BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-24-Jul-18

CORRIGENDUM- 02

PROJECT	:	3X800 MW PVUNL PATRATU TPP PHASE-1
PACKAGE	:	FUEL OIL HANDLING AND STORAGE SYSTEM
ENQUIRY NO	:	PE/PG/PA1/E-5989/2018 Dt. 03.07.2018

Type of Corrigendum			
Technical Corrigendum -	☑	Commercial Corrigendum -	☑

In reference to the above mentioned tender enquiry for **FUEL OIL HANDLING AND STORAGE SYSTEM** package

Please note the following.

1. Amendment to technical specification.
2. Due date has extended from 27.07.2018 to 07.08.2018 till 02:00 PM. Bid opening shall be done at 03:00 PM on the due date.

All the other terms and conditions of the tender enquiry remain unchanged. All the bidders are requested to quote accordingly.

Corrigendum

Yours faithfully,

For and on behalf of BHEL

VINIT KUMAR VERMA

Digitally signed by VINIT KUMAR VERMA
DN: c=IN, o=BHARAT HEAVY ELECTRICALS LIMITED, postalCode=201301, st=Uttar Pradesh, 2.5.4.20=6548fa91156ed58ab733462e2c216ee861e12e8b63f3f0fdc6527323d5766b2f, serialNumber=8b7f06e2ef4d7d5cb58c26fb12c7db987c445ca810453d3685305ea07a561880, cn=VINIT KUMAR VERMA
Date: 2018.07.24 15:05:16 +05'30'

Vinit Kumar Verma
Dy. Manager

PATRATU VIDYUT UTPADAN NIGAM LIMITED

3X800MW PVUNL PATRATU TPP PHASE-1

AMENDMENT NO – 01

FUEL OIL HANDLING SYSTEM

SPECIFICATION NO.: PE-TS-434-166-A001

BHARAT HEAVY ELECTRICALS LTD

POWER SECTOR
PROJECT ENGINEERIING MANAGEMENT

NOIDA

	FUEL OIL HANDLING SYSTEM 3X800 MW PVUNL PATRATU TPP PHASE-1	SPEC. No: PE-TS-434-166-A001
		AMENDMENT NO. - 1
		DATE 21.07.2018
		SHEET 1 OF 1

AMENDMENT / addition TO EXISTING CLAUSES OF FOHS TECHNICAL SPECIFICATION. Bidder to note that existing discription as appearing in the specification stands deleted / modified or added and clauses / details as mentioned in "ammendment (to be Read as)" column shall be applicable and complied by the bidder.

S.no.	Existing clauses	Amendment/ Addition	Modification
1.0	ANNEXURE-IV - INPUT DRAWINGS & DOCUMENTS	AMENDMENT	1. Plot plan, DOC. No. PE-DG-L07-100-M001 R-01 2. P&IDs OF FOHS Doc. No. 9585-001-130-PVM-L-001 R-01
2.0		ADDITION	1. GA/Nozzle Orientation of HFO, LDO Storage Tank & LDO DAY OIL TANK 9585-001-130-PVM-B-004
3	SPECIFICATION NO. PE-TS-434-166-A001 / Page no. 52 of 598 / DATA SHEET FOR DM WATER STORAGE TANKS / Sl.No. 18,19 & 20 AS PER CUSTOMER'S APPROVED PAINTING SCHEDULE FOR TANK, BREATHER AND SEAL POT. REFER SUB SECTION-A-14 AND CL. 16.00.00 OF SECTION VI, PART B OF NTPC SPECIFICATION	ADDITION	SUB SECTION-A-14 AND CL. 16.00.00 OF SECTION VI, PART B OF NTPC SPECIFICATION Is attached.

NOTE:

