



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-30-Oct-20

CORRIGENDUM- 07

PROJECT	:	BRBCL, NABINAGAR STPS 4x250 MW FGD
PACKAGE	:	GYP SUM DEWATERING SYSTEM
TENDER ENQUIRY NO	:	PE/PG/RGM/E-6512/2020 Dt. 01/09/2020
DUE DATE EXTENSION		10.11.2020
SUBJECT	:	REGARDING REPLY OF PRE BID QUERY

Type of Corrigendum			
Technical Corrigendum -	☒	Commercial Corrigendum -	☐

In reference to the above mentioned tender enquiry for **GYP SUM DEWATERING SYSTEM** package

Please find attached the reply of Pre-Bid query asked by bidders along with this Corrigendum no. 7 ,

All the other terms and conditions of the tender enquiry remains same.

Yours faithfully,

For and on behalf of BHEL

		PROJECT: 4x250 MW NABINAGAR TPP						
		PACKAGE: GYPSUM DEWATERING SYSTEM						
		ENQUIRY NO.: E-6512/2020 Dtd. 01.09.2020						
PRE-BID CLARIFICATION								
1	2	3	4	5	6	7	8	9
S. N.	SECTION	CLAUSE	PAGE NO.	STATEMENT OF THE REFERRED CLAUSE	CLARIFICATION REQUIRED BY BIDDER	BHEL Reply	Bidder Reply	BHEL Reply
1	Guaranteed power consumption price format			The total guaranteed power consumption quoted by the bidders at column no. (7) shall be loaded at the rate of USD 1746 per KW for the differential power quoted over the guaranteed base power arrived as mentioned at S.N. 2 above.	Column no 7 is not available in the given table.	Revised GPC format to be followed.	Noted.	-
2	Tech Specification BEBCL GDWS Part-1		29 of 528	Design clarified water analysis	Provide the temperature of the clarified water.	Clarified water shall be at Ambient temperature.	Noted.	-
3	Tech Specification BEBCL GDWS Part-1	2.1.1.5	33 of 528	Bidder to consider the requirement of the vertical seal water sump pumps (2 nos., 1 working + 1 stand by) in his scope for pumping the water expended from the Vacuum pump(s) to the Cake Wash Tank(s). The system shall be complete with pumps, valves, instruments and accessories along with associated supports, fasteners, gaskets etc. with drive (IE3 motor). Also, bidder to include all connection bolts/nuts/washers for installation. Required instruments and any safety device shall be supplied.	Please provide the PID for verticle seal water sump arrangement or bidder will consider minimum requirement	Bidder is required to furnish PIDs during detailed engineering for review & approval in accordance to the scope mentioned in specification.	We understand the scheme mentioned in P&IDs is not matching with technical requirement. Please confirm wheter to consider vertical sump pump for pumping seal water need to be considered.	Bidder to note that P & ID atatched in the specification from Page no 422 to 434 of 528 is replaced by revised P& ID issued along with this clarification.
4	Tech Specification BEBCL GDWS Part-1	2.1.1.6	33 of 528	Vent fan including enclosure and its arrangement: Two (2) numbers	bidder will consider Centrifugal type of vent fan. please confirm	Bidder is to meet system requirement in accorandance to specification.	As per pervious experience with FGD application and BHEL, centrifugal type will meet the requirement.	Noted. Bidder to decide capacity and head of fan to meet system requirement in line with the tender specification
5	Tech Specification BEBCL GDWS Part-1	2.1.1.6	33 of 528	Vent fan including enclosure and its arrangement: Two (2) numbers	Client to specify the MOC of Fume enclosure & ducting if any to be maintained.	Bidder is to meet system requirement in accorandance to specification as per proven design practice.	Noted. OEM shall follow proven design practice.	Bidder to note that MOC of fan as well ducting shall be as per proven practice meeting the system requirement.
6	Tech Specification BEBCL GDWS Part-1	2.1.1.3	33 of 528	Vacuum belt filters complete with Accessories including discharge chute up to the gypsum conveyor skirt board.	Belt width & skirt board inside dimension to be provided to check the feasibility of proposed arrangement & profile of chute & angle.	Belt width shall be 800 mm and skirt board inside dimension at the top shall also be 800 mm.	Noted , and will be considered in layout while designing the chute .	-
7	Tech Specification BEBCL GDWS Part-1	2.1.1.9	34 of 528	Scope of below-mentioned interconnected piping (slurry, air and water pipes) along with valves, rubber lining (wherever applicable), instruments, valves, supports, gaskets, fasteners and accessories which is non-integral to Gypsum dewatering system is limited to engineering only and supply shall be made by BHEL. Engineering includes layout & routing of pipes, preparation of isometric drawing and BOQ:	We understand all the drawings required for the engineering shall be provided by BHEL (Drawings for valves, pumps and other requirements). Please confirm.	All input drawings shall be made available during detailed engineering of the package.	Noted	-
8	Tech Specification BEBCL GDWS Part-1	4.3.4	40 of 528	The complete frame of the filter and all parts in contact with gypsum shall be made of corrosion resistant material or shall be provided with corrosion resistant liners of proven design.	Since frames are not in contact with gypsum slurry hence shall be made of mild steel epoxy coated and parts which are in contact with slurry are made of PP or MSRL. This is as per proven practice in similar application and same has considered.	Bidder is to follow specification. However, all non wetted parts/frames shall be MS-Epoxy painted as per requirement.	Noted	Bidder is to follow the specification. The complete frame of the filter and all parts in contact with gypsum shall be made of corrosion resistant material or shall be provided with corrosion resistant liners of proven design.
					As clause 4.3.4 does not clearly specify the MOC requirement for the filter frame, and as per our proven design for our earlier HBF installations, our Filter MOC considered is as follows: Description Details Filter Frame : A36 Steel or equal Surface Preparation / Coating for Steel parts / items : SSPC-SP10 / (1) Coat of 4 Mils of Red Oxide Primer+ (1) Coat of 4 Mils Epoxy pant (RAL5003). Total paint thickness of (8) Mils DFT Hence, request you to kindly confirm whether we can quote considering the above mentioned MOC, or should we consider SS 304 for Filter considering the clause 4.3.4.			Accordingly, bidder may consider 'Corten / Weathering Steel' or 'SS 304' or any other suitable corrosion resistant material conforming to ASTM A606-4, A588, A847 etc. as applicable. The material so selected, should be meeting the strength requirement of the belt filter.
9	Tech Specification BEBCL GDWS Part-1	4.3.10	40 of 528	The filtrate from gypsum slurry and from cake washing shall be taken to a separate vacuum receiver tank(s) as per the proven practice of the supplier. Each belt filter shall have an independent vacuum pump.	Filtrate from slurry and cake washing will be collected in the single receiver, this is the proven practice hence Separate receiver tank is not required (as per Client PID dwg no : 3-FW-000-01095 filtrate is collecting in single receiver).	Noted. The arrangement indicated in referred P&IDs is to be followed.	Noted	-
10	Tech Specification BEBCL GDWS Part-1	4.3.11	40 of 528	Gypsum cake from each belt filter shall be discharged through a hopper onto belt conveyor being provided by the Employer.	Bidder understand that hopper means discharge chute only, Gypsum cake from each belt filter shall be discharged through a chute arrangement instead of hopper onto belt conveyor indicated in GA drawing.	The bidder understanding is correct.	OK	-
11	Tech Specification BEBCL GDWS Part-1	4.5.6	41 of 528	All pumps shall be fitted with suction and discharge pressure gauges.	bidder will suppy pressure gauge as per Client PID.	Specification requirement is clear.	Noted	-
12	Tech Specification BEBCL GDWS Part-1	4.4	41 of 528	Vacuum System	Client to specify the Margin of Motor for installed power over the Absorbed kW required to select the motor power	Bidder is to refer Clause 4.00.00 (b) page 172 of 528 of technical speification.	The same is not mentioned in page 172.PI Confirm	Bidder is to refer Clause 4.00.00 (b) page 172 of 528 of technical speification.
13	Tech Specification BEBCL GDWS Part-1	4.4	41 of 528	Vacuum System	Client to specify whether bidder can Choose either among rpm 1000 or 1500 rpm speed motor for vacuum pump?	RPM of motor may be selected by bidder as per system requirement.	Noted	-

