EPC PACKAGE FOR LARA SUPER THERMAL POWER PROJECT, STAGE-II (2x800 MW)
Amendment No. 02 to Technical Specifications Section-VI of Bidding Document No.: CS-9587-001R-2

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
TG1-01	VI/A	VI/ Chapter-02	Group C: Mandatory Spares 1. Main Turbine (xxv)	12 of 31	Valve Seat for HPSV, HPCV, IPSV, IPCV, HP Bypass Valve, HP Bypass Spray Valves, HP Bypass Spray Isolation Valve	Valve Seat for HPSV, HPCV, IPSV, IPCV, HP Bypass Valve, HP Bypass Spray Valves, HP Bypass Spray Isolation Valve **(Applicable wherever valve seats are envisaged as separate item)**
TG1-02	VI/A	VI/ Chapter-02	Group C: Mandatory Spares 5(ii)	13 of 31	Shell side safety relief valve for the following: (ii) All LP heater	Shell side safety relief valve for the following: (ii) All LP heater **(as applicable)**
TG1-03	VI/B	A-01	2.02.01 (i)	45 of 101	**Condenser** (i) Design, manufacturing and testing as per Heat Exchanger Institute, USA (latest edition) with proven design. The condenser shall be designed for heat load corresponding to Valve Wide Open (VWO) conditions, 0% make-up, guaranteed condenser pressure and conditions given in Clause No. 2.02.03. The value of condenser pressure to be measured at 300 mm above the top row of condenser tubes shall be demonstrated under VWO output condition 0% make-up. The condenser vacuum shall be measured with a vacuum grid utilizing ASME basket tips. The grid is fitted at 300 mm above top row of tubes of condenser. Condensate temperature at all loads shall be near to the saturation temperature corresponding to condenser pressure.	**Condenser** (i) Design, manufacturing and testing as per Heat Exchanger Institute, USA (latest edition) with proven design. The condenser shall be designed for heat load corresponding to 105% of TMCR Load ~~Valve Wide Open (VWO) conditions~~, 0% make-up, guaranteed condenser pressure and conditions given in Clause No. 2.02.03. The value of condenser pressure to be measured at 300 mm above the top row of condenser tubes. ~~shall be demonstrated under VWO output condition 0% make-up.~~ The condenser vacuum shall be measured with a vacuum grid utilizing ASME basket tips. The grid is fitted at 300 mm above top row of tubes of condenser. Condensate temperature at all loads shall be near to the saturation temperature corresponding to condenser pressure.

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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
TG1-04	VI/B	A-07	11.05.00	21 of 25	Adequate maintenance facilities shall be provided as required for assembly, disassembly, …… hydrogen coolers, air cooled condenser system, vacuum pumps, condensate extraction pumps and boiler feed pump cartridges, ……. to be carried out during major overhauls.	Adequate maintenance facilities shall be provided as required for assembly, disassembly, …… hydrogen coolers, **water** cooled condenser system, vacuum pumps, condensate extraction pumps and boiler feed pump cartridges, ……. to be carried out during major overhauls.
TG1-05	VI/A	IIA-06	10.02.00	8 of 10	**EOT CRANE FOR BOILER FEED PUMP** ……. The main hook capacity of each crane shall be 10% over and above the heaviest component/equipment to be handled (including lifting beam, if applicable, and slings etc.) or 25 Tonne whichever is higher. …….	**EOT CRANE FOR BOILER FEED PUMP** ……. The main hook capacity of each crane shall be 10% over and above the heaviest component/equipment **(including Drive Turbine assembly)** to be handled (including lifting beam, if applicable, and slings etc.) or 25 Tonne whichever is higher. …….
TG1-06	VI/B	A-07	7.02.01	19 of 25	One (1) no of Electrically operated travelling cranes …….. The capacity of each crane shall be 10% over and above the heaviest component/equipment to be handled (including lifting beam and slings etc., if provided) or 25 Tonne whichever is higher.	One (1) no of Electrically operated travelling cranes …… 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.
TG1-07	VI/B	G-05	1.01.00	1 of 38	1. NPSH (R) Test on one BFP and one BP 2. Pressure pulsation test on one BFP. 3. Axial thrust measurement on one BFP. 4. Visual cavitation test on one BFP.	1. NPSH (R) Test on one BFP and one BP 2. Pressure pulsation test on one BFP. 3. Axial thrust measurement on one BFP. ~~4. Visual cavitation test on one BFP.~~ 4. Complete strip down test of BFP which undergone above tests.

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					5. Complete strip down test of BFP which undergone above tests.	
	VI/B	G-05	1.06.00	3 of 38	**Visual Cavitation test:** Visual cavitation test for one first stage production impeller…… be repeated with 25%, 50%, 65%, 80%, 100% & 125% of Design Point. **Acceptance Criteria:** Cavitation-free (bubble free) at…….. length shall be less than 1% of impeller OD.	Deleted
	VI/B	G-05	**Log sheet for Visual Cavitation (Annexure-IV)**	5 of 38	**Log sheet for Visual Cavitation (Annexure-IV)**	Deleted
TG1-08	VI/B	A-24	1.02.05	2 of 6	……The machine room will be provided with R.C.C. floor slab with necessary pockets for anchor bolts and slots.	…… The machine room will be provided with necessary pockets for anchor bolts and slots. Floor of machine room shall be as specified in the chapter "D-1-5 SALIENT FEATURES & DESIGN CONCEPT" of the specification.

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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
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TG1-09	VI/B	A-07	1.19.00	7 of 25	Furnish thermal kit data for plant performance by DDCMIS and true copies of Performance Guarantee test reports for sets rated for 800 MW or above. Furnish turbine clearance …… leakage rate from glands.	Furnish thermal kit data for plant performance by DDCMIS ~~and true copies of Performance Guarantee test reports for sets rated for 800 MW or above~~. Furnish turbine clearance …… leakage rate from glands.
TG1-10	VI/A	VI/ Chaptor-02	Group B: Mandatory Spares I. TG Items (28)	5 of 31	Spray water injection valve for HP Bypass system complete assembly including actuator, yoke and its control.	Spray water injection valve for HP Bypass system complete assembly including actuator, yoke and its control. **(If valve type is different for control and stop functions then spares to be supplied for both types).**
TG1-11	VI/A	VI/ Chaptor-02	Group C: Mandatory Spares 1. Main Turbine (vi)	10 of 31	LP outer & inner casing fasteners & fixing materials 1set (100 % of each type & size) (Requirement for one Unit)	LP outer & inner casing fasteners & fixing materials (In case of identical item for both LP Turbine, one set for one LP Turbine to be provided). 1set (100 % of each type & size) ~~(Requirement for one Unit)~~
TG1-12	VI/A	VI/ Chaptor-02	4.00.00 A. EHC System related instrumentation (4)	23 of 31	High pressure hoses for HPBP, High Pressure LPBP etc.	Hoses for HP and LP Bypass system.
TG1-13	VI/A	VI/ Chaptor-02	General Note	31 of 31	----------	11. Wherever servomotor is mentioned, it means servomotor/complete actuator along with yoke & its control.
TG1-14	VI/B	A-07	1.16.00 (k)	5 of 25	Bidder shall ensure the requirement of minimum degree of superheat upstream of HPLP bypass valve to avoid wet steam	~~Bidder shall ensure the requirement of minimum degree of superheat upstream of HPLP bypass valve to avoid wet steam entry during start-up cases. However, HP-LP~~

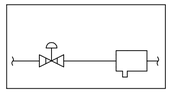
S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					entry during start-up cases. However, HP-LP bypass valve internals/trim shall also be designed to withstand wet steam entry during cold start-up case. Suitable drain lines and drain pot arrangement upstream of HP bypass valve shall also be envisaged to meet above requirement.	~~bypass valve internals/trim shall also be designed to withstand wet steam entry during cold start-up case.~~ ~~Suitable drain lines and drain pot arrangement upstream of HP bypass valve shall also be envisaged to meet above requirement.~~ HP Bypass valves shall be designed as per degree of superheat based on Boiler-Turbine combined start-up curve i.e, degree of superheat based on Main steam pressure and Temperature at the time of HP Bypass valve opening during cold start-up. For achieving degree of superheat as per approved combined start-up curve bidder shall make necessary arrangement for combination of drain lines with drain pots at the upstream of HP Bypass valves. Bidder shall provide necessary pressure and temperature measuring instruments near to HP Bypass valve for calculation of degree of superheat at upstream.
TG1-15	VI/B	G-06	3.03.04 (i)	7of 14	(i) H.P./L.P. Bypass Capabilities (a)…… …….. (c)…… Under all these conditions…… ….. and accepted by the EMPLOYER. The same shall be demonstrated.	New Paragraph added (i) H.P./L.P. Bypass Capabilities (a)…… …….. (c)…… Under all these conditions…….. and accepted by the EMPLOYER. The same shall be demonstrated.

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
						Bidder shall demonstrate the degree of superheat at upstream of HP Bypass valve during cold start-up as per approved Boiler Turbine combined start-up curve (The degree of superheat at upstream of HP bypass valve as derived from boiler turbine startup curve will be specified by bidder in HPBP sizing document). In case the degree of superheat is not achieved as per approved combined start-up curve and subsequently valve starts passing within defect liability period, Bidder shall reassess valve operating condition based on actual steam parameters during cold start-up. Accordingly necessary improvement shall be done by the contractor to prevent further passing in the HP Bypass valves.
TG1-16	VI/B	A-07	11.02.00	21 of 25	The steam turbine generator unit and its auxiliaries …… thermal stresses. Complete technical data including criteria for thermal stresses, cyclic loading, thermal fatigue, together with values of thermal stresses at critical locations shall be furnished to establish the suitability of design for cyclic and two shift operation.	The steam turbine generator unit and its auxiliaries …… thermal stresses. ~~Complete technical data including criteria for thermal stresses, cyclic loading, thermal fatigue, together with values of thermal stresses at critical locations shall be furnished to establish the suitability of design for cyclic and two shift operation.~~
TG1-17	Part-E		XXXX-999-POM-A-006		Auxiliary Steam P&ID	Revised Auxiliary Steam P&ID
TG1-18	VI/B	A-07	5.01.00	11 of 25	**Low Pressure Heaters and Drain Cooler**	**Low Pressure Heaters and Drain Cooler**

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					Horizontal and U-tube type with……be cold bent for fabrication.	Horizontal and U-tube type with……be cold bent for fabrication. Requirement of drain cooler for heaters, installed in condenser neck and heater with drip pump for forward cascading of drains shall be as per standard practice of the bidder and cycle optimisation. If separate drain cooler is offered it shall be of straight or U-tube type.

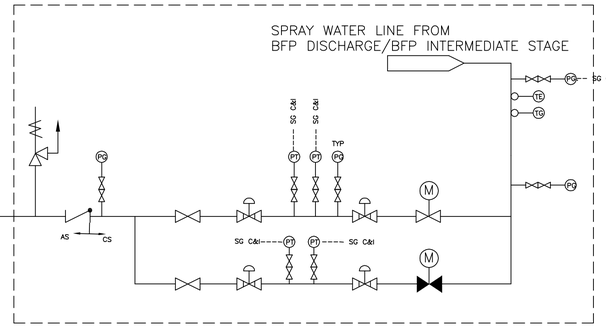
HCPRDS WITH SEPARATE DESUPERHEATER

BOX–A



BOX–B

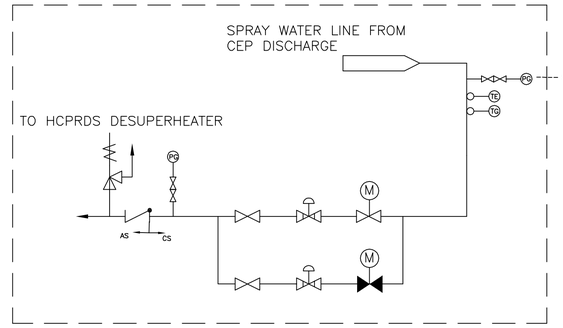
SPRAY WATER LINE FROM BFP DISCHARGE/BFP INTERMEDIATE STAGE



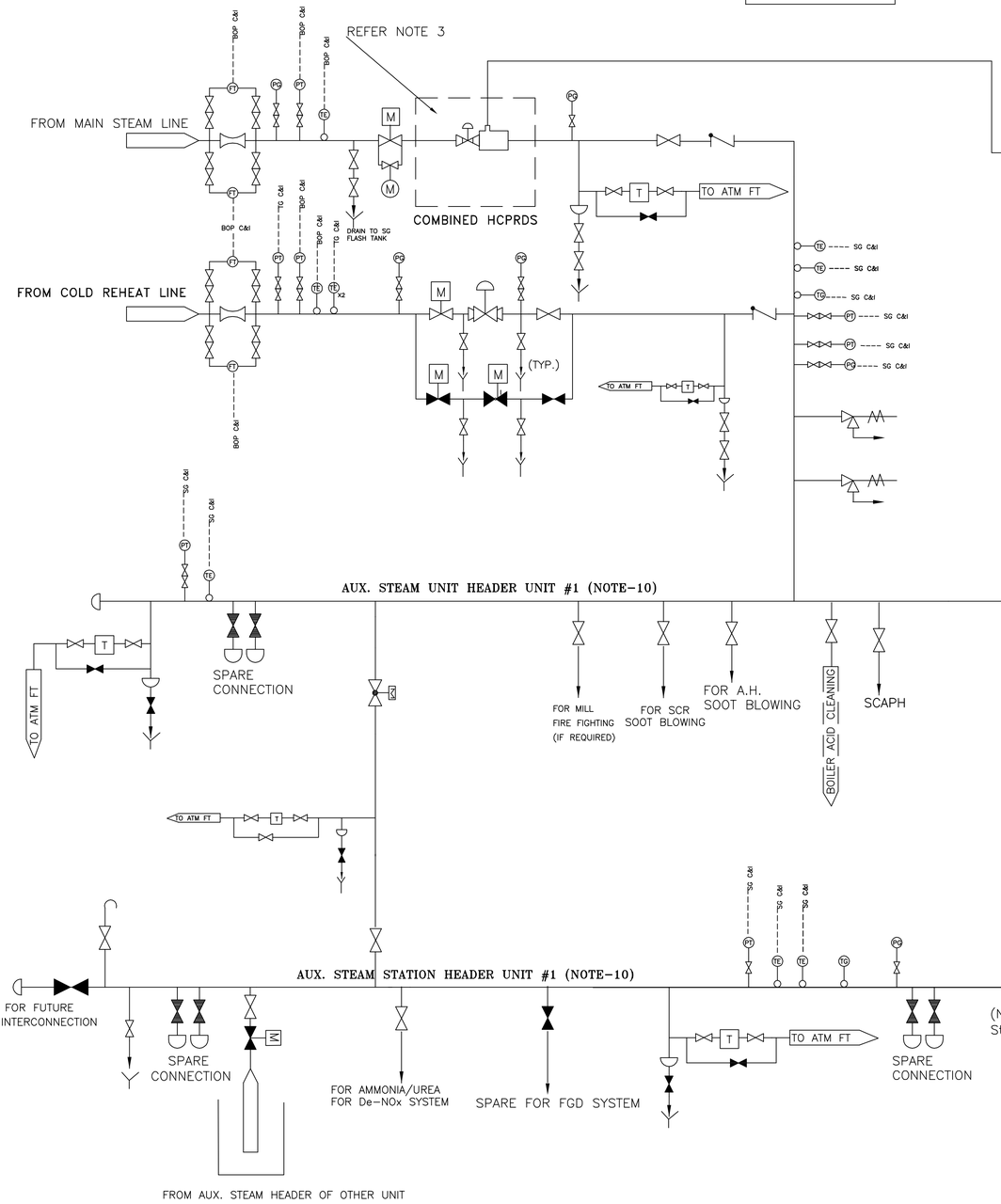
SPRAY STATION FOR HCPRDS (REFER NOTE–4)

SPRAY WATER LINE FROM CEP DISCHARGE

TO HCPRDS DESUPERHEATER



SPRAY STATION FOR HCPRDS (REFER NOTE–4)



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.

