{ TM/M}$.

$d = 500 - 50 - 8 = 442 \text{ MM}$

$\frac{M_u}{bd^2} = \frac{1.5 \times 13.11 \times 10^7}{10^3 \times 442^2}$

$= 1.00$

$P_t = .291$ (Ref SP-16 Table-3)

$A_{st} = 1286.22 \text{ MM}^2$

providing 20 ⌀ @ 130 MM c/c along short direction
12 ⌀ @ 150 MM c/c along long direction } bottom
10 ⌀ @ 250 MM c/c both ways. → Top

Check for one way shear.

$V = 29.05 \times .508$

$= 14.75 \text{ T/M}$

$\tau_v = \frac{1.5 \times 14.75 \times 10^4}{10^3 \times 442}$

$= .5 \text{ N/MM}^2$

A_{st} provided $= 2415.38 \text{ MM}^2$

$\frac{100 A_{st}}{bd} = .54$

$\tau_c = .512$ N/MM2

Hence safe

Design Of Beam

From staad file

Max moment = 137.94 TM

Shear force at d distance from col face = 84.301 T

$d = 1200 - 50 - 20 - 12.5$
$= 1117.5$ MM

$\frac{M_u}{bd^2} = \frac{1.5 \times 137.94 \times 10^7}{700 \times 1117.5^2}$

$= 2.66$

$P_t = .748$

$A_{st} = 5841.89$ MM2

Providing 12 - 25 ϕ

Ast provided = 5887.5 MM2

Check for one way shear.

$\tau_v = \frac{1.5 \times 84.301 \times 10^4}{700 \times 1117.5}$

$= 1.61$ N/MM2

$\frac{100 A_{st}}{bd} = .75$

$\tau_c = .57$ N/MM2.

$V_{us} = 1.5 \times 84.301 \times 10^4 - .87 \times 700 \times 1117.5$

$= 818632.5\ N$

4-L 10 ϕ @

$$V_s \leq \frac{.87 \times 415 \times 314 \times 1117.5}{818632.5}$$

≤ 154

Providing 4-L /10 ϕ @ 150 MM c/c.

FOR COMBINED FOOTING

```
*****************************************************
*                                                   *
*           STAAD.Pro                               *
*           Version  2005    Bld 1001.Ind$a         *
*           Proprietary Program of                  *
*           Research Engineers,  Intl.              *
*           Date=    AUG 17, 2005                   *
*           Time=    11: 6 40                       *
*                                                   *
*      USER ID: Simplex                             *
*****************************************************
```

```
     1. STAAD PLANE
INPUT FILE: combined fp 25.STD
     2. START JOB INFORMATION
     3. ENGINEER DATE 12-AUG-05
     4. END JOB INFORMATION
     5. INPUT WIDTH 79
     6. UNIT METER MTON
     7. JOINT COORDINATES
     8. 1 0 0 0; 2 2 0 0; 3 4 0 0; 4 5 0 0
     9. MEMBER INCIDENCES
    10. 1 1 2; 2 2 3; 3 3 4
    11. DEFINE MATERIAL START
    12. ISOTROPIC CONCRETE
    13. E 2.17467E-006
    14. POISSON 0.17
    15. DENSITY 2.40262
    16. ALPHA 1E-005
    17. DAMP 0.05
    18  END DEFINE MATERIAL
    19. MEMBER PROPERTY AMERICAN
    20. 1 TO 3 PRIS YD 0.85 ZD 2.6
    21. CONSTANTS
    22. MATERIAL CONCRETE MEMB 1 TO 3
    23. SUPPORTS
    24. 2 3 PINNED
    25. LOAD 1 LOADTYPE NONE  TITLE LOADING DUE TO BEARING PRESSURE AND SELF WT
    26. MEMBER LOAD
    27. 1 TO 3 UNI GY -82
    28. 1 TO 3 UNI GY 10.6
    29. JOINT LOAD
    30. 2 3 MZ 32
    31. PERFORM ANALYSIS
```

P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 4/ 3/ 2
ORIGINAL/FINAL BAND-WIDTH= 1/ 1/ 4 DOF
TOTAL PRIMARY LOAD CASES = 1, TOTAL DEGREES OF FREEDOM = 0
SIZE OF STIFFNESS MATRIX = 1 DOUBLE KILO-WORDS
REQRD/AVAIL. DISK SPACE = 12.0/ 11821.1 MB

12. PRINT MAXFORCE ENVELOPE LIST 1 TO 3

MEMBER FORCE ENVELOPE

ALL UNITS ARE METR METE

MAX/MIN FORCE VALUES AMONGST ALL SECTION LOCATIONS

MEMB	FY / FZ	DIST / DIST	LD / LD	MZ / MY	DIST / DIST	LD / LD	FX	DIST	LD
1 MAX	0.00	0.00	1	142.80	2.00	1			
	0.00	0.00	1	0.00	0.00	1	0.00	0.00	1
MIN	-142.80	2.00	1	0.00	0.00	1			
	0.00	2.00	1	0.00	2.00	1	0.00	2.00	1
2 MAX	156.95	0.00	1	174.90	0.00	1			
	0.00	0.00	1	0.00	0.00	1	0.00	0.00	1
MIN	14.15	2.00	1	3.70	2.00	1			
	0.00	2.00	1	0.00	2.00	1	0.00	2.00	1
3 MAX	0.40	0.00	1	55.70	0.00	1			
	0.00	0.00	1	0.00	0.00	1	0.00	0.00	1
MIN	0.00	1.00	1	0.00	1.00	1			
	0.00	1.00	1	0.00	1.00	1	0.00	1.00	1

********** END OF FORCE ENVELOPE FROM INTERNAL STORAGE **********

FINISH

********** END OF THE STAAD.Pro RUN **********

**** DATE= AUG 17,2005 TIME= 11: 6:42 ****

For questions on STAAD.Pro, please contact :
Research Engineers Ltd.
email : support@calcutta.radiusa.com
E2/4,Block GP, Sector-V,Salt Lake, CALCUTTA 700 091
India : TEL:(033)2357-3575 FAX:(033)2357-3667
US : Ph-(714) 974-2500, Fax-(714) 921-0683

PROJECT :-
TITLE.

REFERENCE

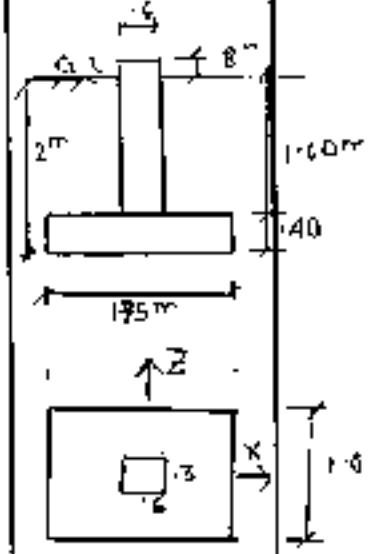
DESIGN OF FOOTING FOR A1 & B1

- Load combination : *Foundation Marked – F5*

		V T	Hx T	Hz T
1.	DL + LL + EQ Load (+X) + EQ Load (+Z)	23.7	0	0
2.	" + WL (+X)	38.7	4	0
3.	" + WL (-X)	8.7	-4	0
4.	" + WL (+Z)	29.5	0	+6
5.	" + WL (-Z)	22.9	0	-6
6.	" + SL (+X)	31.5	1.5	0
7.	" + SL (-X)	-15.9	-1.5	0
8.	" + SL (+Z)	24.2	0	0
9.	" + SL (-Z)	23.2	0	0

For critical case. P = 38.7 T &

Hx = 4 T



Assume: Size of footing (1.75 × 1.0 × .35) m

Size of col. (0.6 × 0.35) m

S/W due to soil, footing & pedestal.

= (1.0 × 1.75 × .4 + .6 × .35 × 2.45) × 2.5 + 1.8 × (1.0 × 1.75 − .6 × .35) × 1.6 T

= 7.5 T

Adding S/W of soil, footing & pedestal,

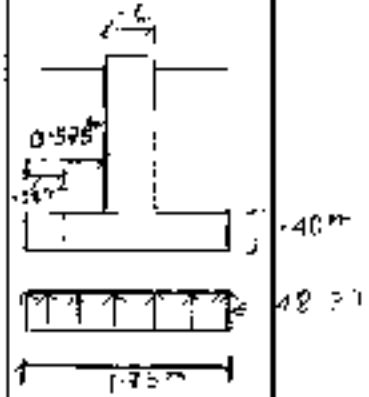
P = (38.7 + 7.6) T = 46.2 T

M_{zz} = 4 × 2.8 T-m = 11.2 T-m

$e = \frac{M}{P} = \frac{11.2}{46.2} m = 0.242 < (B/6 = .25)$

Net upward pr, $w = \left(\frac{46.2}{1.0 \times 1.95} + \frac{6 \times 11.2}{1.0 \times 1.95^2}\right) T/m^2$

$= 48.3 T/m^2 < 55.6 T/m^2$. SO OK



- DESIGN ALONG LONGER SIDE :

Moment at col. face,

$M = (48.3 - 1.8 \times 1.68 - .4 \times 2.5) \times \frac{.575^2}{2}$ T-m

$= 44.42 \times \frac{.575^2}{2}$ T-m

$= 7.34$ T-m

Using 16ϕ bar, & clear cover = 50 mm

$d = (400 - 50 - 8)$ mm $= 342$ mm

$\frac{Mu}{bd^2} = \frac{1.5 \times 7.34 \times 10^7}{1000 \times 342^2} = 0.94 N/mm^2$

From SP-16, Table-3, $P_t = 0.274$

$A_{st} = 937.08 mm^2$

Spacing for 16ϕ $= \frac{201 \times 1000}{937.08}$ mm

$= 214.5$ mm

Provide 16ϕ @ 130 c/c along longer side

Check for one way shear :

S.F at critical section at distance d from col. face

$V = 44.42 \times .233$ T $= 10.35$ T

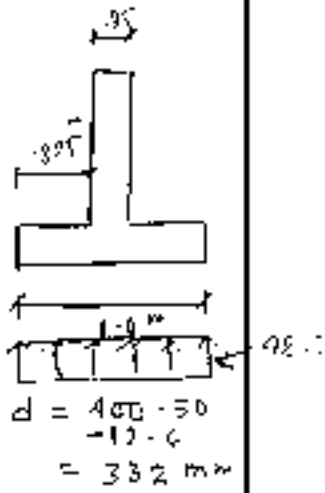
$\tau_v = \frac{1.2 \times 10.35 \times 10^4}{1000 \times 342}$ N/mm² $= 0.36 N/mm^2$

$\frac{100 A_{st}}{bd} = 0.45$

Ast provide
= 1545.8 mm²

From IS-456-2000, $\tau_c = 0.46\ N/mm^2$
$> \tau_v$ So, OK

(Table-19)



- DESIGN ALONG SHORTER DIRECTION

Moment at the col. face = $44.42 \times .325^2/2$ T-m
$= 2.35$ T-m

Using 12 ϕ bar,

$$\frac{M_u}{bd^2} = \frac{1.5 \times 2.35 \times 10^7}{1500 \times 332^2}\ N/mm^2$$
$$= 0.32\ N/mm^2$$

From SP-16 Table-3, $p_t = .163$

Ast req'd = $541.16\ mm^2$

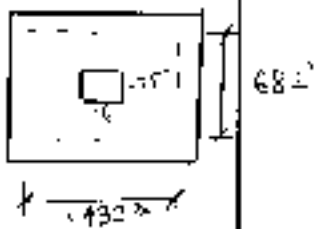
Spacing for 12 ϕ = $\frac{113 \times 1000}{541.16}$ mm
$= 208.88$ mm

Provide 12 ϕ @ 180 c/c

- One way shear check.

As the critical section is out of the footing so there is no need for one way shear check.

• TWO way shear check :



critical punching shear at the distance d/2 (from col face) ; V = (1.75 × 1.3 − .682 × .932) × 44.92 T

= 49.5 T

$$\tau_v = \frac{1.5 \times 49.5 \times 10^3}{3228 \times 332} \text{ N/mm}^2$$

= 0.693 N/mm²

$K_s \tau_c = (0.5 + \beta_c)\tau_c$

$\beta_c = \frac{1.25}{1.000} = 1.25$

$\geq 1 \times \tau_c$

$= 0.25\sqrt{25}$ N/mm²

= 1.25 N/mm²

$\tau_v < K_s \tau_c$ Hence safe.

• Top reinforcement :

min^m Area of top reif = $\frac{0.06 \times 1000 \times 400}{100}$ mm²

= 240 mm²

Spacing for 10 ϕ bar = $\frac{78.5 \times 1000}{240.0}$ mm

= 327.08 mm

provide 10 ϕ @ 250 c/c top reinf.

DESIGN OF COLUMN FOR A'1 & B'1.

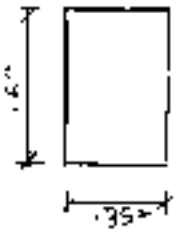
For critical case, $P = 38.7\ T$
$M_{zz} = 11.2\ T\cdot m$

S/W of the c/m = $.6 \times .35 \times 2.4 \times 2.5\ T = 1.26\ T$

Adding S/W of column

$P = 39.96\ T \Rightarrow P_u = 60\ T$

$M_{zz} = 11.2\ T\cdot m \Rightarrow M_{uzz} = 16.8\ T\cdot m$



Let provide 20ϕ bar with 50 clear cover.

$d' = 50 + 20/2 = 60\ mm$

$d'/D = 0.1$

$$\frac{P_u}{f_{ck}\,b\,D} = \frac{60 \times 10^3}{25 \times 350 \times 600} = 0.114$$

$$\frac{M_u}{f_{ck}\,b\,D^2} = \frac{16.8 \times 10^7}{25 \times 350 \times 600^2} = 0.053$$

Hence min^m reif. is req'd.

Min^m reif. $= \frac{.8 \times 350 \times 600}{100}\ mm^2$

$= 1680\ mm^2$

Provide $4 - 20\phi + 4 - 12\phi$

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*******************************************************
*                                                     *
*           STAAD.Pro                                 *
*           Version  2005    Bld 1001.India           *
*           Proprietary Program of                    *
*           Research Engineers,  Intl.                *
*           Date=    AUG 12, 2005                     *
*           Time=    15:12:27                         *
*                                                     *
*      USER ID: Simplex                               *
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INPUT FILE: Canal cp 25.STD
     2. START JOB INFORMATION
     3. ENGINEER DATE 12-T-05
     4. END JOB INFORMATION
     5. INPUT WIDTH 79
     6. UNIT METER MTON
     7. JOINT COORDINATES
     8. 1 0 0 0; 2 5 75 0 0; 3 10 0 0; 4 0 0 -2.5; 5 10 0 -2.5; 6 0 0 -8; 7 0 0 -10
     9. 8 10 0 -8; 9 10 0 -10; 10 5.75 0 -10; 11 0 1.55 0; 12 5.75 1.55 0
    10. 13 10 1.55 0; 14 0 1.55 -2.5; 15 10 1.55 -2.5; 16 0 1.55 -8; 17 0 1.55 -10
    11. 18 10 1.55 -8; 19 10 1.55 -10; 20 5.75 1.55 -10; 21 0 2.8 0; 22 5.75 2.8 0
    12. 23 10 2.8 0; 24 0 2.8 -2.5; 25 10 2.8 -2.5; 26 0 2.8 -8; 27 0 2.8 -10
    13. 28 10 2.8 -8; 29 10 2.8 -10; 30 5.75 2.8 -10
    14. MEMBER INCIDENCES
    15. 1 7 17; 2 17 21; 3 6 16; 4 16 26; 5 4 14; 6 14 24; 7 1 11; 8 11 21; 9 2 12
    16. 10 12 22; 11 3 13; 12 13 23; 13 5 15; 14 15 25; 15 6 18; 16 18 28; 17 9 19
    17. 18 19 29; 19 10 20; 20 20 30; 21 17 16; 22 16 14; 23 14 11; 24 11 12; 25 12 13
    18. 26 13 15; 27 15 18; 28 18 19; 29 19 20; 30 20 17
    19. DEFINE MATERIAL START
    20. ISOTROPIC CONCRETE
    21. E 2.01487E+006
    22. POISSON 0.17
    23. DENSITY 2.40262
    24. ALPHA 5.5E-006
    25. DAMP 0.05
    26. END DEFINE MATERIAL
    27. CONSTANTS
    28. MATERIAL CONCRETE MEMB 1 TO 30
    29. MEMBER PROPERTY INDIAN
    30. 21 TO 30 PRIS YD 0.3 ZD 0.3
    31. MEMBER PROPERTY INDIAN
    32. 9 10 19 20 PRIS YD 0.55 ZD 1
    33. 1 TO 8 11 TO 18 PRIS YD 0.9 ZD 0.5
    34. SUPPORTS
    35. 1 TO 10 FIXED
    36. LOAD 1 DEAD LOAD
    37. SELFWEIGHT Y -1
    38. JOINT LOAD
    39. 27 FY -24.3
    40. 24 FY -25.9
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41. 24 FY -30.7
42. 21 FY -36.5
43. 31 FY -68.8
44. 22 FY -75.6
45. 29 FY -19.7
46. 28 FY -20.1
47. 25 FY -19.1
48. 23 FY -22
49. LOAD 2 LIVE LOAD
50. JOINT LOAD
51 27 FY -10.7
52. 26 FY -26.1
53. 21 FY -12
54. 21 FY -26.6
55. 30 FY -36.1
56. 22 FY -46.5
57. 29 FY -2.8
58 28 FY -7.7
59. 25 FY -5.2
60 23 FY -8.6
61 LOAD 3 EQP. LOAD
62. JOINT LOAD
63. 27 FY -12
64. 26 FY -7
65. 24 FY -16
66. 21 FY -11
67. 30 FY 30.2
68. 22 FY -30.5
69. 26 FY -5
70. 28 FY -2.6
71. 25 FY -17
72. 23 FY -1.5
73. LOAD 4 EQP. LOAD ALONG(+X)
74. JOINT LOAD
75. 27 FY 0.6
76. 26 FY 0.6
77. 24 FY 0.4
78. 30 FX 1.5 FY 4.4
79. 22 FX 1.9 FY 5.5
80. 29 FX 1.6 FY -3.6
81. 25 FY -1.3
82. 28 FY -0.9
83. 23 FX 2 FY 4.5
84. LOAD 5 EQP. LOAD ALONG(+Z)
85. JOINT LOAD
86. 27 FY 24.6 FZ 4.6
87. 26 FY -22.9 FZ 4
88. 24 FY 24.4 FZ 5.3
89. 21 FY -26.3 FZ 5.4
90. 30 FY 1.2
91. 22 FY -1.1
92. 29 FY 13.5 FZ 2
93. 28 FY -11.7 FZ 1.9
94. 25 FY 12.3 FZ 2.3
95. 23 FY -14.2 FZ 2.4
96. LOAD 6 WIND LOAD ALONG(+X)

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 97. JOINT LOAD
 98. 25 FX 0.5 FY 16.5
 99. 26 FX 1 FY 14.4
100. 24 FX 1 FY 5.1
101. 21 FX 1 FZ 16.7
102. 30 FX 13.9 FY 66.5
103. 22 FX 12.4 FY 54.2
104. 29 FX 13 FY -48.9
105. 28 FX 0.5 FZ -26.7
106. 23 FX 0.6 FY -16
107. 23 FX 13.6 FY 40.2
108. LOAD 7 WIND LOAD ALONG(+Z)
109. JOINT LOAD
110. 27 FY 10.8 FZ 10
111. 26 FY -64.5 FZ 7.6
112. 24 FY 60.2 FZ 8.9
113. 21 FY -75.5 FZ 9.2
114. 30 FY 14.1
115. 22 FX 0.9 FY -11
116. 29 FY 52.8 FZ 6.4
117. 28 FY -48.9 FZ 5.6
118. 23 FY 51.9 FZ 6.5
119. 23 FY -51.5 FZ 6.7
120. LOAD 8 SEISMIC ALONG(+X)
121. JOINT LOAD
122. 27 FX 0.3 FY 9
123. 26 FX 0.2 FY 8
124. 24 FX 0.2 FY 10
125. 21 FX 0.2 FY 9
126. 30 FX 8.5 FY 53.6
127. 22 FX 9.2 FY 49.3
128. 29 FX 9 FY -32.9
129. 28 FY +30
130. 23 FX 0.01 FY -16.5
131. 23 FX 9.5 FY -52.3
132. LOAD 9 SEISMIC ALONG(+Z)
133. JOINT LOAD
134. 27 FY 36.8 FZ 6.3
135. 26 FY +32.4 FZ 3.6
136. 24 FY 40.8 FZ 6.9
137. 21 FY -41.3 FZ 5.2
138. 30 FY -11 FX 0.5
139. 22 FY +10 FZ 0.4
140. 29 FY 27.9 FZ 3.2
141. 28 FY -27.7 FZ 3.2
142. 25 FY 31.8 FX 3.9
143. 23 FY -32.5 FZ 4
144. *FOR SUPPORT REACTION
145. LOAD COMB 10 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)
146. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0
147. LOAD COMB 11 DL+LL+EQPTLOAD+BELTTENSION(+Z)+BELTTENSION(+Z)+WIND(+X)
148. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 6 1.0
149. LOAD COMB 12 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-WIND(+X)
150. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 6 -1.0
151. LOAD COMB 13 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)+WIND(+Z)
152. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 7 1.0
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153. LOAD COMB 14 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)+WIND(+Z)
154. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 7 -1.0
155. LOAD COMB 15 DL+LL+EQPTLOAD+BELTTENSION(+X)-BELTTENSION(+Z)+SEISMIC(+X)
156. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 8 1.0
157. LOAD COMB 16 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-SEISMIC(+X)
158. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 8 -1.0
159. LOAD COMB 17 DL+LL+EQPTLOAD+BELTTENSION(+X)-BELTTENSION(+Z)+SEISMIC(+Z)
160. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 9 1.0
161. LOAD COMB 18 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-SEISMIC(+Z)
162. 1 1.0 2 1.0 3 1.0 4 1.0 5 1.0 9 -1.0
163. *FOR BOX DESIGN
164. LOAD COMB 19 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)
165. 1 1.5 2 1.5 3 1.5 4 1.5 5 1.5
166. LOAD COMB 20 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)+WIND(+X)
167. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 6 1.2
168. LOAD COMB 21 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-WIND(+X)
169. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 6 -1.2
170. LOAD COMB 22 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)+WIND(+Z)
171. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 7 1.2
172. LOAD COMB 23 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)+WIND(+Z)
173. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 7 -1.2
174. LOAD COMB 24 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-SEISMIC(-X)
175. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 8 1.2
176. LOAD COMB 25 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-SEISMIC(+X)
177. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 8 -1.2
178. LOAD COMB 26 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-SEISMIC(-Z)
179. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 9 1.2
180. LOAD COMB 27 DL+LL+EQPTLOAD+BELTTENSION(+X)+BELTTENSION(+Z)-SEISMIC(+Z)
181. 1 1.2 2 1.2 3 1.2 4 1.2 5 1.2 9 -1.2
182. PERFORM ANALYSIS
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P R O B L E M S T A T I S T I C S

NUMBER OF JOINTS/MEMBER+ELEMENTS/SUPPORTS = 30/ 30/ 10
ORIGINAL/FINAL BAND-WIDTH= 10/ 6/ 30 DOF
TOTAL PRIMARY LOAD CASES = 9, TOTAL DEGREES OF FREEDOM = 120
SIZE OF STIFFNESS MATRIX = 4 DOUBLE KILO-WORDS
REQRD/AVAIL. DISK SPACE = 12.1/ 11050.9 MB

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183. LOAD LIST 10 TO 18
184. PRINT SUPPORT REACTION
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SUPPORT REACTIONS -UNIT KNON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
1	10	-1.42	105.66	-4.29	11.29	0.54	2.73
	11	19.71	86.69	4.79	21.28	-0.46	24.71
	12	10.87	122.62	-4.27	-11.30	0.14	-19.31
	13	-1.74	160.69	-11.98	-31.31	0.38	3.14
	14	-1.10	27.69	3.43	8.74	0.06	2.25
	15	-9.62	96.47	-4.28	-11.29	-0.34	19.17
	16	6.78	114.84	4.28	11.29	0.02	9.77
	17	-1.43	148.33	-8.15	-21.95	-0.27	2.73
	18	1.41	62.98	-0.40	-0.63	-0.05	2.73
2	10	-0.34	152.90	-0.10	-0.39	0.02	2.25
	11	-2.40	98.35	-0.11	-0.35	0.01	18.67
	12	1.76	207.45	-0.09	-0.31	-0.05	-14.16
	13	-0.10	161.92	-0.34	-1.08	0.04	2.58
	14	-0.50	141.09	0.13	0.43	-0.09	1.91
	15	-1.02	107.35	-0.11	-0.35	0.00	13.22
	16	0.26	198.46	0.09	0.32	-0.05	-8.64
	17	-0.33	162.92	-0.05	-1.87	0.03	2.26
	18	-0.14	142.89	0.45	1.20	0.07	2.25
3	10	-0.04	55.32	-1.09	-4.94	0.01	5.07
	11	-15.90	96.11	-1.86	-4.93	-0.46	42.02
	12	11.82	14.52	-1.93	-4.94	0.50	-31.89
	13	-2.37	106.67	-7.42	-19.36	0.27	5.50
	14	-1.71	1.97	2.64	9.46	-0.25	4.59
	15	-11.55	88.03	-1.86	-4.94	-0.49	30.62
	16	7.91	22.69	-1.91	-4.94	0.42	-20.94
	17	1.03	98.09	-6.61	-15.34	0.16	5.07
	18	-1.05	21.74	1.25	3.46	-0.11	5.07
4	10	-0.03	31.64	-5.13	-31.43	-0.04	0.06
	11	-1.23	32.52	-5.14	-11.43	-0.34	3.35
	12	1.23	42.76	-5.12	-11.44	0.27	-3.24
	13	-9.01	-32.53	-14.59	-31.92	-0.03	0.04
	14	-0.04	107.80	6.31	9.05	-0.04	0.07
	15	-9.38	21.64	-5.13	-11.44	-0.22	0.91
	16	8.33	47.64	-5.13	-11.43	0.15	-0.79
	17	-0.02	-4.24	-0.74	-20.14	0.03	0.04
	18	-0.01	79.51	-0.53	-0.73	-0.04	0.07
5	10	-0.08	33.69	-2.48	-5.10	-0.09	0.16
	11	-1.17	47.73	-2.49	-5.09	-0.79	2.84
	12	1.01	15.65	-2.51	-5.11	0.61	-2.53
	13	-0.11	-22.54	-6.88	-15.68	-0.11	0.20
	14	-0.06	84.92	3.93	9.09	-0.07	0.11
	15	-0.45	46.22	-2.46	-5.10	-0.53	0.92
	16	0.29	15.16	2.49	5.09	0.35	0.60
	17	-0.09	-0.95	-4.08	-19.51	-0.10	0.18
	18	-0.07	84.33	1.83	3.74	-0.06	0.14
6	10	-0.07	79.03	-5.38	-10.95	0.06	0.12
	11	-1.42	64.63	-5.39	-10.94	0.40	3.55
	12	1.29	93.43	-5.39	-10.96	-0.28	-3.32

SUPPORT REACTIONS -UNIT MTON METE STRUCTURE TYPE = SPACE

JOINT	LOAD	FORCE-X	FORCE-Y	FORCE-Z	MOM-X	MOM-Y	MOM Z
	15	0.07	140.09	-16.03	-31.77	0.07	0.14
	16	-0.04	11.70	5.31	9.87	0.04	0.08
	17	-0.57	71.07	-5.35	-10.35	0.33	1.14
	18	0.39	81.03	-5.30	-10.96	-0.19	-0.90
	27	-0.09	110.90	-10.77	-21.25	0.06	0.14
	28	-0.05	65.16	0.02	-0.64	0.05	0.10
7	10	1.03	23.64	4.42	10.55	-0.09	2.14
	11	-12.90	3.87	-4.42	-10.54	0.45	20.45
	12	10.04	19.90	-4.43	-10.56	-0.39	-16.15
	13	-1.40	-56.89	-11.71	-30.32	0.26	0.15
	14	-1.05	96.14	2.86	5.27	0.15	2.15
	15	6.59	14.67	-4.42	-10.55	0.19	13.71
	16	6.53	32.82	-4.43	-10.55	-0.30	-9.69
	17	1.03	113.93	-8.46	-20.24	-0.15	2.13
	18	-1.05	61.70	-0.39	-0.81	0.04	2.15
8	10	-0.08	40.51	-2.10	-4.80	0.09	0.1
	11	-1.47	76.26	-2.14	-4.80	0.91	3.07
	12	1.22	16.75	2.06	4.80	0.75	2.29
	13	-0.06	97.92	-9.20	-19.16	0.01	0.12
	14	-0.12	-2.90	5.01	9.51	0.11	0.22
	15	-0.70	73.52	-2.12	-4.81	0.69	1.51
	16	0.52	37.50	2.08	4.74	-0.49	-0.98
	17	-0.07	96.37	-8.87	-19.89	0.08	0.14
	18	0.31	18.64	1.87	3.29	0.10	0.20
9	10	-1.62	20.49	-2.04	-4.75	0.18	3.94
	11	-15.30	69.96	-2.07	4.75	0.98	39.84
	12	12.06	-28.92	-2.00	-4.76	-0.69	-31.95
	13	-1.65	-33.83	-7.79	-18.55	0.42	3.45
	14	1.59	74.81	3.63	9.04	-0.07	3.96
	15	-10.33	53.78	2.05	4.77	0.73	27.67
	16	7.09	-12.80	-2.02	-4.74	-0.38	-15.76
	17	-1.64	8.80	5.06	12.55	0.31	3.94
	18	-1.60	49.79	1.39	3.04	0.06	3.96
10	10	0.30	136.20	-0.09	-0.30	-0.03	1.76
	11	-0.81	67.34	0.07	-0.27	-0.07	17.61
	12	0.22	208.05	-0.11	-0.33	0.02	-13.94
	13	-0.30	122.07	-0.32	-1.02	0.02	1.56
	14	-0.29	150.32	0.13	0.42	-0.08	1.76
	15	-0.96	77.57	-0.08	-0.28	-0.06	11.96
	16	0.37	194.83	-0.10	-0.32	0.00	-9.40
	17	-0.30	147.28	-0.70	-2.06	0.01	1.76
	18	-0.29	125.22	0.52	1.46	-0.01	1.78

********** END OF LATEST ANALYSIS RESULT **********

105. LOAD LIST 19 TO 27
106. START CONCRETE DESIGN
107. CODE INDIAN
108. MEMB 2549.11 ALL
109. FEMAIN 2215.2 ALL
110. RATIO 2 MEMB 21 TO 30
111. RATIO 4 MEMB 1 TO 20
112. CLEAR 0.05 MEMB 1 TO 30
113. DESIGN BEAM 21 TO 30

BEAM NO. 21 DESIGN RESULTS

NOS Fe415 (Main) Fe415 (Sec.)

LENGTH: 2000.0 mm SIZE: 300.0 mm X 300.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	500.0 mm	1000.0 mm	1500.0 mm	2000.0 mm
TOP REINF.	276.95 (Sq. mm)	148.70 (Sq. mm)	148.70 (Sq. mm)	422.88 (Sq. mm)	999.69 (Sq. mm)
BOTTOM REINF.	984.20 (Sq. mm)	452.36 (Sq. mm)	148.70 (Sq. mm)	148.70 (Sq. mm)	227.90 (Sq. mm)

SUMMARY OF PROVIDED REINF AREA

SECTION	0.0 mm	500.0 mm	1000.0 mm	1500.0 mm	2000.0 mm
TOP REINF.	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)
BOTTOM REINF.	5-16i 1 layer(s)	3-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)
SHEAR REINF.	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM START SUPPORT
VY = -66.32 MZ = -0.18 LD= 22
Provide 2 Legged 8i @ 90 mm c/c

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM END SUPPORT
VY = -66.32 MZ = -0.18 LD= 22
Provide 2 Legged 8i @ 90 mm c/c

BEAM NO. 22 DESIGN RESULTS

NOS Fe415 (Main) Fe415 (Sec.)

LENGTH: 5500.0 mm SIZE: 300.0 mm X 300.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1375.0 mm	2750.0 mm	4125.0 mm	5500.0 mm
TOP REINF.	177.05 (Sq. mm)	150.54 (Sq. mm)	0.00 (Sq. mm)	166.79 (Sq. mm)	465.08 (Sq. mm)
BOTTOM REINF.	272.79 (Sq. mm)	150.96 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1375.0 mm	2750.0 mm	4125.0 mm	5500.0 mm
TOP REINF.	4-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)
BOTTOM REINF.	4-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)
SHEAR REINF.	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 450.0 mm AWAY FROM START SUPPORT
VY = 8.90 MZ = 0.00 LD= 25
Provide 2 Legged 8\| @ 90 mm c/c

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM END SUPPORT
VY = -16.42 MZ = 0.00 LD= 27
Provide 2 Legged 8\| @ 90 mm c/c

B E A M N O 23 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2500.0 mm SIZE: 300.0 mm X 300.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	625.0 mm	1250.0 mm	1875.0 mm	2500.0 mm
TOP REINF.	204.43 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	377.93 (Sq. mm)	898.62 (Sq. mm)
BOTTOM REINF.	850.17 (Sq. mm)	360.60 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	175.45 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	625.0 mm	1250.0 mm	1875.0 mm	2500.0 mm
TOP REINF.	3-12$ 1 layer(s)	2-12$ 1 layer(s)	2-12$ 1 layer(s)	4-12$ 1 layer(s)	8-12$ 2 layer/s.
BOTTOM REINF.	11-10$ 5 layer(s)	5 10$ 1 layer(s)	2 10$ 1 layer(s)	2-10$ 1 layer(s)	3 10$ 1 layer/s.
SHEAR REINF.	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM START SUPPORT
VY = -45.42 MZ = 0.21 LD= 22
Provide 2 Legged @1 @ 90 mm c/c

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM END SUPPORT
VY = -45.29 MZ = 0.21 LD= 22
Provide 2 Legged @1 @ 90 mm c/c

B E A M N O. 24 D E S I G N R E S U L T S

RC6 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5750.0 mm SIZE: 300.0 mm X 300.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm.	1437.5 mm	2875.0 mm	4312.5 mm	5750.0 mm
TOP REINF.	150.90 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	250.28 (Sq. mm)
BOTTOM REINF.	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1437.5 mm	2875.0 mm	4312.5 mm	5750.0 mm
TOP REINF.	2-10$ 1 layer(s)	2-10$ 1 layer(s)	2-10$ 1 layer(s)	2-10$ 1 layer(s)	4-10$ 1 layer(s)
BOTTOM REINF.	2-10$ 1 layer(s)	2-10$ 1 layer(s)	2-10$ 1 layer(s)	2-10$ 1 layer(s)	2-10$ 1 layer(s)
SHEAR REINF.	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 690.0 mm AWAY FROM START SUPPORT
VY = 4.95 MX = 3.61 LD= 22
Provide 2 Legged @1 @ 90 mm c/c

SHEAR DESIGN RESULTS AT 515.0 MM AWAY FROM END SUPPORT
VY = -6.84 MX = 3.61 LD= 22
Provide 2 Legged @1 @ 90 mm c/c

B E A M N O. 25 D E S I G N R E S U L T S

N25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 4250.0 mm SIZE= 300.0 mm X 300.0 mm COVER= 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1062.5 mm	2125.0 mm	3187.5 mm	4250.0 mm
TOP REINF.	210.08 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	273.58 (Sq. mm)
BOTTOM REINF.	154.69 (Sq. mm)	149.93 (Sq. mm)	149.93 (Sq. mm)	149.93 (Sq. mm)	149.93 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1062.5 mm	2125.0 mm	3187.5 mm	4250.0 mm
TOP REINF.	3-10¢ 1 layer(s)	2-10¢ 1 layer(s)	2-10¢ 1 layer(s)	2-10¢ 1 layer(s)	4-10¢ 1 layer(s)
BOTTOM REINF.	2-12¢ 1 layer(s)	2-12¢ 1 layer(s)	2-12¢ 1 layer(s)	2-12¢ 1 layer(s)	2-12¢ 1 layer(s)
SHEAR REINF.	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c	2 legged @1 @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 515.0 mm AWAY FROM START SUPPORT
VY = 2.78 MX = -3.00 LD= 22
Provide 2 Legged @1 @ 90 mm c/c

SHEAR DESIGN RESULTS AT 690.0 mm AWAY FROM END SUPPORT
VY = -4.97 MX = -3.00 LD= 22
Provide 2 Legged @1 @ 90 mm c/c

B E A M N O. 26 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2400.0 mm SIZE: 300.0 mm X 500.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	625.0 mm	1250.0 mm	1875.0 mm	2500.0 mm
TOP REINF.	506.50 (Sq. mm)	228.10 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	238.77 (Sq. mm)
BOTTOM REINF.	201.42 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	221.61 (Sq. mm)	446.61 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	625.0 mm	1250.0 mm	1875.0 mm	2500.0 mm
TOP REINF.	7-10| 2 layer(s)	3-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	3-10| 1 layer(s)
BOTTOM REINF.	2-12| 1 layer(s)	2-12| 1 layer(s)	2-12| 1 layer(s)	2-12| 1 layer(s)	4-12| 1 layer(s)
SHEAR REINF.	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c	2 legged 8| @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM START SUPPORT
VY = 31.32 MX = 0.42 LD= 22
Provide 2 Legged 8\| @ 90 mm c/c

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM END SUPPORT
VY = 27.45 MX = 0.42 LD= 22
Provide 2 Legged 8\| @ 90 mm c/c

B E A M N O. 27 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5500.0 mm SIZE: 300.0 mm X 300.0 mm COVER: 50.0 mm.

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1375.0 mm	2750.0 mm	4125.0 mm	5500.0 mm
TOP REINF.	302.18 (Sq. mm)	150.54 (Sq. mm)	0.00 (Sq. mm)	150.54 (Sq. mm)	360.17 (Sq. mm)
BOTTOM REINF.	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1375.0 mm	2750.0 mm	4125.0 mm	5500.0 mm
TOP REINF.	4-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	3-10| 1 layer(s)
BOTTOM REINF.	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)	2-10| 1 layer(s)
SHEAR REINF.	2 legged @ 90 mm c/c	2 legged @ 90 mm c/c	2 legged @ 90 mm c/c	2 legged @ 90 mm c/c	2 legged @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM START SUPPORT
VY = 13.40 MX = 0.00 LD= 22
Provide 2 Legged 8L @ 90 mm c/c

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM END SUPPORT
VY = -9.06 MX = 0.00 LD= 23
Provide 2 Legged 8L @ 90 mm c/c

B E A M N O. 28 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 2000.0 mm SIZE: 500.0 mm X 300.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	500.0 mm	1000.0 mm	1500.0 mm	2000.0 mm
TOP REINF.	544.63 (Sq. mm)	242.47 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	248.55 (Sq. mm)
BOTTOM REINF.	210.13 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	254.42 (Sq. mm)	529.72 (Sq. mm)

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SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	500.0 mm	1000.0 mm	1500.0 mm	2000.0 mm
TOP REINF.	2-10l 2 layer(s)	4-10l 1 layer(s)	2-10l 1 layer(s)	2-10l 1 layer(s)	4-10l 2 layer(s)
BOTTOM REINF.	3-10l 1 layer(s)	2-10l 1 layer(s)	2-10l 1 layer(s)	4 10l 1 layer(s)	3 10l 2 layer(s)
SHEAR REINF.	2 legged 8: @ 90 mm c/c	2 legged 8l @ 90 mm c/c	2 legged 8l @ 90 mm c/c	2 legged 8l @ 90 mm c/c	2 legged 8l @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM START SUPPORT
Vu = 41.85 MX = -0.38 LD= 22
Provide 2 Legged 8l @ 90 mm c/c

SHEAR DESIGN RESULTS AT 490.0 mm AWAY FROM END SUPPORT
Vu = 36.26 MX = -0.38 LD= 22
Provide 2 Legged 8l @ 90 mm c/c

B E A M N O. 29 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 4250.0 mm SIZE: 300.0 mm X 350.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1062.5 mm	2125.0 mm	3187.5 mm	4250.0 mm
TOP REINF.	204.62 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	220.46 (Sq. mm)
BOTTOM REINF.	169.93 (Sq. mm)	149.93 (Sq. mm)	169.93 (Sq. mm)	149.93 (Sq. mm)	190.49 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1062.5 mm	2125.0 mm	3187.5 mm	4250.0 mm
TOP REINF.	4-10l 1 layer(s)	2-10l 1 layer(s)	2-10l 1 layer(s)	2-10l 1 layer(s)	3-10l 1 layer(s)
BOTTOM REINF.	2-12l 1 layer(s)	2-12l 1 layer(s)	2-12l 1 layer(s)	2-12l 1 layer(s)	2-12l 1 layer(s)
SHEAR REINF.	2 legged 8l @ 90 mm c/c	2 legged 8l @ 90 mm c/c	2 legged 8l @ 90 mm c/c	2 legged 8l @ 90 mm c/c	2 legged 8l @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 690.0 mm AWAY FROM START SUPPORT
VY = 5.62 MX = -2.77 LD= 22
Provide 2 Legged 8i @ 90 mm c/c

SHEAR DESIGN RESULTS AT 595.0 mm AWAY FROM END SUPPORT
VY = -5.73 MX = -2.77 LD= 22
Provide 2 Legged 8i @ 90 mm c/c

B E A M N O. 56 D E S I G N R E S U L T S

M29 Fe415 (Main) Fe415 (Sec.)

LENGTH: 5750.0 mm SIZE: 100.0 mm X 300.0 mm COVER: 50.0 mm

SUMMARY OF REINF. AREA (Sq.mm)

SECTION	0.0 mm	1437.5 mm	2875.0 mm	4312.5 mm	5750.0 mm
TOP REINF.	736.92 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	181.69 (Sq. mm)
BOTTOM REINF.	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)	150.54 (Sq. mm)

SUMMARY OF PROVIDED REINF. AREA

SECTION	0.0 mm	1437.5 mm	2875.0 mm	4312.5 mm	5750.0 mm
TOP REINF.	4-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	3-16i 1 layer(s)
BOTTOM REINF.	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)	2-16i 1 layer(s)
SHEAR REINF.	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c	2 legged 8i @ 90 mm c/c

SHEAR DESIGN RESULTS AT DISTANCE d (EFFECTIVE DEPTH) FROM FACE OF THE SUPPORT

SHEAR DESIGN RESULTS AT 510.0 mm AWAY FROM START SUPPORT
VY = 6.09 MX = 3.48 LD= 22
Provide 2 Legged 8i @ 90 mm c/c

SHEAR DESIGN RESULTS AT 690.0 mm AWAY FROM END SUPPORT
VY = -5.47 MX = 3.49 LD= 22
Provide 2 Legged 8i @ 90 mm c/c

**********END OF BEAM DESIGN RESULTS**********

194. DESIGN COLUMN 1 TO 20

C O L U M N N O. 1 D E S I G N R E S U L Y S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1550.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 7 SHORT COLUMN

REQD. STEEL AREA : 6966.25 Sq.mm.
REQD. CONCRETE AREA: 443033.75 Sq.mm
MAIN REINFORCEMENT : Provide 36 - 16 dia. (1.51%, 7238.23 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 255 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 8367.30 Muzt : 750.60 Muyt : 377.93

INTERACTION RATIO: 0.98 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 7 Puz : 6440.21 Muz : 782.65 Muy : 395.24 IR: 0.93

C O L U M N N O. 2 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1750.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 17 SHORT COLUMN

REQD. STEEL AREA : 1659.13 Sq.mm.
REQD. CONCRETE AREA: 445340.88 Sq.mm.
MAIN REINFORCEMENT : Provide 24 - 16 dia. (1.07%, 4825.49 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 255 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5745.89 Muz : 447.57 Muy : 271.11

INTERACTION RATIO: 0.57 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 17 Puz : 5793.47 Muz : 671.23 Muy : 267.04 IR: 0.93

C O L U M N N O. 3 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1450.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT. 6 SHORT COLUMN

REQD. STEEL AREA : 2353.06 Sq.mm
REQD. CONCRETE AREA: 294132.38 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 16 dia. (0.54%, 2412.74 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 255 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5769.42 Muz : 744.53 Muy : 396.86

INTERACTION RATIO: 0.98 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 6 Puz : 5786.32 Muz : 753.46 Muy : 400.48 IR: 0.97

STAAD SPACE -- PAGE NO. 16

C O L U M N N O. 4 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1250.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm.

** GUIDING LOAD CASE: 22 END JOINT: 16 SHORT COLUMN

REQD. STEEL AREA : 1376.61 Sq.mm.
REQD. CONCRETE AREA: 447974.69 Sq.mm.
MAIN REINFORCEMENT : Provide 12 12 dia. (0.30%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5415.48 Muz1 : 613.76 Muy1 : 233.15

INTERACTION RATIO: 0.51 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 16 Puz : 5426.65 Muz : 635.44 Muy : 243.60 IR: 0.50

C O L U M N N O. 5 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1550.0 mm CROSS SECTION: 500.0 mm X 500.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 4 SHORT COLUMN

REQD. STEEL AREA : 6572.79 Sq.mm.
REQD. CONCRETE AREA: 443427.3' Sq.mm.
MAIN REINFORCEMENT : Provide 36 - 16 dia. (1.61%, 7238.23 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 250 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 6701.01 Muz1 712.42 Muy1 = 387.89

INTERACTION RATIO: 0.98 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 9 Puz : 6440.21 Muz : 453.0; Muy : 431.02 IR: 0.89

C O L U M N N O. 6 D E S I G N R E S U L T S

p75 Beam (Main) Beam (Sec..

LENGTH: 1250.0 mm CROSS SECTION: 500.0 mm X 400.0 mm COVER: 50.0 mm

** GOVERNING LOAD CASE: 22 END JOINT: 14 SHORT COLUMN

REQD. STEEL AREA : 3852.89 Sq.mm.
REQD. CONCRETE AREA: 446147.09 Sq.mm.
MAIN REINFORCEMENT : Provide 20 - 16 dia. (0.89%, 4021.24 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 250 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5533.77 Muz1 = 406.42 Muy1 = 211.15

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 14 Puz : 5577.89 Muz : 425.93 Muy : 222.75 IR: 0.94

STAAD SPACE -- PAGE NO. 20

COLUMN NO. 7 DESIGN RESULTS

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3150.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** BUILDING LOAD CASE: 22 END JOINT: 1 SHORT COLUMN

REQD. STEEL AREA : 1961.10 Sq mm.
REQD. CONCRETE AREA: 232647.25 Sq.mm.
MAIN REINFORCEMENT : Provide 20 - 12 dia. (0.50%, 2261.95 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

Puz : 5670.95 Muz1 : 721.85 Muy1 : 386.99

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 1 Puz : 5741.09 Mux : 760.59 Muy : 405.32 IR: 0.99

COLUMN NO. 8 DESIGN RESULTS

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1250.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** BUILDING LOAD CASE: 22 END JOINT: 11 SHORT COLUMN

REQD STEEL AREA : 1495.76 Sq.mm.
REQD. CONCRETE AREA: 1?e969.92 Sq.mm.
MAIN REINFORCEMENT : Provide 16 - 12 dia. (0.43%, 1809.56 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5?11.25 Muz1 = 653.33 Muy1 : 368.80

INTERACTION RATIO: 0.59 as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 1 Puz : 5605.37 Muz : 714.37 Muy : 383.40 IR: 0.52

C O L U M N N O. 9 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3?50.0 mm CROSS SECTION: 1000.0 mm X 550.0 mm COVER: 50.0 mm

** GOVERNING LOAD CASE: 21 END JOINT: 2 SHORT COLUMN

REQD. STEEL AREA : 1?51.50 Sq.mm.
REQD. CONCRETE AREA: ?18947.91 Sq.mm.
MAIN REINFORCEMENT : Provide 16 - 12 dia. (0.33%, 1809.56 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 6?12.98 Muz1 : 491.63 Muy1 : 917.03

INTERACTION RATIO: 0.30 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 20
END JOINT: 2 Puz : 6?90.37 Muz : 375.09 Muy : ?11.14 IR: 0.64

C O L U M N N O. 10 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1200.0 mm CROSS SECTION: 1300.0 mm X 550.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 21 END JOINT: 12 SHORT COLUMN

REQD STEEL AREA : 1722.89 Sq.mm.
REQD. CONCRETE AREA: 215361.16 Sq.mm.
MAIN REINFORCEMENT : Provide 16 - 12 dia. (0.45%, 1809.56 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 8104.31 Muz1 : 488.60 Muy1 : 911.25

INTERACTION RATIO: 0.28 (as per Cl. 39.5, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 26
END JOINT: 12 Puz : 6730.37 Muz : 375.15 Muy : 702.54 IR: 0.62

C O L U M N N O. 11 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1550.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 21 END JOINT: 3 SHORT COLUMN

REQD. STEEL AREA : 2979.73 Sq.mm.
REQD. CONCRETE AREA: 112466.31 Sq.mm.
MAIN REINFORCEMENT : Provide 28 - 12 dia. (0.79%, 3166.73 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5196.42 Muz1 : 457.20 Muy1 : 253.79

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 21
END JOINT: 3 Puz : 6012.52 Muz : 509.16 Muy : 265.35 IR: 0.98

C O L U M N N O. 12 D E S I G N R E S U L T S

M35 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1250.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 37.5 mm

** RUNNING LOAD CASE: 21 END JOINT: 13 SHORT COLUMN

REQD. STEEL AREA : 1221.02 Sq.mm.
REQD. CONCRETE AREA: 153627.77 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.38%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5428.93 Muz1 : 237.35 Muy1 : 127.73

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 21
END JOINT: 13 Puz : 5469.65 Muz : 256.32 Muy : 137.20 IR: 0.92

COLUMN NO. 13 DESIGN RESULTS

MEMB Fe415 (Main) Fe415 (Sec.

LENGTH: 1550.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 5 SHORT COLUMN

REQD. STEEL AREA : 3931.56 Sq.mm.
REQD. CONCRETE AREA: 446068.44 Sq.mm.
MAIN REINFORCEMENT : Provide 20 - 16 dia. (0.89%, 4021.24 Sq.mm ;
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 255 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Pur : 5550.85 Mux1 : 464.24 Muy1 : 239.91

INTERACTION RATIO: 0.96 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 5 Pur : 5511.89 Mux : 476.64 Muy : 246.09 IR: 0.96

COLUMN NO. 14 DESIGN RESULTS

MEMB Fe415 (Main) Fe415 (Sec.)

LENGTH: 1250.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 15 SHORT COLUMN

REQD. STEEL AREA : 2454.47 Sq.mm.
REQD. CONCRETE AREA: 300805.00 Sq.mm.
MAIN REINFORCEMENT : Provide 24 - 12 dia. (0.80%, 2714.34 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5[illegible]5.92 Muz1 : 211.[illegible] Muy1 : 135.50

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 15 Puz : 5027.58 Muz : 291.66 Muy : 154.19 IR: 0.87

C O L U M N N O. 15 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 3550.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 23 END JOINT: 8 SHORT COLUMN

REQD. STEEL AREA : 1523.42 Sq.mm.
REQD. CONCRETE AREA: 190603.03 Sq.mm
MAIN REINFORCEMENT : Provide 16 - 12 dia. (0.40%, 1809.56 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 4908.35 Muz1 : 211.85 Muy1 : 119.19

INTERACTION RATIO: 1.00 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 23
END JOINT: 8 Puz : 4985.05 Muz : 252.22 Muy : 131.66 IR: 0.85

C O L U M N N O. 16 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1250.0 mm CROSS SECTION: 300.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 18 SHORT COLUMN

REQD. STEEL AREA : 981.65 Sq.mm.
REQD. CONCRETE AREA: 97681.03 Sq.mm.
MAIN REINFORCEMENT : Provide 12 - 12 dia. (0.30%, 1357.17 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5296.93 Muz1 : 672.76 Muy1 : 258.03

INTERACTION RATIO: 0.50 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 21
END JOINT: 18 Puz : 6961.79 Muz : 182.58 Muy : 99.38 ID: 0.56

C O L U M N N O. 17 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1550.0 mm CROSS SECTION: 300.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 9 SHORT COLUMN

REQD. STEEL AREA : 4410.17 Sq.mm.
REQD. CONCRETE AREA: 445589.84 Sq.mm.
MAIN REINFORCEMENT : Provide 40 - 12 dia. (1.01%, 4523.89 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5652.15 Muz1 : 475.50 Muy1 : 245.11

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 9 Pur : 5712.62 Mux : 490.65 Muy : 253.05 IR: 0.96

C O L U M N N O. 18 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1150.0 mm CROSS SECTION: 500.0 mm X 900.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 22 END JOINT: 18 SHORT COLUMN

REQD. STEEL AREA : 2703.71 Sq.mm.
REQD. CONCRETE AREA: 347963.47 Sq.mm.
MAIN REINFORCEMENT : Provide 28 - 12 dia. (0.70%, 3166.73 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 5246.17 Muz1 : 251.60 Muy1 : 133.86

INTERACTION RATIO: 0.99 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 22
END JOINT: 29 Pur : 5348.86 Mux : 306.34 Muy : 161.43 IR: 0.82

C O L U M N N O. 19 D E S I G N R E S U L T S

M20 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1550.0 mm CROSS SECTION: 1000.0 mm X 550.0 mm COVER: 50.0 mm

** GUIDING LOAD CASE: 21 END JOINT: 19 SHORT COLUMN

REQD. STEEL AREA : 1131.34 Sq.mm.
REQD. CONCRETE AREA 216417.19 Sq.mm.
MAIN REINFORCEMENT . Provide 16 - 12 dia. (0.22%, 1809.56 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Puz : 6706.40 Muz1 : 489.53 Muy1 : 913.05

INTERACTION RATIO: 0.50 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 20
END JOINT: 19 Puz : 6730.37 Muz : 321.90 Muy : 606.40 IR: 0.69

C O L U M N N O. 20 D E S I G N R E S U L T S

M25 Fe415 (Main) Fe415 (Sec.)

LENGTH: 1250.0 mm CROSS SECTION: 1000.0 mm X 550.0 mm COVER: 50.0 mm.

** GUIDING LOAD CASE: 21 END JOINT: 20 SHORT COLUMN

REQD. STEEL AREA : 1107.63 Sq.mm.
REQD. CONCRETE AREA: 217628.16 Sq.mm.
MAIN REINFORCEMENT : Provide 16 - 12 dia. (0.33%, 1809.56 Sq.mm.)
(Equally distributed)
TIE REINFORCEMENT : Provide 8 mm dia. rectangular ties @ 190 mm c/c

SECTION CAPACITY BASED ON REINFORCEMENT REQUIRED (KNS-MET)

Pur : 6698.29 Mur1 : 496.33 Muy1 : 906.78

INTERACTION RATIO: 0.16 (as per Cl. 39.6, IS456:2000)

SECTION CAPACITY BASED ON REINFORCEMENT PROVIDED (KNS-MET)

WORST LOAD CASE: 20
END NUMBER: 28 Pur : 6730.37 Mur : 318.49 Muy : 594.41 SR: 0.76

**********END OF COLUMN DESIGN RESULTS**********

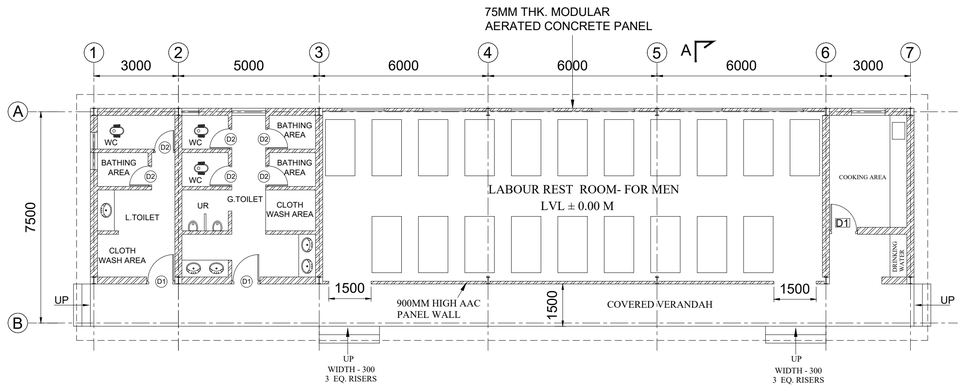
195. END CONCRETE DESIGN
196. FINISH

********** END OF THE STAAD.Pro RUN **********

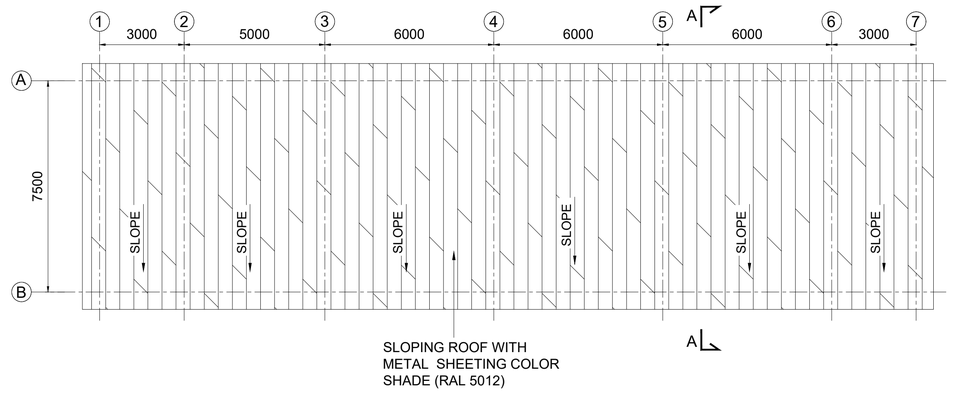
**** DATE= AUG 12,2005 TIME= 15:12:29 ****

For questions on STAAD.Pro, please contact :
Research Engineers Ltd.
email : support@calcutta.reiusa.com
2/4,Block GP, Sector-V,Salt lake, CALCUTTA - 700 091
India : TEL:(033)2357-3515 FAX:(033)2357-3467
US : Ph-(714) 974-2500, Fax-(714) 921-0644

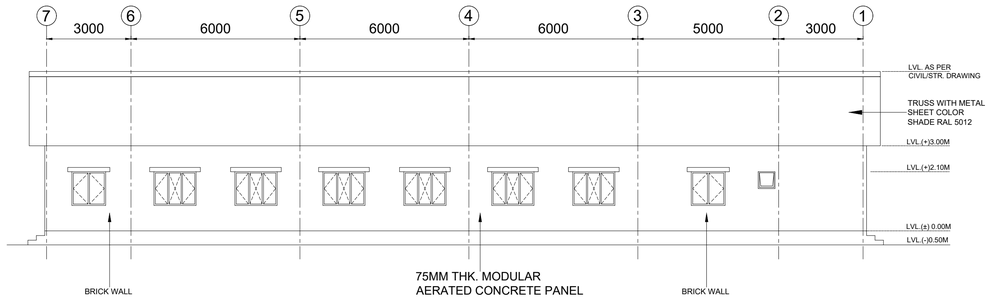
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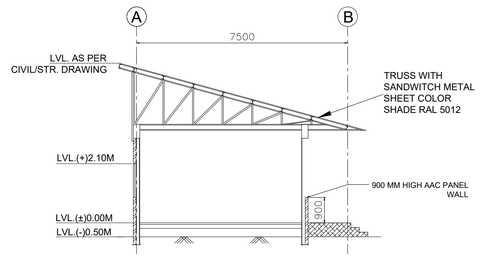
TYP. PLAN OF SHELTER FOR MEN



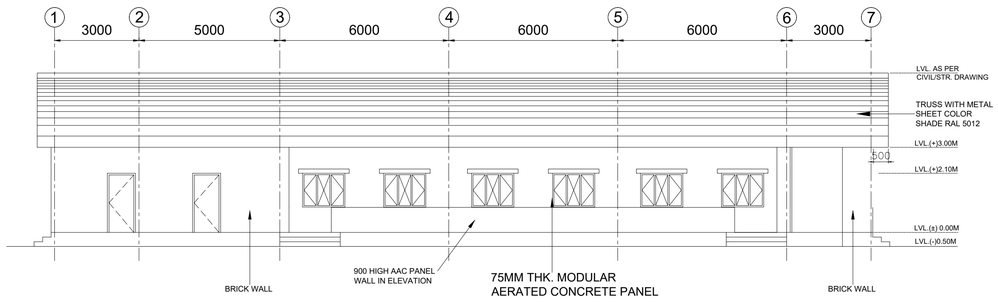
TERRACE PLAN



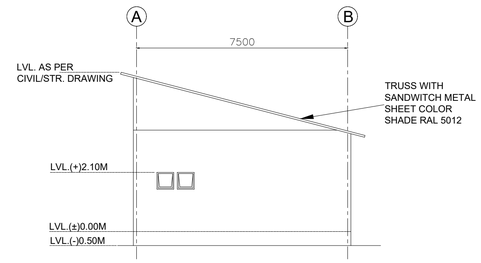
ELEVATION ALONG GRID - A



SECTION-AA



ELEVATION ALONG GRID - B



ELEVATION ALONG AXIS - 1

FINISHING SCHEDULE

FLOOR LEVEL	SPACE DESIGNATION	FLOORING: CEMENTED IPS FLOOORIG	FLOORING: CERAMIC TILES 300X300mm	FLOORING: REMARKS	SKIRTING 150 HIGH/DADO:	SKIRTING 150 HIGH/DADO:	SKIRTING 150 HIGH/DADO: CEMENT PLASTER SKIRTING	SKIRTING 150 HIGH/DADO: CERAMIC GLAZED WALL TILES	SKIRTING 150 HIGH/DADO: REMARKS	WALL: DISTEMPERING WITH 1ST QUALITY ACRYLIC DISTEMPER	WALL:	WALL: REMARKS	CEILING
FLOOR AT LVL (±) 0.00M	REST ROOM	●					●			●			
	TOILET		●					●	DADO 2100MM HIGH	●		ABOVE DADO	

EXTERIOR FINISH
FINISHING WALLS WITH ACRYLIC SMOOTH-I EXTERIOR PAINT

FOR TENDER PURPOSE ONLY

NOTES:-

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
2. SUITABLE STRUCTURAL ARRANGEMENT SHALL BE DEVELOPED BY BIDDER.
3. TENDER DRAWING IS TENTATIVE ONLY. THE DRAWING IS ONLY FOR BUILDING SCHEME, SIZE AND HEIGHT ETC . THE DRAWING SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION IN ALL REGARDS.