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14	Tech Specification BEBCL GDWS Part-1	4.4	41 of 528	The vacuum pump shall be of low speed liquid ring type of proven design.	Client to specify the low speed range for selecting the vacuum pump	RPM of vacuum pump shall be as per system requirement & should be of proven design of the sub supplier approved during detailed engineering.	Noted	-
15	Tech Specification BEBCL GDWS Part-1	4.4.6	41 of 528	Each vacuum receiver tank(s) shall be provided with slide plate type pneumatic vacuum breaker. The plate shall be stainless steel with a min. thickness of 3 mm.	Since we are maintaining sufficient barometric height and it is enough to break the vacuum. Further bidder shall provide vacuum breaker valve in Vacuum line to prevent excess vacuum generation if require.	The method proposed by bidder shall be discussed & finalised during detailed engineering.		-
16	Tech Specification BEBCL GDWS Part-1	4.5.8	42 of 528	Design pumps not to be damaged during reverse rotation at up to 150% of design RPM, at full discharge head in the event that a pump trips while the other operating pump remain on line.	Reverse rotation is not recommended. To have check valve, Immediately after discharge flange of pump.	Check valve/ NRVs have to be considered as per requirement of system.	OK	-
17	Tech Specification BEBCL GDWS Part-1	4.5.15	42 of 528	The pumps shall have mechanical seals of cartridge type with self-lubrication sliding ring cartridges. The static part will be mounted on the seal plate with circumferential ring (O ring) or another flexible sealing ring. Built in seal design will not be accepted.	The pumps shall be supplied with mechanical seals of single cartridge type with self-lubrication arrangement. However, other clause i.e " The static part will be mounted on the seal plate with circumferential ring (O-ring) or another flexible sealing ring & built in seal design will not be accepted" is not applicable. Please confirm.	The requirement of the specification is clear. Bidder to follow the Specification.		-
18	Tech Specification BEBCL GDWS Part-1	4.5.19	42 of 528	The material and thickness of the liners of slurry pumps shall ensure a minimum service life of 2 years before replacement. All the wear parts of the pump shall be guaranteed for a minimum wear life of not less than 14000 hours.	This clause is for slurry pumps only not for cake wash, Filter belt cloth wash and sump pump, slurry pumps are in client scope.	Filtrate extraction pumps which are to be installed at outlet of vacuum receiver tanks are slurry pumps which is in bidder scope.		-
19	Tech Specification BEBCL GDWS Part-1	4.5.38	43 of 528	Equipments requiring monitoring during regular operation shall be approachable from the ground floor through staircase. Staircase with minimum width of 1200 mm shall be provided for approach to elevated structures at 5 m height from the nearest platform. Below this height, a vertical ladder with minimum clear width of 600 mm may also be acceptable.	The Hydrocyclone platform and HBF platform are in bidder scope, others platform and staircase is in client scope, please confirm.	Bidder's understanding is correct.	The layout proposed by Bidder will be indicating same.	Bidder to note that approach platform with access ladder for equipments in bidder's scope shall be provided by bidder. Regarding HBF, bidder to provide 2m (min) wide platform for each belt filter as per Clause 4.3.12, Page 40 of 528 or it may provide a common platform of 3.3m (approx.) width. The "Layout details of Gypsum Dewatering Building" page 420 & 421 of 528 is for reference purpose. In case, common platform for HBF is provided as mentioned above, a movable platform along with access ladder shall be provided for approaching equipment/item on other side of HBF. A 1000 mm wide platform with suitable approach shall be provided by the bidder for each hydro cyclone as per Clause 4.5.36, Page 43 of 528.
20	Tech Specification BEBCL GDWS Part-1	5.4	45 of 528	Hydro cyclone backpressure shall not exceed 20m H	Please clarify the requirement and Hydrocyclone feed inlet pressure will depends on the Hydrocyclone Vendor selection design to achieve the percents solids, Tonnage and PSD distribution.	Bidder is to follow specification requirement.	Shall be as per hydrocyclone vendor input.	Bidder is to follow specification requirement. Details shall be finalised during engineering stage after placement of order to successful bidder.
21	Tech Specification BEBCL GDWS Part-1		50 of 528	General Tech Spec- Part C-NTPC Spec.	This spec. is applicable for main contractor & not to BHEL's sub contractors. Please confirm.	Relevant clauses shall be applicable for the bidder.	OK	-
22	Tech Specification BEBCL GDWS Part-1	11.00.00	91 of 528	Equipment Bases:- A cast iron or welded steel base plate shall be provided for all rotating equipment which is to be installed on a concrete base.	Base frames for all pumps and vacuum pumps shall be MS Fabricated epoxy painted.PI confirm Also the Hold down/Anchor fasteners for foundations shall be MS Epoxy painted.PI confirm	Bidder is to follow specification. These details shall be finalised during detailed engineering.	OK	-
23	Tech Specification BEBCL GDWS Part-2	9	215 of 528	All transmitters shall be suitably grouped together and mounted inside (i) Local Instruments Enclosures (LIEs) in case of open areas of the plant and (ii) In Local Instrument Racks (LIRs) in case of covered areas.	LIE/LIR panel will be applicable only for PIT and TIT, Kindly clarify	Bidder is to follow specification. These details shall be finalised during detailed engineering.	bidder request client to clarify the query during bidding stage, any addition of the instrument or panel will incur cost implication	Bidder is to follow specification requirement. Details shall be finalised during engineering stage with end customer with reference to the specification after placement of order to successful bidder.

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24	Tech Specification BEBCL GDWS Part-2	30	217 of 528	Local control panel and VFD panel, if any required for operation shall be in bidder scope.	As per TECH SPEC RBCL PART-2 Technical specification pg. of 41 mentioned 11KV/3.3/415V Switch gears are in BHEL scope , Hence LCP panel and VFD panel will be in BHEL scope	Bidder's understanding related to switchgears is correct. However same does not include VFD panel. Please refer to clause 2.1.1.3, page 33 of 528, as per which applicable VFD for vacuum belt filter is in bidder's scope. Any LCP as per system requirement of bidder, shall be in bidder's scope.	Noted, VFD will be provided for the filter main drive motor and will be installed at site near to the equipment with IP55, CRCA enclosure. If any motor other than main drive motor required with VFD application , VFD will be in client scope. LCP is not applicable however HBF can be controlled through DCS	Location of VFD panel shall be finalised during detailed engineering. However, there is no impact of location of pnael on bidders, as cables are in BHEL scope. Regarding applicability of VFD, requirement is clear in tender's technical specification..
25	Tech Specification BEBCL GDWS Part-2	3	221 of 528	MEASURING INSTRUMENTS (PRIMARY AND SECONDARY)	Instruments will be as per Client PID only, please confirm.	The requirement of instruments mentioned in PIDs attached in specification are minimum requirement. However, bidder is required to furnish PID during detailed engineering as per their proven design for review & approval in accordance to the scope mentioned in specification.	Instrument will be considered as per the P&ID, kindly review if any addition to be made	Bidder is to follow specification requirement. Details shall be finalised during engineering stage with end customer with reference to the specification after placement of order to successful bidder.
26	Tech Specification BEBCL GDWS Part-2	17.00.00	265 of 528	VFD PANEL REQUIREMENTS	As per TECH SPEC RBCLPART-2 Technical specification pg. of 41 mentioned 11KV/3.3/415V Switch gears are in BHEL scope , Hence LCP panel and VFD panel will be in BHEL scope	Bidder's understanding related to switchgears is correct. However same does not include VFD panel. Please refer to clause 2.1.1.3, page 33 of 528, as per which applicable VFD for vacuum belt filter is in bidder's scope. Any LCP as per system requirement of bidder, shall be in bidder's scope.	Noted, VFD will be provided for the filter main drive motor and will be installed at site near to the equipment with IP55, CRCA enclosure. If any motor other than main drive motor required with VFD application , VFD will be in client scope. LCP is not applicable however HBF can be controlled through DCS	Location of VFD panel shall be finalised during detailed engineering. However, there is no impact of location of pnael on bidders, as cables are in BHEL scope. Regarding applicability of VFD, requirement is clear in tender's technical specification..
27	Tech Specification BEBCL GDWS Part-2	19.00.00	266 of 528	HT SWITCHGEAR	as per TECH SPEC RBCLPART-2 Technical specification pg. of 41 mentioned 11KV/3.3/415V Switch gears are in BHEL scope	Bidder's understanding related to switchgears is correct.	Noted and closed	-
28	Tech Specification BEBCL GDWS Part-2	2.01.02	272 of 528	CONTROL DESK & PANELS	not in bidder scope of supply, please confirm	Controls of Gypsum Dewatering System shall be done through BHEL DDCMIS.	Noted and closed	-
29	Tech Specification BEBCL GDWS Part-2	1	274 of 528	LOCAL PANELS, This specification covers the Design, Manufacture, Inspection and Testing at the manufacturer's works, proper packing for transportation and delivery to site, supervision, erection, and commissioning at site of Local Panels required for control and monitoring of the Auxiliary Plant & Equipment.	bidder will supply Junction boxes for the instruments, HBF can be controlled from client DDCMS.	Bidder's understanding is correct.	Noted and closed	-
30	Tech Specification BEBCL GDWS Part-4	2.b	393 of 528	Mandatory spares list 2,b) Belt - 2 Sets	For spare belt - DELKOR shall supply wear belt or sealing belt	Bidder's understanding is correct.	Noted and closed	Clarification issued by BHEL at col. No. 7 stands withdrawn. Further, Bidder to note that a set shall mean complete replacement for one equipment. All type of belts shall be covered accordingly.
31	Tech Specification BEBCL GDWS Part-4		420 of 528	GA of GDWS	Please provide drawng in Acad version for FGD portion to workout the requirement & check the allocated space adequacy.	AutoCad drawing shall be provided during detailed engineering.	OK	-
32	Tech Specification BEBCL GDWS Part-4	3	440 of 528	Only manual calculation with authentic supporting literature (e.g. extracts of hand Book/standard/codes) shall be acceptable. All design calculations and drawings shall be in SI system only.	The calculation done by reputed software, please confirm	Point is noted. However calculation has to be submitted for review & approval to BHEL/ Its end customer.	OEM Design/Properitaory calculations are restricted to share. Basis shall be provided	Bidder shall be required to submit all required drawings/ documents as per list of drawings which shall be finalised during detailed engineering with customer.
33	Tech Specification BEBCL GDWS Part-4	1.4	506 of 528	The vacuum box shall ensure tight sealing with the belt/cloth and shall be of proven design. MOC of Vacuum Box Should be preferably UHMW-PE	MOC of the Vacuum Box shall be Polypropylene (PP) material, which is the proven practice for the similar type of application.	Bidder is to follow specification.	Noted. MOC of vacuum box shall be PP and sealing arrangement shall be UHMWPE. This is as per requirement	Tender specification requirement is clear. However, bidder can propose any material equivalent or superior to UHMW-PE during detail engineering.
34	Tech Specification BEBCL GDWS Part-4	III-B	508 of 528	For sealing of inspection doors labyrinth type arrangement to be provided.	For sealing of inspection doors of chute rubber gaskets shall be provided instead of labyrinth as it is static / stationary equipment. Please confirm.	The requirement mentioned in specification is minimum. However bidder may propose better solution which has to be proven during detailed engineering.	OK	-
35	Tech Specification BEBCL GDWS Part-4	III-C	509 of 528	Complete chute work in the region of flap gates shall be fabricated from 20 thk TISCRAI or equivalent.	Please confirm the requirement of flap gate & its location in layout.	Flap gate is not applicable.	OK	-
36	Tech Specification BEBCL GDWS Part-4	III-C	509 of 528	On e (1) no. chute blockage switch for each belt filter of proven type (subject to approval of the employer) shall be provided. Chute blockage switch shall trip the feeding conveyor in case of Chute blockage and protect the feeding conveyor equipment.	Since chute is around 2.4 m wide and 0.8 m width, chances of Cake blockage in the chute is less, as per the previous experience, it is not required for HBF Discharge chute. Hence supply is excluded from bidder scope.	Bidder to follow specification requirement.	This is not applicable to HBF chute.	Requirement is clear. Bidder to consider the requirement of chute blockage switch in ther scope.
37					Drip tray (civil work) design, Engineering and supply is in Client scope.	Noted. However, bidder to provide the input of the drip tray.	OK	-