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.		APPD.	DATE
A	RELEASED FOR TENDER	AS	AS	PKD	M / CLEARED BY C&I	AA	08/06/22

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

PROJECT: LARA STPP STAGE–II (2X800 MW) (EPC PACKAGE)

TITLE: AUXILIARY STEAM SYSTEM P&ID

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

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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
WS1-01	VI/A	I	1.02.00	3 OF 9	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	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
WS1-02	VI/A	IIA-10	1.01.02.c	2 OF 12	One (1) number filtered water reservoir (in twin sections located below the filters) of RCC Construction, filtered water sump and common filtered water pump house for PT – Potable water & PT-DM systems.	One (1) number filtered water reservoir (in twin sections located below the filters) of RCC Construction, filtered water sump **each for** PT –Potable water & PT-DM systems with **common filtered water pump house.**
WS1-03	VI/A	IIA-20	2.03.00	1 OF 2	Inclusion of adequate resins for all the condensate polisher service vessels, resin storage vessels (2 nos.) in regeneration area and one (1) additional charge for use during commissioning stage of unit. Therefore, total number of charges supplied by bidder shall be either eleven (11) or nine (9) corresponding to offered configuration (4 x 33.33 % or 3 x 50%) of service vessels.	Inclusion of adequate resins for all the condensate polisher service vessels, resin storage vessel in regeneration area and one (1) additional charge for use during commissioning stage of unit. Therefore, total number of charges supplied by bidder shall be **either ten (10) or eight (8)** corresponding to offered configuration (4 x 33.33 % or 3 x 50%) of service vessels.
WS1-04	VI/A	IIA-20	2.04.00 b)	2 OF 2	CPU Regeneration facilities shall consist of but not limited to the following systems and equipments: a) ..... b) One (1) set of regeneration facilities consisting of Resin separation vessel,	CPU Regeneration facilities shall consist of but not limited to the following systems and equipments: a) ..... b) One (1) set of regeneration facilities consisting of Resin separation vessel,

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					Cation, Anion regeneration vessel(s), Resin make-up hopper, Mixed resin storage vessels (2 nos) etc.	Cation, Anion regeneration vessel(s), Resin make-up hopper, Mixed resin storage vessels (**1 no**) etc.
WS1-05	VI/A	VI, CHAPTER-1	4.00.00 B	30 OF 38	B Plate Type Heat Exchangers i Gaskets = 1 Lot comprising 30% of total requirement of each type & size ii Fasteners = 1 Lot comprising 10% each type iii Plates = 1 Lot comprising 20% of each type	Clause deleted
WS1-06	VI/A	VI CHAPTER-02	1.00.00	26 OF 31	CPU/Regen Area Blowers ….. 4)Gears	CPU/Regen Area Blowers ….. 4) Gears **(if applicable**)
WS1-07	VI/A	VI CHAPTER-02	1.00.01	26 OF 31	CPU/Regen Area Pumps including N-pit & Backwash ……. 6) Stuffing box for each type ……. Agitators ……. 4) Any other agitator assembly with motor & gear box	CPU/Regen Area Pumps including N-pit & Backwash ……. 6) Stuffing box for each type **(if applicable)** ……. Agitators ……. 4) Any other agitator assembly with motor & gear box **(if applicable)**
WS1-08	VI/A	VI CHAPTER-08	3.00.00	27 OF 28	Blowers 1 Impeller with lock nuts and washers 1 set 2 Air Filters 2 no. 3 Bearings for drive & driven 1 set 4 Oil Seals 1 set 5 Gears 1 set 6 V-belts 1 Set for each drive	Clause deleted

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WS1-09	VI/B	A-01	3.06.00 C.3.a)	64 of 101	One (1) number RCC waste service water sump (WSWS)…….....Facility shall be provided to collect free oil from these sumps to MS Oil drum and oil skimmers (2 nos.), Portable oil Centrifuge (1x100%) of suitable capacity shall be provided for reuse of oil.	One (1) number RCC waste service water sump (WSWS)…….....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.
WS1-10	VI/B	A-01	3.06.00 D 4a)	68 OF 100	Two (2) numbers of DM water storage tanks with all accessories	Two (2) nos D.M. water storage tank (**max dia 16m and min usable capacity of 2450m3) with all accessories to store DM water in Existing DM plant area and interconnection with the existing DM Water tanks through necessary piping, valves and fittings.**
WS1-11	VI/B	A-01	3.06.00 D 2l)	66 OF 100	l) Two (2) numbers of DM water storage tanks (Min. capacity 2450 m3) with all accessories with vent, drain, CO_2 absorber, PVC balls, overflow, and seal pots.	Clause deleted.
WS1-12	VI/B	A-01	3.05.00 k	57 OF 91	k) Air pre-heater wash water pumps Air pre-heater wash water pumps shall draw water from service water tank.	k) Air pre-heater wash water pumps Air pre-heater wash water pumps shall draw water from **clarified water tank.**
WS1-13	VI/B	A-01	3.02.00	57 of 101	c) Quantity of water to be cooled by Cooling Towers of One Unit: CW pumps flow per unit + 10% margin d) Heat Load (Excluding Heat of	c) 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)**

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					Evaporation): As per system requirement (10% margin to be taken for CW pump flow only, however heat load to be taken as actual)	d) Heat Load (Excluding Heat of Evaporation): **Design range X Design CW pump flow**
WS1-14	VI/B	A-01	3.06.00 C. 4. a)	64 of 101	4. Coal handling plant run-off water treatment system a) Two (2) numbers of Coal Slurry Settling (CSSP) Ponds (minimum size of 40m x 8m x 3m deep) of RCC Construction shall be provided.	4. Coal handling plant run-off water treatment system a) Two (2) numbers of Coal Slurry Settling (CSSP) Ponds (minimum size of 40m x 8m x 3m deep) of RCC Construction shall be provided. **Suitable approach to be provided for mechanical cleaning of CSSP ponds.**
WS1-15	VI/B	A-11	4.06.00	5 OF 16	1)Resin Separation & Cation Regeneration Vessel(2sets). 2) Anion Resin Regeneration Vessel (2 sets). 3) Mixed Resin storage vessel (2 sets).	1)Resin Separation & Cation Regeneration Vessel**(1set).** 2)Anion Resin Regeneration Vessel **(1set).** 3) Mixed Resin storage vessel **(1 set).**
WS1-16	VI/B	A-11	4.05.00 13. c)	5 OF 16	Design temperature of service vessel and their internals/appurtenances shall take care of all operating regimes including HP-LP bypass operation and minimum 700C.Process design temperature shall be based on all operating regimes of TG cycle and minimum 520C. However, short term excursion of temperature upto 600C is also expected.	Design temperature of service vessel and their internals/appurtenances shall take care of all operating regimes including HP-LP bypass operation and minimum **70degC**.Process design temperature shall be based on all operating regimes of TG cycle and minimum **52deg C**. However, short term excursion of temperature upto **60 degC** is also expected.

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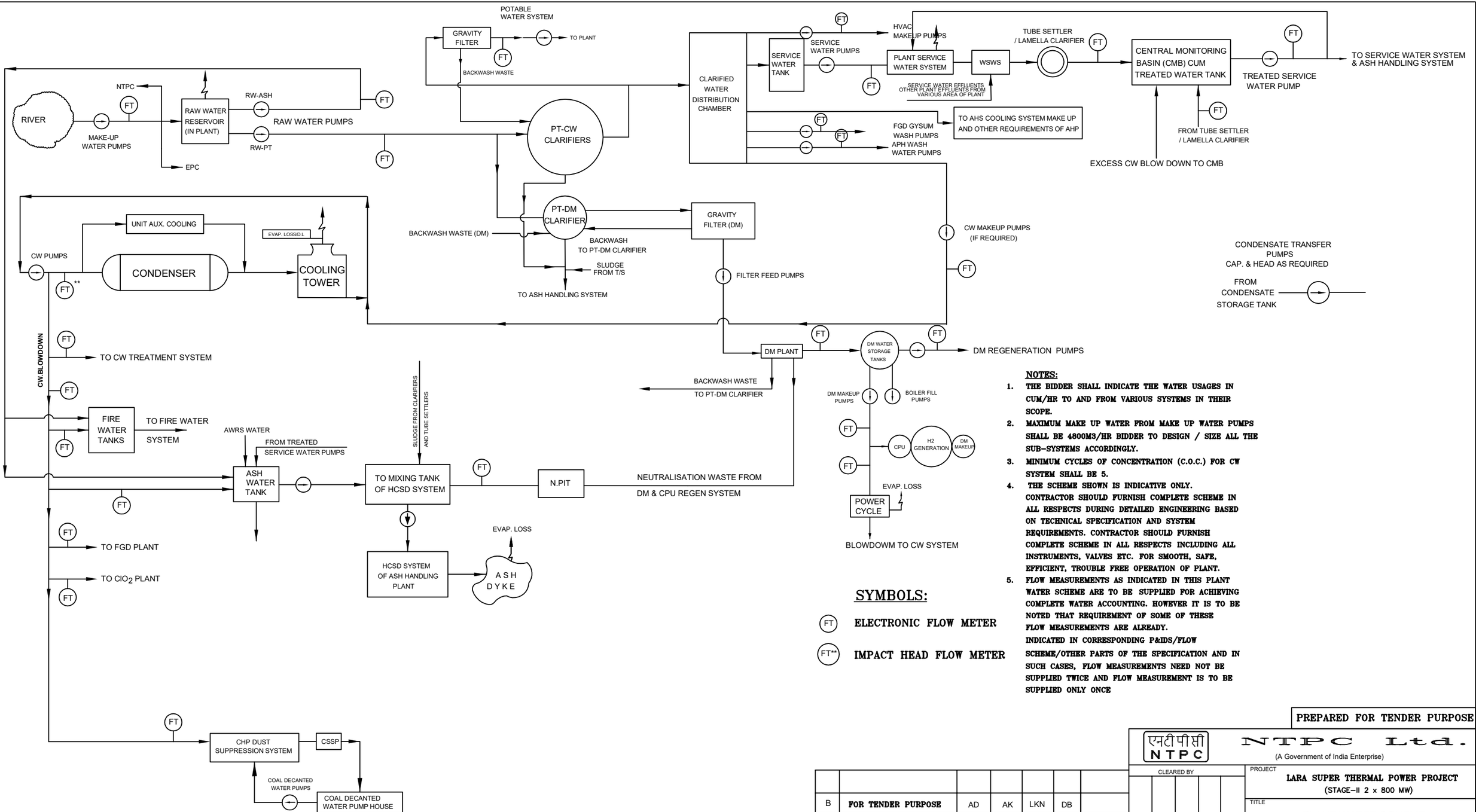
WS1-17	VI/B	A-14	1.01.00 4) c)		New clause added	Excess AWRS water, if any after use in Ash Handling System, shall be suitably treated for recycle and re-use in Service water/ CHP dust suppression etc. to ensure ZLD.
WS1-18	VI/B	G-04		98 OF 217	PG Test Procedure for TG & SG Plate Heat Exchanger (PHE)	Deleted.
WS1-19	VI/E	-	Sl No.49	-	Plant water Scheme, tender drg no. 9587-999-POM-A-037 REV.A	Plant water Scheme, tender drg no. 9587-999-POM-A-037 REV.B
WS1-20	VI/E	-	Sl No.68	-	P & ID Pre-treatment Plant , tender drg no. 9587-999-POM-A-006 REV.A	P & ID Pre-treatment Plant, tender drg no. 9587-999-POM-A-006 REV.B
WS1-21	VI/B	A-15	3.3.00	11 OF 43	Number of operating cells in the cooling tower shall not be less than eight (8). Bidder shall provide spare cells (Minimum four (4) per tower) in the cooling tower to facilitate maintenance without affecting the tower performance.	Bidder shall provide spare cells (Minimum four (4) per tower) in the cooling tower to facilitate maintenance without affecting the tower performance.
WS1-22	VI/B	A-01	3.06.00 C. 4. d)	64 of 101	Two (2) numbers (2x100%) Coal Decanted Water Pumps for reuse of coal decanted water in CHP dust suppression system.	Two (2) numbers (2x100%) Coal Decanted Water Pumps for reuse of coal decanted water in CHP dust suppression system. **(Plain Water Dust Suppression system)**



SYMBOLS:

- (FT) ELECTRONIC FLOW METER
- (FT**) IMPACT HEAD FLOW METER

NOTES:

1. THE BIDDER SHALL INDICATE THE WATER USAGES IN CUM/HR TO AND FROM VARIOUS SYSTEMS IN THEIR SCOPE.
2. MAXIMUM MAKE UP WATER FROM MAKE UP WATER PUMPS SHALL BE 4800M3/HR BIDDER TO DESIGN / SIZE ALL THE SUB-SYSTEMS ACCORDINGLY.
3. MINIMUM CYCLES OF CONCENTRATION (C.O.C.) FOR CW SYSTEM SHALL BE 5.
4. THE SCHEME SHOWN IS INDICATIVE ONLY. CONTRACTOR SHOULD FURNISH COMPLETE SCHEME IN ALL RESPECTS DURING DETAILED ENGINEERING BASED ON TECHNICAL SPECIFICATION AND SYSTEM REQUIREMENTS. CONTRACTOR SHOULD FURNISH COMPLETE SCHEME IN ALL RESPECTS INCLUDING ALL INSTRUMENTS, VALVES ETC. FOR SMOOTH, SAFE, EFFICIENT, TROUBLE FREE OPERATION OF PLANT.
5. FLOW MEASUREMENTS AS INDICATED IN THIS PLANT WATER SCHEME ARE TO BE SUPPLIED FOR ACHIEVING COMPLETE WATER ACCOUNTING. HOWEVER IT IS TO BE NOTED THAT REQUIREMENT OF SOME OF THESE FLOW MEASUREMENTS ARE ALREADY INDICATED IN CORRESPONDING P&IDS/FLOW SCHEME/OTHER PARTS OF THE SPECIFICATION AND IN SUCH CASES, FLOW MEASUREMENTS NEED NOT BE SUPPLIED TWICE AND FLOW MEASUREMENT IS TO BE SUPPLIED ONLY ONCE