DOOR SCHEDULE

LEGEND	WIDTH	HEIGHT	LINTEL LVL.	DESCRIPTION	REMARKS
D1	1000	2100	2100		COLD ROLLED STEEL DOOR FRAME WITH SOLID CORE FLUSH DOOR SHUTTER
D2	750	2100	2100		COLD ROLLED STEEL DOOR FRAME WITH SOLID CORE FLUSH DOOR SHUTTER

WINDOW SCHEDULE

LEGEND	WIDTH	HEIGHT	CILL LEV.	LINTEL LEV.	DESCRIPTION	REMARKS
V1	600	600	1500	2100		STEEL FRAME VENTILATOR WITH FIXED GLASS SHUTTER (6MM THK. TOUGHENED GLASS)
W1	1200	1200	900	2100		ALUMINIUM GLAZED WINDOW WITH OPENABAL WINDOW WITH 4mm THK. CLEAR FLOAT GLASS
W2	1500	1200	900	2100		ALUMINIUM GLAZED WINDOW WITH OPENABAL & FIXED WINDOW WITH 4mm THK. CLEAR FLOAT GLASS

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NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
(ENGINEERING DIVISION)

REV.NO	DESCRIPTION	DRAWN	DESIGN	CHKD.	MECH (L/O)	MECH (WS)	ELEC.	C&I	STR.	APPD.	DATE
A	RELEASED FOR TENDER PURPOSE	NK	DK								27.11.23
A	RELEASED FOR TENDER PURPOSE	NK	DK								27.04.23
					CLEARED BY						

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-III (1X800 MW)

TITLE: Sheds for Construction workers and O&M Workers
TYPICAL ARCHITECTURAL DETAILS

SIZE	SCALE	DRG. NO.	REV. NO.
A1	1:100	XXXX-001-POC-A-011	B

Amendment 02 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	WS-12 to WS-17	1
2	TG-16	2
3	SG-1 to SG-49	3-13
4	MH-06 to MH-57	14-31
5	C-21	32
6	EE-68 to EE-79	33-35
7	D2-50 to D2-58	36-38
8	QA-01	39
9	Annexures to Amendment 02	

Amendment 02 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
WS-12	E		New Drawing		-	Layout of Stage-I DM Plant and DM Tanks
WS-13	A	VI Chapter 8	1/29	1.00.00.A.1 (iii)	Pump shafts line bearings/ bushes only (line bearings / bushes for impeller shaft, intermediate shafts, drive shaft, bowl bearing)	Pump shafts line bearings/ bushes only (line bearings / bushes for impeller shaft, intermediate shafts, drive shaft, bowl bearing) **(As Applicable)**
WS-14	A	IIA-10	6/12	1.03.03 (b)	Facility to collect free oil from these sumps to a MS oil drum of 200 litre capacity with the help of Drum type (2 Nos.) oil skimmers, **Centrifuge (1 no.)** of required capacity.	Facility to collect free oil from these sumps to a MS oil drum of 200 litre capacity with the help of Drum type (2 Nos.) oil skimmers, **Centrifuge (2x100%)** of required capacity.
WS-15	B	A-14	33/36	22.00.00 (C) 2	No. of High Pressure Pumps- One (1) per RO train + Common stand by	No. of High Pressure Pumps- One (1x100%) per RO train (Total 2x100%)
WS-16	A	IIA-10	9/12	2.00.00 B (3) g	Three (3) (3x50%) (2W+1S) numbers of Mixed Bed units…	Two (2) (2x100%) (1W+1S) numbers of Mixed Bed units…
WS-17	B	A-01	56/87	3.06.00, D, 4 (c)	Neutralizing waste disposal system- DM plant Effluent drains**, UF back wash**, UF/RO cleaning chemicals etc. shall be connected to the N-Pit and shall be led suitably to Ash handling system.	Neutralizing waste disposal system- DM plant Effluent drains**, ~~UF back wash~~**, UF/RO cleaning chemicals etc. shall be connected to the N-Pit and shall be led suitably to Ash handling system. UF back wash shall be led to Filter backwash pit

Amendment 02 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No.	Clause No.		
TG-16.	B	A-07	16 of 25	6.05.09 (c)	An additional alternate source of steam from other…… if the auxiliary steam parameter suits the drive turbine requirement. Bidder may however note that it is not envisaged to start the unit with TDBFP when auxiliary steam is available only from auxiliary boiler.	An additional alternate source of steam from other…… if the auxiliary steam parameter suits the drive turbine requirement. ~~Bidder may however note that it is not envisaged to start the unit with TDBFP when auxiliary steam is available only from auxiliary boiler.~~

Amendment 02 to Technical Specifications (Section VI)

S. NO.	SPECIFICATION REFERENCE				EXISTING (As per Base Specification)	READ AS
	SEC/ PART	SUB-SEC.	PAGE NO.	CLAUSE NO.		
SG.1.	VI/B	A-05	20 of 29	7.07.09	Contractor shall provide …FGD system of **2x800 MW** at Design point … automatic/on-load cleaning system, etc.	Contractor shall provide …FGD system of **1x800 MW** at Design point … automatic/on-load cleaning system, etc.
SG.2.	VI/B	A-01	27 of 87	1.05.22.01	A "wet Chimney" shall be installed ….without insulation for borosilicate lining. The stack shall be designed as per the latest guidelines of EPRI Wet Stack Design Guide. The design of wet ducts and stacks system shall consider the Stack liquid discharge (SLD), Corrosion/chemical attack, Condensate collection system and its drainage etc. A wet stack study shall……not be less than 8000mm.	A "wet Chimney" shall be installed ….without insulation for borosilicate lining. The stack shall be designed as per the latest guidelines of EPRI Wet Stack Design Guide. The design of wet ducts and stacks system shall consider the Stack liquid discharge (SLD), Corrosion/chemical attack, Condensate collection system and its drainage etc. **To cater to the requirements of FGD running in bypass mode, the components of Condensate Drain collection system (such as ring collectors, gutters, condensate drain piping etc.) exposed to high temperature flue gas shall be made of Alloy C276 / Alloy 59 / Titanium Gr-II**. A wet stack study shall……not be less than 8000mm.
SG.3.	VI/A	I-B (Project Information)	11 of 19	Annexure-IV-2	**Domestic Coal Characteristics**	**Domestic Coal Characteristics** revised attached at Annexure SG-1
SG.4.	VI/A	II-A-01	7 of 28	2.10.03	Necessary piping, draining … Stage-II (2x500 MW) (capacity 60 TPH), consisting of: (a) One number non-return valve to supply auxiliary steam to station header of Stage-III units from existing Stage-II units. (b) One number electro-hydraulic/ electro- pneumatic operated pressure reducing valve rated for full duty in parallel to the non-return valve to feed auxiliary steam from Stage-III units to Stage-II units. (c) One number motorized isolation valve & manual isolation valve each at the upstream and downstream of Non-return valve / Pressure reducing valve. (d) Pressure relief valve(s) on downstream side of pressure reducing valve.	Necessary piping, draining … Stage-II (2x500 MW) (capacity 60 TPH), consisting of **two sets of motorized inching and one manual isolation valve near each end of stage-II and Stage-III units and necessary piping, draining and warm-up arrangement with valves, instrumentation etc. for the interconnection line between stage-II & stage-III (Refer Auxiliary Steam System P&ID also)** ~~(a) One number non-return valve to supply auxiliary steam to station header of Stage-III units from existing Stage-II units.~~ ~~(b) One number electro-hydraulic/ electro- pneumatic operated pressure reducing valve rated for full duty in parallel to the non-return valve to feed auxiliary steam from Stage-III units to Stage-II units.~~ ~~(c) One number motorized isolation valve & manual isolation valve each at the upstream and downstream of Non-return valve / Pressure reducing valve.~~ ~~(d) Pressure relief valve(s) on downstream side of pressure reducing valve.~~

Amendment 02 to Technical Specifications (Section VI)

S. NO.	SPECIFICATION REFERENCE				EXISTING (As per Base Specification)	READ AS
	SEC/ PART	SUB-SEC.	PAGE NO.	CLAUSE NO.		
					(e) Necessary piping, draining and warm-up arrangement with valves, instrumentation etc. for this interconnection line between stage-II & stage-III.	~~(e) Necessary piping, draining and warm-up arrangement with valves, instrumentation etc. for this interconnection line between stage-II & stage-III.~~
SG.5.	VI/A	II-A-01	9 of 28	2.13.01	Forced Draft Fans Two (2) nos. of axial type, constant speed….. type of foundation being provided. At least two (02) nos. of duplex thermo couples or duplex platinum RTD's (100 ohms at 0°C) and one no of. temperature indicator shall be provided for bearing metal temperature measurement, control & monitoring shall be included in the scope.	Forced Draft Fans Two (2) nos. of axial type, constant speed….. type of foundation being provided. ~~At least two (02) nos. of duplex thermo couples or duplex platinum RTD's (100 ohms at 0°C) and one no of. temperature indicator shall be provided for bearing metal temperature measurement, control & monitoring shall be included in the scope.~~ **Each fan bearing shall be provided with three (03) numbers duplex RTDs connected to three (03) numbers dual input transmitters with display for bearing metal temperature measurement, control & monitoring.**
SG.6.	VI/A	II-A-01	10 of 28	2.13.02	Induced Draft Fans Two (2) nos. two stage ID fans ….. will also be acceptable. At least two (02) nos. of duplex thermo couples or duplex platinum RTD's (100 ohms at 0°C) and one no of. temperature indicator shall be provided for bearing metal temperature measurement, control & monitoring shall be included in the scope.	Induced Draft Fans Two (2) nos. two stage ID fans ….. will also be acceptable. ~~At least two (02) nos. of duplex thermo couples or duplex platinum RTD's (100 ohms at 0°C) and one no of. temperature indicator shall be provided for bearing metal temperature measurement, control & monitoring shall be included in the scope~~. **Each fan bearing shall be provided with three (03) numbers duplex RTDs connected to three (03) numbers dual input transmitters with display for bearing metal temperature measurement, control & monitoring.**
SG.7.	VI/A	II-A-01	13 of 28	2.15.04 (d)	Primary Air Fans (d) At least two(02) nos. of duplex thermocouples or duplex platinum RTDs (100 Ohm at 0 Deg. C) and one no. of temperature indicator shall be provided for bearing metal temperature measurement, control and monitoring.	Primary Air Fans (d) ~~At least two(02) nos. of duplex thermocouples or duplex platinum RTDs (100 Ohm at 0 Deg. C) and one no. of temperature indicator shall be provided for bearing metal temperature measurement, control and monitoring.~~ **Each fan bearing shall be provided with three (03) numbers duplex RTDs connected to three (03) numbers dual input transmitters with display for bearing metal temperature measurement, control & monitoring.**
SG.8.	VI/A	VI, Ch.-01	31 of 38	5.01.00	11 Rappers …….	11 Rappers **(as applicable for the specific design)** **……**

Amendment 02 to Technical Specifications (Section VI)

S. NO.	SPECIFICATION REFERENCE				EXISTING (As per Base Specification)	READ AS
	SEC/ PART	SUB-SEC.	PAGE NO.	CLAUSE NO.		
SG.9.	VI/A	II-A-03			IIA-03 Biomass	IIA-03 Biomass (Revised) attached at Annexure SG-2
SG.10.	VI/A	II-A-04	2 of 7	2.04.01	The FGD System shall be in operation…2x100 electrical heaters. Further, Quick opening Bi-plane motorized/pneumatic damper along with 2x100% seal air fans & 2x100 electrical heaters shall also be provided by the Contractor in the by-pass duct. The design of the damper… the above conditions.	The FGD System shall be in operation…2x100% electrical heaters. Further**,** ~~Quick opening Bi-plane motorized/pneumatic damper~~ **regulating type pneumatically operated bi-plane damper with quick opening facility** along with 2x100% seal air fans & 2x100**%** electrical heaters shall also be provided by the Contractor in the by-pass duct**. Smart positioner shall be provided for regulating purposes. Bidder to refer Clause 7.01.00 Sub Section IIIC-08 Part-B Section VI of Technical Specifications for the details of smart positioner.** The design of the damper… the above conditions.
SG.11.	VI/A	VI, Ch.-01	31 of 38	5.01.00	3 Emitting electrodes …….	3 Emitting electrodes **(as applicable for the specific design)** **……**
SG.12.	VI/A	II-A-04	2 of 7	3.01.05	Limestone slurry piping to each absorber, along with recirculation lines, all isolation and control valves. On/Off type Diaphragm valves in Limestone circulation lines to be provided instead of pinch control valve.	Limestone slurry piping to each absorber, along with recirculation lines, all isolation and control valves. ~~On/Off type Diaphragm valves in Limestone circulation lines to be provided instead of pinch control valve~~. **Pinch control valves shall be provided in the Limestone slurry recirculation lines. Alternatively, the bidder can also provide On/Off type Diaphragm valves as per its proven practice.**
SG.13.	VI/A	II-A-04	3 & 4 of 7	4.01.04	Motorized isolation gates at Absorber gas inlet, Absorber gas outlet along with 2x100 seal air fans for each gate and 2x100 heaters for absorber outlet gate & bypass gate. A bi-plane bypass damper along with 2x100 seal air & 2x100 heaters shall also be provided in the bypass duct.	Motorized isolation gates at Absorber gas inlet, Absorber gas outlet along with 2x100% seal air fans for each gate and 2x100% heaters for absorber outlet gate ~~& bypass gate~~. A bi-plane bypass damper along with 2x100% seal air & 2x100% heaters shall also be provided in the bypass duct.
SG.14.	VI/A	II-A-04	4 of 7	4.01.09	Piping from gypsum bleed pumps to gypsum dewatering system, along with recirculation lines (if required) necessary isolation and control valves.	Piping from gypsum bleed pumps to gypsum dewatering system, along with recirculation lines (if required) necessary isolation and control valves. **Pinch control valve shall be provided in the gypsum slurry recirculation lines. Alternatively, the bidder can also provide On/Off type Diaphragm valves as per its proven practice.**
SG.15.	VI/A	II-A-04	5 of 7	7.02.00A	New Clause	**2x100% cake washing pumps for each vacuum belt filter.**
SG.16.	VI/A	II-A-04	5 of 7	7.02.00B	New Clause	**2x100% cloth washing pumps for each vacuum belt filter.**
SG.17.	VI/A	II-A-04	5 of 7	7.05.00	7.05.00 All the storage tanks shall be lined with repleacable chorobutyl/bromobutyl rubber lining of minimum 4 mm thickness or with vinyl ester based	~~7.05.00 All the storage tanks shall be lined with repleacable chorobutyl/bromobutyl rubber lining of minimum 4 mm thickness or with vinyl ester based flake glass lining of minimum 3 mm thickness from inside~~

Amendment 02 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">S. NO.</th><th colspan="4">SPECIFICATION REFERENCE</th><th rowspan="2">EXISTING
(As per Base Specification)</th><th rowspan="2">READ AS</th></tr>
<tr><th>SEC/ PART</th><th>SUB-SEC.</th><th>PAGE NO.</th><th>CLAUSE NO.</th></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>flake glass lining of minimum 3 mm thickness from inside</td><td>7.06.00 Corrosion Protection requirements of all the storage tanks are specified at clause 13.00.00, I-M1, Part-B of Technical Specifications.</td></tr>
<tr><td>SG.18.</td><td>VI/A</td><td>VI Ch.-01</td><td>5 of 38</td><td>1.05.00 A 10</td><td>ID fan impeller liner</td><td>ID fan impeller liner (if applicable)</td></tr>
<tr><td>SG.19.</td><td>VI/A</td><td>VI Ch.-01</td><td>5 of 38</td><td>1.05.00 A 11</td><td>ID fan casing liner</td><td>ID fan casing liner (if applicable)</td></tr>
<tr><td>SG.20.</td><td>VI/A</td><td>VI Ch.-01</td><td>19 of 38</td><td>1.22.02</td><td><table><tr><td>1.22.02</td><td>Gates in Flue Gas System of Air Flue gas path of Boiler including FGD.</td><td></td></tr><tr><td></td><td>1. Seals</td><td>1 set of each type and size (Set means complete replacement for one gate)</td></tr><tr><td></td><td>2. Actuator</td><td>1 no. of each type</td></tr></table></td><td><table><tr><td><s>1.22.02</s> 1.24.00</td><td>Gates in Flue Gas System of Air and Flue gas path of Boiler including FGD.</td><td></td></tr><tr><td></td><td>1. Seals</td><td>1 set of each type and size (Set means complete replacement for one gate)</td></tr><tr><td></td><td>2. Actuator</td><td>1 no. of each type</td></tr></table></td></tr>
<tr><td>SG.21.</td><td>VI/B</td><td>A-02</td><td>44 of 67</td><td>13.02.04 (ii)</td><td><table><tr><td>Double multi-louver (Bi-plane) type</td><td>at location Cl. no. 13.02.01(e), 13.02.02(ii) , 13.02.02(iii) & 13.02.02(iv)</td></tr></table></td><td><table><tr><td>Double multilouver (Biplane) type</td><td>at location Cl. no. 13.02.01(e), 13.02.02(ii) & 13.02.02(iii) <s>&</s> <s>13.02.02(iv)</s></td></tr></table></td></tr>
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<tr><td>SG.22.</td><td>VI/B</td><td>A-02</td><td>18 of 67</td><td>9.01.03</td><td>Air preheater Construction shall conform to following:
<table>
<tr><td></td><td>Design</td><td colspan="2">Requirements</td></tr>
<tr><td>(1)</td><td>Type</td><td colspan="2">Rotary, regenerative, (Ljungstrom or approved equivalent), counter flow with vertical axis of rotation, enclosed with air/gas tight casing.</td></tr>
<tr><td>(2)</td><td>Heating Elements</td><td>Cold end</td><td>Made of Corten steel of minimum 1.2 mm thickness</td></tr>
<tr><td></td><td></td><td>Hot end</td><td>Made of carbon steel minimum 0.8 mm thick.</td></tr>
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<tr><td></td><td></td><td>Hot end/ Intermediate end</td><td>Made of carbon steel minimum 0.8 mm thick.</td></tr>
</table>
…</td></tr>
<tr><td>SG.23.</td><td>VI/B</td><td>A-02</td><td>19 of 67</td><td>9.01.03 (6) 4.</td><td>The maximum air-in-leakage to flue gas after 3000 hours continuous operation of the Steam Generator with coal shall be guaranteed.</td><td>The maximum air-in-leakage to flue gas ~~after 3000 hours continuous operation of the Steam Generator~~ with coal shall be guaranteed and the same shall be demonstrated along with the boiler PG test.</td></tr>
<tr><td>SG.24.</td><td>VI/B</td><td>A-02</td><td>40 of 67</td><td>13.01.05 (a)</td><td>Minimum 8 mm thick steel plates for gas ducts upstream of ESP and minimum 6 mm thick steel plates for gas ducts downstream of ESP</td><td>Minimum 8 mm thick steel plates for gas ducts upstream of ESP and minimum ~~6 mm~~ 7 mm thick steel plates for gas ducts downstream of ESP</td></tr>
<tr><td>SG.25.</td><td>VI/B</td><td>A-02</td><td>44 of 67</td><td>13.02.05</td><td>Damper Gas Tightness

The dampers mentioned…damper, as follow:</td><td>Damper Gas Tightness

The dampers mentioned…damper, as follow:</td></tr>
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<table>
<tr><th colspan="2">Damper at locations</th><th colspan="2">Min. Guaranteed Gas tightness Efficiency</th></tr>
<tr><th colspan="2">As per Clause No.</th><th>Without Seal Air</th><th>With Seal Air**</th></tr>
<tr><td colspan="2">13.02.01 (e), 13.02.02(ii), 13.02.02 (iii) & 13.02.02(iv)</td><td>99.50%</td><td>100%</td></tr>
<tr><td colspan="2">…</td><td>…</td><td>…</td></tr>
</table>
…
</td><td>
<table>
<tr><th colspan="2">Damper at locations</th><th colspan="2">Min. Guaranteed Gas tightness Efficiency</th></tr>
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<tr><td colspan="2">…</td><td>…</td><td>…</td></tr>
</table>
…
</td></tr>
<tr><td>SG.26.</td><td>VI/B</td><td>A-02</td><td>50 of 67</td><td>16.01.01</td><td>GENERAL

To meet the continuous and startup…… …… …… continuously required for any use.

Further, the Bidder shall provide an interconnection arrangement at station header with High Temperature Aux. Steam station header of existing stage-I (2x800 MW) units (Approx. length of interconnecting line is about 2250 meters). Auxiliary steam when sourced through this interconnection shall be available at a maximum rate of 60 T/hr with parameters 16 ata/ 310°C at Stage-I TP. Bidder shall consider the same for start-up procedures during initial commissioning.

Auxiliary steam pressure reducing and desuperheating stations, alongwith all pipings etc. shall be supplied as per Tender drawing of AUX. STEAM SYSTEM attached in Part-E of the Technical specification, section-VI.</td><td>GENERAL

To meet the continuous and startup…… …… … continuously re-quired for any use.

Further, the Bidder shall provide an interconnection arrangement at station header with High Temperature Aux. Steam station header of existing <s>stage-I (2x800 MW)</s> stage-II (2x500 MW) units (Approx. length of interconnecting line is about 2250 meters). Auxiliary steam when sourced through this interconnection shall be available at a maximum rate of 60 T/hr with parameters 16 ata/ 310°C at Stage-I TP. Bidder shall consider the same for start-up procedures during initial commissioning.

Auxiliary steam pressure reducing and desupesheating stations, alongwith all pipings etc. shall be supplied as per Tender drawing of AUX. STEAM SYSTEM attached in Part-E of the Technical specification, section-VI.</td></tr>
<tr><td>SG.27.</td><td>VI/B</td><td>A-05</td><td>2 of 29</td><td>1.03.14</td><td>In case distance Limestone Grinding system and Absorber is more than 500M, Bidder shall provide the following</td><td>In case distance between Limestone Grinding system/gypsum dewatering system and Absorber is more than 500M, the Bidder shall provide the following</td></tr>
</table>

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S. NO.	SPECIFICATION REFERENCE				EXISTING (As per Base Specification)	READ AS
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					Flushing system at intermittent locations for the limestone pipeline which shall contain… based on their proven practice.	Flushing system at intermittent locations for the limestone **/gypsum slurry** pipeline which shall contain… based on their proven practice.
SG.28.	VI/B	A-05	5 of 29	3.03.02	Quick opening Bi-plane motorized/pneumatic damper along with 2x100% seal air fans & 2x100 electrical heaters shall also be provided in the by-pass duct. The design of the damper… under the above conditions.	~~Quick opening Bi-plane motorized/pneumatic damper~~ **Regulating type pneumatically operated bi-plane damper with quick opening facility** along with 2x100% seal air fans & 2x100 electrical heaters shall also be provided in the by-pass duct. The design of the damper… under the above conditions.
SG.29.	VI/B	A-05	10 of 29	5.06.05	It shall be possible to reach the SO_2 emission guarantees, at Guarantee point condition, with at least one spray level continuously out of service (in case the absorber is equipped with several spray levels) or one spare pump continuously out of service.	It shall be possible to reach the SO_2 emission guarantees, at Guarantee point condition, with at least one spray level continuously out of service (in case the absorber is equipped with several spray levels) or one spare pump continuously out of service. **(This clause shall not be applicable for the JBR technology)**
SG.30.	VI/B	A-05	12 of 29	5.06.22	In case of Spray Tower System, Suction screens shall be installed inside the Absorber vessel to protect the Slurry recirculation pumps. In case of… shall be provided.	In case of Spray Tower System, Suction screens shall be installed inside **or outside** the Absorber vessel to protect the Slurry recirculation pumps. In case of… shall be provided.
SG.31.	VI/B	A-05	12 of 29	5.06.24	5.06.24 Equipment's required for internal & external inspection shall be furnished by the contractor in brand new condition. List of all such items shall be furnished along with the Bid. The formation of agglomeration, deposition & caking shall be avoided with submission of procedures & safety guidelines for all probable areas.	~~5.06.24~~ 5.06.25 Equipment's required for internal & external inspection shall be furnished by the contractor in brand new condition. List of all such items shall be furnished along with the Bid. The formation of agglomeration, deposition & caking shall be avoided ~~with submission of procedures & safety guidelines for all probable areas~~. **For areas, where this might occur, (e.g. mist eliminators, spray levels) the Contractor shall submit a cleaning procedure including the required safety measures as part of the inspection concept.**
SG.32.	VI/B	A-05	13 of 29	6.03.05	NA	**In addition, a hand wheel with proper access shall also be provided for manual operation of the gate. The force at the rim of the hand wheel shall not exceed 35 kg with bunker full of limestone**.
SG.33.	VI/B	A-05	19 of 29	7.07.06	1x100% Waste water tank shall be provided…. The Waste water collection tank shall be of Steel construction with rubber lining or Vinyl Ester based flake glass lining with minimum 3 mm thickness. 2x100% horizontal centrifugal…. shall be stainless steel.	1x100% Waste water tank shall be provided…. The Waste water collection tank shall be of Steel construction with ~~rubber lining or Vinyl Ester based flake glass lining with minimum 3 mm thickness~~ **corrosion protection as per clause 10.01.00 of this sub-section**. 2x100% horizontal centrifugal…. shall be stainless steel.
SG.34.	VI/B	A-05	22 of 29	10.00.00	**SLURRY & PROCESS WATER TANKS**	**SLURRY ~~& PROCESS WATER~~ TANKS**

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	SEC/ PART	SUB-SEC.	PAGE NO.	CLAUSE NO.		
SG.35.	VI/B	A-05	22 of 29	10.01.00	All the slurry tanks (Slurry Tanks, Filtrate Tank, Secondary hydro cyclone feed tank, vacuum receiver tank, Waste water Tank, Lime Neutralization tanks etc.) & Process water tanks (Process water storage tanks, Clarified water storage tanks, Emergency water storage tanks etc.) sh all be designed, fabricated, erected and tested in accordance with the IS:803, latest edition. Additional Corrosion….. Interior surface of the tanks shall be lined with the following: Wastewater tank, Filtrate tank, Secondary hydro cyclone feed tank: Vinyl Ester based flake glass lining/ Polymeric Epoxy of minimum 3 mm thickness. Slurry tanks: Replaceable Chlorobutyl/ Bromobutyl rubber lining of minimum 5 mm thickness.	All the slurry tanks (Slurry Tanks, Filtrate Tank, Secondary hydro cyclone feed tank, vacuum receiver tank, Waste water Tank, Lime Neutralization tanks etc.) ~~& Process water tanks (Process water storage tanks, Clarified water storage tanks, Emergency water storage tanks etc.)~~ shall be designed, fabricated, erected and tested in accordance with the IS:803, latest edition. Additional Corrosion….. Interior surface of the tanks shall be lined with the following: Wastewater tank, Filtrate tank, Secondary hydro cyclone feed tank: **Chlorobutyl/Bromobutyl rubber lining of minimum 5 mm thickness or** Vinyl Ester based flake glass lining/ Polymeric Epoxy of minimum 3 mm thickness. **Other** Slurry tanks: Replaceable Chlorobutyl/ Bromobutyl rubber lining of minimum 5 mm thickness
SG.36.	VI/B	A-05	24 of 29	13.01.00	Two (2) Process water Storage tanks…… operating at Design point. All the process water storage tanks shall be designed, fabricated, erected and tested in accordance with the IS:803, latest edition. Additional Corrosion allowance of 1.50 mm on the minimum tank shell thickness as calculated by IS:803, latest edition shall be provided by the bidder. Tanks shall be made from IS:2062 quality mild steel plates of tested quality. The tank shall receive…. control valves etc.	Two (2) Process water Storage tanks…… operating at Design point. ~~All the process water storage tanks shall be designed, fabricated, erected and tested in accordance with the IS:803, latest edition. Additional Corrosion allowance of 1.50 mm on the minimum tank shell thickness as calculated by IS:803, latest edition shall be provided by the bidder. Tanks shall be made from IS:2062 quality mild steel plates of tested quality.~~ The tank shall receive…. control valves etc.
SG.37.	VI/B	A-05	26 of 29	15.01.00 (i)	Type of service: One (1) no. Passenger cum goods elevator per Absorber (higher than 15 m), Mill building and dewatering building.	Type of service: One (1) no. Passenger cum goods elevator per Absorber (higher than 15 m), Mill building, dewatering building **and MCC cum control room buildings of FGD plant**
SG.38.	VI/B	A-02	33 of 67	11.03.04	(v) No. of pumps LDO pumps- 3 (2 working+1 standby) Drain oil pumps- 3	(v) No. of pumps LDO pumps- 2 (1 working+1 standby) Drain oil pumps- 2
SG.39.	VI/E			25, 26	Scheme of air & flue gas path with instrumentation (with BISECTOR AH) Drg No. XXXX-001-POM-A-018a, Sh.1 of 2 Rev A	Scheme of air & flue gas path with instrumentation (with BISECTOR AH) Drg No. XXXX-001-POM-A-018a, Sh.1 of 2 Rev B

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					Drg No. XXXX-001-POM-A-018a, Sh.2 of 2 Rev A	Drg No. XXXX-001-POM-A-018a, Sh.2 of 2 Rev B Revised Drawing attached at Annexure SG-3
SG.40.	VI/E			27,28	Scheme of air & flue gas path with instrumentation (with Tri-sector AH) Drg No. XXXX-001-POM-A-018b, Sh.1 of 2 Rev A Drg No. XXXX-001-POM-A-018b, Sh.2 of 2 Rev A	Scheme of air & flue gas path with instrumentation (with Tri-sector AH) Drg No. XXXX-001-POM-A-018b, Sh.1 of 2 Rev B Drg No. XXXX-001-POM-A-018b, Sh.2 of 2 Rev B Revised Drawing attached at Annexure SG-3
SG.41.	VI/E			32	Scheme of FGD -Absorber System Drg No XXXX-101-POM-A-022 Rev A	Scheme of FGD -Absorber System Drg No XXXX-101-POM-A-022 Rev B Revised Drawing attached at Annexure SG-3
SG.42.	VI/E			33	Scheme of FGD Milling System Drg No XXXX-101-POM-A-023 Rev A	Scheme of FGD Milling System Drg No XXXX-101-POM-A-023 Rev B Revised Drawing attached at Annexure SG-3
SG.43.	VI/E			34	Scheme of FGD Gysum Dewatering System Drg No XXXX-101-POM-A-024 Rev A	Scheme of FGD Gysum Dewatering System Drg No XXXX-101-POM-A-024 Rev B Revised Drawing attached at Annexure SG-3
SG.44.	VI/A	II-A 04	1 of 7	1.02.00	The scope of supply identified for FGD system… in the scope of the contractor. In case of higher pressure /flow requirements are envisaged for instrument & service air and water Contractor shall make its own arrangement.	The scope of supply identified for FGD system… in the scope of the contractor. ~~In case of higher pressure /flow requirements are envisaged for instrument & service air and water Contractor shall make its own arrangement~~.
SG.45.	VI/A	IIA-04	2 of 7	2.06.00	The gypsum from …secondary dewatering equipment. The water removed from the absorber shall be recycled to the absorber. The waste water from the system shall be collected and neutralized using lime and **shall be pumped to the mixing tanks of HCSD System** or in any other area with suitable treatment so as to suit/ not disturb the destination fluid quality.	The gypsum from … secondary dewatering equipment. The water removed from the absorber shall be recycled to the absorber. The waste water from the system shall be collected and neutralized using lime **and shall be pumped to the sump of combined slurry pump house** or in any other area with suitable treatment so as to suit/ not disturb the destination fluid quality.
SG.46.	VI/A	IV	32 of 76	1.03.03 (vi)	**Gypsum Purity**	**Gypsum Purity**

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	SEC/ PART	SUB-SEC.	PAGE NO.	CLAUSE NO.		
					The contractor shall demonstrate that the purity of the gypsum produced shall not be less than 90%, chloride content shall not be more than 100ppm and the moisture content shall not be more than 10% for the range of specified coal(s) and based on CaO content of 51% in limestone.	The contractor shall demonstrate that the purity of the gypsum produced shall not be less than 90%, chloride content shall not be more than 100ppm and the moisture content shall not be more than 10% for the range of specified coal(s) and ~~based on CaO content of 51% in limestone~~ **limestone characteristics specified at ANNEXURE-IV-5, Sub Section I-B (Project Information) Part A, Section VI of Technical Specifications.**
SG.47.	VI/B	A-23	2 of 4	2.00.00	**OXYGEN DOSING SYSTEM** Complete Oxygen Dosing System… included by the Bidder. Each of the dosing locations…associated control system etc. The dosing rate shall be regulated... repair of regulating valve. At each dosing locations … each location per unit. for each location per unit, skid containing equipment required for dosing like isolation/ check valves, cylinder manifolds, regulating valves, instruments shall be redundant (2 nos. for each location of one unit), so that problem in one dosing skid of one location shall not hamper dosing process at that location. The condensate and feed water flow shall be of the order of 1500 CU.M/hr for each unit or actual design flow whichever is higher.	**OXYGEN DOSING SYSTEM** Complete Oxygen Dosing System… included by the Bidder. Each of the dosing locations…associated control system etc. The dosing rate shall be regulated... repair of regulating valve. At each dosing locations …. each location per unit. **For** each **dosing** location per unit, **the** skid containing equipment required for dosing like isolation/ check valves, cylinder manifolds, regulating valves, instruments shall be redundant (2 nos. for each **dosing** location of one unit), so that problem in one dosing skid of one location shall not hamper dosing process at that location. **A minimum number of five (05) oxygen cylinders shall be connected to each cylinder manifold.** The condensate and feed water flow shall be of the order of 1500 CU.M/hr for each unit or actual design flow whichever is higher.
SG.48.	VI/B	A-23	3 of 4	3.07.00	Each unit shall be provided….wet laying of boiler. The capacity of tanks…. as persystem requirements.	Each unit shall be provided….wet laying of boiler. **The Ammonia dosing point shall be located at a minimum distance of 150-200 mm downstream of the SWAS sampling line at CPU outlet.** The capacity of tanks…. as per system requirements.
SG.49.	VI/B	A-23	3 of 4	-	-	**3.08.00 Safety shower arrangement shall be provided in close proximity to the Ammonia dosing skid.**

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-06	VI/A	IA	12/35	4.19.1 (a)	(i) **Wet Bottom Ash handling system** comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or a submerged Scraper Chain Conveyor system designed for **pulverized coal** fired boilers. **(ii) Wet Bottom Ash handling system comprising either a Jet pump system (for Water impounded Bottom Ash Hopper) consisting of Feed Gate, Clinker Grinder, Oil/Air Convertor tank, Water pumping system as a minimum or a Submerged Scraper Chain Conveyor system** **The above Wet Bottom Ash handling system under (i) & (ii) shall be designed for the following conveying capacities for pulverized coal fired boilers:** Jet Pump System: 50 tonnes/hour (dry ash basis) or more per jet pump. Submerged Scraper :20 tonnes/hour (dry ash basis) Scrapper Chain Conveyor System or more per Conveyor. The reference Bottom Ash Handling systems should be of the same type i.e. Jet pump system or Submerged Scraper chain conveyor system as is being offered by the Bidder/ its Sub- vendor.	**Wet Bottom Ash handling system** comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or a submerged Scraper Chain Conveyor system designed **for the following conveying capacities** for **coal/lignite** fired boilers. Jet Pump System : 50 tonnes/hour (dry ash basis) or more per jet pump. Submerged Scraper :20 tonnes/hour (dry ash basis) Scrapper Chain Conveyor System or more per Conveyor. The reference Bottom Ash Handling systems should be of the same type i.e. Jet pump system or Submerged Scraper chain conveyor system as is being offered by the Bidder/ its Sub- vendor. **If the bidder/its sub-vendor is not fully meeting requirement of Jet Pump System in conjunction with water impounded bottom ash hopper referred under clause 4.19.1 (a), can also participate provided it has designed, engineered, supplied, erected / supervised erection and commissioned/ supervised commissioning of Jet Pump of capacity 50 tonnes/hour (dry ash basis) or more per jet pump for coal fired boilers. In such case, bidder /its sub-vendor shall engage design agency for vetting/review/carrying out the design and Engineering activity of 'Jet Pump system in conjunction with water impounded bottom ash hopper'. Design agency can be either Wet bottom ash system (Jet Pump System in conjunction with water impounded bottom ash hopper) supplier meeting the qualification of clause 4.19.1 (a) or design consultant having experience of design/review of Jet Pump System in conjunction with water impounded bottom ash hopper which are in successful operation in at**

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					In case, Bidder/its sub-vendor qualifies through (a) (ii), the bidder shall engage a design agency who has done design/vetting of design of bottom ash handling system comprising of Jet pump system in conjunction with Water impounded Bottom ash hopper.	**least one (1) plant for a period not less than one (1) year. Vetting by reputed institutes like IITs & IISc is also acceptable.**
MH-07	VI/A	IA	13/35	4.19.1 (c)	**Pneumatic Fly Ash Transportation System** for transporting fly ash from pulverized coal fired boiler unit having capacity of not less than 20 TPH for a conveying distance of not less than 500 meter **including fly ash storage silo.** Further, a transportation system provided for an individual boiler unit having dedicated transportation vessels below dry dust collection buffer hoppers and dedicated piping from dry dust collection buffer hoppers/ intermediate Silos to **storage silos**, including storage silos can be considered as a plant for meeting the requirement above.	Pneumatic Fly Ash Transportation System for transporting fly ash from pulverized coal fired boiler unit having capacity of not less than 20 TPH for a conveying distance of not less than 500 meter**.** Further, a transportation system provided for an individual boiler unit having dedicated transportation vessels below dry dust collection buffer hoppers and dedicated piping from dry dust collection buffer hoppers / intermediate Silos to storage silos, including storage silo **equipment (like Vent Fan, Rotary Feeder, Ash Unloader, Ash Conditioner etc)** can be considered as a plant for meeting the requirement above.
MH-08	VI/A	IA	13/35	4.19.1 (d)	Complete ash slurry disposal system for handling not less than 40 tons of ash per hour for **pulverized coal** fired power stations which includes, among others, ash slurry pumps & piping system with associated controls.	Complete ash slurry disposal system for handling not less than 40 tons of ash per hour for **coal/lignite** fired power stations which includes, among others, ash slurry pumps & piping system with associated controls.
MH-09	VI/A	IA	13/35	Notes to Clause No. 4.19.1	(iii) The systems mentioned at 4.19.1 (a), (b), (c) & (d) above, should have been in successful operation in at least one (1) plant for at least **two (2) years**. For the purpose of qualification, the experience as at 4.19.1 (a), (b), (c) & (d) above in separate plants also is permissible.	(iii) The systems mentioned at 4.19.1 (a), (b), (c) & (d) above, should have been in successful operation in at least one (1) plant for at **least one (1) year**. For the purpose of qualification, the experience as at 4.19.1 (a), (b), (c) & (d) above in separate plants also is permissible.
MH-10	VI/A	IA	14/35	New Note to Clause No. 4.19.1		V) De-packaging can be done by engaging separate sub-vendors for the sub-systems of AHP i.e. Bottom Ash system [4.19.1 (a)] can be ordered to vendor A, fly ash system [4.19.1 (b) & (c)] can be ordered to vendor B & Ash slurry disposal system [4.19.1 (d)] can be ordered to Vendor C.
MH-11	VI/A	IA	14/35	4.19.2	…… The systems mentioned at 4.19.2 (a) and 4.19.2 (b) above should have been in successful operation in at least one (1) plant for **two (2) years** and should have been installed for pulverized coal fired boiler units generating not less than 40 TPH of ash per boiler.	…….. The systems mentioned at 4.19.2 (a) and 4.19.2 (b) above should have been in successful operation in at least one (1) plant for **one (1) year** and should have been installed for pulverized coal fired boiler units generating not less than 40 TPH of ash per boiler.

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					……..	……
MH-12	VI/A	I-A	15/35	Notes for clause 4.19.3 (i)	QAHPM (Qualified Ash Handling Plant Manufacturer) means a manufacture meeting requirement stipulated at 4.19.1.	QAHPM (Qualified Ash Handling Plant Manufacturer) means a **single** manufacturer meeting requirement stipulated at 4.19.1 (a), (b), (c) & (d).
MH-13	VI/A	I-A	15/35	4.20.1	The Bidder/ its Sub-vendor should have designed, **engineered / got engineered,** manufactured/ got manufactured, erected/supervised erection and commissioned/ supervised commissioning at least one (1) number integrated bulk material handling plant (essentially comprising of conveying) including all associated structural steel works and electrical works of 1000 Metric tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity which should have been in successful operation for at least one (1) year. **Note:- In case the Bidder has not carried out the engineering activity by himself in respect of the System of the reference installation(s) (against which the bidder is seeking qualification), then the engineering of the package shall be carried out by an engineering firm, meeting the following stipulations:** **Engineering firm should be an organization who has engineered at least one (1) number integrated bulk material handling plant (essentially comprising of conveying by Trough Conveyors) including all associated structural steel works and electrical works of 1000 Metric Tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity, involving activities which include preparation of Flow diagrams, Layout & General arrangement drawings, Design & sizing Calculations document, Fabrication (as applicable) and Erection drawings, etc. and such systems must be in successful operation prior to the date of Techno-commercial bid opening.**	The Bidder/ its Sub-vendor should have designed, manufactured/ got manufactured, erected/supervised erection and commissioned/ supervised commissioning at least one (1) number integrated bulk material handling plant (essentially comprising of conveying) including all associated structural steel works and electrical works of 1000 Metric tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity which should have been in successful operation for at least one (1) year.

Amendment 02 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-14	VI/B	A-21	23/42	2.15.00 New clause		Following are MOC for the parts of DAES valves:- Sl Item description Technical Specification requirements 1. Buffer hopper RSV Gate & seat /Air lock tank inlet & outlet valve seat & disc MOC: ASTM-A532-82 CLASS-III TYPE-A, Hardness-600 BHN(Min) stress relieved. Lap finish; This is not applicable for Dome Valves 2. Pressure equalizing valve seat MOC: AISI:8620, Hardness - 500-550 BHN (Min),stress relieved. Lap finish 3. Pressure equalizing valve disc MOC: ASTM-A532 CLASS-III TYPE-A, Heat Treated: To achieve 600BHN(Min.) & stress relieved. Lap finish 4. MHV (material handling valve) slide /ESP outlet valve slide MOC: SS 410; HARDNESS:325BHN(Min). Lap finish 5. MHV (material handling valve) seat /ESP outlet valve seat MOC: As per IS:4771-1985, Type-1A; Hardness: 500 BHN (Min), Ni/Cr=30/300. Lap finish 6. Branch Segregating valve slide gate MOC: SS-410, Hardness-325BHN(Min.) Surface finish at both the faces= 16 micron 7. Branch Segregating valve seat Ni/Cr 30/500 AS PER IS 4771-1985 TYPE 1A (300 BHN MIN.) Lap finish In case of any conflict with other clauses, 2.15.00 shall supersede other clauses
MH-15	VI/B	A-21	23/42	2.11.00	Dryness of air at Outlet : Dry air with dew point of (-) 20^{o}C. at 1 ata pressure	Dryness of air at Outlet : Dry air with dew point of (-) 20^{o}C. at 1 ata pressure **or +2 Deg Celsius of Pressure Dew Point**

Amendment 02 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-16	IV/Functional guarantee		37 of 73	1.03.09 (G)	Bidder to demonstrate efficiency (95%) of the classification system. The classified fine ash shall have a size of (-) 45 microns	Bidder to demonstrate Ash particle size distribution of Fine ash, as specified
MH-17	VI/B	A-01	72/87	4.01.01 (a) (i)	Dewatering Bins system Dewatering Bins shall be of proven design / **supplier for similar applications**	Dewatering Bins system (i) Dewatering Bins shall be of proven design (ii) **Moisture content in ash after decantation shall be 30% (w/w) Max.**
MH-18	VI/B	A-20		Annexure to A-20		**Annexure I to Sub-section A-20 for 'Safety Module'**
MH-19	VI/A	IIA-16	8 of 18	1.01.06 (C), (iv)	Pipe support structures for all Ash conveying lines to be provided. Pipe lifting and shifting arrangement in pipe rack must be provided.	Pipe support structures for all Ash conveying lines to be provided. Pipe lifting and shifting arrangement in pipe rack must be provided. **Hooks (suitable for hanging 2 T capacity Chain pulley block) to be provided (with proper access/approach) at every 10 m intervals of Pipe rack for handling of Pipes of each Tier.**
MH-20	VI/A	IIA-16	9/18	1.01.07 (e)	The fine ash and coarse ash after classification shall be stored in RCC/Structural steel hoppers, separate for fine ash and coarse ash respectively. The capacity of the fine ash hopper (01 No) and coarse ash hopper **(02 No)** shall be **250 Tonnes each.**	The fine ash and coarse ash after classification shall be stored in RCC/Structural steel hoppers, separate for fine ash and coarse ash respectively**. The capacity and number of the fine ash hoppers and coarse ash hoppers shall be as per the tender Drws. For (Vacuum + Pressure) system, Minimum (1 W + 1S) Coarse Ash Hoppers shall be provided.**
MH-21	Vi/A	IIA-15	1 of 6	1.02.00	Trough Belt Conveyors complete with conveyor galleries……. and their associated foundations etc. **Designated Conveyors shall have arrangements for manual stone picking arrangement at an appropriate location.**	Trough Belt Conveyors complete with conveyor galleries……. and their associated foundations etc.

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-22	VI/E			Tender Drawings	Coal + Biomass Flow Diagram- XXXX-001-POM-A-040(OPTION-1)-**Rev A** Coal + Biomass Flow Diagram- XXXX-001-POM-A-040(OPTION-2)-**Rev A** Limestone Flow Diagram-XXXX-001-POM-A-039 (SH 1) **Rev-A** Gypsum Flow Diagram-XXXX-001-POM-A-039 (SH 1) **Rev-A**	Coal + Biomass Flow Diagram- XXXX-001-POM-A-040(OPTION-1)-**Rev B** Coal + Biomass Flow Diagram- XXXX-001-POM-A-040(OPTION-2)-**Rev B** Limestone Flow Diagram-XXXX-001-POM-A-039 (SH 1) **Rev-B** Gypsum Flow Diagram-XXXX-001-POM-A-039 (SH 1) **Rev-B**
MH-23	Vi/A	IIA-15	3 of 6	2.02.00	One (1) No. Pitless type weigh bridge (100 T Capacity) shall be provided at **Limestone unloading building** for weighing of received **Limestone Truck.**	One (1) No. Pitless type weigh bridge (100 T Capacity) shall be provided **near Biomass unloading area** for weighing of received **Biomass** Truck.
MH-24	Vi/A	IIA-15	1 of 6	1.00.00	Coal required for the proposed unit shall be catered from the existing Coal Handling……. conveying stream. **Conveyor C-32 shall take feed from upstream conveyor C-19B at TP-17 and C-33 shall take feed from existing upstream conveyor C-28 at TP-24. Both C-33 and C-32 shall discharge into C-34A/B at TP-27 and TP-28. Similarly, C- 38A taking feed from existing up-stream conveyor C-31A at TP-18 and C-38B taking feed from existing upstream conveyor C-29 at TP-25, shall discharge into C-39A/B at TP-26. Subsequently, C-34A/B and C-38A/B shall discharge feed into C-35A/B. C-35A/B shall finally feed Bunker conveyors C-37A directly and C-37B through C-36A/B.** Rated capacity of the all the conveyors shall be 2600 MTPH.	Coal required for the proposed unit shall be catered from the existing Coal Handling……. conveying stream. **Conveyor C-34B shall take feed from upstream conveyor C-19B at TP-17 and C-34A shall take feed from existing upstream conveyor C-28 at TP-24. Both C-34A and C-34B shall discharge into C-35 A/B at TP-29 and TP-30. Similarly, C- 39A taking feed from existing up-stream conveyor C-31A at TP-18 and C-39B taking feed from existing upstream conveyor C-29 at TP-25, shall discharge into C-40 A/B at TP-34. At TP-31, C-35 A/B and C-40 A/B shall discharge feed into C-36 A/B. In case of side Mill arrangement, C-36A/B shall finally feed Bunker conveyors C-38B directly and C-38A through C-37A/B. In case of front/rear Mill arrangement, C-37A/B shall be the Bunker Conveyors.** Rated capacity of the all the conveyors shall be 2600 MTPH.
MH-25	VI/B	A-01	84 of 87	4.04.01 (b)	The rated capacity of all Gypsum handling conveyors shall be 150 MTPH.	The rated capacity of all Gypsum handling conveyors shall be 150 MTPH.

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
				4.04.01 (c)	Belt speed for 150 MTPH conveyors shall not be more than 2.0 m/s	Belt speed for 65 MTPH conveyors shall not be more than 2.0 m/s
MH-26	VI/A	IIA-16	4/18	1.01.05 (D),(ii)	One (1) number hopper isolation valve assembly below each economizer/eco duct hopper as specified complete with hopper connecting flanges, gaskets, nuts, bolts etc	One (1) number manual hopper isolation valve assembly & **One (1) number motorized hopper isolation valve assembly** below each economizer/eco duct hopper as specified complete with hopper connecting flanges, gaskets, nuts, bolts etc
MH-27	VI/E			Tender Drws	SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM (JET PUMP SYSTEM)- XXXX-001-POM-A-025-**Rev A** SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM (SUBMERGED SCRAPPER CHAIN) - XXXX-001-POM-A-026-**Rev A** XXXX-001-POM-A-027-**Rev A** XXXX-001-POM-A-028-**Rev A** SINGLE LINE FLOW DIAGRAM OF ASH CLASSIFIER SYSTEM (VACUUM SYSTEM) - XXXX-001-POM-A-029-**Rev A** SINGLE LINE FLOW DIAGRAM OF ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM) - XXXX-001-POM-A-029-**Rev A**	SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM- XXXX-001-POM-A-025-**Rev B** SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM (SUBMERGED SCRAPPER CHAIN) - XXXX-001-POM-A-026-**Rev B** XXXX-001-POM-A-027-**Rev B** XXXX-001-POM-A-028-**Rev B** SINGLE LINE FLOW DIAGRAM OF ASH CLASSIFIER SYSTEM (VACUUM SYSTEM) - XXXX-001-POM-A-029-**Rev B** SINGLE LINE FLOW DIAGRAM OF ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM) - XXXX-001-POM-A-029-**Rev B**
MH-28	VI/A	IIA-16	14 of 18	1.02.00 (e)	All ash water and seal water piping from **Owner's terminal points** to all the equipment's and sumps complete with fittings, valves, strainers, flanges, gaskets, nuts, bolts, hangers, supports, flushing nozzles, agitating nozzles, etc. as specified and as required.	All ash water and seal water piping and all the equipment's and sumps complete with fittings, valves, strainers, flanges, gaskets, nuts, bolts, hangers, supports, flushing nozzles, agitating nozzles, etc. as specified and as required.

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-29	VI/A	IIA-16	12 of 18	1.01.08 (d)	Pitiless type Weigh Bridge for rail loading below each dry fly ash silos **and in-between two Coarse ash Silos**, minimum **Four** numbers, complete with all electrical, controls, civil and structural works for weighment of rail Wagons during filling.	Pitiless type Weigh Bridge for rail loading below each dry fly ash silos, minimum **Three** numbers, complete with all electrical, controls, civil and structural works for weighment of rail Wagons during filling.
MH-30	VI/A	IIA-16	12 of 18	1.01.08 (m)	The pitching of ash silo and overall arrangement of hydro-mix conditioner units, telescopic chutes, air slides etc shall facilitate simultaneous loading of **three** wagons (BOXN/BCFC/ BCCW/BTAP) from **two number** of **Coarse** Fly ash Silos. Suitable arrangement for Control of movement of Telescopic spout shall have to be provided in all three X-Y-Z directions to facilitate loading of ash into Wagons.	The pitching of ash silo and overall arrangement of hydro-mix conditioner units, telescopic chutes, air slides etc shall facilitate simultaneous loading of wagons (BOXN/BCFC/ BCCW/BTAP) from **all the** Fly ash Silos. Suitable **positioning** arrangement for Control of movement of Telescopic spout shall have to be provided in all three X-Y-Z directions to facilitate loading of ash into Wagons.
MH-31	VI/A	IIA-16	5 of 18	1.01.05 (a)	**Six (6) nos**. dewatering storage bins **(3 nos. working and 3 nos standby**) each of sufficient capacity to store the total ash production of bottom ash, economizer ash and air preheater from one (1) unit for specified time period ……..…… maintenance of dewatering bins.	**Four (4) nos**. dewatering storage bins (**3 nos. working and 1 no standby**) each of sufficient capacity to store the total ash production of bottom ash, economizer ash and air preheater from one (1) unit for specified time period ……..…… maintenance of dewatering bins.
MH-32	VI/A	IIA-16	9/18	1.01.07 (a)	The fly ash coming from ESP hoppers or buffer hoppers of shall be led to a classifier silo of **capacity 200 tonnes**. From this silo the ash shall be further fed to the classifier. The silo shall have a provision to bypass ash without classification, directly to coarse fly ash silo/hopper.	The fly ash coming from ESP hoppers or buffer hoppers shall be led to a classifier silo **(capacity as specified in Tender drawing).** From this silo the ash shall be further fed to the classifier. The silo shall have a provision to bypass ash without classification, directly to coarse fly ash silo/hopper.
				1.01.07 (b)	Suitable numbers of ash classifier as required shall be provided to meet the requirement. The ash classifier shall be of proven design for similar application**. Efficiency of the Classifier shall be 95% minimum.** No standby classifier shall be required.	Suitable numbers of ash classifier as required shall be provided to meet the requirement. The ash classifier shall be of proven design for similar application**. After classification, segregated fine ash shall be of max retention 12% or less on 45-micron sieve.** No standby classifier shall be required.
				1.01.07 (d)	**The classified fine ash shall have a size of (-) 45 microns (95%).** All the ash conveying and generation rates shall be considered as per clause no 4.01.02 of sub section A-02 of part B of section VI.	**The classified fine ash shall be of max retention 12% or less on 45-micron sieve.** All the ash conveying and generation rates shall be considered as per clause no 4.01.02 of sub section A-02 of part B of section VI.

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-33	VI/A	IIA-16	9/18	1.01.07 (c)	In case fine ash and coarse ash is coming through same pipelines to the classifiers, Classification of 40 % of ESP ash (40% of ash conveying capacity) in ash classifiers is to be provided. The remaining unclassified ash shall be taken directly to the coarse fly ash hopper.	In case fine ash and coarse ash is coming through same pipelines to the classifiers, Classification of 40 % of ESP ash (40% of ash conveying capacity) in ash classifiers is to be provided. The remaining unclassified ash shall be taken directly to the coarse fly ash hopper. **For sizing of classifier, 40% of total number of ash conveying working lines from buffer hopper/ESP shall be considered.** **In case, calculated number of lines would be fraction, then bidder to consider next higher integer for number of input pipes to the classifier.**
MH-34	VI/B	A-21	36/42	6.00.00 New clause		The fluid coupling for LT motors shall be of traction type and for HT motors, shall be of scoop tube type. Suitable electrically operated actuators shall be provided for scoop tube operation from local as well as remote. Manual operation shall also be provided. Separate pump with motor or integral shaft driven oil pump shall be provided for circulating the fluid coupling oil through oil cooler. Forced cooling water supply to oil cooler shall be provided for which cooling water pumps to be provided for group of scoop couplings. Suitable interlock using flow switches shall be provided in both oil as well as water lines to trip the drive motor in the event of flow in either line falling below acceptable levels. Alternatively, Air cooled type scoop coupling is also acceptable for drives with HT motors. Suitable pressure indicators and flow indicators shall be provided in the cooling water lines along with all-relevant valves, and accessories. Necessary isolation valves shall be provided in the oil / water line for maintenance of any equipment in the line. Necessary interlock shall also be provided so that the HT motor cannot be started from remote / local unless position of scoop tube permits no load start of the motor. Tripping of downstream equipment while the system is under normal operation shall result in scoop tube re-positioning to permit no load run of the concerned HT motor. Temperature switch shall be provided in the oil circuit and shall trip the system in case of high oil temperature. The scoop tube operation must be such so to ensure draining of oil from the operating circuit by providing a double speed motor

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-35	VI/B	A-21	13/42	1.08.00	2.0. Capacity- As per design for **economizer**/eco duct/ APH/Duct hoppers 3.4. No. of nozzles per flushing apparatus – **Min 2 nos.**	(2.0) Capacity- As per design criteria for Eco duct/ APH/Duct hoppers **For Economizer Hopper:- 5 TPH or as per the design criteria whichever is higher** (3.4) No. of nozzles per flushing apparatus – **Min 4 Nos.** **Minimum Two (2) no separate pipelines to be provided from discharge of economizer flushing boxes upto BA Hopper.**
MH-36	VI/A	IIA-16	9 of 18	1.01.07 (f)	**Six (6) nos. (3 W + 3 S)** Pump tanks/Air lock tank for each coarse ash hopper and **four (4) nos**. of pump tanks/air locks tank for fine ash hopper for transportation of coarse fly ash and fine fly ash respectively……..	**Suitable number (as specified elsewhere)** of Pump tanks/Air lock tank for each coarse ash hopper and fine ash hopper for transportation of coarse fly ash and fine fly ash respectively……..
MH-37	VI/A	IIA-16	9 of 18	1.01.07 (g)	..... This silo shall have one outlet provided with telescopic chute and rotary feeder for loading the ash into closed tankers. The silo shall be provided with Target box and bag filter assembly along with pulse jetting arrangement, fan units etc. and other accessories**, Five (5) nos**. Slide plate type isolation valves below the silo, Required numbers segregation valves for isolation of fly ash transportation lines.....	..... This silo shall have one outlet provided with telescopic chute and rotary feeder for loading the ash into closed tankers. The silo shall be provided with Target box and bag filter assembly along with pulse jetting arrangement, fan units etc. and other accessories**, Required number of.** Slide plate type isolation valves below the silo, Required numbers segregation valves for isolation of fly ash transportation lines.....
MH-38	VI/A	IIA-16	6 of 18	1.01.06 (b (ii)	Two (2) nos. Intermediate fly ash storage silos (Structural steel Silos) of 250 MT effective storage capacity each …….. …… fly ash storage system. **Each intermediate fly ash storage silo shall have three (3) outlets, One (1) outlets for unloading ash to closed truck through rotary feeders, One (1) for unloading ash to open truck with rotary feeders and ash conditioners and One(1) blanked outlet for future use.**	Two (2) nos. Intermediate fly ash storage silos (Structural steel Silos) of 250 MT effective storage capacity each …….. …… fly ash storage system. **Refer Tender Drw. for number of outlets below intermediate Silos.**
			7 of 18	1.01.06 (b (iii)	**Four (04) numbers (two working + two standby)** Feeder ejector below each intermediate Silo with expansion joints, vertical pipe connections, cylinder operated valve, slurry discharge piping up to slurry disposal sump, and necessary fixing clamps, and structural steel as required. ……..…….. complete with supports, all slurry and water connections, etc.	**Six (06) numbers (four working + two standby)** Feeder ejector below each intermediate Silo with expansion joints, vertical pipe connections, cylinder operated valve, slurry discharge piping up to slurry disposal sump, and necessary fixing clamps, and structural steel as required. ……..…….. complete with supports, all slurry and water connections, etc.