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38	PE-DG-463-571-A001			Conveyor location	Please mark Centre line of conveyor w.r.t. to belt filter in GA drawing. BHEL to provide the conveyor details to finalise the profile of chute at conveyor feeding area (Skirt board inside width, length & height.)	Conveyor location is already indicated in the drawing attached with specification. However further details shall be provided during detailed engineering.	Noted.	-
39	PE-DG-463-571-A001			As per Layout drawing, Bucket Elevator,Lime feeding system, marked in vendors scope	These scope of engineering and Supply is Excluded from bidder scope, please confirm	Bidder's understanding is correct.	Noted.	-
40	PE-DG-463-571-A001 - GA & 0-FW-000-01393			Foot print of HBF building is 32m x 20m in plot plan whereas it is only 32 m x 17 m in GA drawing.	Client to confirm the correctness of HBF building footprint	Dimension of building shall be 32 m x 17 m as indicated in GA drawing of GDWB.	Noted.	-
41	PE-DG-463-571-A001			Conveyor location	TIPL battery limit ends at bottom of discharge chute. Belt conveyor selection & conveyor profile & detailing by others.	Bidder's understanding is correct.	Noted.	-
42		19.00.00		Colour coding	Vendor bought out equipments shall be as per vendor standards of colour coding and painting specs?.PI confirm	These details shall be finalised during detailed engineering	OK	-
43				The pumps shall be connected to its motors by flexible couplings. All couplings shall have suitable rigid steel coupling guards having closed ends and anchored to the base plate.	bidder generally suggest V- Belt driven Vaccuum Pumps,which has the option to vary the rpm by changing the pulley diameter if required. Client to confirm whether v-belt pump is ok?	Bidder to follow specification requirement.	OEM shall follow proven design practice	Vacuum pump drive arrangement shall be selected by bidder to meet system requirement as per proven practice and shall be approved during detailed engineering.
44				Vacuum System	Client to specify whether bidder can Choose either among rpm 1000 or 1500 rpm speed motor for vacuum pump?	RPM of motor may be selected by bidder as per system requirement.		-
45				The vacuum pump shall be of low speed liquid ring type of proven design.	Client to specify the low speed range for selecting the vaccuum pump	RPM of vacuum pump shall be as per system requirement & should be of proven design of the sub supplier approved during detailed engineering.	Noted.	-
46	Part 4 of 4 STANDARD TECHNICAL REQUIREMENTS	1.0.II.a.7		Impeller Tip speed to be kept in range of 13-22 m/sec.	provide the tip speed of Vacuum Pumps need to maintain.	Tip speed of Vacuum pump shall be in range of 13-22 m/sec	Noted.	-
47					Cake wash,Cloth wash and Filtrate pumps shall be direct driven pumps through spacer coupling or V-Belt connection as per pump Vendor standard.-.Please confirm	Bidder to follow specification requirement.	OK	-
48	TECH SPEC BRBCL GDWS PART-1	VI C		The slurry pumps shall be provided with motorized suction and discharge valves. In addition, flushing water lines with motorized valves shall be provided for each pump for automatic flushing of the pump after each shut down.	We understand as client per P&ID, instead of motorized puematic valves can be used. Please confirm.	Pneumatic valves are acceptable.	Noted	-
49					Piping software and version details to be provided	Specification requirement is clear. Further details shall be discussed during detailed engineering.	Noted.	-
50					Stress analysis /Critical line list to be provided	Specification requirement is clear. Further details shall be discussed during detailed engineering.	Noted.	-
51					Stress analysis software and version details	Specification requirement is clear. Further details shall be discussed during detailed engineering.	Noted.	-
52					Model review software and version details	Specification requirement is clear. Further details shall be discussed during detailed engineering.	Noted.	-
53					Interface details if any	Specification requirement is clear. Further details shall be discussed during detailed engineering.	Noted.	-
54				Area is in safe or hazardous zone	Kindly Confirm	Area is not classified in Hazardous zone.	Noted	-
55				Excluded 1. LCP & VFD Panel 2.Control Desk & Panels 3. Transformer 4. Furnitures 5. POwe cables, control cables and signal cable 6. LPBS	Please confirm the scope, listed as per TECH SPEC BRBCL GDWS PART 2 page number 41 of 150.	Specification requirement is clear. Bidder may further refer reply furnished at S.N. 24 above.	as per S.N.24 VFD and motor scope is clear, kindly clarify the scope of cables and cable tray. As of now all cables and cable trays are excluded from bidder scope of supply , however engineering will be provided for the cable interconnection in skid	Specification requirement Is clear. Bidder is to refer scope defined at page 166-167 of 528 of technical specification.
56					Provide the Approved Vendor List	Refer notes mentioned at Page 391 of 528.		-

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57				Particle Size Distribution	The Particle Size Distribution (PSD) provided by BHEL for Hydrocyclone feed is very fine resulting in very fine fraction particles feeding to HBF. This will impact on cake moisture and other process parameters.	Bidder to note the gypsum particle size distribution (PSD) to be used for designing Hydrocyclones and Vacuum Belt Filter shall be as per the PSD curve provided in the tender specification.		-
58				Particle Size Distribution	The percentage of fines at primary hydro cyclone feed are too high (50% <20 μ, 80% <30 μ). It is difficult to classify such high percentage of fines in hydro cyclone and may hinder the dewatering process in VBF. The maximum percentage of fines (<20 microns) shall be restricted to 15% in hydro cyclone feed. Please confirm.	All guarantees of Gypsum dewatering system performance shall be met by bidder as per the provided PSD only. The PSD curve provided in the technical specification is a standard curve and the Vacuum Belt Filter based on the same are running successfully.		-
59				Solid% in Gypsum Feed Slurry	The solids % in primary hydro cyclone slurry is comparatively dense (30%). Generally, it is in the range of 15-20%. Please confirm.	Bidder to follow specification.		-
60				Gypsum Purity	Chemical composition of solids in feed slurry at hydro cyclone inlet is not provided. The main concern is about the impurities (like inerts & fly ash) content in hydro cyclone feed since high impurities content (>10%) hinders the dewatering process in VBF. Hence the impurities content shall be restricted to max. 10%. Please provide feed slurry solids chemical composition.	Bidder to refer clause 1.2.4 Sub section C1, page 32 of 528, wherein it is mentioned that the Gypsum purity is in BHEL's scope. However, the moisture content (<10%) and chloride content (<100 ppm) in the output gypsum cake is to be guaranteed by the bidder at rated capacity. Feed slurry solids composition will be shared during detail engineering.		-
61						P&IDs for Bidder's scope of Engineering as per Clause 2.1.1.9 (ii) (d), (e) & (f) are enclosed as Annexure-C to this pre-bid clarifications.		-
62					In page 393 of 528 of the Tender Document, under the requirement of Mandatory Spares it is mentioned "Belt 2 sets for Vacuum Belt Filter". Please clarify which Belt you are referring to – the main carrier belt for the Vacuum Belt Filter or the v-belt for the main drive of the Vacuum Belt Filter.	The referred belt is 'wear belt or sealing belt' which are being used for sealing of vacuum box in vacuum belt filter.		Clarification issued by BHEL at col. No. 7 stands withdrawn. Further, Bidder to note that a set shall mean complete replacement for one equipment. All type of belts shall be covered accordingly.

THIRD ANGLE PROJECTION	No. REQ'D
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LINE SYMBOLS

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

PIPING VALVE SYMBOLS

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

INSTRUMENT VALVE SYMBOLS

SYMBOLS	NAME
	ACTUATED BY AIR
	ACTUATED BY MOTOR
	AIR CONTROL VALVE
	SOLENOID ACTUATOR
	SELF REGULATING VALVE
	SELF REGULATING VALVE

TRENCH SYMBOLS

SYMBOLS	NAME
	TO ABSORBER AREA DRAIN SUMP
	TO GYPSUM AREA DRAIN SUMP
	TO LIMESTONE AREA DRAIN SUMP

SYMBOLS FOR PIPING PARTS
& INSTRUMENT PARTS

SYMBOLS	NAME
	STEAM TRAP
	AIR TRAP
	Y-STRAINER
	T-STRAINER
	TEMPORARY STRAINER
	REDUCER
	EXPANSION JOINT
	DUCT EXPANSION JOINT
	FLEXIBLE HOSE
	SPOOL PIECE
	VENT
	HOSE CONNECTION
	BLIND FLANGE
	REDUCING FLANGE
	CAP (BW)
	CAP (SCR)
	TRENCH
	SIGHT GLASS
	SILENCER
	ORIFICE
	DIAPHRAGM
	MAGNETIC FLOW METER
	VORTEX FLOW METER
	PH METER
	FILTER
	MANHOLE
	INSPECTION HOLE
	PITOT TUBE
	SAMPLING POT
	SAMPLING NOZZLE
	RESTRICTION ORIFICE
	ROTAMETER

SYMBOLS FOR VALVE OPERATION

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

INSULATION SYMBOLS

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

DELIVERY LIMITS

SYMBOLS	NAME
	BETWEEN CLIENT AND CONTRACTOR
	BETWEEN SUB CONTRACTOR AND VENDOR

SYSTEM

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

FLUID NAME

FLUID SYMBOL	FLUID NAME	FLUID SYMBOL	FLUID NAME
AA	ANTIFOAM AGENT	WCS	COOLING WATER SUPPLY
AC	COMPRESSED AIR	WCR	COOLING WATER RETURN
AF	FLUIDIZER AIR		
AI	INSTRUMENT AIR	WP	PROCESS WATER
AO	OXIDATION AIR	WR	RAW WATER
AS	SEAL AIR	WW	WASTE WATER
DD	DUCT DRAIN	VG	VACUUM PUMP VENT
FS	FILTRATE SLURRY	VBC	BELT FILTER VENT GAS
GS	GYPSUM SLURRY	LD	LIMESTONE DEDUSTING
LS	LIMESTONE SLURRY	LOL	LUBE OIL (LOW PRESSURE)
		LOH	LUBE OIL (HIGH PRESSURE)