PREPARED FOR TENDER PURPOSE

REV.NO	DESCRIPTION	DRAWN/ DESIGN	REVIEWED BY		APPRVD BY	DATE
B	FOR TENDER PURPOSE	AD	AK	LKN	DB	
		WS	WS	WS	WS	27.12.22

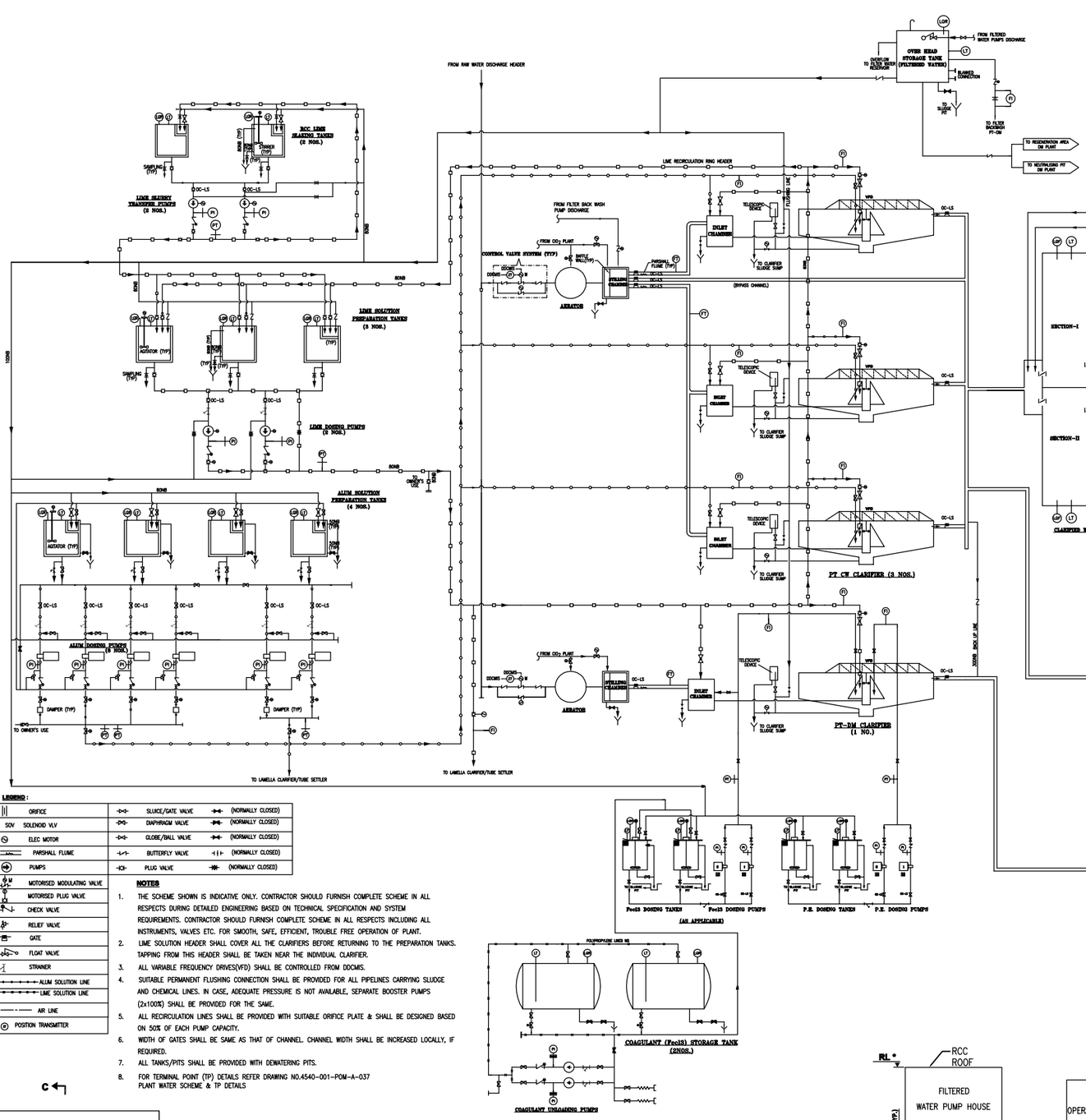
CLEARED BY: DRN | DGN | CHKD | APPD | DATE

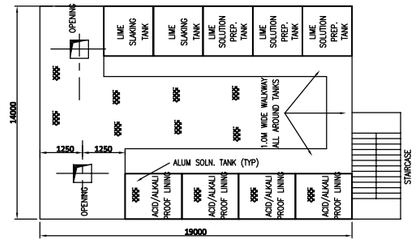
NTPC Ltd.
(A Government of India Enterprise)

PROJECT: LARA SUPER THERMAL POWER PROJECT (STAGE-II 2 x 800 MW)

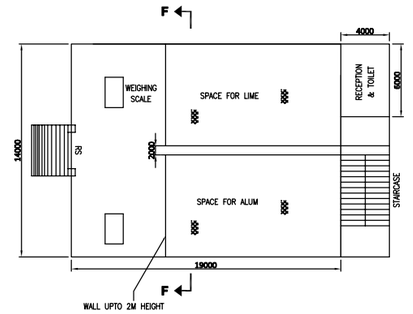
TITLE: PLANT WATER SCHEME

SCALE | DRG NO. 9587-999-POM-A-037 | REV B

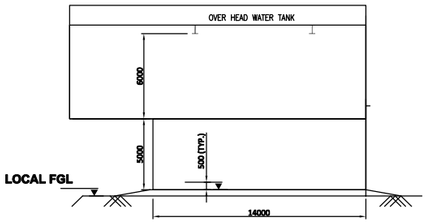




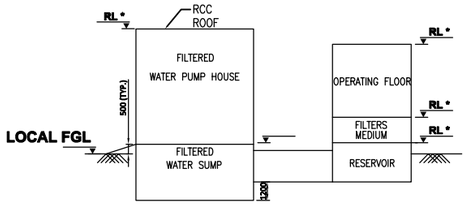
CHEMICAL HOUSE – FIRST FLOOR



CHEMICAL HOUSE – GROUND FLOOR



SECTION F-F



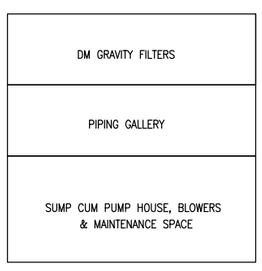
SECTION C-C

LEGEND :

ORIFICE	SLUICE/GATE VALVE		(NORMALLY CLOSED)
SOV SOLENOID VLV	DIAPHRAGM VALVE		(NORMALLY CLOSED)
ELEC MOTOR	GLOBE/BALL VALVE		(NORMALLY CLOSED)
PARSHALL FLUME	BUTTERFLY VALVE		(NORMALLY CLOSED)
PUMPS	PLUG VALVE		(NORMALLY CLOSED)
MOTORISED MODULATING VALVE			
MOTORISED PLUG VALVE			
CHECK VALVE			
RELIEF VALVE			
GATE			
FLOAT VALVE			
STRAINER			
ALUM SOLUTION LINE			
LIME SOLUTION LINE			
AIR LINE			
POSITION TRANSMITTER			

NOTES

1. THE SCHEME SHOWN IS INDICATIVE ONLY. CONTRACTOR SHOULD FURNISH COMPLETE SCHEME IN ALL RESPECTS DURING DETAILED ENGINEERING BASED ON TECHNICAL SPECIFICATION AND SYSTEM REQUIREMENTS. CONTRACTOR SHOULD FURNISH COMPLETE SCHEME IN ALL RESPECTS INCLUDING ALL INSTRUMENTS, VALVES ETC. FOR SMOOTH, SAFE, EFFICIENT, TROUBLE FREE OPERATION OF PLANT.
2. LIME SOLUTION HEADER SHALL COVER ALL THE CLARIFIERS BEFORE RETURNING TO THE PREPARATION TANKS. TAPPING FROM THIS HEADER SHALL BE TAKEN NEAR THE INDIVIDUAL CLARIFIER.
3. ALL VARIABLE FREQUENCY DRIVES(VFD) SHALL BE CONTROLLED FROM DDCMIS.
4. SUITABLE PERMANENT FLUSHING CONNECTION SHALL BE PROVIDED FOR ALL PIPELINES CARRYING SLUDGE AND CHEMICAL LINES. IN CASE, ADEQUATE PRESSURE IS NOT AVAILABLE, SEPARATE BOOSTER PUMPS (2x100%) SHALL BE PROVIDED FOR THE SAME.
5. ALL RECIRCULATION LINES SHALL BE PROVIDED WITH SUITABLE ORIFICE PLATE & SHALL BE DESIGNED BASED ON 50% OF EACH PUMP CAPACITY.
6. WIDTH OF GATES SHALL BE SAME AS THAT OF CHANNEL. CHANNEL WIDTH SHALL BE INCREASED LOCALLY, IF REQUIRED.
7. ALL TANKS/PITS SHALL BE PROVIDED WITH DEWATERING PITS.
8. FOR TERMINAL POINT (TP) DETAILS REFER DRAWING NO.4540-001-POM-A-037 PLANT WATER SCHEME & TP DETAILS



GRAVITY FILTER
BOTH FOR OPTION 1 & 2

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C	LAYOUT(M)	M	E	C&I	APPD	DATE
A	RELEASED FOR TENDER	TARUN			CLEARED BY						

FOR TENDER PURPOSE ONLY

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

PROJECT: LARA SUPER THERMAL POWER PROJECT
STAGE-II (2 X 800MW)

TITLE: SINGLE LINE FLOW & INSTRUMENTATION DIAGRAM OF PRE-TREATMENT PLANT

SIZE	SCALE	DRG.NO.	REV.
A1	NTS	9587-999-POM-A-006	B

CAD FILE NAME : 9587-999-POM-A-006

EPC PACKAGE FOR LARA SUPER THERMAL POWER PROJECT, STAGE-II (2x800 MW)
Amendment No. 02 to Technical Specifications Section-VI of Bidding Document No.: CS-9587-001R-2

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
PIP1-01	VI PART-A	SUB SECTION VI MANDATORY SPARES CHAPTER 6 PIPING	2.0 POWER CYCLE PIPING	PG NO. 1 OF 3	5) Spare gaskets/pressure seal gaskets for NRV of all sizes — 50% population of each type, material, size & class of one unit 6) Spare set of gaskets for safety valves, relief valves and safety relief valves of all sizes — 50% population of each type, material, size & class of one unit	5) Spare gaskets/pressure seal gaskets for NRV of all sizes (if applicable) — 50% population of each type, material, size & class of one unit 6) Spare set of gaskets for safety valves, relief valves and safety relief valves of all sizes (if applicable) — 50% population of each type, material, size & class of one unit
PIP1-02	VI PART-A	SUB SECTION VI MANDATORY SPARES CHAPTER 6 PIPING	2.0 POWER CYCLE PIPING	PG NO. 1 OF 3	9) Complete angle valves assembly up to the inlet size of 50 NB — 50% population of each type, material, size & class of one unit.	9) Complete angle valves assembly up to the inlet size of 50 NB (if applicable) — 50% population of each type, material, size & class of one unit.

EPC PACKAGE FOR LARA SUPER THERMAL POWER PROJECT, STAGE-II (2x800 MW)
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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
PIP1-03	VI PART-A	SUB SECTION VI MANDATORY SPARES CHAPTER 6 PIPING	2.0 POWER CYCLE PIPING	PG NO. 2 OF 3	13) Gasket for each flanged connection on high pressure steam and feed line. — 3 Nos. per unit	13) Gasket for each flanged connection on high pressure steam and feed line. (if applicable) — 3 Nos. per unit
PIP1-04	VI PART-A	SUB SECTION VI MANDATORY SPARES CHAPTER 6 PIPING	2.0 POWER CYCLE PIPING	PG NO. 2 OF 3	14a) safety valves, relief valves and safety relief valves up to 50 NB size — 02 nos. of each type, material, size & class per unit	14a) safety valves, relief valves and safety relief valves up to 50 NB size (if applicable) — 02 nos. of each type, material, size & class per unit. (If there is one no. valve only of particular type, class, and size then only one no per unit to be considered.)
PIP1-05	VI PART-A	SUB SECTION VI MANDATORY SPARES CHAPTER 6 PIPING	2.0 POWER CYCLE PIPING	PG NO. 2 OF 3	15b) Steam trap & Y strainer above 25 NB & up to 50 NB — 05 nos. of each type, material, size & class per unit	15b) safety valves, relief valves and safety relief valves up to 50 NB size (if applicable) — 02 nos. of each type, material, size & class per unit

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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					15c) Steam trap & Y strainer above 50 NB — 02 nos. of each type, material, size & class per unit	15c) Steam trap & Y strainer above 50 NB (if applicable) — 02 nos. of each type, material, size & class per unit
PIP1-06	VI PART-A	SUB SECTION VI MANDATORY SPARES CHAPTER 6 PIPING	2.0 POWER CYCLE PIPING	PG NO. 3 OF 3	16) Complete Valve assembly (all types) for sizes above 50 NB and up to & including 250 NB — 02 nos. of each type, material, size & class per unit	16) Complete Valve assembly (all types) for sizes above 50 NB and up to & including 250 NB — 02 nos. of each type, material, size & class per unit..(If there is one no. valve only of particular type, class, and size then, only one no per unit to be considered.)
PIP1-07	VI PART-A	SUB SECTION VI MANDATORY SPARES CHAPTER 6 PIPING	2.0 POWER CYCLE PIPING	PG NO. 3 OF 3	Notes: 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.	Notes: 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.

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					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. 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. 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. 5) In case the quantity of mandatory spares so calculated happens to be a fraction, the same shall be rounded off 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. 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).	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. 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. 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. 5) In case the quantity of mandatory spares so calculated happens to be a fraction, the same shall be rounded off 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. 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).

EPC PACKAGE FOR LARA SUPER THERMAL POWER PROJECT, STAGE-II (2x800 MW)
Amendment No. 02 to Technical Specifications Section-VI of Bidding Document No.: CS-9587-001R-2

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
					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. 8) In case any of the above specified mandatory spares / Items are not covered in the actual design / supply, then that spares / items may be treated as "not applicable".	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. 8) Deleted
PIP1-08	**VI PART-A**	**SUB SECTION III TERMINAL POINTS & EXCLUSIONS**	**CLAUSE 1.01.01**	**PG NO.1 OF 3**	Auxiliary Steam System Headers Interconnection a) TP for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing Stage-I with motorized isolation valve 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 required for interconnection shall be provided by bidder.	Auxiliary Steam System Headers Interconnection a) TP Location for Auxiliary Steam interconnection for Auxiliary Steam Station Header with existing Stage-I with motorized isolation valve as indicated in the tender drg. Shall be near Column No. 2, C-Row at 35 M elevation of Stage I TG Bay. 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.