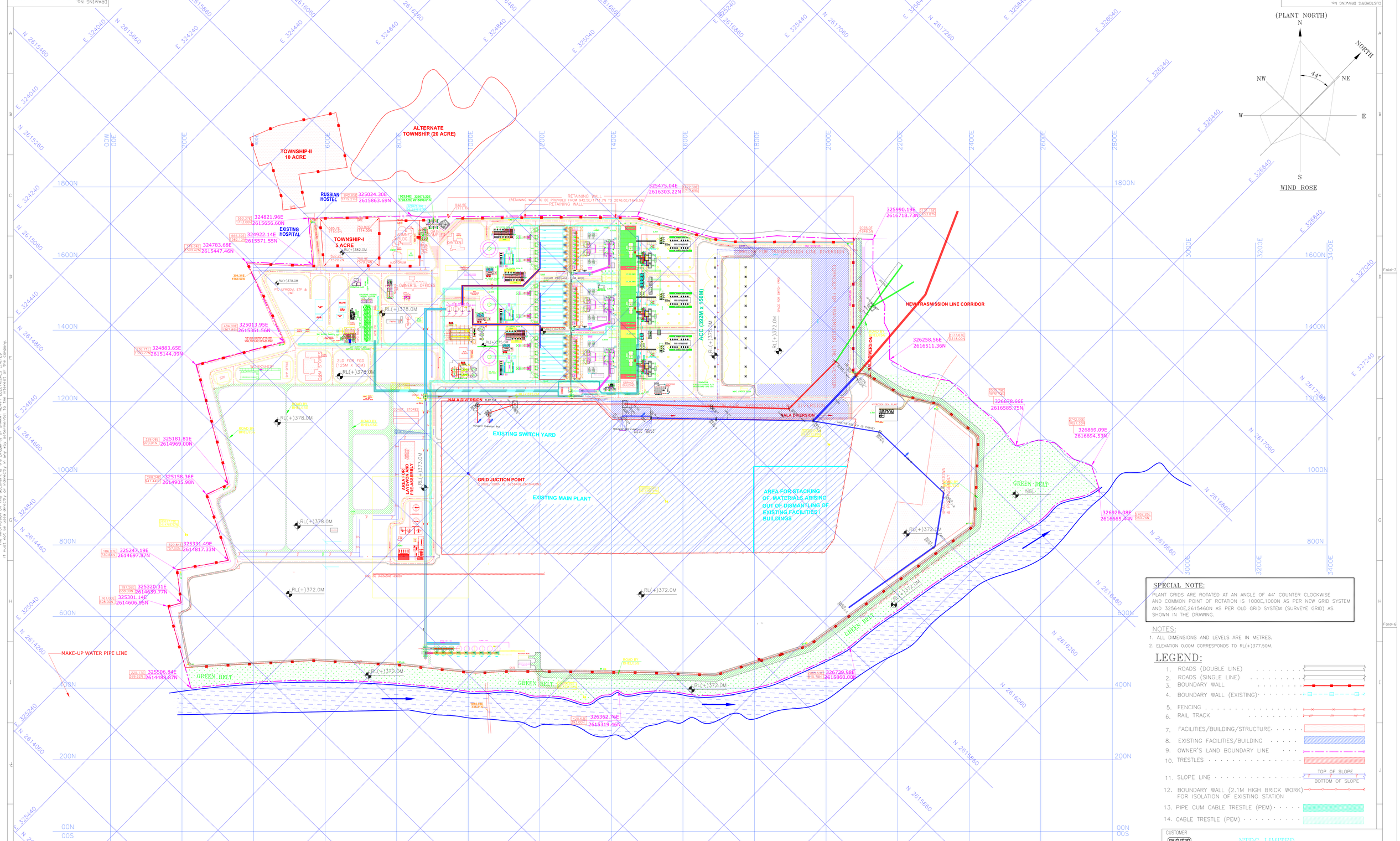
1. REPLIES TO PRE-BID QUERIES SHALL BE BINDING ON BIDDERS.

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

DRAWING No. PE-DG-434-100-M001

CUSTOMER'S DRAWING No.



SPECIAL NOTE:

PLANT GRIDS ARE ROTATED AT AN ANGLE OF 44° COUNTER CLOCKWISE AND COMMON POINT OF ROTATION IS 1000E,1000N AS PER NEW GRID SYSTEM AND 325640E,2615460N AS PER OLD GRID SYSTEM (SURVEYE GRID) AS SHOWN IN THE DRAWING.

NOTES:

1. ALL DIMENSIONS AND LEVELS ARE IN METRES.
2. ELEVATION 0.00M CORRESPONDS TO RL(+)377.50M.

LEGEND:

1. ROADS (DOUBLE LINE)
2. ROADS (SINGLE LINE)
3. BOUNDARY WALL
4. BOUNDARY WALL (EXISTING)
5. FENCING
6. RAIL TRACK
7. FACILITIES/BUILDING/STRUCTURE
8. EXISTING FACILITIES/BUILDING
9. OWNER'S LAND BOUNDARY LINE
10. TRESTLES
11. SLOPE LINE — TOP OF SLOPE / BOTTOM OF SLOPE
12. BOUNDARY WALL (2.1M HIGH BRICK WORK) FOR ISOLATION OF EXISTING STATION
13. PIPE CUM CABLE TRESTLE (PEM)
14. CABLE TRESTLE (PEM)

PRELIMINARY
AS ON 15.02.2018

SCALE: 40 0 40 80 120 160M

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD

JOB NO. 434
STATUS CONTRACT
DISTRIBUTION

CUSTOMER: NTPC LIMITED

3x800MW PATRATU SUPER THERMAL POWER PROJECT

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

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	DESN			
	CHD			
	APPD			

TITLE: PLOT PLAN

DEPT. | SCALE | SIGN | DRAWING NO. PE-DG-L07-100-M001 | SHEET 1 OF 1 | REV. 0P

SIZE-A0

COMPUTER FILE NAME: D4_L07_M001

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

DRAWING No. PE-DG-434-166-A101

CUSTOMER'S DRAWING No.