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-39	VI/A	IIA-16	9/10 of 18	1.01.07	(j) **Six (6) numbers (4 working + 2 stand by**) screw type transport air compressors suitably……. (k) **Six (6) numbers (4 working + 2 stand by**) refrigerant type air dryer for the…… (l) **Six (6) numbers (4 working + 2 stand by)** air receivers along with safety……. (m) **Six (6) lengths** of cast iron/MS pipes (four working + two standby lines) for coarse fly ash conveying from coarse fly ash hoppers…….	(j) **Suitable number (minimum as specified in Tender drawing)** screw type transport air compressors suitably……. (k) **Suitable number (minimum as specified in Tender drawing)** refrigerant type air dryer for the…… (l) **Suitable number (minimum as specified in Tender drawing)** air receivers along with safety……. (m) **Suitable number of cast iron/MS pipe length (minimum as specified in Tender drawing)** for coarse fly ash conveying from coarse fly ash hoppers……
MH-40	VI/A	IIA-16	10 of 18	1.01.07 (n)	The bagging plant shall be sized for **50 % of the fine ash (Classified fine ash)**. The bagging plant shall have provision for mechanized bagging of this fine ash. Fine ash shall be bagged in 50 kg cement bags. The quantity of fine ash shall be 35 kg in cement bag of 50 kg. **Suitable numbers of such bagging streams shall be provided**. **No standby stream shall be required.**	**Two numbers Semi-automatic Bagging machines with capacity of 200 bags/Hr/Nozzle having two Nozzles per Machines.** The bagging plant shall have provision for mechanized bagging of this fine ash. Fine ash shall be bagged in 50 kg cement bags. The quantity of fine ash shall be 35 kg in cement bag of 50 kg.
MH-41	VI/A	IIA-16	11 of 18	1.01.08 (h)	**Six (6) nos.** Slide plate type isolation valves below each fly ash storage silos.	**Required numbers** of Slide plate type isolation valves below each fly ash storage silos.
				1.01.08(l)	**Five (5) numbers** of Dry fly ash unloaders from each dry fly ash storage silo along with rotary feeders, telescopic chutes and other accessories as specified and as required.	**Suitable number (minimum as specified in Tender drawing)** Dry fly ash unloaders from each dry fly ash storage silo along with rotary feeders, telescopic chutes and other accessories as specified and as required.
MH-42	VI/A	IIA-16	10 of 18	1.01.07 (o)	The bags shall be stored in suitable closed storage area having a provision to store bags filled in 8 hours. Mechanized transportation (without manual intervention) of fly ash bags from bagging machine up to the storage shed and from storage shed to load into the Trucks, by	Deleted

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					suitable conveying system along with associated arrangements. Provisions for direct loading of bags into trucks without storing shall also be there. Adjustment to load bags in all types of Trucks shall be provided.	
MH-43	VI/B	A-20	5 of 79	4.1.4	Automatic take-up of gravity type shall be generally provided with necessary take-up arrangements complete with bend pulleys, take-up pulley, with its supporting / sliding assembly, wire ropes with turn buckle arrangement (to adjust the level) for suspending the separate take - up weight sliding assembly close to the ground, counter-weights and other accessories. Suitable guards marked up scale attached to the frame to monitor belt stretch and access/maintenance platforms with handrails all around etc. shall be provided.	Automatic take-up of gravity type shall be generally provided with necessary take-up arrangements complete with bend pulleys, take-up pulley, with its supporting / sliding assembly, wire ropes with turn buckle arrangement (to adjust the level) for suspending the separate take - up weight sliding assembly close to the ground, counter weights and other accessories. Suitable guards marked up scale attached to the frame to monitor belt stretch and access/maintenance platforms with handrails all around etc. shall be provided. **Height of take-up guide structure shall be sufficient to allow the take-up weight movement up and down for all operating conditions of conveyor and to allow minimum two (2) vulcanizing lengths margin in the belt or percentage of conveyor length (2.5% for synthetic belting, 0.5% for steel cord belting) whichever is larger. Suitable guides shall be provided both for take up pulley and take up weight.** **Two (2) meter safety fencing along with suitable gate and locking arrangement shall be provided around gravity take-up at the base level / ground level.** **Irrespective of take-up location, the travel zone of take-up weight shall start from a suitable height above ground level.** **Suitable buffer arrangement shall be provided to arrest the fall of take-up pulley in order to avoid damage of the pulley assembly in case of belt snapping. Similar buffer arrangement shall be provided for take-up weight also, in case of, take-up weight travel zone terminating above a building floor. Sandpits of 600 mm deep shall be provided at ground below the take-up weights.** **In case of double stream conveyors, a partition of 3 mm steel plate shall be provided between the two take-up pulleys along entire travel zone of take-up pulleys. Intermediate platforms shall be provided in**

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
						the take-up zone for maintenance of take - up pulleys / counter-weight. **Take-up weight shall consist of multi-blocks and not of single block to facilitate adjustment in weight if required during operation. Single heaviest piece shall be suitable for easy handling. Take-up weight block shall be provided with edge protection angle to take care of any damage. Take up weights shall be kept inside a take up weight box and shall be properly anchored / bolted with the main frame, so that the none of the weight shall be loose/free inside the box. The box shall be painted with counter-weight and conveyor number and shall have good aesthetic look.**
MH-44	VI/B	A-20	13 of 79	**4.10.2**	Supply of adequate length of rails to cover the runway length for the motor driven tripper shall be included. The supporting structures for the rails with necessary end stops shall also be supplied under this specification. Suitable belt hold down guide pulley shall be provided over the concave curve of belt over tripper. The travelling trippers shall be provided with fail safe A.C. thruster operated brake of totally enclosed type which shall engage as soon as tripper travel motor stops. A.C. thruster operated rail clamps **alongwith** manual Rail clamps on both side of the tripper shall also be provided. Independent motorized linear actuator shall be provided to operate each flap gate of the tripper chute.	Supply of adequate length of rails to cover the runway length for the motor-driven tripper shall be included. The supporting structures for the rails with necessary end stops shall also be supplied under this specification. Suitable belts hold down guide pulley shall be provided over the concave curve of belt over tripper. The travelling trippers shall be provided with fail safe A.C. thruster operated brake of totally enclosed type which shall engage as soon as tripper travel motor stops. **Travelling Tripper & respective Tripper Conveyors shall be designed in such way that Tripper shall not move/overtravel during feeding to Bunkers/Storage shed while travel motor not in operation. In addition,** A.C. thruster operated rail clamps **and separate** manual Rail clamps on both side of the tripper shall also be provided. An independent motorized linear actuator shall be provided to operate each flap gate of the tripper chute.
MH-45	VI/A	IIA-16	11 of 18	1.01.08 (c)	Mass flow meter/Solid flow meter (**Five numbers below each silo**) complete with all electrical, controls etc to be provided for measurement of ash quantity (total or part, as required) during filling of ash to the road tanker/Rail Wagons.	Mass flow meter/Solid flow meter (**as specified elsewhere**) complete with all electrical, controls etc to be provided for measurement of ash quantity (total or part, as required) during filling of ash to the road tanker/Rail Wagons.

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SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-46	VI/B	A-01	77 of 87	4.01.02 (K)	Two Fly ash Silos of 1500 MT effective capacity each having rail cum road loading facility shall be provided for the unit to receive ash from ESP Hoppers. An additional fine ash silo of capacity 1000 MT shall be provided at a separate location/adjacent to Fly ash Storage Silos having facility for feeding to the ash bagging plant. Storage capacity for Classifier Block Silos/Hoppers are as follows: - **Fine fly ash Hopper-500 (T), Coarse Fly ash Hopper-500 (T), Classifier Silo -200 (T). Main storage for fine Ash Silo shall have minimum 1750 MT effective storage capacity.**	Two **Main** Fly Ash Silos of 1500 MT effective capacity each having rail cum road loading facility shall be provided for the unit to receive ash from ESP Hoppers. An additional main fine ash silo of capacity 1000 MT having **rail cum road loading facility** shall be provided at a separate location/adjacent to Fly ash Storage Silos and having facility for feeding to the ash bagging plant. Storage capacity for Classifier Block Silos/Hoppers are as follows: - **As per the tender drawings**
MH-47	VI/A	Mandatory Spares-Chapter 03	1 of 14	1.01.02	Bottom ash hopper Liners	Bottom ash hopper **Liners (as applicable)**
			3 of 14	3.04.00	Flushing Water Pumps/BA Hopper Overflow Water Pumps/**Surge Tank Overflow Pumps**	Flushing Water Pumps/BA Hopper Overflow Water Pumps
			3 of 14	3.04.09	Motor for Flushing water pump/BA Hopper overflow pump/**Surge tank overflow pump**	Motor for Flushing water pump/BA Hopper overflow pump
			9 of 14	7.01.10	Resilience Plate	Resilience Plate (if applicable)
			5 of 14	4.03.00	Vacuum Conveying system	Vacuum Conveying system **(if applicable)**
			7 of 14	4.03.00	Vacuum Pump	Vacuum Pump **(if applicable)**
			8 of 14	5.00.00	Fly Ash Conveying Line / isolation valves/ fittings couplings	Fly Ash Conveying Line / isolation valves/ fittings couplings **(As applicable)**

Amendment 02 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
			9 of 14	7.01.00	Ash slurry disposal pumps & Drives	Ash slurry disposal pumps & Drives **(BA Slurry transportation pumps & Combined ash slurry disposal Pumps) Quantities applicable for Transportation pumps & Slurry disposal Pumps separately**
			9 of 14	7.02.00	Slurry Line Valves **(Pipes and Valves)**	Slurry Line Valves **(Quantities applicable for BA transportation, FA transportation and combined ash disposal separately)**
			9 of 14	**7.03.00** 7.03.01	**Ash Slurry Lines and fittings** Ash Slurry **Pipes &** Fittings (bends): 25% of Population of each size	Ash Slurry Fittings (bends): 25% of Population of each size
MH-48	VI/B	A-01	75 of 87	4.01.02 (F)	**Ash slurry disposal system** **Combined Ash slurry disposal system** The ash concentration (W/W) for shall be as given below: a) For bottom ash slurry disposal 25% max. b) Combined Ash slurry disposal 28% max	**Ash slurry disposal system** The ash concentration (W/W) for shall be as given below: a) Bottom ash slurry disposal 25% max. b) Combined Ash slurry disposal 28% max **c) Coarse ash slurry disposal 30 % max** **d) Fly ash (ESP ash) slurry disposal 35 % max**
MH-49	VI/A	IIA-16	12 of 18	1.01.08 (a)	**Combined ash slurry disposal pumping system** **Three (03) streams** of horizontal combined ash slurry disposal pumps complete with…….. …… Pump in series within the Pump House, for future use.	**Combined ash slurry disposal pumping system** **Suitable number (minimum as specified in Tender Drawing)** of streams of horizontal combined ash slurry disposal pumps complete with…….. …… Pump in series within the Pump House, for future use.
			13 of 18	1.01.08 (b)	**Three (03) lengths of combined** ash slurry disposal MS pipelines from combined ash ……. …… as specified and as required. **Cast Basalt pipelines along the ash slurry corridor shall be provided as specified and as required.** For garlanding of Mine Void, MS bends shall be provided. The length of total combined Ash disposal pipelines shall be 39,000 m (excluding fittings and including branch pipes for garlanding of mine void) or the actual distance (excluding fittings) including branch pipes for garlanding of mine void, whichever is higher.	**Required number of lengths** of combined ash slurry disposal MS pipelines from combined ash…… …… as specified and as required. For garlanding of Mine Void, MS bends shall be provided. The length of total combined Ash disposal pipelines shall be **39,000 m** (excluding fittings and including branch pipes for garlanding **of ash dyke-Lagoon 1, Lagoon 2 and Lagoon 3**). **Slurry lines to be routed through the available space (refer Topographical & contour survey drw of Ash Pipeline corridor) adjacent to the existing disposal corridor upto the Ash Dykes. Slurry shall be discharged into any of the Lagoons from any of the disposal pipelines**.

Amendment 02 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
			13 of 18	1.01.08 (b)	Complete ash slurry piping along with bends, supports, bolts, nuts, clamps etc. **inside** the combined ash slurry pump shed. All the piping inside the pump house shall be basalt lined.	Complete ash slurry piping along with bends, supports, bolts, nuts, clamps etc. **from** combined ash slurry pump shed **to Dyke end**. All the piping inside the pump house shall be basalt lined. **Cast Basalt pipe-lines along the ash slurry corridor shall be provided at Road/Rail crossing (Culverts, Trenches & Bridges, if any).**
			13 of 18	1.01.08 (d)	**Three (03) nos** slurry sump compartment isolation valves.	**Required number of** slurry sump compartment isolation valves.
			13 of 18	1.01.08 (j)	**Six (6) nos**. solenoid operated pneumatically actuated knife gate valves at the suction [**Three (3) nos**.] and discharge [**Three (3) nos**.] of combined ash slurry disposal pumps.	**Required nos. of** solenoid operated pneumatically actuated knife gate valves at the suction and discharge of combined ash slurry disposal pumps.
MH-50	VI/A	IIA-15	3 of 6	1.17.00	Complete dust suppression system for control of fugitive dust transfer points (**including Biomass transfer Point**), complete with pump houses……..	Complete dust suppression system for control of fugitive dust transfer points, complete with pump houses……
	VI/B	A-01	87/87	4.04.15	**Dust extraction system** Type: Dry type dust extraction system Location: Truck un-loading points, Junction Towers (limestone/ gypsum discharge & receipt points), limestone crusher house (including belt feeder & vibrating screening feeder) and limestone/gypsum storage Shed/Silo.	**Dust extraction system** Type: Dry type dust extraction system Location: Truck un-loading points (**Biomass & Limestone**), Junction Towers (limestone/Biomass discharge & receipt points), limestone crusher house (including belt feeder & vibrating screening feeder) and limestone/**Biomass** storage Shed/Silo.

Amendment 02 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
		A-20	61/79	2.01.02 (c)(ii)	**Dust extraction system for Limestone Handling area** Dust extraction system for limestone handling system shall be dry type comprising of dust collection hoods, ducting, fans, bag filter and dust collection hopper. The Limestone dust collected in dust collection hopper shall be periodically emptied back to the conveyor leaving the building.	**Dust extraction system for Limestone & Biomass Handling area** Dust extraction system for limestone **and Biomass** handling system shall be dry type comprising of dust collection hoods, ducting, fans, bag filter and dust collection hopper. The Limestone dust collected in dust collection hopper shall be periodically emptied back to the conveyor leaving the building.
MH-51	VI/A	IIA-16	15 of 18	1.03.00	Decanted water shall be pumped from owners' existing pumping system located at ash dyke. It has been envisaged that existing pumping system (5 W + 2S, Pumps of 950 M3/Hr capacity, St-I & St-II) and existing AWRS pipeline (two pipeline of St-I & St-II) shall be used for the new Stage. Hence, pipelines complete with flow control valves, bends, fixtures, couplings, fittings, gaskets, nuts, bolts, clamps, structural steel supports and other accessories from tapping point (suitable point inside plant) of Stage-II AWRS pipe (700 NB Dia) shall be provided by the bidder.	Decanted water shall be pumped from owners' existing pumping system located at ash dyke. It has been envisaged that existing pumping system (5 W + 2S, Pumps of 950 M3/Hr capacity, St-I & St-II) and existing AWRS pipeline (two pipeline of St-I & St-II) shall be used for the new Stage. Hence, **separate pipelines complete with motorized isolation valves, orifice plate (if required), bends, fixtures, couplings, fittings, gaskets, nuts, bolts, clamps, structural steel supports and other accessories from tapping point (as specified elsewhere) of existing St-I AWRS Pipeline (800 NB Dia) and St-II AWRS pipeline (700 NB Dia) up to Ash Water tank of Stage-III**, shall be provided by the bidder. Bidder to consider 70% recovery of the slurry water used (during slurry mode operation) for the proposed St-III for tapping from the existing AWRS lines.
MH-52	VI/A	III	1 of 3	1.06.00	**Terminal point for LDO supply and return** - Supply line (400 NB) from existing Stage-II FO storage tanks (2x4000 KL) - 200 NB return line header to the existing Stage-II FO storage tanks (2x4000 KL) for LDO return line from the boiler.	**Terminal point for LDO supply and return** - Existing supply line **(450 NB)** header from FO storage tanks (2x4000 KL**) to Stage-I FO Pump House and Stage-II FO Pump House.** - **Return line from Stage-III shall be connected to existing FO tank-1 and FO tank-2 with suitable interconnections.**
MH-53	VI/A	IV	22 of 73	1.01.07.02 (e)	**Ash Handling Plant** List of drives with corresponding weightage factors thereof for which power consumption is to e guaranteed is as follows: …….. 6. Combined Ash Slurry disposal pumps- **0.875** ……..	**Ash Handling Plant** List of drives with corresponding weightage factors thereof for which power consumption is to e guaranteed is as follows: …….. 6. Combined Ash Slurry disposal pumps- **0.5** ……..

Amendment 02 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-54	VI/A	III	1 of 3	1.03.00	**Ash handling system & AWRS** Rail wagon/ closed tanker/ open truck loading below Fly Ash storage Silos. Open truck loading below De-watering Bins. Tapping point from existing St-II AWRS pipe (located inside plant) shall be at any convenient location decided by the employer during detail engineering.	**Ash handling system & AWRS** Rail wagon/ closed tanker/ open truck loading below Fly Ash storage Silos. Open truck loading below De-watering Bins. Tapping point from existing St-I **and St-II** AWRS pipe (located inside/**outside** plant) shall be at any convenient location **that shall be finalized** during detail engineering**. Terminal point for Tapping points shall be (+/-) 100 m in any direction from the Tentative tapping location marked in the revised GLP.**
MH-55	VI/A	IIA-14	1 of 5	2.01.01	Limestone will be received to power plant through road by trucks. Limestone received through Road shall be unloaded by **Two (2) numbers** Truck Tipplers **each** of minimum 40T capacity …… Limestone by truck tipplers. **Two (2) numbers** Box Feeders/ Bulk-material Receiving Unit/ Surface feeder each of **150 TPH**…… …….. of capacity 100% for conveying.	Limestone will be received to power plant through road by trucks. Limestone received through Road shall be unloaded by **One (1) number** Truck Tipplers of minimum 40T capacity …… Limestone by truck tipplers. **One (1) number** Box Feeders/ Bulk-material Receiving Unit/ Surface feeder each of **200 TPH**…….. …….. of capacity 100% for conveying.
MH-56	VI/A	IIA-15	3 of 6	2.03.00	One (1) number unloading system along with One (1) Truck Tippler……. either of the following:- One number Bulk material receiving units/Box feeders / Truck unloading system/ Surface feeder, for Torrefied Biomass of size (-) 35 mm each rated for **240 TPH** along with access ramp as required, receiving hoppers/feeders ,……... ……..	One (1) number unloading system along with One (1) Truck Tippler……. either of the following:- One number Bulk material receiving units/Box feeders / Truck unloading system/ Surface feeder, for Torrefied Biomass of size (-) 35 mm each rated for **260 TPH** along with access ramp as required, receiving hoppers/feeders ,……... ……..

Amendment 02 to Technical Specifications (Section VI)

	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
C-21	VI/A	**SUB-SECTION-IIC CONTROL & INSTRUMENTATION SYSTEM**	17 of 19	20.00.00	**20.00.00 SAFETY CONTROL ROOM AND EQUIPMENT** 24/7 Safety Control room in safety park is envisaged for monitoring safety in plant area. The Contractor shall provide all hardware and software including IP based CCTV camera, Drone, loudspeakers, Redundant Servers/PC workstations, network switches, furniture, power supply, cables, Joystick etc for meeting the above requirement. For quantity refer Annexure C to this sub section.	**20.00.00 SAFETY CONTROL ROOM AND EQUIPMENT** 24/7 Safety Control room ***~~in safety park~~*** is envisaged for monitoring safety in plant area. The Contractor shall provide all hardware and software including IP based CCTV camera, Drone, loudspeakers, Redundant Servers/PC workstations, network switches, furniture, power supply, cables, Joystick etc for meeting the above requirement. For quantity refer Annexure C to this sub section.

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-57	VI/B	A-21	22/42	2.07.01 New clause		**Pneumatic Ash Extraction and Transportation Pipelines** Spool pieces (Alloy C.I. or basalt lined as the case may be) of minimum 1.5 m length shall be provided at the discharge of every fitting having an angle of 45 º or above.
			32/42	4.00.00	**ASH DISPOSAL PIPING AND ACCESSORIES** **……..** **……** Spool pieces (Alloy C.I. or basalt lined as the case may be) of minimum 1.5 m length shall be provided at the discharge of every fitting having an angle of 45 º or above.	Deleted

Amendment 02 to Technical Specifications (Section VI)

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S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-68	VI/B	IIB	6 of 20	1.09.02	In addition to above, HT power cables, as indicated under Clause 1.19.00, if required for Employer's requirement shall also be in bidder scope	deleted
EE-69	VIB	Part-A	26,27,28,29	5.14,5.16,5.17	----which should have been in successful operation for minimum two (2) years prior to the date of Techno-Commercial bid opening. .	--- which should have been in successful operation for minimum two (2) years prior to the date of placement of LOA for EPC Package.
EE-70	VI/B	B-06	13 of 19	3.14.00	Wireless temperature monitoring system to be provided and same shall be integrated to DDCMIS/ separate HMI. Temperature sensors shall be installed in all relevant joints, contact joints etc. as per the standard OEM Practice, however Position of such sensors shall be decided at the time of detailed engineering. This shall be provided for the following switchgears: USS, BMCC, TMCC and UES	Wireless temperature monitoring system to be provided and same shall be integrated to DDCMIS/ separate HMI. Temperature sensors shall be installed in all relevant joints, contact joints etc. as per the standard OEM Practice, however Position of such sensors shall be decided at the time of detailed engineering. This shall be provided only for the following switchgears: USS(Unit service switchgear), BPMCC(Boiler PMCC), TPMCC(Turbine PMCC) and UES(Unit emergency switchgear)
EE-71	VI/B	IIB	9 of 20	1.16.00 & 1.6.02	One(1) No. of 765kV Single Circuit Cross country interconnecting overhead Tie line between Sipat Stage-III GT and 765kV Stage-I Switchyard with Twin Moose Conductor on towers. ...	One(1) No. of 765kV Single Circuit Cross country interconnecting overhead Tie line between Sipat Stage-III GT and 765kV Stage-I Switchyard with Quad Bersimis / HEXA ZEBRA Conductor on towers with redundant OPGW connectivity -----
EE-72	VI/B	B-08	3 of 7	2.010.00	All LT power cables of sizes more than 120 sq.mm. shall be XLPE insulated, and sizes shall be of 1Cx150, 1Cx300, 1Cx630, 3Cx150,3CX185, 3Cx240 & 3Cx300 sq.mm ...	Multicore cables are allowed up to 300sq.mm only. All LT Power cables of sizes more than 120Sq.mm shall be XLPE insulated.
EE-73	VI/B	B-0	8 of 16	3.06.00 (h) (d)	h) Sizing of LT boards... d) A spare capacity of about 10 % shall be kept for addition of loads during detail engineering as many of the LT loads cannot be predicted during the Rating selection of the Board. k) Spare capacity and Future Requirements Each of the LV switchboards shall be designed for 1.1 times the required rating as a spare	h) Sizing of LT boards... d) DELETED. k) Spare capacity All LV Switchboards shall be provided with spare feeders / modules as specified in relevant clause of Part-A of Technical Specification.

Amendment 02 to Technical Specifications (Section VI)

S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					capacity. Further all LV Switchboard shall be provided with spare feeders / modules as specified in relevant clause of Part-A of Technical Specification.	
EE-74	VI/B	B-0	5 of 16	3.04.01	... Case I: Outage of One Unit transformer a) Loads served by fully loaded Unit transformer as defined above plus b) MDBFP load for one unit plus c) Meeting the station loads distributed on the respective station boards plus d) Loads due to outage of largest transformer /outgoing feeder (except station to unit/station tie feeders) connected to the bus plus e) Multiplied by no load voltage correction factor as defined at 3.04.00.	... Case I: Outage of One Unit transformer a) Loads served by fully loaded Unit transformer as defined above plus b) MDBFP load for one unit plus c) Meeting the station loads distributed on the respective station boards plus d) Multiplied by no load voltage correction factor as defined at 3.04.00.
EE-75	VI/B	B-0	11 of 16	3.08.00	D.C. Systems... The battery shall be sized considering a minimum electrolyte temperature of 15 deg.C along with temperature correction factors as per relevant standard. An ageing factor of 1.25 shall be considered. The no. of cells, end cell voltage shall be considered based on the minimum and maximum voltage window and cable drop etc. as per system requirement. ...	D.C. Systems... The battery shall be sized considering a minimum electrolyte temperature of 15 deg.C along with temperature correction factors as per relevant standard. An ageing factor of 1.25 shall be considered for Ni-Cd only. The no. of cells, end cell voltage shall be considered based on the minimum and maximum voltage window and cable drop etc. as per system requirement. ...
EE-76	VI/B	B-11	10 of 18	4.04.00	...Flexible conduit shall be water proof and rust proof made of heat resistant TERNE coated steel...	...Flexible conduit shall be water proof, rust proof, made of heat resistant steel with temperature rating of 150 deg C...
EE-77	VI/B	B-11	11 of 18	4.12.00	Occupancy based Passive Infra-red sensors. The sensors shall be recess mounted, programmable type suitable for lighting load of 6A with variable off delay settings. The detection area shall be minimum 5 metres for standard room height of 3mt. All the calibrated settings shall be stored in non-volatile memory of PIR sensor which shall be unaffected by power	Reliable occupancy based Passive Infra-red sensor shall be provided in air-conditioned office rooms suitable to cater the controlled lighting systems. The detection area shall be minimum 5 metres for standard room height of 3mt. All the calibrated settings shall be stored in non-volatile memory of PIR sensor which shall be unaffected by power supply fluctuations. If necessary, contactor shall

Amendment 02 to Technical Specifications (Section VI)

S.No	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					supply fluctuations. Necessary 16A contactor shall be supplied along with each sensor & shall be located inside the switch box	be supplied along with sensor & may be located inside the switch box/Panel.
EE-78	VI/B	B-0	7 of 15	3.06.00 (a) & Amendment Sl No EE-01	a) All switchboards shall be of double front, draw out, complete closed-door operation, metal enclosed, indoor, floor-mounted, free-standing type of bolted design. Entire bus bar system shall be insulated with PVC sleeves (UL 224). Cable terminations located in cable alley shall be designed to meet the Form IVb Type-7 (as per IEC 60439) for safety purpose. Soot blower MCC/switchboard (with IP 55 protection) on the boiler platform shall be acceptable.	a) All switchboards shall be of double front, draw out, complete closed-door operation, metal enclosed, indoor, floor-mounted, free-standing type of bolted design. Entire bus bar system shall be insulated with PVC sleeves (UL 224). Cable terminations located in cable alley shall be designed to meet the Form IVb (as per IEC 60439) for safety purpose. Soot blower MCC/switchboard (with IP 55 protection) on the boiler platform shall be acceptable.
EE-79	VI/B	B-17			--	Existing SLD/Layout of Sipat-I/II 765/132kV switchyard is enclosed.

Amendment 02 to Technical Specifications (Section VI)

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
D2-50	VI/Part B	D-1-5	5.05.11	24 of 69	**All liquid retaining structure shall be designed by working stress method as per IS 3370 (Part-1&2):2009**. **The thickness of base slab in liquid retaining/ carrying structures shall be minimum 150mm.** Minimum grade of concrete for liquid retaining structures like Sumps/tanks/drain sumps etc shall be M-30.	**All liquid retaining structure shall be designed as per IS 3370 (Part-1&2) with Tightening Class 3** . **The thickness of base slab in liquid retaining tank shall be minimum 250mm**. Minimum grade of concrete for liquid retaining structures like Sumps/tanks/drain sumps etc shall be M-30.
D2-51	VI/Part B	D-1-5	5.05.12	24 of 69	For liquid retaining structures, the minimum reinforcement in each direction shall not be less than **0.24% of the gross cross-sectional area.**	For liquid retaining structures, the minimum reinforcement in each direction shall not be less than **as specified in IS 3370 Part 2**
D2-52	VI/Part B	D-1-5	5.05.13	24 of 69	All liquid retaining structures shall be tested for leak proofness with full water level in accordance with **clause no.12 of** IS 3370(Part 1)**:2009** and IS 6494.	All liquid retaining structures shall be tested for leak proofness with full water level in accordance with IS 3370(Part 1) and IS 6494.
D2-53	VI/Part B	D-1-6	6.03.13 S.No 1	12 of 23	1. Fly Ash silo shall be of RCC construction. The silo shall be designed as per the requirement of IS:4995. **The pressure due to ash filling on the side wall and the bottom portion of as h bins/silos shall be taken as the maximum of (a) static pressure determined in accordance with the Jansen's formula multiplied by an impact factor of 1.4 and (b) pressure determined as per Walker's formula for static as well as dynamic conditions.** The silo shall be designed for the following conditions:…….	1. Fly Ash silo shall be of RCC construction. The silo shall be designed as per the requirement of IS:4995. **The static pressure calculated at rest shall be multiplied by an over pressure factor of 1.35 for the top 1/3rd – portion and by a factor of 1.75 for the bottom 2/3rd portion The effect of hot temperature of ash on the concrete wall shall also be considered.** The silo shall be designed for the following conditions:……
D2-54						Annexure-AC-5
D2-55			Tender Drawing		-	TENDER DRAWING NO .XXXX-001-POC-A-005-Rev-A-SSTPP- TOPOGRAPHICAL SURVEY OUTSIDE PLANT BOUNDARY

Amendment 02 to Technical Specifications (Section VI)

D2-56			**Existing drawing of Pit less weigh bridge arrangement at Silo**		-	Annexure-AC-6
D2-57	**VI/Part B**	**D-1-4**	**4.03.01**		Complete levelling of entire plant area as shown in drawing Titled 'Site Levelling Plan' shall be done by the Bidder. Bidder shall carry …… …….. Contour map and spot levels of the area based on the preliminary survey carried out by Owner is enclosed for the purpose of guidance of Bidder. Refer tender drawing titled Topographical survey …… …….	Complete levelling of entire plant area as shown in drawing Titled 'Site Levelling Plan' shall be done by the Bidder. Bidder shall carry …… …….. **Materials of any kind obtained from excavation on the Site shall remain the property of the Employer and shall be disposed of as the Project Manager may direct. In case of in-plant excavation and backfilling the excavated material can be used for backfilling, if it meets the technical requirements. However, any royalty or statutory charges involved as per local laws have to be borne by the vendor. Excavated material (like rock, boulders, sand, moorum, etc.), which meets the technical requirements of construction material, can be used by the vendor on directions of EIC, subject to payment of requisite charges as decided by NTPC for the purpose. Any royalty or statutory charges involved as per local laws have to be borne by the vendor. If the excavated material is to be disposed outside plant boundary, as stipulated in the technical specifications, all clearances and permissions has to be obtained by the vendor. No extra charges for the same, including statutory charges and taxes, would be payable by NTPC to the vendor. NTPC would only extend support for obtaining the clearances and permissions.** Contour map and spot levels of the area based on the preliminary survey carried out by Owner is enclosed for the purpose of guidance of Bidder. Refer tender drawing titled Topographical survey …… ……

Amendment 02 to Technical Specifications (Section VI)

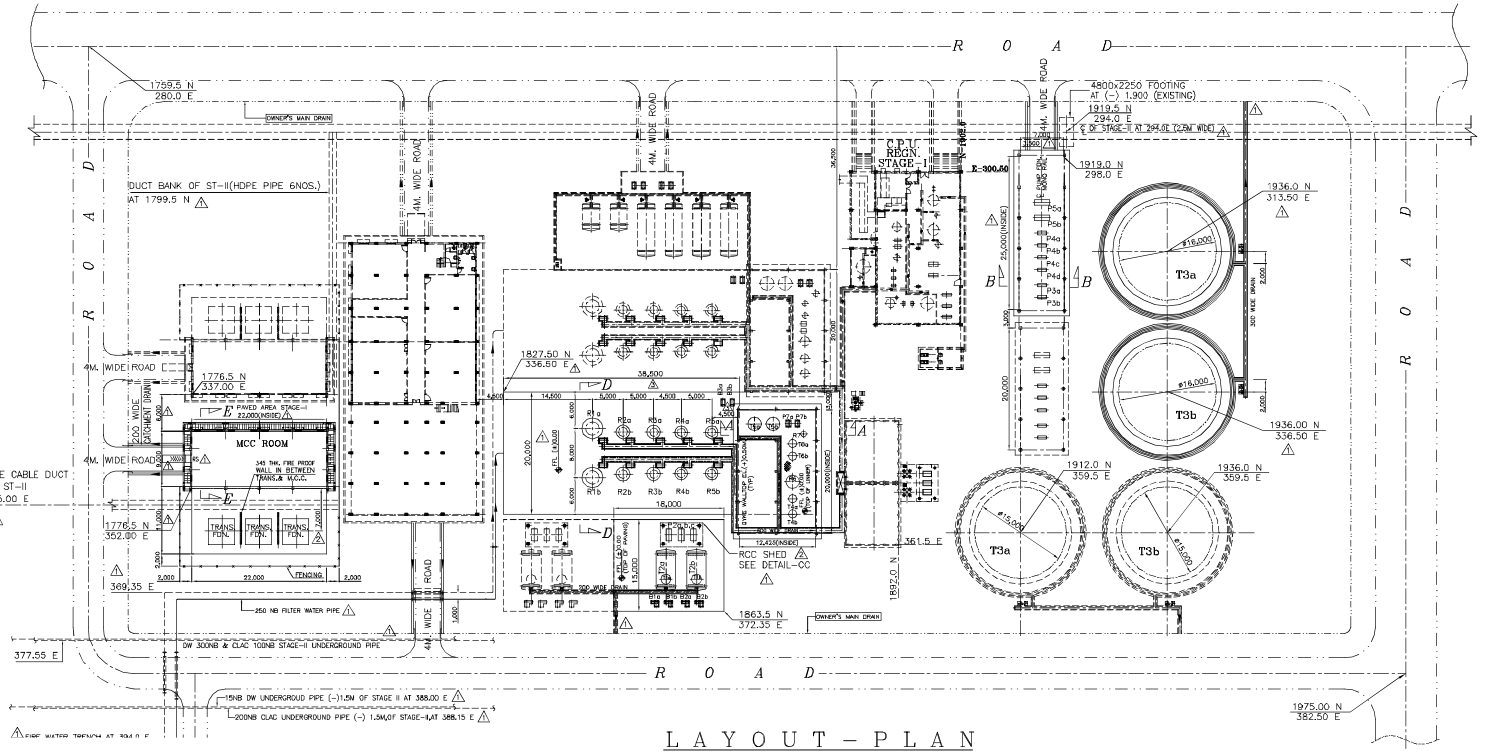
D2-58	**VI/B**	**D-1-5**	**5.01.00**		n) All floor areas indicated in subsequent pages shall be total floor area required.	n) All floor areas indicated in subsequent pages shall be total floor area required. **The total floor Area shall be area enclosed under the outside walls, including the wall thickness, of the building but excluding the following:** **- Lift shaft, Open staircase, Rainwater downcomer in-casements, Sunshades, any floor/ roof projection, terrace area, any other shaft (Electrical/ HVAC, Plumbing), Atrium, porch, balconies, patios and same area multiplied by number of floors.** **The total floor area shall be maximum of floor area mentioned in technical specifications or Floor area as per tender drawings.**

Amendment 02 to Technical Specifications (Section VI)

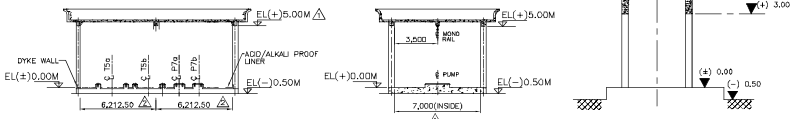
SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
QA-01	C		61/119	40.00.00	Appendix-II	Updated PPP-MII Order, (MoP order no A-1/2021-FSC-Part (5) dated 03.07.2023) enclosed in Annexure

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NORTH



LAYOUT – PLAN

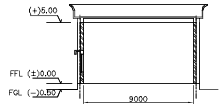


SECTION–AA (SCALE–1:200)

SECTION–BB (SCALE–1:200)

DETAIL C–C

SECTION–DD



SECTION EE

S.NO.	TAG NO.	DESCRIPTION	SIZE/CAP.	QTY.	REMARKS
1	R1a,b	ACF EXCHANGER	⌀3.40 x 2.20 Ht.	2	
2	R2a,b	SAC EXCHANGER	⌀2.25 x 3.56 Ht.	2	
3	R3a,b	WBA EXCHANGER	⌀2.25 x 2.00 Ht.	2	
4	R4a,b	SBA EXCHANGER	⌀2.10 x 2.80 Ht.	2	
5	R5a,b	MB EXCHANGER	⌀2.10 x 2.10 Ht.	2	
6	R6	DILUENT WATER HEATING TANK (10M³)	⌀2.20 x 2.00 Ht.	1	
7	R7	ALKALI FILTER (10M³/Hr.)	⌀1.00 x 2.10 Ht.	1	
7	T1a,b	DEGASSER TOWER	⌀1.70 x 3.40 Ht.	2	
8	T2a,b	DEGASSED WATER STORAGE TANK (50M³)	⌀3.20 x 5.90 LOS.	2	
9	T3a,b	DM WATER STORAGE TANK	⌀16.0 x 12.30 Ht.	2	
10	T4a,b	ACID MEASURING TANK FOR SAC & MB (2M³)	⌀1.40 x 1.30 Ht.	2	
11	T5a,b	ALKALI PREPRATION TANK (4M³)	⌀2.30 x 1.30 Ht.	2	
12	T6a,b	ALKALI MEASURING TANK FOR SBA & MB (2.00M³)	⌀1.40 x 1.30 Ht.	2	
13	P1a,b,c	FILTER WATER TRANSFER PUMP	145 M³/HR.x43MWC	3	VERTICAL TURBINE
14	P2a,b,c	DEGASSER WATER PUMP	140 M³/HR.x5CMWC	3	
15	P3a,b	DM WATER REGN. PUMP	40 M³/HR.x 35MWC	2	
16	P4a,b,c,d	DM MAKE UP WATER PUMP	100 M³/HRx60MWC	4	
17	P5a,b	BOILER FILL PUMP	175 M³/HRx150MWC	2	
18	P6a,b,c	CONDENSATE TRANSFER PUMP	300 M³/HRx70MWC	3	SUPPLY ONLY
19	P7a,b	ALKALI TRANSFER CUM RECIRCULATION PUMP	10 M³/HRx10MWC	2	
20	B1a,b,B2a,b	DEGASSER BLOWER	4000 M³/HRx110MWC	4	
21	B3a,b	MB BLOWER	450 M³/HRx4000MWC	2	
22	SH 1a, b	SAFETY SHOWER			

NOTE:–

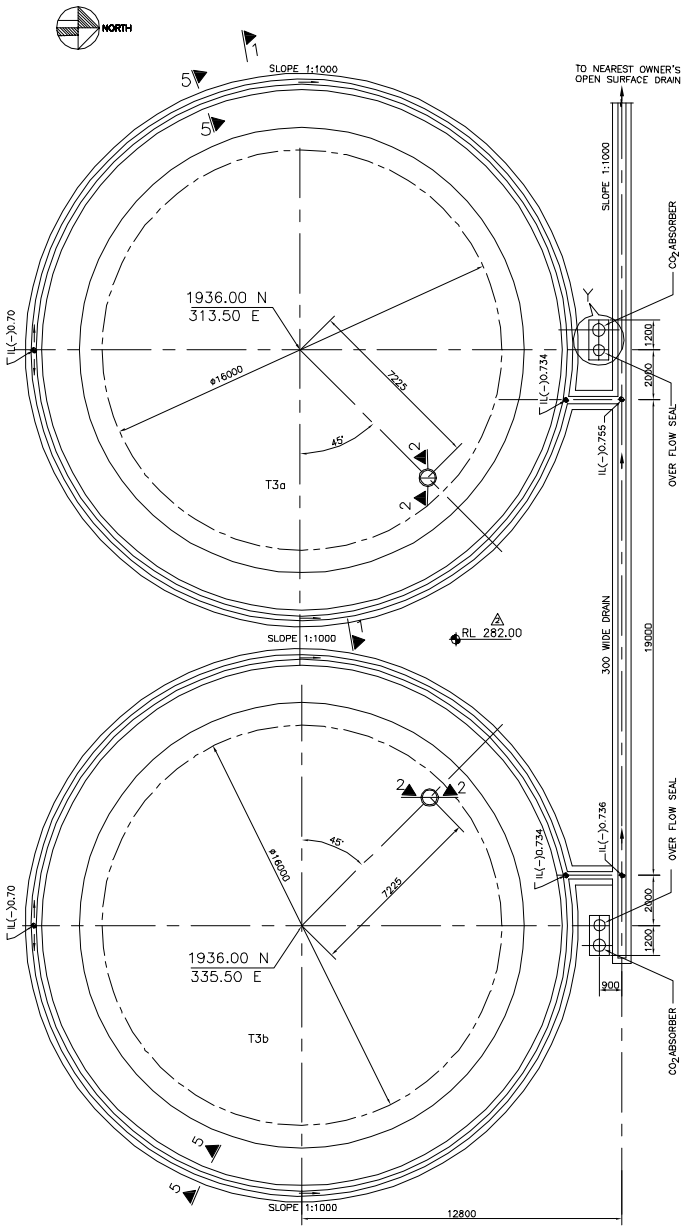
1) ALL DIMENSIONS ARE IN MM., LEVELS & GRIDS ARE IN METRES.
2) ALL DIMENSION/ELEVATIONS GIVEN ARE CLEAR INSIDE DIMENSION.
3) ±0.00(F.F.L.) ELEVATION CORROSPONDS TO RL.(+)282.50M AND(–) 0.50(FGL) ELEVATION CORROSPONDS TO RL.(+)282.00M
4) DRAIN INSIDE THE BUILDING SHALL BE COVERED BY GI GRATING / PRECAST SLAB.
5) DRAIN OUTSIDE BUILDING SHALL BE COVERED BY PRECAST SLAB.
6) ACID/ALKALI PROOF LINING SHOWN THUS
7) ALL THE DRAINS LEADING TOWARDS NEU. PIT SHALL BE LINED WITH ACID / ALKALI PROOF TILES 38mmTHK.
8) TYPE OF FINISH FOR FLOORS , WALLS & PAINTING SHALL BE SHOWN IN CIVIL ENGINEERING DRAWINGS.
9) AFTER LAYING OF CABLES, CABLE SLITS TO BE FILLED WITH SAND AND COVERED WITH 50mm THICK LEAN CONCRETE TO FLUSH WITH FFL/FGL.
10) WINDOWS AND VENTILATION SYSTEM SHALL BE SHOWN IN DETAIL CIVIL ENGG. DRG.
11) ALL WALKWAYS SHALL BE 2M WIDE WITH TOP OF WALKWAY AT EL(–)0.30M
12) MINOR MODIFICATION IN THE LAYOUT IF REQUIRED ON THE BASIS OF CIVIL DESIGN SHALL BE CARRIED OUT DURING DETAIL ENGINEERING.
13) FOR CABLE TRAY/SLIT, CABLE ROUTING ETC. PLEASE REF. SEPARATE ELECTRICAL DRG. 003–C–182A–82–EN–604
14) RS– ROLLING SHUTTER

APPROVED
CAT I

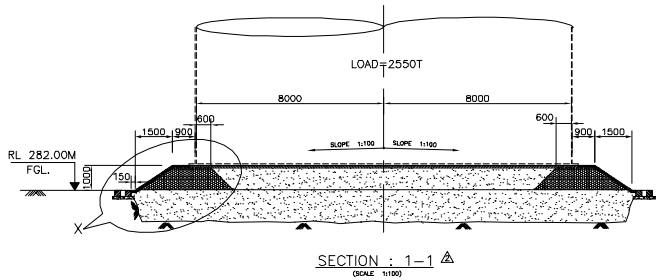
Digitally signed by Yogesh Sawedkar
DN: cn=Yogesh Sawedkar, c=IN, o=NTPC, ou=PE-S I F, email=yogeshsawedkar@nipsoc2.co.in
Location: 173
Date: 2007.06.15 15:38:55 +05'30'

MKD.	DATE	PARTICULAR	DRN.	CHKD.	APPD.
3	18.05.07	REGENERATION SHED SHIFTED BY 2.0M. TOWARDS SOUTH AS PER SITE REQUIREMENT, & NTPC CORPORATE OFFICE E-MAIL DATED 10.05.07 SUBMITTED FOR REAPPROVAL	G	DPS	KK
2	26.02.07	REVISED AS PER NTPC COMMENTS VIDE LTR.NO. PES:9518:1372:PVM:8272 DATED 19.02.07	K	DPS	KK
1	06.01.07	NTPC COMMENTS VIDE LTR.NO. 72 DATED 20.11.06 AND 35 DATED 28.12.06	C	DPS	KK
0	30.10.06	SUBMISSION FOR APPROVAL	K	DPS	KK

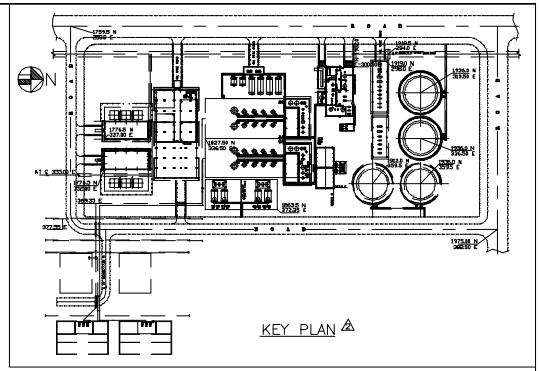
APPD.	K.K.	TITLE: EQUIPMENT LAYOUT PLAN OF D.M. PLANT.
DATE	2 06	CLIENT'S DRG. NO.: 9518-1372-PVM-F-001
ISSUED F	AB.	

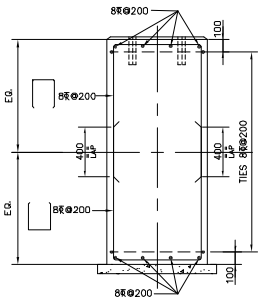


PLAN
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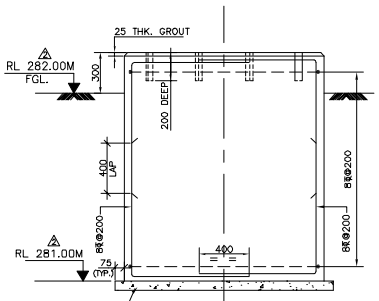


SECTION : 1-1
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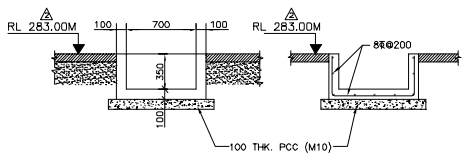




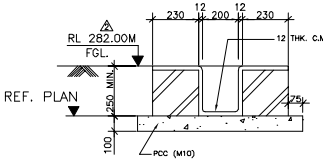
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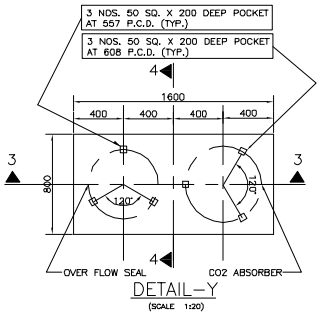
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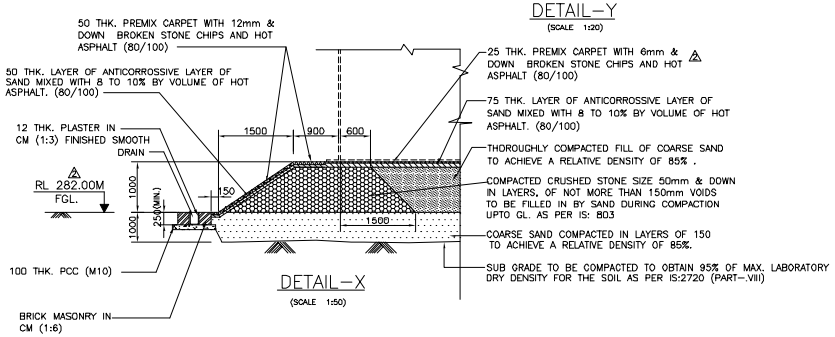
SECTION : 2-2 → R/F DETAIL
(SCALE 1:25)



SECTION : 5-5
(SCALE 1:10)



DETAIL-Y
(SCALE 1:20)



DETAIL-X
(SCALE 1:50)

NOTES:-

1) ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS IN METERS.
2) THIS DRAWING IS NOT BE SCALED, ONLY WRITTEN DIMENSIONS ARE BE FOLLOWED.
3) GRADE OF CONCERTE SHALL BE M25.
4) REINFORCEMENT SHALL BE H.Y.S.D. BARS CONFORMING TO IS:1786(GRADE Fe 415).
5) CLEAR COVER TO MAIN REINFORCEMENT SHALL BE 50mm.
6) GROUTING OF POCKETS SHALL BE DONE WITH ANTI SHRINK GROUT OF GRADE M30
7) EL. 0.000 CORRESPONDS TO RL 282.00 M ABOVE M.S.L.
8) FOR LAYOUT, REF.DRG. NO. DO3-C-182A-82-PL-034-A001
   FOR MECH.G.A., REF.DRG. NO. DO3-C-182A-82-MF-00084-A001

Signature Not Verified

Digitally signed by P.K.Dash
Date: 2007.01.22 14:04:09 IST
Reason: Approved in Cat- I

REV.	DATE	PARTICULARS	DRN.	CHKD.	CHKD.
2	18.01.07	REVISED AS/ NTPC LT.NO. 9518:1372:PVC:7643 DT.10.01.07	SUNIL	DPS	
1	23.12.06	REVISED AS/ NTPC LT.NO. 9518:1372:PVC:6347 DT.02.11.06	SUNIL	DPS	
0	20.10.06	SUBMISSION FOR APPROVAL	SUNIL	DPS	DPS

APPD.	DPS	TITLE: DM PLANT
DATE	20.10.06	D. M. WATER STORAGE TANK AREA.
		CIVIL GA & R/F DETAILS

ANNEXURE-IV-2

DOMESTIC COAL CHARACTERISTICS

Sipat 800	Coal Characteristics Sipat Stage III					
S.No.	Characteristics	Range of coal supplies 95%			Range of coal supplies 5%	
	(as received basis)	Column - 1	Column - 2	Column - 3	Column - 1	Column - 2
1.0	PROXIMATE ANALYS	Design	Worst	Best	Worst	Best
1.1	Total Moisture (%)	14	16	13	17	10
1.2	Ash (%)	41	45	37	46	34
1.3	Volatile Matter (%)	22	19	24	18	25
1.4	Fixed Carbon (%)	23	20	26	19	31
1.5	Total (%)	100.00	100.00	100.00	100.00	100.00
2.0	ULTIMATE ANALYSIS					
2.1	Carbon (%)	34.02	30.53	37.94	29.23	42.75
2.2	Hydrogen (%)	2.75	2.25	2.85	2.1	2.95
2.3	Sulphur (%)	0.45	0.35	0.6	0.35	0.65
2.4	Nitrogen(%)	0.83	0.63	1.2	0.55	1.3
2.5	Oxygen(%)(By differ	6.95	5.24	7.41	4.77	8.35
2.8	Total Moisture (%)	14	16	13	17	10
2.9	Ash (%)	41	45	37	46	34
	Total	100	100	100	100	100
2.10	GCV (Kcal/Kg)	3400	3000	3750	2900	4100
2.11	Hard Grove Index	45.00	40.00	50.00	40.00	55.00
3.0	ASH ANALYSIS					
3.1	Silica (%)	58.59	56.81	59.20	55.00	57.90
3.2	Alumina(%)	26.77	27.42	27.10	29.07	29.18
3.3	Iron Oxide (%)	8.80	9.80	7.80	8.00	6.00
3.4	Titania	1.66	1.78	1.56	0.48	1.48
3.5	Phosphoric Anhydric	0.19	0.10	0.24	0.80	0.10
3.6	Lime (%)	1.38	1.48	1.32	1.00	1.00
3.7	Magnesia (%)	1.00	1.13	0.97	2.31	0.50
3.8	Sulphuric Anhydride	0.05	0.04	0.10	0.40	1.70
3.9	Sodium Oxide (%)	0.10	0.08	0.15	0.30	0.20
3.10	Balance Alkalies (by	1.46	1.36	1.56	2.64	1.94
	Total	100.00	100.00	100.00	100.00	100.00
4.0	ASH FUSION RANGE					
	REDUCING ATMOSPHERE					
4.1	Initial Deformation T	1150.00	1100.00	1200.00	1100.00	1200.00
4.2	Hemispherical Temp	1300.00	1250.00	1350.00	1250.00	1350.00
4.3	Fusion Temperature	1400.00	1400.00	1400.00	1400.00	1400.00

Note: For FGD design and guarantee conditions- HCL (ppm) wet-45 & HF (ppm) wet-12 may be considered.

CLAUSE NO.	SCOPE OF SUPPLY & SERVICES

Scope for biomass co-firing in the Steam Generator

The unit should have biomass co-firing capability as follows-

- Each milling system shall be capable of co-milling at least 10% non-torrefied biomass pellet along with coal on weight basis without any degradation in mill throughput and performance.
- Also, each milling system shall be capable of co-milling at least 20% torrefied biomass pellet along with coal on weight basis without any degradation in mill throughput and performance.
- Provision of view glass in mill feeder with adequate illumination and sealing air arrangement to prevent dust deposition to view presence of biomass pellets is to be made. Additionally, electronic monitoring of biomass pellet using camera may be provided in control room.
- Boiler shall be capable for co-firing at least 10% of non-torrefied biomass on weight basis. The boiler shall also be capable of co-firing 20% torrefied biomass pellets on weight basis.
- Due to presence of high volatile matter in biomass pellets, the mill and associated pulverised fuel piping (PF) systems shall be equipped with suitable & adequate fire detection system. Milling system and Bunkers shall be installed with CO monitor sensor with adequate redundancy for alarm in case of any possible fire hazard.
- All the PF pipes shall be provided with RTDs and temperature of coal pipes to be hooked upto UCB.
- Biomass pellet being a material having high volatile content and low ignition temperature, design of milling system and parameters shall take care of safety aspects/ any possible fire hazard during biomass co-firing.

Mill inerting system with auto operated valves (motorised or pneumatic) operable from Control room at mill inlet along with pressure gauge after valve shall be provided. Provisions for continuous monitoring of mill inlet air temperature (Mixed air temperature), Mill outlet temperature, mill current, Mill DP is to be made. Provision of view glass in mill feeder with adequate illumination to view presence of biomass pellets is to be made. The scope shall include the unloading, storage, transportation & feeding to coal bunkers along with all the associated systems. The bunker area firefighting system shall be suitably reinforced to tackle biomass fire hazard also.

The boiler & auxiliaries like pulverisers, ducting etc. including electrostatic precipitator system and all the associated system for handling the non-torrefied and torrefied biomass (as a fuel feed) and flue gas (as a combustion product) shall be compatible to the physio-chemical properties and composition of the specified biomass. These equipment & systems shall be designed and engineered accordingly based on the nature and behaviour of the biomass pellets.

It should be ensured that the specified steam outlet parameters are maintained with the biomass co-firing for the entire control range.

Additional pressure drops, if any, shall be factored in the PA fan sizing as also any additional soot blowers shall be provided on account of deposition while biomass co-firing. The milling system internals like classifier, mill throat for maintaining the correct velocities including any internal baffling to maintain the mill throughput shall be ensured. Burners shall ensure well

anchored flames and good flame detector signals to factor-in the impacts of such co-firing for effective results.

The feeders shall be suitable to take care of biomass feeding, calibration requirements. The flame scanning should factor-in the impacts of such co-firing for trouble free scanning.

Contractor shall provide a detailed write-up regarding the measures and features which have been adopted in heat transfer surfaces, milling system, burners and air supply system for NOx control including that in ducting & ESP/FGD design. The operating procedure for the mill with biomass co-firing shall be submitted for employer's approval.

All the necessary civil, electrical & instrumentation on account of above co-firing shall also be included in the scope. Further, the related special monitoring & analytical instruments on account of bio-mass co-firing towards satisfactorily performance of the boiler & auxiliaries are also included. Control requirements for maintaining the mill inlet and outlet temperatures shall be provided.

Write up for milling system and plant operating procedure during biomass co-firing with safety to be provided.

Annexure-IV-7(A), (B) & (C) of Sub-Section-IB, Part-A, for ''Torrefied Biomass Characteristics'' may be referred. The non- torrefied biomass (agro-residue) shall have the meaning as identified in Government of India, Ministry of Power OM No F. No. tL/ 86/ 2017-Th.II (C.No 238797) dated 03.05.2023 placed at Annexure to this Sub Section.

F. No.11/86/2017-Th.II (C.No 238797)
Government of India
Ministry of Power
*****

Shram Shakti Bhawan, Rafi Marg,
New Delhi, dated the 03rd May, 2023.

ADDENDUM

Subject: Addendum to Revised Policy for Biomass Utilization for Power Generation through Co-firing in Coal based Power Plants issued on 08.10.2021 - reg.

Ministry of Power had issued a Revised Policy for Biomass Utilization for Power Generation through Co-firing in Coal based Power Plants, vide letter dated 08.10.2021 (copy enclosed).

2. This is an 'Addendum' to the Policy referred to above, for addition of Para 4, after Para 3 of ibid policy, as under:

"4. Biomass pellets used for co-firing in TPPs can be made from the following:

(i) 'agro-residue' [as mentioned in Para 3(i), 3(ii) and 3(iii) above] i.e. the leftover portion of the agriculture produce such as stubble/straw/stalk/husk which are surplus and not being used as animal fodder. This includes agro-residue obtained from crops like Paddy, Soya, Arhar, Gwar, Cotton, Gram, Jawar, Bajra, Moong, Mustard, Sesame, Til, Maize, Sunflower, Jute, Coffee, etc. as well as Groundnut Shell, Coconut Shell, Castor Seed Shell etc.