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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
PIP1-09	VI PART-B	SUB SECTION A-09 LOW PRESSURE PIPING	1.05.00	PG NO. 2 OF 20	Based on the inside diameter so established, minimum thickness calculation shall be made as per ANSI B 31.1 OD. Manufacturing allowance shall be added to minimum calculated thickness and next higher standard thickness of pipes shall than be selected as per ANSI B 36.10/IS-1239 Heavy grade/IS-3589/ASTM-A-53/API-5L/ANSI B36.19 as the case may be. Selected thickness then shall be checked for vacuum loading criterion as per the guidelines given in AWWA-M-11, as applicable for the systems.	Based on the inside diameter so established, minimum thickness calculation shall be made as per ANSI B 31.1 OD. Manufacturing allowance shall be added to minimum calculated thickness and next higher standard thickness of pipes shall than be selected as per ANSI B 36.10/IS-1239 Heavy grade/IS-3589/ASTM-A-53/API-5L/ANSI B36.19 as the case may be. Alternatively, manufacturers standard thickness can also be accepted subject to that such thickness shall be equal to or more than the minimum calculated thickness after considering manufacturing allowance. Selected thickness then shall be checked for vacuum loading criterion as per the guidelines given in AWWA-M-11. However, in no case, the selected Thickness for various pipe sizes shall be less than the following for indicated Pipe Sizes as below: 200 NB - 6mm 250 NB – 6 mm 300 NB - 6 mm 350 NB- 6mm 400 NB- 6 mm 450 NB- 6 mm 500 NB- 6 mm 600 NB- 6mm 700 NB- 7mm 800 NB- 8 mm 900 Nb – 10 mm 1000 Nb – 10 mm 1100 Nb – 10mm 1200 Nb – 12 mm

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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section/ Chapter	Clause No.	Page No.		
LAY1-01	VI/B	G-03	1.08.00	14 of 14	Bottom flange level of Air-Preheaters (Both Primary and Secondary) hoppers and additional hoppers (if any) shall be fixed based on dry ash evacuation system as offered by the bidder taking care of clear height requirement between Boiler & ESP and considering unobstructed route for Fly Ash conveying pipes avoiding vertical bends.	Bottom flange level of Air-Preheaters (Both Primary and Secondary) hoppers and additional hoppers (if any) shall be fixed based on ash evacuation system as offered by the bidder taking care of clear height requirement between Boiler & ESP and considering unobstructed route for Fly Ash conveying pipes avoiding vertical bends.
LAY1-02	VI/B	G-03	1.04.00(5)	13 of 14	1. The Bidder shall also make arrangement for storing following mandatory spares (whichever is applicable as per scope of the package) inside TG hall with access from EOT crane: a. Complete assembly of HPT module or its alternative, as applicable b. Complete assembly of IPT module or its alternative, as applicable c. LP Turbine bladed rotor assembly d. HP/IP/LP casing e. Drive Turbine bladed rotor for TDBFP f. Generator stator / Rotor g. Boiler Feed Pump motor	1. The Bidder shall also make arrangement for storing following mandatory spares (whichever is applicable as per scope of the package) inside TG hall with access from EOT crane: a. Complete assembly of HPT module or its alternative, as applicable b. Complete assembly of IPT module or its alternative, as applicable c. LP Turbine bladed rotor assembly d. HP/IP/LP casing e. Drive Turbine bladed rotor for TDBFP f. Generator Rotor g. Boiler Feed Pump motor

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section/ Chapter	Clause No.	Page No.		
LAY1-03	VI/B	G-03	1.03.00(39)(IV)	10 of 14	Fire water pipes in main plant area shall generally be routed either on trestle or shall be supported from main plant structure, except in transformer yard area and in C-D bay, where the FW pipes shall be routed in trenches. Further, fire water pipes shall be routed underground (with proper encasement of pipes at roads/passage bay crossings) by the sides of main plant roads (inside the main plant area) from transformer yard to chimney area after clearing the road side drains. Fire water pipes shall not be routed on the same trestle over which the fuel oil pipes and steam pipes are running. In offsite areas, fire water pipes can be routed on trestles or on pedestals. In exceptional cases, fire pipes can be buried.	Fire water pipes in main plant area shall generally be routed either on trestle or shall be supported from main plant structure, except in transformer yard area and in C-D bay, where the FW pipes shall be routed in trenches. In case of front/ rear mill arrangement, from D row to last row of boiler column pipe shall either be routed on separate structure or within trench. However, in case of trench heavy duty cover to be provided throughout the length of trench. Further, fire water pipes shall be routed underground (with proper encasement of pipes at roads/passage bay crossings) by the sides of main plant roads (inside the main plant area) from transformer yard to chimney area after clearing the road side drains. Fire water pipes shall not be routed on the same trestle over which the fuel oil pipes and steam pipes are running. In offsite areas, fire water pipes can be routed on trestles or on pedestals. In exceptional cases, fire pipes can be buried.
LAY1-04	VI / PART-C	General Technical requirements	8.03.04	15 of 106	Contractor shall prepare the model of all the facilities located within plant boundary covering facilities in Main Plant Block area and Balance of plant (BOP) area in an integrated & intelligent 3D software solution. Main Plant Block area shall include ACC,	Contractor shall prepare the model of all the facilities located within plant boundary covering facilities in Main Plant Block area and Balance of plant (BOP) area in an integrated & intelligent 3D software solution. Main Plant Block area shall include ACC, Transformer Yard, TG building (including all facilities), Boiler area, ESP area,

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section/ Chapter	Clause No.	Page No.		
					Transformer Yard, TG building (including all facilities), Boiler area, ESP area, chimney area, FGD area and any other facility located in main plant block. BOP area shall include all facilities pertaining to AHP, CHP, LHP, GHP, DM PT plant, pipe & cable racks and any other facility located within plant boundary. All piping layouts, equipment layouts, floor plans, ducting layout (Air/flue gas, A/C, Ventilation etc.), General Arrangement drawings of major buildings and structural arrangement drawings and RCC layout drawings shall necessarily be extracted from the aforesaid 3D model and submitted for employer's review along with the 3D review model to enable NTPC to review and approve these drawings. 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 .	chimney area, FGD area and any other facility located in main plant block. BOP area shall include all facilities pertaining to AHP, CHP, LHP, GHP, DM PT plant, pipe & cable racks and any other facility located within plant boundary. All piping layouts, equipment layouts, floor plans, ducting layout (Air/flue gas, A/C, Ventilation etc.), General Arrangement drawings of major buildings and structural arrangement drawings and RCC layout drawings shall necessarily be extracted from the aforesaid 3D model and submitted for employer's review along with the 3D review model to enable NTPC to review and approve these drawings. 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. Observations of NTPC during the 3D model review to be incorporated and revised editable model to be submitted to NTPC within 2 weeks. The complete 3D data(editable model) which shall be utilised for all future detailed engineering related to maintenance, operation , R&M , efficiency improvement

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					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. All input files of software used for design of Equipments / Piping like CAESAR2 files, input files for Pressure vessel design, datasheets etc., shall be handed over to NTPC as per NTPC specifications for handover of Engineering Information.	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. All input files of software used for design of Equipments / Piping like CAESAR2 files, input files for Pressure vessel design, datasheets etc., shall be handed over to NTPC as per NTPC specifications for handover of Engineering Information. 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

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Amendment No. 02 to Technical Specifications Section-VI of Bidding Document No.: CS-9587-001R-2

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					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 provided shall necessarily include cost for perpetual license(s) for use on all the machines and an Annual maintenance contract (AMC) which shall include software upgrades as & when released by the software agency for a period of three years after warranty/guarantee period . Handover Plan: There shall be continuous handover of documents and data at various stages of the project including rules and trigger points for handover of data to NTPC shall be at 30%, 60% and 90 % of 3D model stage	preparation of 3D model or it shall have all editable features to edit the model supplied by bidder on time to time basis. All software provided shall necessarily include cost for perpetual license(s) for use on all the machines and an Annual maintenance contract (AMC) which shall include software upgrades as & when released by the software agency for a period of three years after warranty/guarantee period . Handover Plan: There shall be continuous handover of documents and data at various stages of the project including rules and trigger points for handover of data to NTPC shall be at 30%, 60% and 90 % of 3D model stage

EPC PACKAGE FOR LARA SUPER THERMAL POWER PROJECT, STAGE-II (2x800 MW)
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S. No.	SPECIFICATION REFERENCE				Instead of	Read as
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MH-1	VI/PART-E				9587-001(R)-POM-A-002 R0 9587-001(R)-POM-A-025 R0 9587-001(R)-POM-A-026 R0 9587-001(R)-POM-A-027 R0 9587-001(R)-POM-A-028 R0 9587-001(R)-POM-A-029 SH1 R0 9587-001(R)-POM-A-029 SH2 R0	9587-001(R)-POM-A-002 R1 9587-001(R)-POM-A-025 R1 9587-001(R)-POM-A-026 R1 9587-001(R)-POM-A-027 R1 9587-001(R)-POM-A-028 R1 9587-001(R)-POM-A-029 SH1 R1 9587-001(R)-POM-A-029 SH2 R1
MH-2	VI/PART-A	IIA-15	2.03.00	5 OF 8	Space and interface provision for one (1) additional stream of Truck Tippler, BRU/Surface Feeder and Bucket Elevator shall be kept for future eventuality.	Space and interface provision for one (1) additional stream of Truck Tippler, BRU/Surface Feeder and Bucket Elevator shall be kept for future eventuality **considering following as a minimum** **a. Ramp to be constructed considering for both truck tippler.** **b. BRU station / building to be sized considering two no's BRU unit & feeding system.** **c. Bucket elevator supporting arrangement shall be considered from silo for two no's bucket elevators.** **d. Silo is to be designed for two streams of conveyor feeding. (One is for St-II + One future stream)** **e. Handling arrangement to be designed considering future equipment also.**
MH-3	VI/PART-A	IIA-15	1.25.00	4 OF 8	**Four (7) Nos.** of suspended magnets on Conveyors complete with reject chutes, reject trolleys, supporting arrangement, and all mechanical, electrical, civil, structural works and accessories	**Five (5) Nos**. of suspended magnets on Conveyors complete with reject chutes, reject trolleys, supporting arrangement, and all mechanical, electrical, civil, structural works and accessories
MH-4	VI/PART-B	A-01	4.02.06	93 OF 101	All mechanical, civil and structural system design shall consider:	All mechanical, **Electrical,** civil and structural system design shall consider:

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<table>
<tr><th rowspan="2">S. No.</th><th colspan="4">SPECIFICATION REFERENCE</th><th>Instead of</th><th>Read as</th></tr>
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<tr><td>MH-5</td><td>VI/PART-A</td><td>CHAPTER-04</td><td>R
5.1
5.2
10
11
18
22</td><td>11 OF 20</td><td>R) Mandatory Spares for STACKER/RECLAIMER

Mechanical

5.1 Hydraulic pump & hydraulic motor drive for luffing system

5.2 Hydraulic pump & hydraulic motor drive for slew mechanism

10. Slew gear Box

11. Gear Box of bucket wheel

18. Chain & chain sprockets

22. Plummer block with bearing for cable reel drums</td><td>R) Mandatory Spares for STACKER/RECLAIMER

5.1 Hydraulic pump & hydraulic motor (if applicable) drive for luffing system

5.2 Hydraulic pump & hydraulic motor drive for slew mechanism (As applicable)

10 Slew gear Box (As applicable)

11. deleted

18. Chain & chain sprockets (if applicable)

22. deleted</td></tr>
<tr><td>MH-6</td><td>VI/PART-B</td><td>A-01</td><td>4.02.06</td><td>94 OF 101</td><td>Design capacities & margins
<table><tr><td>Sl no</td><td>Equipment</td><td>Duty requirement</td><td>Design capacity as %age of duty requirement</td></tr><tr><td>3</td><td>Paddle feeders</td><td>2 X75%</td><td>150%</td></tr></table></td><td>Design capacities & margins
<table><tr><td>Sl no</td><td>Equipment</td><td>Duty requirement</td><td>Design capacity as %age of duty requirement</td></tr><tr><td>5</td><td>Paddle feeders</td><td>2 X75%</td><td>110%</td></tr></table></td></tr>
</table>

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MH-7	VI/PART-A	IIA-15	2.07.00	6 OF 8	Two numbers (2 Nos) of Mechanical Extractor & Biomass Feeder below each **limestone** storage silos with drives, dust hoods (for Feeder), all mechanical, electrical accessories and supporting structures etc to feed the Biomass to downstream conveyors.	Two numbers (2 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. Bidder to provide Silo extractor/Rotary extractor consists of rotating chute, extractor blade/sweeper arm/paddle wheel, slewing arrangement etc.
MH-8	VI/PART-B	A-01	4.01.02	88 OF 101	**Broad Design Criteria** **(F) Ash slurry disposal system** **Combined Ash slurry disposal system** **h)** Maximum pumping distance – **6.0 Km** or as per actual distance for the farthest disposal point in ash dyke whichever is higher	**Broad Design Criteria** **(F) Ash slurry disposal system** **Combined Ash slurry disposal system** **h)** Minimum pumping distance – **6.5 Km** or as per actual distance for the farthest disposal point in ash dyke whichever is higher
MH-9	VI/PART-B	A-01	4.01.04	91 OF 101	**Standby arrangement for Ash handling system** Combined Ash Disposal System- Two pump streams operating with **One pump stream as operating standby per unit.** Independent pipelines for each pump stream	**Standby arrangement for Ash handling system** Bottom Ash Slurry Ash Disposal System- **One pump stream as operating standby and one pump stream as maintenance standby**. Independent pipelines for each pump stream
MH-10	VI/PART-A	IIA-16	1.01.05	5 OF 15	Nine (9) nos. dewatering storage bins (3 nos. for each unit and 3 nos standby) ……...for safe and reliable operation and maintenance of dewatering bins.	Nine (9) nos. dewatering storage bins (3 nos. for each unit and 3 nos **common** standby) ……...for safe and reliable operation and maintenance of dewatering bins.

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MH-11	VI/PART-B	A-21	1.12.00	15 OF 44	DEWATERING BINS 1.0 Numbers required : 3 NO PER UNIT(Out of three (3) nos.dewatering bins provided for each unit, one(1) no. shall be under filling, one (1) no. shall be under decantation 2.0 Capacity: As per design criteria (Minimum 8 hours of Bottom ash storage)	DEWATERING BINS 1.0 Numbers required : 3 NO PER UNIT(Out of three (3) nos.dewatering bins provided for each unit, one(1) no. shall be under filling, one (1) no. shall be under decantation, **one (1) no. shall be under evacuation** **03 No Dewatering Bins as Common standby for both units** **2.0** Capacity: As per design criteria (Minimum 8 hours generation of Bottom ash, economizer ash, air preheater ash, SCR ash (as applicable), duct ash (as applicable) while firing worst coal.)
MH-12	VI/PART-A	IIA-16	1.01.06 (A)	6 OF 15	(III) **Six (6) 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.	(III) **Eight (8) lengths** for each unit 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.
MH-13	VI/PART-A	IIA-16	1.01.06 (B)	7 OF 15	Dry Fly Ash Transportation system from Buffer Hoppers to Ash Classifier System (d) **Four (4) lengths** of cast iron/MS pipes for each unit for fly ash transportation from buffer hoppers to Classifier Block including pipe rack, platforms, access stairs and other associated supporting steel structure and other accessories as required.	Dry Fly Ash Transportation system from Buffer Hoppers to Ash Classifier System (d) **Six (6) lengths** of cast iron/MS pipes for each unit for fly ash transportation from buffer hoppers to Classifier Block including pipe rack, platforms, access stairs and other associated supporting steel structure and other accessories as required.
MH-14	VI/PART-B	A-01	4.01.02	89 OF 101	Storage capacity for Classifier Block Silos/Hoppers are as follows: - Fine fly ash Hopper-600 (T), Coarse Fly ash Hopper-600 (T), Classifier Silo -250 (T).	Storage capacity for Classifier Block Silos/Hoppers are as follows: - **Fine fly ash Hopper-300 (T), Coarse Fly ash Hopper- 2 x 300 (T), Classifier Silo -250 (T).**

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MH-15	VI/PART-A	IIA-16	1.01.06	8 OF 15	(D) ASH CLASSIFICATION AND BAGGING SYSTEM (e) The fine ash and coarse ash after classification shall be stored in separate RCC hoppers, fine ash hopper and coarse ash hopper respectively. The capacity of the **fine ash hopper and coarse ash hopper shall be 600 Tonnes each.**	(D) ASH CLASSIFICATION AND BAGGING SYSTEM (e) The fine ash and coarse ash after classification shall be stored in separate RCC/**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 300 Tonnes.**
MH-16	VI/PART-A	IIA-16	1.01.06	8 OF 15	(D) ASH CLASSIFICATION AND BAGGING SYSTEM (f) **Eight (8) nos**. 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, to silos provided for dry fly ash storage silos meant for Road and Rail loading. Provisions shall be provided to convey & store Fine Ash to another Coarse Fly ash Silo in addition to Fine Fly Ash Silo.	(D) ASH CLASSIFICATION AND BAGGING SYSTEM (f) **Ten (10) nos**. 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, to silos provided for dry fly ash storage silos meant for Road and Rail loading. Provisions shall be provided to convey & store Fine Ash to another Coarse Fly ash Silo in addition to Fine Fly Ash Silo
MH-17	VI/PART-A	IIA-16	1.01.06	8 OF 15	(D) ASH CLASSIFICATION AND BAGGING SYSTEM (m) Required lengths of cast iron/MS pipes **(at least two standby lines for two units)** for coarse fly ash conveying from coarse fly ash hoppers to three fly ash storage silos located in the fly ash silo complex. Required lengths of cast iron/MS pipes for fine fly ash conveying from Fine fly ash hoppers to Fine fly ash storage silo .	(D) ASH CLASSIFICATION AND BAGGING SYSTEM (m) Required lengths of cast iron/MS pipes **(two standby lines for each unit)** for coarse fly ash conveying from coarse fly ash hoppers to three fly ash storage silos located in the fly ash silo complex. Required lengths of cast iron/MS pipes for fine fly ash conveying from Fine fly ash hoppers to Fine fly ash storage silo.
MH-18	VI/PART-A	IIA-16	1.01.07	10 OF 15	Dry Fly Ash Storage System (i) **Eight (8)** numbers of twin shaft paddle type/rotary drum type hydro-mix conditioner units along with drive motor, rotary feeder, **Two (2)** number for each silo, along with associated water piping and valves, for unloading the conditioned fly ash into trucks.	Dry Fly Ash Storage System (i) **Four (4)** numbers of twin shaft paddle type/rotary drum type hydro-mix conditioner units along with drive motor, rotary feeder, **One (1)** number for each silo, along with associated water piping and valves, for unloading the conditioned fly ash into trucks.