SERVICE CLASS

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

UNIT CODE

SYMBOLS	UNIT IDENTIFICATION
00	COMMON
10	UNIT-1 FGD SYSTEM AND AUXILIARIES
20	UNIT-2 FGD SYSTEM AND AUXILIARIES
30	UNIT-3 FGD SYSTEM AND AUXILIARIES
40	UNIT-4 FGD SYSTEM AND AUXILIARIES

EXPRESSION OF PIPING LINE

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

CUSTOMER NOS: G201,G202,G203,G204

CUSTOMER: NTPC LIMITED. PROJECT: NABINAGAR (4X250MW) FGD SYSTEM PACKAGE			
DESIGNED BY	NAME (H&L)	DATE	
DRAWN BY	NAME (H&L)	DATE	
CHECKED BY	NAME (H&L)	DATE	
APPROVED BY	NAME (H&L)	DATE	
MITSUBISHI HITACHI POWER SYSTEMS, LTD. AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION			
P & ID - LEGENDS AND NOTES			
SCALE: 1/8"			
NTPC DRG NO: 0270-109-PVM-F-020	SH 01 of 15		
REV. DRG NO 3-FW-000-01095	FILE NO B240-00001	REV. NO 03	

THIRD ANGLE
PROJECTION

No. REQ'D

INSTRUMENT ABBREVIATION

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

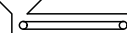
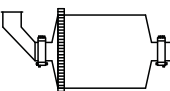
INSTRUMENT SYMBOLS

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

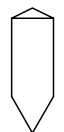
PNEUMATIC VALVE ACTUATOR

CODE NO.	ACTION
FLXXWA-D	DOUBLE SOLENOID NO LIMIT SWITCH
FLXXWA-DL	DOUBLE SOLENOID WITH LIMIT SWITCH
FLXXWA-S	SINGLE SOLENOID NO LIMIT SWITCH
FLXXWA-SL	SINGLE SOLENOID WITH LIMIT SWITCH

MACHINERY SYMBOLS

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

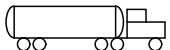
EQUIPMENT SYMBOLS

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

DRIVER SYMBOLS

SYMBOLS	NAME
	AIR MOTOR
	ELECTRIC MOTOR

OTHER SYMBOLS

SYMBOLS	NAME
	INSERT PIPE / LANCE
	CHUTE
	TRUCK

CUSTOMER NOS: G201,G202,G203,G204

CUSTOMER: NTPC LIMITED. PROJECT: NABINAGAR (4X250MW) FGD SYSTEM PACKAGE			
DESIGNED BY DRAWN BY CHECKED BY APPROVED BY	DATE	DATE	DATE
	12.08.2020	12.08.2020	12.08.2020
MITSUBISHI HITACHI POWER SYSTEMS LTD. AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION			
P & ID - LEGENDS AND NOTES			
NTPC DRG NO: 0270-109-PVM-F-020		SH 02 of 15	
SHEET NO 3-FW-000-01095	FILE NO B240-00002	REV NO 03	

THIRD ANGLE
PROJECTION

No. REQ'D

A3

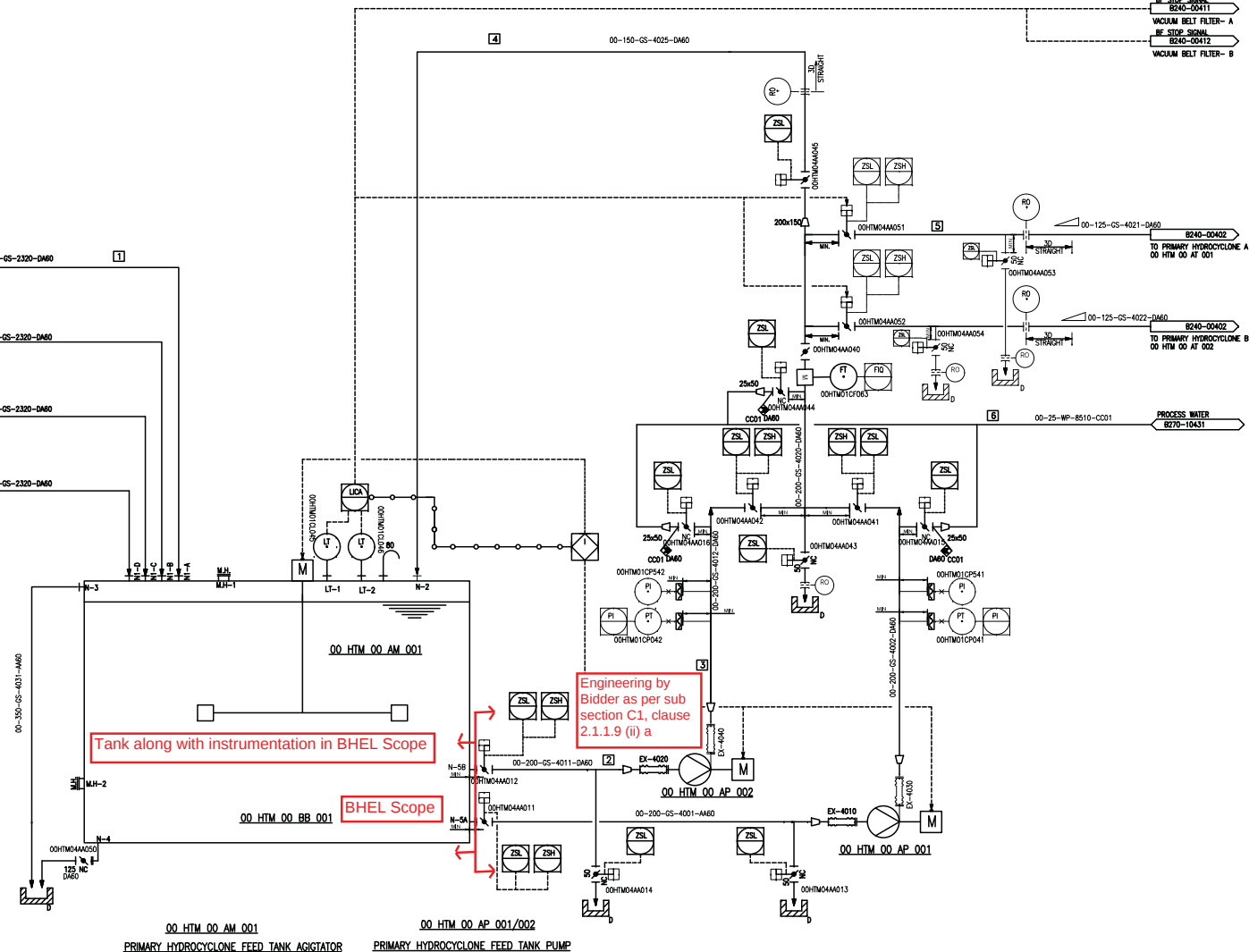
DRAWING No.

GYPSUM SLURRY
B240-00231
FROM GYPSUM BLEED PUMP A/B
20 HTM 00 AP 001/002

GYPSUM SLURRY
B240-00232
FROM GYPSUM BLEED PUMP A/B
20 HTM 00 AP 001/002

GYPSUM SLURRY
B240-00233
FROM GYPSUM BLEED PUMP A/B
30 HTM 00 AP 001/002

GYPSUM SLURRY
B240-00234
FROM GYPSUM BLEED PUMP A/B
40 HTM 00 AP 001/002



Tank along with instrumentation in BHEL Scope

BHEL Scope

Engineering by
Bidder as per sub
section C1, clause
2.1.1.9 (ii) a

S.NO	SECTION	FLOW m ³ /hr	TEMP (°C)	DENSITY kg/m ³
1	Gypsum bleed from Gypsum bleed pump	26.6	61.6	1212
2	Primary hydrocyclone feed pump suction	213	61.6	1212
3	Primary hydrocyclone feed pump discharge	213	61.6	1212
4	Recirculation flow	106.5	61.6	1212
5	primary hydrocyclone flow	106.5	61.6	1212
6	process water flow for flushing	3	45.0	990

00 HTM 00 BB 001
PRIMARY HYDROCYCLONE FEED TANK

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COUNTRY IN WHICH IT IS BEING USED.

CUSTOMER NOS: G201,G202,G203,G204

CUSTOMER: NTPC LIMITED.
PROJECT: NABINAGAR (4X250MW)
FGD SYSTEM PACKAGE

NAME (BHEL)	DATE
DESIGNED BY	12.09.2020
CHECKED BY	12.09.2020
APPROVED BY	12.09.2020

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

PAID-PRIMARY HYDROCYCLONE FEED TANK

NTPC DRG NO: 0270-108-PYM-F-020 SH 03 of 15
3-FW-000-01095 B240-00401 REV 03

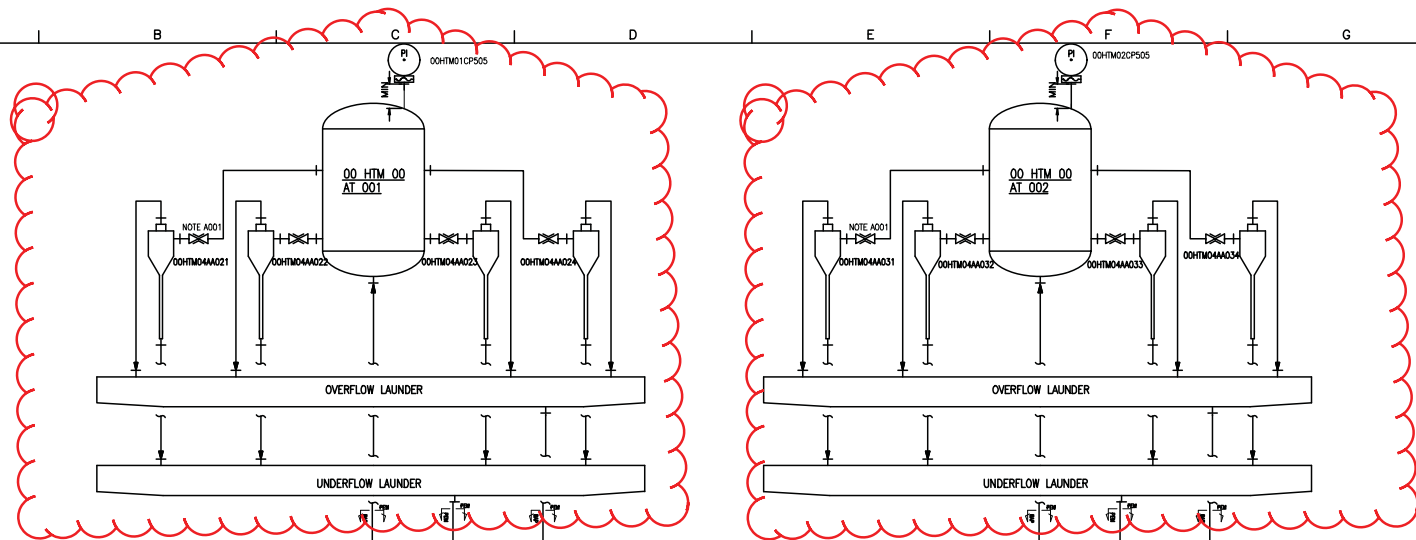
MITSUBISHI HITACHI POWER SYSTEMS, LTD.
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION

THIRD ANGLE
PROJECTION

No. REQ'D

In Bidder scope
including U/F & O/F
Launders

In Bidder scope
including U/F & O/F
Launders



Engg & supply by Bidder

Engg & supply by Bidder

Engg & supply by Bidder

Engg & supply by Bidder

Engg by Bidder as per
sub section C1, clause
2.1.1.9 (ii) a

Engg by Bidder as per
sub section C1, clause
2.1.1.9 (ii) b

Engg by Bidder as per
sub section C1, clause
2.1.1.9 (ii) a

Engg by Bidder as per
sub section C1, clause
2.1.1.9 (ii) b

Engg & Supply by Bidder
as per sub section C1,
clause 2.1.1.9 (ii) a

Engg & Supply by Bidder
as per sub section C1,
clause 2.1.1.9 (ii) a

B240-00401
FROM PRIMARY HYDROCYCLONE FEED TANK PUMP A/B
00 HTM 00 AP 001/002

00-250-GS-4051-D460
B240-00442
TO SECONDARY HYDROCYCLONE FEED TANK
00 HTM 04 BB 001

00-200-GS-4052-AA60
B240-00412
TO OYSPUM BELT FILTER B
00 HTM 01 AT 002

B240-00442
TO SECONDARY HYDROCYCLONE FEED TANK
00 HTM 04 BB 001

B240-00411
TO VACUUM BELT FILTER A
00 HTM 01 AT 001

B240-00401
FROM PRIMARY HYDROCYCLONE FEED TANK PUMP A/B
00 HTM 00 AP 001/002

00-125-GS-4022-D460

00-250-GS-4041-D460

00-200-GS-4042-AA60

00 HTM 00 AT 001/002
PRIMARY HYDROCYCLONE A/B

NOTE:A001
NUMBER OF VALVES & HYDROCYCLONES SHALL
BE FINALIZED AFTER VENDOR'S INFORMATION
DETAILS ARE REQUIRED FROM PEM VENDOR

S NO	SECTION	FLOW m ³ /hr	TEMP (°C)	DENSITY kg/m ³
1	Primary hydrocyclone feed flow	106.5	61.6	1212
2	Primary hydrocyclone underflow	44.9	61.6	1354
3	Primary hydrocyclone overflow	61.5	61.6	1108

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COUNTRY IN WHICH IT IS BEING USED.

CUSTOMER NOS: G201,G202,G203,G204			
CUSTOMER: NTPC LIMITED.			
PROJECT: NABINAGAR (4X250MW)			
FGD SYSTEM PACKAGE			
DESIGNER	NAME (BH&L)	DATE	
BRUNNEN HEAVY ELECTRICALS LIMITED,	KARLASH	12.08.2020	
UNITED STATES AMERICAN PLANT,	MAHDI KT	12.08.2020	
INDUSTRIAL ENG.	SAFFO IN KEROFF	12.08.2020	
MITSUBISHI HITACHI POWER SYSTEMS, LTD.			
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION			
P&ID-PRIMARY HYDROCYCLONE			
SCALE: 1/10			
NTPC DRG NO: 0270-109-PYM-F-020	SH 04 of 15		
ENCL. DRG NO 3-FW-000-01095	FILE NO B240-00402	REV NO 03	



S NO	SECTION	FLOW m ³ /hr	TEMP(°C)	DENSITY kg/m ³
1	Gypsum slurry line to belt filter	44.9	61.6	1354
2	Gypsum outlet from belt filter to gypsum handling system	33.8 TPH	56.0	900
3	Filtrate water from vacuum receiver to filtrate water tank	41.5	61.6	1002
4	Vacuum pump flow	LATER	LATER	LATER
5	Seal water to vacuum pump	22.4	45.0	990
6	Seal water return	22.4	45.0	990

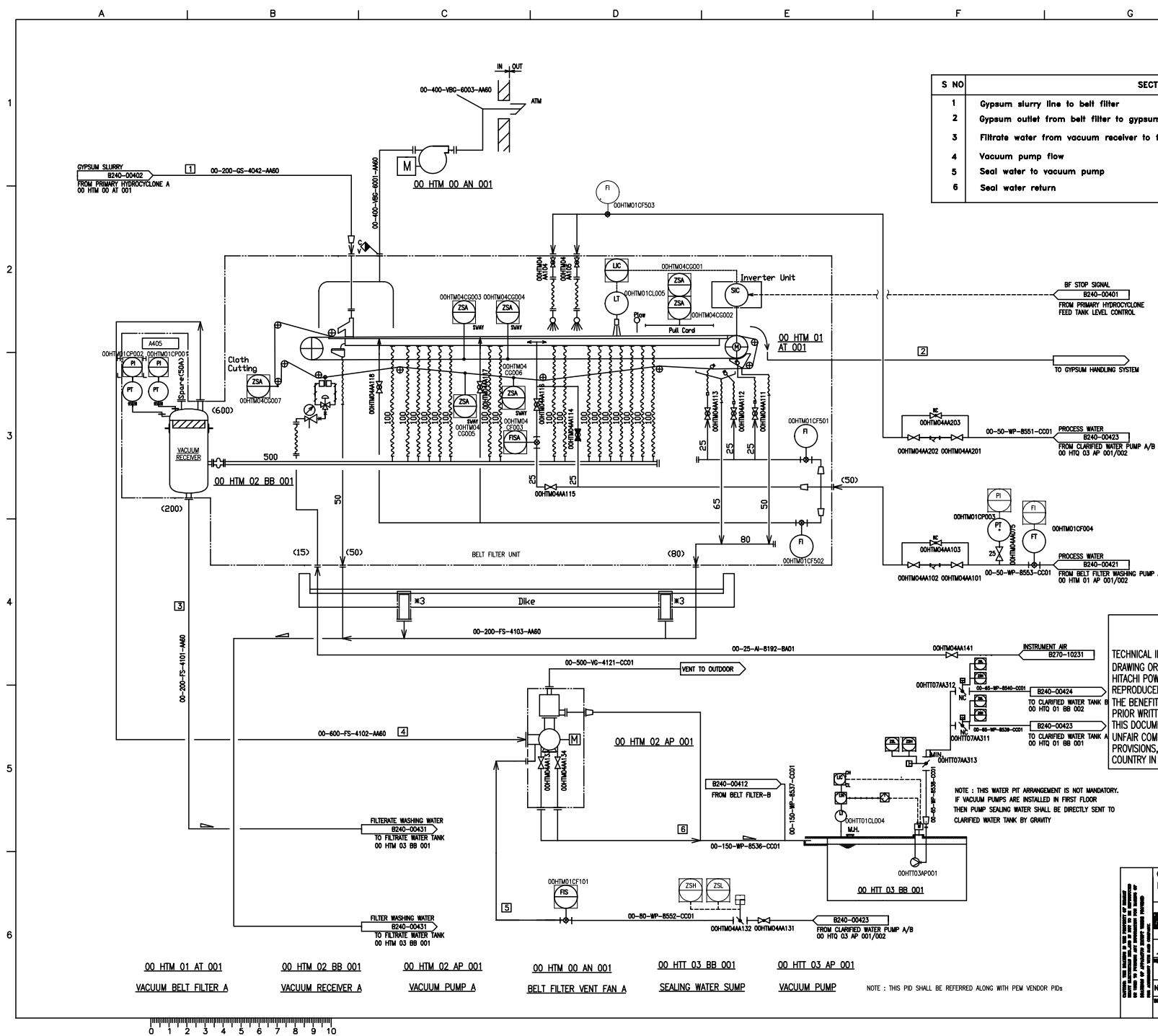
Complete System in Bidder scope EXCEPT:

1. Piping with accessories from Filtrate Extraction Pump to Filtrate Water Tank. Refer Scheme No. PE-FEP-00.
2. Associated drain of vacuum belt filters (drip tray) to filtrate tanks. Refer sub section C1, clause 2.1.1.9 (ii) f of the Specification