LEGEND

SYMBOL	DESCRIPTION
	HOSE
	HFO PIPE WITH INSULATED & STEAM TRACED
	COIL HEATER
	PUMP
	LOCAL DRAIN
M	MOTOR
LMS	LIMIT SWITCH
PI	PRESSURE INDICATOR
PT	PRESSURE TRANSMITTER
DPIT	DIFFERENTIAL PRESSURE INDICATOR TRANSMITER
FM	FLOW METER (CORIOLIS TYPE)
FG	FLOW GAUGE
LT	LEVEL TRANSMITTER(RADAR/ULTRASONIC TYPE)
LI	LEVEL INDICATOR
LS	LEVEL SWITCH
TI	TEMPERATURE INDICATOR
TE+TT	TEMPERATURE ELEMENT + TEMPERATURE TRANSMITTER
D	SIGNAL TO DCS
T	STEAM TRAP
	SIMPLEX STRAINER
CS	STEAM CONTROL VALVE
/	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
/	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
/	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
/	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	NON RETURN VALVE
	RELIEF VALVE
	REDUCER/EXPENDER

PIPE NOMENALATURE

350	HFO	3	50

- 50 — INSULATION THICKNESS (IN MM)
- 3 — NO. OF STEAM TRACERS
- HFO — SERVICE FLUID
- 350 — PIPE SIZE IN NB

KKS NOMENALATURE

9	ENC	10	AA	001

- 001 — Instrument number key
- AA — Equipment/Instrument Key
- 10 — Area key
- ENC — Function key
- 9 — Unit number identifier

EQUIPMENTS DETAIL:-

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9ENB10BB001, 9ENB11BB001	HFO STORAGE TANK	2
2	9ENR10BB001	OIL WATER SEPARATOR TANK	1
3	9ENC11AP001, 9ENC12AP001, 9ENC13AP001, 9ENC14AP001, 9ENC15AP001	HFO UNLOADING PUMPS	5
4	9ENC11AT001, 9ENC11AT002, 9ENC12AT001, 9ENC12AT002, 9ENC13AT001, 9ENC13AT002, 9ENC14AT001, 9ENC14AT002, 9ENC15AT001, 9ENC15AT002	HFO SUCTION STRAINER	10
5	9ENB10AC001, 9ENB11AC001	HFO SUCTION HEATER	2
6	9ENB10AH001, 9ENB11AH001, 9ENB20AH001	FLOOR COIL HEATER	3
7	9ENR10AP001, 9ENR10AP002	OIL RECOVERY PUMP (OWS)	2
8	9ENB30AP001, 9ENB30AP002	HFO U/L P/H SUMP PUMP	2
9	ENB31AP001, ENB31AP002, ENB32AP001, ENB32AP002	U/L HEADER TRENCH AND DRAIN TRENCH SUMP PUMP	4

VALVE SELECTION CRITERIA FOR FUEL LINE:

300NB & BELOW: BALL/ PLUG VALVE	50 NB & ABOVE: SWING CHECK VALVE,
ABOVE 300NB: GATE VALVE	BELOW 50NB: LIFT CHECK VALVE

MOC OF OIL PIPE: API-5L GR. B ERW

PIPE SIZE	OUTSIDE DIA (MM)	THICKNESS (MM)
15NB	21.34	2.77
20NB	26.67	2.87
25NB	33.40	3.38
40NB	48.26	3.68
50NB	60.32	3.91
100/80/65NB	114.3/ 88.30/ 73.20	3.96
150NB	168.27	4.78
250/200NB	273.05/ 219.07	5.56
350/300NB	355.60/ 323.85	6.35
400NB	406.40	7.14
450/500NB	457/508	7.14
450NB AND ABOVE SIZE PIPE CAN BE 8.0MM PLATE FABRICATED.		
STEAM/CONDENSATE LINE: ASTM 106 GR. B, STD / 40 SCH.		

NOTES:

1. PUMP HEAD SHALL BE AS PER CALCULATION.
2. ALL VALVES SHOULD BE LOCATED AT GRADE/MAN APPROACHABLE LEVEL.
3. VENTS AND DRAINS SHALL BE PROVIDED AT THE HIGHEST AND LOWEST POINTS RESPECTIVELY AS PER LAYOUT REQUIREMENT.
4. ALL INSTRUMENTS ISOLATION VALVES SHALL BE GLOBE VALVE.
5. ALL HFO LINES, DRAIN OIL LINES, PUMPS, STRAINER, HFO TANKS, DRAIN OIL AND TANKS ARE STEAM TRACED. HFO PUMP AND STRAINER SHALL BE STEAM JACKETED.
6. ALL HFO LINES SHALL BE STEAM TRACED AS FOLLOWS:-

S.NO.	HFO LINE SIZE	NO. OF TRACERS	TRACER LINE SIZE
1	100 NB AND BELOW	1	20NB
2	150NB TO 300NB	2	20NB
3	350NB AND ABOVE	3	20NB

7. ALL DRAIN & VENT VALVES ARE IN NORMALLY CLOSE CONDITION.
8. SIZE OF INLET AND OUTLET SPARE CONNECTIONS SHALL BE SAME AS INLET AND OUTLET NOZZLES.
9. ALL VALVES USED IN OIL LINES SHALL BE FIRE SAFE.
10. ALL HFO, STEAM AND CONDENSATE LINES/EQUIPMENTS SHALL BE INSULATED.
11. COUNTER FLANGES WITH FASTENER & GASKETS AT TERMINAL POINT WILL BE SUPPLY BY VENDER.
12. DRAIN OIL TANK SHALL BE INSULATED.
13. 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.