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MH-19	VI/PART-A	IIA-16	1.01.07	10 OF 15	Dry Fly Ash Storage System K) **Four (4)** 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.	Dry Fly Ash Storage System K) **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.
MH-20	VI/PART-A	IIA-16	1.01.07	9 OF 15	Mass flow meter/Solid flow meter (**Two** 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 (**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.
MH-21	VI/PART-A	IIA-16	1.01.08	11 OF 15	Six (6) lengths seamless steel pipes with fittings for high concentration slurry disposal from HCSD pumps upto plant boundry.	Six (6) lengths seamless steel pipes **of 175 NB diameter** with fittings for high concentration slurry disposal from HCSD pumps upto plant boundry.
MH-22	VI/PART-B	A-21	5.01.02	36 OF 44	Combined Fly ash and bottom ash in high concentration form shall be disposed off in the ash disposal area earmarked for stacking ash slurry and routing of HCSD pipes inside ash dyke including garlanding of dyke and routing of ash pipeline inside the disposal area is in bidder's scope.	Combined Fly ash and bottom ash in high concentration form shall be disposed off in the **Bottom** ash disposal area. **The routing of HCSD pipes inside plant boundary is in bidder's scope.**
MH-23	VI/PART-A	IIA-16	1.02.01. 02	13 OF 15	i) Decanted water shall be pumped from owners' pumping system located at ash dyke. There shall be one no. working AWRS Pump of 400 m3/hr flow rate (owners' pumping system), is envisaged. Hence, maximum recovery water received inside plant shall be 400 m3/hr, accordingly pipeline within plant boundary upto terminal point shall be in Bidders scope.	i) Decanted water shall be pumped from owners' pumping system located at ash dyke. There shall be one no. working AWRS Pump of **600 m3/hr** flow rate (owners' pumping system), is envisaged. Hence, maximum recovery water received inside plant shall be **600 m3/hr**, accordingly pipeline of **400NB** diameter within plant boundary upto terminal point shall be in Bidders scope.

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<tr><td>MH-24</td><td>VI/PART-B</td><td>A-21</td><td>4.00.00</td><td>31 OF 44</td><td>
ASH DISPOSAL PIPING AND ACCESSORIES
<table>
<tr><td>Location</td><td>i)</td><td>For BA transportation from boiler area upto slurry sump of BA slurry disposal pump house.
For BA transportation from jet pump discharge upto bottom/combined ash slurry sump.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>ii)</td><td>From the ash slurry disposal pump discharge upto disposal point at the Mine Void/Ash Dyke.</td></tr>
<tr><td>Type</td><td>a)</td><td>20 thk. Cast basalt lined MS (MS shell of 6.00 mm thick) piping for BA slurry transportation from boiler area up to slurry sump of Combined/BA slurry pump house and slurry disposal pipes within ash slurry pump house & in culverts/trenches at rail/road crossings.</td></tr>
<tr><td></td><td>b)</td><td>ERW/SAW pipes of grade Fe-410 as per API-5L Gr. B/IS:3589 (9.5 mm thick for slurry disposal pipes to from Combined/ BA slurry pump house to Mine void/Ash dyke.</td></tr>
</table>
</td><td>
ASH DISPOSAL PIPING AND ACCESSORIES
<table>
<tr><td>Location</td><td>i)</td><td>For BA transportation from boiler area upto slurry sump of BA slurry disposal pump house.
For BA transportation from jet pump discharge upto bottom ash slurry sump.</td></tr>
<tr><td></td><td></td><td></td></tr>
<tr><td></td><td>ii)</td><td>From the ash slurry disposal pump discharge upto disposal point at the Dewatering Bins</td></tr>
<tr><td>Type</td><td>a)</td><td>20 thk. Cast basalt lined MS (MS shell of 6.00 mm thick) piping for BA slurry transportation from boiler area up to slurry sump of BA slurry pump house and slurry disposal pipes within ash slurry pump house, From the ash slurry disposal pump discharge upto disposal point at the Dewatering Bins, in culverts/trenches at rail/road crossings.</td></tr>
<tr><td>b)</td><td></td><td>DELETED</td></tr>
</table>
</td></tr>
</table>

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MH-25	VI/PART-B	**A-01**	**4.03.03**	98 of 101	In case of mechanical conveying system, 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.	In case of mechanical conveying system, a vibrating feeder **(if required)** 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.
MH-26	VI/PART-B	**A-20**	**4.12.00 c)**	**88 OF 93**	Coal Sampling system: All necessary automatic controls shall be provided for meeting the requirements of ASTM-D-2234.	Coal Sampling system: All necessary automatic controls shall be provided for meeting the requirements of IS: 16143 (Part 2) & IS: 16143 (Part 4).
MH-27	VI/PART-B	**A-21**	**3.08.00**	**30 OF 44**	Dry Ash unloader, Conditioned Ash unloader, Telescopic chute: Capacity range 40-100 TPH during open Truck/Bulker loading **through Condition ash unloader / Dry Ash unloader** 40-300 TPH for Truck/Bulkar/Rail Wagon Loading through Dry Ash unloader	Dry Ash unloader, Conditioned Ash unloader, Telescopic chute: Capacity range 40-100 TPH during open Truck/Bulker loading **through Condition ash unloader** 40-300 TPH for Truck/Bulkar/Rail Wagon Loading **through Dry Ash unloader**
MH-28	VI/PART-B	**A-21**	**2.12.00**	**23 OF 44**	Classifier Silo/Intermediate FA Silo: Flat bottom/Conical type with proven design with respect to Flowability of ash. **Intermediate FA Silo shall necessarily be conical type only**	Classifier Silo/Intermediate FA Silo: Flat bottom/Conical type with proven design with respect to Flowability of ash.
MH-29	VI/PART-B	**A-01**	**4.01.02 (B) (a)**	**86 OF 101**	Ash removal rate shall meet the following criteria: Fly Ash System- 8 hours collection shall be removed in 6 hours for ESP Ash. The conveying system shall be designed to evacuate ash generated both during normal mode and	Ash removal rate shall meet the following criteria: Fly Ash System- 8 hours collection shall be removed in 6 hours for ESP Ash **(From ESP to Coarse fly ash hopper/Fine fly ash hoppers and**

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					SCR Bypass mode. The ash conveying rate from ESP hoppers must be designed considering two fields out of service condition at any one time.	**From Coarse fly ash hopper/Fine fly ash hoppers to Fly ash Silos having Road cum Rail loading facilities)** The conveying system shall be designed to evacuate ash generated both during normal mode and SCR Bypass mode. The ash conveying rate from ESP hoppers must be designed considering two fields out of service condition at any one time.
MH-30	**VI/PART-B**	**A-20**	**4.4.3**	**8 OF 93**	Skirt Board Skirt board shall ensure ……..one edge of the skirt. Skirt sealing **Plate** of each side shall be in single piece.	Skirt Board Skirt board shall ensure ……..one edge of the skirt. Skirt sealing **material** of each side shall be in single piece.
MH-31	**VI/PART-B**	**A-20**	**4.11.6 (B) a) (i)**	**17 OF 93**	Fogging system & controls consisting of: Cold Fog producing Nozzles (SS 316 body), Nozzles orifice shall be suitably protected with Anti-abrasive material **(Ruby).**	Fogging system & controls consisting of: Cold Fog producing Nozzles (SS 316 body), Nozzles orifice shall be suitably protected with Anti-abrasive material
MH-32	**VI/PART-A**	**1A**	**4.19.3 (c)**	**14 OF 36**	Design and Engineering Agency for High Concentration Slurry Disposal System: Design agency/agencies for high concentration slurry disposal system should be either an high concentration slurry disposal system supplier meeting the qualification of **clause 2.3.1 (d),** for the offered system or consultancy organization who has designed and engineered similar system(s) for handling not less than 40 tonnes of ash per hour, for pulverized coal fired power station(s) and the system(s) should have been in successful operation in at least one (1) plant for at least	Design and Engineering Agency for High Concentration Slurry Disposal System: Design agency/agencies for high concentration slurry disposal system should be either an high concentration slurry disposal system supplier meeting the qualification of **clause 4.19.1 (d),** for the offered system or consultancy organization who has designed and engineered similar system(s) for handling not less than 40 tonnes of ash per hour, for pulverized coal fired power station(s) and the system(s) should have been in

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					two (2) years prior to the date of Techno-Commercial bid opening.	successful operation in at least one (1) plant for at least two (2) years prior to the date of Techno-Commercial bid opening.
MH-33	**VI/PART-B**	**A-21**	**5.01.00 (4)**	**33 OF 44**	HORIZONTAL CENTRIFUGAL PUMPS Nos. operating BAHP Water pump: 2 working + 1standby BALP Water pump: **3 working + 2 standby** FAHP Water pump: **3 working + 2 standby** Flushing water pump **(If applicable):** 1x100% BA Seal water pump: 1working +1standby Eco/APH ash water pump : 2 working+ 1 standby Conditioning Water pumps: 2 Working for HCSD cum storage silo + 1 standby Wash water pumps: 1working +1standby	HORIZONTAL CENTRIFUGAL PUMPS Nos. operating BAHP Water pump: 2 working + 1standby BALP Water pump: **2 working + 1 standby** FAHP Water pump: **2 working + 1 standby** Flushing water pump : 1x100% BA Seal water pump: 1working +1standby Eco/APH ash water pump : 2 working+ 1 standby Conditioning Water pumps: 2 Working for HCSD cum storage silo + 1 standby Wash water pumps: 1working +1standby

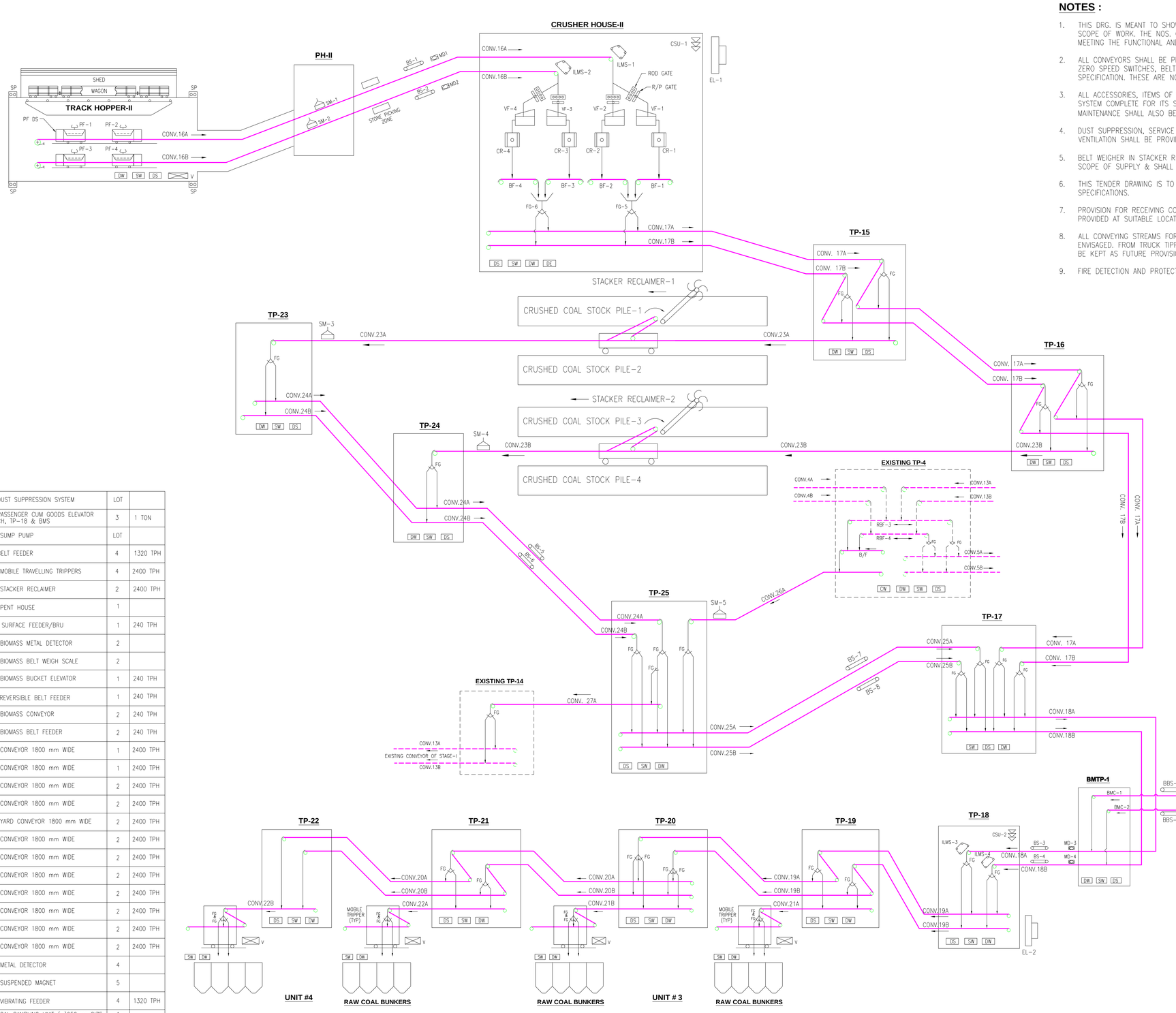
NOTES :

1. THIS DRG. IS MEANT TO SHOW ONLY COAL FLOW PATH AND DOES NOT INDICATE COMPREHENSIVE SCOPE OF WORK. THE NOS. OF TPs SHOWN IS INDICATIVE. BIDDER MAY OPTIMIZE THE LAYOUT MEETING THE FUNCTIONAL AND TECHNICAL REQUIREMENTS.
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. DUST SUPPRESSION, SERVICE WATER, POTABLE WATER, COOLING WATER, DUST EXTRACTION & VENTILATION SHALL BE PROVIDED AS PER TECHNICAL SPECIFICATION REQUIREMENT.
5. BELT WEIGHER IN STACKER RECLAIMER MACHINE NOT SHOWN FOR CLARITY IS IN BIDDER'S SCOPE OF SUPPLY & SHALL BE AS PER TECH SPECIFICATION.
6. THIS TENDER DRAWING IS TO BE REVIEWED IN CONJUNCTION WITH THE THECNICAL SPECIFICATIONS.
7. PROVISION FOR RECEIVING COAL FROM STAGE-I TO STAGE-II AND STAGE -II TO STAGE-I TO BE PROVIDED AT SUITABLE LOCATION.
8. ALL CONVEYING STREAMS FOR BIOMASS SHALL BE WORKING. NO STAND BY STREAM HAS BEEN ENVISAGED. FROM TRUCK TIPPLER UPTO STORAGE SILO, ONE ADDITIONAL BIOMASS STREAM SHALL BE KEPT AS FUTURE PROVISION
9. FIRE DETECTION AND PROTECTION SYSTEM SHALL BE AS SPECIFIED ELSEWHERE.

