

5 X 800MW YADADRI TPS

TECHNICAL SPECIFICATION
FOR
FUEL OIL UNLOADING & STORAGE SYSTEM

ANNEXURE - D

(MDL WITH SUBMISSION SCHEDULE)



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA

ANNEXURE-D					
DRAWING / DOC SUBMISSION SCHEDULE DURING DEAIL ENGINEERING					
PROJECT : 5 X 800 MW YADADRI TPS PROJECT					
PACKAGE : FUEL OIL UNLOADING & STORAGE SYSTEM					
S.N	DRAWING NO.	DRAWING TITLE	Sch submission week from LOI	CAT	Resubmission after incorporating comments
1	PE-V0-417-166-A003	DESIGN CALCULATION OF ROOF STRUCTURE OF TANKS WITH STAAD CALCULATIONFOR FOHS	6	A-CUST	WITHIN 1 WEEK
2	PE-V0-417-166-A004	SIZING CALCULATION OF UTILITIES OF FOHS (STEAM CONSUMPTION, PIPE SIZING, SIZING CALC FOR PRS , STEAM TRAP, FLOOR COIL HEATER AND INSULATION & CLADDING)	4	I-CUST	WITHIN 1 WEEK
3	PE-V0-417-166-A005	DATASHEET & GAD OF SCREW PUMPS & MOTORS FOR FOHS	12	I-CUST	WITHIN 1 WEEK
4	PE-V0-417-166-A006	NPSH AND PUMP HEAD CALULATION OF PUMPS FOR FOHS	6	A-CUST	WITHIN 1 WEEK
5	PE-V0-417-166-A007	DESIGN CALCULATION AND GAD OF SUCTION HEATER FOR FOHS	10	I-CUST	WITHIN 1 WEEK
6	PE-V0-417-166-A009	STRESS ANALYSIS OF LINES FOR FOHS	10	I-CUST	WITHIN 1 WEEK
7	PE-V0-417-166-A010	DESIGN CALCULATION AND GAD OF OWS FOR FOHS	8	I-CUST	WITHIN 1 WEEK
8	PE-V0-417-166-A012	PAINTING SCHEDULE OF FOHS	4	A-CUST	WITHIN 1 WEEK
9	PE-V0-417-166-A013	DS AND GAD OF PRS, TCV, TRAP, INSULATION AND CLADDING FOR FOHS	14	I-CUST	WITHIN 1 WEEK
10	PE-V0-417-166-A014	DATASHEET OF FOHS INSTRUMENTS	10	I-CUST	WITHIN 1 WEEK
11	PE-V0-417-166-A016	PIPING LAYOUT IN TANK FARM AREA OF FOHS	10	A-CUST	WITHIN 1 WEEK
12	PE-V0-417-166-A017	PIPING LAYOUT IN UNLOADING PUMP HOUSE OF FOHS	10	A-CUST	WITHIN 1 WEEK
13	PE-V0-417-166-A018	GAD OF FOHS (COMPOSITE LAYOUT) FOR CCOE APPROVAL	12	A-CUST	WITHIN 1 WEEK
14	PE-V0-417-166-A019	SUGGESTIVE ELECTRICAL LAYOUT DRAWING OF FOHS	10	I-CUST	WITHIN 1 WEEK
15	PE-V0-417-166-A023	FABRICATION DRAWING OF FOHS TANKS INCLUDING ACCESSORIES	18	I-CUST	WITHIN 1 WEEK
16	PE-V0-417-166-A024	DESIGN CALCULATION & GAD OF MISCELLANEOUS TANKS FOR FOHS	10	I-CUST	WITHIN 1 WEEK
17	PE-V0-417-166-A025	CIVIL INPUT DRAWING IN TANK FARM AREA FOR FOHS	16	I-CUST	WITHIN 1 WEEK
18	PE-V0-417-166-A026	QAP OF SCREW PUMP & MOTORS FOR FOHS	16	I-CUST	WITHIN 1 WEEK
19	PE-V0-417-166-A027	QAP OF PRS, TCV, TRAP, INSULATION AND CLADDING FOR FOHS	16	I-CUST	WITHIN 1 WEEK
20	PE-V0-417-166-A028	QAP OF SUMP PUMP & MOTORS FOR FOHS	12	I-CUST	WITHIN 1 WEEK
21	PE-V0-417-166-A029	QAP OF FOHS INSTRUMENTS	16	I-CUST	WITHIN 1 WEEK
22	PE-V0-417-166-A030	QAP OF CONTROL PANEL	16	I-CUST	WITHIN 1 WEEK
23	PE-V0-417-166-A031	EQUIPMENT SCHEDULES OF FOHS	20	I-CUST	WITHIN 1 WEEK
24	PE-V0-417-166-A032	CABLE SCHEDULE OF FOHS	18	I-G-P	WITHIN 1 WEEK
25	PE-V0-417-166-A033	ELECTRICAL LOAD DATA OF FOHS	16	I-G-P	WITHIN 1 WEEK
26	PE-V0-417-166-A034	ISOMETRIC DRAWING OF FOHS WITH COMPLETE BOQ	10	I-G-P	WITHIN 1 WEEK
27	PE-V0-417-166-A035	SUB-VENDOR LIST WITH INSPECTION CATEGORIZATION LIST FOR FOHS	4	A-CUST	WITHIN 1 WEEK
28	PE-V0-417-166-A036	INSTRUMENT INSTALLATION DIAGRAM OF FOHS	20	I-CUST	WITHIN 1 WEEK
29	PE-V0-417-166-A039	INSULATION I& CLADDING NSTALLATION PROCEDURE FOR FOHS EQUIPMENTS	20	I-G-P	WITHIN 1 WEEK
30	PE-V0-417-166-A040	STEAM TRACING INSTALLATION PROCEDURE	20	I-G-P	WITHIN 1 WEEK
31	PE-V0-417-166-A042	COMMISSIONING PROCEDURE OF FOHS	20	I-G-P	WITHIN 1 WEEK
32	PE-V0-417-166-A044	O&M MANUAL OF FOHS	20	I-CUST	WITHIN 1 WEEK
33	PE-V0-417-166-A045	DEMONSTRATION TEST PROCEDURE OF FOHS	16	A-CUST	WITHIN 1 WEEK

34	PE-V0-417-166-A041	ANALOG & BINARY I/O LIST, BOM, HMI PICTURES/ PLANT SCHEMATICS FOR FOHS (DCS BASED)	16	*I-G-P	WITHIN 1 WEEK
35	PE-V0-417-166-A046	SCHEME/ LOGIC DIAGRAM FOR FOHS (DCS BASED)	16	I-G-P	WITHIN 1 WEEK
36	PE-V0-417-166-A047	PROCESS MANUSCRIPT FOR IMPLEMENTATION IN DCS FOR FOHS	16	I-G-P	WITHIN 1 WEEK
37	PE-V0-417-166-A048	DATASHEET & GAD OF SUMP PUMPS & MOTORS IN FOHS	14	I-CUST	WITHIN 1 WEEK
38	PE-V0-417-166-A049	DS AND GAD OF VALVES,HOSE AND STRAINER	10	I-CUST	WITHIN 1 WEEK
39	PE-V0-417-166-A050	DS AND GAD PIPES, PLATES AND FITTINGS ETC FOR FOHS	8	I-CUST	WITHIN 1 WEEK
40	PE-V0-417-166-A051	PIPING LAYOUT IN UNLOADING AREA OF FOHS	10	A-CUST	WITHIN 1 WEEK
41	PE-V0-417-166-A052	PIPING LAYOUT IN YARD AREA OF FOHS	10	A-CUST	WITHIN 1 WEEK
42	PE-V0-417-166-A053	CIVIL INPUT DRAWING IN UNLOADING PUMP HOUSE OF FOHS	16	I-G-P	WITHIN 1 WEEK
43	PE-V0-417-166-A054	CIVIL INPUT DRAWING IN UNLOADING AREA OF FOHS	16	I-G-P	WITHIN 1 WEEK
44	PE-V0-417-166-A055	CIVIL INPUT DRAWING IN YARD AREA OF FOHS	16	I-G-P	WITHIN 1 WEEK
45	PE-V0-417-166-A056	QAP OF VALVES, HOSE AND STRAINER FOR FOHS	12	I-CUST	WITHIN 1 WEEK
46	PE-V0-417-166-A057	QAP OF PIPES, PLATES AND FITTINGS ETC FOR FOHS	8	I-CUST	WITHIN 1 WEEK
47	PE-V0-417-166-A058	ERECTION PROCEDURE OF ALL EQUIPMENT IN FOHS SCOPE	20	I-CUST	WITHIN 1 WEEK

NOTES

1. Finally approved documents / drawings to be provided in editable format(MS office/Autocad format) for onward submission to end customer.
2. Bidder to note that during detailed engineering, drwg/doc will be submitted through web based document management system in addition to hard copies to be submitted as per drawing/document distribution schedule. Procedure for the same shall be informed after award of contract.
3. *I-G-P stands for ' internal generation purpose'.