TENDER DRAWING

434

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REV.	DATE	ALTD	CHD	APPD			

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NTPC DRG No.	9585-001-130-PVM-L-001
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT: –	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE		NAME	SIGN	DATE
M	DRN	SC	Sd/-	23.06.2018
	DESN	SC/RG	Sd/-	23.06.2018
	CHD	HK	Sd/-	23.06.2018
	APPD	SKB	Sd/-	23.06.2018

TITLE PROCESS & INSTRUMENTAION DIAGRAM FOR HFO SYSTEM

DEPT. / SCALE / DRAWING No. PE-DG-434-166-A001

SIGN / DATE

SHEET 01 OF 06 REV 01

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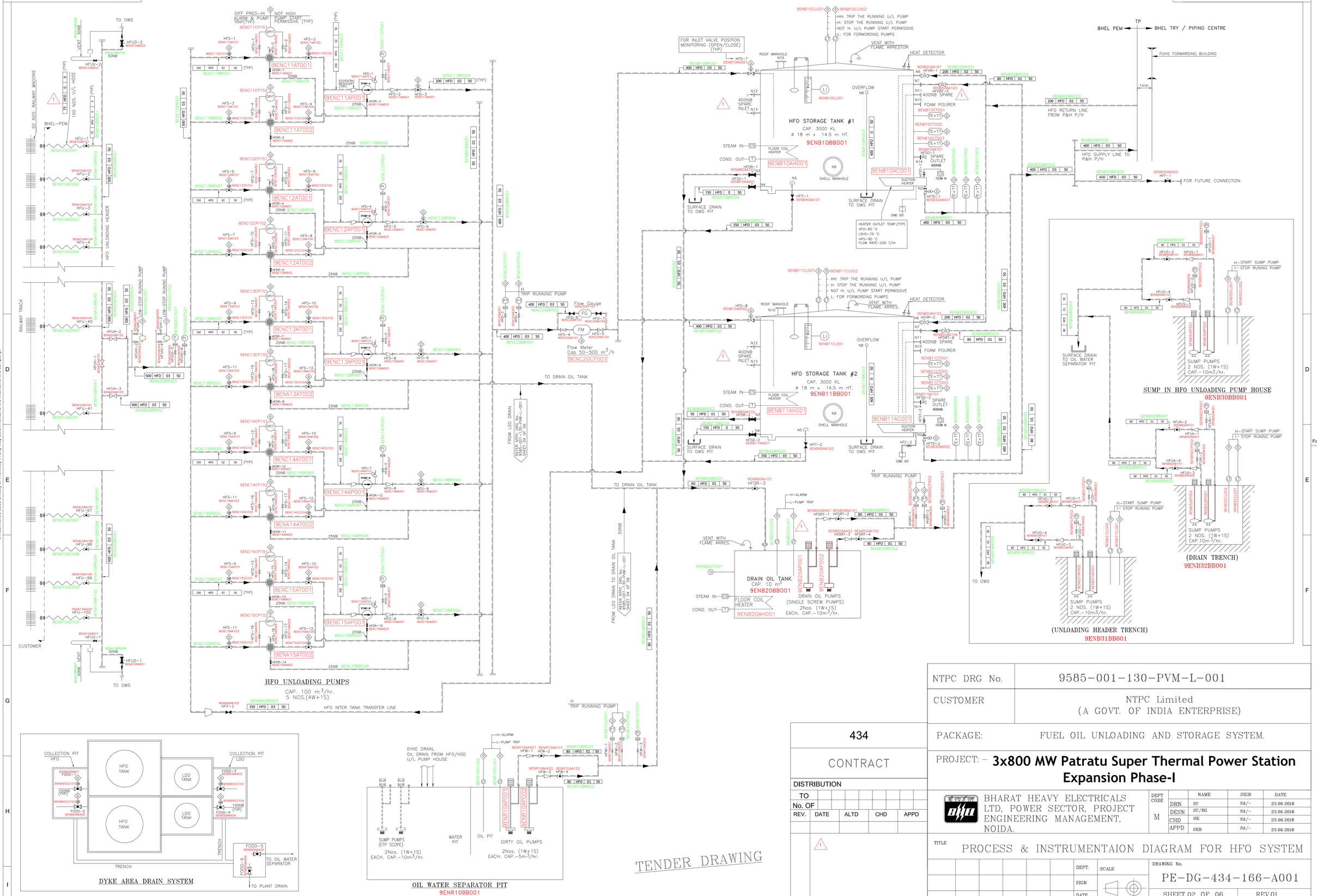
COMPUTER FILE NAME: PE-DG-434-166-A101

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

DRAWING No. PE-DG-434-166-A101

CUSTOMER'S DRAWING No.