(ii) In addition, pellets made from the following agro product/crop/waste can also be used for co-firing in TPPs

a. Bamboo and its by-products (e.g. Bamboo Chips, Cuttings, Bamboo Dust etc.).

b. Horticulture waste such as dry leaves and trimmings obtained from maintenance & pruning of trees and plants.
c. Other biomass such as Pine Cone/Needle, Elephant Grass, Sarkanda etc. "

3. This issues with approval of Hon'ble Minister of Power & NRE.

3/5/23

(J.Misra)
Under Secretary to the Government of India
Tele: 23063746

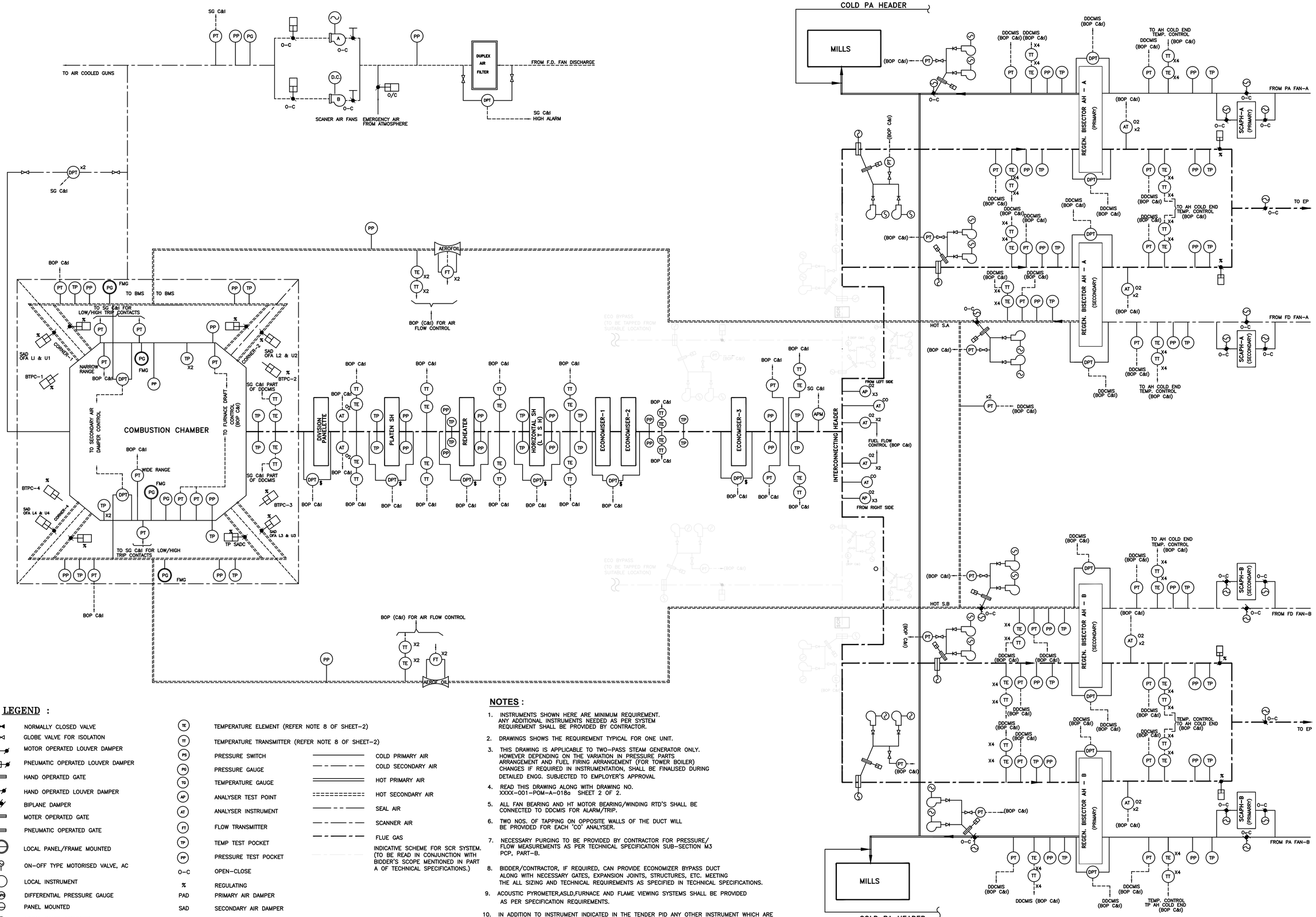
To,

1. Principal Secretary/Secretary in charge of Energy/Power Department, All States/UTs
2. Chairperson, CEA
3. CMDs of all CGSs/IPPs

Copy to:

(i) PS to Hon'ble Minister of Power & NRE.
(ii) PS to Hon'ble MoS for Power
(iii) Sr PPS to Secretary(Power)
(iv) PPS to SS&FA ,PPS to AS(AT)
(v) All Joint Secretaries/EA/Chief Engineer, Ministry of Power
(v) In-charge, NIC, Ministry of Power- with a request to upload this document on the website of MoP.

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LEGEND :

	NORMALLY CLOSED VALVE
	GLOBE VALVE FOR ISOLATION
	MOTOR OPERATED LOUVER DAMPER
	PNEUMATIC OPERATED LOUVER DAMPER
	HAND OPERATED GATE
	HAND OPERATED LOUVER DAMPER
	BIPLANE DAMPER
	MOTER OPERATED GATE
	PNEUMATIC OPERATED GATE
	LOCAL PANEL/FRAME MOUNTED
	ON-OFF TYPE MOTORISED VALVE, AC
	LOCAL INSTRUMENT
DPG	DIFFERENTIAL PRESSURE GAUGE
	PANEL MOUNTED
	LOCAL PANEL MOUNTED
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
PT	PRESSURE TRANSMITTER
FE	FLOW ELEMENT
APM	ACOUSTIC PYROMETER

TE	TEMPERATURE ELEMENT (REFER NOTE 8 OF SHEET-2)
TT	TEMPERATURE TRANSMITTER (REFER NOTE 8 OF SHEET-2)
PS	PRESSURE SWITCH
PG	PRESSURE GAUGE
TG	TEMPERATURE GAUGE
AP	ANALYSER TEST POINT
AT	ANALYSER INSTRUMENT
FT	FLOW TRANSMITTER
TP	TEMP TEST POCKET
PP	PRESSURE TEST POCKET
O-C	OPEN-CLOSE
%	REGULATING
PAD	PRIMARY AIR DAMPER
SAD	SECONDARY AIR DAMPER
GD	GAS DAMPER
CD	COAL DAMPER
(BOP C&I)	BALANCE OF PLANT C&I
SLD	SEAL AIR DAMPER
SCAD	SCANNER AIR DAMPER
BTPC	BURNER TILT POWER CYLINDER
SCR	SELECTIVE CATALYTIC REDUCTION

	COLD PRIMARY AIR
	COLD SECONDARY AIR
	HOT PRIMARY AIR
	HOT SECONDARY AIR
	SEAL AIR
	SCANNER AIR
	FLUE GAS

INDICATIVE SCHEME FOR SCR SYSTEM. (TO BE READ IN CONJUNCTION WITH BIDDER'S SCOPE MENTIONED IN PART A OF TECHNICAL SPECIFICATIONS.)

NOTES :

1. INSTRUMENTS SHOWN HERE ARE MINIMUM REQUIREMENT. ANY ADDITIONAL INSTRUMENTS NEEDED AS PER SYSTEM REQUIREMENT SHALL BE PROVIDED BY CONTRACTOR.
2. DRAWINGS SHOWS THE REQUIREMENT TYPICAL FOR ONE UNIT.
3. THIS DRAWING IS APPLICABLE TO TWO-PASS STEAM GENERATOR ONLY. HOWEVER DEPENDING ON THE VARIATION IN PRESSURE PARTS ARRANGEMENT AND FUEL FIRING ARRANGEMENT (FOR TOWER BOILER) CHANGES IF REQUIRED IN INSTRUMENTATION, SHALL BE FINALISED DURING DETAILED ENGG. SUBJECTED TO EMPLOYER'S APPROVAL
4. READ THIS DRAWING ALONG WITH DRAWING NO. XXXX-001-POM-A-018a SHEET 2 OF 2.
5. ALL FAN BEARING AND HT MOTOR BEARING/WINDING RTD'S SHALL BE CONNECTED TO DDCMIS FOR ALARM/TRIP.
6. TWO NOS. OF TAPPING ON OPPOSITE WALLS OF THE DUCT WILL BE PROVIDED FOR EACH 'CO' ANALYSER.
7. NECESSARY PURGING TO BE PROVIDED BY CONTRACTOR FOR PRESSURE/ FLOW MEASUREMENTS AS PER TECHNICAL SPECIFICATION SUB-SECTION M3 PCP, PART-B.
8. BIDDER/CONTRACTOR, IF REQUIRED, CAN PROVIDE ECONOMIZER BYPASS DUCT ALONG WITH NECESSARY GATES, EXPANSION JOINTS, STRUCTURES, ETC. MEETING THE ALL SIZING AND TECHNICAL REQUIREMENTS AS SPECIFIED IN TECHNICAL SPECIFICATIONS.
9. ACOUSTIC PYROMETER,ASLD,FURNACE AND FLAME VIEWING SYSTEMS SHALL BE PROVIDED AS PER SPECIFICATION REQUIREMENTS.
10. IN ADDITION TO INSTRUMENT INDICATED IN THE TENDER PID ANY OTHER INSTRUMENT WHICH ARE REQUIRED FOR CONTROL, INTERLOCKS AND PROTECTIONS OF BIDDER SUPPLIED BINARY AND MODULATING DRIVES AND MONITORING OF CRITICAL PARAMETERS SHALL BE IN THE SCOPE OF BIDDER.
11. SG (C&I) & BOP (C&I) PART OF DDCMIS ARE IN THE SCOPE OF CONTRACTOR. HOWEVER, CONNECTIONS OF INSTRUMENTS TO SG (C&I) & BOP(C&I) ARE INDICATIVE ONLY AND SHALL BE FINALISED DURING DETAILED ENGG. SUBJECT TO EMPLOYER'S APPROVAL.
12. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF CONTRACTOR.

$: Separate PTs are also acceptable at inlet and outlet of SH & RH heating zone instead of DPT indicated in this drawing.

FOR TENDER PURPOSE ONLY

NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1 X 800 MW)

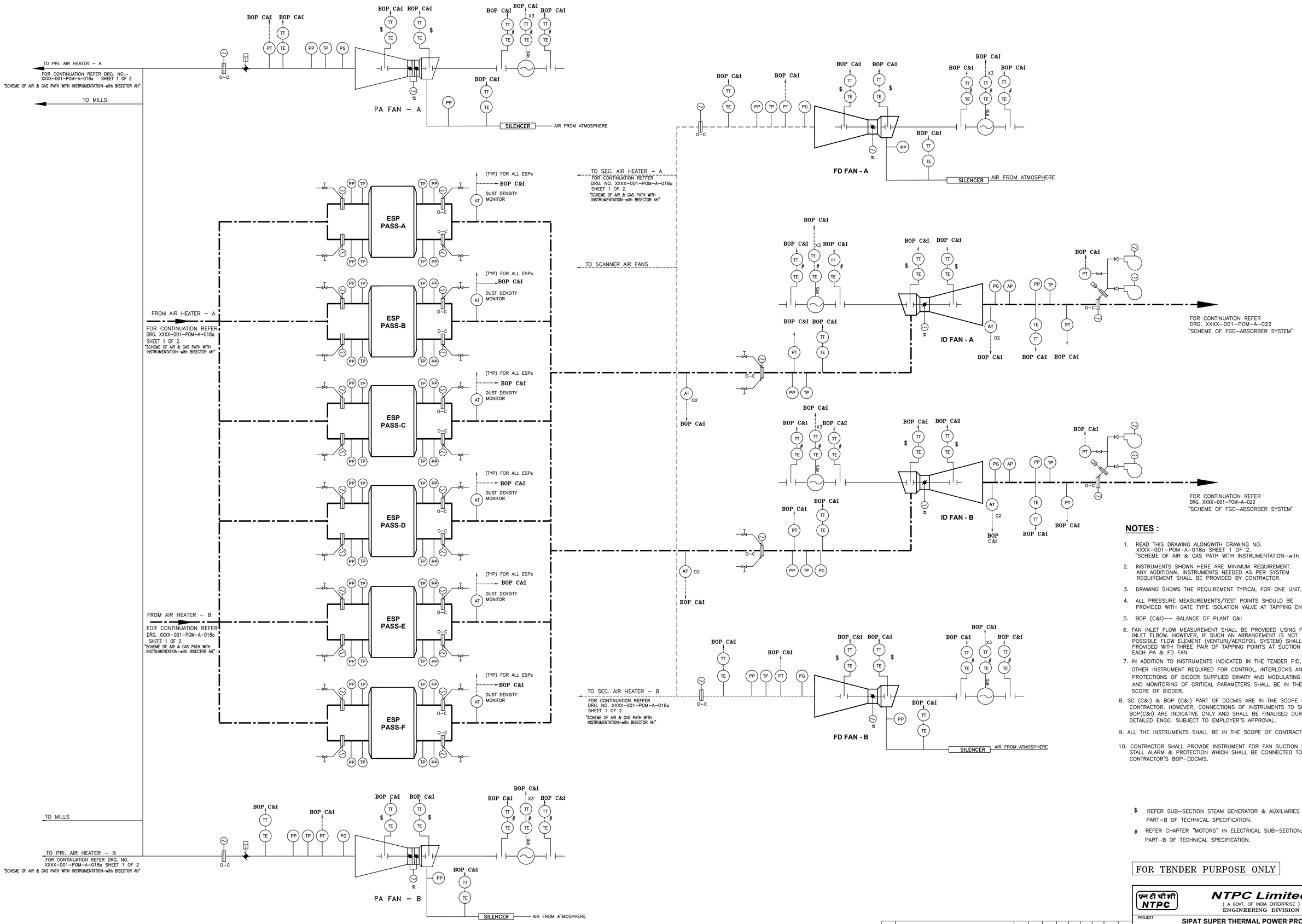
TITLE: SCHEME OF AIR & FLUE GAS PATH WITH INSTRUMENTATION (WITH BISECTOR AH)

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY C	CLEARED BY M	CLEARED BY E	CLEARED BY C&I	APPD	DATE
A	RELEASED FOR TENDER	AA	DA	DA						

SIZE: A1 | SCALE: ---- | DRG.NO.: XXXX-001-POM-A-018a | SHEET 1 OF 2 | REV.: B

cad file name : XXXX-001-POM-A-018a

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NOTES :

1. READ THIS DRAWING ALONGWITH DRAWING NO. XXXX–001–POM–A–018a SHEET 1 OF 2. "SCHEME OF AIR & GAS PATH WITH INSTRUMENTATION–with BISECTOR AH"
2. INSTRUMENTS SHOWN HERE ARE MINIMUM REQUIREMENT. ANY ADDITIONAL INSTRUMENTS NEEDED AS PER SYSTEM REQUIREMENT SHALL BE PROVIDED BY CONTRACTOR.
3. DRAWING SHOWS THE REQUIREMENT TYPICAL FOR ONE UNIT.
4. ALL PRESSURE MEASUREMENTS/TEST POINTS SHOULD BE PROVIDED WITH GATE TYPE ISOLATION VALVE AT TAPPING END.
5. BOP (C&I)–– BALANCE OF PLANT C&I
6. FAN INLET FLOW MEASUREMENT SHALL BE PROVIDED USING FAN INLET ELBOW. HOWEVER, IF SUCH AN ARRANGEMENT IS NOT POSSIBLE FLOW ELEMENT (VENTURI/AEROFOIL SYSTEM) SHALL BE PROVIDED WITH THREE PAIR OF TAPPING POINTS AT SUCTION OF EACH PA & FD FAN.
7. IN ADDITION TO INSTRUMENTS INDICATED IN THE TENDER PID, ANY OTHER INSTRUMENT REQUIRED FOR CONTROL, INTERLOCKS AND PROTECTIONS OF BIDDER SUPPLIED BINARY AND MODULATING DRIVES AND MONITORING OF CRITICAL PARAMETERS SHALL BE IN THE SCOPE OF BIDDER.
8. SG (C&I) & BOP (C&I) PART OF DDCMIS ARE IN THE SCOPE OF CONTRACTOR. HOWEVER, CONNECTIONS OF INSTRUMENTS TO SG (C&I) & BOP(C&I) ARE INDICATIVE ONLY AND SHALL BE FINALISED DURING DETAILED ENGG. SUBJECT TO EMPLOYER'S APPROVAL.
9. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF CONTRACTOR.
10. CONTRACTOR SHALL PROVIDE INSTRUMENT FOR FAN SUCTION FLOW AND STALL ALARM & PROTECTION WHICH SHALL BE CONNECTED TO CONTRACTOR'S BOP–DDCMIS.

$ REFER SUB–SECTION STEAM GENERATOR & AUXILIARIES PART–B OF TECHNICAL SPECIFICATION.

REFER CHAPTER "MOTORS" IN ELECTRICAL SUB–SECTION; PART–B OF TECHNICAL SPECIFICATION.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
A	RELEASED FOR TENDER	Rakesh	DA	DA						

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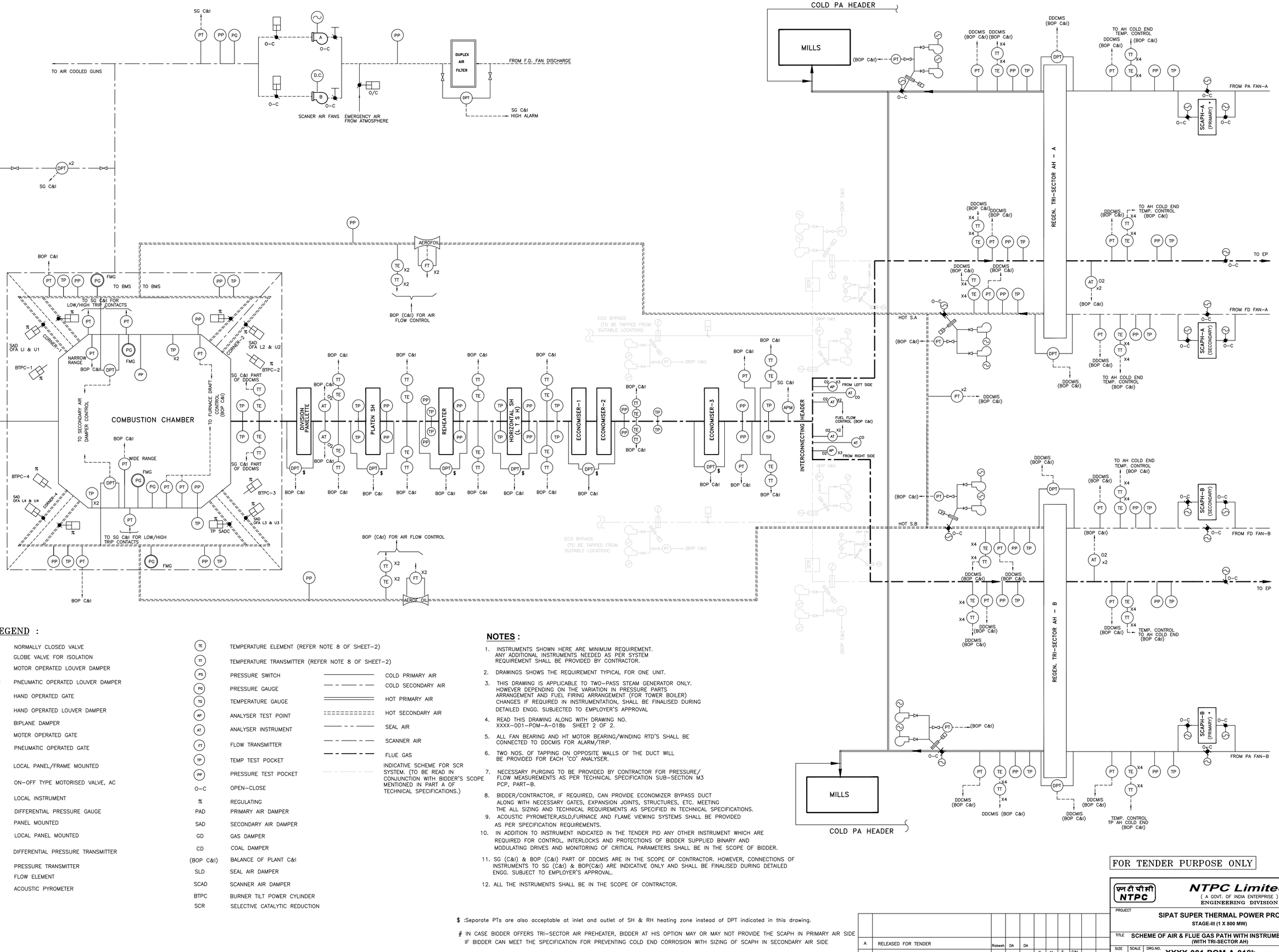
NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: **SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1X800MW)**

TITLE: **SCHEME OF AIR & FLUE GAS PATH WITH INSTRUMENTATION (WITH BISECTOR AH)**

SIZE	SCALE	DRG.NO.	SHEET	REV.
A1	SCALE	XXXX-001-POM-A-018a	SHEET 2 OF 2	B

cad file name : XXXX–001–POM–A–018a



LEGEND :

- NORMALLY CLOSED VALVE
- GLOBE VALVE FOR ISOLATION
- MOTOR OPERATED LOUVER DAMPER
- PNEUMATIC OPERATED LOUVER DAMPER
- HAND OPERATED GATE
- HAND OPERATED LOUVER DAMPER
- BIPLANE DAMPER
- MOTER OPERATED GATE
- PNEUMATIC OPERATED GATE
- LOCAL PANEL/FRAME MOUNTED
- ON–OFF TYPE MOTORISED VALVE, AC
- LOCAL INSTRUMENT
- DIFFERENTIAL PRESSURE GAUGE
- PANEL MOUNTED
- LOCAL PANEL MOUNTED
- DIFFERENTIAL PRESSURE TRANSMITTER
- PRESSURE TRANSMITTER
- FLOW ELEMENT
- ACOUSTIC PYROMETER

- TE — TEMPERATURE ELEMENT (REFER NOTE 8 OF SHEET–2)
- TT — TEMPERATURE TRANSMITTER (REFER NOTE 8 OF SHEET–2)
- PS — PRESSURE SWITCH
- PG — PRESSURE GAUGE
- TG — TEMPERATURE GAUGE
- AP — ANALYSER TEST POINT
- AT — ANALYSER INSTRUMENT
- FT — FLOW TRANSMITTER
- TP — TEMP TEST POCKET
- PP — PRESSURE TEST POCKET
- O–C — OPEN–CLOSE
- % — REGULATING
- PAD — PRIMARY AIR DAMPER
- SAD — SECONDARY AIR DAMPER
- GD — GAS DAMPER
- CD — COAL DAMPER
- (BOP C&I) — BALANCE OF PLANT C&I
- SLD — SEAL AIR DAMPER
- SCAD — SCANNER AIR DAMPER
- BTPC — BURNER TILT POWER CYLINDER
- SCR — SELECTIVE CATALYTIC REDUCTION

COLD PRIMARY AIR
COLD SECONDARY AIR
HOT PRIMARY AIR
HOT SECONDARY AIR
SEAL AIR
SCANNER AIR
FLUE GAS
INDICATIVE SCHEME FOR SCR SYSTEM. (TO BE READ IN CONJUNCTION WITH BIDDER'S SCOPE MENTIONED IN PART A OF TECHNICAL SPECIFICATIONS.)

NOTES :

1. INSTRUMENTS SHOWN HERE ARE MINIMUM REQUIREMENT. ANY ADDITIONAL INSTRUMENTS NEEDED AS PER SYSTEM REQUIREMENT SHALL BE PROVIDED BY CONTRACTOR.
2. DRAWINGS SHOWS THE REQUIREMENT TYPICAL FOR ONE UNIT.
3. THIS DRAWING IS APPLICABLE TO TWO–PASS STEAM GENERATOR ONLY. HOWEVER DEPENDING ON THE VARIATION IN PRESSURE PARTS ARRANGEMENT AND FUEL FIRING ARRANGEMENT (FOR TOWER BOILER) CHANGES IF REQUIRED IN INSTRUMENTATION, SHALL BE FINALISED DURING DETAILED ENGG. SUBJECTED TO EMPLOYER'S APPROVAL
4. READ THIS DRAWING ALONG WITH DRAWING NO. XXXX–001–POM–A–018b SHEET 2 OF 2.
5. ALL FAN BEARING AND HT MOTOR BEARING/WINDING RTD'S SHALL BE CONNECTED TO DDCMIS FOR ALARM/TRIP.
6. TWO NOS. OF TAPPING ON OPPOSITE WALLS OF THE DUCT WILL BE PROVIDED FOR EACH 'CO' ANALYSER.
7. NECESSARY PURGING TO BE PROVIDED BY CONTRACTOR FOR PRESSURE/ FLOW MEASUREMENTS AS PER TECHNICAL SPECIFICATION SUB–SECTION M3 PCP, PART–B.
8. BIDDER/CONTRACTOR, IF REQUIRED, CAN PROVIDE ECONOMIZER BYPASS DUCT ALONG WITH NECESSARY GATES, EXPANSION JOINTS, STRUCTURES, ETC. MEETING THE ALL SIZING AND TECHNICAL REQUIREMENTS AS SPECIFIED IN TECHNICAL SPECIFICATIONS.
9. ACOUSTIC PYROMETER,ASLD,FURNACE AND FLAME VIEWING SYSTEMS SHALL BE PROVIDED AS PER SPECIFICATION REQUIREMENTS.
10. IN ADDITION TO INSTRUMENT INDICATED IN THE TENDER PID ANY OTHER INSTRUMENT WHICH ARE REQUIRED FOR CONTROL, INTERLOCKS AND PROTECTIONS OF BIDDER SUPPLIED BINARY AND MODULATING DRIVES AND MONITORING OF CRITICAL PARAMETERS SHALL BE IN THE SCOPE OF BIDDER.
11. SG (C&I) & BOP (C&I) PART OF DDCMIS ARE IN THE SCOPE OF CONTRACTOR. HOWEVER, CONNECTIONS OF INSTRUMENTS TO SG (C&I) & BOP(C&I) ARE INDICATIVE ONLY AND SHALL BE FINALISED DURING DETAILED ENGG. SUBJECT TO EMPLOYER'S APPROVAL.
12. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF CONTRACTOR.

$:Separate PTs are also acceptable at inlet and outlet of SH & RH heating zone instead of DPT indicated in this drawing.

IN CASE BIDDER OFFERS TRI–SECTOR AIR PREHEATER, BIDDER AT HIS OPTION MAY OR MAY NOT PROVIDE THE SCAPH IN PRIMARY AIR SIDE IF BIDDER CAN MEET THE SPECIFICATION FOR PREVENTING COLD END CORROSION WITH SIZING OF SCAPH IN SECONDARY AIR SIDE

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REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY C	M	E	C&I	APPD	DATE
A	RELEASED FOR TENDER	Rakesh	DA	DA						

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PROJECT: SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1 X 800 MW)

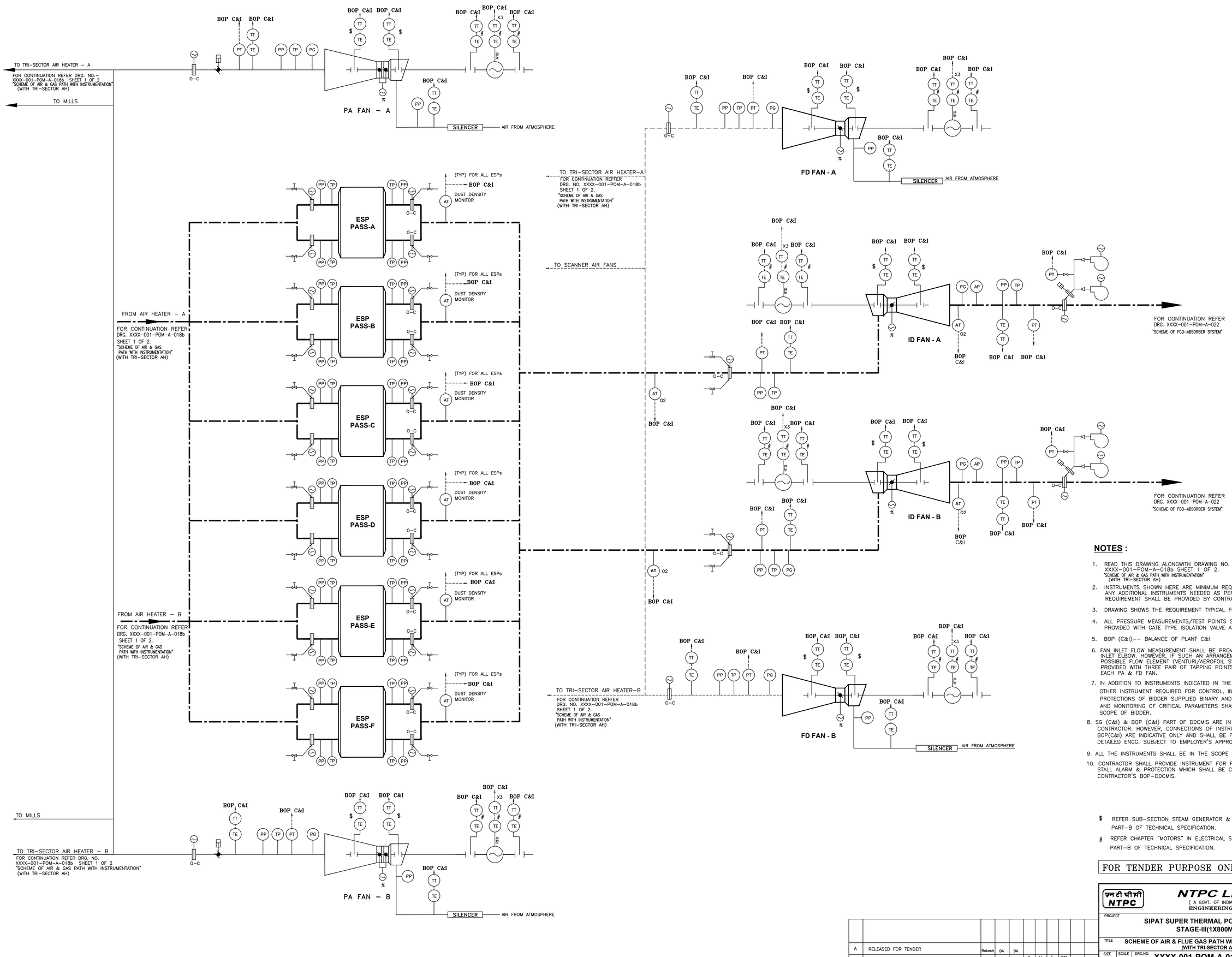
TITLE: SCHEME OF AIR & FLUE GAS PATH WITH INSTRUMENTATION (WITH TRI-SECTOR AH)

SIZE	SCALE	DRG.NO.	REV.
A1	---	XXXX-001-POM-A-018b SHEET 1 OF 2	B

cad file name : XXXX–001–POM–A–018b

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NOTES :

1. READ THIS DRAWING ALONGWITH DRAWING NO. XXXX-001-POM-A-018b SHEET 1 OF 2. "SCHEME OF AIR & GAS PATH WITH INSTRUMENTATION" (WITH TRI-SECTOR AH)
2. INSTRUMENTS SHOWN HERE ARE MINIMUM REQUIREMENT. ANY ADDITIONAL INSTRUMENTS NEEDED AS PER SYSTEM REQUIREMENT SHALL BE PROVIDED BY CONTRACTOR.
3. DRAWING SHOWS THE REQUIREMENT TYPICAL FOR ONE UNIT.
4. ALL PRESSURE MEASUREMENTS/TEST POINTS SHOULD BE PROVIDED WITH GATE TYPE ISOLATION VALVE AT TAPPING END.
5. BOP (C&I)-- BALANCE OF PLANT C&I
6. FAN INLET FLOW MEASUREMENT SHALL BE PROVIDED USING FAN INLET ELBOW. HOWEVER, IF SUCH AN ARRANGEMENT IS NOT POSSIBLE FLOW ELEMENT (VENTURI/AEROFOIL SYSTEM) SHALL BE PROVIDED WITH THREE PAIR OF TAPPING POINTS AT SUCTION OF EACH PA & FD FAN.
7. IN ADDITION TO INSTRUMENTS INDICATED IN THE TENDER PID, ANY OTHER INSTRUMENT REQUIRED FOR CONTROL, INTERLOCKS AND PROTECTIONS OF BIDDER SUPPLIED BINARY AND MODULATING DRIVES AND MONITORING OF CRITICAL PARAMETERS SHALL BE IN THE SCOPE OF BIDDER.
8. SG (C&I) & BOP (C&I) PART OF DDCMIS ARE IN THE SCOPE OF CONTRACTOR. HOWEVER, CONNECTIONS OF INSTRUMENTS TO SG (C&I) & BOP(C&I) ARE INDICATIVE ONLY AND SHALL BE FINALISED DURING DETAILED ENGG. SUBJECT TO EMPLOYER'S APPROVAL.
9. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF CONTRACTOR.
10. CONTRACTOR SHALL PROVIDE INSTRUMENT FOR FAN SUCTION FLOW AND STALL ALARM & PROTECTION WHICH SHALL BE CONNECTED TO CONTRACTOR'S BOP-DDCMIS.

$ REFER SUB-SECTION STEAM GENERATOR & AUXILIARIES PART-B OF TECHNICAL SPECIFICATION.

REFER CHAPTER "MOTORS" IN ELECTRICAL SUB-SECTION; PART-B OF TECHNICAL SPECIFICATION.

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REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
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ENGINEERING DIVISION

PROJECT: **SIPAT SUPER THERMAL POWER PROJECT STAGE-III(1X800MW)**

TITLE: **SCHEME OF AIR & FLUE GAS PATH WITH INSTRUMENTATION (WITH TRI-SECTOR AH)**

SIZE	SCALE	DRG.NO.	SHEET	REV.
A1	---	XXXX-001-POM-A-018b	SHEET 2 OF 2	B

cad file name :

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LEGEND :

	PUMP
	AIR COMPRESSOR
	NON RETURN VALVE
	MANUAL GATE VALVE(OPEN)
	MANUAL GATE VALVE(CLOSED)
	MOTORISED GATE VALVE(OPEN)
	MOTORISED GATE VALVE(CLOSED)
	MOTORISED GATE
	AGITATOR
	PNEUMATIC CONTROL VALVE
	PNEUMATIC OPERATED BI-PLANE DAMPER
	MOTOR OPERATED LOUVER DAMPER
	PNEUMATIC OPERATED LOUVER DAMPER
	PNEUMATIC OPERATED PINCH CONTROL VALVE
	KNIFE GATE/BUTTERFLY VALVE
	FAN
	HEATER
	PNEUMATIC GATE
	PNEUMATIC OPERATED
	MOTORIZED

TG	TEMPERATURE GAUGE
TE	TEMPERATURE ELEMENT
PI	PRESSURE INDICATOR
PT	PRESSURE TRANSMITTER
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DPI	DIFFERENTIAL PRESSURE INDICATOR
FT	FLOE TRANSMITTER
LT	LEVEL TRANSMITTER
AT	ANALYSER INSTRUMENT
VT	VIBRATION TRANSDUCER
DM	DENSITY MONITOR
PH	PH ANALYSER

	PROCESS WATER
	FILTRATE
	CRUSHED LIMESTONE
	GYPSUM SLURRY
	RECIRCULATION SLURRY
	AIR
	GAS
	VACUUM

REFER P&ID OF AIR & FLUE GAS SYSTEM (XXXX-001-POM-A-018a/018b) FOR MORE DETAILS

ID FAN-B

ID FAN-A

TYPICAL FOR ONE UNIT

CHIMNEY

CEMS ANALYSER

SEAL AIR SYSTEM

SEAL AIR SYSTEM

SEAL AIR SYSTEM

EMERGENCY WATER TANK

FROM PROCESS WATER PUMP (FOR CONTINUATION SEE DRG. NO. XXXX-001-POM-A-024)

NORMAL QUENCH SYSTEM

FROM FILTRATE WATER PUMP (FOR CONTINUATION SEE DRG. NO. 1150-001-POM-A-024)

FROM PROCESS WATER PUMP (FOR CONTINUATION SEE DRG. NO. XXXX-001-POM-A-024)

FROM LIMESTONE SLURRY PUMP (FOR CONTINUATION SEE DRG. NO. XXXX-001-POM-A-023)

TO GYPSUM DEWATERING SYSTEM (FOR CONTINUATION SEE DRG. NO. XXXX-001-POM-A-024)

GYPSUM BLEED PUMPS (2x100%)

MIST ELIMINATORS

FROM MIST ELUMINATION WASH WATER PUMPS (FOR CONTINUATION SEE DRG. NO. XXXX-001-POM-A-024)

SLURRY PIPING & PUMPS FLUSHING SYSTEM

ABSORBER

SLURRY RECIRCULATION PUMPS

OXIDATION TANK

SLURRY PIPING & PUMPS FLUSHING SYSTEM

TYPICAL FOR EACH PUMP

TYPICAL FOR EACH BLOWER/COMPRESSOR

OXIDATION AIR BLOWER/COMPRESSOR

FROM PROCESS WATER PUMP (FOR CONTINUATION SEE DRG. NO. XXXX-001-POM-A-024)

TO ABSORBER

DRAINAGE

ABSORBER AREA SUMP

NOTES

1. THE SCHEME SHALL BE FINALIZED DURING DETAILED ENGINEERING BASED ON SPECIFICATION AND SYSTEM REQUIREMENT.
2. ANY EQUIPMENT / VALVE / PIPE NOT SHOWN IN THE DRAWING BUT REQUIRED FOR COMPLETION OF THE SYSTEM SHALL BE INCLUDED IN THE SCOPE OF THE CONTRACTOR.
3. NUMBER OF AGITATORS / SLURRY SPRAY LEVELS/PUMPS SHALL BE AS PER THE CONTRACTOR'S PROVEN PRACTICE WITH REDUNDANCIES AS STIPULATED IN THE SPECIFICATION.
4. UTILITES LIKE COOLING WATER, SERVICE WATER, INSTRUMENT AIR, SERVICE AIR, AUXILIARY STEAM SHALL BE PROVIDED TO THE CONTRACTOR AT EMPLOYER'S TERMINAL POINT AS ELABORATED IN SUB-SECTION:IV, PART-A, SECTION-VI OF THE SPECIFICATION. ALL PIPING/SYSTEM FROM THE TERMINAL POINT SHALL BE IN THE CONTRACTOR'S SCOPE.
5. ALL INSTRUMENTS SHALL BE PROVIDED WITH ISOLATION VALVES.
6. ALL INSTRUMENTS IN SLURRY LINES SHALL BE PROVIDED ISOLATION VALVES AND DIAPHRAGM.
7. ALL TEMPERTURE ELEMENTS (TEs) SHALL BE PROVIDED WITH TEMPERATURE TRANSMITERS.
8. ONLY ULTRASONIC/RADAR TYPE LEVEL TRANSMITTER SHALL BE PROVIDED FOR SLURRY TANK/SUMPS.
9. ALL MANUAL PUMP SUCTION VALVES SHALL BE PROVIDED WITH OPEN LIMIT SWITCHES.
10. ALL SLURRY TANKS SHALL BE PROVIDED WITH FIELD INDICATORS FOR LOCAL LEVEL INDICATION AND OTHER TANKS SHALL BE PROVIDED WITH LEVEL GAUGES FOR LOCAL LEVEL INDICATION.
11. PROPER DRAINAGE AND WATER WASHING ARRANGEMENT AS PER CONTRACTOR'S PROVEN PRACTICE SHALL BE PROVIDED.
12. PROVISION FOR FLUSHING OF SLURRY PIPING/VALVES/PUMPS & DRAIN SYSTEM ETC. SHALL BE PROVIDED.
13. FGD INLET, OUTLET AND BYPASS DAMPERS SHALL BE CONTROLLED FROM UNIT-BOP PART OF DDCMIS.
14. IN CASE THE CONTRACTOR OFFERS A CENTRIFUGAL TYPE COMPRESSOR A MOTORIZED VALVE/GATE SHELL BE PPROVIDED AT THE DISCHARGE OF EACH COMPRESSOR.
15. CONTRACTOR SHALL ENSURE THE SIGNALS TO BE EXCHANGED WITH SG/BOP-DDCMIS FOR SAFE AND SATISFACTORY OPERATION OF FGD SYSTEM.
16. * AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC CAN BE PROVIDED.
17. BIDDER CAN OFFER A PNEUMATIC/MOTORIZED KNIFE GATE OF LEAKAGE CLASS VI ALONG WITH MANUAL KNIFE GATE AS AN ALTERNATE ARRANGEMENT TO THE INDICATED SCHEME.
18. $ AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC OPERATED ON/OFF TYPE DIAPHRAGM VALVE CAN BE PROVIDED.

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NTPC LTD.
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ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-III(1X800MW)

TITLE: SCHEME OF FGD-ABSORBER SYSTEM

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ARCH	APPD.	DATE
A	FOR TENDER PURPOSE ONLY	Rakesh	DA								

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SIZE	SCALE	DRG NO.	REV. NO.
A-1		XXXX-001-POM-A-022	B

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CRUSHED LIMESTONE FROM LIMESTONE HANDLING PLANT

LIMESTONE SILO – A **

LIMESTONE SILO – B **

LIMESTONE TO MILL–B

FROM FILTRATE WATER PUMPS (FOR CONTINUATION SEE DRG. NO. XXXX–001–POM–A–024)

FROM MILL–A

FROM MILL–B

LIMESTONE MILLING SYSTEM

FEEDER–A

MILL HYDROCYCLONE – A

LIMESTONE BALL MILL – A along with LOS

GEAR BOX

MAIN MOTOR

AUXILIARY MOTOR

MILL SEPERATOR TANK

MILL CIRCUIT PUMP (2x100%)

LIMESTONE SLURRY STORAGE TANK

LIMESTONE SLURRY PUMP (2x100%)

TO ABSORBER
REFER DRG. NO. XXXX–001–POM–A–022

TYPICAL FOR ONE LIMESTONE SLURRY STORAGE TANK

SLURRY PIPING & PUMP FLUSHING SYSTEM

DRAINAGE

LIMESTONE GRINDING AREA SUMP

FROM PROCESS WATER PUMPS (FOR CONTINUATION SEE DRG. NO. XXXX–001–POM–A–024)

NOTES

1. FOR NOTES AND LEGENDS SEE DRAWING NO. XXXX–001–POM–A–022. LOS–LUBE OIL SYSTEM AS DETAILED IN TECHNICAL SPECIFICATION.
2. FACILITIES SHALL BE PROVIDED FOR UNLODING THE BUNKER THROUGH FEEDER.
   ** EACH SILO SHALL BE PROVIDED WITH SS LINING IN CONICAL PORTION, LEVEL TRANSMITTERS, AIR CANONS, BAG FILTER SYSTEM, ETC. AS DETAILED IN PART–B, SECTION–IV OF TECHNICAL SPECIFICATIONS.
3. $ AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC OPERATED ON/OFF TYPE DIAPHRAGM VALVE CAN BE PROVIDED.
4. * AS PER THE BIDDER'S PROVEN PRACTICE, PNEUMATIC CAN BE PROVIDED.

TYPICAL ARRANGEMENT ONE LIMESTONE MILL

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NTPC LTD.
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ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE–III(1X800MW)

TITLE: SCHEME OF FGD MILLING SYSTEM

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY	APPD.	DATE
A	FOR TENDER PURPOSE ONLY	Rakesh	AD	SP	M E C C&I ARCH		

SIZE	SCALE	DRG NO.	REV. NO.
A–1		XXXX–001–POM–A–023	B

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FROM GYPSUM BLEED PUMP
(REFER DRG. NO. XXXX-001-POM-A-022)

PRIMARY HYDROCYCLONE FEED TANK

TO OTHER HYDROCYCLONE / BELT FILTERS

To auxiliary Absorbent Tank

TO FILTRATE WATER TANK
ALTERNETIVELY TO ABSORBER

PRIMARY HYDROCYCLONE

SECONDARY HYDROCYCLONE FEED TANK

SECONDARY WASTE WATER HYDROCYCLONE X2

LIME FEEDING SYSTEM

PROCESS WATER LINE

LIME SOLUTION TANK

RECIRULATION CUM MIXING

WASTE WATER TANK

WASTE WATER TREATMENT SYSTEM

REFER SPECIFICATION FOR TERMINAL POINT

SEE NOTE-2

VACUUM BELT FILTERS

CLARIFIED WATER

CAKE WASH WATER TANK

TO GYPSUM HANDLING SYSTEM

AIR DISCHARGE

VACUUM PUMP SEAL

VACUUM PUMP

RECEIVER TANK

BOOSTER PUMPS (2x100%)

LEVEL CONTROL STATION FOR TANK

CW BLOWDOWN

PROCESS WATER TANK-2

Emergency spray system
in bypass duct
Cake wash water
Absorber process needs
To normal flue gas
quenching system
To Limestone slurry
Preparation system
Flushing system header
& other process needs

PROCESS WATER PUMPS

WATER

PROCESS WATER TANK-1

Mist Ellminator Wash Water Pumps

To Mist Ellminator
Washing System
(REFER DRG. NO.
XXXX-001-POM-A-022)

TYPICAL FOR 1x100%

TYPICAL ARRANGEMENT FOR ONE VACUUM BELT FILTER

TO ABSORBERS
(REFER DRG. NO. XXXX-001-POM-A-022)

(FOR CONTINUATION SEE DRG. NO. XXXX-001-POM-A-023)

FILTRATE WATER PUMPS (2x100%)

FILTRATE TANK

BELT FILTER WASH WATER PUMP

DRAINAGE

GYSPUM DEWATERING AREA SUMP

NOTES

1. FOR NOTES AND LEGEND SEE DRAWING NUMBER XXXX-001-POM-A-022.
2. ARRANGEMENT FOR CAKE AND CLOTH WASHING SYSTEM INDICATED IS TYPICAL. CONTRACTOR MAY OFFER AN ALTERNATE SYSTEM AS PER HIS PROVEN PRACTICE.
3. FLUSHING SYSTEM FOR FILTRATE & WASTE WATER SYSTEM IF REQUIRED SHALL BE PROVIDED BY THE CONTRACTOR.
4. LIME STORAGE AND FEEDING SYSTEM IS ALSO TO BE PROVIDED BY THE CONTRACTOR.
5. * AS PER THE BIDDER PROVEN PRACTICE PNEUMATIC CAN BE PROVIDED.

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD.	DATE
A	FOR TENDER PURPOSE ONLY	Rakesh				

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NTPC Limited
(A Government of India Enterprise)
ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-III(1X800MW)

TITLE: SCHEME OF GYPSUM DEWATERING SYSTEM

SIZE	SCALE	DRG NO.	REV. NO.
A-1		XXXX-001-POM-A-024	B

SAFETY MODULE

1.00.00 GENERAL

1.01.00 All equipment furnished by the Contractor shall be complete in every respect, with all mountings, fittings, fixtures and standard accessories normally provided with such equipment and/or those needed for erection, commissioning and safe operation of the equipment and for the safety of the operating personnel, as required by applicable codes.

All equipment shall be 'fail safe' in any conditions.

1.02.00 CODES AND STANDARDS

Technical specification stipulates compliance to applicable statutory regulations and safety codes of India as well as of the locality where those will be installed. In particular, the CHP shall conform to the latest edition of the following standards, rules, acts.

- NTPC Safety Rules for Construction and Erection
- NTPC Safety Policy
- IS:7155 : Codes of Practice for Conveyor Safety.
- ASME B20.1 "Safety Standard for Conveyors and Related Equipment".
- ASME Standard B15.1 "Safety Standard for Mechanical Power Transmission Apparatus"
- ISO 7149, " Continuous handling Equipment-Safety Code-Special Rule"
- ISO 12944 - Corrosion protection of steel structures
- IS:3764 EXCAVATION WORK CODE OF SAFETY
- Occupational Safety and Health Administration- Guidelines
- CEMA Publication No. 201, " Safety Label Brochure"
- IE (Indian Electricity) Rules and Acts

2.00.00 GENERAL SAFETY REQUIREMNT FOR COAL/LIMESTONE/GYPSUM HANDLING PLANT

2.01.00 **CONVEYING SYSTEM**

Belt conveyors' safety generally begins with sound design that, as far as is practical, avoids foreseeable dangers and hazards. Diligence in safety considerations must be applied during the course of design, engineering, manufacture, installation, and establishment of operation and maintenance policies and procedures. Important aspects of conveyor safety are elaborated as follows:

2.01.01 Safety devices- Pull cord switches, belt sway switches, zero speed switches, and plugged chute switches are to be provided on conveyors to provide maximum protection to both personnel and equipment.

2.01.02 Conveyor Take up- Two (2) meter safety fencing along with suitable gate and locking arrangement shall be provided around gravity take-up at the base level / ground level. In

	case of double stream conveyors, a partition of 3.15 mm steel plate shall be provided between the two take-up pulleys along entire travel zone of take-up pulleys. Intermediate platforms shall be provided in the take-up zone for maintenance of take - up pulleys / counter weight.
2.01.03	Pulleys- Suitable guards shall be provided for all tail pulleys and bend pulleys for safety of operating personnel.
2.01.04	Conveyor Bridges- Seal plates throughout the length of the conveyor gallery to be provided in such a way that complete gallery's bottom surface area forms a single water proof floor and no water / coal/Limestone falls down from conveyor gallery. Safety Handrails to be provided all along walkways along with toe guard. In case of conveyor angle is more than 10 deg, stepped walkways are to be provided along the conveyor.
2.01.05	Fire Fighting- Structures and floors shall be so designed as to provide suitable space for routing of firefighting pipe with water, cables and conduits. Firefighting arrangement is to be provided as specified elsewhere in technical specification. Fire Escape provision along with cage ladder to be provided on each trestle.
2.01.06	Movable discharge pulleys and movable belt feeders- The complete discharge pulley movement area shall be covered with proper sealing arrangement. The discharge chute opening shall be provided with proper handrails for the safety purpose. Suitable rotating strobe lights and siren on mobile equipment shall be provided to warn personnel at the time of operation.
2.01.07	Hooter alarm is to be activated before the start of conveyor/ equipment. The operating staff is cautioned and would stay away from the vicinity of conveyor. The beacon lamp is activated simultaneously with the starting of conveyor. The same is to be incorporated in control philosophy.
2.01.08	Manual Stone Picking arrangement at a suitable location in the conveyor gallery before the crusher house shall be provided complete with platforms, overhead lighting, handrailings, suitable seating with good ergonomic arrangement, safety hook & holding arrangement/ safety belt for manual pickers, disposal chutes to ground level etc. Suitable provision of alarm in conveyor gallery to be provided for non-compliance with applying of safety hook and safety belts by stone pickers.
2.01.09	All movable parts giving access through mechanical handling equipment shall be designed so that they cannot be opened whilst the equipment is working.
2.01.10	All the lubrication points used frequently shall be accessible without it being necessary to remove the guards.
2.01.11	It is recommended that equipment be so designed that cleaning is facilitated.
2.01.12	Overhead gantry portion of road and rail crossings, walkways, galleries, work places under the overhead conveyors used by the personnel, shall be protected by means of suitable covering such as plates/steel sheet covers to prevent falling of the material/objects over such areas/personnel.

2.01.13	Gangways, hand-rails, staircases, ladders, guards, etc shall be erected before the installation is put into service.
2.01.14	The gallery should as far as possible be erected as a box section keeping all the vertical and horizontal bracing tied in proper position. The gallery should be checked for all erection stresses that are likely to develop during handling and erection and if required, temporary strengthening of gallery members during erection shall be made.
2.01.15	Coal conveying tunnels shall be provided with fire escape at every 50 m in case of tunnel length length exceeds 100m.
2.02.00	**CHP/LHP/GHP BUILDINGS**
2.02.01	The design and construction of CHP Buildings shall comply with all the currently applicable statutes, regulations and safety codes in the locality where the equipment is to be installed.
2.02.02	All CHP buildings shall have sufficient space to accommodate all equipment and ample space shall be provided for maintenance purposes. The clear space around equipment to be maintained minimum 1200 mm for ease of maintenance and man movement safely.
2.02.03	Openings and edges in the floors of MH buildings (i.e. TPs/CH etc.) shall be provided with curb of 100 mm high along **with top of handrails and toe guard** at 1200 mm for safety purpose.
2.02.04	Necessary facilities for ventilation of track hopper, tunnels, underground buildings, control/MCC rooms, WT control room and Bunker bay shall be provided as specified elsewhere.
2.02.05	External fire escape stair case along with internal staircase shall be provided for all MCC/ control rooms & Crusher house. External staircases shall be provided for all transfer points. All buildings shall have the fire protection provisions to meet TAC and IS – 3034 regulations.
2.02.06	All stairs of over and underground portion of transfer houses & crusher house shall be of minimum 1200 mm wide and maximum rise should not be more than 180 mm with safety Handrails of 1200 mm all along the flight to protect fall protection. Numbers and arrangement (including enclosures etc.) of stair cases shall be such as to meet the fire safety requirement as per guide lines of statutory regulatory bodies. Minimum headroom in all staircases and all levels shall be 2200 mm from floor finish level.
2.02.07	Staircase with minimum width of 1200 mm shall be provided for approach to elevated structures at 5m height from the nearest platform. Below this height a vertical cage ladder with minimum clear width of 600 mm may also be acceptable. Proper Clear headroom of 2200 mm on all maintenance platforms to be provided. Handrails of minimum 1500 mm height, are to be provided around all maintenance platforms.
2.02.08	Safety chain or handrails or side sheeting to be provided up to working safe level near Monorail doors at sides of Transfer towers/VGTU's.

2.02.09	Monorail Hoist for handling of equipment weighing more than 500 kg is to be provided.
2.02.10	Extent of the RCC floor in CHP buildings (i.e. TPs/CH etc.) shall flush with the cladding.
2.02.11	Deck sheet should be placed in such a way so that deck sheet profile should be along shorter direction.
2.02.11	Loading/ Unloading zones in CHP buildings (TPs/CHs) shall be marked permanently for identification of zone and capacity.
2.02.12	Erection shall be done as per approved erection scheme. Erection of bracing/ties elements simultaneously along with column/beam elements is very essential for stability of structure and transfer of lateral load both at the completed and under erection stage.
2.02.13	Any excavation greater than 1.5 m shall be planned as per 'IS 3764 - *Excavation Work Code Of Safety*'.
2.03.00	**WAGON TIPPLER & ASSOCIATED SYSTEM-Not applicable**
2.04.00	**TRACK HOPPER & ASSOCIATE SYSTEM-Not applicable**
2.05.00	**STOCKYARD AREA- Not applicable**
2.06.00	**Tripper Floor**
2.06.01	Provision shall be kept for automatic tripping of bunker bay conveyor in the event of travelling tripper getting dragged (i.e. travel speed in excess of rated speed). Emergency push button to be provided on tripper floor.
2.06.02	Wheels or rollers of travelling conveyors and of additional travelling equipment shall be guarded at points accessible to personnel under normal working conditions.
2.06.03	Whenever an operator remains on the travelling equipment, a platform shall be provided and be so designed as to prevent any accidental contact with mobile components or any part of the fixed installation.
2.06.04	When mobile appliances or equipment travel, warning devices, audio as well as visual, shall be provided.
3.00.00	**Electrical Safety** 1. Electrical Insulation mats in front of every switchgear/MCC shall be provided as per relevant Indian standards. ~~2.~~ All trailing cables/festooning arrangement in trippers, hoists etc., shall be easily accessible with proper approach for operation & maintenance people. 3. All electrical/switchgear buildings shall have necessary electrical and general safety instruction charts, Caution/Danger safety labels, properly insulated tools and accessories for handling electrical equipment.

4. Earthing and Lightning protection of all buildings/equipment shall be as per latest electrical acts / rules/ amendments / guidelines.
5. All lighting fixtures in TPs, Crusher house shall be wall mounted type and shall be easily accessible with proper approach for operation & maintenance people.
6. "Earth mat of CHP area" shall be connected to nearest "main plant area earth mat" at minimum of two locations. All buildings/structures shall be interconnected together by minimum two parallel conductors.
7. Minimum Safety clearances for electrical apparatus as per BIS (Bureau of Indian Standard) shall be maintained so that sufficient space is available for easy operation and maintenance without any hazard to the operating and maintenance personnel working near the equipment and for ensuring adequate ventilation. However, any additional stringent requirement for clearance specified elsewhere in the specifications shall prevail.
8. Where a transformer or transformers are used, suitable provision shall be made, either by connecting with earth, a point of the circuit at the lower voltage or otherwise, to guard against the danger by reason of the said circuit becoming accidentally charged above its normal voltage by leakage from or contact with the circuit at the higher voltage.
9. Where the oil filled transformers with capacity more than 2000litres are installed, suitable baffle walls of four hours fire rating shall be provided.
10. Only dry type transformers shall be used inside the buildings.
11. Transformers having capacity more than 10MVA capacity and more than 2000 liters of oil are to be provided with firefighting system as per IS-3034:1993 or with Nitrogen Injection Fire Protection System.
12. All switchgear /MCC shall be "Closed door" operation type.
13. Metallic frame of all electrical equipment shall be earthed by two separate and distinct connections to earthing system, each of 100% capacity. Crane rails, tracks, metal pipes and conduits shall also be effectively earthed at two points. Steel RCC columns, metallic stairs and rails etc., of the building housing electrical equipment shall be connected to the nearby earthing grid conductor by one earthing ensured by bonding the different sections of hand rails and metallic stairs.
14. All switchgear room shall have minimum two exit doors suitable for two hours of fire rating.
15. All cable shall be Fire Retardant Low Smoke (FRLS) type having minimum two hours of fire rating.
16. All cable trestles and trenches shall have a minimum of clear 600mm walkway for ease of accessibility.
17. All cables shall be segregated by voltage wise as HV/MV/LV/Control/ instrumentation type and a minimum of 300mm clearances shall be maintained between cable trays of each type.
18. Fire buckets filled with clean dry sand and ready for immediate use for extinguishing fires, in addition to fire extinguishers suitable for dealing with fires, shall be conspicuously marked and kept in convenient locations in the electrical buildings.
19. First aid boxes or cup boards conspicuously marked and equipped with such contents as the state government may specify shall be provided and maintained in each electrical building.
20. Instruction chart for resuscitation of persons suffering from electric shock in English or Hindi and the local language of the district shall be affixed in a conspicuous location in electrical buildings. (where Hindi is local language it shall be in English and Hindi).

21. Adequate number of gas masks shall be provided in each electrical building.
22. Adequate precautions shall be taken to ensure that no live parts are so exposed as to cause danger.
23. All equipment shall be conspicuously marked and identified.
24. Permanent metallic (MS) ladders shall be provided to access walkway at every 100 meters of cable trestle.
25. Suitable Earth flat shall be laid along the cable trays and connected to nearest earth riser at every 50 meters.
26. All push button stations in CHP area shall be IP65 degree of ingress protection.
27. Lighting fixtures and lamps shall meet the illumination lux levels of different areas as specified elsewhere and all areas shall have aesthetically pleasing and glare free illumination.
28. Minimum twelve (12) nos of lighting masts shall be provided for coal stockyard and Wagon Tippler area illumination.
29. Battery rooms shall have relevant acid/alkali resistant flooring and skirting. Ventilation fans in battery rooms shall be flame proof type. An easily accessible wash basin with mirror shall be provided in the battery room.
30. All outgoing feeders of lighting panels shall have suitable earth fault protection devices (ELCB/RCCB)
31. All welding receptacles shall have suitable ELCB/RCCB.
32. CHP 220V DC system shall be separate and independent from other DC systems of plant. The DC emergency lighting fixtures shall be fed from bidder's 220 V LDBs through DC lighting panels so that tracing and isolation of DC earth fault is convenient. Each switchgear/MCC room shall have a DC LDB and corresponding LPs.
33. The DC emergency lighting fixtures shall be mounted suitably on wall/columns at strategic locations for safe movement of operating personnel and access to important control points during an emergency, when the normal AC lighting system fails. The supply to the DC lighting panels shall be automatically switched on in case of loss of AC supply. The DC supply will be automatically switched off after about 3 minutes following the restoration of AC lighting system.
34. 100W,220V incandescent (or equivalent LED) DC Emergency lighting shall be provided (as applicable) as follows:

    One (1) no. in each local control area

    Three (3) nos. in each MCC/ Switchgear room and control room

    One (1) no in each office room and each pump house

    Six (6) nos. in Track hopper shed

    Twelve (12) nos in track hopper tunnels

    Two (2) nos in each underground portion of TPs

    0ne (1) no at every 5.0m height interval in the staircases of various TPs and buildings under contractor’s scope

    One (1) no in each drive floor in each TP under contractor’s scope

    Eight (8) nos in wagon tippler tunnel

35. Four (4) nos. 240V AC lighting fixtures fed from UPS shall be provided on each stacker re-claimer machine as emergency lighting.
36. MCCs located on the Stacker re-claimer, paddle feeders, travelling trippers shall be fixed type, compartmentalized, single front and suitable for the system fault level.
37. Degree of protection for the MCCs mounted on paddle feeders and travelling trippers shall be IP-65.
38. All motors shall be provided with coupling guards.