SIGNATURE:

NAME:

DESIGNATION:

COMPANY:

DATE:

COMPANY SEAL

5 X 800MW YADADRI TPS

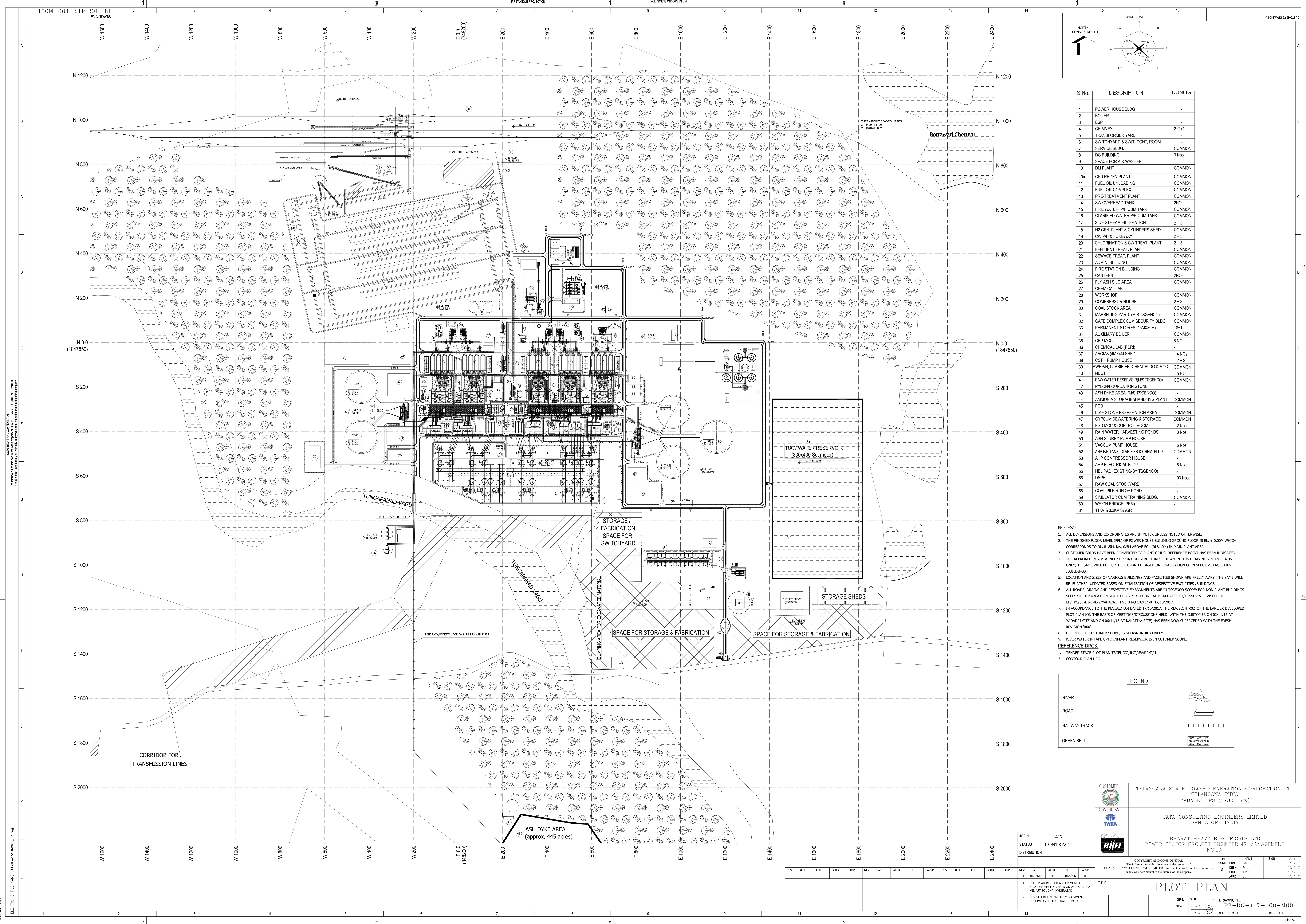
TECHNICAL SPECIFICATION
FOR
FUEL OIL UNLOADING & STORAGE SYSTEM

ANNEXURE - E

(INPUT DRAWINGS & DOCUMENTS OF TENDER)



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA



S.NO.	DESCRIPTION	CONFIG.
1	POWER HOUSE BLDG	-
2	BOILER	-
3	ESP	-
4	CHIMNEY	2+2+1
5	TRANSFORMER YARD	-
6	SWITCHYARD & SWIT. CONT. ROOM	COMMON
7	SERVICE BLDG.	COMMON
8	DG BUILDING	3 Nos
9	SPACE FOR AIR WASHER	COMMON
10	DM PLANT	COMMON
10a	CPU REGEN PLANT	COMMON
11	FUEL OIL UNLOADING	COMMON
12	FUEL OIL COMPLEX	COMMON
13	PRE-TREATMENT PLANT	COMMON
14	SW OVERHEAD TANK	2Nos
15	FIRE WATER PH CUM TANK	COMMON
16	CLARIFIED WATER PH CUM TANK	COMMON
17	SIDE STREAM FILTRATION	2 + 3
18	H2 GEN. PLANT & CYLINDERS SHED	COMMON
19	CW PH & FOREWAY	2 + 3
20	CHLORINATION & CW TREAT. PLANT	2 + 3
21	EFFLUENT TREAT. PLANT	COMMON
22	SEWAGE TREAT. PLANT	COMMON
23	ADMIN. BUILDING	COMMON
24	FIRE STATION BUILDING	COMMON
25	CANTEEN	2Nos
26	FLY ASH SILO AREA	COMMON
27	CHEMICAL LAB	-
28	WORKSHOP	COMMON
29	COMPRESSOR HOUSE	2 + 3
30	COAL STOCK AREA	COMMON
31	MARSHLING YARD (MS TSGENCO)	COMMON
32	GATE COMPLEX CUM SECURITY BLDG.	COMMON
33	PERMANENT STORES (15MX30M)	18+
34	AUXILIARY BOILER	COMMON
35	CHP MCC	6 Nos
36	CHEMICAL LAB (PCRI)	-
37	AQMS (MXMX SHED)	4 Nos
38	CST + PUMP HOUSE	2 + 3
39	AWRPH, CLARIFIER, CHEM. BLDG & MCC	COMMON
40	NDCT	5 Nos.
41	RAW WATER RESERVOIR (MS TSGENCO)	COMMON
42	PYLON FOUNDATION STONE	-
43	ASH DYKE AREA (MS TSGENCO)	-
44	AMMONIA STORAGE & HANDLING PLANT	COMMON
45	FGD	-
46	LIME STONE PREPARATION AREA	COMMON
47	GYPSPUM DEWATERING & STORAGE	COMMON
48	FGD MCC & CONTROL ROOM	2 Nos.
49	RAIN WATER HARVESTING PONDS	3 Nos.
50	ASH SLURRY PUMP HOUSE	-
51	VACUUM PUMP HOUSE	5 Nos.
52	AHP PH, TANK, CLARIFIER & CHEM. BLDG.	COMMON
53	AHP COMPRESSOR HOUSE	-
54	AHP ELECTRICAL BLDG.	5 Nos.
55	HELIPAD (EXISTING-BY TSGENCO)	-
56	DSPH	03 Nos.
57	RAW COAL STOCKYARD	-
58	COAL PILE RUN OF POND	-
59	SIMULATOR CUM TRAINING BLDG.	COMMON
60	WEIGH BRIDGE (PEM)	-
61	11KV & 3.3KV SWGR	-