LEGEND

	BELT FEEDER
DS	DUST SUPPRESSION SYSTEM
SW	SERVICE WATER SYSTEM
DW	DRINKING WATER SYSTEM
DE	DUST EXTRACTION SYSTEM
SP	SUMP & SUMP DRAINAGE PUMPS
	BELT CONVEYOR
BS	BELT SCALE
CSU	COAL SAMPLING UNIT
DS	DUST SUPPRESSION-PF
ILMS	MAGNETIC SEPARATOR (IN LINE)
MD	METAL DETECTOR
PF	PADDLE FEEDER
V	VENTILATION
FG	FLAP GATE
	ROD GATE
	RACK & PINION GATE
CR	CRUSHER
VF	VIBRO FEEDER
SM	SUSPENDED MAGNET
EL	CONVENTIONAL ELEVATOR

EQPT. DESIGN.	EQUIPMENT	QTY.	CAPACITY
DS	DUST SUPPRESSION SYSTEM	LOT	
EL	PASSENGER CUM GOODS ELEVATOR CH, TP-18 & BMS	3	1 TON
SP	SUMP PUMP	LOT	
BF-1 TO 4	BELT FEEDER	4	1320 TPH
MT	MOBILE TRAVELLING TRIPPERS	4	2400 TPH
SR	STACKER RECLAIMER	2	2400 TPH
PH-II	PENT HOUSE	1	
	SURFACE FEEDER/BRU	1	240 TPH
BMD	BIOMASS METAL DETECTOR	2	
BBS	BIOMASS BELT WEIGH SCALE	2	
BBE 1	BIOMASS BUCKET ELEVATOR	1	240 TPH
RBF-1	REVERSIBLE BELT FEEDER	1	240 TPH
BMC1&2	BIOMASS CONVEYOR	2	240 TPH
BBF1&2	BIOMASS BELT FEEDER	2	240 TPH
27A	CONVEYOR 1800 mm WIDE	1	2400 TPH
26A	CONVEYOR 1800 mm WIDE	1	2400 TPH
25A/25B	CONVEYOR 1800 mm WIDE	2	2400 TPH
24A/24B	CONVEYOR 1800 mm WIDE	2	2400 TPH
23A/23B	YARD CONVEYOR 1800 mm WIDE	2	2400 TPH
22A/22B	CONVEYOR 1800 mm WIDE	2	2400 TPH
21A/21B	CONVEYOR 1800 mm WIDE	2	2400 TPH
20A/20B	CONVEYOR 1800 mm WIDE	2	2400 TPH
19A/19B	CONVEYOR 1800 mm WIDE	2	2400 TPH
18A/18B	CONVEYOR 1800 mm WIDE	2	2400 TPH
17A/17B	CONVEYOR 1800 mm WIDE	2	2400 TPH
16A/16B	CONVEYOR 1800 mm WIDE	2	2400 TPH
MD	METAL DETECTOR	4	
SM	SUSPENDED MAGNET	5	
VF 1-4	VIBRATING FEEDER	4	1320 TPH
CSU-1 CSU-2	COAL SAMPLING UNIT (-)250mm SIZE COAL SAMPLING UNIT (-)20mm SIZE	1 1	
CH-II	CRUSHER	4	1320 TPH
FG	FLAP GATE	LOT	
BS	BELT WEIGH SCALE	8	
RPG	RACK AND PINION GATE	4	
RG	ROD GATE	4	
ILMS	IN LINE MAGNETIC SEPARATOR ALONG WITH TRAMP IRON CHUTE	4	
PF 1-4	PADDLE FEEDER	4	1800 TPH



FOR TENDER PURPOSE ONLY

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

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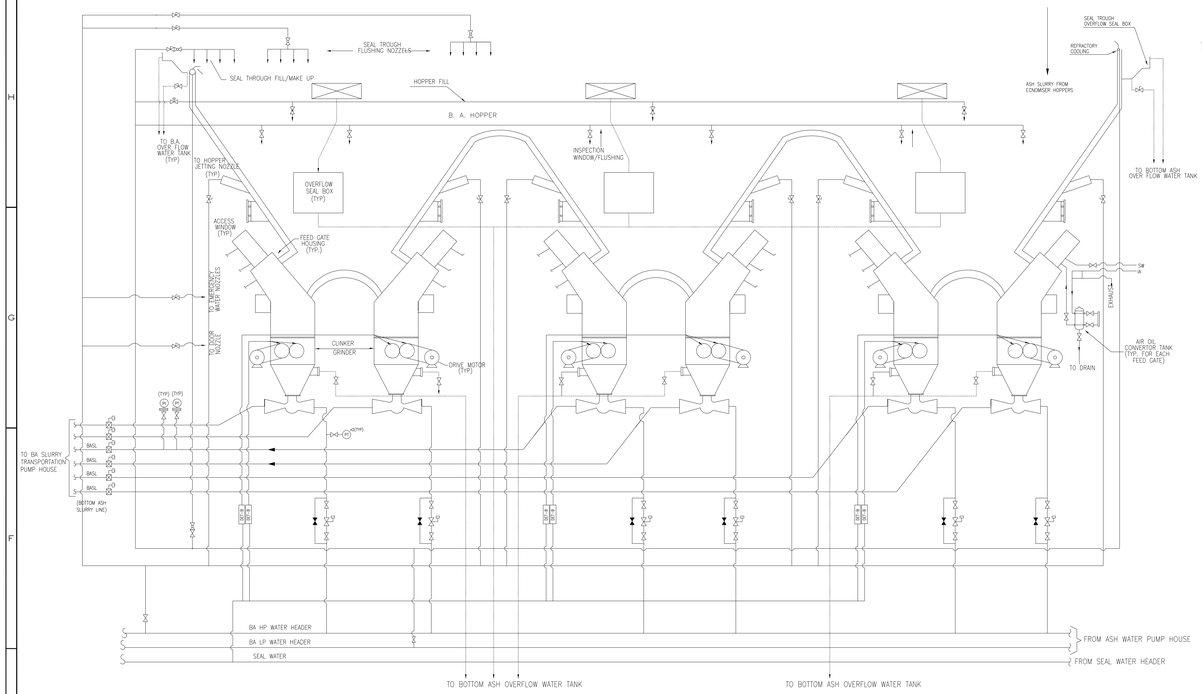
NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: **LARA SUPER THERMAL POWER PROJECT**
STAGE-II (2x800MW)

TITLE: COAL & BIOMASS HANDLING PLANT PACKAGE
COAL + BIOMASS FLOW DIAGRAM

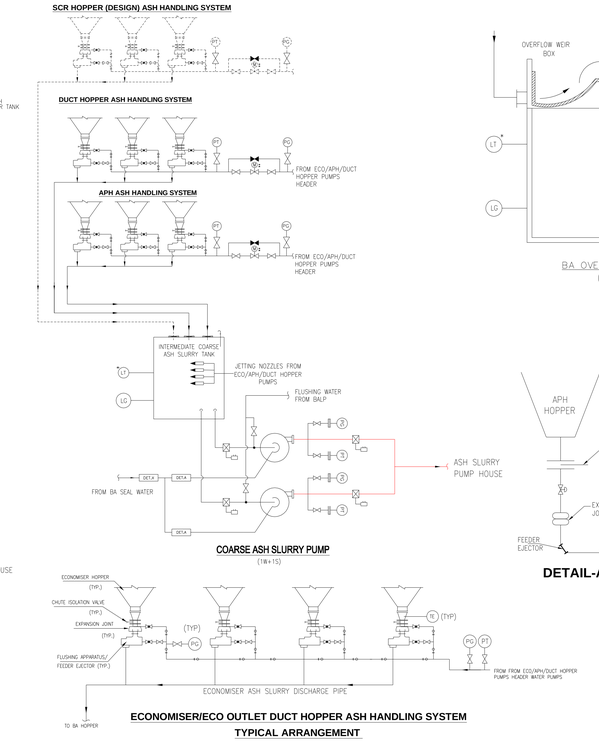
SIZE	SCALE	DRG.NO.	REV.
A1	--	9587-001(R)-POM-A-002	B

CAD FILE NAME : 9587-001(R)-POM-A-002.dwg



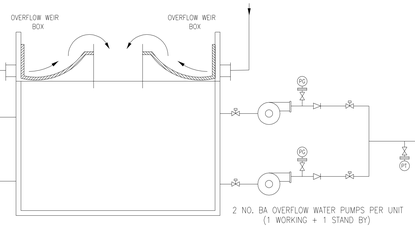
JET PUMP SYSTEM FOR UNIT # 1
(SHALL BE IDENTICAL FOR UNIT # 2)

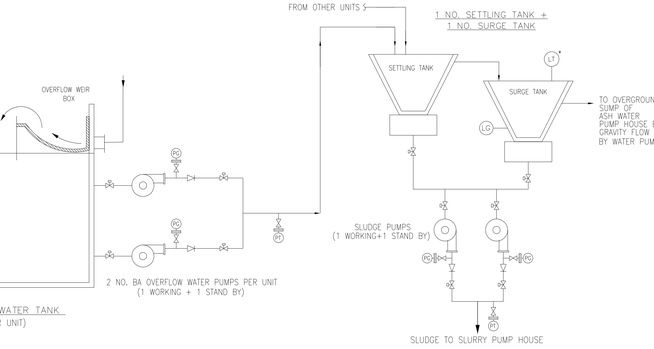
TYPICAL ARRANGEMENT OF COARSE ASH HANDLING SYSTEM

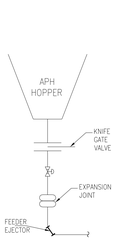


COARSE ASH SLURRY PUMP
(1W+1S)

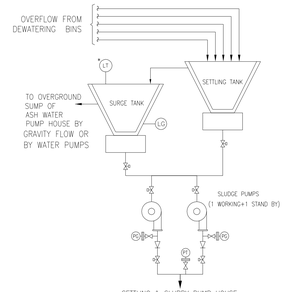
ECONOMISER/ECO OUTLET DUCT HOPPER ASH HANDLING SYSTEM
TYPICAL ARRANGEMENT

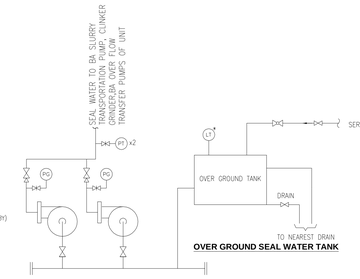






DETAIL-A





BA SEAL WATER PUMPS (PER UNIT)
(1 WORKING + 1 STANDBY)

OVER GROUND SEAL WATER TANK

B.A. SLURRY TRANSPORTATION PUMPS HOUSE
(FOR UNIT # 1)
(SHALL BE IDENTICAL FOR UNIT # 2)

BELT CONVEYOR (TYP)
BA DEWATERING AND CONVEYING SYSTEM

BELT CONVEYOR (TYP)
BA DEWATERING AND CONVEYING SYSTEM

BELT CONVEYOR (TYP)
BA DEWATERING AND CONVEYING SYSTEM

ASH WATER PUMP HOUSE
(COMMON FOR BOTH UNITS)

TYPICAL INSTRUMENT AIR CONNECTION

NOTES

1. BOTTOM ASH / ECO ASH / APH ASH / SCR ASH / DUCT HOPPER ASH HANDLING SYSTEM SHOWN IS INDICATIVE, COMPLETE ASH HANDLING SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR BOTH UNITS, THE NOS. OF ECONOMISER AND AIR PREHEATER HOPPERS SHALL BE DECIDED BY 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 PUMP HOUSE SHALL BE BASALT LINED. ASH SLURRY TRANSPORTATION PIPING WITH IN BA PUMP HOUSE AND UP TO DEWATERING BINS SHALL BE BASALT LINED.
8. FOR MEETING THE FLUSHING APPARATUS WATER REQUIREMENT OF ECO HOPPERS, THREE(3) NOS. (TWO 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 FOR ALL UNITS.
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 PER UNITS. THESE PUMPS SHALL BE LOCATED IN THE BA SLURRY TRANSPORTATION 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, EFFECIENT, RELIABLE AND TROUBLE FREE OPERATION AND MAINTENANCE SHALL ALSO BE INCLUDED IN BIDDER'S SCOPE UNLESS SPECIFICALLY EXCLUDED.

FOR TENDER PURPOSE ONLY

LEGEND :

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

REV.	DESCRIPTION	DRAWN	DESIGN	CHKD.	C.	M.	E.	C&I	APPD	DATE
B	RELEASED FOR TENDER									
A	RELEASED FOR TENDER	PVG/PMG	MK							

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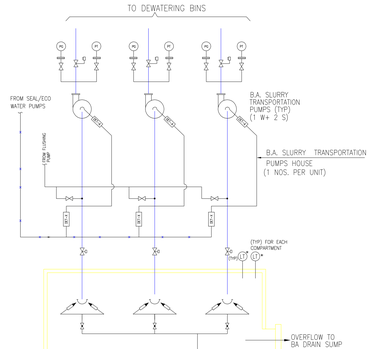
CONSULTANT
एन टी पी सी लिमिटेड
NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT
LARA SUPER THERMAL POWER PROJECT
STAGE – II (2x800MW)
EPC PACKAGE

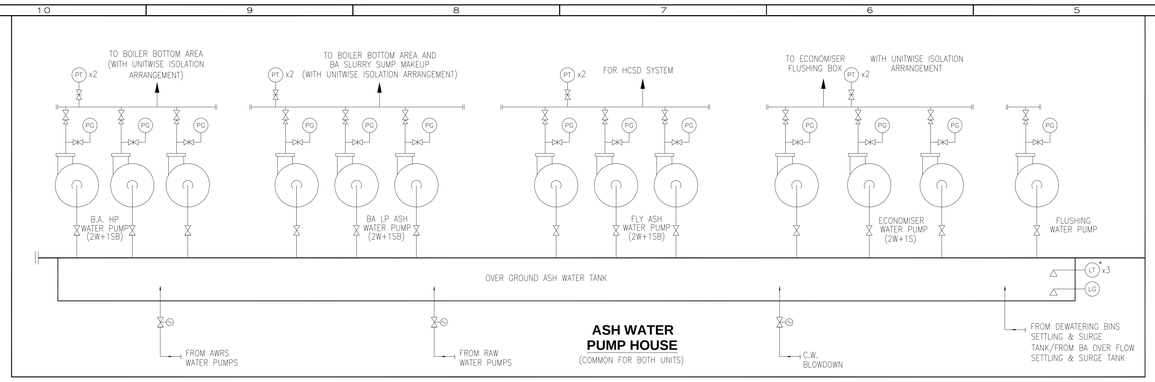
TITLE
SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM (JET PUMP SYSTEM) ASH DISPOSAL & ASH WATER SYSTEM

SIZE	SCALE	DRG.NO.	REV.
A0		9587-001(R)-POM-A-025	B

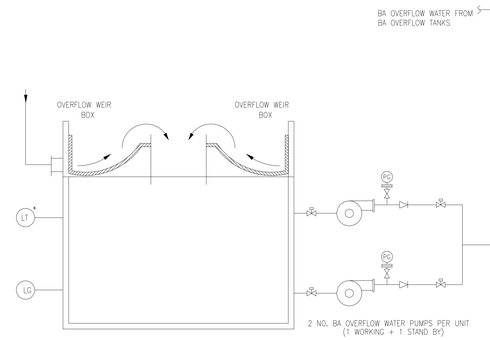
cad file name : 9587-001(R)-POM-A-025.dwg



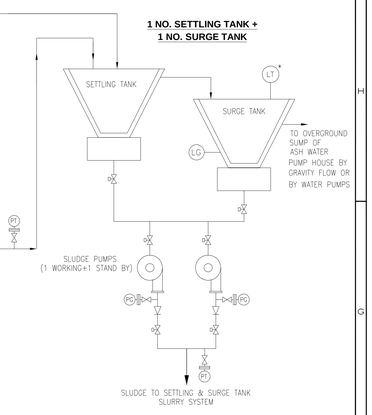
DRY BOTTOM ASH HOPPER AND SUBMERGED SCRAPPER CHAIN CONVEYOR (4x50%) FOR UNIT # 1 (SHALL BE IDENTICAL FOR UNIT # 2)