NTPC DRG No.	9585-001-130-PVM-L-001
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT: –	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

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	APPD	SKB	Sd/-	23.06.2018

TITLE: PROCESS & INSTRUMENTAION DIAGRAM FOR HFO SYSTEM

DEPT. / SIGN / DATE / SCALE

DRAWING No. PE-DG-434-166-A001

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FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

DRAWING No. PE-DG-434-166-A102

CUSTOMER'S DRAWING No.

LEGEND

SYMBOL	DESCRIPTION
	HOSE
	LDO PIPE LINE
	PUMP
	LOCAL DRAIN
M	MOTOR
LMS	LIMIT SWITCH
PI	PRESSURE INDICATOR
PT	PRESSURE TRANSMITTER
DPIT	DIFFERENTIAL PRESSURE INDICATOR TRANSMITER
FM	FLOW METER (CORIOLIS TYPE)
FG	FLOW GAUGE
LT	LEVEL TRANSMITTER(RADAR/ULTRASONIC TYPE)
LI	LEVEL INDICATOR
LS	LEVEL SWITCH
D	SIGNAL TO DCS
	SIMPLEX STRAINER
	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	NON RETURN VALVE
	RELIEF VALVE
	REDUCER/EXPENDER

EQUIPMENTS DETAIL:-

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9EGB10BB001, 9EGB11BB001	LDO STORAGE TANK	2
2	9EGC11AP001, 9EGC12AP001	LDO UNLOADING PUMPS	2
3	9EGC11AT001, 9EGC11AT002, 9EGC12AT001, 9EGC12AT002, 9EGC31AT001, 9EGC31AT002	SUCTION STRAINER	6
4	9EGB12BB001	LDO DAY OIL TANK	1
5	9EGC31AP001, 9EGC31AP002	LDO TRANSFER PUMPS	2

VALVE SELECTION CRITERIA FOR FUEL LINE:

300NB & BELOW: BALL/ PLUG VALVE	50 NB & ABOVE: SWING CHECK VALVE,
ABOVE 300NB: GATE VALVE	BELOW 50NB: LIFT CHECK VALVE

NOTES:

1. ALL VALVES SHOULD BE LOCATED AT GRADE/MAN APPROACHABLE LEVEL.
2. VENTS AND DRAINS SHALL BE PROVIDED AT THE HIGHEST AND LOWEST POINTS RESPECTIVELY.
3. HIGHER SIZE HAS BEEN PROVIDED BASED ON PIPE SIZING CRITERIA AND AS PER TENDER DRG.
4. ALL INSTRUMENTS ISOLATION VALVES SHALL BE GLOBE VALVE.
5. ALL DRAIN & VENT VALVES ARE IN NORMALLY CLOSE CONDITION.
6. 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.

KKS NOMENALATURE

9	ENC	10	AA	001

- 001 → INSTRUMENT NUMBER KEY
- AA → EQUIPMENT/INSTRUMENT KEY
- 10 → AREA KEY
- ENC → FUNCTION KEY
- 9 → UNIT NUMBER IDENTIFIER

PIPE NOMENALATURE

XXX	XXX	XXX	XXX

- XXX → INSULATION THICKNESS (IN MM)
- XXX → NO. OF STEAM TRACERS
- XXX → SERVICE FLUID
- XXX → PIPE SIZE IN NB

TENDER DRAWING

NTPC DRG No.	9585-001-130-PVM-L-001
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT:-	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