- NOTES:-
- ALL DIMENSIONS AND CO-ORDINATES ARE IN METER UNLESS NOTED OTHERWISE.
 - THE FINISHED FLOOR LEVEL (FFL) OF POWER HOUSE BUILDING GROUND FLOOR IS EL. + 0.00M WHICH CORRESPONDS TO RL, RLSP, Ls, 0.5M ABOVE FGL (RLSL.0M) IN MAIN PLANT AREA.
 - CUSTOMER GRIDS HAVE BEEN CONVERTED TO PLANT GRIDS. REFERENCE POINT HAS BEEN INDICATED.
 - THE APPROACH ROADS & PIPE SUPPORTING STRUCTURES SHOWN IN THIS DRAWING ARE INDICATIVE ONLY. THE SAME WILL BE FURTHER UPDATED BASED ON FINALIZATION OF RESPECTIVE FACILITIES /BUILDINGS.
 - LOCATION AND SIZES OF VARIOUS BUILDINGS AND FACILITIES SHOWN ARE PRELIMINARY. THE SAME WILL BE FURTHER UPDATED BASED ON FINALIZATION OF RESPECTIVE FACILITIES /BUILDINGS.
 - ALL ROADS, DRAINS AND RESPECTIVE EMBANKMENTS ARE IN TSGENCO SCOPE. FOR NON PLANT BUILDINGS SCOPE/TP DEMARCATION SHALL BE AS PER TECHNICAL MOM DATED 04/10/2017 & REVISED LOI ED/TPC/SE-II/EME-9/YADADRI TPS, D.NO.102/17 dt. 17/10/2017.
 - IN ACCORDANCE TO THE REVISED LOT DATED 17/10/2017, THE REVISION 'R02' OF THE EARLIER DEVELOPED PLOT PLAN (ON THE BASIS OF MEETINGS/DISCUSSIONS HELD WITH THE CUSTOMER ON 02/11/15 AT YADADRI SITE AND ON 06/11/15 AT KAKATIYA SITE) HAS BEEN NOW SUPERCEDED WITH THE FRESH REVISION 'R03'.
 - GREEN BELT (CUSTOMER SCOPE) IS SHOWN INDICATIVELY.
 - RIVER WATER INTAKE UPTO INPLANT RESERVOIR IS IN CUSTOMER SCOPE.
- REFERENCE DRGS.
- TENDER STAGE PLOT PLAN: TSGENCO/NG/PP/VRP/M01
 - CONTOUR PLAN DRG

LEGEND

RIVER

ROAD

RAILWAY TRACK

GREEN BELT

CUSTOMER:

TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA INDIA
YADADRI TPS (5X800 MW)

CONSULTANT:

TATA CONSULTING ENGINEERS LIMITED
BANGALORE INDIA

CLIENT:

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
Noida

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DEPT CODE: M

NAME: AMS

DATE: 15.12.17

DESIGN: MK

DATE: 15.12.17

CHECK: BKA

DATE: 15.12.17

APPRO: JJ

DATE: 15.12.17

JOB NO. 417

STATUS CONTRACT

DISTRIBUTION

TITLE

PLOT PLAN

DEPT. SIGN

SCALE 1:5000

DRAWING NO. PE-DG-417-100-M001

SHEET 1 OF 1

REV. 01

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Bharat Heavy Electricals Limited
Noida

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DEPT. CODE: M
NAME: AMS
DATE: 15.12.17
DESIGN: MK
DATE: 15.12.17
CHECK: BKA
DATE: 15.12.17
APPRO: JJ
DATE: 15.12.17

JOB NO. 417
STATUS CONTRACT
DISTRIBUTION

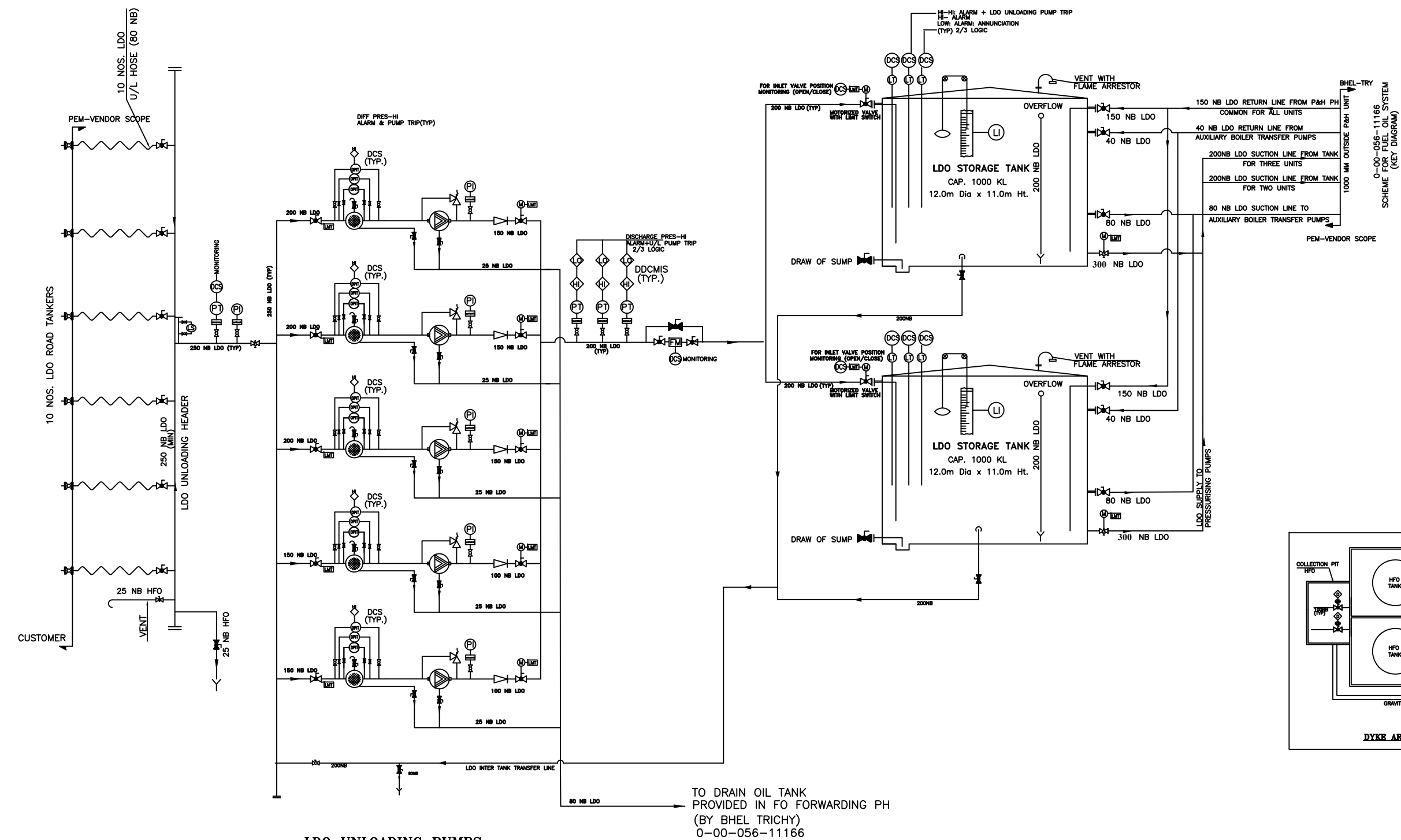
TITLE
PLOT PLAN
DEPT. SIGN
SCALE 1:5000
DRAWING NO. PE-DG-417-100-M001
SHEET 1 OF 1
REV. 01

Page 200 of 403

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PE-DG-417-166-A001

DRAWING NO. PE-DG-417-166-A001



LDO UNLOADING PUMPS

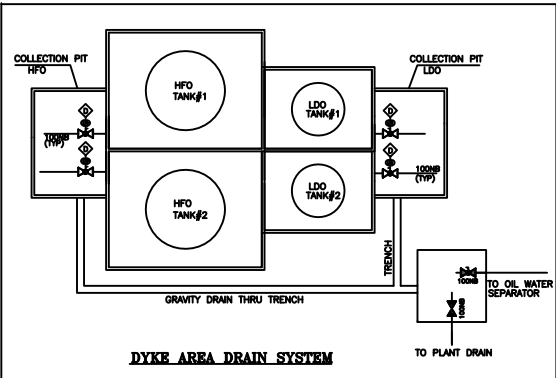
CAP. 50 m³/hr. & CAP. 25 m³/hr.
3 NOS.(2W+1S) & 2 NOS.(1W+1S)

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH FOHS CONTRACT SPECIFICATION
2. VENTS AND DRAINS SHALL BE PROVIDED AT THE HIGHEST AND LOWEST POINTS RESPECTIVELY.
3. THE PIPE SIZING IS DONE BASED ON PIPE SIZING CRITERIA INDICATED IN CONTRACT SPECIFICATION
4. ALL INSTRUMENTS ISOLATION VALVES SHALL BE GLOBE VALVE.
5. TANK DRAIN VALVES ARE IN NORMALLY CLOSE CONDITION.
6. SIZE OF INLET AND OUTLET SPARE CONNECTIONS SHALL BE SAME AS INLET AND OUTLET NOZZLES.
7. ALL BALL VALVES USED IN OIL LINES SHALL BE FIRE SAFE.
8. COUNTER FLANGES WITH FASTENER & GASKETS AT TERMINAL POINT WILL BE SUPPLY BY VENDER.
9. THE INSTRUMENTS AND VALVES FURNISHED IN THE P&ID IS A MINIMUM REQUIREMENT, HOWEVER ANY INSTRUMENT/VALVE REQUIRED FOR COMPLETENESS OF THE SYSTEM SHALL BE PROVIDED BY BIDDER WITHOUT ANY COST IMPLICATION. FOR REDUNDANCY CRITERIA, VENDOR TO FOLLOW THE CLAUSE PERTAINING TO REDUNDANCY CRITERIA MENTIONED IN THE SPECIFIC TECHNICAL REQUIREMENT OF C & I