4.00.00 Control & Instrumentation Safety (as applicable)

a. Area classification should be done for CHP to identify Hazardous area if any and instrumentation to be upgraded accordingly.
b. All the instruments and actuators mounting shall be reachable for maintenance or suitable platform/ arrangement shall be provided for maintenance.
c. Contractor shall comply all AERB requirements for nucleonic instruments like Coal Analysers (if applicable) and provide suitable symbols/ sign boards in all the relevant locations.
d. In this package unmanned operation of Stacker/ Reclaimer has been envisaged. Contractor shall provide all the safety systems for safe operation of un-manned operation of Stacker / Reclaimer considering the safety of man and machine.
e. Contractor shall provide specific marking on the protective devices like EPBs in field.
f. CCTV analytics shall be suitably utilized for safe operation of planned and human safety.
g. In CHP DDCMIS fail safe single command philosophy is implemented. Therefore, in case of failure of DDCMIS in any set of controller, set of power supply, set of communication modules, set of RIO link then complete CHP conveying system should take safe shutdown.
h. In case of Fire Alarm Panel Sensing Fire in any area of CHP, Emergency shutdown is activated from Controller End for complete system
i. Draw out console containing Emergency Stop Push Button for all major drives shall be used for complete system shutdown in case of DDCMIS failure.

5.00.00 Safety Labels:

Safety Labels and Placement Guidelines to be provided Prior to operating the conveyor or any of the associated accessories or equipment, all safety markings, guards and warnings must be in place in accordance with governmental regulations and site specific requirements. All safety labels should be bilingual. Some of safety labels are indicated below:

To be placed on removable guards to warn that operation of the machinery with guards removed would expose chains, belts, gears, shafts, pulleys, couplings, etc. which create hazards



To be located on conveyors where there are exposed moving parts which must be unguarded to facilitate function, i.e. rollers, pulleys, shafts, chains, etc.



LOCATE ON INSPECTION DOOR (S)

General warning to personnel that a conveyor's moving parts, which operate unguarded by necessity of function, i.e. belts, rollers, terminal pulleys, etc., create hazards to be avoided; in particular, conveyors which stop and start by automatic control near operator work stations would use this label.



LOCATE AT ENTREACE TO CONVEYOR WALKWAY

To be placed on removable guards to warn that operation of the machinery with guards removed would expose chains, belts, gears, shafts, pulleys, couplings, etc. which create hazards.



To be placed up to a maximum of 50' centers along the walkway side.



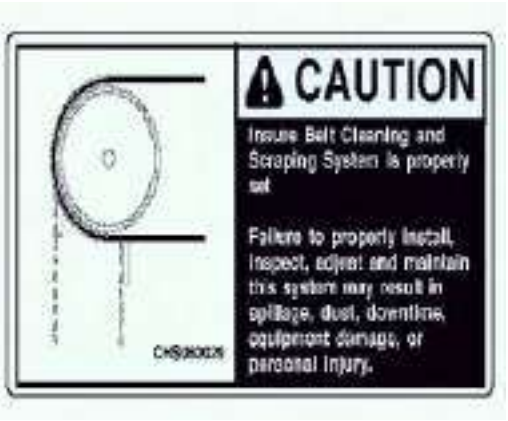
SPACE UP TO A MAXIMUM OF 50 FT CENTERS (WALKWAY SIDES)

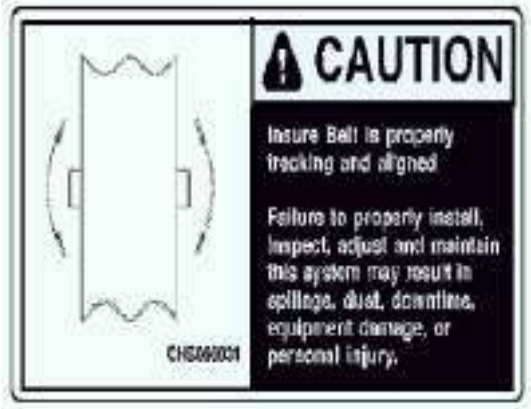
To be placed at entrances to enclosed areas which would expose personnel to operational or environmental hazards which should only be entered by trained and authorized personnel under specific conditions; Examples, lifting conveyors, transfer car aisleways, confined spaces, etc.











The above list is not exhaustive and suitable safety labels to be provided for all equipment and hazardous locations in line with international practice for material handling equipment.

6.00.00 Training:

After the design and installation are developed and supervised by qualified engineers familiar with recognized safety features and requirements, the next priority should be personnel training. Operating and maintenance personnel and their supervisors should be initially and then periodically retrained in safe operating procedures, recognizable hazards, precautions, and the maintenance of a safe work place. Accordingly, Contractor to provide the list of proper tools and tackles to operate and maintain the conveyor in an adequately safe condition. Employees should be made aware of, and forbidden to enter, hazardous areas. The training proposal by contractor must include safety training module for site personnel.

MILL REJECT HANDLING SYSTEM

We, hereby furnish the data on provenness criteria for manufacturer/supplier of Coal Mill reject handling system and have previous experience of manufacturing/got manufactured and supplying metallic belt conveyor type or chain flight conveyor type handling systems of capacity 1.5 MTPH or higher for any industrial installation which are in successful operation in at least one (1) plant for a period not less than one (1) year as per clause no. 4.13 of Sub-section-I, Part-A of Section-VI.
The details of type and minimum equipment rating of such equipment are given below :

S.No.	Item Description	Station-I
(i)	Name of the station and its location	
(ii)	Client name and its address, Fax No. & Tel. No.	
	– e-mail id	
	– website address	
iii)	Name and Designation of the responsible person in client's organisation	
(iv)	Name of manufacturer/supplier & address	
(v)	Contract No. & Date	
(vi)	-	
(vii)	Starting date of work	
(viii)	Scheduled date of completion	
(ix)	Actual date of completion	
(x)	Date of Commissioning of system/Package	
(xi)	Whether the Handling System has been in successful operation for a period not less than one (1) year.	*Yes/*No

Signature of authorized signatory.....

S.No.	Item Description	Station-I
(xii)	Brief Technical Particulars of the system/Package/equipment :	
	- Type of system:	Metallic belt conveyor/chain flight conveyor
	- Material conveying rate (MTPH)	.....

***Strike off whichever is not applicable.**

Date :

Place :

(Signature).....

(Printed Name).....

(Designation).....

(Common seal).....

EPC PACKAGE FOR
SIPAT STPP STAGE-III (1X800 MW)
BIDDING DOCUMENT NO. CS-9587-001R-2

(For Qualification as per Clause No. 4.19 of Sub-Section-IA, Part-A of Section-VI)

Bidder's Name and Address :

To
Contract Services ,
NTPC Limited.
NOIDA-201301

1.0 We are qualified under clause no. 4.19.1 of Sub-Section-IA, Part-A, Section-VI of Bidding Documents.

2.0 We are a supplier of ash handling system(s) and have executed ash handling system(s) involving design, engineering, manufacturing/got manufactured, supply, erection /supervised erection and commissioning/ supervised commissioning for the following systems:

We also confirm that the activity of design and engineering for the systems described 2.1(a), 2.1(b) & 2.1(c) of this Attachment-3K have been carried out by us.

2.1 (a) Bottom Ash Handling System (Strike out whichever is not applicable)

Wet Bottom Ash handling system comprising a jet pump system in conjunction with water impounded Bottom Ash Hopper designed for the conveying capacity of 50 tonnes/hour (dry ash basis) or more per jet pump for coal /lignite fired boilers.

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity per Jet pump (TPH) referred by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder per Jet Pump (TPH)	Name of Manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Signature of authorized signatory.....

Note : (a) The reference Bottom Ash Handling System is of the same type i.e. jet pump system as is being offered by us for the present plant
(b) Clients certificate enclosed in support of
(i) Details about above (Yes/No.)
(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

OR

2.1 (b) Wet Bottom Ash Handling system comprising a submerged scrapper chain conveyor system designed for the conveying capacity of 20 tonnes/hour (dry ash basis) or more per conveyor, for coal/lignite fired boilers:

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity per Scrapper conveyor (TPH) referred by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder per Jet Pump (TPH)	Name of Manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Note : (a) The reference Bottom Ash Handling System is of the same type i.e. submerged scrapper chain conveyor system as is being offered by us for the present plant.
(b) Clients certificate enclosed in support of
(i) Details about above (Yes/No.)
(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

2.1(b) **Pneumatic Fly Ash Handling System (Strike out whichever is not applicable)**

Signature of authorized signatory.....

(i) Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by pressure conveying system designed for 30 TPH or more conveying capacity.

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder (TPH)	Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. pressure system as is being offered by us for the present plant.

(b) Clients certificate enclosed in support of

(i) Details about above Yes/No.

(ii) Successful operation of above plants for at least two (2) years. Yes/No.

OR

2.1(b)(ii) Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by vacuum conveying system designed for 30 TPH or more conveying capacity per vacuum extractor.

Signature of authorized signatory.....

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder (TPH)	Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. vacuum system as is being offered by us for the present plant.

(b) Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years (Yes/No.)

And

2.1(c) Pneumatic Fly Ash Transportation System for transporting Fly Ash from a pulverized Coal and Boiler unit having capacity of not less than 20 TPH for a conveying distance of not less than 500 mtr.

Sl.	Name of	No. of Units	Design Fly Ash	Offered Ash	Name of	Date of Commissioning	Remarks

Signature of authorized signatory.....

No.	Plant with location	with MW Capacity in which system installed	transportation capacity (TPH) and conveying distance specified by client (Documentary evidence attached)		transportation capacity and conveying distance		manufacturer (Experience list enclosed)	and No. of years in successful operation
			Capacity TPH	Conveying distance Mtr.	Capacity TPH	Conveying distance Mtr.		

Note : Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

2.1 (d) Complete ash slurry disposal system for handling not less than 40 tonnes of ash per hour for Coal/lignite fired power stations which includes, among others, ash slurry pumps & piping system with associated controls.

Signature of authorized signatory.....

S.No	Name of plant with location	No of units with MW capacity in which system installed	Total quantity of ash handled (TPH)	Scope of work alongwith scheme (enclosed with bid)	Name of manufacturer (Experience list enclosed)	Date of commissioning and No of years in successful operation	remarks

Note : Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

3.0 We are qualified under clause 4.19.2 of Sub-Section-IA, Part-A, Section-VI of Bidding Documents.

1.1 We have executed Ash Handling Plants for pulverised coal fired boiler units generating not less than 40 TPH of ash per Boiler which includes bottom ash handling system comprising either a jet pump system in conjunction with water impounded Bottom Ash Hopper or submerged scrapper chain

Signature of authorized signatory.....

conveyor system involving design and engineering either through bidder/its sub vendor or through design agency/agencies, manufacture/got manufactured, supply, erection/supervised erection and commissioning/ supervised commissioning for the following plants (Refer clause no. 4.19.2(a) of Sub-Section-IA, Part-A, Section-VI of bidding documents)

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Total Ash generation per boiler (T/Hr)	Total ash handling capacity (bottom+fly ash) (Tonnes/hour) per boiler	Type of Bottom Ash Handling System Supplied	Name of design and Engineering agency (Experience) list enclosed)	Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Note : Client's certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

We confirm that we* (or our proposed sub-vendor) have valid collaboration or licensing or Technology transfer agreement agreement for either the total requirement or the balance part under clause 4.19.1 (a), which we/ our sub vendor itself is not able to meet, with M/s ..... The details of type and minimum equipment rating of such equipment are given below :

3.1 (a) Bottom Ash Handling System (Strike out whichever is not applicable)

(i) Wet Bottom Ash handling system comprising a jet pump system in conjunction with water impounded Bottom Ash Hopper designed for the conveying capacity of 50 tonnes/hour (dry ash basis) or more per jet pump for pulverised coal fired boilers.

Signature of authorized signatory.....

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity per Jet pump (TPH) referred by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder per Jet Pump (TPH)	Name of Manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

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Note : (a) The reference Bottom Ash Handling System is of the same type i.e. jet pump system as is being offered by us for the present plant
(b) Clients certificate enclosed in support of
(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

OR

3.1 (a) (ii) Wet Bottom Ash Handling system comprising a submerged scrapper chain conveyor system designed for the conveying capacity of 20 tonnes/hour (dry ash basis) or more per conveyor, for pulverised coal fired boilers:

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity per Scrapper conveyor (TPH) referred by client	Offered Ash conveying capacity by bidder per Jet Pump (TPH)	Name of Manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Signature of authorized signatory.....

			(Documentary evidence attached)				

Note : (a) The reference Bottom Ash Handling System is of the same type i.e. submerged scrapper chain conveyor system as is being offered by us for the present plant.
(b) Clients certificate enclosed in support of
(i) Details about above (Yes/No.)
(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No)

And

Signature of authorized signatory.....

3.2 We are a supplier of ash handling systems and have executed ash handling plant for pulverised coal fired boiler unit, generating not less than 40 TPH of ash per Boiler which includes fly ash handling system for conveying fly ash from ESPs in dry form (involving pneumatic conveying systems of vacuum or pressure type) involving design and engineering either through bidder/it's sub vendor or through design agency/agencies, manufacture/got manufactured, supply, erection/supervised erection, and commissioning/ supervised commissioning for the following plants (Refer clause no. 4.19.2(b) of sub-section-IA, Part-A, Section-VI of bidding documents).

(a) (i) Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by pressure conveying system designed for 30 TPH or more conveying capacity.

S.No	Name of plant with location	No of units with MW capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offer ash conveying capacity by bidder (TPH)	Name of manufacture (experience list enclosed)	Date of commissioning and No. of years in successful operation	Name of design and engineering agency (experience list enclosed)	Remarks

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. pressure system as is being offered by us for the present plant.
(b) Clients certificate enclosed in support of

(i) Details about above Yes/No.
(ii) Successful operation of above plants for at least two (2) years. Yes/No.

Signature of authorized signatory.....

We confirm that we* (or our proposed sub-vendor) have valid collaboration or licensing or Technology transfer agreement agreement for either the total requirement or the balance part under clause 4.19.1 (b), which we/ our sub vendor itself is not able to meet, with M/s ..... The details of type and minimum equipment rating of such equipment are given below :

(i) Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by pressure conveying system designed for 30 TPH or more conveying capacity.

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder (TPH)	Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. pressure system as is being offered by us for the present plant.

(b) Clients certificate enclosed in support of

(i) Details about above Yes/No.

(ii) Successful operation of above plants for at least two (2) years. Yes/No.

Signature of authorized signatory.....

OR

3.2 (a) (ii) Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by vacuum conveying system designed for 30 TPH or more conveying capacity per vacuum extractor.

S.No	Name of plant with location	No of units with MW capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offer ash conveying capacity by bidder (TPH)	Name of manufacture (experience list enclosed)	Date of commissioning and No. of years in successful operation	Name of design and engineering agency (experience list enclosed)	remarks

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. vacuum system as is being offered by us for the present plant.

(b) Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years (Yes/No.)

Signature of authorized signatory.....

We confirm that we* (or our proposed sub-vendor) have valid collaboration or licensing or Technology transfer agreement agreement for either the total requirement or the balance part under clause 4.19.1 (b), which we/ our sub vendor itself is not able to meet, with M/s ..... The details of type and minimum equipment rating of such equipment are given below :

(a) (ii) Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by vacuum conveying system designed for 30 TPH or more conveying capacity per vacuum extractor.

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder (TPH)	Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. vacuum system as is being offered by us for the present plant.

(b) Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years (Yes/No.)

Signature of authorized signatory.....

And

We confirm that we* (or our proposed sub-vendor) have valid collaboration/association agreement for either the total requirement or the balance part under clause 4.19.1 (c), which we/ our sub vendor itself is not able to meet, with M/s ..... The details of type and minimum equipment rating of such equipment are given below :

1.2 (b) Pneumatic Fly Ash Transportation System for transporting Fly Ash from a pulverized Coal and Boiler unit having capacity of not less than 20 TPH for a conveying distance of not less than 500 mtr.

S.No	Name of plant with location	No of units with MW capacity in which system installed	Design transportation capacity (TPH) specified by client (Documentary evidence attached)	Offer ash transportation capacity by bidder (TPH)	Name of manufacture (experience list enclosed)	Date of commissioning and No. of years in successful operation	Name of design and engineering agency (experience list enclosed)	remarks

Signature of authorized signatory.....

Note : Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

And

3.3. We confirm that we* (or our proposed sub-vendor) have valid collaboration/association agreement for either the total requirement or the balance part under clause 4.19.1 (d), which we/ our sub vendor itself is not able to meet, with M/s ..... The details of type and minimum equipment rating of such equipment are given below :

Complete Ash slurry disposal system for handling not less than 40 tonnes of ash per hour for coal fired power stations which includes, among others, ash slurry pumps & piping system with associated controls.

S.No	Name of plant with location	No of units with MW capacity in which system installed	Total quantity of ash handled (TPH)	Scope of work along with scheme (enclosed with bid)	Name of manufacturer (Experience list enclosed)	Date of commissioning and No of years in successful operation	remarks

Note : Clients certificate enclosed in support of

Signature of authorized signatory.....

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

4.0 We are qualified under clause 4.19.3 of Sub-Section-IA, Part-A, Section-VI of Bidding Documents.We confirm that we* /our proposed sub-vendor is an EPC organization in Collaboration with QAHPM (Qualified Ash Handling Plant Manufacturer):

a. The Bidder/Bidder's sub-vendor is an Engineering, Procurement and Construction (EPC) organization and have executed, in the last 10 years, industrial projects on EPC basis (with or without civil works) in the area of Power, Steel, Oil & Gas, Petro-chemical, Fertilizer, Flue Gas Desulphurisation and/or any other process industry with the total value of such projects being INR 4,000 million or more. At least one of such projects have a contract value of INR 1,600 million or more. These projects shall be in successful operation for a period of not less than one (1) year.
   i. Name of EPC Sub-Vendor:
   ii. Area of Project:
   iii. Total value of Project:
   iv. Total value of one such project:
   v. No of years of successful operation:

b. The Bidder/Bidder’s sub-vendor have a valid ongoing collaboration and technology transfer/licensing agreement with a QAHPM meeting requirements of clause 4.19.1 on its own, valid minimum up to the end of the defect liability period of the contract. In such a case, Bidder/Bidder’s sub-vendor shall either source the AHP System from such manufacturer or manufacture/get manufactured the AHP System as per the design and manufacturing drawings released by such QAHPM.
   Name of QAHPM (Qualified Ash Handling Plant Manufacturer):

Signature of authorized signatory.....

Details of QAHPM (Qualified Ash Handling Plant Manufacturer):

i. Bottom Ash Handling System (Strike out whichever is not applicable)

Wet Bottom Ash handling system comprising a jet pump system in conjunction with water impounded Bottom Ash Hopper designed for the conveying capacity of 50 tonnes/hour (dry ash basis) or more per jet pump for coal/lignite fired boilers.

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity per Jet pump (TPH) referred by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder per Jet Pump (TPH)	Name of Manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

---

Note : (a) The reference Bottom Ash Handling System is of the same type i.e. jet pump system as is being offered by us for the present plant
(b) Clients certificate enclosed in support of
(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least one (1) year. (Yes/No.)

OR

Wet Bottom Ash Handling system comprising a submerged scrapper chain conveyor system designed for the conveying capacity of 20 tonnes/hour (dry ash basis) or more per conveyor, for coal/lignite fired boilers:

Signature of authorized signatory.....

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity per Scrapper conveyor (TPH) referred by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder per Jet Pump (TPH)	Name of Manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Note : (a) The reference Bottom Ash Handling System is of the same type i.e. submerged scrapper chain conveyor system as is being offered by us for the present plant.
(b) Clients certificate enclosed in support of
(i) Details about above (Yes/No.)
(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

AND

(ii) **Pneumatic Fly Ash Handling System(Strike out whichever is not applicable)**

Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by pressure conveying system designed for 30 TPH or more conveying capacity.

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder (TPH)	Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Signature of authorized signatory.....

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. pressure system as is being offered by us for the present plant.

(b) Clients certificate enclosed in support of

(i) Details about above Yes/No.

(ii) Successful operation of above plants for at least two (2) years. Yes/No.

OR

Pneumatic Fly ash handling system for conveying fly ash from ESPs of a single pulverised coal fired boiler unit, by vacuum conveying system designed for 30 TPH or more conveying capacity per vacuum extractor.

SI. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design conveying capacity (TPH) specified by client (Documentary evidence attached)	Offered Ash conveying capacity by bidder (TPH)	Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks

Signature of authorized signatory.....

Note : (a) The reference Pneumatic Fly Ash Handling Systems are of the same type i.e. vacuum system as is being offered by us for the present plant.

(b) Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years (Yes/No.)

And

Pneumatic Fly Ash Transportation System for transporting Fly Ash from a pulverized Coal and Boiler unit having capacity of not less than 20 TPH for a conveying distance of not less than 500 mtr.

Sl. No.	Name of Plant with location	No. of Units with MW Capacity in which system installed	Design Fly Ash transportation capacity (TPH) and conveying distance specified by client (Documentary evidence attached)		Offered Ash transportation capacity and conveying distance		Name of manufacturer (Experience list enclosed)	Date of Commissioning and No. of years in successful operation	Remarks
			Capacity TPH	Conveying distance Mtr.	Capacity TPH	Conveying distance Mtr.			

Signature of authorized signatory.....

Note : Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

AND

iii) Complete ash slurry disposal system for handling not less than 40 tonnes of ash per hour for coal fired power stations which includes, among others, ash slurry pumps & piping system with associated controls.

S.No	Name of plant with location	No of units with MW capacity in which system installed	Total quantity of ash handled (TPH)	Scope of work alongwith scheme (enclosed with bid)	Name of manufacturer (Experience list enclosed)	Date of commissioning and No of years in successful operation	remarks

Signature of authorized signatory.....

Note : Clients certificate enclosed in support of

(i) Details about above (Yes/No.)

(ii) Successful operation of above plant(s) for at least two (2) years. (Yes/No.)

Bidder confirms to furnish letter of support from Collaborator/ Licensor /Technology provider for successful performance of the AHP system valid up to the end of defect liability period of the contract as per the format enclosed in the bidding document, at the time of placement of order on the approved sub-vendor.

Bidder confirms that the Technology transfer/Licensing agreement between the Bidder, Bidder's sub-vendor & QAHPM shall cover transfer/licensing of technological knowhow for AHP system in the form of transfer/licensing of design dossier, design software's, drawings and documentation, quality system manuals and imparting relevant personnel training to the Bidder/Bidder's sub-vendor.

Annexure- LETTER OF SUPPORT_4.19.3

Letter of Support/Technology Transfer/Licensing agreement to be executed by the Bidder/Contractor, Bidder's Sub vendor and Collaborator & Technology Provider/Licensor (QAHPM) meeting the requirement of clause 4.19.3 of sub-section-I-A, Part A

1. We, the Collaborator & Technology Provider/Licenser, and the Contractor *and *his Sub-Vendor, do hereby declare and undertake that we shall be jointly and severally responsible to the Employer for the design, execution, and successful performance of the complete Ash handling System and all the contractual obligations including the technical guarantees for the complete Ash handling System, as specified under the said Contract(s) to the satisfaction of the Employer.

Signature of authorized signatory.....

2. We the Collaborator & Technology Provider/Licenser do hereby undertake, declare, and confirm that we shall be fully responsible for the successful performance of the ash handling System and undertake to carry out all the obligations and responsibilities under this Technology transfer/Licensing agreement to discharge the Contractor's obligations stipulated under the Contract.

3. Further the manner of achieving the objectives set forth in paragraph 1 above shall be as follows:

   (a) We, the Collaborator & Technology Provider/Licenser shall be fully responsible for complete design, engineering, preparation of all designs, design calculations, design documents/drawings, and manufacturing drawings including all its internals; preparation of all P&IDs & process flow diagrams; Selection of auxiliaries, and interfacing/ integrating with their auxiliaries so as to ensure satisfactory, reliable, safe and trouble free performance meeting all stipulated technical requirements as well as all guaranteed parameters specified in the Contract for Ash handling System.

   (b) We, the Collaborator & Technology Licenser shall extend our quality surveillance/ supervision/ quality control to the Contractor during manufacture, erection, commissioning, and performance testing, both at Contractor's/Sub-vendor'' works and/ or at Employer's project site and shall depute technical experts from time to time to the Contractor's/ Sub-vendor's works/ Employer's project site, as mutually agreed upon between the Employer and the Contractor.

   (c) In the event the Collaborator & Technology Provider/Licenser and the Contractor and his Sub-Vendor fail to demonstrate that the ash handling System meets the guaranteed parameters and demonstration parameters as specified in the contract, the Collaborator & Technology Provider/Licenser and the Contractor and his Sub-Vendor shall promptly carry out all the corrective measures related to engineering services at their own expense and shall promptly provide corrected design to the Employer.

   (d) We, the Collaborator & Technology Licenser shall participate in Technical Coordination Meetings (TCMs) from time to time, as and when required by the Employer.

4. We, the Contractor and his Sub-Vendor and the Collaborator & Technology Provider/Licenser do hereby undertake and confirm that this Technology transfer agreement/Licensing agreement **shall** be valid until the end of the defect liability period.

5. The Contractor will be fully responsible for the complete design, engineering, supply, erection, commissioning, quality of all the equipment/main assemblies/components manufactured at their works or at their Vendors' works or constructed at site, and their repair or replacement, if necessary, for incorporation in the Plant and timely delivery thereof to meet the completion schedule under the Contract.

Signature of authorized signatory.....

Signatures of Contractor, Contractor's Sub-Vendor, Collaborator & Technology Provider/Licenser

1. For M/s .....
   (Contractor)

   (Signature of the Authorised Representative, Official Address) .....

2. For M/s.....
   (Contractor's Sub-Vendor)

   (Signature of the Authorised Representative, Official Address) .....

3. For M/s .....
   (Collaborator & Technology Provider/Licenser)

   (Signature of the Authorised Representative, Official Address)

LETTER OF SUPPORT FOR SATISFACTORY PERFORMANCE OF …… (Name of Equipment) FOR SIPAT SUPER THERMAL POWER PROJECT, STAGE-III (1X800 MW) EPC PACKAGE

TO:

[EMPLOYERS NAME & ADDRESS]

Sub: Letter of Support submitted From …….. (name of the Associate /Collaborator*/Technology provider*/Licensor*/Qualified equipment manufacturer*) undertaking the responsibility for satisfactory performance of …..(name of the equipment).

Dear Sirs,

Signature of authorized signatory.....

1. In accordance with the Award of the Contract by …… (Name of the Contractor) to M/s. ……. (Name of the sub-vendor), we the aforesaid Associate /Collaborator*/Technology provider*/Licensor*/Qualified equipment manufacturer*, (M/s …….) shall be fully responsible for the satisfactory performance of the ……. (Equipment name).

2. Further, the manner of achieving the objective set forth in point 1 above shall be as follows:
   For ……. (Equipment name):

(A) We shall provide and shall be fully responsible for design, engineering & commissioning, manufacturing and assembly drawings of……. (Equipment name). ……. (Equipment name) shall be manufactured and supplied as per above design provided by us and the drawings approved by Employer.

(B) We shall depute technical experts to Bidder's/sub-vendor's works for supervision during manufacturing, assembly, erection, commissioning and final testing (as and when necessary) of the……. (Equipment name).

(C) We shall promptly carry out all the corrective measures and shall promptly provide corrected design and shall undertake replacements, rectifications or modifications to the equipment as required in case the equipment fails to demonstrate successful performance as per contract at site.

(D) We shall participate in Technical Co-ordination meetings (TCMs) from time to time, as and when required by Employer

3. We, the Associate /Collaborator*/Technology provider*/Licensor*/Qualified equipment manufacturer* do hereby undertake and confirm that this Letter of Support shall be valid for a period of seven (7) years or up to the end of defect liability period of the contract, whichever is later.

.

Signature of the Authorised Representative:……..
For M/s ……..

(Associate*/*Collaborator/*Technology provider/*Licensor/ Qualified equipment manufacturer*)

Name ……

Signature of authorized signatory.....

Designation …….

Date:……

Common Seal of the Company

*: Strike off whichever is not applicable.

For Qualification as per Clause No. 4.19.4 of Sub-Section-IA, Part-A of Section-VI

In conformity with the requirements specified under clause 4.19.4 Sub section-IA, Section -VI, Part-A of Horizontal centrifugal pump module, we have offered Ash Slurry pumps manufactured by M/s ..... who have in the past supplied and installed ash slurry pumps for similar duty application and have at least two (2) nos. pumps of the same models that are being offered having capacity not less than 1000 cubic meters per hour at each of two (2) different stations which are in successful operation for at least one (1) year prior to the date of Techno-Commercial bid opening. In support of the above, we furnish below the following details.

i)	Name of Ash Slurry pumps manufacturer	:
ii)	The above pump manufacturer have supplied and installed at least two (2) nos. Ash slurry pumps of	Yes / No

Signature of authorized signatory.....

parameters as specified in Clause 4.19.4, sub

section-IA, Section-VI, Part-A

iii) Details of the Power Plants at which Ash Slurry Pumps

of the above make as specified in Clause 4.19.4,

sub section -IA, Section-VI, Part-A

a) Name of the Power Plant :

b) Pump Model :

c) Size of Pumps :

d) Number of pumps :

e) Capacity of the pump (m3 / hr.) :

f) Total dynamic Head of the pump (mwc) :

g) Concentration (by wt.) of the slurry and the

maximum particle size handled :

h) Date of commissioning of ash handling system :

i) Whether the pumps are in successful operation prior to Techno-Commercial bid ` opening(Attach certificate from Client)
:

Signature of authorized signatory.....

LETTER OF SUPPORT FOR SATISFACTORY PERFORMANCE OF …… (Name of Equipment) FOR SIPAT SUPER THERMAL POWER PROJECT, STAGE-III (1X800 MW) EPC PACKAGE

TO:

[EMPLOYERS NAME & ADDRESS]

Sub: Letter of Support submitted From …….. (name of the Associate /Collaborator*/Technology provider*/Licensor*/Qualified equipment manufacturer*) undertaking the responsibility for satisfactory performance of …..(name of the equipment).

Dear Sirs,

4. In accordance with the Award of the Contract by …… (Name of the Contractor) to M/s. ……. (Name of the sub-vendor), we the aforesaid Associate /Collaborator*/Technology provider*/Licensor*/Qualified equipment manufacturer*, (M/s …….) shall be fully responsible for the satisfactory performance of the …….. (Equipment name).

5. Further, the manner of achieving the objective set forth in point 1 above shall be as follows:

Signature of authorized signatory.....

For ……. (Equipment name):

(E) We shall provide and shall be fully responsible for design,engineering & commissioning, manufacturing and assembly drawings of……. (Equipment name). ……. (Equipment name) shall be manufactured and supplied as per above design provided by us and the drawings approved by Employer.

(F) We shall depute technical experts to Bidder's/sub-vendor's works for supervision during manufacturing, assembly, erection, commissioning and final testing (as and when necessary) of the……. (Equipment name).

(G) We shall promptly carry out all the corrective measures and shall promptly provide corrected design and shall undertake replacements, rectifications or modifications to the equipment as required in case the equipment fails to demonstrate successful performance as per contract at site.

(H) We shall participate in Technical Co-ordination meetings (TCMs) from time to time, as and when required by Employer

6. We, the Associate /Collaborator*/Technology provider*/Licensor*/Qualified equipment manufacturer* do hereby undertake and confirm that this Letter of Support shall be valid for a period of seven (7) years or up to the end of defect liability period of the contract, whichever is later.

.

Signature of the Authorised Representative:……..
For M/s ……..

(Associate*/*Collaborator/*Technology provider/*Licensor/ Qualified equipment manufacturer*)

Name ……
Designation …….

Date:……

Common Seal of the Company

*: Strike off whichever is not applicable.

Signature of authorized signatory.....

COLLABORATOR'S/LICENSOR/ASSOCIATED EXPERIENCE FOR ASH HANDLING SYSTEM

	1	2	3	4
Name and address of the collaborator/licensor/associate				
System for which collaboration/licensing/association made				

M/s ……..(Our collaborator/licensor/associate) are a supplier of ash handling systems having executed ash handling systems involving design, engineering, manufacture, supply, erection and commissioning for the following systems.

Signature of authorized signatory.....

We also confirm that the activity of design and engineering for the systems described in this Attachment- 3K have been carried out by the collaborator/licensor/associate of the relevant system, himself and through external design agency/agencies.

Qualification requirements details as per Clause No. 4.20.1 of Sub Section-IA , Part-A, Section VI

EPC PACKAGE FOR

SIPAT STPP STAGE-III (1X800 MW)
BIDDING DOCUMENT NO. CS-9587-001R-2
(Experience List of Bidder)

Bidder's Name and Address :

To
Contract Services (II)
NTPC Limited
NOIDA - 201 301

Dear Sirs,

Sub : Sub-Qualifying Requirements for the Coal Handling Plant Package.

1. To satisfy the requirements of Item no. 4.20 of Sub-Section-IA, Part-A, Section-VI of Bidding Documents, we furnish the following details:

Signature of authorized signatory.....

***** We M/s.....(Bidder/Sub-vendor) have filled in the requisite Qualifying Requirement (QR) details in line with requirements of Clause No. 4.20.1 of Sub-Section-IA, Part-A, Section-VI of Bidding Documents in Attachment-3K which establishes our meeting the QR.

***** **Sub-vendor to strike out whichever is not applicable.**

I. Applicable to Sub-vendor meeting Sub-QR as per Clause No. 4.20.1 of Sub-Section-IA, Part-A, Section-VI.

To satisfy the requirement of Clause No. **4.20.1 of Sub-Section-IA, Part-A, Section-VI.** We give below the details:

A. Qualifying Requirement details as per Clause 4.20.1 of Sub-Section-IA, Part-A, Section-VI.

In accordance with Clause No. **4.20.1 of Sub-Section-IA, Part-A, Section-VI**, we confirm that we have designed, manufactured/ got manufactured, erected/supervised erection and commissioned/ supervised commissioning at least one (1) number integrated bulk material handling plant (essentially comprising of conveying) including all associated structural steel works and electrical works of 1000 Metric tonnes per hour rated capacity or above for coal or other minerals of equivalent volumetric capacity which should have been in successful operation for at least one (1) year.

The details of the qualifying plant are as under:

1. Name of the client :.....
2. Complete address of Client with name of contact person(s), e-mail, Fax and Tel No. :.....
3. Name & Location of the Plant :.....
4. Contract / Order No. & Date :.....

Signature of authorized signatory.....

5. Date of commissioning :.....

6. Conveying capacity (in Metric tonnes/hour) : .....

7. Materials handled alongwith its bulk density : .....

8. Whether the System is in operation Yes*/No*

9. No. of years of successful operation .....

10. Whether bidder's/ its Sub Vendor scope included

(a) Design Yes*/No*

(b) Engineering Yes*/No*

(c) Got Engineering Yes*/No*

(d) Manufacturing Yes*/No*

(e) Got Manufactured Yes*/No*

(f) Erection Yes*/No*

(g) Supervise Erection Yes*/No*

(h) Commissioning Yes*/No*

(i) Got commissioned Yes*/No*

11. Whether the scope of work Yes*/No*

Signature of authorized signatory.....

included all associated civil & structural steel and Electrical Works

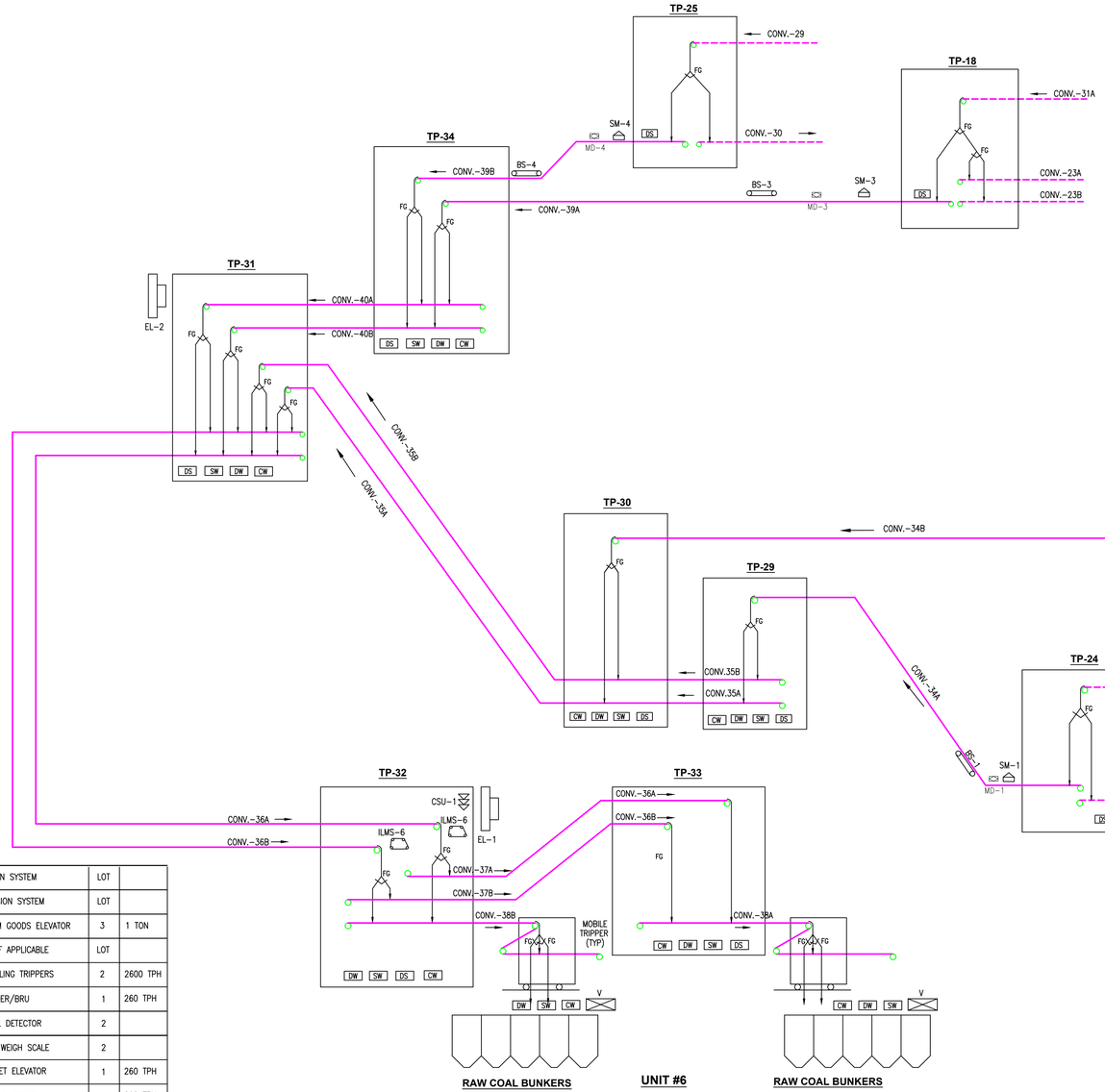
12. Client's certificate enclosed at Annexure..... to this Attachment-3K in support of :

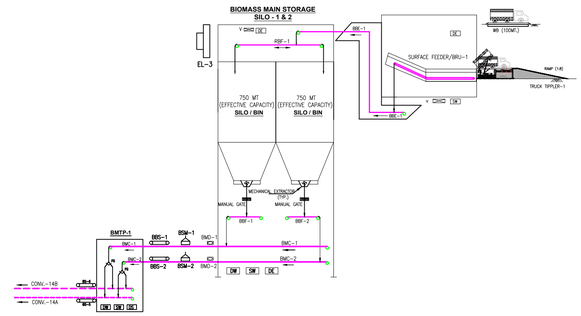
(i)	Details sought at item Nos. 3 thru 11 above.	Yes*/No*
(ii)	Successful operation of above Plant for at least one (1) Year.	Yes*/No*

*** Please strike out whichever is not applicable.**

Signature of authorized signatory.....

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DE	DUST EXTRACTION SYSTEM	LOT	
DS	DUST SUPPRESSION SYSTEM	LOT	
EL	PASSENGER CUM GOODS ELEVATOR	3	1 TON
SP	SUMP PUMP, IF APPLICABLE	LOT	
MT	MOBILE TRAVELLING TRIPPERS	2	2600 TPH
SF	SURFACE FEEDER/BRU	1	260 TPH
BMD	BIOMASS METAL DETECTOR	2	
BBS	BIOMASS BELT WEIGH SCALE	2	
BBE 1	BIOMASS BUCKET ELEVATOR	1	260 TPH
RBF-1	REVERSIBLE BELT FEEDER	1	260 TPH
BMC1&2	BIOMASS CONVEYOR	2	260 TPH
BBF1&2	BIOMASS BELT FEEDER	2	260 TPH
39B	CONVEYOR 1800 mm WIDE	1	2600 TPH
39A	CONVEYOR 1800 mm WIDE	1	2600 TPH
38B	BUNKER CONVEYOR 1800 mm WIDE	1	2600 TPH
38A	BUNKER CONVEYOR 1800 mm WIDE	1	2600 TPH
37A/37B	CONVEYOR 1800 mm WIDE	2	2600 TPH
36A/36B	CONVEYOR 1800 mm WIDE	2	2600 TPH
35A/35B	CONVEYOR 1800 mm WIDE	2	2600 TPH
34B	CONVEYOR 1800 mm WIDE	1	2600 TPH
34A	CONVEYOR 1800 mm WIDE	1	2600 TPH
MD	METAL DETECTOR	4	
BSM	BIOMASS SUSPENDED MAGNET	2	
SM	SUSPENDED MAGNET	4	
CSU-1	COAL SAMPLING UNIT (-)20mm SIZE	1	
FG	FLAP GATE	LOT	
BS	BELT WEIGH SCALE	6	
ILMS	IN LINE MAGNETIC SEPARATOR ALONG WITH TRAMP IRON CHUTE	2	
EQPT. DESIGN.	EQUIPMENT	QTY.	CAPACITY

APPLICABLE FOR SIDE MILL ARRANGEMENT

LEGEND		LEGEND	
	BELT FEEDER/REVERSIBLE BELT FEEDER	BS	BELT SCALE
DS	DUST SUPPRESSION SYSTEM	CSU	COAL SAMPLING UNIT
SW	SERVICE WATER SYSTEM	DS	DUST SUPPRESSION-PF
DW	DRINKING WATER SYSTEM	ILMS	MAGNETIC SEPARATOR
DE	DUST EXTRACTION SYSTEM	MD	METAL DETECTOR
SP	SUMP & SUMP DRAINAGE PUMPS	SM	SUSPENDED MAGNET
	BELT CONVEYOR	V	VENTILATION
EL	ELEVATOR	FG	FLAP GATE

NOTES :

1. THIS DRG. IS MEANT TO SHOW ONLY COAL & BIOMASS FLOW PATH AND DOES NOT INDICATE COMPREHENSIVE SCOPE OF WORK. THE NOS. OF TPs SHOWN ARE MINIMUM. TP-17, TP-18, TP-24, TP-25 ARE THE EXISTING TPs.
2. ALL CONVEYORS SHALL BE PROVIDED WITH ACCESSORIES SUCH AS PULL CORD, BELT SWAY AND ZERO SPEED SWITCHES, BELT WIPER UNITS, TENSIONING DEVICES ETC. AS PER TECHNICAL SPECIFICATION. THESE ARE NOT SHOWN IN THE FLOW DIAGRAM FOR CLARITY.
3. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
4. BIDDER TO CARRY OUT ALL NECESSARY MODIFICATION WORK OF EXISTING TRANSFER POINTS LIKE CHUTE ARRANGEMENT, SUPPORTING STRUCTURE, FLOORING, RELOCATION OF FACILITIES ETC AS REQUIRED FOR THE PROPOSED CONVEYING SYSTEM. BIDDER MAY INSTALL ADDITIONAL FLAP GATE, BELT FEEDER/REVERSIBLE BELT FEEDER/MOVABLE BELT FEEDER, IF REQUIRED IN THE EXISTING TP's TO DISCHARGE THE FEED TO PROPOSED CONVEYORS FROM EXISTING CONVEYORS. THE MODIFICATION ACTIVITIES SHALL BE CARRIED OUT IN SUCH A MANNER THAT THE EXISTING SYSTEM OPERATION SHALL BE LEAST AFFECTED.
5. RELOCATION OF EXISTING FACILITIES, IF REQUIRED TO INSTALL THE PROPOSED SYSTEM SHALL BE IN THE SCOPE OF THE BIDDER.
6. DUST SUPPRESSION, DUST EXTRACTION, SERVICE WATER, POTABLE WATER, COOLING WATER, & VENTILATION SHALL BE PROVIDED AS PER THE TECHNICAL SPECIFICATION REQUIREMENT.
7. THIS TENDER DRAWING IS TO BE REVIEWED IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS.
8. MINIMUM CHUTE VALLEY ANGLE AND MINIMUM HEADROOM AS SPECIFIED ELSEWHERE SHALL BE RELAXED (IF REQUIRED) FOR EXISTING TRANSFER POINTS (TP-17,TP-24, TP-18 & TP-25) DUE TO THE LAYOUT CONSTRAINTS.
9. AT TP-17, INSTEAD OF TAKING FEED FROM C-19B, COAL CAN BE FED TO THE NEW CONVEYOR C-34B FROM C-19A ALSO. FURTHER, BIDDER MAY COMBINE/ MERGE TP-29 & TP-30 INTO A SINGLE TP, IF FEASIBLE.
10. LOCATIONS OF THE ELEVATORS IN TRANSFER POINT OF CHP IS INDICATIVE ONLY. TWO NOs ELEVATORS SHALL BE INSTALLED IN COAL TRANSFER POINTS. INSTALLATION LOCATION SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE HEIGHT OF THE TRANSFER POINTS. IN ADDITION, ELEVATOR FOR BIOMASS HANDLING PLANT SHALL BE LOCATED AT BIOMASS STORAGE SILO.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
					CLEARED BY					
B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							29.11.23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31.05.23

एन टी पी सी लिमिटेड
NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

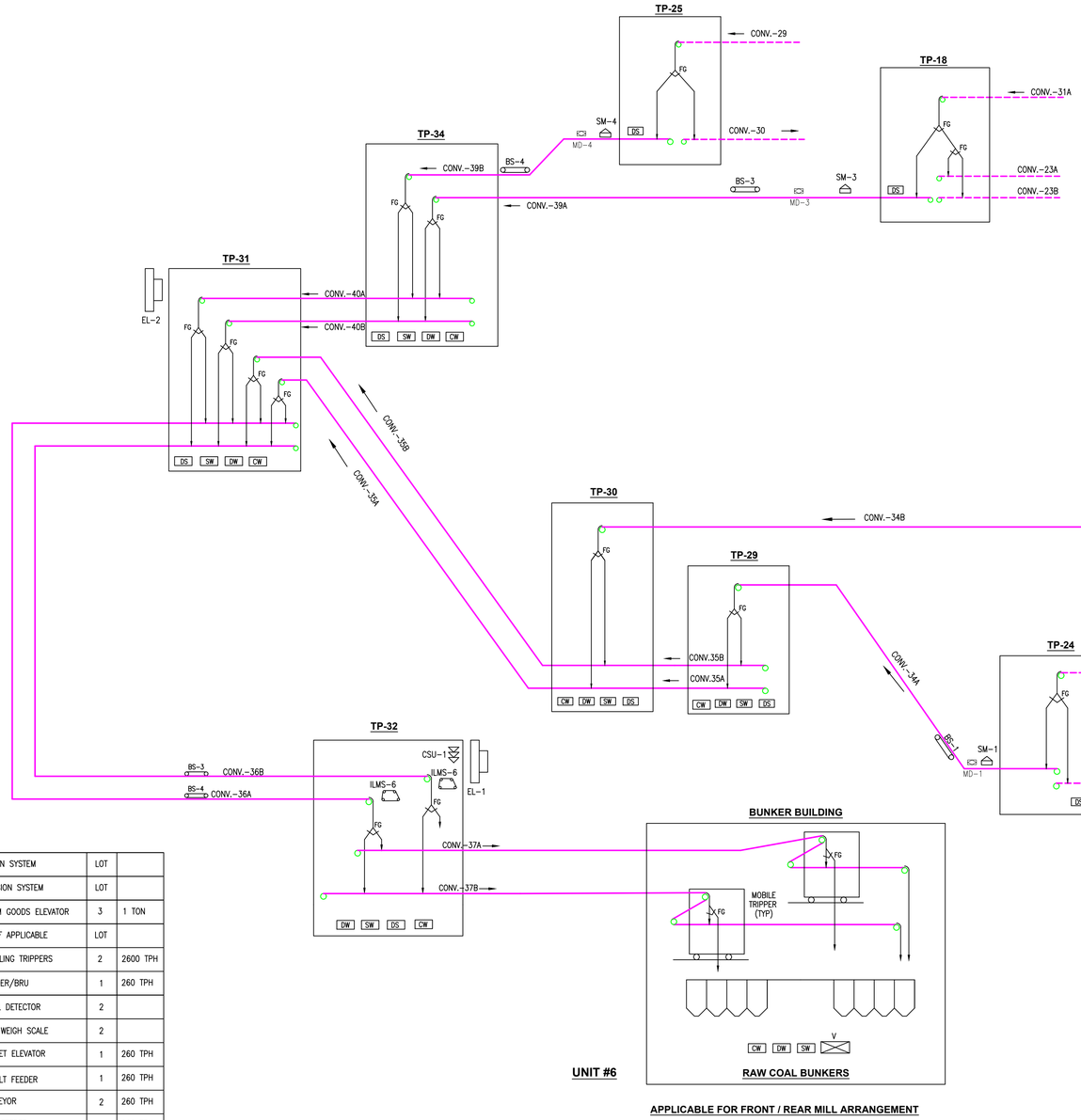
PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-III (1x800MW)

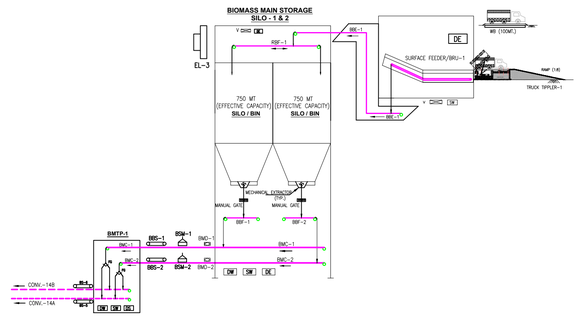
TITLE: EPC PACKAGE
COAL + BIOMASS FLOW DIAGRAM

SIZE	SCALE	DRG.NO.	REV.
A1	--	XXXX-001-POM-A-040(OPTION-1)	B

CAD FILE NAME : XXXX-001-POM-A-040(OPTION-1)

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DE	DUST EXTRACTION SYSTEM	LOT	
DS	DUST SUPPRESSION SYSTEM	LOT	
EL	PASSENGER CUM GOODS ELEVATOR	3	1 TON
SP	SUMP PUMP, IF APPLICABLE	LOT	
MT	MOBILE TRAVELLING TRIPPERS	2	2600 TPH
SF	SURFACE FEEDER/BRU	1	260 TPH
BMD	BIOMASS METAL DETECTOR	2	
BBS	BIOMASS BELT WEIGH SCALE	2	
BBE 1	BIOMASS BUCKET ELEVATOR	1	260 TPH
RBF–1	REVERSIBLE BELT FEEDER	1	260 TPH
BMC1&2	BIOMASS CONVEYOR	2	260 TPH
BBF1&2	BIOMASS BELT FEEDER	2	260 TPH
39B	CONVEYOR 1800 mm WIDE	1	2600 TPH
39A	CONVEYOR 1800 mm WIDE	1	2600 TPH
37B	BUNKER CONVEYOR 1800 mm WIDE	1	2600 TPH
37A	BUNKER CONVEYOR 1800 mm WIDE	1	2600 TPH
36A/36B	CONVEYOR 1800 mm WIDE	2	2600 TPH
35A/35B	CONVEYOR 1800 mm WIDE	2	2600 TPH
34B	CONVEYOR 1800 mm WIDE	1	2600 TPH
34A	CONVEYOR 1800 mm WIDE	1	2600 TPH
MD	METAL DETECTOR	4	
BSM	BIOMASS SUSPENDED MAGNET	2	
SM	SUSPENDED MAGNET	4	
CSU–1	COAL SAMPLING UNIT (–)20mm SIZE	1	
FG	FLAP GATE	LOT	
BS	BELT WEIGH SCALE	6	
ILMS	IN LINE MAGNETIC SEPARATOR ALONG WITH TRAMP IRON CHUTE	2	

EQPT. DESIGN.	EQUIPMENT	QTY.	CAPACITY

LEGEND		LEGEND	
	BELT FEEDER/REVERSIBLE BELT FEEDER	BS	BELT SCALE
DS	DUST SUPRRESSION SYSTEM	CSU	COAL SAMPLING UNIT
SW	SERVICE WATER SYSTEM	DS	DUST SUPPRESSION–PF
DW	DRINKING WATER SYSTEM	ILMS	MAGNETIC SEPARATOR
DE	DUST EXTRACTION SYSTEM	MD	METAL DETECTOR
SP	SUMP & SUMP DRAINAGE PUMPS	SM	SUSPENDED MAGNET
	BELT CONVEYOR	V	VENTILATION
EL	ELEVATOR	FG	FLAP GATE

NOTES :

1. THIS DRG. IS MEANT TO SHOW ONLY COAL & BIOMASS FLOW PATH AND DOES NOT INDICATE COMPREHENSIVE SCOPE OF WORK. THE NOS. OF TPs SHOWN ARE MINIMUM. TP–17, TP–18, TP–24, TP–25 ARE THE EXISTING TPs.
2. ALL CONVEYORS SHALL BE PROVIDED WITH ACCESSORIES SUCH AS PULL CORD, BELT SWAY AND ZERO SPEED SWITCHES, BELT WIPER UNITS, TENSIONING DEVICES ETC. AS PER TECHNICAL SPECIFICATION. THESE ARE NOT SHOWN IN THE FLOW DIAGRAM FOR CLARITY.
3. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
4. BIDDER TO CARRY OUT ALL NECESSARY MODIFICATION WORK OF EXISTING TRANSFER POINTS LIKE CHUTE ARRANGEMENT, SUPPORTING STRUCTURE, FLOORING, RELOCATION OF FACILITIES ETC AS REQUIRED FOR THE PROPOSED CONVEYING SYSTEM. BIDDER MAY INSTALL ADDITIONAL FLAP GATE, BELT FEEDER/REVERSIBLE BELT FEEDER/MOVABLE BELT FEEDER, IF REQUIRED IN THE EXISTING TP's TO DISCHARGE THE FEED TO PROPOSED CONVEYORS FROM EXISTING CONVEYORS. THE MODIFICATION ACTIVITIES SHALL BE CARRIED OUT IN SUCH A MANNER THAT THE EXISTING SYSTEM OPERATION SHALL BE LEAST AFFECTED.
5. RELOCATION OF EXISTING FACILITIES, IF REQUIRED TO INSTALL THE PROPOSED SYSTEM SHALL BE IN THE SCOPE OF THE BIDDER.
6. DUST SUPPRESSION, DUST EXTRACTION, SERVICE WATER, POTABLE WATER, COOLING WATER, & VENTILATION SHALL BE PROVIDED AS PER THE TECHNICAL SPECIFICATION REQUIREMENT.
7. THIS TENDER DRAWING IS TO BE REVIEWED IN CONJUNCTION WITH THE TECHNICAL SPECIFICATIONS.
8. MINIMUM CHUTE VALLEY ANGLE AND MINIMUM HEADROOM AS SPECIFIED ELSEWHERE SHALL BE RELAXED (IF REQUIRED) FOR EXISTING TRANSFER POINTS (TP–17,TP–24, TP–18 & TP–25) DUE TO THE LAYOUT CONSTRAINTS.
9. AT TP–17, INSTEAD OF TAKING FEED FROM C–19B, COAL CAN BE FED TO THE NEW CONVEYOR C–34B FROM C–19A ALSO. FURTHER, BIDDER MAY COMBINE/ MERGE TP–29 & TP–30 INTO A SINGLE TP, IF FEASIBLE.
10. LOCATIONS OF THE ELEVATORS IN TRANSFER POINT OF CHP IS INDICATIVE ONLY. TWO NOs ELEVATORS SHALL BE INSTALLED IN COAL TRANSFER POINTS. INSTALLATION LOCATION SHALL BE FINALIZED DURING DETAIL ENGINEERING BASED ON THE HEIGHT OF THE TRANSFER POINTS. IN ADDITION, ELEVATOR FOR BIOMASS HANDLING PLANT SHALL BE LOCATED AT BIOMASS STORAGE SILO.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
					CLEARED BY					
B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							29.11.23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31.05.23

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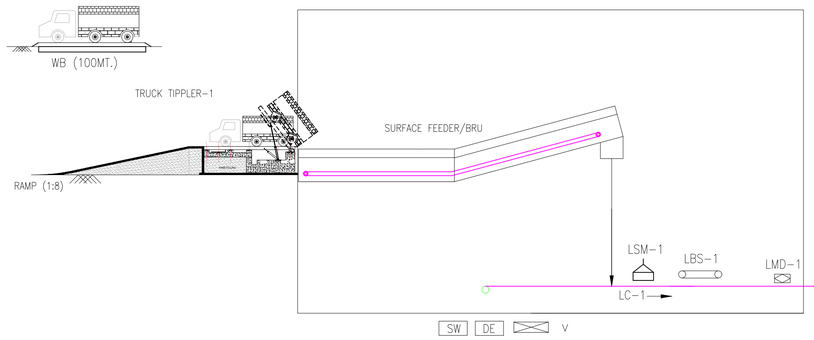
PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE–III (1×800MW)

TITLE: EPC PACKAGE
COAL + BIOMASS FLOW DIAGRAM

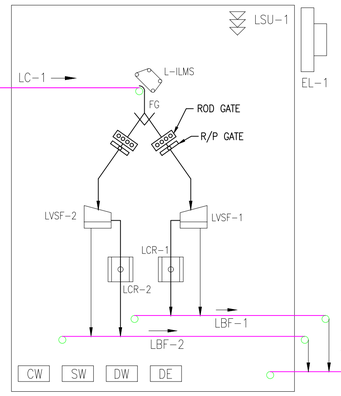
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CAD FILE NAME : XXXX–001–POM–A–040(OPTION–2)

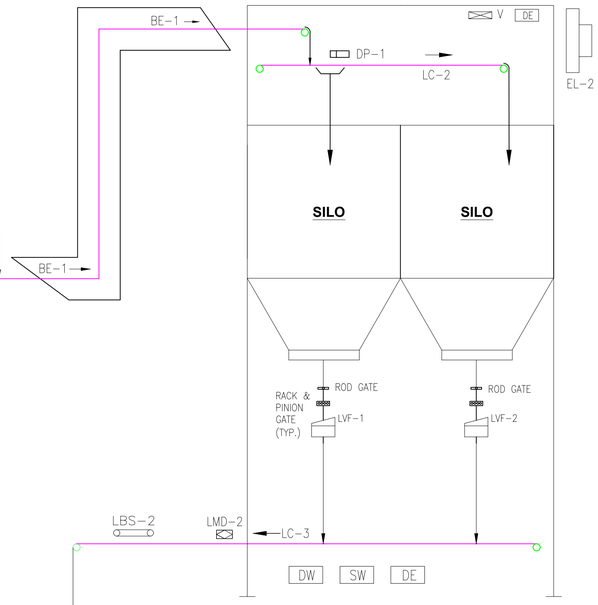
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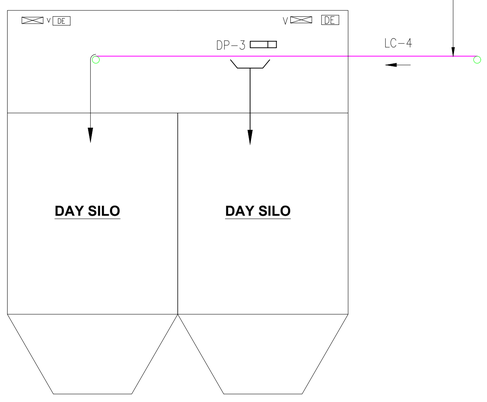
LIME STONE CRUSHER HOUSE