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	APPD	SKB	Sd/-	23.06.2018

TITLE PROCESS & INSTRUMENTAION DIAGRAM FOR LDO SYSTEM

DEPT. / SIGN / DATE / SCALE

DRAWING No. PE-DG-434-166-A001

SHEET 03 OF 06 REV 01

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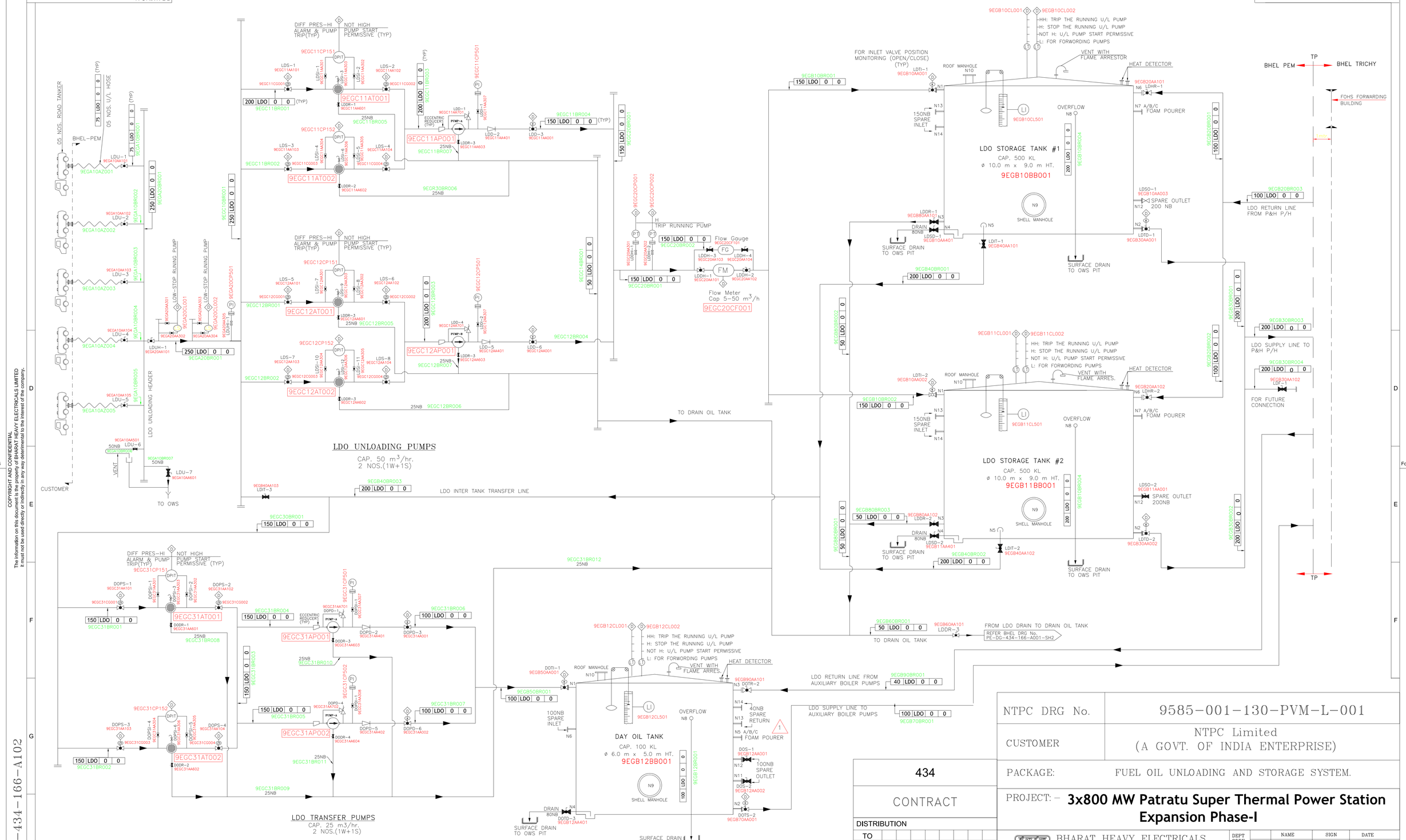

NTPC DRG No.	9585-001-130-PVM-L-001
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT: –	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

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TITLE: PROCESS & INSTRUMENTAION DIAGRAM FOR LDO SYSTEM

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LEGEND

SYMBOL	DESCRIPTION
	STEAM LINE WITH INSULATION
	HOSE
	CONDENSATE LINE WITH INSULATION
	INSTRUMENT AIR LINE
	DM WATER LINE
	COIL HEATER
	HEATING COIL
	LOCAL DRAIN
TE+TT	TEMPERATURE ELEMENT + TEMPERATURE TRANSMITTER
TI	TEMPERATURE INDICATOR
PI	PRESSURE INDICATOR
PT	PRESSURE TRANSMITTER
TE	TEMPERATURE ELEMENT
D	SIGNAL TO DCS
T	TRAP WITH INBUILT STRAINER
	SIMPLEX STRAINER
	Y-TYPE STRAINER
CS	CONTROL STATION
	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	NON RETURN VALVE
	PRESSURE RELIEF VALVE
	DISC CHECK VALVE
	CONTROL VALVE
SP	SMART POSITIONER
	REDUCER/EXPENDER

EQUIPMENTS DETAIL:-

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9ENB10BB001, 9ENB11BB001	HFO STORAGE TANK	2
3	9ENB20BB001	DRAIN OIL TANK	1
4	9ENC11AP001, 9ENC12AP001, 9ENC13AP001	HFO UNLOADING PUMPS	3
5	9ENC11AT001, 9ENC11AT002, 9ENC12AT001, 9ENC12AT002, 9ENC13AT001, 9ENC13AT002	HFO SUCTION STRAINER	6
6	9ENB10AC001, 9ENB11AC001	HFO SUCTION HEATER	2
7	9ENB10AH001, 9ENB11AH001, 9ENR10AH001	FLOOR COIL HEATER	3