LEGEND	
SYMBOL	DESCRIPTION
(PI)	PRESSURE INDICATOR
(PS)	PRESSURE SWITCH
(PT)	PRESSURE TRANSMITTER
(V)	PLUG VALVE
(DPI)	DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER
(LS)	LEVEL SWITCH
(LT)	LEVEL TRANSMITTER
(LI)	LEVEL INDICATOR
(TI)	TEMPERATURE INDICATOR
(TE)	TEMPERATURE ELEMENT
(LO/HI)	SIGNAL TO DCS(LO OR HI)
(CS)	STEAM CONTROL VALVE
(T)	STEAM TRAP
(FM)	COROLIS TYPE FLOWMETER
(S)	SIMPLEX STRAINER
(B)	BALL VALVE
(RV)	RELIEF VALVE
(NRV)	NON RETURN VALVE
(H)	HOSE
(CH)	COIL HEATER
(LD)	LOCAL DRAIN
(GV)	GLOBE VALVE
(NCV)	NORMALLY CLOSED VALVE
(GV)	GATE VALVE
(LMT)	LIMIT SWITCH: OPEN-CLOSE INDICATION TO CP

VALVE SCHEDULE FOR OIL LINES:	
FOR OIL LINES	FOR CHECK VALVE
200NB & BELOW : BALL VALVE.	ABOVE 60NB : SWING CHECK VALVE.
250NB TO 350NB : PLUG VALVE.	50NB & BELOW : LIFT CHECK VALVE.
ABOVE 350NB : GATE VALVE.	

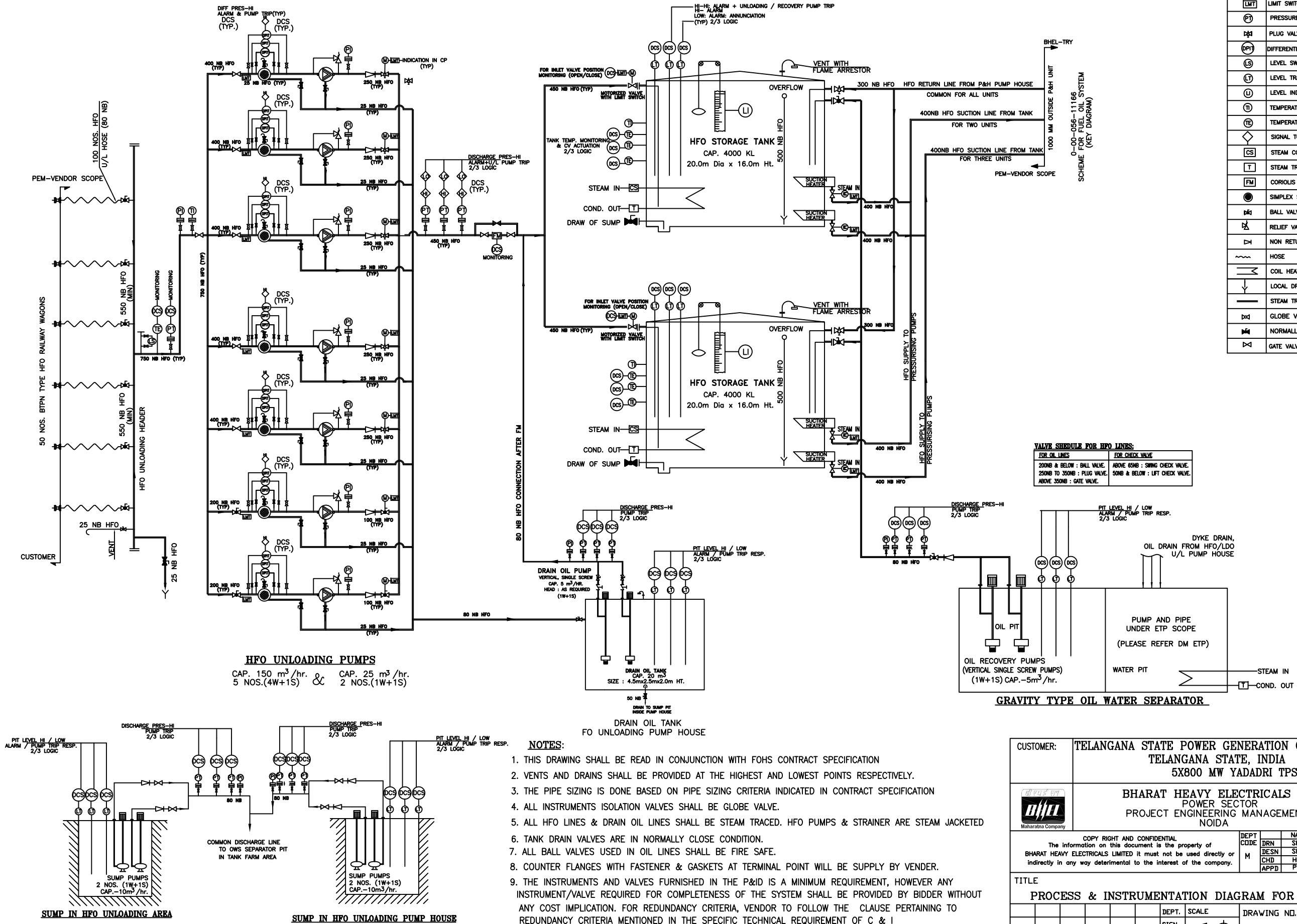


CUSTOMER:	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA STATE, INDIA 5X800 MW YADADRI TPS				
 Maharatna Company	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA				
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			M	NAME	SIGN
			DRN	SKY	17/02/18
			DESIN	SKY	17/02/18
			CHD	HK	19/02/18
			APPD	PK	19/02/18
TITLE					
PROCESS & INSTRUMENTATION DIAGRAM FOR LDO SYSTEM					
				DEPT.	SCALE
				SIGN	
				DRAWING NO. PE-DG-417-166-A001	
				SHEET 1 OF 3	
				REV. 00	

DRAWING NO. PE-DG-417-166-A001

LEGEND	
SYMBOL	DESCRIPTION
	PRESSURE INDICATOR
	LIMIT SWITCH: OPEN-CLOSE INDICATION TO CP
	PRESSURE TRANSMITTER
	PLUG VALVE
	DIFFERENTIAL PRESSURE INDICATOR TRANSMITTER
	LEVEL SWITCH
	LEVEL TRANSMITTER
	LEVEL INDICATOR
	TEMPERATURE INDICATOR
	TEMPERATURE ELEMENT
	SIGNAL TO DCS(LO OR HI)
	STEAM CONTROL VALVE
	STEAM TRAP
	CORIOLIS TYPE FLOWMETER
	SIMPLEX STRAINER
	BALL VALVE
	RELIEF VALVE
	NON RETURN VALVE
	HOSE
	COIL HEATER
	LOCAL DRAIN
	STEAM TRACED HFO PIPE
	GLOBE VALVE
	NORMALLY CLOSED VALVE
	GATE VALVE