CRUSHED LIME STONE MAIN STORAGE SILO



LIME STONE DAY SILO



EQPT. DESIGN.	EQUIPMENT	QTY.	CAPACITY
RG	ROD GATE	2	
RPG	RACK AND PINION GATE	2	
LVF	LIMESTONE VIBRATING FEEDER	2	
LVSF	LIMESTONE VIBRATING SCREEN FEEDER	2	
LC 1,2,3&4	LIMESTONE CONVEYOR	4	150 TPH RATED COPACITY
EL	PASSENGER CUM GOODS ELEVATOR AT LCH	2	CONVENTIONAL TYPE ELEVATOR
LMD – 1 & 2	LIME STONE METAL DETECTOR	2	
LSM	SUSPENDED MAGNET	1	
SF	SURFACE FEEDER / BRU	1	200 TPH
LCR	LIME STONE CRUSHER	2	150 TPH RATED CAPACITY
LBS	LIME STONE BELT WEIGH SCALE	2	
L-ILMS	IN LINE MAGNETIC SEPARATOR ALONG WITH TRAMP IRON CHUTE	1	
LBF-1/2	LIME STONE BELD FEEDER	2	150 TPH RATED CAPACITY
TRUCK TIPPLER	TRUCK TIPPLER	1	
BE-1&2	BUCKET ELEVATOR	2	150 TPH RATED CAPACITY (PIT LESS)

LEGEND	
	LIME BELT FEEDER
SW	SERVICE WATER SYSTEM
DW	DRINKING WATER SYSTEM
DE	DRY DUST EXTRACTION SYSTEM
SP	SUMP & SUMP DRAINAGE PUMPS
LC	LIME STONE BELT CONVEYOR
	ROD GATE
	RACK & PINION GATE
LCR	LIME STONE CRUSHER
EL	CONVENTIONAL TYPE ELEVATOR
LBS	LIME STONE BELT SCALE
LSU	LIME STONE SAMPLING UNIT
L-ILMS	LIME STONE MAGNETIC SEPARATOR (IN LINE)
LMD	LIME STONE METAL DETECTOR
V	VENTILATION
DP	DIVERTER PLOW
LSM	SUSPENDED MAGNET

NOTES :

1. THE SCHEME SHOWN IS INDICATIVE. THIS DRG. IS MEANT TO SHOW ONLY LIMESTONE FLOW PATH AND DOES NOT INDICATE COMPREHENSIVE SCOPE OF WORK.
2. ALL CONVEYORS SHALL BE PROVIDED WITH ACCESSORIES SUCH AS PULL CORD, BELT SWAY AND ZERO SPEED SWITCHES, BELT WIPER UNITS, TENSIONING DEVICES ETC. ALL BUCKET ELEVATORS SHALL BE PROVIDED SUITABLE PROTECTION DEVICES AS PER TECHNICAL SPECIFICATION. THESE ARE NOT SHOWN IN THE FLOW DIAGRAM FOR CLARITY.
3. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
4. BIDDER MAY PROVIDE REVERSIBLE BELT FEEDER AS ALTERNATIVE ARRANGEMENT OF DIVERTER PLOW FOR FEEDING INTO STORAGE SILOS.
5. SERVICE WATER, POTABLE WATER, COOLING WATER, DUST EXTRACTION & VENTILATION SHALL BE PROVIDED AS PER TECHNICAL SPECIFICATION REQUIREMENT.
6. THE MAXIMUM CAPACITY OF EACH LIMESTONE MAIN STORAGE SILO SHALL NOT EXCEED 2000 MT. NUMBER OF LIMESTONE MAIN STORAGE SILOS SHALL BE MINIMUM TWO AND CAPACITY OF SILO SHALL BE DECIDED DURING DETAIL ENGINEERING BASED ON REQUIREMENTS OF TECHNICAL SPECIFICATIONS.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
					CLEARED BY					
B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							01-12-23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31-05-23

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PROJECT: **SIPAT THERMAL POWER STATION**
STAGE-III (1x800MW)

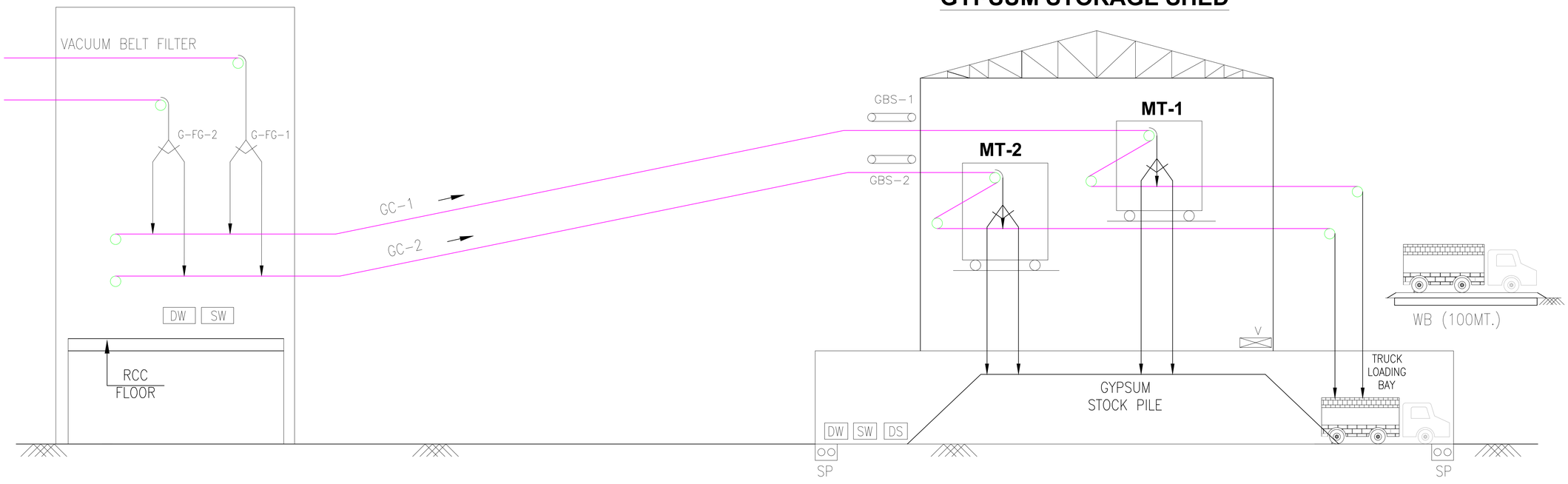
TITLE: EPC PACKAGE-LIMESTONE HANDLING SYSTEM
LIME STONE FLOW DIAGRAM

SIZE	SCALE	DRG.NO.	REV.
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CAD FILE NAME : XXXX-001-POM-A-039 (SH-1).dwg

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GYPSUM STORAGE SHED



MT – 1/2	MOBILE TRIPPER	02	55 TPH
GC – 1/2	GYPSUM CONV.	02	55 TPH
EQPT. DESIGNING	EQUIPMENT	QTY.	CAPACITY

LEGEND

	GYPSUM BELT CONVEYOR
SW	SERVICE WATER SYSTEM
DW	DRINKING WATER SYSTEM
DS	DUST SUPPRESSION SYSTEM
SP	SUMP & SUMP DRAINAGE PUMPS
G–FG	GYPSUM FLAP GATE
G–BS	GYPSUM BELT SCALE

NOTES :

1. THIS DRG. IS MEANT TO SHOW ONLY GYPSUM FLOW PATH AND DOES NOT INDICATE COMPREHENSIVE SCOPE OF WORK.
2. ALL CONVEYORS SHALL BE PROVIDED WITH ACCESSORIES SUCH AS PULL CORD, BELT SWAY AND ZERO SPEED SWITCHES, BELT WIPER UNITS, TENSIONING DEVICES ETC. AS PER TECHNICAL SPECIFICATION. THESE ARE NOT SHOWN IN THE FLOW DIAGRAM FOR CLARITY.
3. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFECIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
4. SERVICE WATER, POTABLE WATER & DUST SUPPRESSION SHALL BE PROVIDED AS PER TECHNICAL SPECIFICATION REQUIREMENT.
5. NECESSARY MAINTENANCE AND OPERATING PLATFORM FOR VARIOUS EQUIPMENT SHALL BE PROVIDED.
6. IN PLACE GYPSUM STORAGE SHED, BIDDER MAY ALTERNATELY PLACE EURO SILO / EQUIVALENT FOR STORAGE. CONVENTIONAL SILO ARE NOT ACCEPTABLE.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							01-12-23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31-05-23

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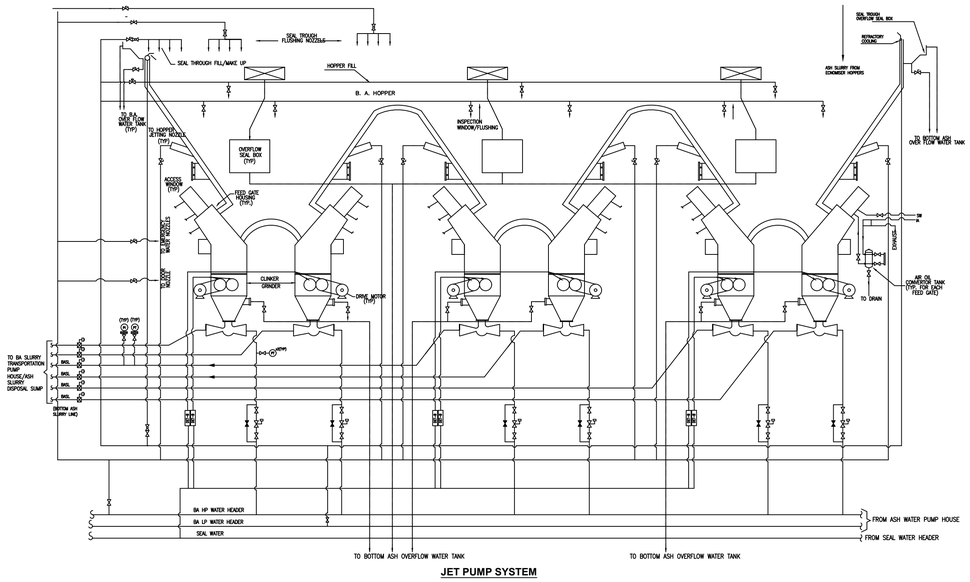
PROJECT: **SIPAT THERMAL POWER STATION**
STAGE–III (1x800MW)

TITLE: EPC PACKAGE
GYPSUM FLOW DIAGRAM

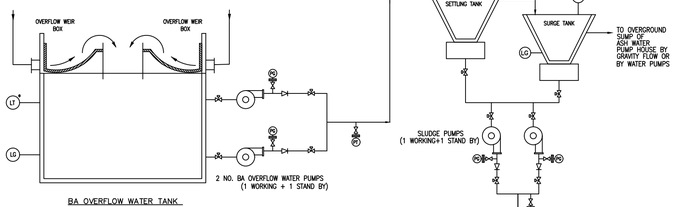
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CAD FILE NAME : XXXX–001–POM–A–039(SH–2).dwg

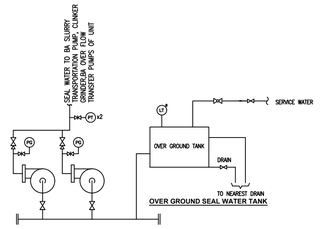
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JET PUMP SYSTEM

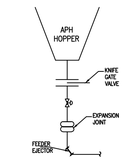


BA OVERFLOW WATER TANK

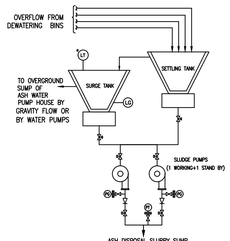


BA SEAL WATER PUMPS (1 WORKING + 1 STANDBY)

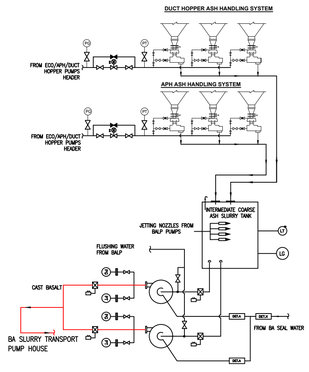
OVER GROUND SEAL WATER TANK

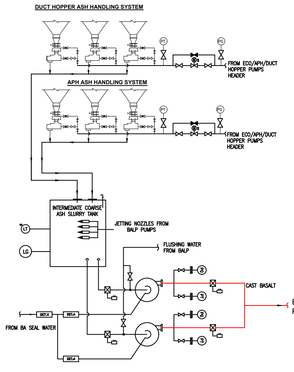


DETAIL-A

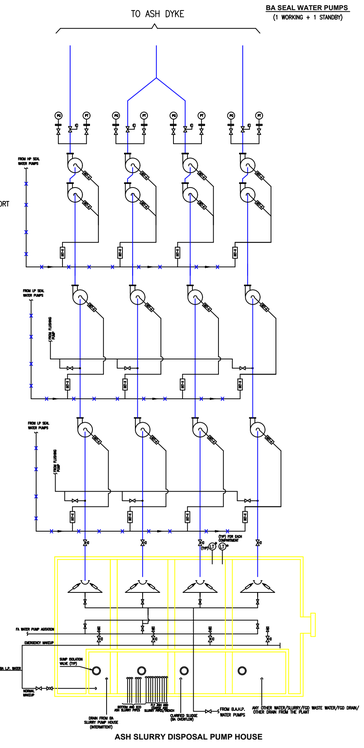


ASH DISPOSAL SLURRY SUMP

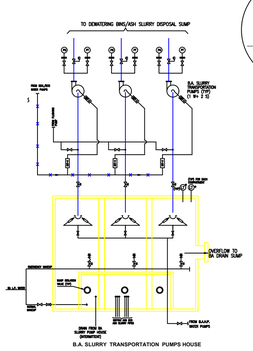




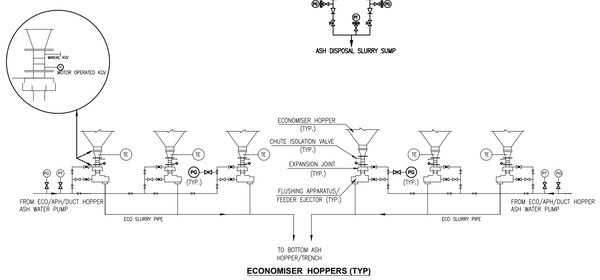
COARSE ASH SLURRY DISPOSAL SYSTEM



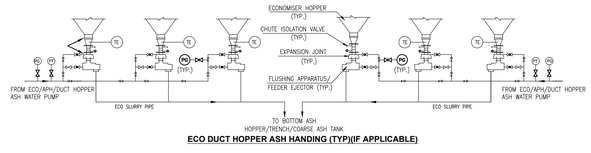
ASH SLURRY DISPOSAL PUMP HOUSE



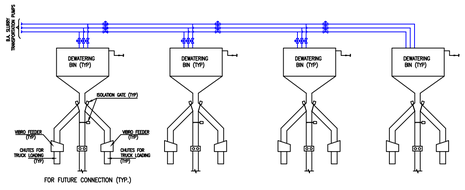
B.A. SLURRY TRANSPORTATION PUMPS HOUSE

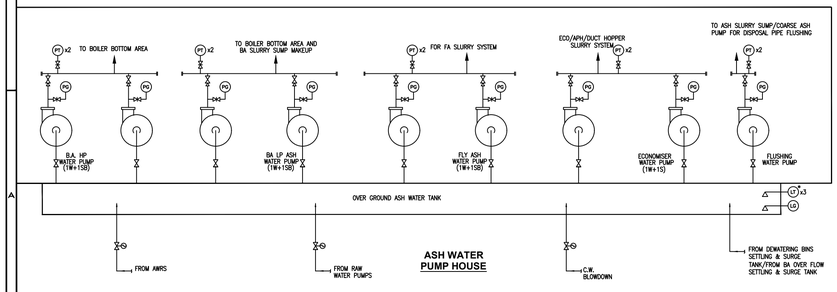


ECONOMISER HOPPERS (TYP)

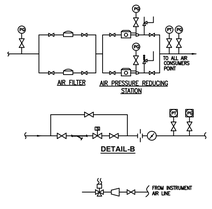


ECO DUCT HOPPER ASH HANDING (TYP)(IF APPLICABLE)





ASH WATER PUMP HOUSE



TYPICAL INSTRUMENT AIR CONNECTION

LEGEND :

- PLUG VALVE
- GLOBE VALVE
- NON RETURN VALVE
- ISOLATION VALVE
- ISOLATION VALVE (PNEUMATICALLY OPERATED)
- RELIEF VALVE
- PUMP
- PRESSURE SWITCH
- PRESSURE GAUGE
- STRAINER
- SOLENOID VALVE (PNEUMATICALLY OPERATED)
- MOTORISED VALVE
- ASH SLURRY VALVE
- PRESSURE TRANSMITTER
- LEVEL TRANSMITTER (ULTRASONIC TYPE)
- LEVEL GAUGE
- INSTRUMENT VALVE
- DIFFERENTIAL PRESSURE GUAGE
- LEVEL INDICATOR
- DIAPHRAGM SEAL
- PNEUMATIC VALVE
- FLOW INDICATOR
- BASL BOTTOM ASH SLURRY LINE
- IA INSTRUMENT AIR LINE
- LS LEVEL SWITCH

NOTES

1. BOTTOM ASH / ECO ASH / APH ASH / DUCT HOPPER ASH HANDLING SYSTEM SHOWN IS INDICATIVE. COMPLETE ASH HANDLING SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT. THE NOS. OF ECONOMISER, DUCT HOPPERS AND AIR PREHEATER HOPPERS SHALL BE DECIDED BY THE BIDDER.
2. THE SCHEME & NO. OF PUMPS/EQUIPMENT SHALL BE FINALISED BASED ON STIPULATIONS OF TECHNICAL SPECIFICATION & SYSTEM REQUIREMENTS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH TECH.SPECS. AND OTHER TENDER DOCUMENTS. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
4. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS SPECIFIED.
5. THE BOTTOM ASH HOPPER OVERFLOW WATER SHALL BE LED TO AN OVERFLOW TANK. BOTTOM ASH OVERFLOW WATER PUMP SHALL TAKE SUCTION FROM THIS OVERFLOW TANK AND PUMP THE WATER TO THE REQUIRED TREATMENT FACILITIES. SUITABLE CHEMICAL TREATMENT / FILTRATION / CLARIFICATION ETC. SHALL BE PROVIDED SO THAT TSS OF OUTLET WATER AT DISCHARGE OF SETTLING TANK/SURGE TANK SHALL NOT BE MORE THAN 100 PPM BEFORE THE WATER IS BEING DISCHARGED TO THE SUMP OF ASH WATER PUMP HOUSE.
6. OVER FLOW FROM DEWATERING BINS SHALL BE TAKEN TO SETTLING TANK.SUITABLE CHEMICAL TREATMENT/ FILTRATION / CLARIFICATION ETC. SHALL BE PROVIDED SO THAT TSS OF OUTLET WATER AT DISCHARGE OF SETTLING TANK/SURGE TANK SHALL NOT BE MORE THAN 100 PPM BEFORE THE WATER IS BEING DISCHARGED TO THE SUMP OF ASH WATER PUMP HOUSE.
7. THE ASH SLURRY PIPING FROM THE DISCHARGE OF JET PUMP UP TO BA SLURRY TRANSPORTATION SUMP AND ASH SLURRY DISPOSAL SUMP SHALL BE BASALT LINED. ASH SLURRY TRANSPORTATION PIPING WITH IN SLURRY PUMP HOUSE AND UP TO DEWATERING BINS SHALL BE BASALT LINED.
8. FOR MEETING THE FLUSHING APPARATUS WATER REQUIREMENT OF ECO HOPPERS. TWO(2) NOS. (ONE WORKING AND ONE STANDBY) ECONOMISER ASH WATER PUMPS ALONG WITH VALVES, PIPES & FITTINGS SHALL BE PROVIDED FOR ALL UNITS.THESE PUMPS SHALL BE LOCATED IN ASH WATER PUMP HOUSE.
9. FOR SEALING OF BA COOLING WATER OVERFLOW PUMPS, COOLING OF BA OVERFLOW PUMP FLUID COUPLING, SEALING OF CLINKER GRINDERS ETC, BIDDER SHALL PROVIDE TWO (2) NOS. (1 WORKING + 1 STANDBY) SEAL WATER PUMPS.
10. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
11. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBERS SHALL BE INDICATED ON DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
12. FOR SEALING OF BA SLURRY TRANSPORTATION PUMPS, BIDDER SHALL PROVIDE TWO (2) NOS. (1 WORKING + 1 STANDBY) BA SEAL WATER PUMPS. IN CASE, BA SLURRY TRANSPORTATION PUMPS SHALL BE LOCATED INSIDE ASH SLURRY DISPOSAL PUMP HOUSE, HP & LP SEAL WATER PUMPS (AS SPECIFIED ELSEWHERE) FOR SLURRY DISPOSAL PUMP MAY BE PROVIDED FOR BOTH BA SLURRY TRANSPORTATION PUMPS & ASH SLURRY DISPOSAL PUMPS, IF FEASIBLE.
13. RECIRCULATION LINE ALONG WITH VALVES AND INSTRUMENTATION IN ASH WATER PUMPS SHALL BE PROVIDED.
14. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY C	CLEARED BY M	CLEARED BY E	CLEARED BY C&I	APPD	DATE
B	RELEASED FOR TENDER	PRIYANKA	ABHIJIT							28.11.23
A	RELEASED FOR TENDER	PRIYANKA	ABHIJIT							30.05.23

CONSULTANT: एनटीपीसी NTPC

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ENGINEERING DIVISION

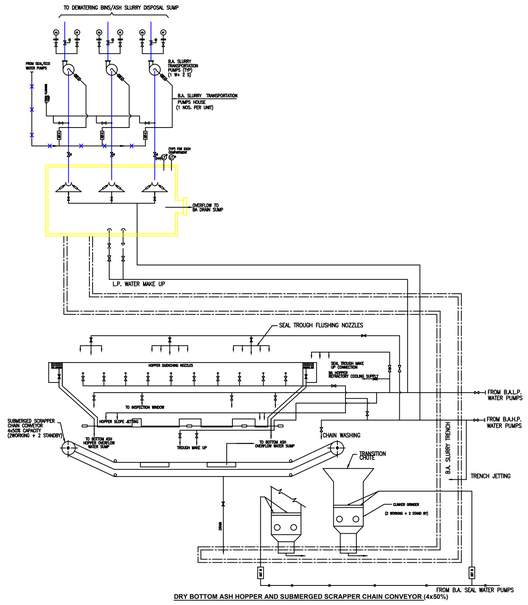
PROJECT: SIPAT THERMAL POWER STATION
STAGE–III (1X800 MW)

TITLE: EPC PACKAGE
SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM (JET PUMP SYSTEM) ASH DISPOSAL & ASH WATER SYSTEM

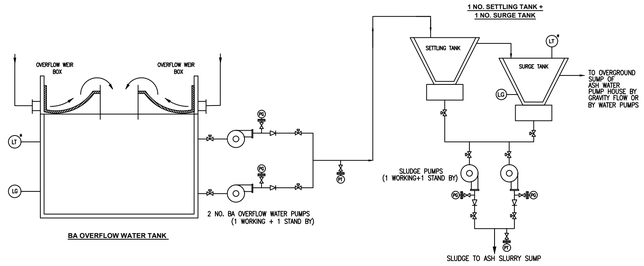
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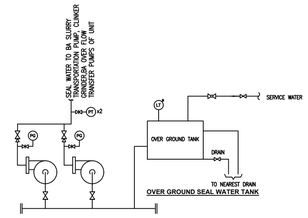
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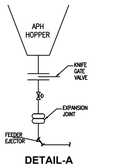
DRY BOTTOM ASH HOPPER AND SUBMERGED SCRAPPER CHAIN CONVEYOR (4x50%)



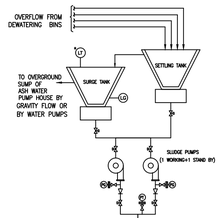
BA OVERFLOW WATER TANK

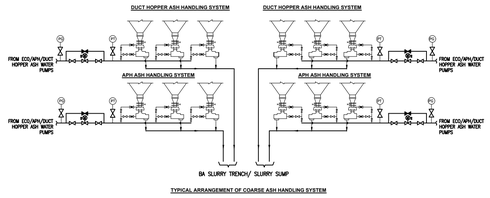


BA SEAL WATER PUMPS (1 WORKING + 1 STANDBY)

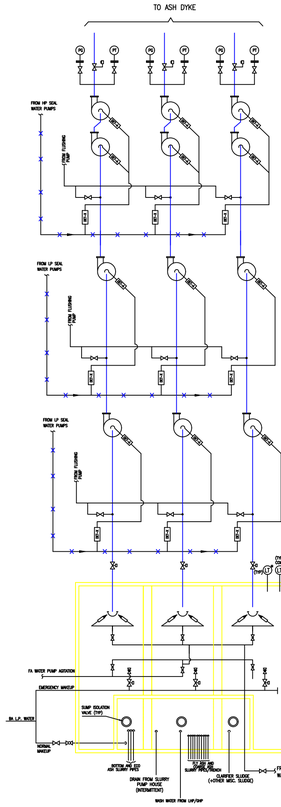


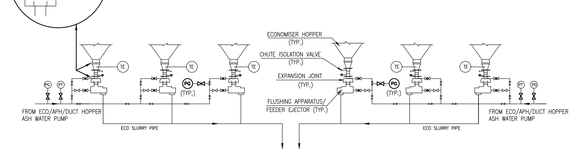
DETAIL-A



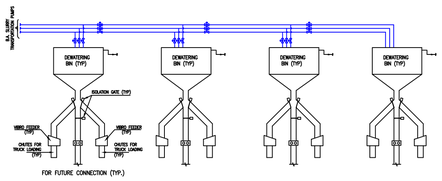


TYPICAL ARRANGEMENT OF COARSE ASH HANDLING SYSTEM

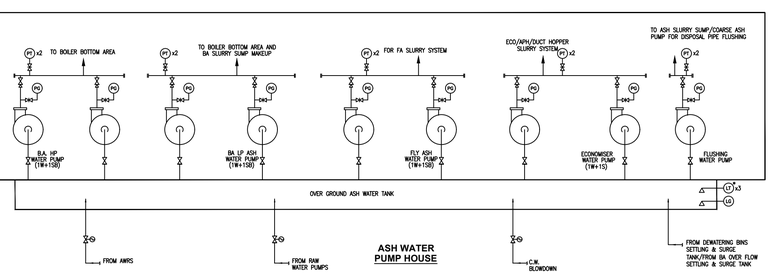




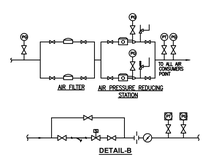
ECONOMISER AND ECO DUCT HOPPERS (IF APPLICABLE) (TYPICAL)



FOR FUTURE CONNECTION (TYP.)



ASH WATER PUMP HOUSE



TYPICAL INSTRUMENT AIR CONNECTION

LEGEND :

- VACUUM BREAKER
- SOLENOID VALVE
- GLOBE VALVE
- BALL VALVE
- GATE VALVE
- NON RETURN VALVE
- Y-STRAINER
- PRESSURE RELEASE VALVE
- CHECK VALVE
- PNEUMATIC VALVE
- ISOLATION VALVE
- ISOLATION VALVE (CYL. OP.)
- H HEATER
- OLS OPEN LIMIT SWITCH
- DS DUST SENSOR
- FI FLOW INDICATOR
- PT PRESSURE TRANSMITTER
- PS PRESSURE SWITCH
- PG PRESSURE GAUGE
- SFT SLURRY FLOW TRANSMITTER
- NDM NUCLEONIC DENSITY METER
- DM DENSITY METER (CORIOLIS TYPE)
- M MOTOR
- VFD VARIABLE FREQUENCY DRIVE
- DPT DIFF PRESSURE TRANSMITTER
- DPS DIFF PRESSURE SWITCH
- DPG DIFF PRESSURE GAUGE
- LT* LEVEL TRANSMITTER (ULTRASONIC TYPE)
- LT** LEVEL TRANSMITTER (RADAR TYPE)
- LS LEVEL SWITCH
- LG LEVEL GAUGE
- LI LEVEL INDICATOR
- TE TEMP ELEMENT
- TG TEMP GAUGE
- VT VACUUM TRANSMITTER
- VG VACUUM GAUGE
- DP DEW POINT METER
- LT^A LEVEL TRANSMITTER–ACOUSTIC FREQUENCY BASED
- FT FLOW TRANSMITTER

LEGEND :

- PLUG VALVE
- GLOBE VALVE
- NON RETURN VALVE
- ISOLATION VALVE
- ISOLATION VALVE (PNEUMATICALLY OPERATED)
- RELIEF VALVE
- PUMP
- PS PRESSURE SWITCH
- PG PRESSURE GAUGE
- STRAINER
- SOLENOID VALVE (PNEUMATICALLY OPERATED)
- MOTORISED VALVE
- ASH SLURRY VALVE
- PT PRESSURE TRANSMITTER
- LT* LEVEL TRANSMITTER (ULTRASONIC TYPE)
- LG LEVEL GAUGE
- INSTRUMENT VALVE
- DPG DIFFERENTIAL PRESSURE GUAGE
- LG LEVEL INDICATOR
- DIAPHRAGM SEAL
- PNEUMATIC VALVE
- FI FLOW INDICATOR
- BASL BOTTOM ASH SLURRY LINE
- IA INSTRUMENT AIR LINE
- LS LEVEL SWITCH

NOTES

1. BOTTOM ASH / ECO ASH / APH ASH / DUCT HOPPER ASH HANDLING SYSTEM SHOWN IS INDICATIVE. COMPLETE ASH HANDLING SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT.
2. THE SCHEME & NO. OF PUMPS/EQUIPMENT SHALL BE FINALISED BASED ON STIPULATIONS OF TECHNICAL SPECIFICATION & SYSTEM REQUIREMENTS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH TECHSPECS. AND OTHER TENDER DOCUMENTS. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
4. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS SPECIFIED.
5. THE BOTTOM ASH HOPPER OVERFLOW WATER SHALL BE LED TO AN OVERFLOW TANK. BOTTOM ASH OVERFLOW WATER PUMP SHALL TAKE SUCTION FROM THIS OVERFLOW TANK AND PUMP THE WATER TO THE REQUIRED TREATMENT FACILITIES. SUITABLE CHEMICAL TREATMENT/ FILTRATION/ CLARIFICATION ETC. SHALL BE PROVIDED SO THAT TSS OF OUTLET WATER AT DISCHARGE OF SETTLING TANK/SURGE TANK SHALL NOT BE MORE THAN 100 PPM BEFORE THE WATER IS BEING DISCHARGED TO THE SUMP OF ASH WATER PUMP HOUSE.
6. THE ASH SLURRY PIPING FROM THE DISCHARGE OF BA SLURRY TRANSPORTATION PUMPS UP TO DEWATERING BINS & ASH SLURRY DISPOSAL SUMP SHALL BE BASALT LINED.
7. FOR MEETING THE FLUSHING APPARATUS WATER REQUIREMENT OF ECO HOPPERS, TWO(2) NOS. (ONE WORKING AND ONE STANDBY) ECONOMISER ASH WATER PUMPS ALONG WITH VALVES, PIPES & FITTINGS SHALL BE PROVIDED FOR ALL UNITS. THESE PUMPS SHALL BE LOCATED IN ASH WATER PUMP HOUSE.
8. FOR SEALING OF BA COOLING WATER OVERFLOW PUMPS, COOLING OF BA OVERFLOW PUMP FLUID COUPLING, SEALING OF CLINKER GRINDERS ETC, BIDDER SHALL PROVIDE TWO (2) NOS. (1 WORKING + 1 STANDBY) SEAL WATER PUMPS.
9. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
11. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBERS SHALL BE INDICATED ON DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
12. OVER FLOW FROM DEWATERING BINS SHALL BE TAKEN TO SETTLING TANK.SUITABLE CHEMICAL TREATMENT/ FILTRATION/ CLARIFICATION ETC. SHALL BE PROVIDED SO THAT TSS OF OUTLET WATER AT DISCHARGE OF SETTLING TANK/SURGE TANK SHALL NOT BE MORE THAN 100 PPM BEFORE THE WATER IS BEING DISCHARGED TO THE SUMP OF ASH WATER PUMP HOUSE.
13. RECIRCULATION LINE ALONG WITH VALVES AND INSTRUMENTATION IN ASH WATER PUMPS SHALL BE PROVIDED.
14. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
B	RELEASED FOR TENDER									28-11-23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31-05-23

CLEARED BY

CONSULTANT: एन टी पी सी लिमिटेड NTPC Limited (A GOVT. OF INDIA ENTERPRISE) ENGINEERING DIVISION

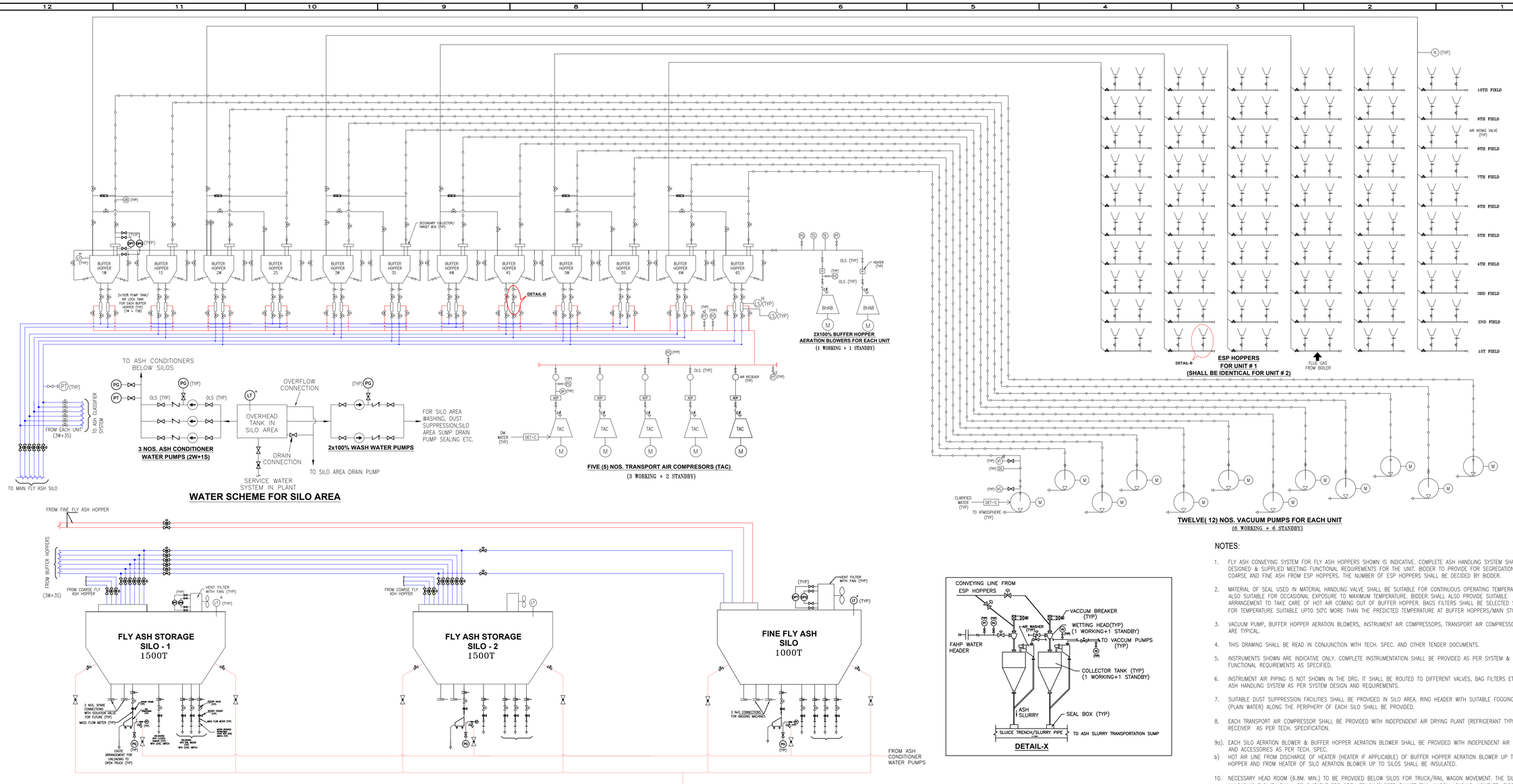
PROJECT: SIPAT THERMAL POWER STATION
STAGE–III (1X800 MW)
EPC PACKAGE

TITLE: SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM (SUBMERGED SCRAPER CHAIN CONVEYOR)

SIZE: A0 | SCALE: | DRG.NO.: XXXX-001-POM-A-026 | REV.: B

cad file name : XXXX-001(A)-POM-A-026.dwg

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LEGEND :

VB	VACUUM BREAKER	DPT	DIFF PRESSURE TRANSMITTER
	SOLENOID VALVE	DPS	DIFF PRESSURE SWITCH
	GLOBE VALVE	DPG	DIFF PRESSURE GAUGE
	BALL VALVE	LT*	LEVEL TRANSMITTER (ULTRASONIC TYPE)
	GATE VALVE	LT**	LEVEL TRANSMITTER (RADAR TYPE)
	NON RETURN VALVE	LS	LEVEL SWITCH
	Y-STRAINER	LG	LEVEL GAUGE
	PRESSURE RELEASE VALVE	LI	LEVEL INDICATOR
	CHECK VALVE	TE	TEMP ELEMENT
	PNEUMATIC VALVE	TG	TEMP GAUGE
	ISOLATION VALVE	VT	VACUUM TRANSMITTER
H	HEATER	VG	VACUUM GAUGE
OLS	OPEN LIMIT SWITCH	DP	DEW POINT METER
DS	DUST SENSOR	LT^A	LEVEL TRANSMITTER–ACOUSTIC FREQUENCY BASED
	FLOW INDICATOR		
PT	PRESSURE TRANSMITTER		
PS	PRESSURE SWITCH		
PG	PRESSURE GAUGE		

NOTES:

1. FLY ASH CONVEYING SYSTEM FOR FLY ASH HOPPERS SHOWN IS INDICATIVE. COMPLETE ASH HANDLING SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT. BIDDER TO PROVIDE FOR SEGREGATION OF COARSE AND FINE ASH FROM ESP HOPPERS. THE NUMBER OF ESP HOPPERS SHALL BE DECIDED BY BIDDER.
2. MATERIAL OF SEAL USED IN MATERIAL HANDLING VALVE SHALL BE SUITABLE FOR CONTINUOUS OPERATING TEMPERATURE AND ALSO SUITABLE FOR OCCASIONAL EXPOSURE TO MAXIMUM TEMPERATURE. BIDDER SHALL ALSO PROVIDE SUITABLE ARRANGEMENT TO TAKE CARE OF HOT AIR COMING OUT OF BUFFER HOPPER. BAGS FILTERS SHALL BE SELECTED SUITABLE FOR TEMPERATURE SUITABLE UPTO 50°C MORE THAN THE PREDICTED TEMPERATURE AT BUFFER HOPPERS/MAIN STORAGE.
3. VACUUM PUMP, BUFFER HOPPER AERATION BLOWERS, INSTRUMENT AIR COMPRESSORS, TRANSPORT AIR COMPRESSORS SHOWN ARE TYPICAL.
4. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECH. SPEC. AND OTHER TENDER DOCUMENTS.
5. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS AS SPECIFIED.
6. INSTRUMENT AIR PIPING IS NOT SHOWN IN THE DRG. IT SHALL BE ROUTED TO DIFFERENT VALVES, BAG FILTERS ETC. IN FLY ASH HANDLING SYSTEM AS PER SYSTEM DESIGN AND REQUIREMENTS.
7. SUITABLE DUST SUPPRESSION FACILITIES SHALL BE PROVIDED IN SILO AREA. RING HEADER WITH SUITABLE FOGGING NOZZLES (PLAIN WATER) ALONG THE PERIPHERY OF EACH SILO SHALL BE PROVIDED.
8. EACH TRANSPORT AIR COMPRESSOR SHALL BE PROVIDED WITH INDEPENDENT AIR DRYING PLANT (REFRIGERANT TYPE) AND AIR RECEIVER AS PER TECH. SPECIFICATION.

9a). EACH SILO AERATION BLOWER & BUFFER HOPPER AERATION BLOWER SHALL BE PROVIDED WITH INDEPENDENT AIR HEATERS AND ACCESSORIES AS PER TECH. SPEC.

b) HOT AIR LINE FROM DISCHARGE OF HEATER (HEATER IF APPLICABLE) OF BUFFER HOPPER AERATION BLOWER UP TO BUFFER HOPPER AND FROM HEATER OF SILO AERATION BLOWER UP TO SILOS SHALL BE INSULATED.

10. NECESSARY HEAD ROOM (6.8M. MIN.) TO BE PROVIDED BELOW SILOS FOR TRUCK/RAIL WAGON MOVEMENT. THE SILO UNLOADING FACILITY SHALL BE SUITABLE FOR OPEN TRUCK/CLOSED TANKER/RAIL WAGON LOADING. HOWEVER, BIDDER SHALL ENSURE THAT THE CLEARANCE OF ASH SILOS OVER THE RAILWAY TRACKS SHALL BE AS PER RAILWAYS/RDSO GUIDELINES. THE SCOPE ALSO INCLUDES GETTING APPROVALS FROM RAILWAYS.
11. BOTH SILO AERATION AND BUFFER HOPPER AERATION BLOWERS SHALL BE AIR COOLED.
12. ALL DEVICES REQUIRING INSTRUMENT AIR SHALL BE PROVIDED WITH MANUAL ISOLATION VALVE IN IA LINE. THIS IS APPLICABLE FOR ENTIRE ASH HANDLING SYSTEM.
13. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
14. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBER SHALL BE INDICATED ON ALL DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
15. PRESSURE MEASUREMENT (TRANSMITTER) TO BE PROVIDED FOR INSTRUMENT AIR HEADER PRESSURE MEASUREMENT AT BUFFER HOPPER TOWERS AREA & IN SILO AREA.
16. ONE NO. PT AND ONE NO. PG SHALL BE PROVIDED IN PULSE JETTING INSTRUMENT AIR HEADER/MANIFOLD OF EACH BUFFER HOPPER AND SILO VENT FILTER.
18. TWO (2) NOS. (ONE AT ENTRY & ONE AT EXIT) PITLESS TYPE WEIGH BRIDGE SHALL BE PROVIDED AT MAIN FLY ASH SILO AREA COMPLETE WITH ALL ELECTRICAL, CONTROLS, CIVIL AND STRUCTURAL WORKS FOR WEIGHMENT OF TRUCKS/BULKER FILLED FROM SILOS. ONE (1) NO. PITLESS TYPE WEIGH BRIDGE FOR RAIL LOADING BELOW EACH MAIN FLY ASH SILO COMPLETE WITH ALL ELECTRICAL, CONTROLS, CIVIL AND STRUCTURAL WORKS. FOR WEIGHMENT FROM SILOS. MASS FLOW METER /SOLID FLOW METER FOR ONLINE WEIGHMENT OF TOTAL LOADED ASH OF WAGON/TRUCK, DURING LOADING SHALL BE PROVIDED FOR EACH MAIN FLY ASH SILO, AS SPECIFIED.
19. ONE NO PT AND PG SHALL BE PROVIDED IN EACH UNIT SERVICE WATER HEADER USED FOR VACUUM PUMP SEALING/COOLING.
20. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD.	DATE
					CLEARED BY					
B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							21.11.23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31.05.23

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ENGINEERING DIVISION

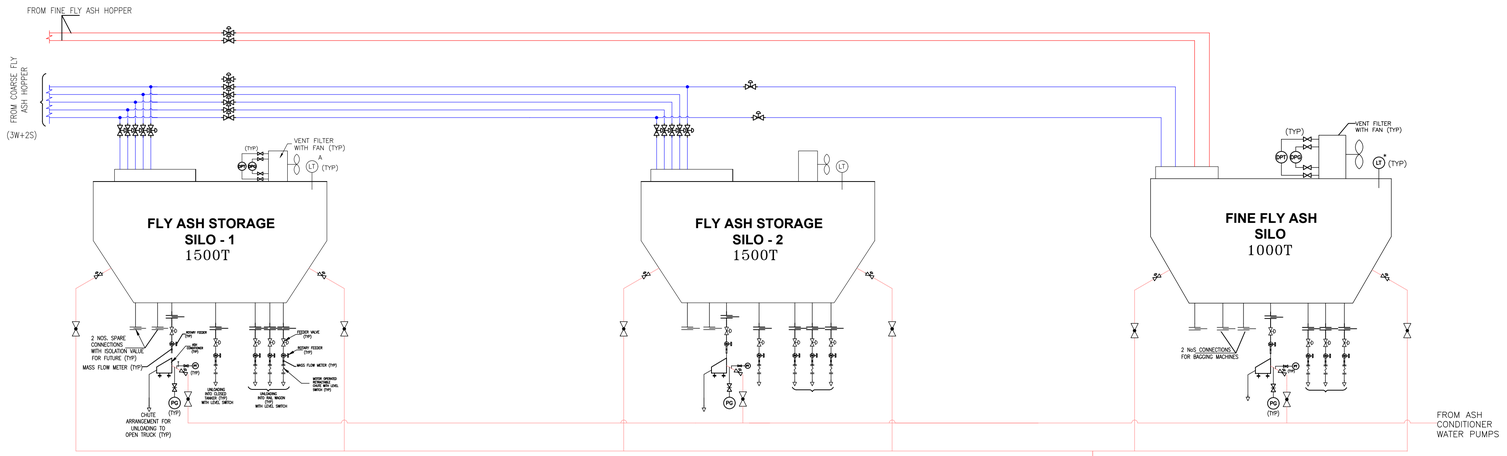
PROJECT: SIPAT THERMAL POWER STATION
STAGE–III (1X800 MW)

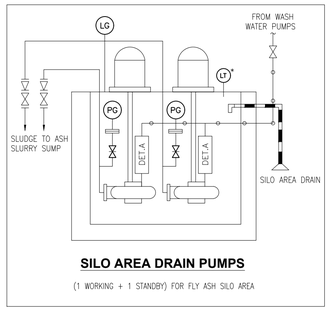
TITLE: EPC PACKAGE
SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (VACUUM SYSTEM)

SIZE	SCALE	DRG.NO.	REV.
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cad file name : XXXX-001(A)-POM-A-027.dwg

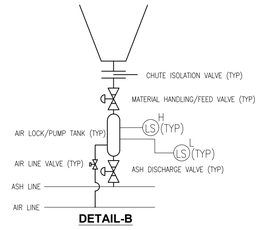
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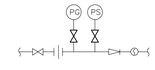


SILO AREA DRAIN PUMPS

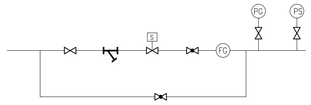
(1 WORKING + 1 STANDBY) FOR FLY ASH SILO AREA



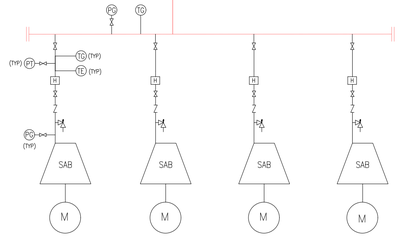
DETAIL-B



DETAIL-A

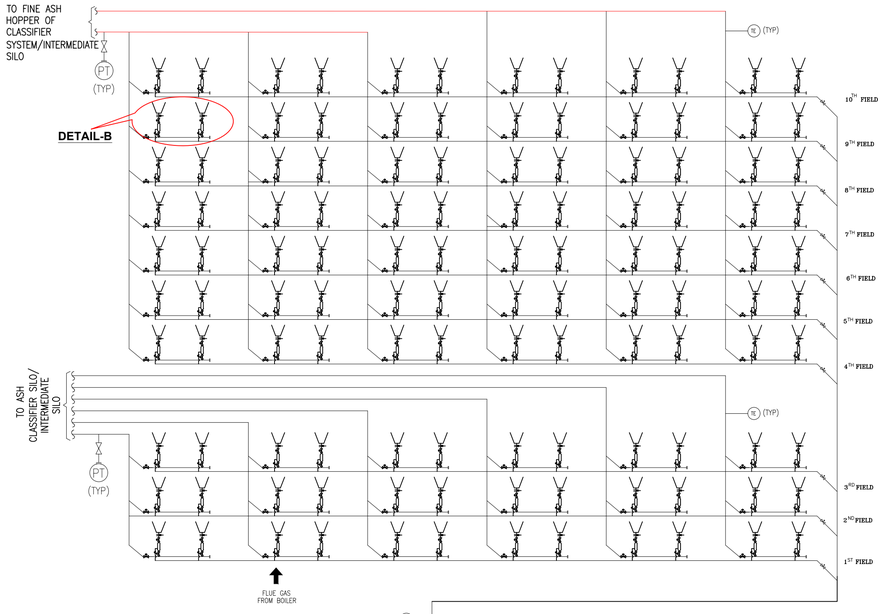


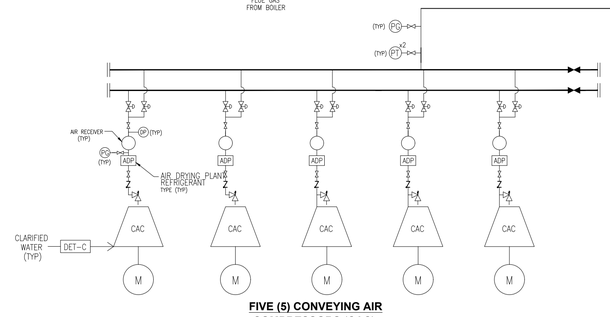
DETAIL-C



FLY ASH SILO-AERATION BLOWERS

(3 WORKING + 1 COMMON STANDBY)



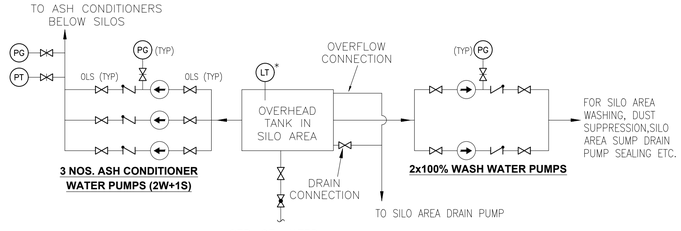


FIVE (5) CONVEYING AIR COMPRESSORS (CAC)

(3 WORKING +2 STANDBY)



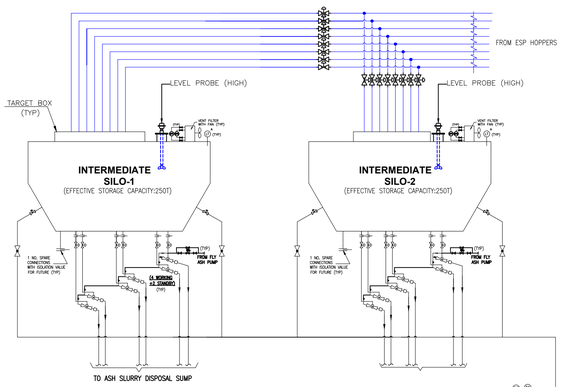
TYPICAL INSTRUMENT AIR CONNECTION



3 NOS. ASH CONDITIONER WATER PUMPS (2W+1S)

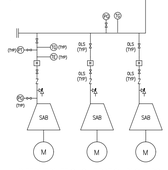
2x100% WASH WATER PUMPS

WATER SCHEME FOR SILO AREA



INTERMEDIATE SILOS

(1 WORKING + 1 STANDBY)



LEGEND :

VB	VACUUM BREAKER
	SOLENOID VALVE
	GLOBE VALVE
	BALL VALVE
	GATE VALVE
	NON RETURN VALVE
	Y-STRAINER
	PRESSURE RELEASE VALVE
	CHECK VALVE
	PNEUMATIC VALVE
	ISOLATION VALVE
	ISOLATION VALVE (CYL. OP.)
H	HEATER
OLS	OPEN LIMIT SWITCH
DS	DUST SENSOR
	FLOW INDICATOR
PT	PRESSURE TRANSMITTER
PS	PRESSURE SWITCH
PG	PRESSURE GAUGE
SPT	SLURRY FLOW TRANSMITTER
NDM	NUCLEONIC DENSITY METER
DM	DENSITY METER (CORIOLIS TYPE)
M	MOTOR
VFD	VARIABLE FREQUENCY DRIVE
DPT	DIFF PRESSURE TRANSMITTER
DPS	DIFF PRESSURE SWITCH
DPG	DIFF PRESSURE GAUGE
LT*	LEVEL TRANSMITTER (ULTRASONIC TYPE)
LT**	LEVEL TRANSMITTER (RADAR TYPE)
LS	LEVEL SWITCH
LG	LEVEL GAUGE
LI	LEVEL INDICATOR
TE	TEMP ELEMENT
TG	TEMP GAUGE
VT	VACUUM TRANSMITTER
VG	VACUUM GAUGE
DP	DEW POINT METER
LT A	LEVEL TRANSMITTER-ACOUSTIC FREQUENCY BASED
FT	FLOW TRANSMITTER

NOTES:

1. FLY ASH CONVEYING SYSTEM FOR FLY ASH HOPPERS SHOWN IS INDICATIVE AND IS FOR ONE UNIT ONLY AND THE SAME SHALL BE IDENTICAL FOR OTHER UNIT. BIDDER TO PROVIDE FOR SEGREGATION OF COARSE AND FINE ASH FROM ESP HOPPERS. THE NUMBER OF ESP HOPPERS SHALL BE DECIDED BY BIDDER.
2. MATERIAL OF SEAL USED IN MATERIAL HANDLING VALVE SHALL BE SUITABLE FOR CONTINUOUS OPERATING TEMPERATURE AND ALSO SUITABLE FOR OCCASIONAL EXPOSURE TO MAXIMUM TEMPERATURE. BIDDER SHALL ALSO PROVIDE SUITABLE ARRANGEMENT TO TAKE CARE OF HOT AIR COMING OUT OF BUFFER HOPPER. BAGS FILTERS SHALL BE SELECTED SUITABLE FOR TEMPERATURE SUITABLE UPTO 50°C MORE THAN THE PREDICTED TEMPERATURE AT BUFFER HOPPERS/MAIN STORAGE.
3. CONVEYING AIR COMPRESSORS, TRANSPORT AIR COMPRESSOR & INSTRUMENT AIR COMPRESSORS SHOWN ARE TYPICAL.
4. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH TECH. SPEC. AND OTHER TENDER DOCUMENTS.
5. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS AS SPECIFIED.
6. INSTRUMENT AIR PIPING IS NOT SHOWN IN THE DRG. IT SHALL BE ROUTED TO DIFFERENT VALVES, BAG FILTERS ETC. IN FLY ASH HANDLING SYSTEM AS PER SYSTEM DESIGN AND REQUIREMENTS.
7. SUITABLE DUST SUPPRESSION FACILITIES SHALL BE PROVIDED IN SILO AREA. RING HEADER WITH SUITABLE FOGGING NOZZLES (PLAIN WATER) ALONG THE PERIPHERY OF EACH SILO SHALL BE PROVIDED.
8. EACH TRANSPORT AIR COMPRESSOR AND CONVEYING AIR COMPRESSOR SHALL BE PROVIDED WITH INDEPENDENT AIR DRYING PLANT (REFRIGERANT TYPE, IF APPLICABLE) AND AIR RECEIVER AS PER TECH. SPECIFICATION.

9a). EACH SILO AERATION BLOWER & BUFFER HOPPER AERATION BLOWER SHALL BE PROVIDED WITH INDEPENDENT AIR HEATERS AND ACCESSORIES AS PER TECH. SPEC.

b) HOT AIR LINE FROM DISCHARGE OF HEATER (HEATER IF APPLICABLE) OF SILO AERATION BLOWER UP TO SILOS SHALL BE INSULATED.