EQUIPMENTS DETAIL:-

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9ENB10BB001, 9ENB11BB001	HFO STORAGE TANK	2
2	9ENR10BB001	OIL WATER SEPARATOR TANK	1
3	9ENC11AP001, 9ENC12AP001, 9ENC13AP001, 9ENC14AP001, 9ENC15AP001	HFO UNLOADING PUMPS	5
4	9ENC11AT001, 9ENC11AT002, 9ENC12AT001, 9ENC12AT002, 9ENC13AT001, 9ENC13AT002, 9ENC14AT001, 9ENC14AT002, 9ENC15AT001, 9ENC15AT002	HFO SUCTION STRAINER	10
5	9ENB10AC001, 9ENB11AC001	HFO SUCTION HEATER	2
6	9ENB10AH001, 9ENB11AH001	FLOOR COIL HEATER	2
7	9ENR10AP001, 9ENR10AP002	OWS SUMP PUMPS	2
8	9ENB30AP001, 9ENB30AP002	HFO U/L P/H SUMP PUMP	2
9	ENB31AP001, ENB31AP002, ENB32AP001, ENB32AP002	U/L HEADER TRENCH AND DRAIN TRENCH SUMP PUMP	4

NOTES:

1. ALL STEAM/CONDENSATE LINES SHALL BE INSULATED.
2. STEAM TRAPS FOR SUCTION HEATER & FLOOR COIL HEATER OF STORAGE TANKS SHALL BE OF IB TYPE. ALL OTHER STEAM TRAPS SHALL BE OF TD TYPE.
3. FOR STEAM LINES & TRACER LINES, TRAPS SHALL BE PROVIDED AT EVERY 30 TO 35 MTR.
4. SHELL SURFACE OF F.O. STORAGE TANKS SHALL BE INSULATED.
5. PIPE SIZES FOR ALL STEAM LINES, TRACER LINES, CONTROL STATIONS, CONDENSATE LINES ETC. SHALL BE PROVIDED AS PER APPROVED CALCULATION.
6. ALL CONTROL VALVES SHALL BE PROVIDED WITH ISOLATION VALVES AND WITH A DRAIN VALVE IN UPSTREAM AND DOWNSTREAM.
7. DELETED.
8. DELETED (1)
9. MODULATING TYPE CONTROL VALVE FOR FLOOR COIL HEATER AND SUCTION HEATER SHALL BE PROVIDED.
10. INSTRUMENTS SHALL BE PROVIDED AS PER P&ID.
11. DRAIN FROM FLASH TANK SHALL BE DISCHARGED TO OIL WATER SEPARATOR.
12. DELETED.
13. 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.

PIPE NOMENALATURE

350	HFO	3	50

- 50 → INSULATION THICKNESS (IN MM)
- 3 → NO. OF STEAM TRACERS
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- 350 → PIPE SIZE IN NB

KKS NOMENALATURE

9	ENC	10	AA	001

- 001 → Instrument number key
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TENDER DRAWING

NTPC DRG No.	9585-001-130-PVM-L-001
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT:-	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

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No. OF							
REV.	DATE	ALTD	CHD	APPD			

(1)

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DEPT CODE		NAME	SIGN	DATE
M	DRN	SC	Sd/-	23.06.2018
	DESN	SC/RG	Sd/-	23.06.2018
	CHD	HK	Sd/-	23.06.2018
	APPD	SKB	Sd/-	23.06.2018