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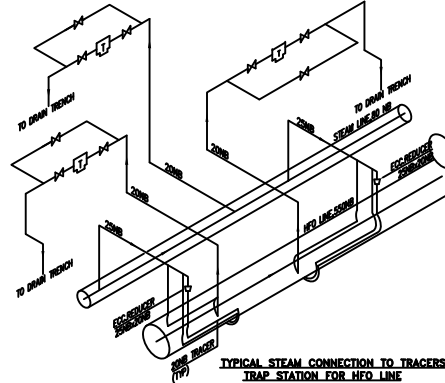
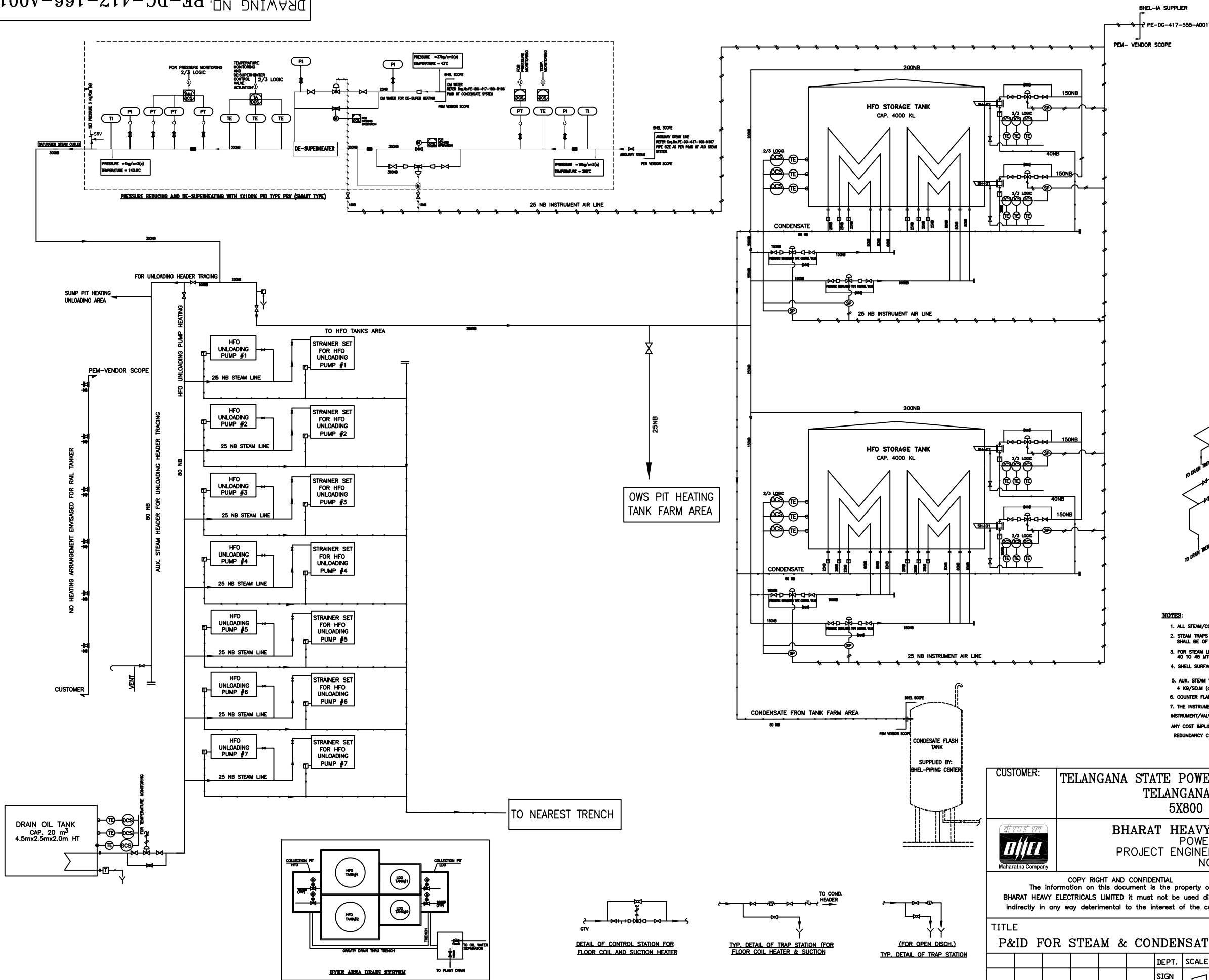
VALVE SCHEDULE FOR HFO LINES:	
FOR OIL LINES	FOR CHECK VALVE
200NB & BELOW : BALL VALVE.	ABOVE 65NB : SPRING CHECK VALVE.
250NB TO 350NB : PLUG VALVE.	50NB & BELOW : LIFT CHECK VALVE.
ABOVE 350NB : GATE VALVE.	

CUSTOMER:	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA STATE, INDIA 5X800 MW YADADRI TPS				
 Maharashtra Company	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA				
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		M	SKY		17/02/18
			SKY		17/02/18
			HK		19/02/18
			PK		19/02/18
TITLE					
PROCESS & INSTRUMENTATION DIAGRAM FOR HFO SYSTEM					
		DEPT.	SCALE	DRAWING NO. PE-DG-417-166-A001	
		SIGN			
SHEET 2 OF 3				REV. 00	

DRAWING NO. PE-DG-417-166-A001

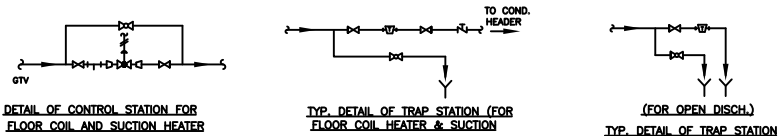
LEGEND	
SYMBOL	DESCRIPTION
	TEMPERATURE CONTROLLER
	TEMPERATURE ELEMENT
	STEAM TRAP
	TEMPERATURE INDICATOR
	PRESSURE INDICATOR
	SIGNAL TO DCS(LO OR HI)
	GATE VALVE
	PNEUMATICALLY OPERATED CONTROL VALVE
	HOSE
	COIL HEATER
	LOCAL DRAIN
	ELECTRICAL SIGNAL
	CONDENSATE LINE
	INSTRUMENT AIR LINE
	AUX. STEAM LINE
	SMART POSITIONER
	GLOBE VALVE
	STRAINER FOR CV
	STEAM TRAP

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- NOTES:
- ALL STEAM/CONDENSATE LINES SHALL BE INSULATED.
 - STEAM TRAPS FOR SUCTION HEATER & FLOOR COIL HEATER OF STORAGE TANKS SHALL BE OF ID TYPE. ALL OTHER STEAM TRAPS SHALL BE OF TD TYPE.
 - FOR STEAM LINES & TRACER LINES, TRAPS SHALL BE PROVIDED AT EVERY 40 TO 45 MTR.
 - SHELL SURFACE OF F.O. STORAGE TANKS & DRAIN OIL TANK ARE INSULATED.
 - AUX. STEAM WILL BE SUPPLIED TO AT 16 KG/SQ.M (a) & 280°C. FURTHER IT SHALL BE REDUCED TO 4 KG/SQ.M (a) OR AS PER SYSTEM REQUIREMENT
 - COUNTER FLANGES WITH FASTENER & GASKETS AT TERMINAL POINT WILL BE SUPPLY BY VENDOR.
 - THE INSTRUMENTS AND VALVES FURNISHED IN THE P&ID IS A MINIMUM REQUIREMENT, HOWEVER ANY INSTRUMENT/VALVE REQUIRED FOR COMPLETENESS OF THE SYSTEM SHALL BE PROVIDED BY BIDDER WITHOUT ANY COST IMPLICATION. FOR REDUNDANCY CRITERIA, VENDOR TO FOLLOW THE CLAUSE PERTAINING TO REDUNDANCY CRITERIA MENTIONED IN THE SPECIFIC TECHNICAL REQUIREMENT OF C & I

CUSTOMER:	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA STATE, INDIA 5X800 MW YADADRI TPS			
	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA			
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TITLE P&ID FOR STEAM & CONDENSATE FOR HFO HEATING & TRACING				
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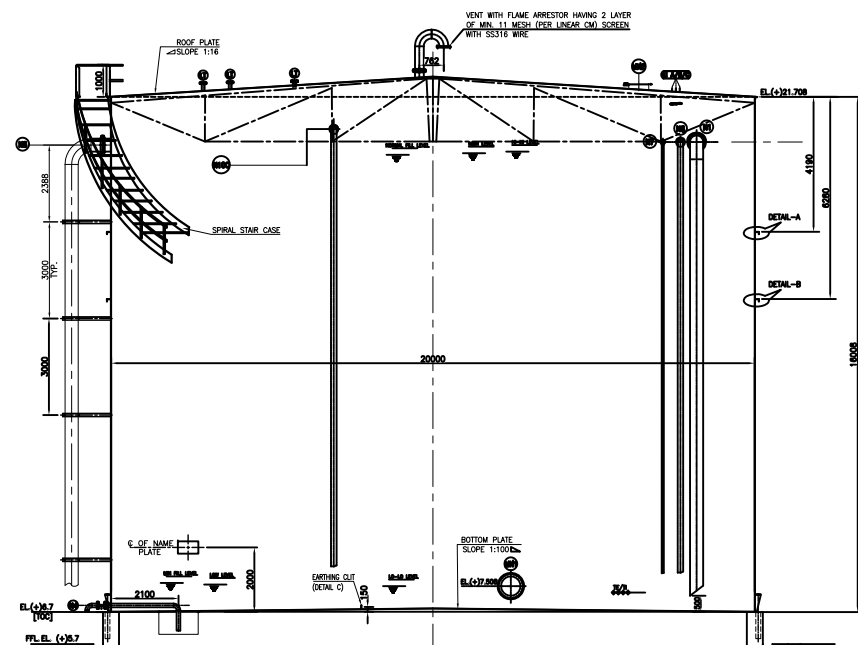


Figure 1 is an elevation view of a roof structure. The total height is 15,000 mm. The structure consists of the following components from top to bottom:

- ROOF PLATE (25 SLOPE 1:10)
- ROOF PLATE 8 THK.
- 8th COURSE 6 THK.
- 7th COURSE 6 THK.
- 6th COURSE 6 THK.
- 5th COURSE 8 THK.
- 4th COURSE 10 THK.
- 3rd COURSE 10 THK.
- 2nd COURSE 10 THK.
- 1st COURSE 12 THK.
- BOTTOM PLATE (25 SLOPE 1:10)
- BOTTOM PLATE

A 55° angle is indicated at the top left, and a 50 mm dimension is shown at the bottom left.