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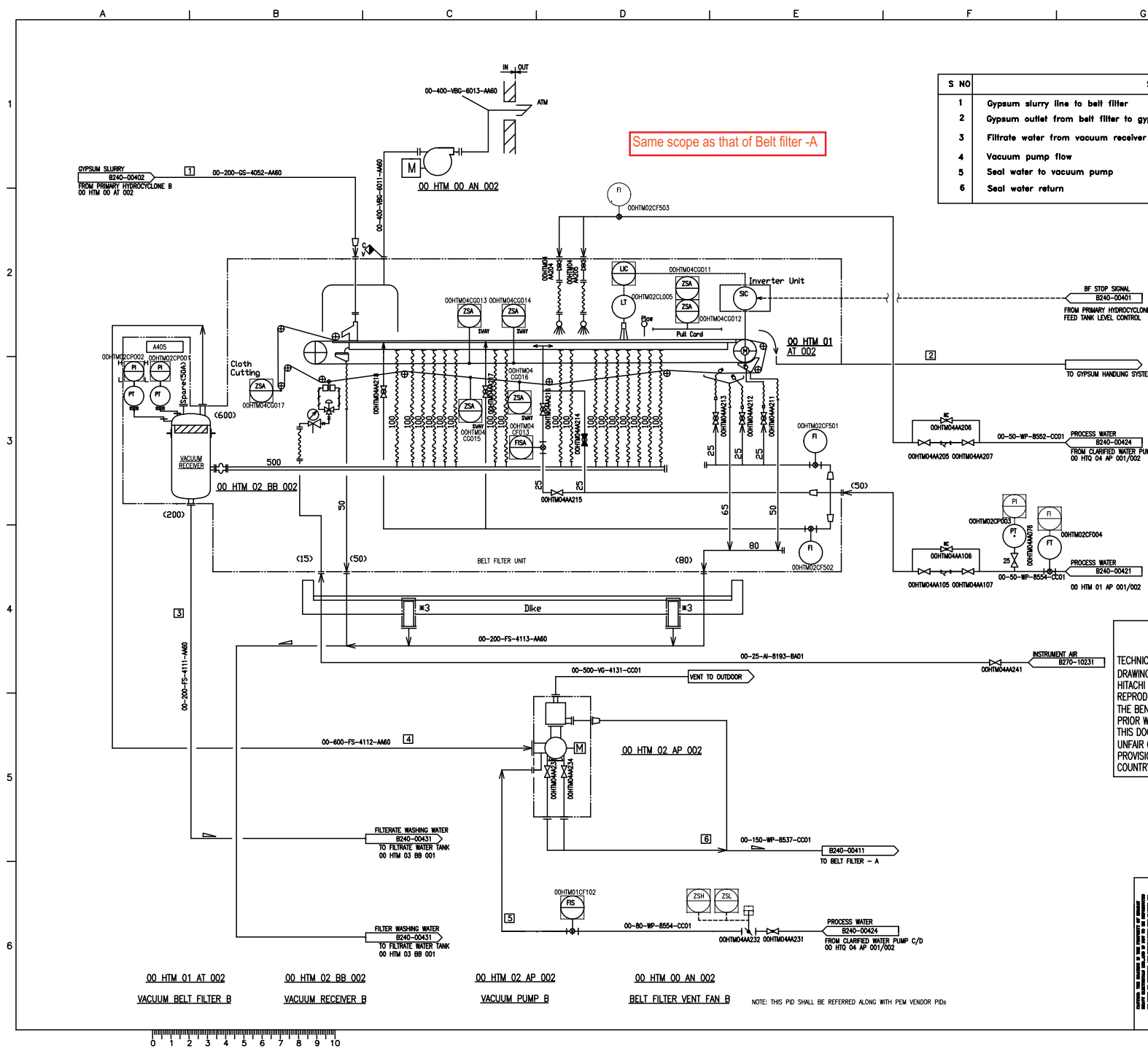
CUSTOMER NOS: G201,G202,G203,G204			
CUSTOMER: NTPC LIMITED.			
PROJECT: NABINAGAR (4X250MW)			
FGS SYSTEM PACKAGE			
DESIGNED BY	NAME (BHEL)	DATE	
000000	KARLASH	12.05.2020	
000000	MAHDI KT	12.05.2020	
000000	MAHDI KT	12.05.2020	
MITSUBISHI HITACHI POWER SYSTEMS, LTD.			
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION			
P&ID-BELT FILTER-A			
SCALE: 1:100			
NTPC DRG NO: 0270-109-PVM-F-020		SH 05 OF 15	
BHEL DRG NO	FILE NO	REV NO	
3-FW-000-01095	B240-00411	03	

NOTE: THIS PID SHALL BE REFERRED ALONG WITH PEM VENDOR PID

THIRD ANGLE	No. REQ'D

S NO	SECTION	FLOW m ³ /hr	TEMP(°C)	DENSITY kg/m ³
1	Gypsum slurry line to belt filter	44.9	61.6	1354
2	Gypsum outlet from belt filter to gypsum handling system	33.8TPH	56.0	900
3	Filtrate water from vacuum receiver to filtrate water tank	41.5	61.6	1002
4	Vacuum pump flow	LATER	LATER	LATER
5	Seal water to vacuum pump	22.4	45.0	990
6	Seal water return	22.4	45.0	990

Same scope as that of Belt filter -A



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CUSTOMER NOS: G201,G202,G203,G204			
CUSTOMER: NTPC LIMITED.			
PROJECT: NABINAGAR (4X250MW)			
FGD SYSTEM PACKAGE			
DATE	NAME (SHE)	DATE	
12.09.2020	KABIRASH	12.09.2020	
12.09.2020	MAHESH KT	12.09.2020	
12.09.2020	MAHESH KT	12.09.2020	
MITSUBISHI HITACHI POWER SYSTEMS, LTD.			
AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION			
P & ID - BELT FILTER - B			
SCALE: 1/10			
NTPC DRG NO: 0270-109-PYM-F-020		SH 06 OF 15	
REV NO	REV NO	REV NO	REV NO
3-FW-000-01095	B240-00412	03	