10. NECESSARY HEAD ROOM (6.8M. MIN.) TO BE PROVIDED BELOW SILOS FOR TRUCK/RAIL WAGON MOVEMENT. THE SILO UNLOADING FACILITY SHALL BE SUITABLE FOR OPEN TRUCK/CLOSED TANKER/RAIL WAGON LOADING. HOWEVER, BIDDER SHALL ENSURE THAT THE CLEARANCE OF ASH SILOS OVER THE RAILWAY TRACKS SHALL BE AS PER RAILWAYS/RDSO GUIDELINES. THE SCOPE ALSO INCLUDES GETTING APPROVALS FROM RAILWAYS.
11. BOTH SILO AERATION AND BUFFER HOPPER AERATION BLOWERS SHALL BE AIR COOLED.
12. ALL DEVICES REQUIRING INSTRUMENT AIR SHALL BE PROVIDED WITH MANUAL ISOLATION VALVE IN IA LINE. THIS IS APPLICABLE FOR ENTIRE ASH HANDLING SYSTEM.
13. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
14. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBER SHALL BE INDICATED ON ALL DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
15. PRESSURE MEASUREMENT (TRANSMITTER) TO BE PROVIDED FOR INSTRUMENT AIR HEADER PRESSURE MEASUREMENT IN SILO AREA.
16. ONE NO. PT AND ONE NO. PG SHALL BE PROVIDED IN PULSE JETTING INSTRUMENT AIR HEADER/MANIFOLD OF SILO VENT FILTER.
17. BIDDER TO FURNISH ALL INSTRUMENTS/CONTROLS AS PER SYSTEM REQUIREMENT. INSTRUMENT AND CONTROLS FOR AUTOMATIC OPERATION OF PUMPS & EQUIPMENTS ARE NOT SHOWN FOR CLARITY IN THIS DRG. THE SAME SHALL BE PROVIDED AS PER SYSTEM REQUIREMENT AND AS SPECIFIED IN TECH. SPECIFICATION.
18. TWO (2) NOS. (ONE AT ENTRY & ONE AT EXIT) PITLESS TYPE WEIGH BRIDGE SHALL BE PROVIDED AT MAIN FLY ASH SILO AREA COMPLETE WITH ALL ELECTRICAL, CONTROLS, CIVIL AND STRUCTURAL WORKS FOR WEIGHMENT OF TRUCKS/TANKER FILLED FROM SILOS. ONE (1) NO. WEIGH BRIDGE FOR RAIL LOADING BELOW EACH MAIN FLY ASH SILO COMPLETE WITH ALL ELECTRICAL, CONTROLS, CIVIL AND STRUCTURAL WORKS. FOR WEIGHMENT FROM SILOS. MASS FLOW METER /SOLID FLOW METER FOR ONLINE WEIGHMENT OF TOTAL LOADED ASH OF WAGON/TRUCK, DURING LOADING SHALL BE PROVIDED FOR EACH MAIN FLY ASH SILO, AS SPECIFIED.
19. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFECIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							29-11-23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31-05-23

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ENGINEERING DIVISION

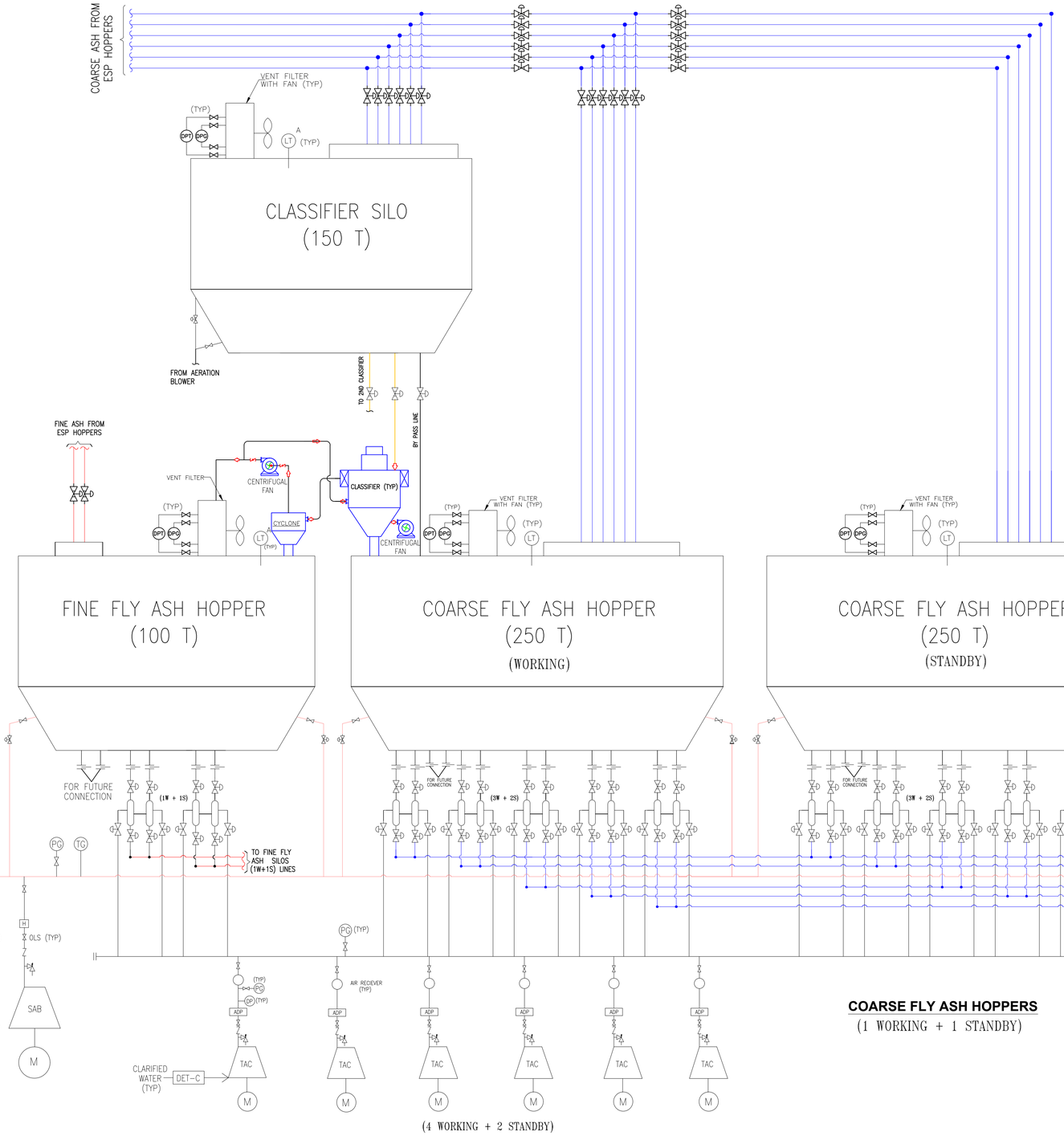
PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-III (1x800MW)

TITLE: EPC PACKAGE
SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM)

SIZE	SCALE	DRG.NO.	REV.
A0	--	XXXX-001-POM-A-028	B

cad file name : XXXX-001(R)-POM-A-028.dwg

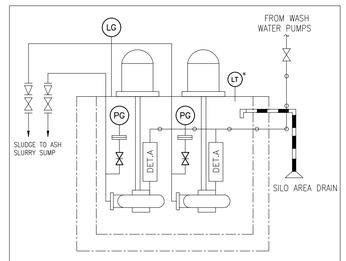
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AERATION BLOWERS
(3 WORKING + 1 STANDBY)

(4 WORKING + 2 STANDBY)
TRANSPORT AIR COMPRESORS (TAC)

COARSE FLY ASH HOPPERS
(1 WORKING + 1 STANDBY)



DRAIN PUMPS
(1 WORKING + 1 STANDBY)

NOTES

1. ASH CLASSIFIER SYSTEM SHOWN IS INDICATIVE ONLY. ASH CLASSIFIER SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT. ASH CLASSIFIER SYSTEM SHALL BE COMPLETE WITH ALL EQUIPMENT & ACCESSORIES LIKE AIR SLIDE/SCREW CONVEYOR/BLOWER/WEIGHING BIN/FLOW CONTROL VALVE/FAN/VALVES ETC AS APPLICABLE.
2. THE SCHEME & NO. OF EQUIPMENT SHALL BE FINALISED BASED ON STIPULATIONS OF TECHNICAL SPECIFICATION & SYSTEM REQUIREMENTS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH TECH.SPECS. AND OTHER TENDER DOCUMENTS. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
4. INSTRUMENTS SHOWN ARE INDICATIVE ONLY. COMPLETE INSTRUMENTATION SHALL BE PROVIDED AS PER SYSTEM & FUNCTIONAL REQUIREMENTS SPECIFIED.
5. LIMIT SWITCHES ARE TO BE PROVIDED FOR MANUAL VALVES AS PER SYSTEM REQUIREMENTS & CONTROL PHILOSOPHY.
6. FOR ALL INSTRUMENTS AND DRIVES, SUPPLIER TO ASSIGN UNIQUE TAG NUMBERS FOR IDENTIFICATION. THIS TAG NUMBERS SHALL BE INDICATED ON DOCUMENTS/DRAWINGS/DATA SHEETS APPLICABLE FOR THE RESPECTIVE INSTRUMENT/DRIVE.
7. THIS OPTION IS APPLICABLE FOR SYSTEM WHERE ESP BUFFER HOPPER IS NOT ENVISAGED. OUT OF TWO NUMBERS COARSE ASH HOPPERS, ONE WILL BE WORKING AND ONE WILL BE STANDBY.
8. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
9. QUANTITY, NUMBER OF LINES & CAPACITY OF EQUIPMENTS, AS INDICATED ARE MINIMUM.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
B	RELEASED FOR TENDER	NAVEEN	ABHIJIT							29-11-23
A	RELEASED FOR TENDER	NAVEEN	ABHIJIT							31-05-23

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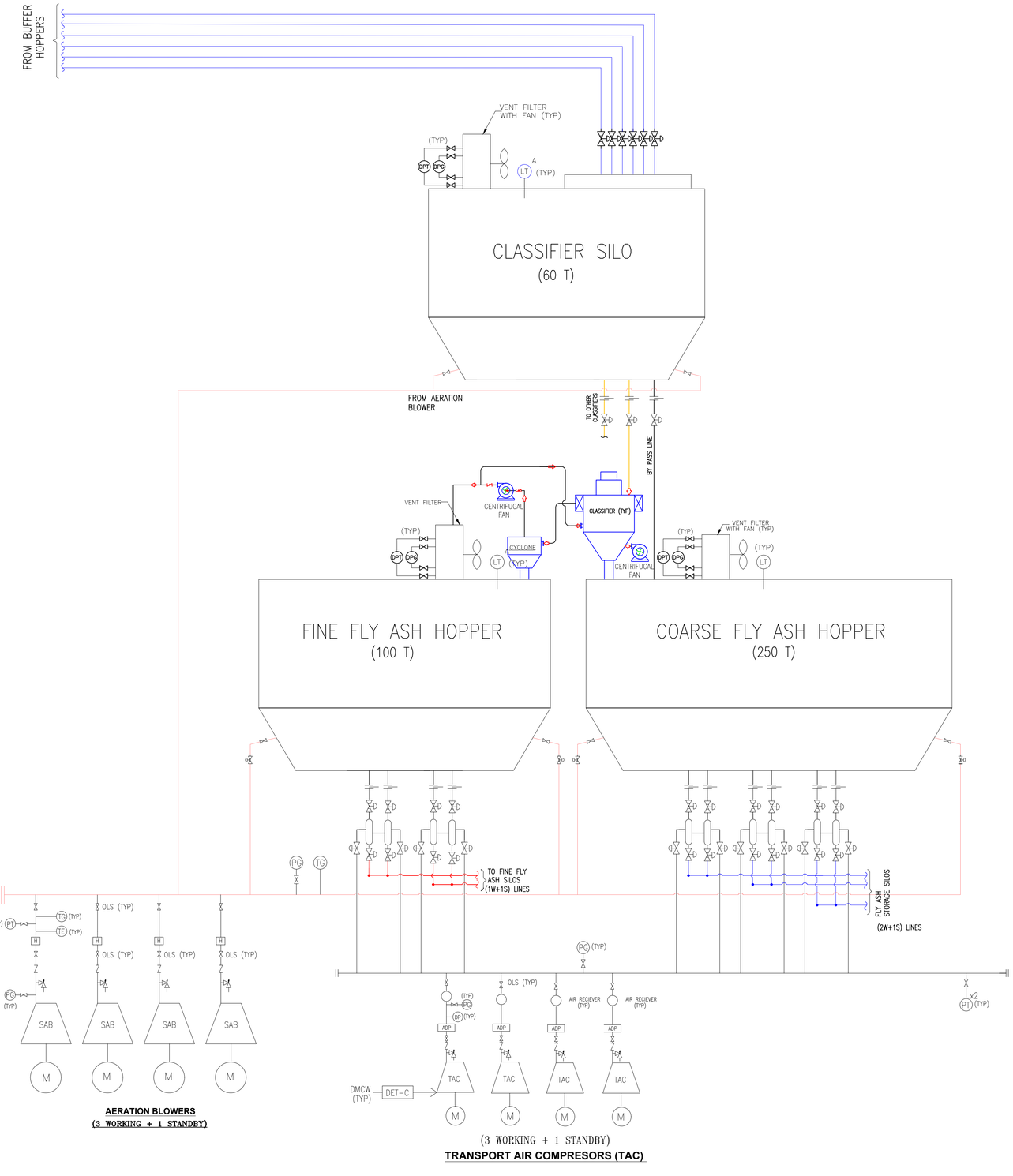
PROJECT: **SIPAT SUPER THERMAL POWER PROJECT**
STAGE–III (1x800MW)

TITLE: EPC PACKAGE
SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM)

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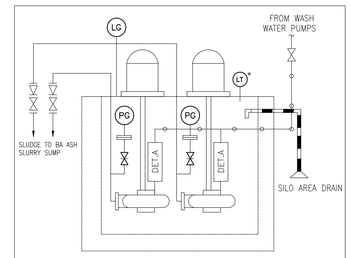
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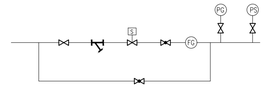


AERATION BLOWERS
(3 WORKING + 1 STANDBY)

(3 WORKING + 1 STANDBY)
TRANSPORT AIR COMPRESORS (TAC)



DRAIN PUMPS
(1 WORKING + 1 STANDBY)



DETAIL-C

NOTES

1. ASH CLASSIFIER SYSTEM SHOWN IS INDICATIVE ONLY. ASH CLASSIFIER SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR THE UNIT. ASH CLASSIFIER SYSTEM SHALL BE COMPLETE WITH ALL EQUIPMENT & ACCESSORIES LIKE AIR SLIDE/SCREW CONVEYOR/BLOWER/WEIGHING BIN/FLOW CONTROL GATE/FAN/VALVES ETC AS APPLICABLE.
2. THE SCHEME & NO. OF EQUIPMENT SHALL BE FINALIZED IN CONJUNCTION WITH TECHNICAL SPECIFICATION & AS PER THE SYSTEM REQUIREMENTS.
3. THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH TECH.SPECS. AND OTHER TENDER DOCUMENTS. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
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7. THIS OPTION IS APPLICABLE FOR SYSTEM WHERE ESP BUFFER HOPPER IS ENVISAGED.
8. ALL ACCESSORIES, ITEMS OF WORK, THOUGH NOT INDICATED BUT REQUIRED TO MAKE THE SYSTEM COMPLETE FOR ITS SAFE, EFFICIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.
9. QUANTITY, NUMBER OF LINES & CAPACITY OF EQUIPMENTS, AS INDICATED ARE MINIMUM.

FOR TENDER PURPOSE ONLY

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	C&I	APPD	DATE
B	RELEASED FOR TENDER	NAVEEN	RAJESH							
A	RELEASED FOR TENDER	NAVEEN	RAJESH							

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NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: **SIPAT THERMAL POWER STATION**
STAGE–III (1x800MW)

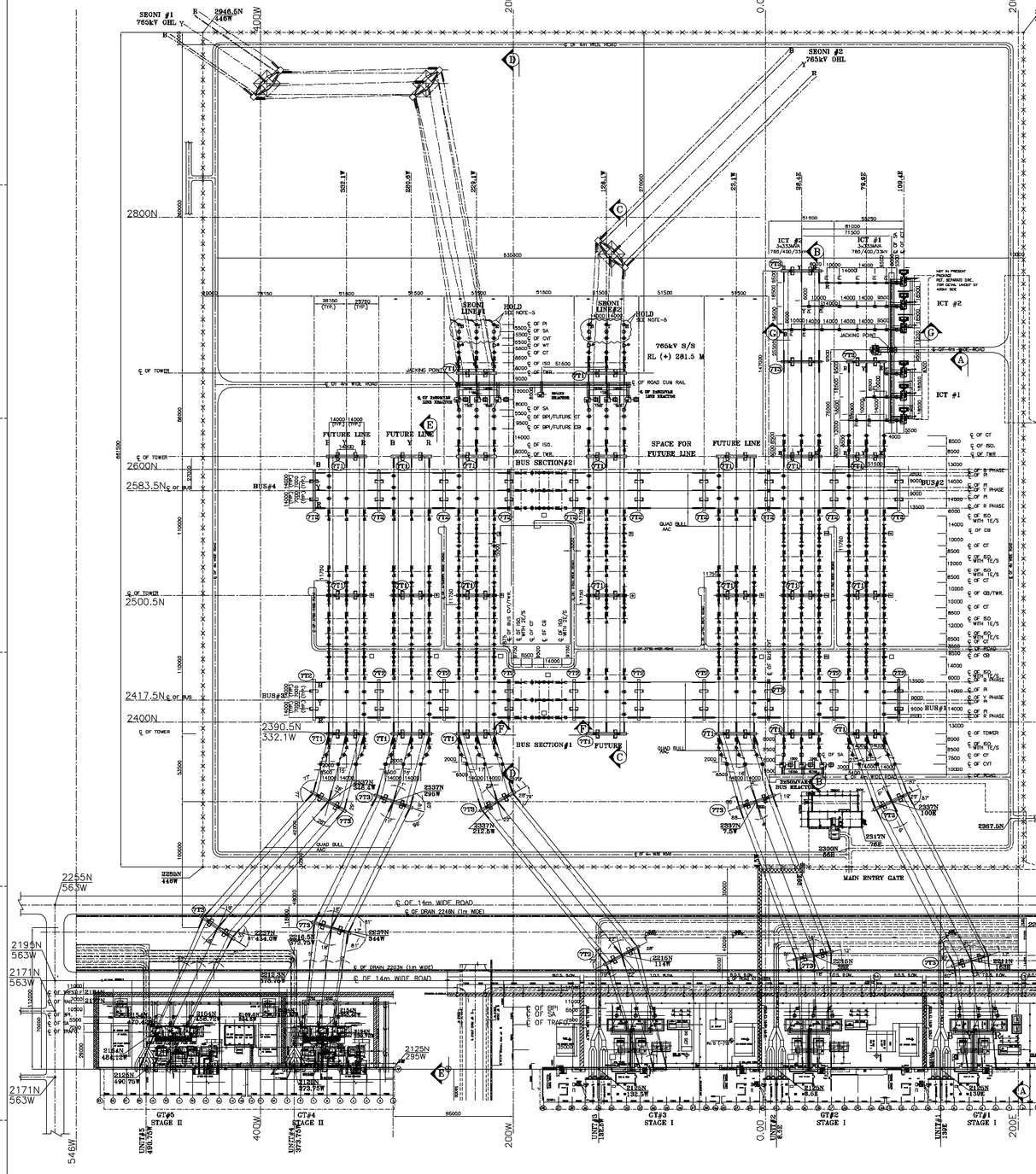
TITLE: EPC PACKAGE
SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (FOR VACUUM CONVEYING SYSTEM)

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CAD FILE NAME : XXXX–001(R)–POM–A–029.dwg

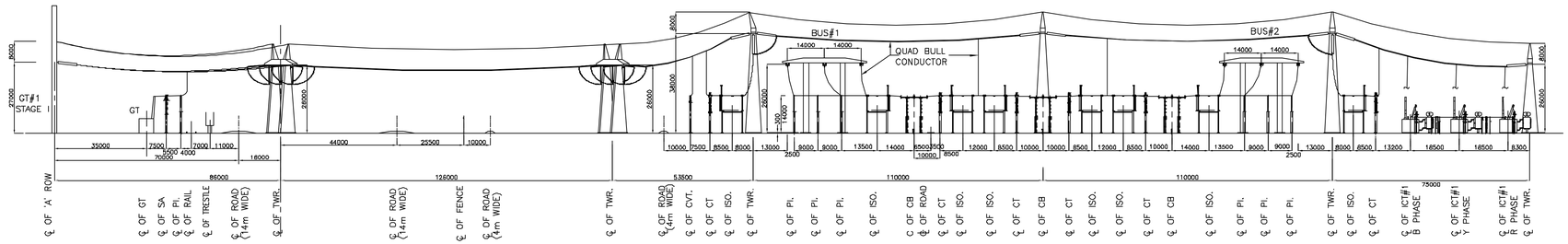
DF009

DRAWING NO.:SYS-CS2516-LAY-010


SEONI #1
765kV OHL
SEONI #2
765kV OHL
2946.5N
446W
2946.5N
204.3E
2800N
2600N
2583.5N
2500.5N
2417.5N
2400N
2390.5N
332.1W
2255N
563W
2195N
563W
2171N
563W
2171N
563W
546W
400W
200W
0.00
200E
765kV S/S
RL (+) 281.5 M
ICT #1
ICT #2
SEONI LINE#1
SEONI LINE#2
HOLD SEE NOTE-5
FUTURE LINE
SPACE FOR FUTURE LINE
BUS SECTION#2
BUS SECTION#1
BUS#1
BUS#2
BUS#3
BUS#4
QUAD BULL ACC
JACKING POINT
MAIN ENTRY GATE
EXISTING
GT#6 STAGE II
GT#5 STAGE II
GT#4 STAGE II
GT#3 STAGE I
GT#2 STAGE I
GT#1 STAGE I
UNIT#6 490.75W
UNIT#5 490.75W
UNIT#4 373.75W
UNIT#3 373.75W
UNIT#2 132.5W
UNIT#1 132.5W
2125N 295W
2125N 132.5W
2125N 132E
2125N 8.5E
2125N 295E
2125N 490.75W
2125N 48.12W
2125N 420.62W
2125N 420.62E
2125N 48.12E
2125N 490.75E
2125N 132.5E
2125N 132.5W
2125N 8.5W
2125N 132E
2125N 295E
2125N 420.62W
2125N 420.62E
2125N 48.12W
2125N 490.75W

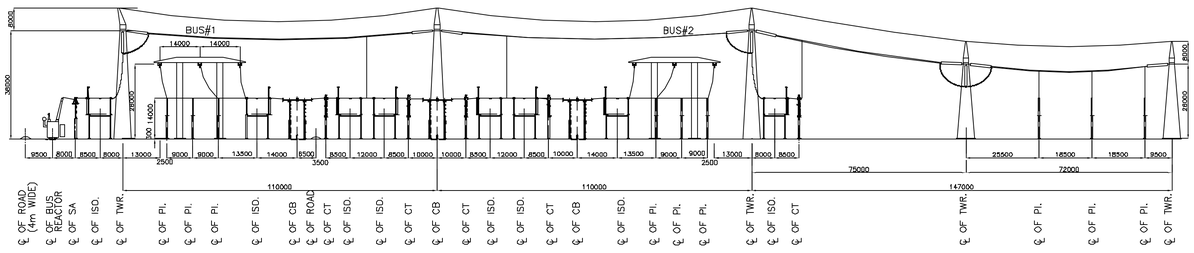
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DRAWING NO.:SYS-CS2516-LAY-010



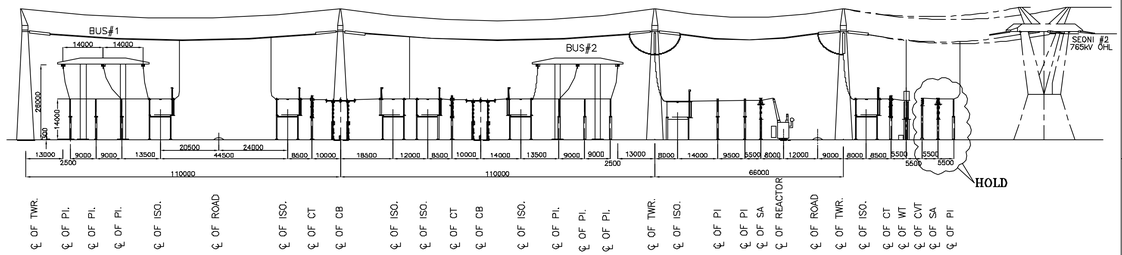
SECTION–AA

(GT#1 – TIE – ICT#1)



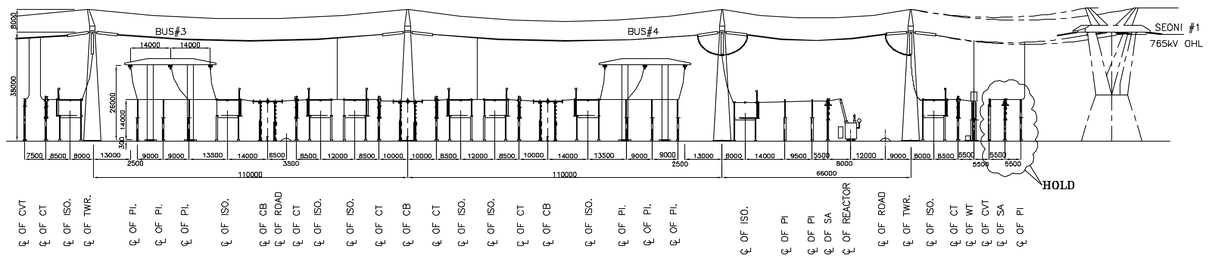
SECTION–BB

(BUS REACTOR – TIE – ICT#2)



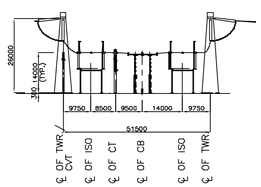
SECTION–CC

(FUTURE – TIE – SEONI#2)



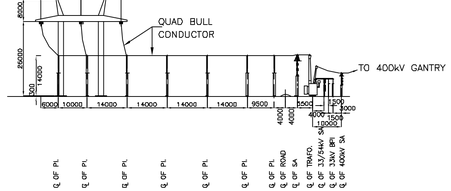
SECTION–DD

(GT#3 – TIE – SEONI#1)

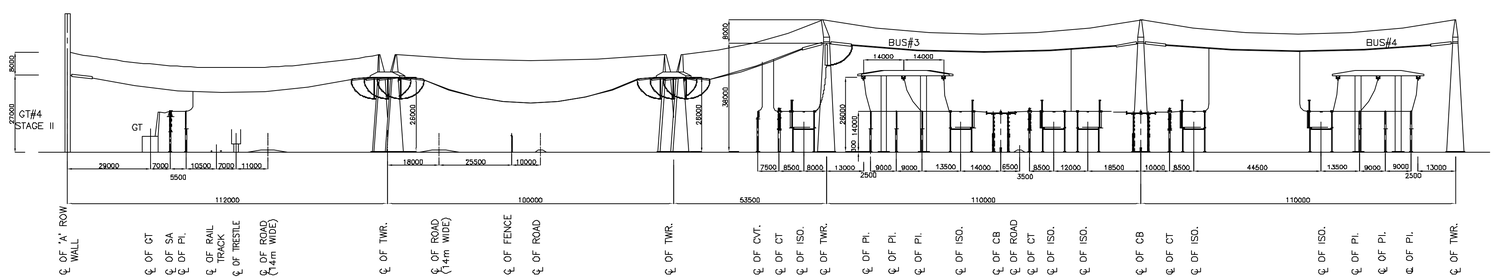


SECTION–FF

(BUS SECTION)



SECTION–GG



SECTION–EE

(GT#4 – TIE – FUTURE LINE)
(GT#5 – TIE – FUTURE LINE)

REVIEWED AND ENDORSED BY AREVA — SIGN.

CLIENT : एनटीपीसी NTPC — **NATIONAL THERMAL POWER CORPORATION LTD.** (A GOVERMENT OF INDIA ENTERPRISE)

PROJECT : 765kV SWITCHYARD PACKAGE ASSOCIATED WITH SIPAT STPP STAGE–I (3x660MW) & STAGE–II (2x500MW)

LOA NO. : CS–9545–505–2–FC–NOA–4557 Dtd: 16.05.05

MAIN TURNKEY CONTRACTOR: AREVA — M/S AREVA T&D SA, TOUR AREVA 1, Place de la Coupole, 92084 Paris La Defense, FRANCE

ASSIGNEE TURNKEY CONTRACTOR: ALSTOM — ALSTOM T&D SYSTEMS LTD, A 21–24, SECTOR–16, ELECTRONICS NAGAR, NOIDA (INDIA) – 201301

TITLE : LAYOUT PLAN AND SECTIONS FOR 765kV SWITCHYARD

REFR. DRG. NO.	DESCRIPTION

REV.	DATE	DESCRIPTION	DRAWN	SIGN.	CHKD	SIGN.	APPD	SIGN.	STATUS
3	26.10.05	REVISED AS PER NTPC COMMENTS	GSR		PTK		RNS		FOR APPROVAL
2	29.09.05	REVISED AS PER CUSTOMER COMMENTS	GSR		PTK		RNS		FOR APPROVAL
1	11.08.05	REVISED AS PER NTPC COMMENTS	GSR		RNS		RNG		FOR APPROVAL
0	04.08.05	FIRST ISSUE	GSR		RNS		RNG		FOR APPROVAL

A1	NTPC DRAWING NO.	ALSTOM DRAWING NO.	TOTAL SH 002	SH.No.	REV.
	9545–505–PVE–P–010	SYS–CS2516–LAY–010	SCALE 1:1000	002	3

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DRAWING NO.:SYS-CS2516-SLD-003

LINE (FUTURE) | LINE (FUTURE) | LINE REACTOR | SEONI#1 | BUS SECTION#2 | LINE REACTOR | SEONI#2 | LINE FUTURE | LINE FUTURE | ICT#2 | ICT#1

765kV, 3150A, 40kA FOR 1SEC. BUS-IV

765kV, 3150A, 40kA FOR 1SEC. BUS-II

765kV, 3150A, 40kA FOR 1SEC. BUS-III

765kV, 3150A, 40kA FOR 1SEC. BUS-I

3x1PHASE 80MVAR

NOT IN PRESENT SCOPE

3x1PHASE, 333MVA 1000MVA 765/√3 400kV/√3 33kV

* REFER DETAIL-A

GT#5 3x200MVA | GT#4 3x200MVA | GT#3 3x260MVA | GT#2 3x260MVA | GT#1 3x260MVA

500MW UNIT#5 STAGE-II | 500MW UNIT#4 STAGE-II | 660MW UNIT#3 STAGE-I | BUS SECTION#1 | FUTURE | FUTURE | 660MW UNIT#2 STAGE-I | BUS REACTOR | 660MW UNIT#1 STAGE-I

DETAIL-A
(TERTIARY FORMATION 3 LINE DIAGRAM)

SYSTEM PARAMETERS

Sl.No.	DESCRIPTION OF PARAMETER	765kV SYSTEM
1	SYSTEM OPERATING VOLTAGE	765kV
2	MAX. OPERATING VOLTAGE OF THE SYSTEM (rms)	800kV
3	RATED FREQUENCY	50Hz
4	NO. OF PHASES	3
5	RATED INSULATION LEVELS	
	i) FULL WAVE LIGHTNING IMPULSE WITHSTAND VOLTAGE (1.2/50microsec.)	±2100kVp
	ii) SWITCHING IMPULSE WITHSTAND VOLTAGE (250/2500microsec.) DRY & WET	±1550kVp
	iii) ONE MINUTE POWER FREQUENCY DRY & WET WITHSTAND VOLTAGE (rms)	830kV
6	CORONA EXTINCTION VOLTAGE	508kV
7	MAX. RADIO INTERFERENCE VOLTAGE LEVEL AT 508kV (rms).	2500 micro volts
8	MIN. CREEPAGE DISTANCE	20000mm
9	MIN. CLEARANCE	
	i) PHASE TO PHASE (CONDUCTOR TO CONDUCTOR)	7600mm
	ii) PHASE TO EARTH (CONDUCTOR TO STRUCTURE)	4900mm
	iii) SECTIONAL CLEARANCE	10300mm
10	RATED SHORT CIRCUIT CURRENT FOR 1 SEC. DURATION	40kA
11	SYSTEM NEUTRAL EARTHING	EFFECT. EARTHED

REVIEWED AND ENDORSED BY AREVA — SIGN.

LEGEND

- AUTO TRANSFORMER
- C.V.T.
- C.T.
- WAVE TRAP
- LIGHTNING ARRESTOR
- ISOLATOR WITH ONE EARTH SWITCH
- ISOLATOR WITH TWO EARTH SWITCH
- CIRCUIT BREAKER WITHOUT CLOSING RESISTER & WITHOUT CONTROLLED SWITCHING
- CIRCUIT BREAKER WITH CONTROLLED SWITCHING
- CIRCUIT BREAKER WITH CLOSING RESISTER
- 400KV, 80MVAR BUS REACTOR(3-ph) WITH NGR AND LA
- PRESENT SCOPE
- EXISTING/FUTURE SCOPE

REFR. DRG. NO.	DESCRIPTION
9545-505-PDE-A-001	765kV SWYD SINGLE LINE DIAGRAM (TENDER DRAWING)

REV.	DATE	DESCRIPTION	DRAWN	SIGN.	CHKD	SIGN.	APPD	SIGN.	STATUS
3	23.11.05	REVISED AS PER NTPC COMMENTS	GSR		PRM		RNS		FOR APPROVAL
2	18.11.05	REVISED AS PER NTPC COMMENTS	GSR		PTM		RNS		FOR APPROVAL
1	12.07.05	REVISED AS PER NTPC COMMENTS	GSR		RNS		RNG		FOR APPROVAL
0	10.06.05	FIRST ISSUE	GSR		RNS		RNG		FOR APPROVAL

CLIENT : NTPC — **NATIONAL THERMAL POWER CORPORATION LTD.** (A GOVERMENT OF INDIA ENTERPRISE)

PROJECT : 765kV SWITCHYARD PACKAGE ASSOCIATED WITH SIPAT STPP STAGE-I (3x660MW) & STAGE-II (2x500MW)

LOA NO. : CS-9545-505-2-FC-NOA-4557 Dtd: 16.05.05

MAIN TURNKEY CONTRACTOR: AREVA — M/S AREVA T&D SA, TOUR AREVA 1, Place de la Coupole, 92084 Paris La Defense, FRANCE

ASSIGNEE TURNKEY CONTRACTOR: ALSTOM — ALSTOM T&D SYSTEMS LTD, A 21-24, SECTOR-16 ELECTRONICS NAGAR NOIDA (INDIA) - 201301

TITLE : SINGLE LINE DIAGRAM FOR 765kV SWITCHYARD

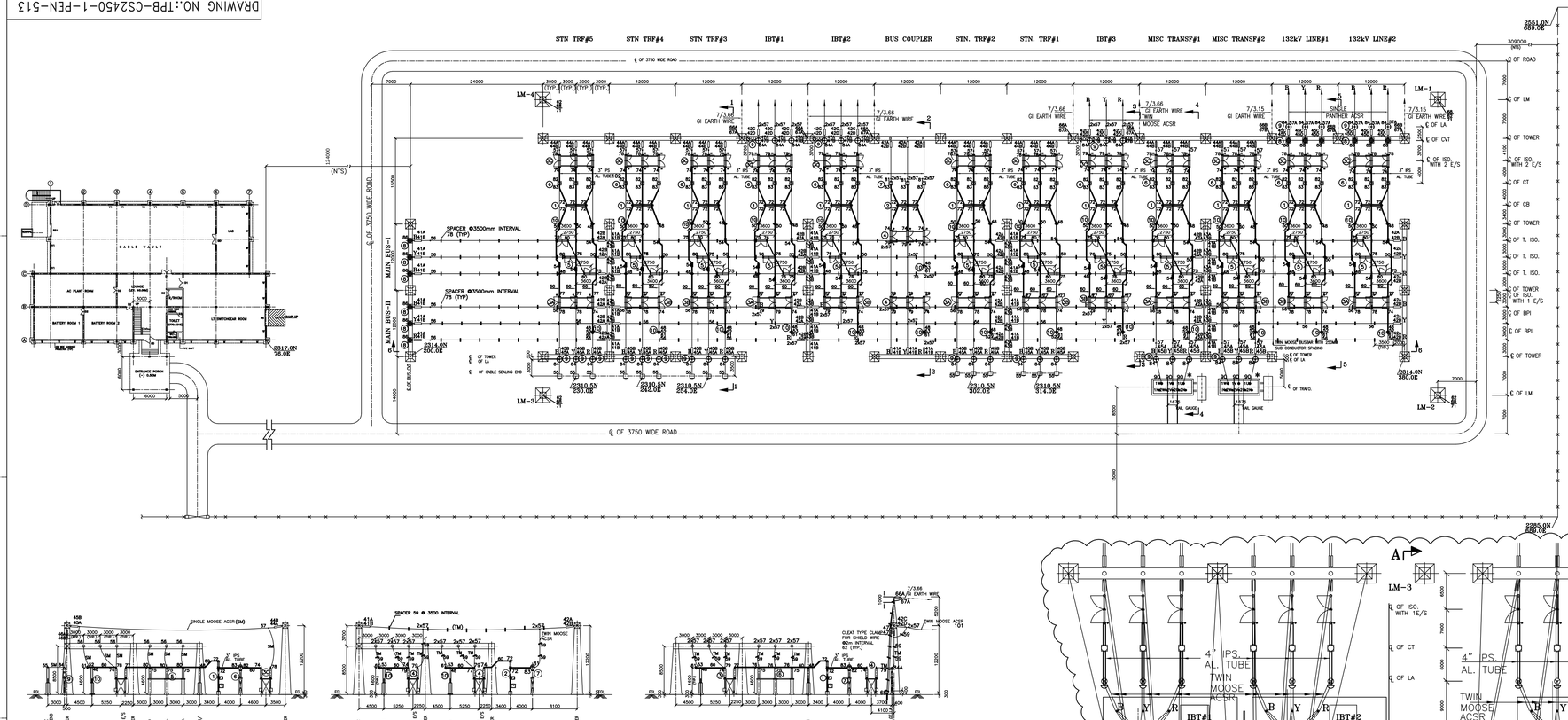
A1	NTPC DRAWING NO.	ALSTOM DRAWING NO.	TOTAL SH. 001	SH.No.	REV.
	9545-505-PVE-P-003	SYS-CS2516-SLD-003	SCALE NTS	001	3

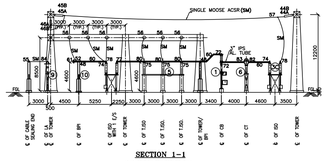
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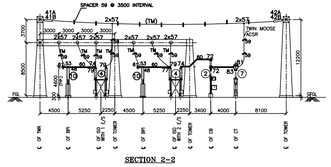
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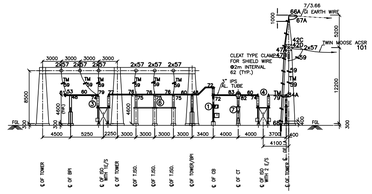
DRAWING NO.:TPB-CS2450-1-PEN-513

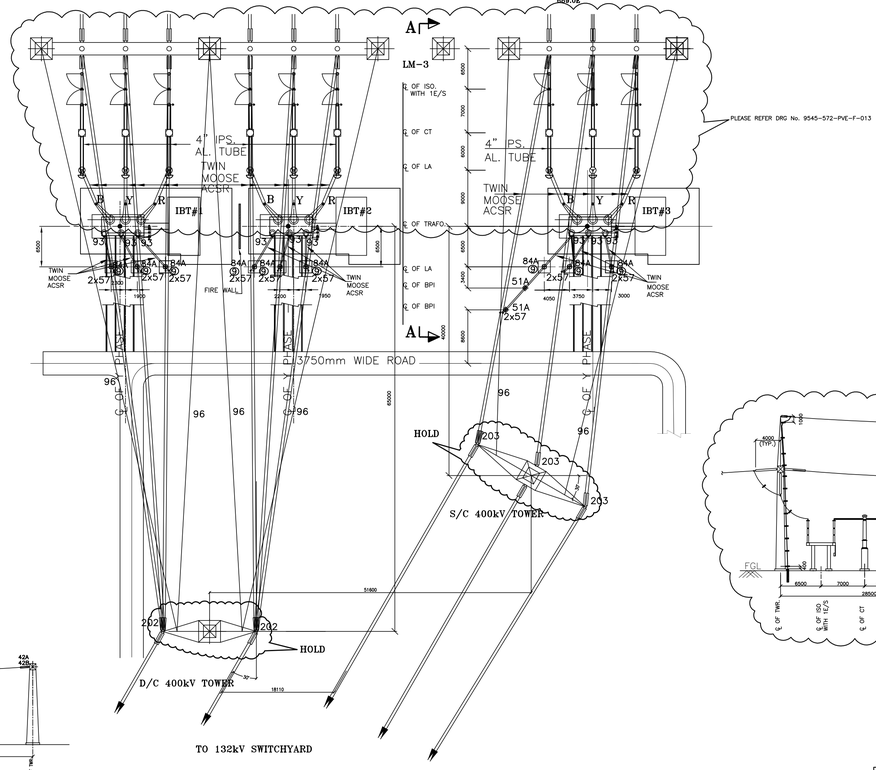
STN TRF#5 | STN TRF#4 | STN TRF#3 | IBT#1 | IBT#2 | BUS COUPLER | STN. TRF#2 | STN. TRF#1 | IBT#3 | MISC TRANSF#1 | MISC TRANSF#2 | 132kV LINE#1 | 132kV LINE#2

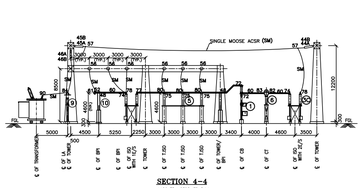


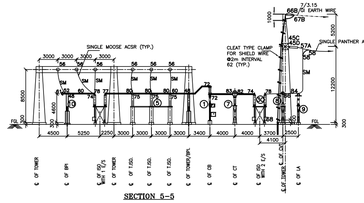


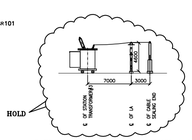


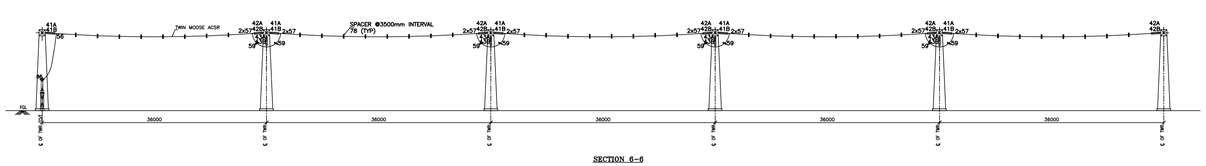




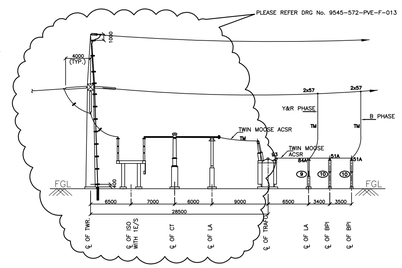








EXTRACTED VIEW OF 400/132kV IBT BAYS FROM 400kV YARD



NTPC DRG. NO. 9545-572-PVE-F-513

CLIENT : NTPC

NATIONAL THERMAL POWER CORPORATION LTD.
(A GOVERMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT : 400/132kV SWITCHYARD PACKAGE FOR SIPAT STPP STAGE-I & II

LOA NO. : CS9545-572-2-FC-NOA-4412

TITLE : ERECTION KEY DIAGRAM OF 132kV SWITCHYARD (AT SIPAT)

LEGEND
CT, CB, LA, CVT, INSULATOR, ISOLATOR
FUTURE
PRESENT

NOTES:-
1. ITEM NUMBERS SHOWN WITHIN CIRCLE ARE INDICATED MAIN EQUIPMENT NUMBER AND WITHOUT CIRCLE SHOWS POWER CONNECTOR NUMBER OF EQUIPMENT / OTHERS.
2. ✱ STATION TRANSFORMERS, MISC. TRANSFORMER AND THEIR CLAMPS ARE UNDER SCOPE OF CUSTMER's SUPPLY.

REFR. DRG. NO.	DESCRIPTION
9545-572-PVE-F-513A	ERECTION BOQ
9545-572-PVE-F-502	132kV S/Y LAYOUT PLAN & SECTIONS

REV.	DESCRIPTION	DRAWN	SIGN.	CHECKED	SIGN.	APPROVED	SIGN.	STATUS
		Name / Date		Name / Date		Name / Date		
2	REVISED AS PER NTPC COMMENTS	GSR 14.05.05		VRM 16.05.05		RNS 16.05.05		FOR APPROVAL
1	REVISED AS PER NTPC COMMENTS Dtd:27.01.05	GSR 12.04.05		VRM 12.04.05		RNS 12.04.05		FOR APPROVAL
0	FIRST ISSUE	GSR 08.01.05		VRM 08.01.05		RNS 08.01.05		CAT-II

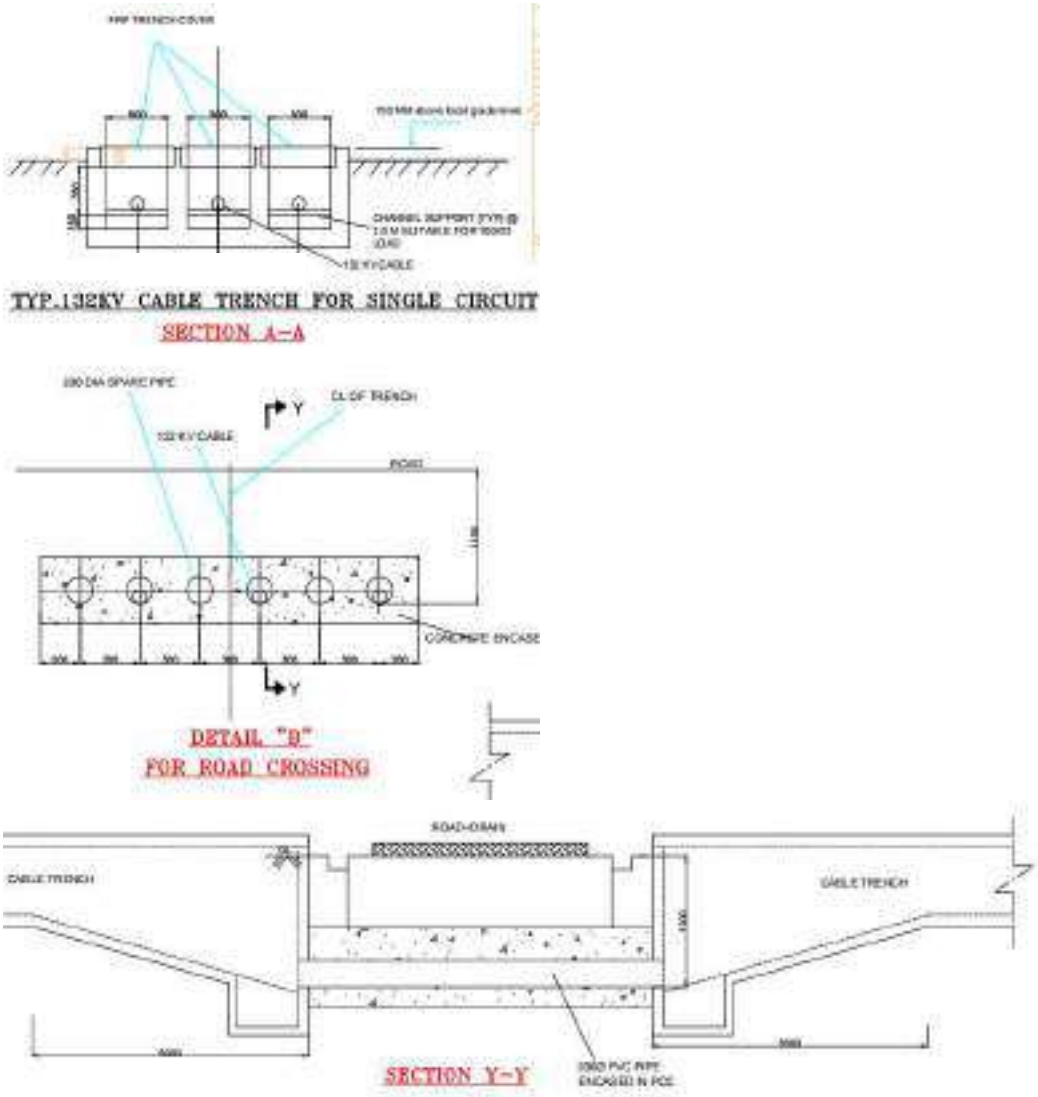
ALSTOM LIMITED
A 21-24, SECTOR-16
ELECTRONICS NAGAR
NOIDA – 201301

DRAWING NO. TPB-CS2450-1-PEN-513

TOTAL SH.	SH.No.	REV.
001	001	2

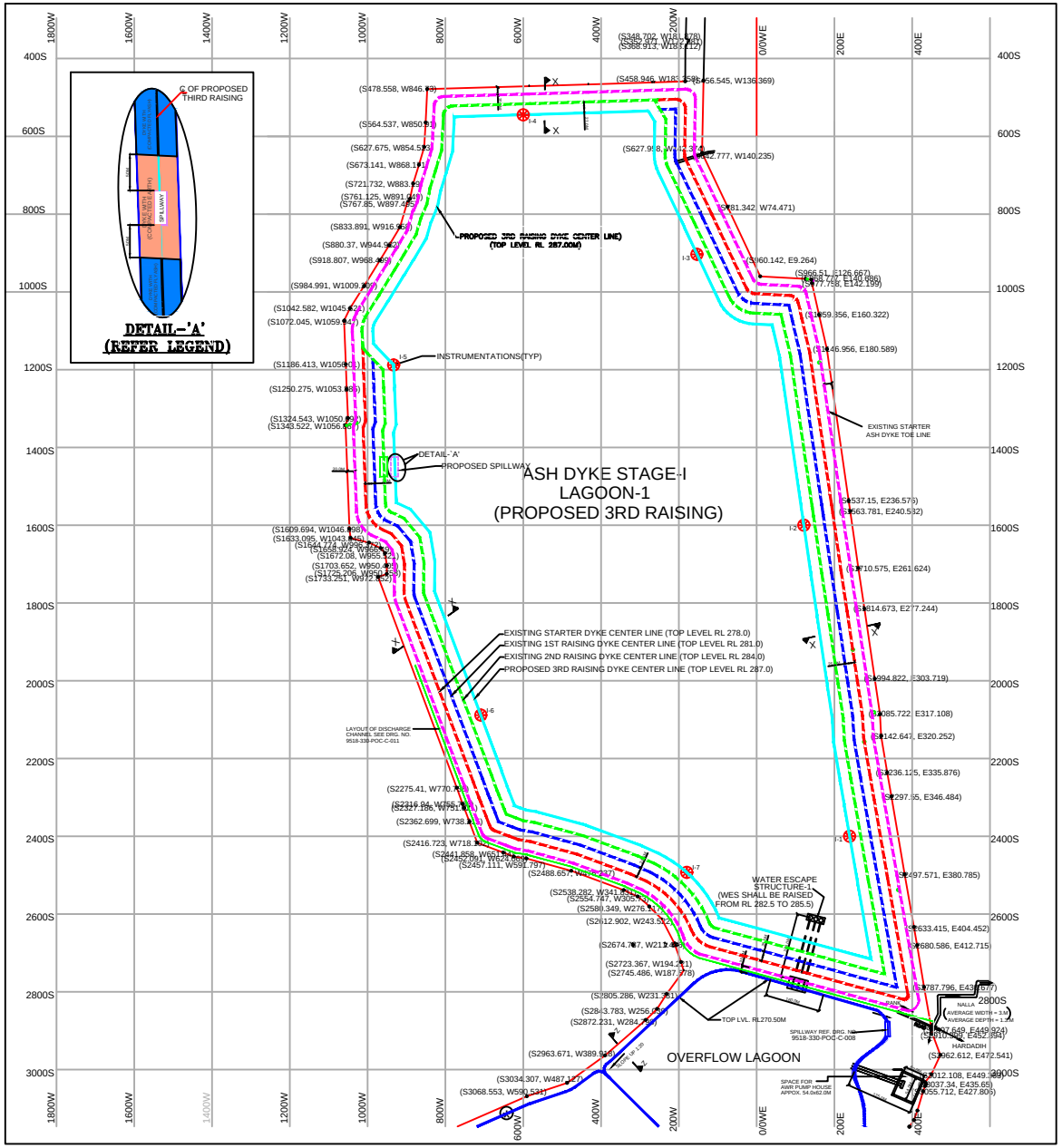
SCALE 1:325

A0



Typical Rail/Road/Drain Crossing

Drg No 0000-215-POE-F-EH1



LEGEND:

- EXISTING STARTER DYKE CENTER LINE
- EXISTING 1ST RAISING DYKE CENTER LINE
- EXISTING 2ND RAISING DYKE CENTER LINE
- PROPOSED 3RD RAISING DYKE CENTER LINE
- PROPOSED SPILLWAY
- COMPACTED EARTH
- COMPACTED FLYASH

NOTES:

1. ALL DIMENSIONS ARE IN METERS INCLUDING THE GRIDS.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH FOLLOWING DRAWINGS:

TITLE	DRAWING NO.
A. SECTION & ALLIED DETAILS	9518-XXX-POC-A-002
B. DETAILS OF INSTRUMENTATIONS	9518-XXX-POC-A-003
C. DETAILS OF SPILLWAYS	9518-XXX-POC-A-004
D. DETAILS OF APPROACH RAMPS AND OVERTAKE ZONES	9518-XXX-POC-A-005

3. THIS DRAWING HAS BEEN PREPARED BASED ON THE DRAWING OF PREVIOUS RAISINGS. ANY CHANGE IN THE ALIGNMENT SHALL BE MADE AT SITE DUE TO ACTUAL STARTER DYKE CONSTRUCTED AT SITE.
4. AT ALL LOCATIONS MARKED AS ⊛('I'), A SET OF INSTRUMENTS AS SHOWN IN THE DRAWING. NO. 9518-XXX-POC-A-003 SHALL BE PROVIDED.
5. BENCHING SHALL BE PROVIDED AT JUNCTIONS WHERE THE DYKES MEET. NO SEPARATE PAYMENT SHALL BE MADE FOR BENCHING.
6. EXISTING WATER ESCAPE STRUCTURE SHALL BE RAISED UP TO RL 285.50M AS PER THE DETAILS GIVEN IN DRAWING. NO. 9518-XXX-POC-A-002.
7. THE DETAILS SHOWN IN TENDER DRAWINGS ARE INDICATIVE AND MINOR CHANGE IN THE SAME MAY OCCUR DEPENDING UPON ACTUAL SITE CONDITIONS.
8. COMPACTED EARTH SHALL BE USED IN CONSTRUCTION OF DYKE EMBANKMENT AT SPILLWAY LOCATION AS INDICATED IN DETAIL-'A' AND IN BALANCE ALIGNMENT, COMPACTED FLY ASH SHALL BE USED.
9. AS INFORMED BY SITE IN NOTE REGARDING NON AVAILABILITY OF MILL REJECT AND COAL BOULDERS AT SITE, MILL REJECT AND COAL BOULDERS ARE REPLACED BY AGGREGATES AND ROCK BOULDERS RESPECTIVELY
10. BOTTOM ASH OF SPECIFIED THICKNESS SHALL BE LAID AS SHOWN IN THE DRAWINGS. THE MATERIAL FOR BLANKET, CHIMNEY AND FILTERS SHALL CONSIST OF CLEAN AND WELL GRADED BOTTOM ASH. THE GRADATION OF BOTTOM ASH SHALL MEET THE REQUIREMENTS OF IS 9429.

FOR TENDER PURPOSE ONLY

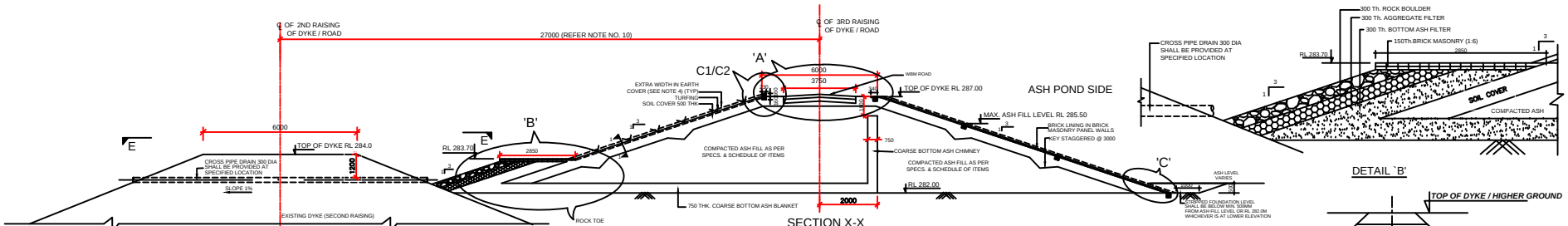
REV	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD	DATE
B	RELEASED FOR TENDER PURPOSE (SPILLWAY LOCATION CHANGED AS PER AS BUILT DWG)	KN	KN	AP	SGD	
A	RELEASED FOR TENDER PURPOSE	KN	KN	SGD	SGD	

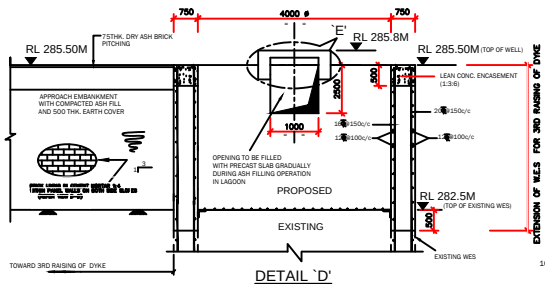
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NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

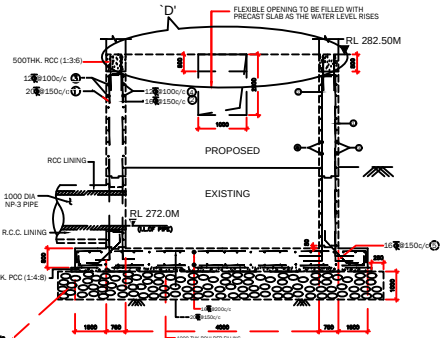
PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-I (3x660MW)

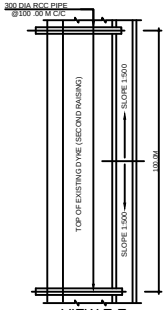
TITLE: CIVIL WORKS OF 3RD RAISING OF LAGOON-I
LAYOUT PLAN OF ASH DYKE

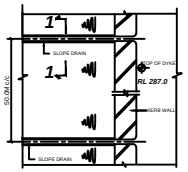
SIZE	SCALE	DRG.NO.	REV.
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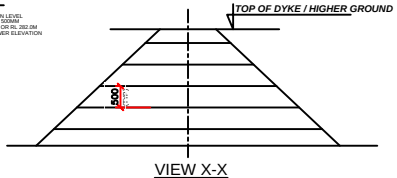


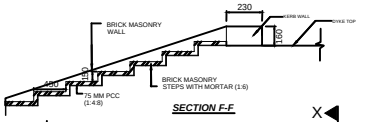


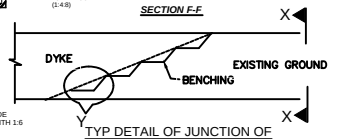


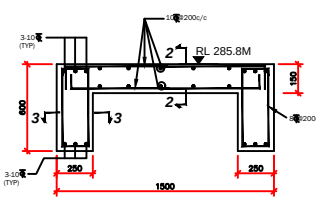


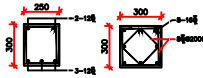


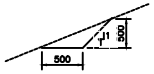


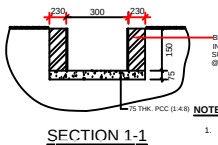






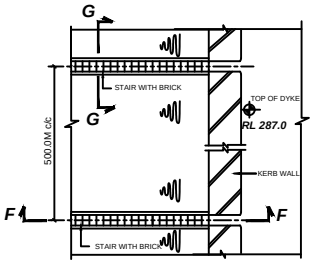


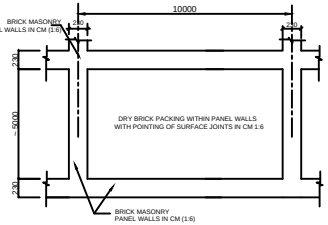


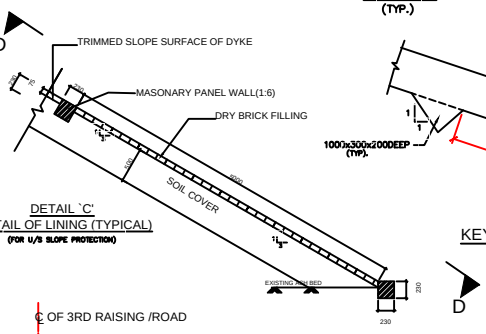


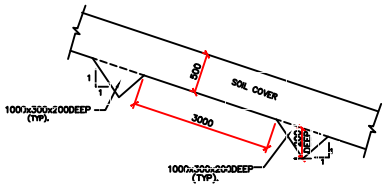
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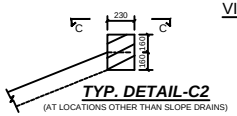
1. ALL DIMENSIONS ARE IN MILLIMETERS AND ALL LEVELS ARE IN METER.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRG. NO. 9518-XXX-POC-A-001, 003, 004 & 005.
3. ROCK TOE SHALL BE PROTECTED TEMPORARILY WITH PLASTIC SHEET OR GUNNY BAGS TO PREVENT CLOGGING OF ROCK TOE DURING CONSTRUCTION OF ASH DYKE. THE PROTECTIVE LAYER SHALL BE REMOVED ONLY AFTER ALL THE CONSTRUCTION WORKS ARE COMPLETED.
4. THE SOIL COVER SHALL BE CONSTRUCTED EITHER SIMULTANEOUSLY WITH THE ASH FILL OR SEPARATELY AFTER THE ASH FILL IS COMPLETED IN LAYERS OF SPECIFIED THICKNESS. IN EITHER CASE, COMPACTION OF THE SLOPES OF ASH/ EARTH FILL TO THE SPECIFIED DENSITY (95% OF MDD) SHALL BE ENSURED EITHER BY PROVIDING EXTRA WIDTH AND TRIMMING AFTER COMPACTION OR BY USING SLOPE COMPACTORS. IF SOIL COVER IS DONE SEPARATELY, KEYS SHALL BE PROVIDED ON ASH SURFACE.
5. BEFORE PLACING THE FILL MATERIAL, THE FOUNDATION AREA SHALL BE STRIPPED TO THE SPECIFIED DEPTH OF ASH INCLUDING VEGETATION, AND SHALL BE COMPACTED TO ACHIEVE DRY DENSITY NOT LESS THAN 95% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR).
6. BRICK MASONRY WORK SHALL BE DONE WITH OWNER SUPPLIED ASH BRICK.
7. MORTAR FOR BRICK MASONRY WORK SHALL BE 1:6 CEMENT SAND MORTAR UNLESS NOTED OTHERWISE.
8. THE FOUNDATION STRIPPING SHALL EXTEND TO 1.0M BEYOND HEEL OF EMBANKMENT.
9. HORIZONTAL BENCHES SHALL BE EXCAVATED ON THE EXISTING HIGHER GROUND AND ON THE EXISTING DYKE AT THE JUNCTION OF DIFFERENT DYKES.
10. CENTRE TO CENTRE SPACING OF EXISTING DYKE AND RAISING DYKE SHALL DEPEND ON DEPTH OF STRIPPING ON EXISTING FILLED UP ASH DYKE. DISTANCE ASH SHOWN IN THE DRAWING IS FOR STRIPPED LEVEL 2.0M BELOW TOP LEVEL OF 2ND RAISING DYKE. IF DEPTH OF THE FOUNDATION STRIPPING CHANGES, THE SPACING MAY BE REVISED ACCORDINGLY.
11. EXCAVATION OF ASH FOR EMBANKMENT CONSTRUCTION FROM INSIDE THE ASH POND AREA SHALL BE DONE ONLY AFTER LEAVING 25M OR 5 TIMES THE HEIGHT OF RAISING (WHICH EVER IS HIGHER) FROM THE HEEL OF RAISING DYKE.
12. PROVISION OF INSTALLATION OF RELIEF WELL SHALL ALSO BE DONE, WHENEVER SEEPAGE WATER ACCUMULATION OBSERVED DURING STRIPPING AND FOUNDATION PREPARATION.
13. IF IN ANY CASE, SLURRY AREA IS ENCOUNTERED BELOW THE FOUNDATION AFTER STRIPPING, THE SAME SHALL BE MADE DRY/ WORKABLE CONDITION EITHER BY DEWATERING THE WATER OR BY EXCAVATING PIT NEAR BY AND COLLECTING THE WATER INTO THE PIT SO THAT THE FOUNDATION BED CAN BE MADE DRY/ WORKABLE AND FOUNDATION PREPARATION SHALL BE DONE.
14. EXISTING WATER ESCAPE STRUCTURE SHALL BE RAISED UPTO RL 285.5M BY BREAKING THE TOP 500MM LEAN CONCRETE AND RAISING THE WELL UPTO RL 285.5M WITH M25 CONCRETE.