TANK SHELL
 TANK INNER DIA
 (ø20000)
 100
 12
 25
 ø14 HOLE FOR
 M12 EARTHING BOLTS
 DETAIL-C
 EARTHING CLIP
 AS PER FIG 5.23 OF API650

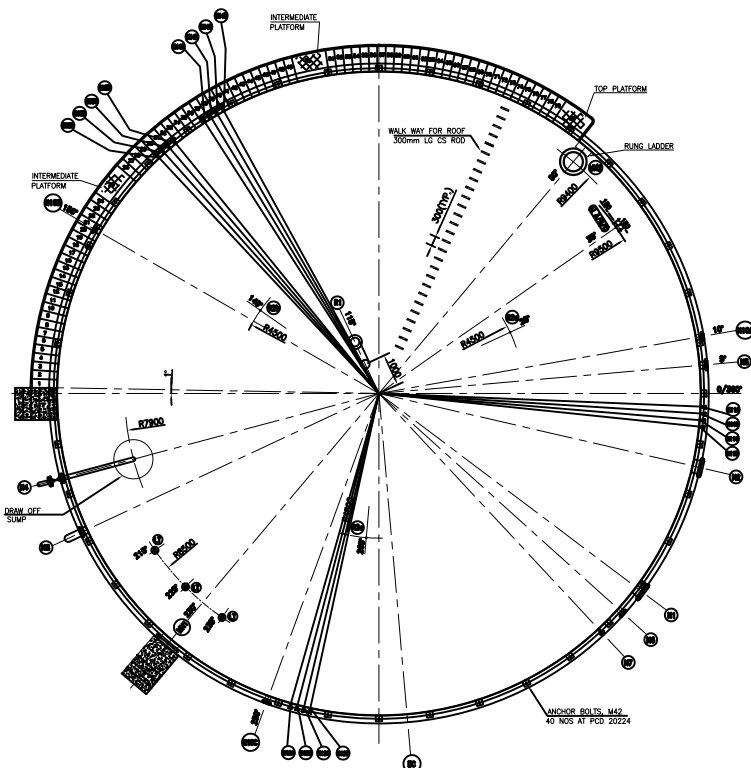
+	Name of Manufacturer:	BHEL	+
	TANK NOMINAL DIAMETER	20.0 M	
	TANK NOMINAL HEIGHT	16.0 M	
	MAXIMUM CAPACITY	4333 M3	
	DATE OF MANUFACTURE	2018	
	DESIGN LIQUID LEVEL	13,950 M	
	DESIGN CODE	API850	
	MAXIMUM OPERATING PRESS.	AMBIENT	
	MAXIMUM OPERATING TEMP.	50 DEGC	
	DESIGN TEMPERATURE	90 DEGC	
	MATERIAL OF TANK	IS 2002 GR A/B	

DESIGN DATA		
DESCRIPTION	UNIT	DETAIL
DESIGN CODE	-	API 650
STORED PRODUCT	-	HFO
SPECIFIC GRAVITY OF PRODUCT STORED	kg/m ³	890 to 950
TYPE OF TANK	-	VERTICAL CYLINDRICAL, SUPPORTED CONE ROOF
NUMBER OF TANKS	no	TWO (2)
DIAMETER OF TANK (ID)	m	20000
HEIGHT OF TANK	m	16000
TANK EMPTY WEIGHT	kg	121181
TANK FILLED WEIGHT	kg	4454181
NET WORKING CAPACITY	m ³	4094 (AS PER FIG 5.4 OF API650)
MAXIMUM TANK CAPACITY	m ³	4333 (AS PER FIG 5.4 OF API650)
BASIC WIND SPEED	m/s	44
DESIGN TEMPERATURE	°C	90
INTERNAL DESIGN PRESSURE	KPa	18 AS PER API650
OPERATING PRESSURE	-	ATMOSPHERIC
CORROSION ALLOWANCE	mm	2
SEISMIC FACTORS	-	ZONE-III , PEAK GROUND ACCELERATION = 0.16g
SEISMIC MOMENTS	KNM	RING WALL MOMENT - 37138.49, SLAB MOMENT - 53287.01
WIND LOAD &	KN	VERTICAL-336, HORIZONTAL-552.64
WIND MOMENT	KNM	8214.40
ROOF LOAD (UNIFORM LIVE)	kg/m ²	150
TESTING	-	AS PER CL7.3 AND SECTION 8 OF API650
RATE OF FILLING OF TANK (MAX)	m ³ /hr	600
RATE OF EMPTYING OF TANK	m ³ /hr	361 (total of all unit) AS PER BHEL POLY. ENG. NO. P-00-056-11166

KEY PLAN							
SHELL NOZZLES & APPURTENANCES FOR TANK							
MARK	SIZE	QTY. (NO.)	FLANGE TYPE & RATING	NOZZLE CENTRE ELE FROM TOP OF BOTTOM PLATE AS PER TABLE 5.6a OF AP1650	PROJ. DIST. FROM SHELL PER TABLE 5.6a OF AP1650	NOZZLE THK IN MM AS PER TABLE 5.6a OF AP1650	SERVICE
N1	450	1	SDRF, 150#	14600.0	250	12.70	HFD INLET
N2	550	1	SDRF, 150#	700	275	12.70	OUTLET (SUCTION HEATER-1 MAINTAINING)
N4	100	1	SDRF, 150#	300	175	8.56	DRAW-OFF SUMP
N5	550	1	SDRF, 150#	700	275	12.7	OUTLETS(SUCTION HEATER-2 MAINTAINING)
N6	300	1	SDRF, 150#	14600.0	225	12.70	HFD RETURN FROM BOILER
N7	80	1	SDRF, 150#	14600.0	175	7.62	D/O RETURN FROM DWS
N8	500	1	SDRF, 150#	14500.0	275	12.70	OVERFLOW
N10 A/B/ C	200	1	SDRF, 150#	14700	200	10.97	FOAM POUER
N11 A/B/ C/D	80	4	SDRF, 150#	475.0	150	5.54	STEAM INLET TO FLOOR COIL HEATER
N12 A/B/ C/D	80	4	SDRF, 150#	475.0	150	5.54	STEAM INLET TO FLOOR COIL HEATER
N13 A/B/ C/D	50	4	SDRF, 150#	255.0	150	5.54	CONDENSATE OUT OF FLOOR COIL HEATER
N14 A/B/ C/D	50	4	SDRF, 150#	255.0	150	5.54	CONDENSATE OUT OF FLOOR COIL HEATER
N15	25	1	SDRF, 150#	500.0	150	5.54	DRAIN NOZZLE FOR SAMPLING COLLECTION
TE	M33X 2 - SDCCK ET	3	-	600	-	-	TEMPERATURE ELEMENT
T1	M33X 2 - SDCCK ET	1	-	600	-	-	TEMPERATURE INDICATOR
MH1	600	1	AS PER FIG 5.16 OFAP1650	800.0	150	6.0	SHELL MANHOLE WITH BLIND FLANGE
EC	-	2	AS PER DETAIL C	-	-	-	EARTHING CLIT

ROOF NOZZLES & APPURTENANCES FOR TANK							
MARK	SIZE	QTY. (NO.)	FLANGE TYPE RATING	NOZZLE CENTRE FROM ROOF CENTRE	PROJ. DIST. FROM SHELL PLATE AS TABLE 5.6a OF AP1650	NOZZLE TAK IN MM AS PER TABLE 5.6a OF AP1650	SERVICE
R1	200	1	SORF, #150	1000	200	12.7	VENT WITH FLAME ARRESTOR
R2 a/b/c	25	3	-	4500	-	-	25 DIA HOLES FOR HEAT DETECTION
L1	80	3	SORF, #150	8500	175	7.62	LEVEL TRANSMITTERS (RADAR TYPE)
L1 A/B/C	25	3	SORF, #150	9500	150	6.35	LEVEL INDICATOR (FLOAT & ARROW TYPE)
MH2	600	1	AS PER FIG 5.16	9400	150	6	ROOF MANHOLE WITH COVER

ALL THE REQUIREMENTS SHOWN UNDER GA DRAWING ARE BARE MINIMUM, ANY OTHER ITEM FOUND APPLICABLE DURING DETAILED ENGINEERING AS PER TECHNICAL SPECIFICATION/ FUNCTIONAL REQUIREMENT SHALL BE SUPPLIED BY BIDDER WITHOUT ANY COMMERCIAL IMPLICATION TO BHEL.



Technical drawing of a shell plate assembly. The drawing shows a horizontal shell plate (100NB) connected to a vertical shell plate (SHELL PLATE) via a flange (N4). The horizontal shell plate is supported by a bottom plate (60Wx10 THK) and a 10THK plate. Dimensions include a total length of 2100, a distance of 175 from the flange to the end of the horizontal shell plate, a distance of 300 from the bottom plate to the horizontal shell plate, a distance of 1240 from the end of the horizontal shell plate to the vertical shell plate, and a distance of 114 from the bottom plate to the vertical shell plate. The bottom plate is 1220 wide. The vertical shell plate is 600 high and 10 THK thick.