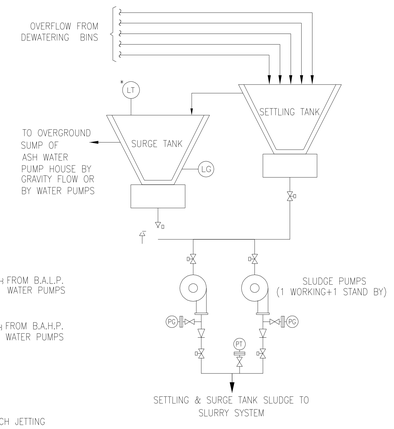


ASH WATER PUMP HOUSE
(COMMON FOR BOTH UNITS)



BA OVERFLOW WATER TANK



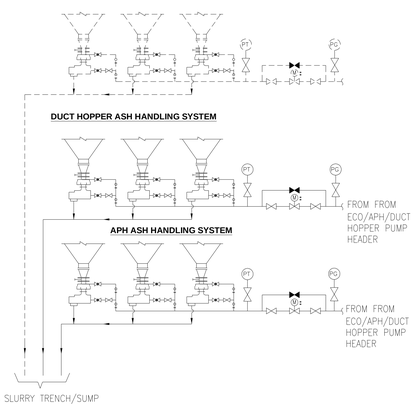


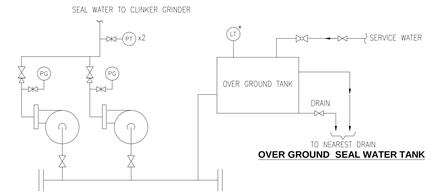
TYPICAL ARRANGEMENT OF COARSE ASH HANDLING SYSTEM

SCR HOPPER ASH HANDLING SYSTEM

DUCT HOPPER ASH HANDLING SYSTEM

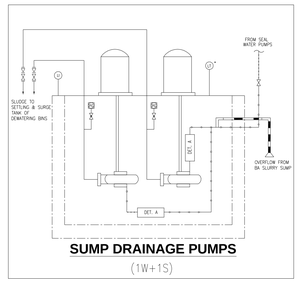
APH ASH HANDLING SYSTEM



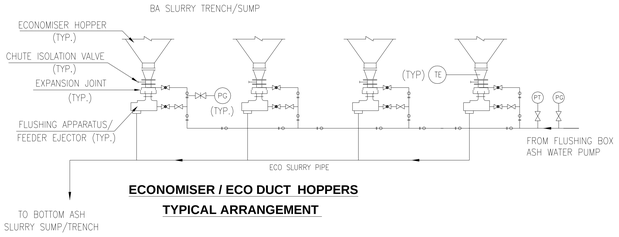


OVER GROUND SEAL WATER TANK

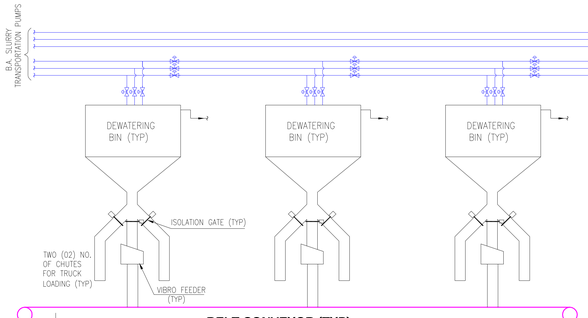
SEAL WATER PUMPS (COMMON FOR ALL UNITS)
(1 WORKING + 1 STANDBY)



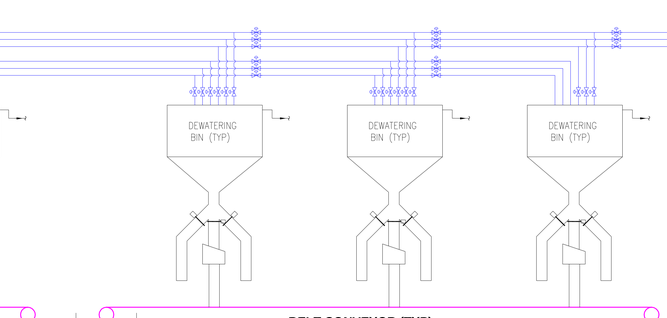
SUMP DRAINAGE PUMPS
(1W+1S)



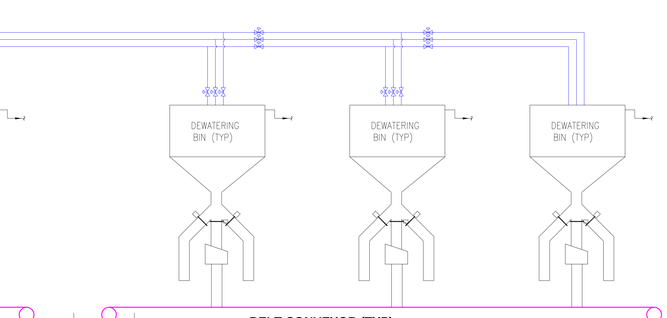
ECONOMISER / ECO DUCT HOPPERS
TYPICAL ARRANGEMENT



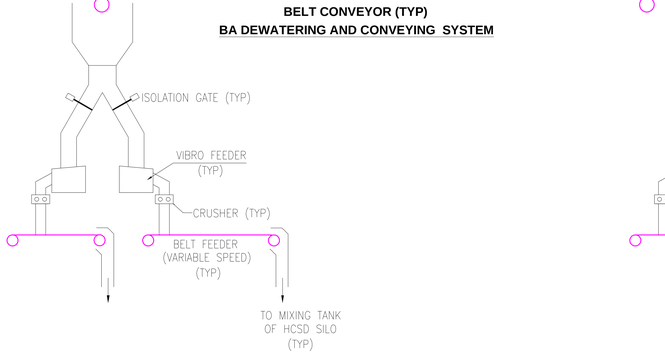
BELT CONVEYOR (TYP)
BA DEWATERING AND CONVEYING SYSTEM

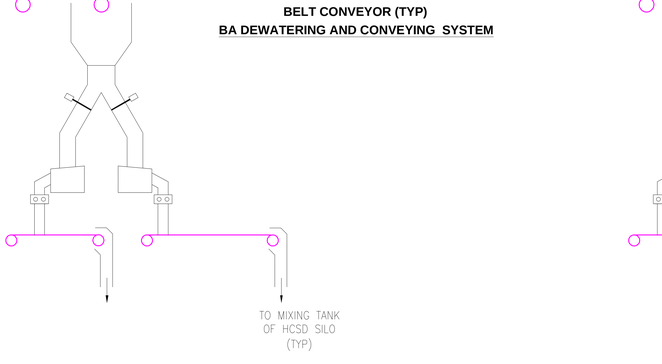


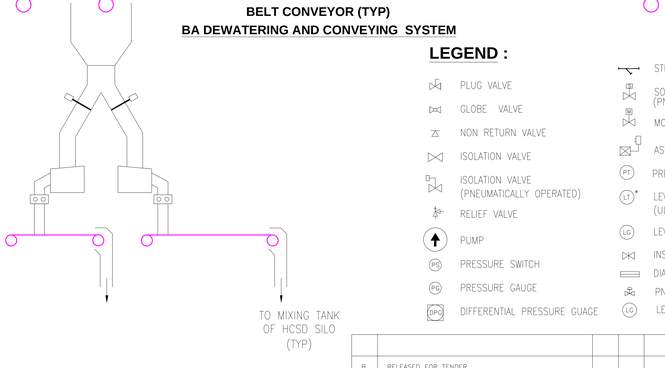
BELT CONVEYOR (TYP)
BA DEWATERING AND CONVEYING SYSTEM



BELT CONVEYOR (TYP)
BA DEWATERING AND CONVEYING SYSTEM







LEGEND :

- PLUG VALVE
- GLOBE VALVE
- NON RETURN VALVE
- ISOLATION VALVE
- ISOLATION VALVE (PNEUMATICALLY OPERATED)
- RELIEF VALVE
- PUMP
- PS — PRESSURE SWITCH
- PG — PRESSURE GAUGE
- DPG — DIFFERENTIAL PRESSURE GUAGE
- STRAINER
- SOLENOID VALVE (PNEUMATICALLY OPERATED)
- MOTORISED VALVE
- ASH SLURRY VALVE
- PT — PRESSURE TRANSMITTER
- LT — LEVEL TRANSMITTER (ULTRASONIC TYPE)
- LG — LEVEL GAUGE
- INSTRUMENT VALVE
- DIAPHRAGM SEAL
- PNEUMATIC VALVE
- LG — LEVEL INDICATOR

NOTES

1. BOTTOM ASH / ECO ASH / APH ASH / SCR ASH / DUCT HOPPER ASH HANDLING SYSTEM SHOWN IS INDICATIVE. COMPLETE ASH HANDLING SYSTEM SHALL BE DESIGNED & SUPPLIED MEETING FUNCTIONAL REQUIREMENTS FOR BOTH UNITS.
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. THE ASH SLURRY PIPING FROM THE DISCHARGE OF BA SLURRY TRANSPORTATION PUMPS UP TO DEWATERING BINS SHALL BE BASALT LINED.
7. FOR MEETING THE FLUSHING APPARATUS WATER REQUIREMENT OF ECO HOPPERS, THREE(3) NOS. (TWO 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 FOR ALL UNITS.
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, EFFECIENT, 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	PRIYANKA	MR							
A	RELEASED FOR TENDER									

CLEARED BY

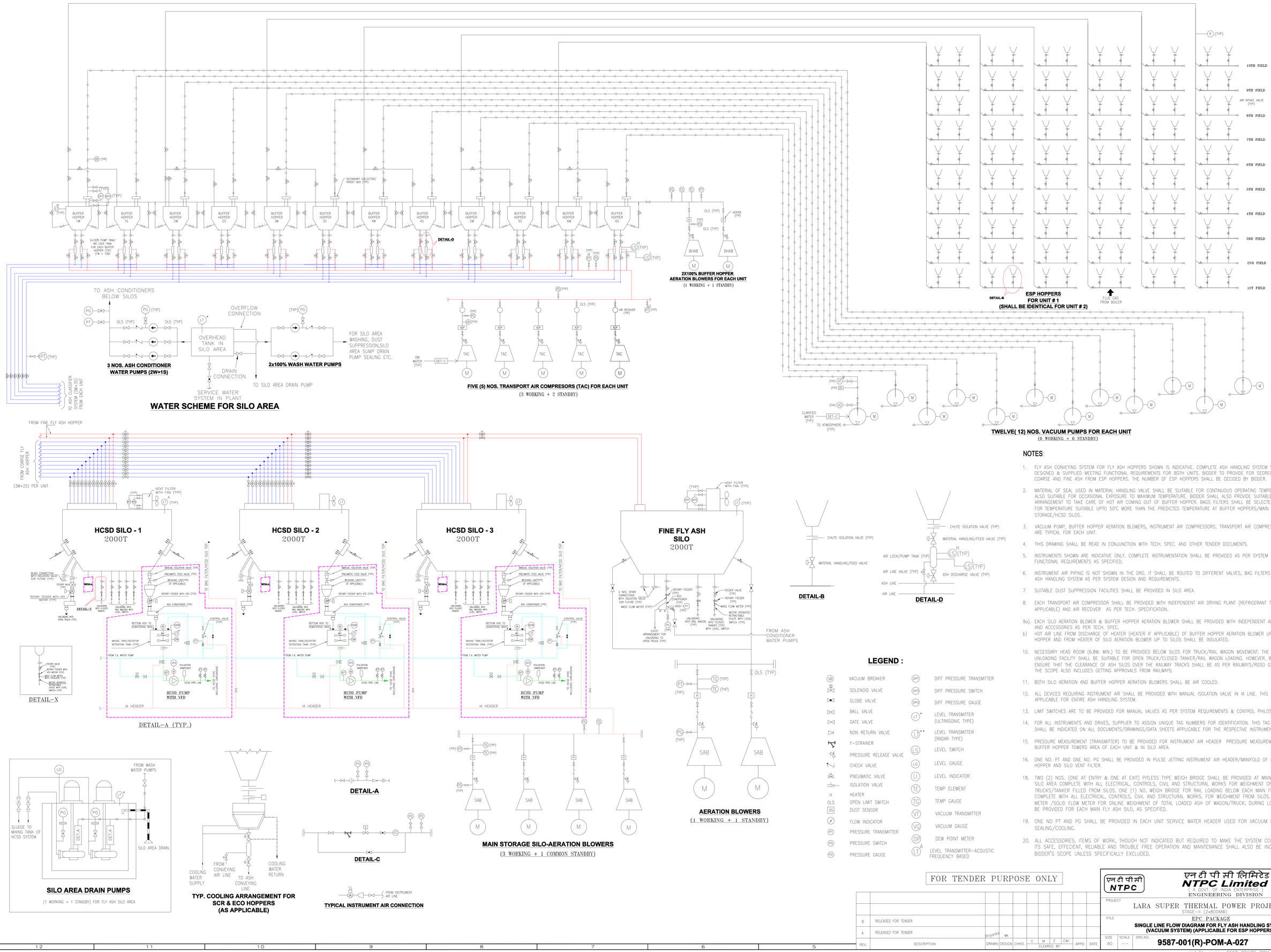
CONSULTANT: एन टी पी सी लिमिटेड NTPC Limited (A GOVT. OF INDIA ENTERPRISE) ENGINEERING DIVISION

PROJECT: LARA SUPER THERMAL POWER PROJECT
STAGE-II (2x800MW)

TITLE: ASH HANDLING SYSTEM
SINGLE LINE FLOW DIAGRAM OF BOTTOM ASH HANDLING SYSTEM (SUBMERGED SCRAPER CHAIN CONVEYOR) ASH DISPOSAL & ASH WATER SYSTEM)

SIZE: A0 | SCALE: | DRG.NO.: 9587-001(R)-POM-A-026 | REV.: B

cad file name : 9587-001(R)-POM-A-026.dwg



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 BOTH UNITS. 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/HCSD SILOS.
3. VACUUM PUMP, BUFFER HOPPER AERATION BLOWERS, INSTRUMENT AIR COMPRESSORS, TRANSPORT AIR COMPRESSORS SHOWN ARE TYPICAL FOR EACH UNIT.
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.
8. EACH TRANSPORT 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 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 OF EACH UNIT & 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/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. 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, EFFECIENT, 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
					CLEARED BY					
B	RELEASED FOR TENDER									
A	RELEASED FOR TENDER	DEVDOKD	MK							