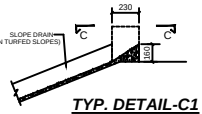


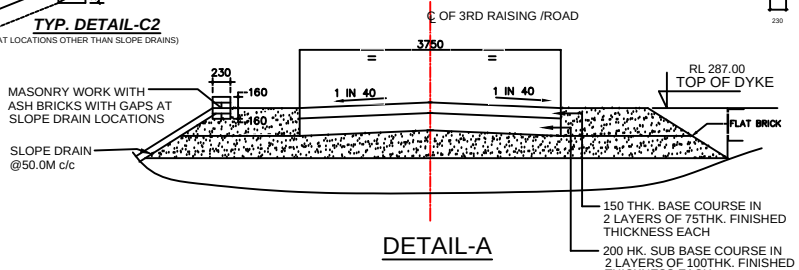


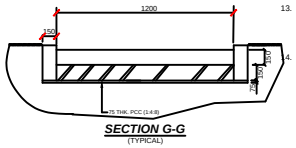






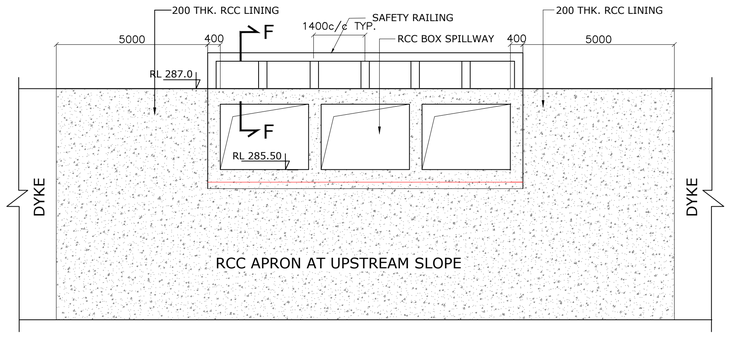




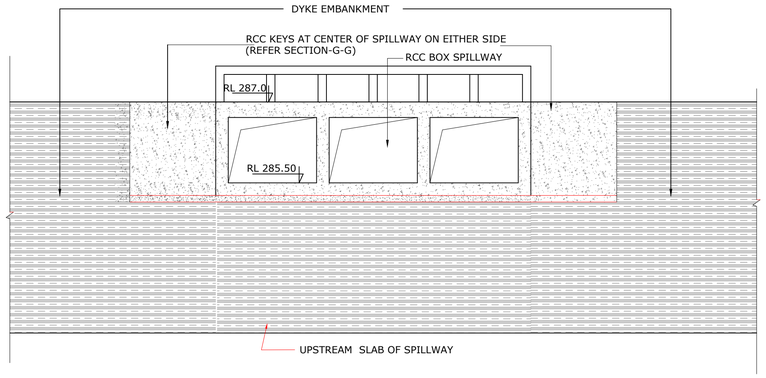


REV.	DESCRIPTION	DRAWN	DESIGN	CHD.	APPD.	DATE
B	GENERALLY REVISED AS PER SITE REQUIREMENTS	KKK	KKK	AP		
A	RELEASED FOR TENDER PURPOSE	KKK	KKK	SMD		

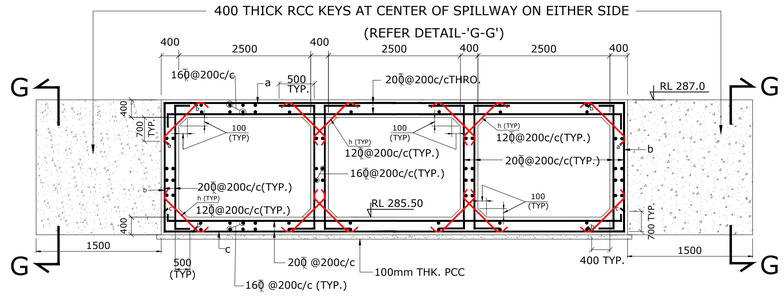
NTPC Limited
PROJECT: SIPAT SUPER THERMAL POWER PROJECT (STAGE-I(3X660MW))
TITLE: CIVIL WORKS 3RD RAISING OF LAGOON-I
SECTION AND ALLIED DETAILS
SCALE: AS NTS | DRG. NO.: 9518-XXX-POC-A-002 | REV.: B



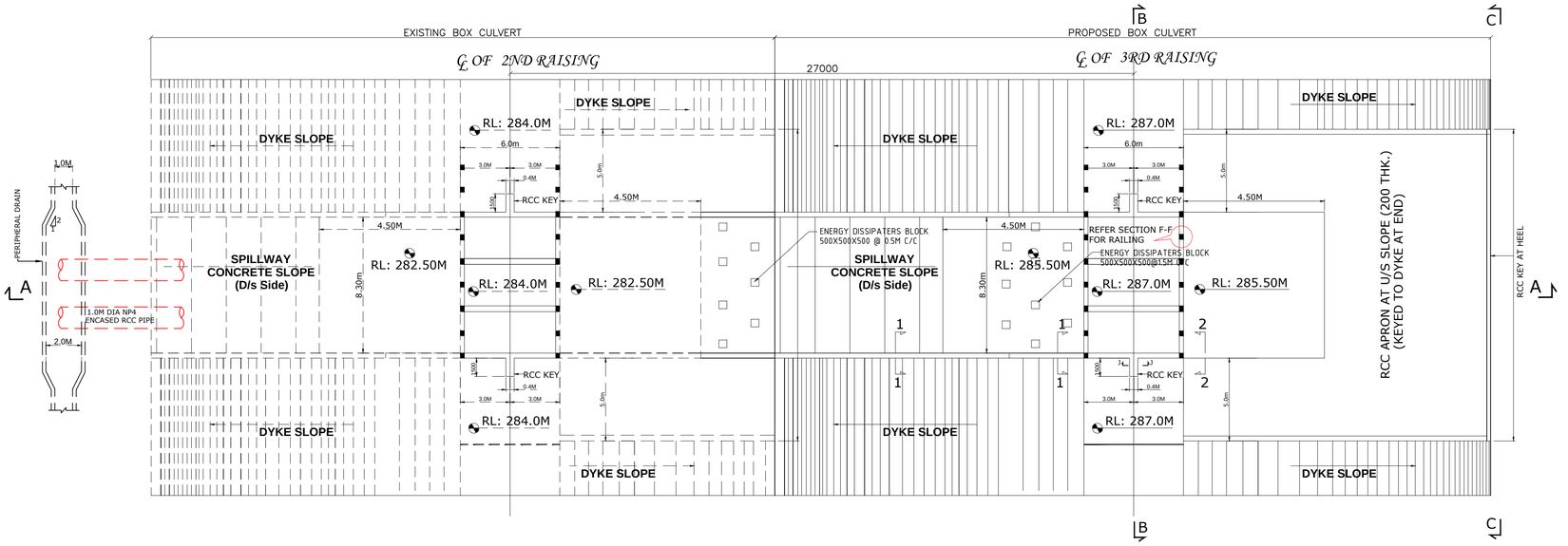
SECTION C-C
(VIEW FROM UPSTREAM)



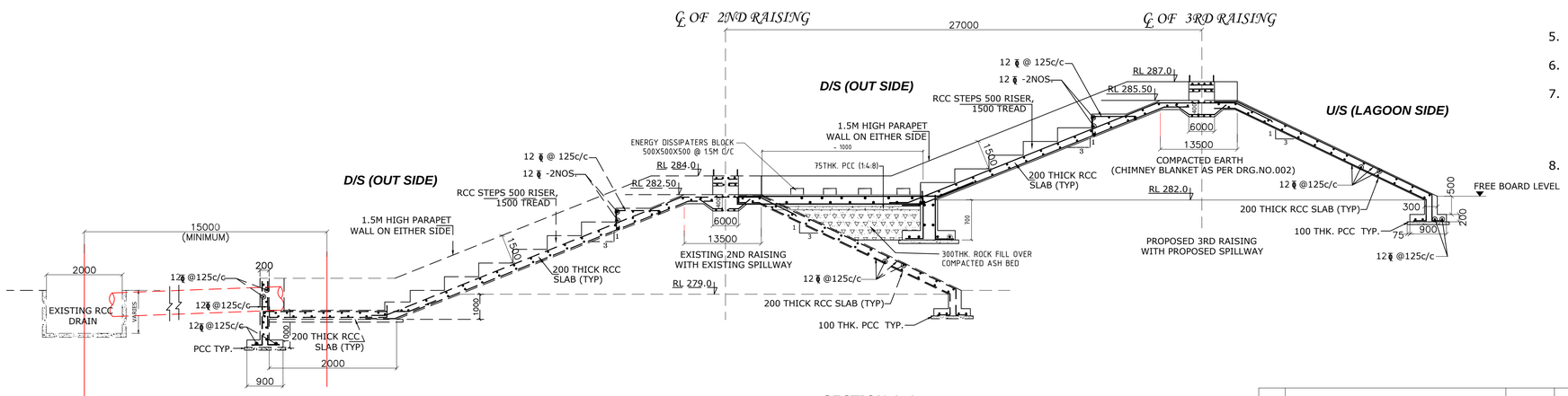
SECTION B-B
(AT CENTER OF SPILLWAY)



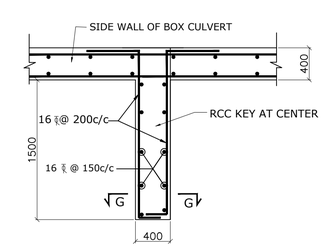
REINFT. DETAILS FOR BOX CULVERT AREA
(WITH SHEAR KEYS AT CENTER)



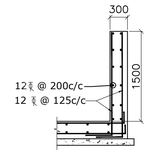
PLAN VIEW OF SPILLWAY



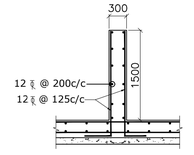
SECTION A-A



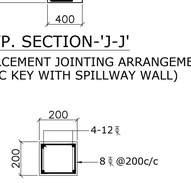
TYP. SECTION-'J-J'
(REINFORCEMENT JOINTING ARRANGEMENT
OF RCC KEY WITH SPILLWAY WALL)



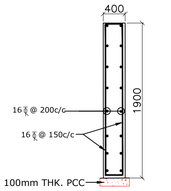
SECTION 1-1



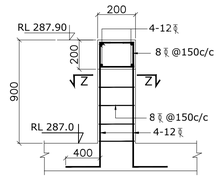
SECTION 2-2



SECTION Z-Z



SECTION 'G-G'



SECTION F-F

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETER AND LEVELS ARE IN METERS UNLESS NOTED OTHERWISE .
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH FOLLOWING DRAWINGS:

TITLE	DRAWING NO.
LAYOUT PLAN OF ASH DYKE	9518-XXX-POC-A-001
SECTION & ALLIED DETAILS	9518-XXX-POC-A-002
DETAILS OF INSTRUMENTATIONS	9518-XXX-POC-A-003
DETAILS OF APPROACH RAMPS & OVERTAKE ZONES	9518-XXX-POC-A-005

3. BENCHING SHALL BE PROVIDED AT JUNCTIONS WHERE THE DYKES MEET.
4. PCC, RCC, REINFORCEMENT, FORM WORK AND OTHER ITEMS OF WORK SHALL BE AS PER SPECIFICATION. GRADE OF CONCRETE SHALL BE M-25 FOR RCC AND 1:4:8 FOR PCC.
5. CLEAR COVER OF REINFORCEMENT TO THE CONCRETE SHALL BE 50mm.
6. DEVELOPMENT LENGTH OF REINFORCEMENT BARS SHALL BE 50xDIA OF BAR.
7. EMBANKMENT TO BE MADE UP TO FULL HEIGHT AND CONSTRUCTION OF BOX CULVERT TO BE DONE AFTER CUTTING THE EMBANKMENT (INCLUDING UPSTREAM SLOPE & DOWNSTREAM SLOPE TO MATCH THE FINISHED TOP SURFACE OF RCC SLAB WITH FINISHED EMBANKMENT SURFACE AT UPSTREAM AND DOWNSTREAM SLOPES).
8. AFTER COMPLETION OF RCC WORK, EXCAVATED PORTION OUT SIDE OF RCC WALL SHALL BE FILLED WITH BENTONITE BLENDED EARTH (MIN 4% BENTONITE TO CHECK THE PERMEABILITY NOT MORE THAN 1X10^6 CM/SEC). THE FILL MATERIAL SHALL BE COMPACTED WITH PNEUMATIC HAND COMPACTORS/TAMPERS IN THIN LAYERS.THERE AFTER THE UPSTREAM AND DOWNSTREAM AREA SHALL BE LINED WITH BRICK LINING IN CEMENT MORTAR (1:6).

FOR TENDER PURPOSE ONLY

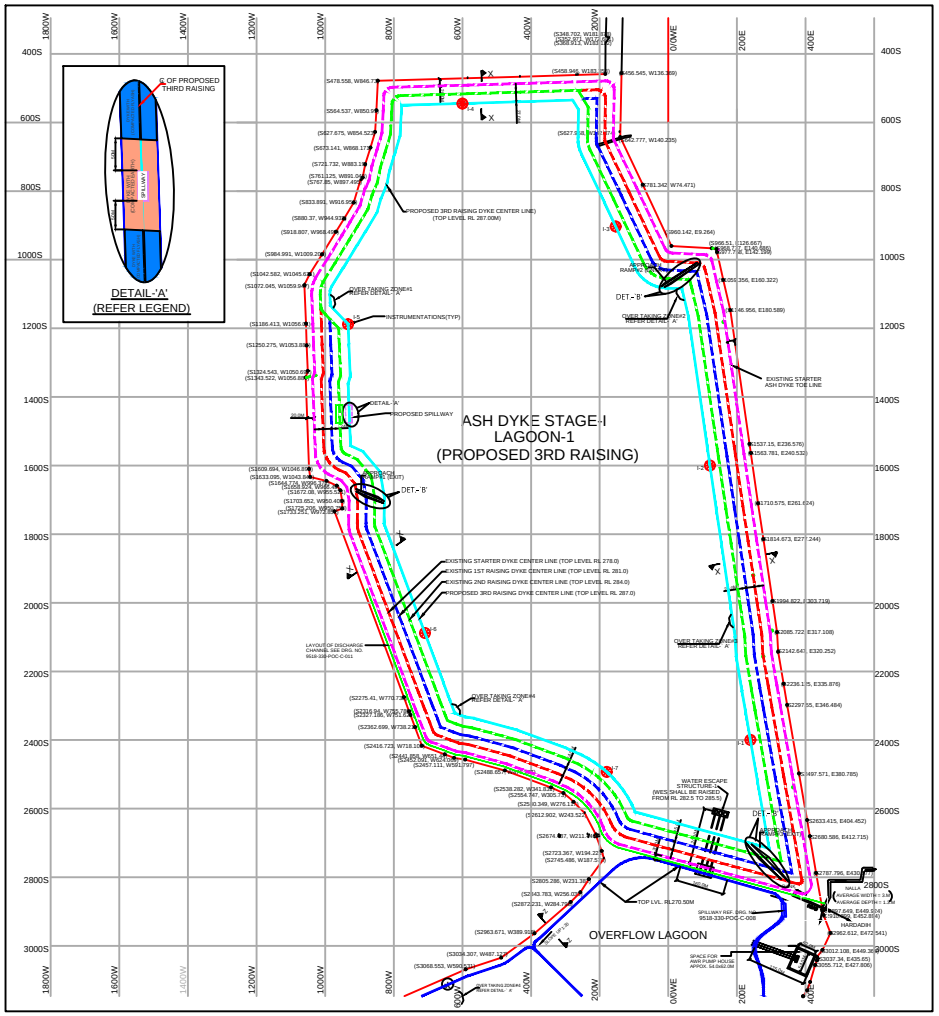
REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD	DATE
A	RELEASED FOR TENDER PURPOSE	KN	KN	SGD	SGD	06.08.2020

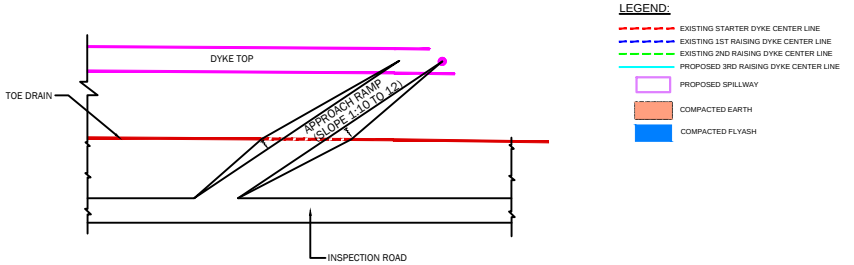
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NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-I (3x660MW)

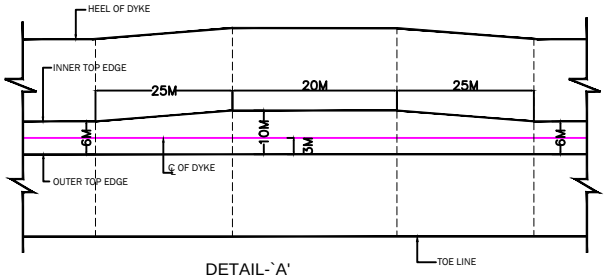
TITLE: CIVIL WORKS OF 3RD RAISING OF LAGOON-I
DETAILS OF SPILLWAYS

SIZE	SCALE	DRG.NO.	REV.
A1		9518-XXX-POC-A-004	A

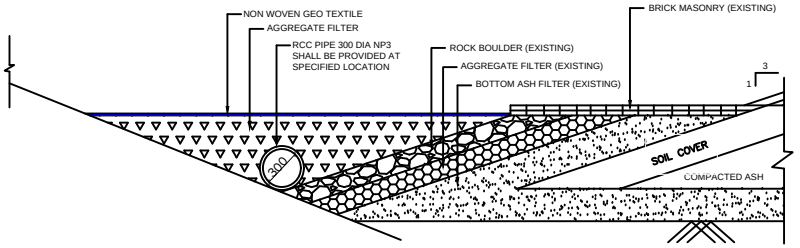




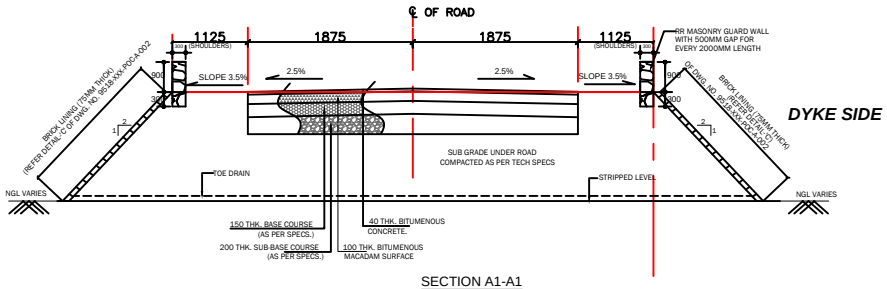
DETAIL-`B'



DETAIL-`A'
OUTSIDE DYKE
DETAILS FOR OVERTAKING ZONE ON DYKE TOP



TOE DRAIN SECTION AT APPROACH RAMP CROSSINGS



SECTION A1-A1

DYKE SIDE

NOTES:

1. ALL DIMENSIONS ARE IN METERS INCLUDING THE GRIDS.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH FOLLOWING DRAWINGS:

TITLE	DRAWING NO.
LAYOUT PLAN OF ASH DYKE	9518-XXX-POC-A-001
SECTION & ALLIED DETAILS	9518-XXX-POC-A-002
DETAILS OF INSTRUMENTATIONS	9518-XXX-POC-A-003
DETAILS OF SPILLWAYS	9518-XXX-POC-A-004

3. TENTATIVE LOCATIONS OF APPROACH RAMPS AND OVERTAKE ZONES AS MENTIONED IN THE DRAWING MAY VARY SLIGHTLY AS PER SITE LOCATION AND SITE CONDITIONS

FOR TENDER PURPOSE ONLY

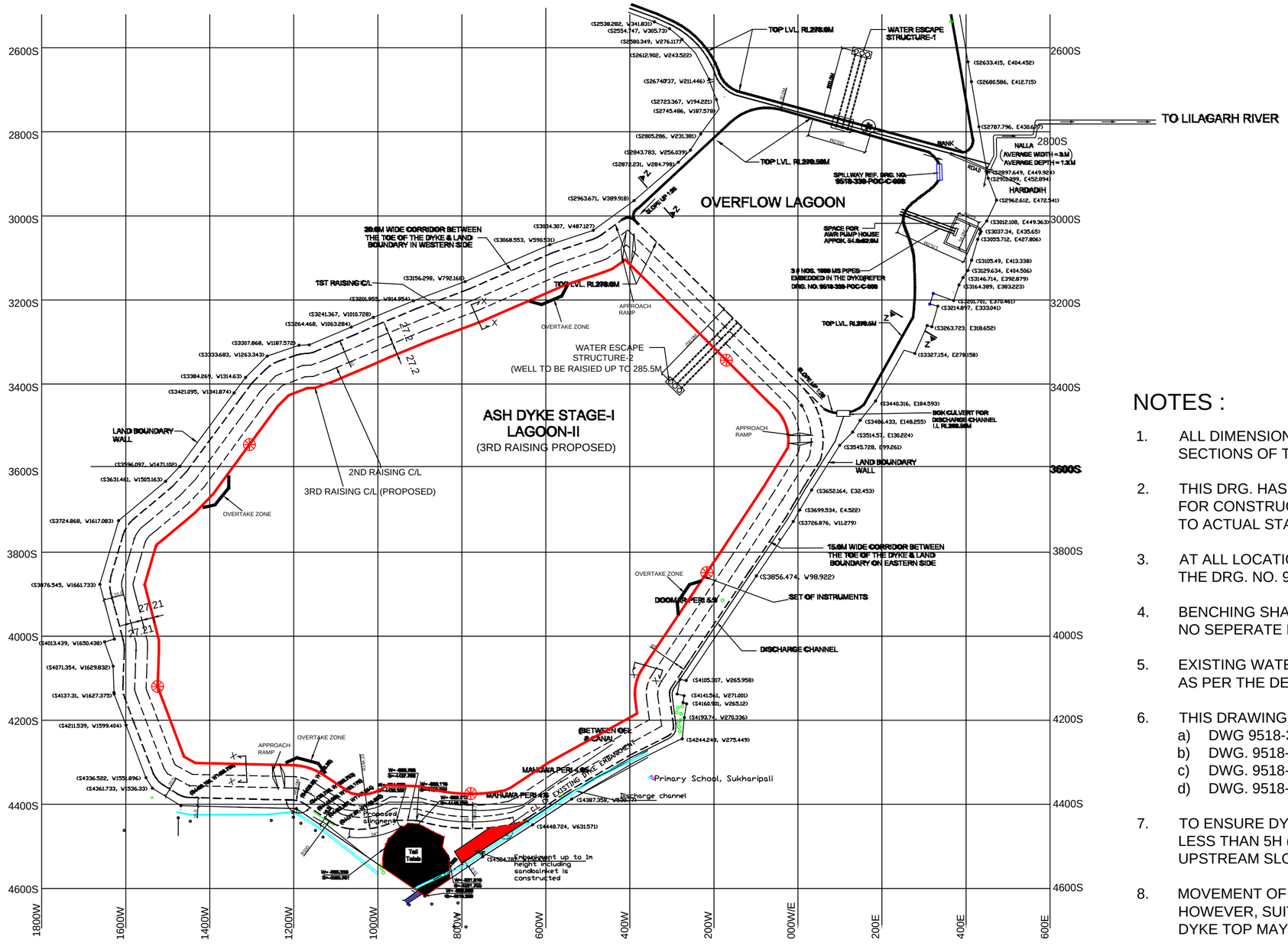
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NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE-I (3x660MW)

TITLE: CIVIL WORKS OF 3RD RAISING OF LAGOON-I
DETAILS OF APPROACH RAMPS AND OVERTAKE ZONES

SIZE: A1 | SCALE: NTS | DRG.NO.: 9518-XXX-POC-A-005 | REV: A

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	APPD	DATE
A	RELEASED FOR TENDER PURPOSE	KN	KN	AP	SGD	



LEGEND:

PROPOSED RAISING

EXISTING RAISING

NOTES :

1. ALL DIMENSIONS ARE IN METERS (INCLUDING THE GRIDS) FOR CROSS SECTIONS OF THE DYKE REFER DRG. NO. 9518-330-POC-C-1002.

2. THIS DRG. HAS BEEN PREPARED BASED ON THE STARTER DYKE DRG. RELEASED FOR CONSTRUCTION. ANY CHANGE IN THE ALIGNMENT SHALL BE MADE AT SITE DUE TO ACTUAL STARTER DYKE CONSTRUCTED AT SITE.

3. AT ALL LOCATIONS MARKED AS ⊕ A SET OF INSTRUMENTS AS SHOWN IN THE DRG. NO. 9518-330-POC-C-1005 BE PROVIDED .

4. BENCHING SHALL BE PROVIDED AT JUNCTIONS WHERE THE DYKES MEET. NO SEPERATE PAYMENT SHALL BE MADE FOR BENCHING.

5. EXISTING WATER ESCAPE STRUCTURE SHALL BE RAISED UP TO RL 285.5M AS PER THE DETAILS GIVEN IN DRG. NO. 9518-330-POC-C-1003.

6. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH FLOWING DRAWING.
   a) DWG 9518-330-POC-C-1002 SECTION AND ALLIED DETAILS .
   b) DWG. 9518-330-POC-C-1003 DETAILS OF EXTENSION OF EXISTING WES.
   c) DWG. 9518-330-POC-C-1004 DETAILS OF APPROACH RAMPS & OVERTAKE ZONE .
   d) DWG. 9518-330-POC-C-1005 DETAILS OF INSTRUMENTATIONS.

7. TO ENSURE DYKE STABILITY AND SAFETY, ASH EVACUATION SHALL START FROM NOT LESS THAN 5H (FIVE TIMES THE HEIGHT OF EMBANKMENT) MEASURED FROM THE UPSTREAM SLOPE SURFACE MEETING THE ASH DEPOSITION LEVELS.

8. MOVEMENT OF ASH LOADED VEHICLES OVER THE DYKE TOP IS STRICTLY PROHIBITED. HOWEVER, SUITABLE NUMBER OF ENTRY AND EXIT RAMPS MAY BE PROVIDED AND DYKE TOP MAY BE USED ONLY FOR CROSSING OVER THE EMBANKMENT.

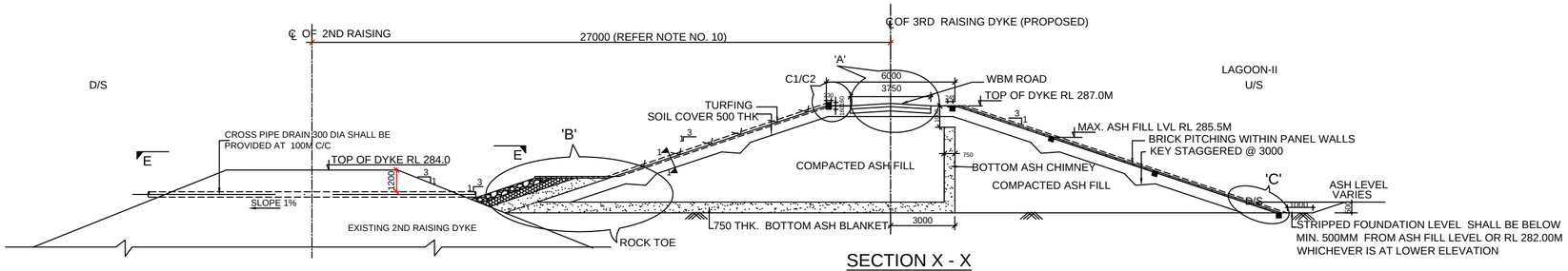
REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	CLEARED BY C	M	E	ARCH	APPD	DATE
0	RELEASED FOR TENDER/ CONSTRUCTION PURPOSE	CD	KN	AN					SGD	29.09.23

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PROJECT: SIPAT SUPER THERMAL POWER STATION
STAGE-I (3x660MW)

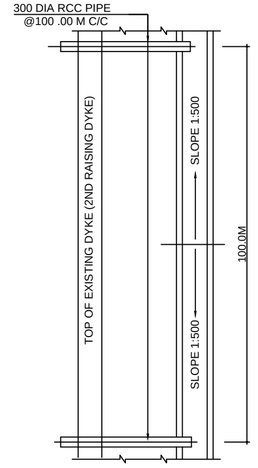
TITLE: 3RD RAISING OF ASH DYKE (LAGOON-II)
LAYOUT PLAN FOR ASH DYKE

SIZE	SCALE	SCALE	DRG.NO.	REV.
A1	NTS	NTS	9518-330-POC-C-1001	0

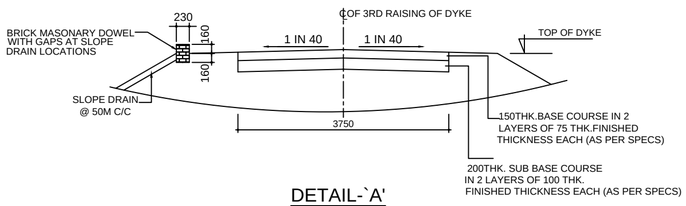


SECTION X - X

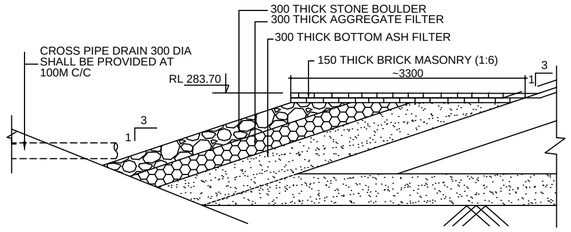
TYPICAL CROSS SECTION OF ASH DYKE



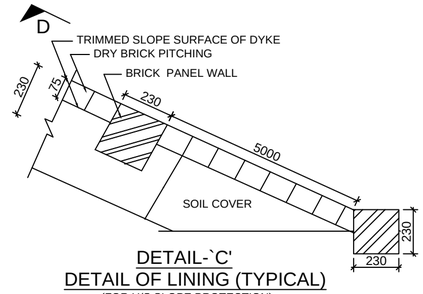
PLAN VIEW OF RCC PIPES



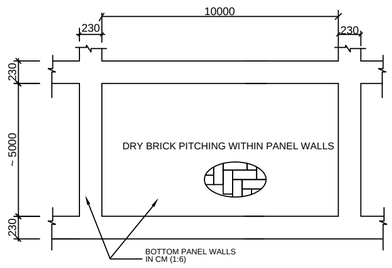
DETAIL-`A'



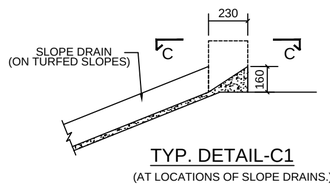
DETAIL `B'



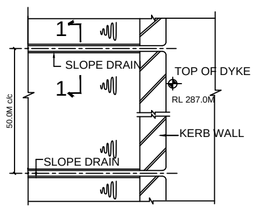
DETAIL-`C'
DETAIL OF LINING (TYPICAL)
(FOR U/S SLOPE PROTECTION)



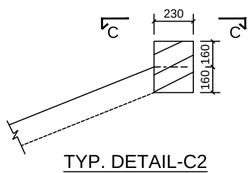
VIEW D - D
(TYPICAL)



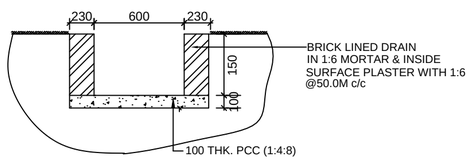
TYP. DETAIL-C1
(AT LOCATIONS OF SLOPE DRAINS.)



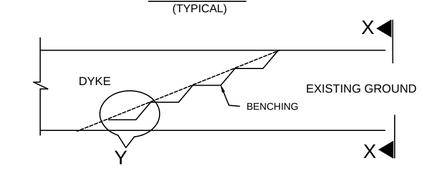
VIEW C-C
PART PLAN OF OF SLOPE DRAIN LOCATION



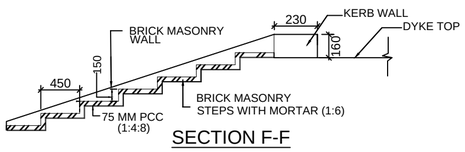
TYP. DETAIL-C2
(AT LOCATIONS OTHER THAN SLOPE DRAINS)



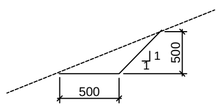
SECTION 1-1
(SLOPE DRAIN)



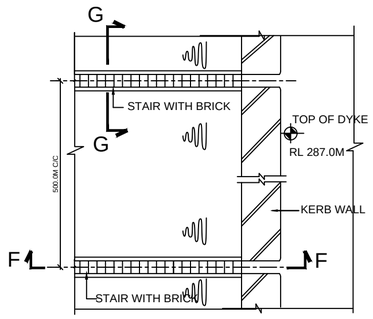
TYP DETAIL OF JUNCTION OF DYKE WITH EXISTING GROUND/ EMBANKMENT



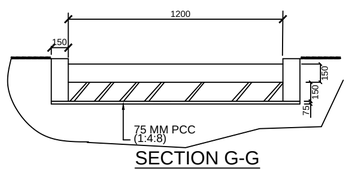
SECTION F-F



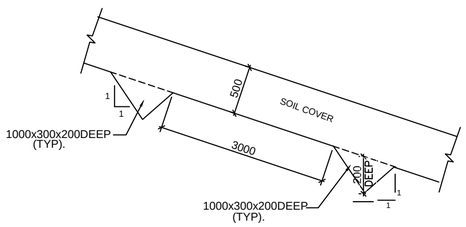
DETAIL-Y
(TYP.)



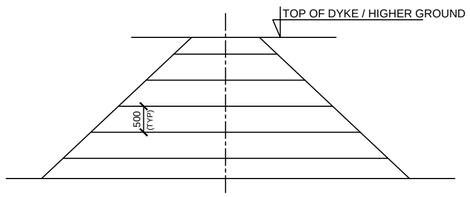
VIEW E- E
(PART PLAN SHOWING TYP. STAIR)
(DETAILS ON D/S SLOPE OF THE DYKE)



SECTION G-G
(TYPICAL)



KEY DETAILS



VIEW X-X

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRE AND ALL LEVELS ARE IN METER.
2. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRG. NO. 9518-330-POC-1001.
3. SOIL/ ASH FILL IN THE EMBANKMENT SHALL BE COMPACTED TO ACHIEVE DRY DENSITY NOT LESS THAN 95% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR).
4. THE SOIL COVER SHALL BE CONSTRUCTED EITHER SIMULTANEOUSLY WITH THE ASH FILL OR SEPARATELY AFTER THE ASH FILL IS COMPLETED IN LAYERS OF SPECIFIED THICKNESS. IN EITHER CASE, COMPACTION OF THE SLOPES OF ASH/ EARTH FILL TO THE SPECIFIED DENSITY (95% OF MDD) SHALL BE ENSURED EITHER BY PROVIDING EXTRA WIDTH AND TRIMMING AFTER COMPACTION OR BY USING SLOPE COMPACTORS. IF SOIL COVER IS DONE SEPARATELY, KEYS SHALL BE PROVIDED ON ASH SURFACE.
5. BEFORE PLACING THE FILL MATERIAL THE FOUNDATION AREA SHALL BE STRIPPED TO THE SPECIFIED DEPTH OF ASH INCLUDING VEGETATION AND SHALL BE COMPACTED TO ACHIEVE DRY DENSITY NOT LESS THAN 95% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR).
6. ALL THE BRICK WORKS SHALL BE DONE WITH ASH BRICKS.
7. MORTAR FOR BRICK MASONRY WORK SHALL BE 1:6 CEMENT SAND MORTAR UNLESS NOTED OTHERWISE.
8. THE FOUNDATION STRIPPING SHALL EXTEND TO 1.0M BEYOND HEEL OF EMBANKMENT.
9. HORIZONTAL BENCHES SHALL BE EXCAVATED ON THE EXISTING HIGHER GROUND AND ON THE EXISTING DYKE AT THE JUNCTIONS OF THE DIFFERENT DYKES.
10. CENTRE TO CENTRE SPACING OF EXISTING DYKE AND RAISING DYKE SHALL DEPEND ON DEPTH OF STRIPPING ON EXISTING FILLED UP ASH DYKE. DISTANCE AS SHOWN IN THE DRAWING IS FOR STRIPPED LEVEL 2.0M BELOW TOP LEVEL OF 2ND RAISING DYKE. IF DEPTH OF FOUNDATION STRIPPING CHANGES, THE SPACING MAY BE REVISED ACCORDINGLY.
11. AT EACH LOCATIONS MARKED AS '⊛' ON THE ALIGNMENT OF ASH DYKE, ONE SET OF INSTRUMENTS (TWO PIEZOMETERS AND ONE SURFACE SETTLEMENT MARKER) SHALL BE PROVIDED AS PER DETAIL IN DRG. NO. 9518-330-POC-1005.
12. BOTTOM ASH (MEETING FILTER CRITERIA REQUIREMENTS) TO BE USED FOR CONSTRUCTION OF CHIMNEY AND BLANKET.
13. IF ANY SLUSHY AREA IS ENCOUNTERED BELOW THE FOUNDATION AFTER STRIPPING, THE SAME SHALL BE MADE DRY/ WORKABLE CONDITION EITHER BY DEWATERING OR BY EXCAVATING PIT NEAR BY AND COLLECTING THE WATER INTO THE PIT, SO THAT THE FOUNDATION BED CAN BE MADE DRY/ WORKABLE AND FOUNDATION PREPARATION SHALL BE DONE.
14. UPSTREAM SLOPE OF THE EMBANKMENT SHALL BE PROTECTED WITH FLAT BRICK AS PER THE DETAILS SHOWN IN THE DRAWING.

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	ARCH	APPD	DATE
0	RELEASED FOR TENDER/ CONSTRUCTION PURPOSE	CD	KN	AN					SGD	29/09/23

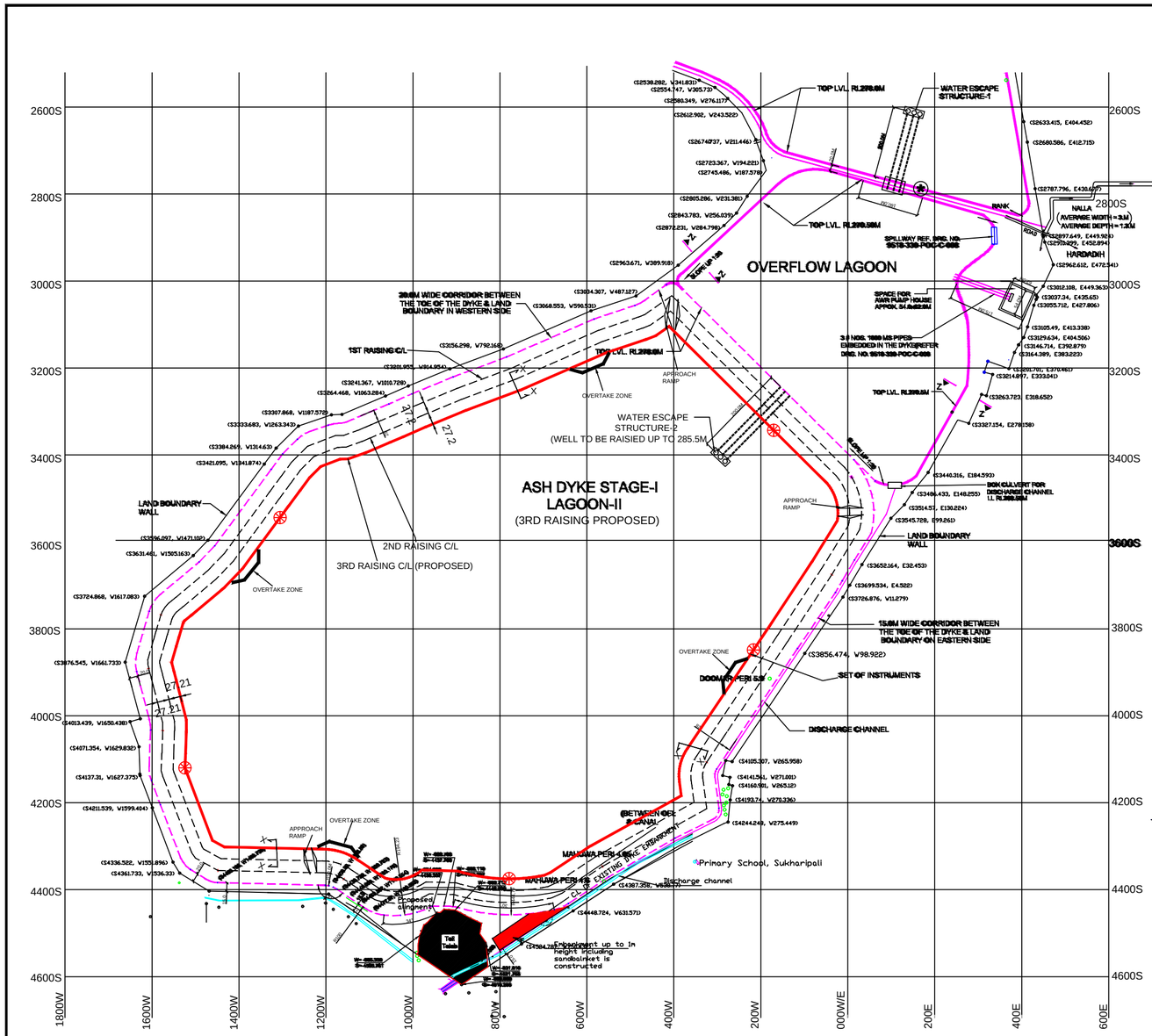
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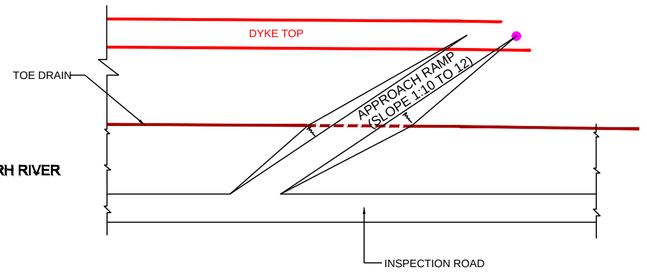
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NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER STATION
STAGE-I (3x660MW)

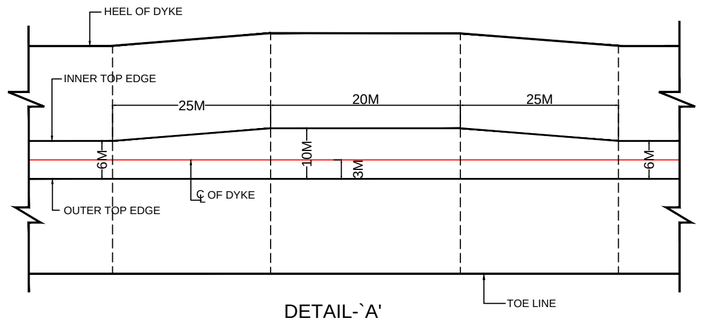
TITLE: 3RD RAISING OF ASH DYKE (LAGOON-II)
SECTION AND ALLIED DETAILS

SIZE	SCALE	DRG.NO.	REV.
NTS	SCALE	9518-330-POC-C-1002	0



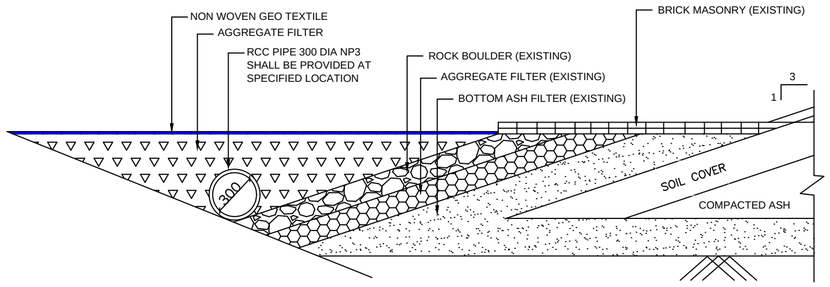


DETAIL-`B'

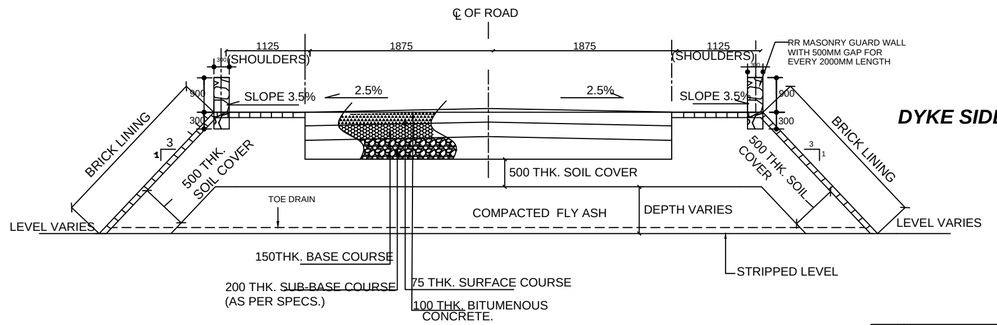


DETAIL-`A'

DETAILS FOR OVERTAKING ZONE ON DYKE TOP



TOE DRAIN SECTION AT APPROACH RAMP CROSSINGS



DYKE SIDE

SECTION A1-A1

NOTES :

1. ALL DIMENSIONS ARE IN METER INCLUDING THE GRID.
2. TENTATIVE LOCATIONS OF APPROACH RAMP AND OVERTAKE ZONES AS MENTIONED IN THE DRAWING MAY VARY SLIGHTLY AS PER SITE LOCATION AND SITE CONDITIONS.
3. TO ENSURE DYKE STABILITY AND SAFETY, ASH EVACUATION SHALL START FROM NOT LESS THAN 5H (FIVE TIMES THE HEIGHT OF EMBANKMENT) MEASURED FROM THE UPSTREAM SLOPE SURFACE MEETING THE ASH DEPOSITION LEVELS.
4. MOVEMENT OF ASH LOADED VEHICLES OVER THE DYKE TOP IS STRICTLY PROHIBITED. HOWEVER, SUITABLE NUMBER OF ENTRY AND EXIT RAMPS MAY BE PROVIDED AND DYKE TOP MAY BE USED ONLY FOR CROSSING OVER THE EMBANKMENT.

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	M	E	ARCH	APPD	DATE
0	RELEASED FOR TENDER/ CONSTRUCTION PURPOSE	CD	KN	AN					SGD	29.09.23

CLEARED BY

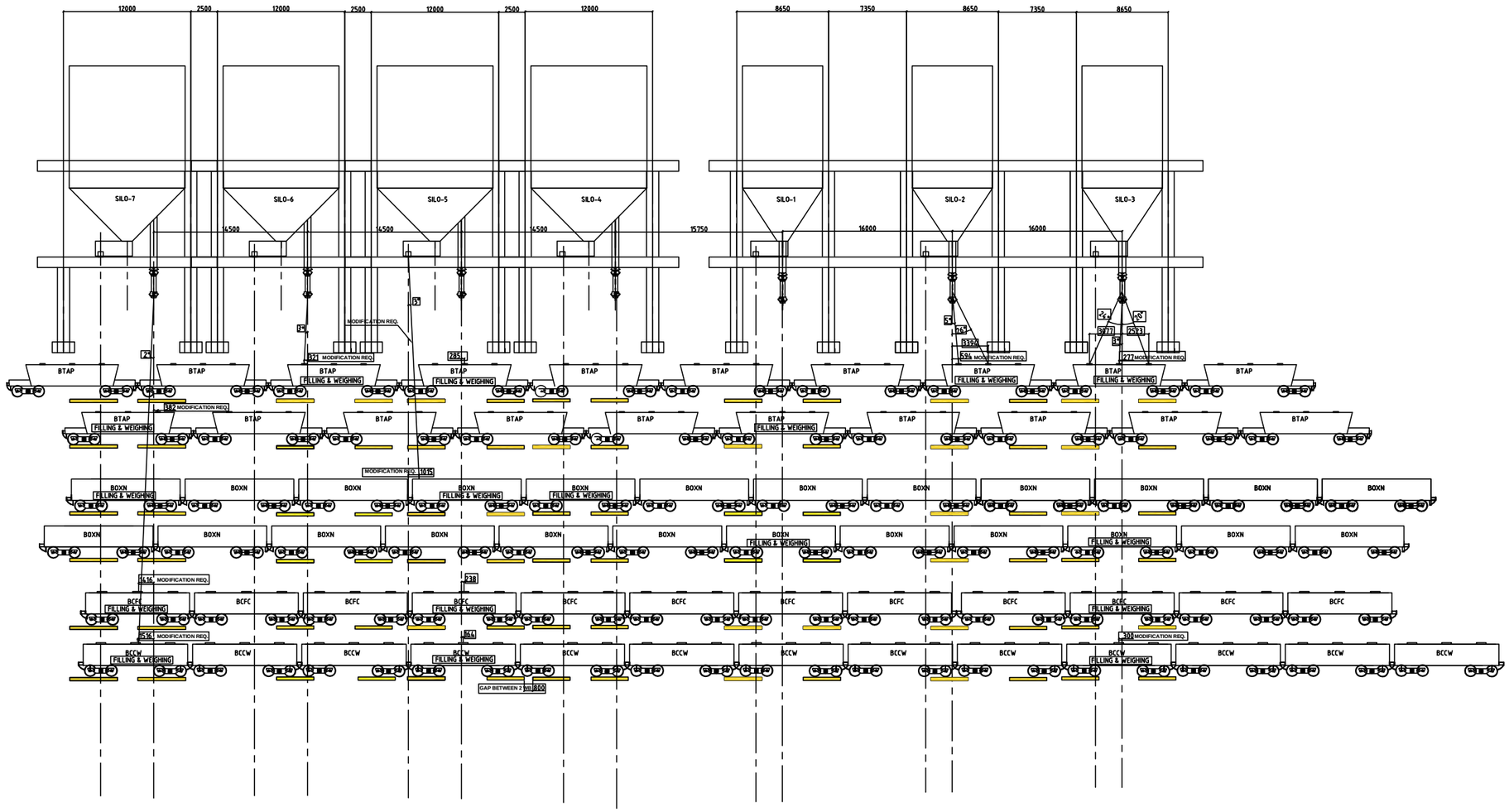
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ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER STATION
STAGE-I (3x660MW)

TITLE: 3RD RAISING OF ASH DYKE (LAGOON-II)
DETAILS OF APPROACH RAMPS & OVERTAKE ZONE

SIZE	SCALE	DRG.NO.	REV.
NTS	SCALE	9518-330-POC-C-1004	0

BTAP	COMBINATION-A-(2),(3),5,6
BTAP	COMBINATION-B-(7),1
BOXN	COMBINATION-A-4,(5),7
BOXN	COMBINATION-A-1,3
BCFC	COMBINATION-A-(7),5,3
BCCW	COMBINATION-A-(7),5,(3)



POSITION OF WEIGH BRIDGE FOR BTAP, BOXN, BCFC & BCCW WAGON FOR SILO-1 TO SILO-7

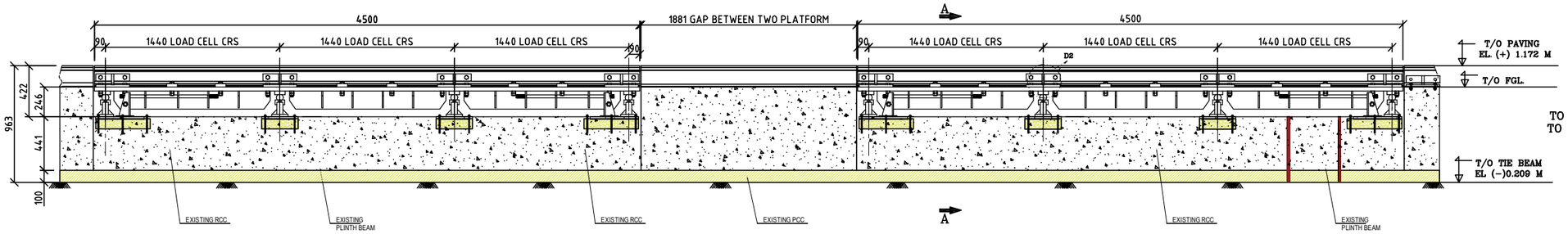
REV.NO	DATE	DESCRIPTION	APPD.	SL.NO.	DRG.NO.	TITLE.
03	31.01.2022	REVISED AS PER COMMENT	DC			
02	18.01.2022	REVISED AS PER COMMENT	DC			
01	17.01.2022	REVISED AS PER COMMENT	DC			

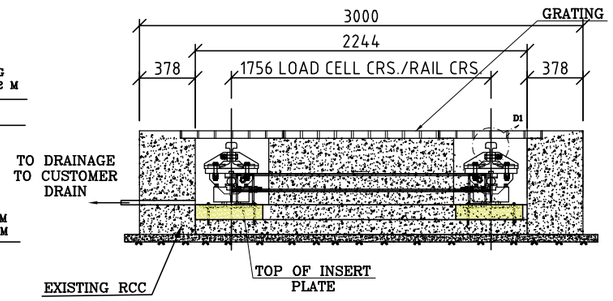
REVISION DETAILS OF DRAWING | DETAILS OF REFERENCE DRAWING

CATEGORY	APPROVAL / INFORMATION / REFERENCE ✓ / RECORD / CONSTRUCTION
CLIENT :	**NTPC LIMITED** SIPAT SUPER THERMAL PROJECT AT STAGE-I
DESIGN	ACME
DRAWN	DC
CONTRACTOR :	M/S ACME AUTOMATION PVT. LTD. BHILAI -490026 (C. G.).
CHKD	DC
APPROVED	RKN
DATE	07-01-22
TITLE :	GA AND KEY PLAN DRAWING OF STATIC RAIL WEIGH-BRIDGE FOR BATP,BOXN, BCCW & BCFC WAGONS AT STAGE-I
ACMEDRG NO.-	AAMD000/21-22/RLWB/LY-001
REV	A
SCALE :-	NTS
SHEET:	1/1
	3

Drg. Size-A3

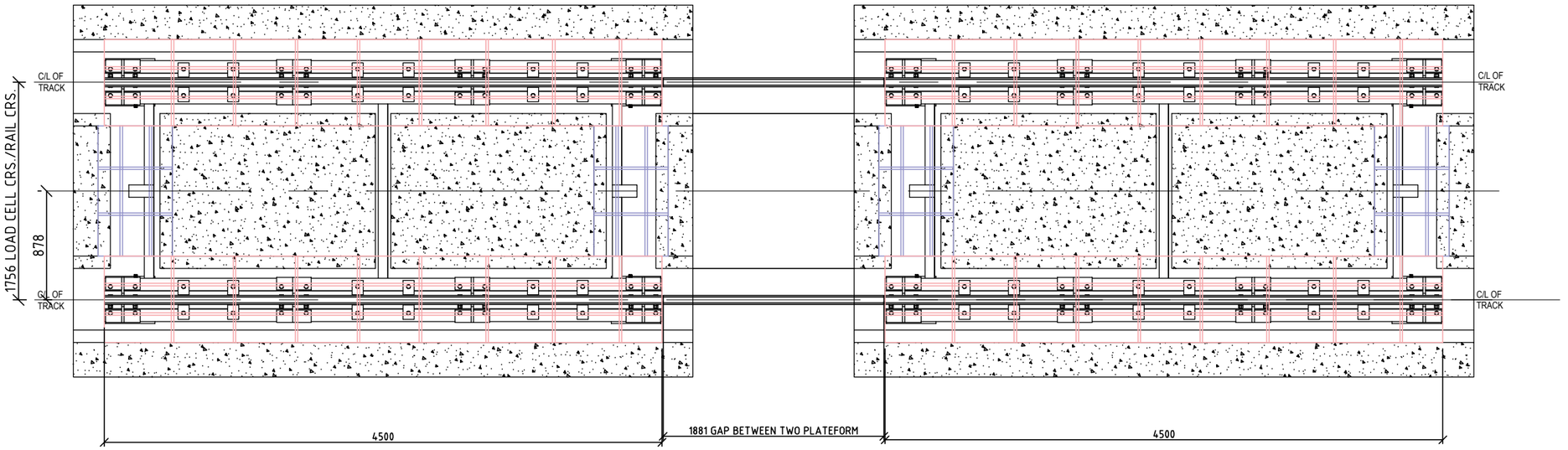
Plt. Scale: 1:1



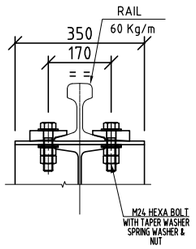


VIEW A–A

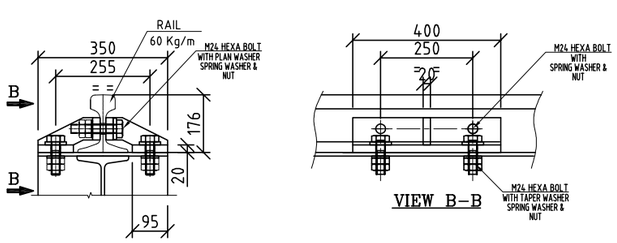
ELEVATION VIEW OF WEIGH BRIDGE FOR BTAP, BOXN, BCFC & BCCW WAGON



PLAN VIEW OF WEIGH BRIDGE FOR BTAP, BOXN ,BCFC & BCCW WAGON



DETAIL–D1



DETAIL D2 (RAIL ANTI CREEP)

VIEW B–B

NOTES :–

1. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METER UNLESS OTHERWISE NOTED.
2. EXISTING NEAR BY FOUNDATIONS, STRUCTURES, / EQUIPMENTS SHALL BE SUITABLY PROTECTED.
3. EXISTING UNDER GROUND SERVICES SHALL BE SUITABLY PROTECTED.
4. BRIDGE SHALL BE SUPPLIED WITH TWO COAT OF RED OXIDE & TWO COAT OF BLACK SYNTHETIC ENAMEL PAINT.
5. WELD SIZE SHALL BE 4mm FILLET AT SHOP & AT SITE UNLESS NOTED OTHER WISE.
6. RAILS SHALL BE PROVIDED BY NTPC.
7. PLEASE READ THIS DRAWING WITH SCHEMATIC LAYOUT DRAWING NO AAMD000/21–22/RLWB/MP–001.
8. GP–2 GROUTING SHALL USED FOR FOUNDATION BOLT FIXING.

TECHNICAL DATA		
GENERAL DATA	EQUIPMENT	STATIC RAIL WEIGH BRIDGE
	EQUIPMENT QTY. (NO.)	1 NO.
	CAPACITY (T)	120
	ACCURACY	±0.05 % of F.S.
	MODEL	AWB -120T
	MAXIMUM PERMISSIBLE ERROR (e)	50 Kg.
	DISPLAY RESOLUTION (d)	20 Kg.
LOAD CELL DATA	TYPE	COMPRESSION TYPE
	MAKE	ACME
	LOAD CELL CAPACITY	30T
	DEGREE OF PROTECTION	IP 68
	MOC	SS
	QUANTITY/EQUIPMENT	16 NOS.
JUNCTION BOX	MODEL	1503.510
	MAKE	RITTAL
	QUANTITY/EQUIPMENT	2 NOS.

NO.	DATE	REVISION	DRAWN	CHECKED	APPROVED

PRPD BY	
CHKD BY	
APPD BY	

CLIENT: NTPC LIMITED
SIPAT SUPER THERMAL PROJECT,BILASPUR(C.G.)

CONTRACTOR: ACME AUTOMATION PVT. LIMITED
16K–LIA, BHILAI– 490026

DRAWING TITLE: GENERAL ARRANGEMENT AND CIVIL FOUNDATION DRAWING OF 120T RAIL WEIGH BRIDGE

SUBMITTED FOR: APPROVAL — SCALE :– NTS — DATE

		BY	DATE			
✓	APPROVAL			PRPD	N.C.	21/02/2022
	REFERENCE					
	CONSTRUCTION			CHKD	N.C	21/02/2022
	AS BUILT	SHEET NO. :– 01 OF 01		APPD BY	L.K.S	21/02/2022

JOB NO. 115/21–22 — DRAWING NO. AAMD115/21–22/RLWB/GA–002 — REV. 02

SHEET A3