Figure 1: Detail of the probe assembly. The top part shows a cross-section of the probe assembly with labels: TANK ROOF, RUBBER BUSH, and Ø25 HOLE PROVIDED TO THE PROBE. The bottom part shows a top-down view of the probe assembly with labels: TANK ROOF, Ø25 HOLE, and a dimension line indicating a distance of 100.

JOB NO.		: 417	
STATUS		: CONTRACT	
REV	DATE	DESN	CHD

JOB NO.		: 417	
STATUS		: CONTRACT	
REV	DATE	DESN	CHD

CUSTOMER

TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA

H

CONSULTANT

PROJECT

5x800 MW YADADRI TPS, NALGONDA

BEHARAT HEAVY ELECTRICALS LTD
POWER SECTOR -- PROJECT ENGINEERING MANAGEMENT
MORDA, UTTAR PRADESH -- 201301

DEPT	NAME	SIGN	DATE
CODE	DRN	SKY	S/D 17.02.18
	DESIN	SKY	S/D 17.02.18
	CHD	HS	S/D 17.02.18
	APPD	PK	S/D 17.02.18

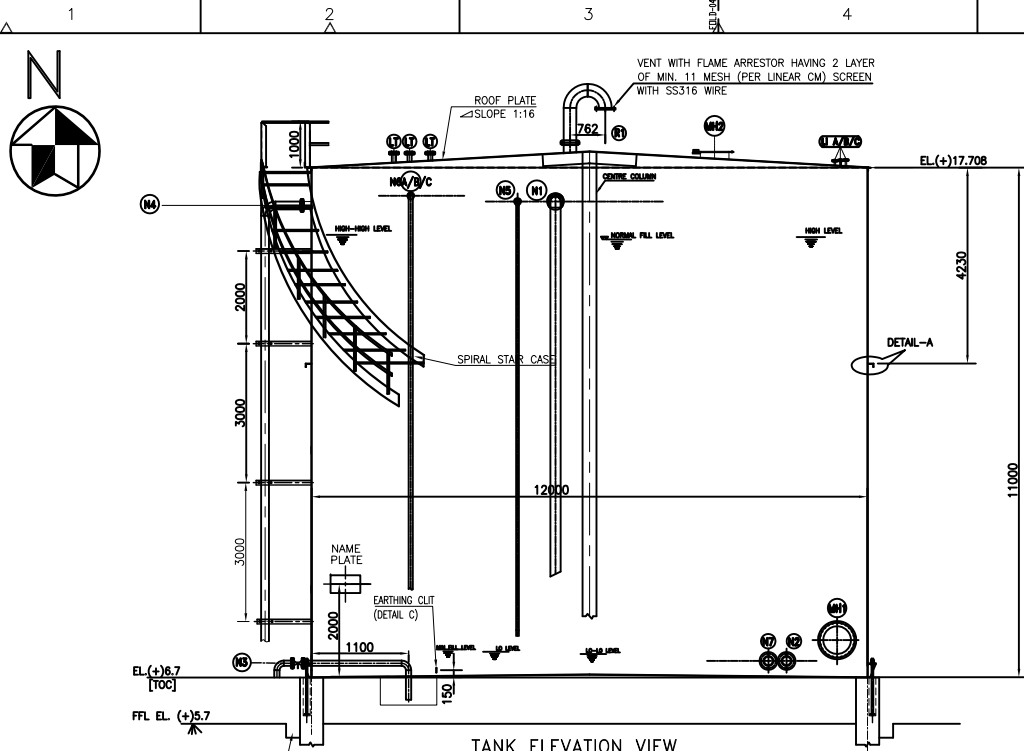
PACKAGE

FUEL OIL UNLOADING & STORAGE SYSTEM

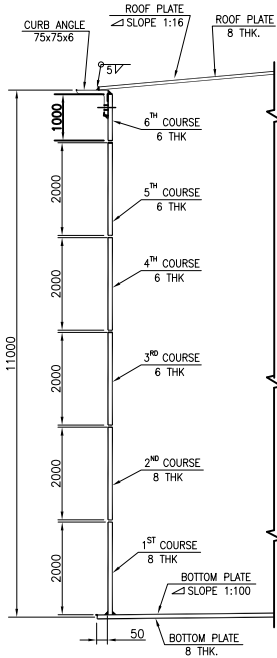
TITLE

**GA AND NOZZLE ORIENTATION DRAWING OF
HFO STORAGE TANK CAP. 4000m³**

DEPT.	SCALE	NTS	BHEL DRAWING NO.
SIGN			FE-DG-417-166-A002
DATE	SHEET	01 OF 02	REV. 00



SHELL ARRANGEMENT FOR 1ST TO 06TH COURSE



Name of Manufacturer:	BHEL
TANK NOMINAL DIAMETER	12.0 M
TANK NOMINAL HEIGHT	11.0 M
MAXIMUM CAPACITY	1085 M3
DATE OF MANUFACTURE	2016
DESIGN LIQUID LEVEL	9.800 M
DESIGN CODE	API650
MAXIMUM OPERATING PRESS.	AMBIENT
MAXIMUM OPERATING TEMP.	AMBIENT
DESIGN TEMPERATURE	60 DEGC
MATERIAL OF TANK	IS 2062 GR. A/B

NAME PLATE DETAIL

KEY PLAN

DESIGN DATA		
DESCRIPTION	UNIT	DETAIL
DESIGN CODE	-	API 650
STORED PRODUCT	-	LDO
SPECIFIC GRAVITY OF PRODUCT STORED	kg/m3	850
TYPE OF TANK	-	VERTICAL CYLINDRICAL, SUPPORTED CONE ROOF
NUMBER OF TANKS	no	TWO (2)
DIAMETER OF TANK (ID)	mm	12000
HEIGHT OF TANK	mm	11000
TANK EMPTY WEIGHT	kg	41984
TANK FILLED WEIGHT	kg	1126984
NET WORKING CAPACITY	m3	1000 (AS PER FIG 5.4 OF API650)
MAXIMUM TANK CAPACITY	m3	1085 (AS PER FIG 5.4 OF API650)
BASIC WIND SPEED	m/s	44
DESIGN TEMPERATURE	°C	60
INTERNAL DESIGN PRESSURE	KPa	18 AS PER API650 FOR SEISMIC CALCULATION
OPERATING PRESSURE	-	ATMOSPHERIC
CORROSION ALLOWANCE	mm	2.0
SEISMIC FACTORS	-	ZONE-III , PEAK GROUND ACCELERATION - 0.16g
SEISMIC MOMENTS	KNM	RING WALL MOMENT -6183.64, SLAB MOMENT - 8765.79
WIND LOAD	KN	VERTICAL - 138.6, HORIZONTAL - 198.96
WIND MOMENT	KNM	1956.06
ROOF LOAD (UNIFORM LIVE)	kg/m2	150
TESTING	-	AS PER CL7.3 AND SECTION 8 OF API650
RATE OF FILLING OF TANK (MAX)	m3/hr	100, FOR THREE (3) NOS. 2W +1S , LDO TRANSFER PUMPS (CAP. 50 M3/HR EACH)
RATE OF EMPTYING OF TANK (MAX)	m3/hr	98 (total of all unit) AS PER BHEL TRICY DRG. NO. 0-00-056-11166

SHELL NOZZLES & APPURTENANCES FOR TANK

MARK	SIZE NB	QTY. (NO.)	FLANGE TYPE, RATING	NOZZLE CENTRE ELE FROM TOP OF BOTTOM PLATE AS PER TABLE 5.6a OF API650	PROJ. DIST. FROM SHELL PLATE AS PER TABLE 5.6a OF API650	NOZZLE THK IN MM AS PER TABLE 5.6a OF API650	SERVICE
N1	200	1	SORF,150#	9750.0	200	12.70	LDO INLET
N2	300	1	SORF,150#	400	225	12.70	LDO OUTLET
N3	50	1	SORF,150#	200	150	5.54	DRAW-OFF SUMP
N4	250	1	SORF,150#	9600.0	225	12.70	OVERFLOW
N5	150	1	SORF,150#	9750.0	200	10.97	LDO RETURN FROM BOILER
N6 A/B/C	100	1	SORF,150#	9700	175	8.56	FOAM POURER
N7	25	1	SORF, #150	400	150	6.35	DRAIN NOZZLE FOR SAMPLING COLLECTION
N8	80	1	SORF,150#	200	175	7.62	SUPPLY LINE TO AUXILIARY BOILER
N9	40	1	SORF,150#	9750	150	5.54	RETURN LINE FROM AUXILIARY BOILER
MH1	600	1	AS PER FIG 5.16 OF API650	800.0	150	6.0	SHELL MANHOLE WITH BLIND FLANGE
EC	-	2	AS PER DETAIL C	-	-	-	EARTHING CLIT