NOTE: THIS PID SHALL BE REFERRED ALONG WITH PEN VENDOR PIDS

00 HTM 01 AT 002
VACUUM BELT FILTER B

00 HTM 02 BB 002
VACUUM RECEIVER B

00 HTM 02 AP 002
VACUUM PUMP B

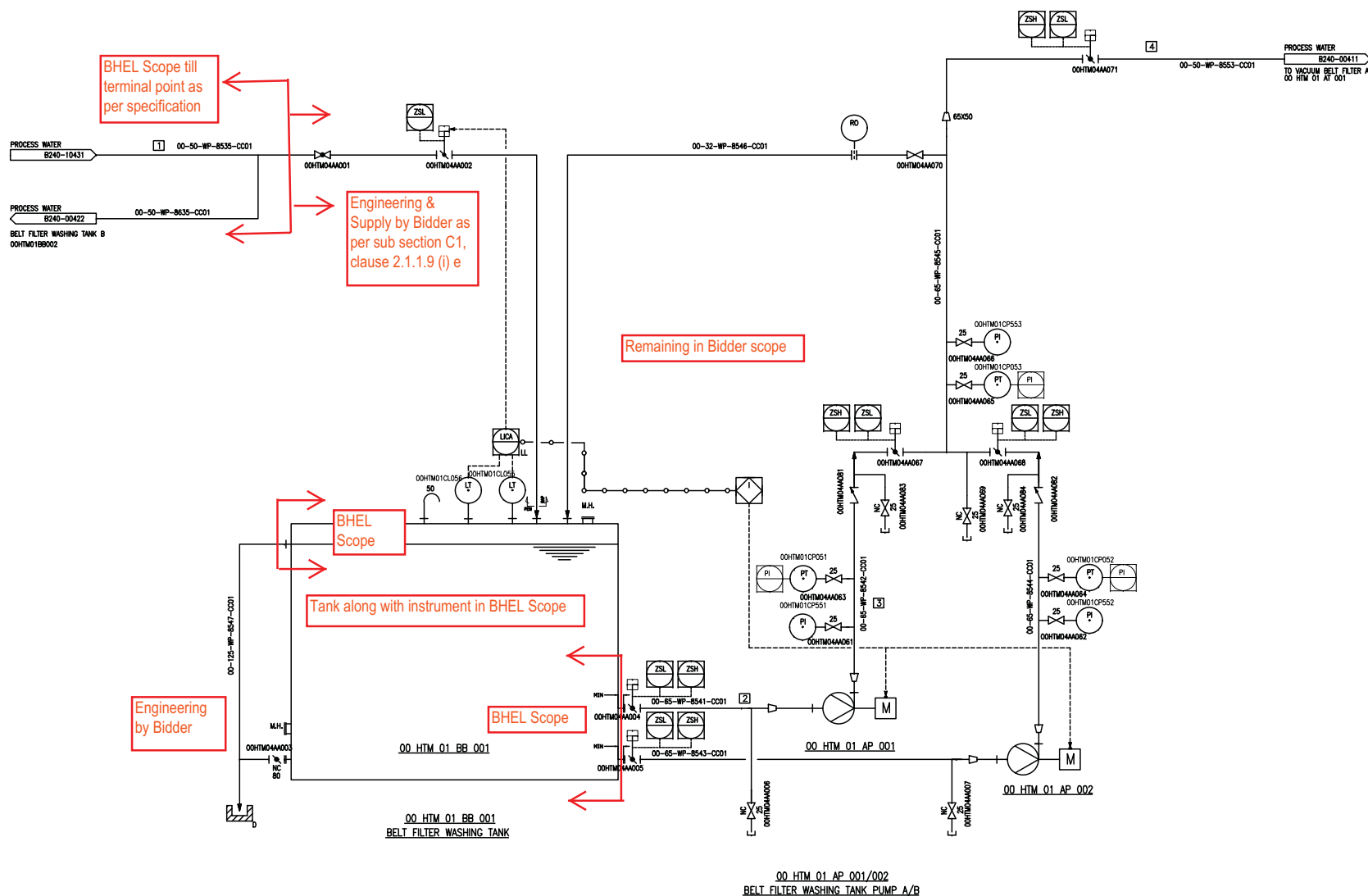
00 HTM 00 AN 002
BELT FILTER VENT FAN B

THIRD ANGLE
PROJECTION

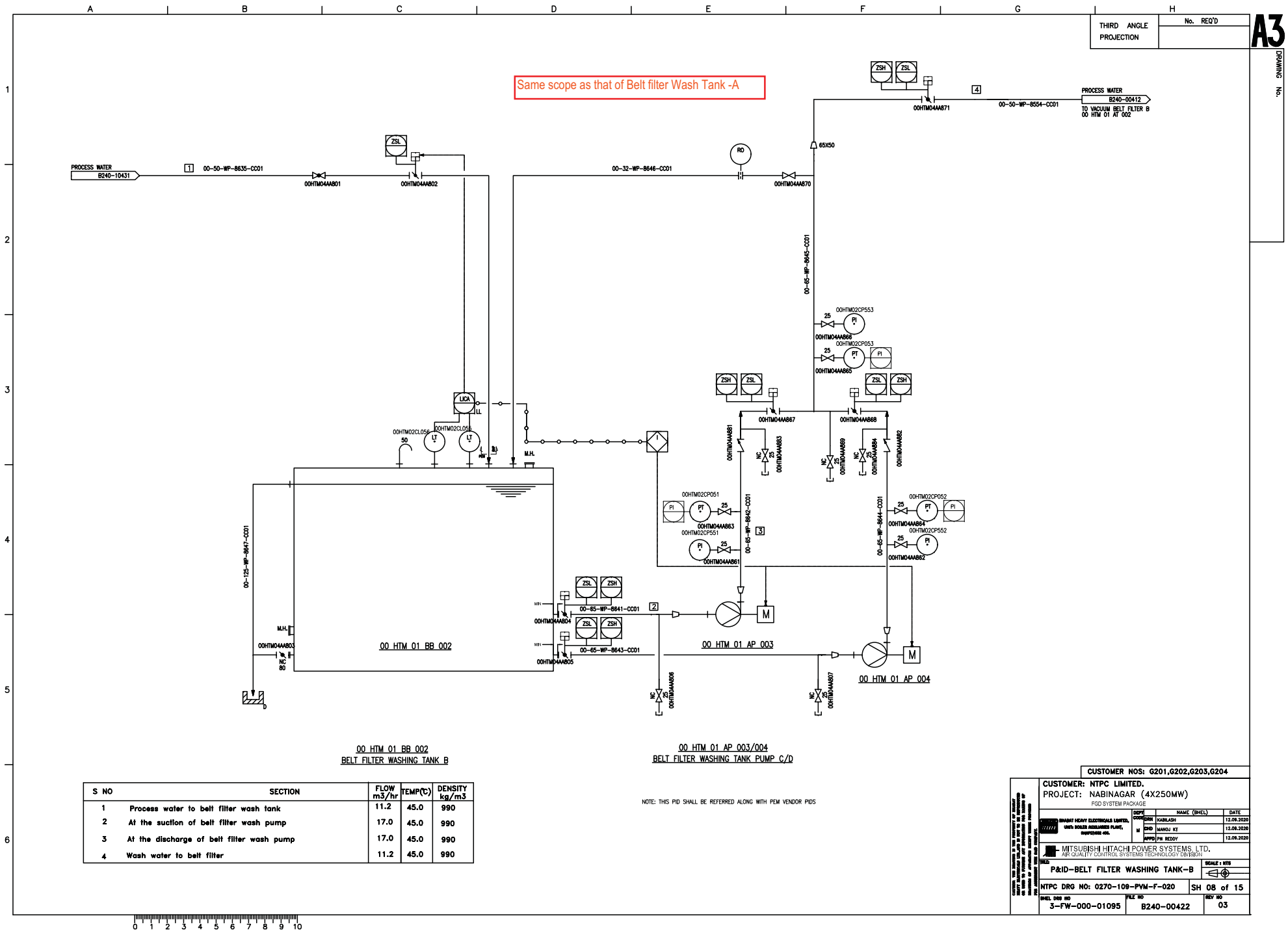
No. REQ'D

A3

DRAWING No.



CUSTOMER NOS: G201,G202,G203,G204				
CUSTOMER: NTPC LIMITED. PROJECT: NABINAGAR (4X250MW) FGD SYSTEM PACKAGE				
SHEET NO. 07 OF 15 DATE: 12.09.2020 BY: [Signature] CHECKED: [Signature] APPROVED: [Signature]	DESIGNED BY	NAME (BHEL)	DATE	
	KABIRASH		12.09.2020	
	SCALE: 1:100			
MITSUBISHI HITACHI POWER SYSTEMS, LTD. AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION				
P&ID-BELT FILTER WASHING TANK-A				
NTPC DRG NO: 0270-109-PVM-F-020 SH 07 of 15				
BHEL DRG NO: 3-FW-000-01095		FILE NO: B240-00421		REV NO: 03





NOTE : THIS PID SHALL BE REFERRED ALONG WITH PEM VENDOR PIDS

CUSTOMER NOS: G201,G202,G203,G204			
CUSTOMER: NTPC LIMITED.			
PROJECT: NABINGBAR (4X250MW) FGD SYSTEM PACKAGE			
		SHIP	DATE
 MITSUBISHI HITACHI POWER SYSTEMS LTD. 1000, KAWASAKI, CHUOH-KU, TOKYO 100, JAPAN		NO	12.29.2010
		NO	12.29.2010
		NO	12.29.2010
MITSUBISHI HITACHI POWER SYSTEMS LTD. AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIV.-A			
(SEAL) P&ID-CLARIFIED WATER TANK-A			
NTPC DRG NO: G270-109-PYM-F-020			SH 09 OF 15
(SEAL) DRG NO 3-FW-000-01095	FILE NO B240-00423	REV NO 03	

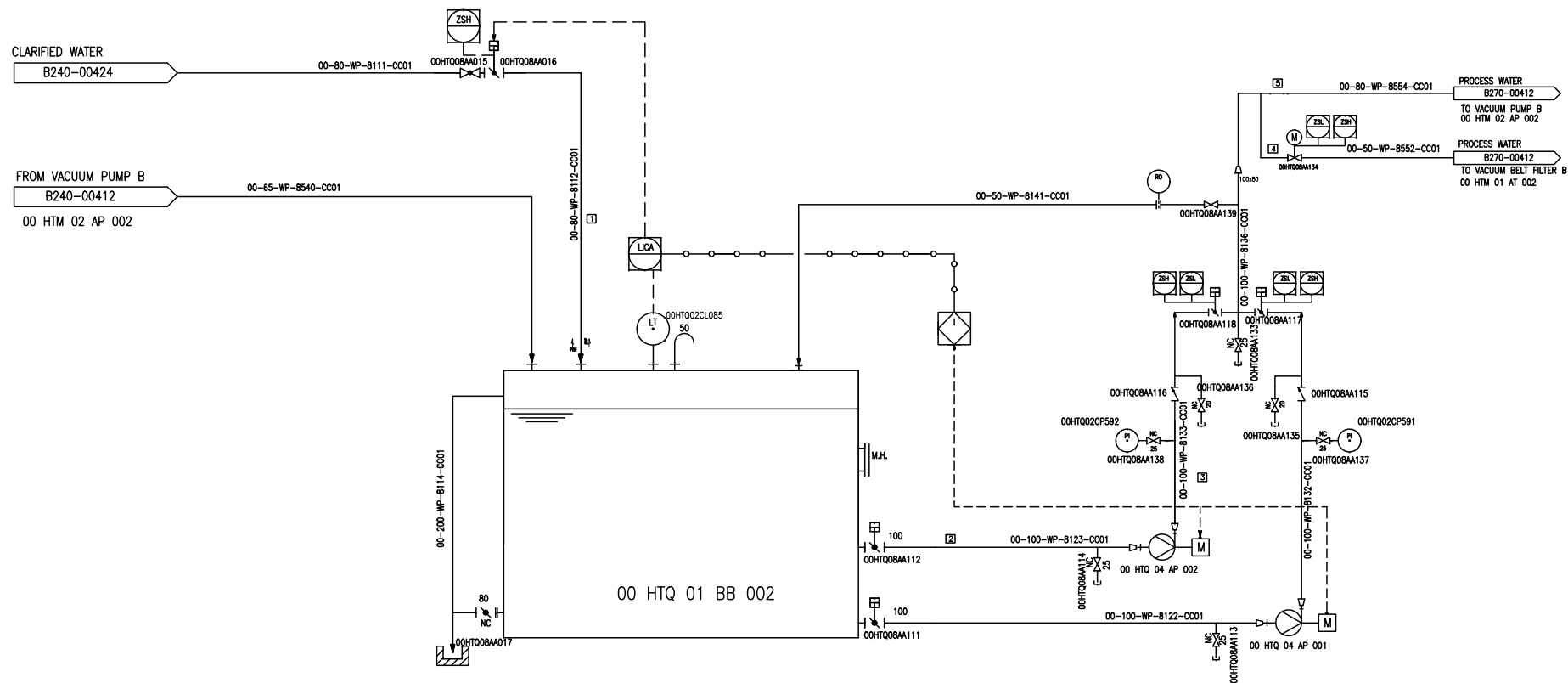
THIRD ANGLE
PROJECTION

No. REQ'D

A3

DRAWING No.

Same scope as that of Belt filter Wash Tank -A

CLARIFIED WATER TANK B
00 HTQ 01 BB 002CLARIFIED WATER PUMP C/D
00 HTQ 04 AP 001/002

S NO	SECTION	FLOW m ³ /hr	TEMP(°C)	DENSITY kg/m ³
1	Clarified water to clarified wash tank	15.0	45.0	990
2	At the suction of clarified wash pump	45.0	45.0	990
3	At the discharge of clarified wash pump	45.0	45.0	990
4	Clarified Wash water to belt filter	15.0	45.0	990
5	Vacuum pump seal water	22.4	45.0	990

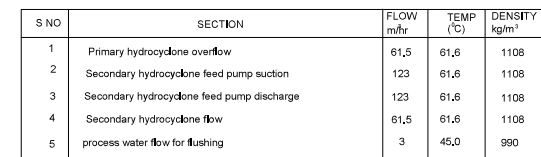
NOTE THIS PID SHALL BE REFERRED ALONG WITH PEM VENDOR PIDS

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CUSTOMER NOS: 0201,0202,0203,0204			
CUSTOMER: NTPC LIMITED, PROJECT: NABINAGAR (4X250MW) FGD SYSTEM PACKAGE			
REVISION	NO.	DESCRIPTION	DATE
	1	ISSUED FOR CONSTRUCTION	12.08.2020
REVISION	2	ISSUED FOR CONSTRUCTION	12.08.2020
	3	ISSUED FOR CONSTRUCTION	12.08.2020
MITSUBISHI HITACHI POWER SYSTEMS, LTD. AIR QUALITY CONTROL SYSTEMS TECHNOLOGY DIVISION			
P&ID-CLARIFIED WATER TANK-B			
NTPC DRG NO: 0270-109-PW-F-020		SH 10 of 15	
3-FW-000-01095		B240-00424	
		03	

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



CUSTOMER NOS: G201, G202, G203, G204

CUSTOMER: NTPC LIMITED.

PROJECT: NABNAGRA (4X250MW)

FOR SYSTEM PACKAGE

MITSUBISHI HEAVY ELECTRICAL SYSTEMS, LTD.
1-1-1, HAMA-KU, YOKOHAMA, JAPAN
TEL: 045-224-1111
FAX: 045-224-1112

ORDER NO.	DATE	NAME (S/RELS)	DATE
0000000000	01/01/00	KANBARI	11/26/00
0000000000	01/01/00	KANBARI KT	11/26/00
0000000000	01/01/00	KANBARI	11/26/00

MITSUBISHI HEAVY ELECTRICAL SYSTEMS, LTD.