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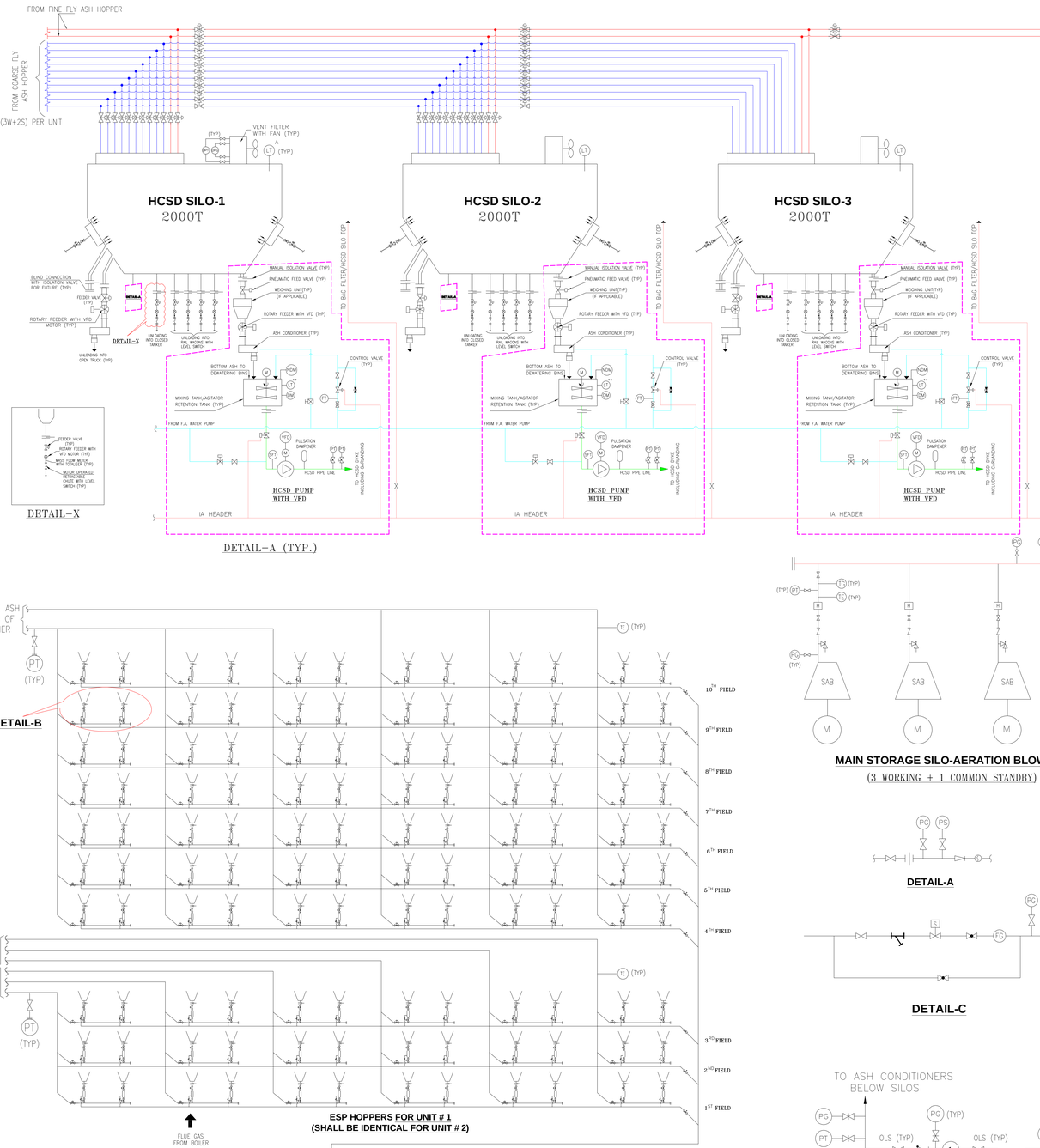
NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: LARA SUPER THERMAL POWER PROJECT
STAGE-II (2x800MW)
EPC PACKAGE

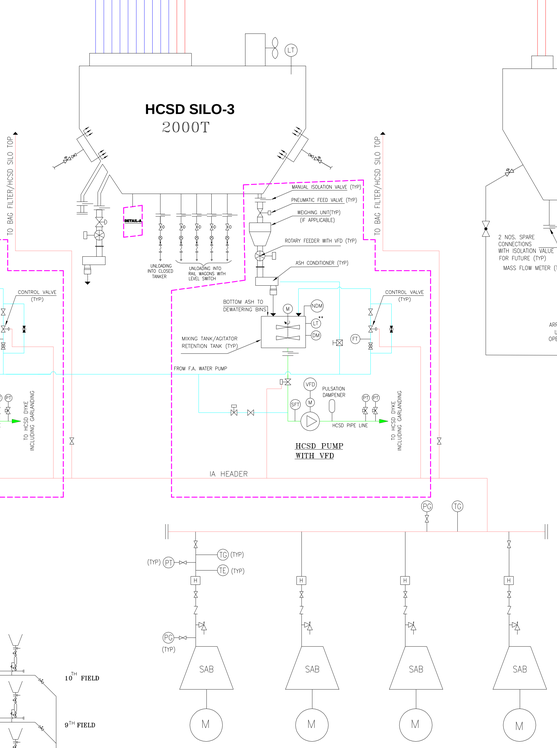
TITLE: SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (VACUUM SYSTEM) (APPLICABLE FOR ESP HOPPERS)

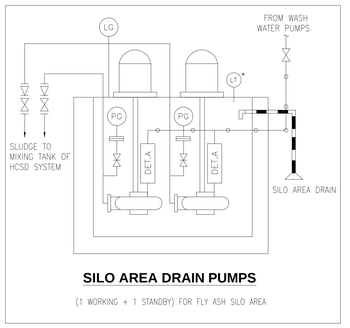
SIZE: AO | SCALE: - - - | DRG.NO.: 9587-001(R)-POM-A-027 | REV.: B

cad file name : 9587-001(R)-POM-A-027.dwg



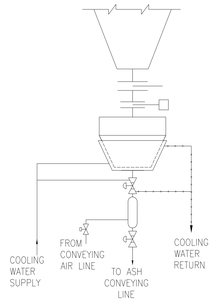
DETAIL-X





SILO AREA DRAIN PUMPS

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



TYP. COOLING ARRANGEMENT FOR SCR & ECO HOPPERS (AS APPLICABLE)

ESP HOPPERS FOR UNIT # 1 (SHALL BE IDENTICAL FOR UNIT # 2)

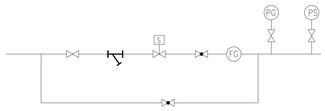
MAIN STORAGE SILO-AERATION BLOWERS

(3 WORKING + 1 COMMON STANDBY)

AERATION BLOWERS

(1 WORKING + 1 STANDBY)

DETAIL-A



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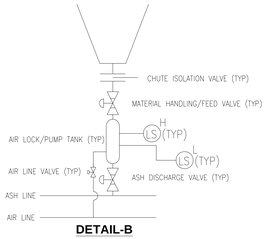
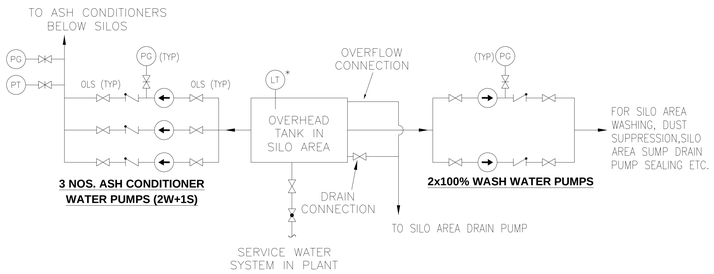


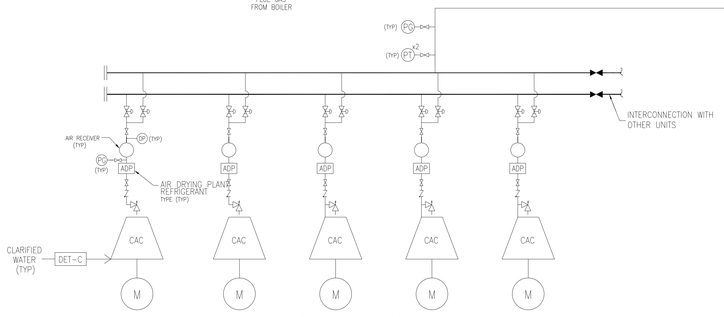
DETAIL-B



3 NOS. ASH CONDITIONER WATER PUMPS (2W+1S)

2x100% WASH WATER PUMPS

WATER SCHEME FOR SILO AREA



FIVE (5) CONVEYING AIR COMPRESSORS (CAC) FOR EACH UNIT

(3 WORKING +2 STANDBY)

TYPICAL INSTRUMENT AIR CONNECTION

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
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

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/HSHD SILOS.
3. CONVEYING AIR COMPRESSORS & INSTRUMENT AIR COMPRESSORS SHOWN ARE TYPICAL FOR EACH UNIT. TRANSPORT AIR COMPRESSORS SHOWN ARE FOR BOTH UNITS
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.
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. REFER CLAUSE NO 1.01.06 (B) OF PART –A OF TECHNICAL SPEC
20. 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.

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

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

PROJECT: LARA SUPER THERMAL POWER PROJECT
STAGE-II (2×800MW)

TITLE: EPC PACKAGE
SINGLE LINE FLOW DIAGRAM FOR FLY ASH HANDLING SYSTEM (PRESSURE SYSTEM)

SIZE	SCALE	DRG.NO.	REV.
A0	- - -	9587-001(R)-POM-A-028	B

cad file name : 9587-001(R)-POM-A-028.dwg

COARSE ASH FROM ESP HOPPERS

VENT FILTER WITH FAN (TYP)

(TYP) DPT DPC A LT (TYP)

CLASSIFIER SILO (250 T)

FROM AERATION BLOWER

TO 2ND CLASSIFIER

BY PASS LINE

FINE ASH FROM ESP HOPPERS

VENT FILTER (TYP)

CENTRIFUGAL FAN

CYCLONE

CLASSIFIER (TYP) 1 NO./UNIT

VENT FILTER WITH FAN (TYP)

FINE FLY ASH HOPPER (300 T)

COARSE FLY ASH HOPPER (300 T)

COARSE FLY ASH HOPPER (300 T)

TO FINE FLY ASH SILOS (1W+1S) LINES

TO HCSD CUM FLY ASH STORAGE SILOS (3W+2S) LINES

PG TG

(TYP) PT TE (TYP) TG (TYP)

OLS (TYP)

H Z

SAB

M

AERATION BLOWERS
(2 WORKING + 1 STANDBY)

CLARIFIED WATER (TYP) DET-C

ADP TAC

AIR RECIEVER (TYP)

(3 WORKING + 2 STANDBY)
FIVE (5) NOS. TRANSPORT AIR COMPRESORS (TAC)

(3 WORKING + 2 STANDBY)
FIVE (5) NOS. TRANSPORT AIR COMPRESORS (TAC)

LG FROM WASH WATER PUMPS

LT PG DET.A

SLUDGE TO MIXING TANK OF HCSD SYSTEM

SILO AREA DRAIN

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 BOTH UNITS.
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.
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7. THIS OPTION IS APPLICABLE FOR SYSTEM WHERE ESP BUFFER HOPPER IS NOT ENVISAGED.
8. 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.

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B	RELEASED FOR TENDER									
A	RELEASED FOR TENDER	Priyanka	MK							

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NTPC Limited
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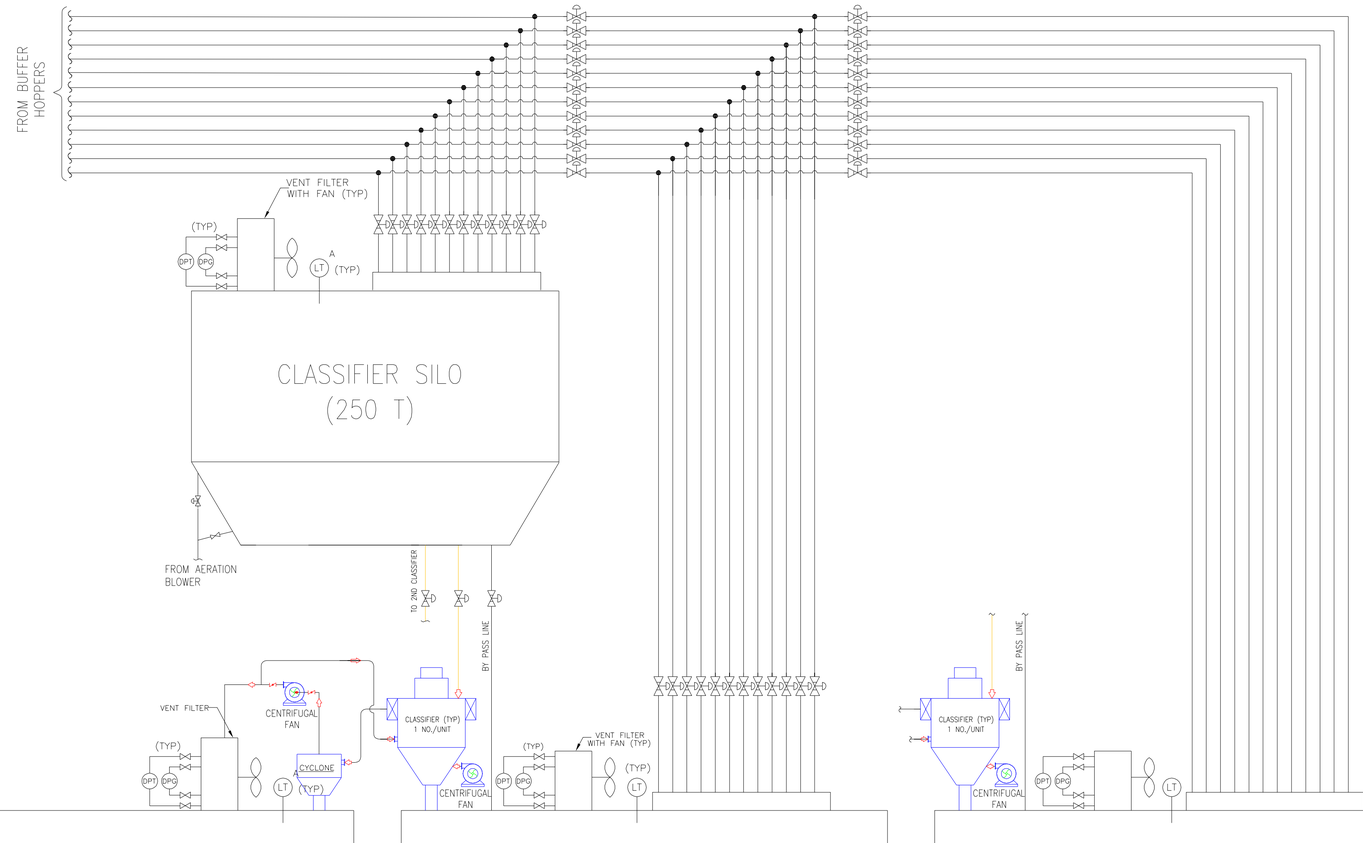
ENGINEERING DIVISION

PROJECT: **LARA SUPER THERMAL POWER PROJECT**
STAGE-II(2x800MW)

TITLE: EPC PACKAGE
SINGLE LINE DIAGRAM FOR ASH CLASSIFIER SYSTEM (PRESSURE SYSTEM)

SIZE	SCALE	DRG.NO.	REV.
A1	--	9587-001(R)-POM-A-029	B

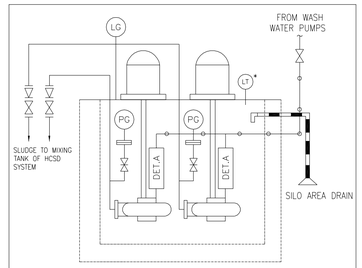
CAD FILE NAME : 9587-001(R)-POM-A-029.dwg



AERATION BLOWERS
(2 WORKING + 1 STANDBY)

(3 WORKING + 2 STANDBY)
FIVE (5) NOS. TRANSPORT AIR COMPRESORS (TAC)

(3 WORKING + 2 STANDBY)
FIVE (5) NOS. TRANSPORT AIR COMPRESORS (TAC)



DRAIN PUMPS
(1 WORKING + 1 STANDBY)

NOTES

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A	RELEASED FOR TENDER	Priyanka	MK							

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ENGINEERING DIVISION

PROJECT: **LARA SUPER THERMAL POWER PROJECT**
STAGE–II(2x800MW)

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

SIZE	SCALE	DRG.NO.	REV.
A1	––	**9587-001(R)-POM-A-029**	B

CAD FILE NAME : 9587–001(R)–POM–A–029.dwg