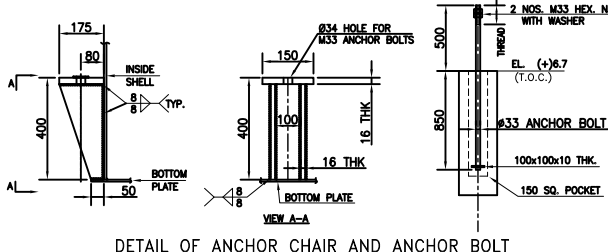
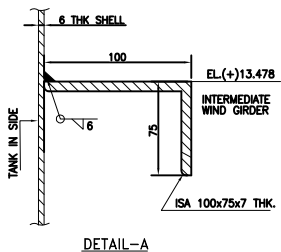
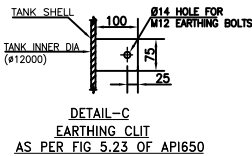
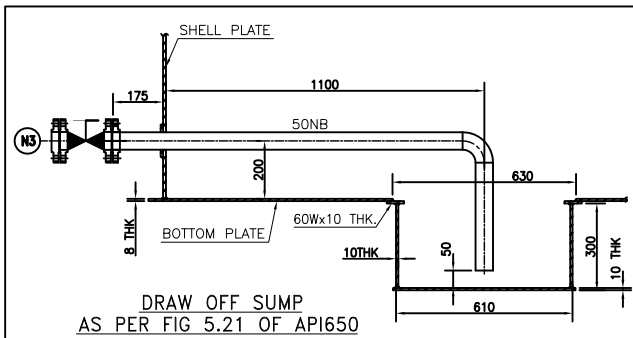
ROOF NOZZLES & APPURTENANCES FOR TANK

MARK	SIZE NB	QTY. (NO.)	FLANGE TYPE, RATING	NOZZLE CENTRE DISTANCE FROM ROOF CENTRE	PROJ. DIST. FROM SHELL PLATE AS TABLE 5.6a OF API650	NOZZLE THK IN MM AS PER TABLE 5.6a OF API650	SERVICE
R1	150	1	SORF, #150	1000	200	10.97	VENT WITH FLAME ARRESTOR
R2 a/b/c	25	3	-	3000	-	-	25 DIA HOLES FOR HEAT DETECTION
LT	80	3	SORF, #150	4500	175	7.62	LEVEL TRANSMITTERS (RADAR TYPE)
LI A/B/C	25	3	SORF, #150	5500	150	6.35	LEVEL INDICATOR (FLOAT & ARROW TYPE)
MH2	600	1	AS PER FIG 5.16 OF API650	5400	150	6	ROOF MANHOLE WITH COVER

NOZZLE ORIENTATION OF LDO TANK

NOTES:-

- ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METRE UNLESS OTHER WISE SPECIFIED.
- THE FINISHED FLOOR LEVEL (F.L.) OF POWER HOUSE BUILDING GROUND FLOOR IS EL. + 0.00M WHICH CORRESPONDS TO RL. 81.5M, I.E., 0.5M ABOVE FGL (RL.81.0M) IN MAIN PLANT AREA.
- TANK SURFACE SHOULD BE CLEANED THOUGHLY AFTER FABRICATION FROM LOOSE SUBSTANCES AND FOREIGN MATERIALS SUCH AS DIRT, RUST, SCALE, OIL, GREASE AND WELDING FLUX ETC.
- VERTICAL SHELL JOINTS SHALL BE OFFSET FROM EACH OTHER WITH A MINIMUM DISTANCE OF 5 TIMES THE THICKNESS OF SHELL COURSE UNDER CONSIDERATION.
- BOTTOM PLATE SHALL UNIFORMLY REST ON THE FOUNDATION. THREE PLATE JOINTS IN BOTTOM PLATE SHALL NOT BE CLOSER THAN 300mm FROM EACH OTHER AND ALSO FROM THE TANK SHELL.
- EARTHING LUG AND NAME PLATE SHALL BE WELDED TO THE TANK AS PER SITE REQUIREMENT.
- ALL THE INLET PIPING SHALL BE EXTENDED UP TO BOTTOM OF TANK AND CLEARANCE BETWEEN THE BOTTOM OF TANK AND THE EDGES OF INLET PIPING SHALL BE 500 MM MAXIMUM.
- WEIR PLATE SHALL BE PROVIDED AT THE BOTTOM OF ALL THE INLET PIPES INSIDE TANK TO AVOID EROSION OF BOTTOM PLATE.
- TREAD AND RISE FOR STAIRCASE OF THE TANK SHALL BE 250 AND 200 MM RESPECTIVELY.
- LEVEL INDICATOR SUPPORTS SHALL BE PROVIDED ON THE SHELL & ROOF.
- NOZZLE FOR FOAM POURER, HOLES FOR HEAT DETECTOR ON TANK ROOF, PAD PLATES ON TANK FOR SUPPORTING FOAM POURER PIPE AND MW SPRAY SYSTEM SHALL BE PROVIDED BY VENDOR AS PER FIRE PROTECTION SYSTEM DRAWING.
- FINAL PAINTING SHALL BE CARRIED OUT AS PER APPROVED PAINTING SCHEDULE AFTER HYDRO TEST OF TANK.
- TANK NOZZLE FLANGES SHALL BE PROVIDED WITH COUNTER FLANGES ALONG WITH NUTS & BOLTS BY TANK VENDOR.
- OPERATING PLATFORMS SHALL BE PROVIDED BY TANK VENDOR FOR ALL THE INACCESSIBLE VALVES AND FOAM POURER OF TANK.
- FABRICATION, ERECTION AND TESTING SHALL BE AS PER API650/IS 803.
- FOR MANUAL WELDING PROCESSES, FILLET WELD LEGS OR GROOVE WELD DEPTHS GREATER THAN 6MM SHALL BE MULTIPASS.
- ALL TANK SHELL WELD INTERSECTIONS WHERE VERTICAL JOINTS MEET THE HORIZONTAL JOINTS SHALL BE RADIOGRAPHED, REGARDLESS OF THICKNESS.
- ALL RADIOGRAPHY OR OTHER NDE AND ANY WELDING SHALL BE COMPLETED PRIOR TO HYDROSTATIC TESTING.
- THE TANK HYDROSTATIC TEST SHALL BE CONDUCTED BEFORE PERMANENT EXTERNAL PIPING IS CONNECTED TO THE TANK EXCEPT FOR PIPING THAT IS NECESSARY TO FILL AND EMPTY THE TANK, WHICH SHOULD HAVE A FLEXIBLE COMPONENT TO ALLOW FOR SETTLEMENT.
- ALL INLET PIPING TO THE TANK SHALL BE PROVIDED WITH SUITABLE SIPHON BREAKER.
- MANHOLE FOR ROOF AND SHELL OF TANK SHALL BE HINGED TYPE.
- NOZZLE ORIENTATION OF TANK#1 IS MIRROR IMAGE OF TANK#2
- INSULATION SHALL BE PROVIDED ON COMPLETE SHELL OF THE HFO TANKS.
- NOZZLE ORIENTATION SHOWN IN DRAWING IS TENTATIVE. THE SAME SHALL BE FINALISED DURING DETAILED ENGG.
- EACH TANK SHALL BE PROVIDED WITH ONE SPARE CONNECTION FOR INLET AND OUTLET NOZZLE FOR FUTURE USE. OUTLET NOZZLE SHALL BE PROVIDED WITH VALVE. INLET NOZZLE WITH BLIND FLANGE.



ALL THE REQUIREMENTS SHOWN UNDER GA DRAWING ARE BARE MINIMUM, ANY OTHER ITEM FOUND APPLICABLE DURING DETAILED ENGINEERING AS PER TECHNICAL SPECIFICATION/ FUNCTIONAL REQUIREMENT SHALL BE SUPPLIED BY BIDDER WITHOUT ANY COMMERCIAL IMPLICATION TO BHEL.

CUSTOMER	TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA STATE, INDIA				
CONSULTANT					
PROJECT	5x800 MW YADADRI TPS, NALGONDA				
DRAWING NO.	BHARAT HEAVY ELECTRICALS LTD		DEPT CODE	NAME	DATE
	POWER SECTOR - PROJECT ENGINEERING MANAGEMENT		M	SKY	S/D 17.02.16
NOIDA, UTTAR PRADESH - 201301			CHK	SKY	S/D 17.02.16
			APPD	PK	S/D 17.02.16
PACKAGE FUEL OIL UNLOADING & STORAGE SYSTEM					
TITLE GA AND NOZZLE ORIENTATION DRAWING OF LDO STORAGE TANK CAP. 1000M ³					
			DEPT. SCALE	NTS	BHEL DRAWING NO.
			SIGN		FE-DG-417-106-A002
			DATE		SHEET 02 OF 02
					REV. 00