1-1-1, HAMA-KU, YOKOHAMA, JAPAN

TEL: 045-224-1111

FAX: 045-224-1112

1/21

PAIR-SELECTION HYDROCYCLO-FLUID FEED TANK

SCALE: NTS

NTPC DRG NO: 027B-109/PMP-F-020

SH 11 of 15

SHEET DRG NO

3-FW-004-01095

SHEET DRG NO

B240-00441

REV NO

03



NOTE:A001
NUMBER OF VALVES & HYDROCYCLONES SHALL
BE FINALIZED AFTER VENDOR'S INFORMATION
DETAILS ARE REQUIRED FROM PEM VENDOR

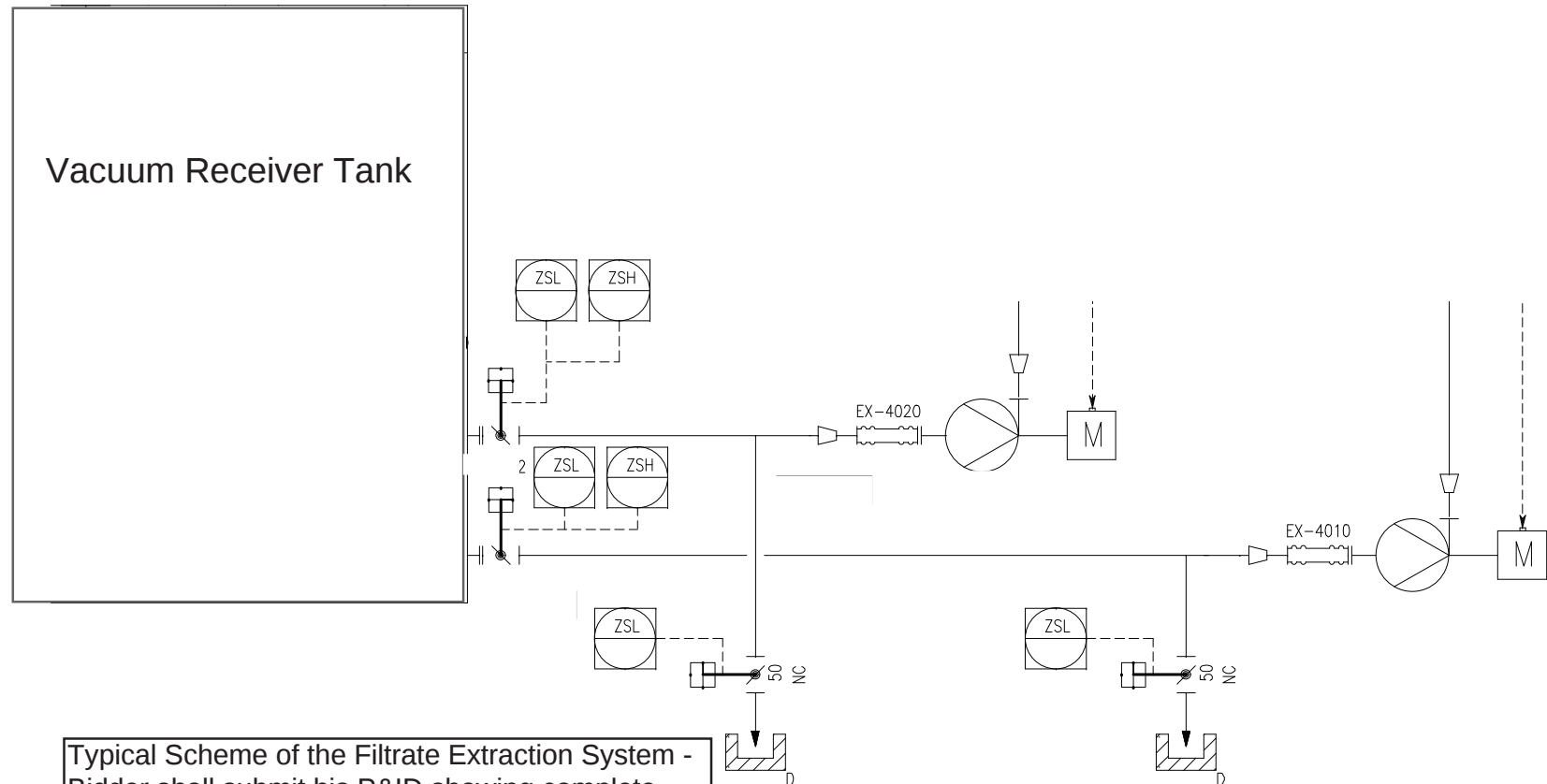
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COUNTRY IN WHICH IT IS BEING USED.

CUSTOMER NOS: G201, G202, G203, G204 CUSTOMER: NTPC LIMITED, PROJECT: NABINAGAR (4X250MW) FSD SYSTEM PACKAGE		NAME (SHELL)		DATE
		CODE	DATE	DATE
 NTPC LIMITED NABINAGAR HYDRO-ELECTRIC PLANT PART - 1	M	24	24/04/2011	12.06.2011
	M	24	24/04/2011	12.06.2011
	M	24	24/04/2011	12.06.2011
MITSUBISHI HITACHI POWER SYSTEMS, LTD. OR QUALITY CONTROL SYSTEMS TECHNOLOGY ENGINEER				
P/ID-SECONDARY HYDROCYCLONE NTPC DRG NO: 0274-1056-PJM-F-020				
SH 12 of 15				
SHEET ORIGIN NO		SHEET NO		SHEET NO
3-FW-0000-01095		B240-00445		03

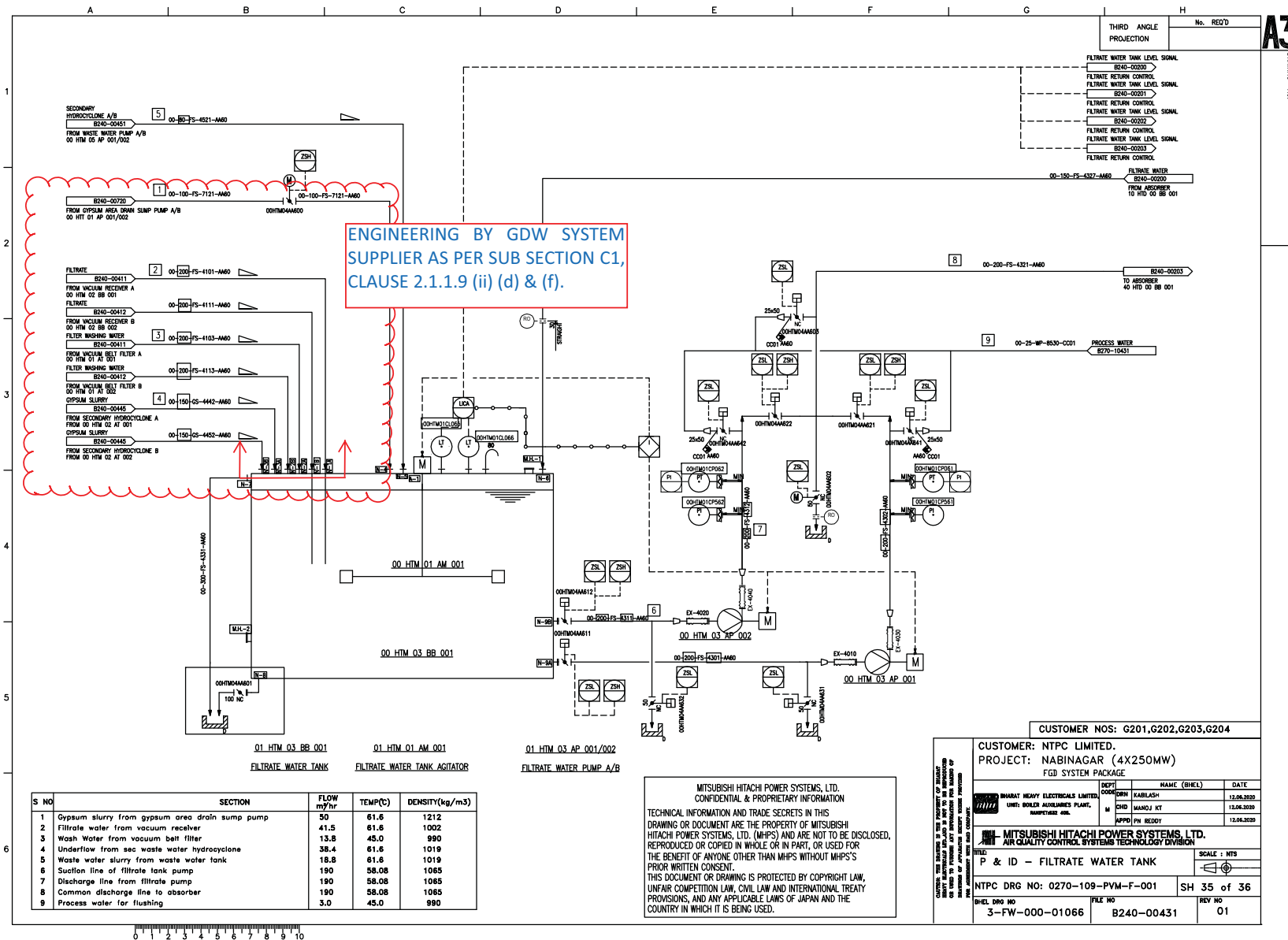
Bidder scope after the Pump Discharge is limited to the Engineering of the Piping up to the Filtrate Water Tank as per Clause 2.1.1.9 (ii) f of Sub-section C1, Section-I of this specification.



Typical Scheme of the Filtrate Extraction System - Bidder shall submit his P&ID showing complete arrangement for BHEL/Customer approval. Piping and Valves shall be rubber lined as per the details provided elsewhere in the specification.

Scheme No.: PE-FEP-00

ANNEXURE -C



ANNEXURE -C

THIRD ANGLE
PROJECTION

No. REQ'D

A3

DRAWING No.