TITLE: PROCESS & INSTRUMENTATION DIAGRAM FOR STEAM AND CONDENSATE SYSTEM

DEPT. / SIGN / DATE / SCALE

DRAWING No. PE-DG-434-166-A103

SHEET 05 OF 06 REV 01

SIZE-A1

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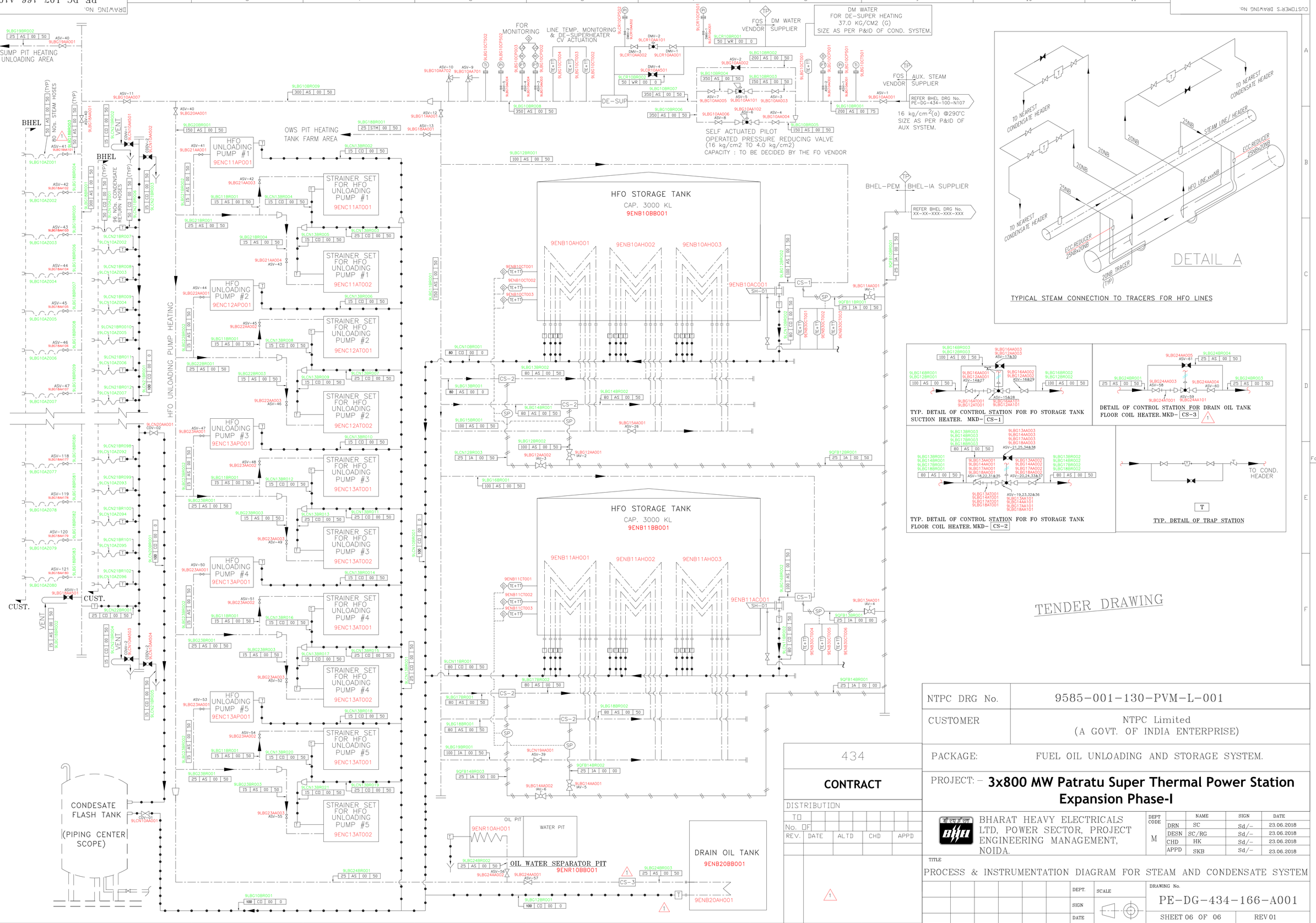
COMPUTER FILE NAME: PE-DG-434-166-A101

FIRST ANGLE PROJECTION

ALL DIMENSIONS ARE IN MM

DRAWING No. PE-DG-L07-166-A103

CUSTOMER'S DRAWING No.



NTPC DRG No.	9585-001-130-PVM-L-001
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT: –	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

434

CONTRACT

DISTRIBUTION

TO

No. OF

REV.	DATE	ALTD	CHD	APPD

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE		NAME	SIGN	DATE
M	DRN	SC	Sd/-	23.06.2018
	DESN	SC/RG	Sd/-	23.06.2018
	CHD	HK	Sd/-	23.06.2018
	APPD	SKB	Sd/-	23.06.2018

TITLE

PROCESS & INSTRUMENTATION DIAGRAM FOR STEAM AND CONDENSATE SYSTEM

DEPT. / SIGN / DATE / SCALE

DRAWING No. PE-DG-434-166-A001

SHEET 06 OF 06 REV 01

SIZE-A1

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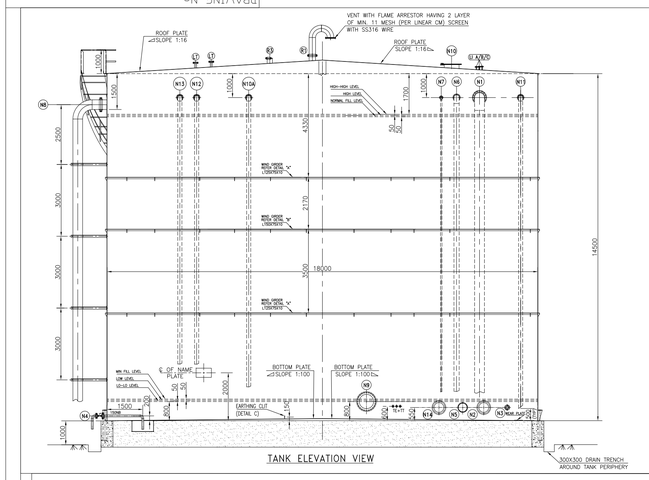
COMPUTER FILE NAME PE-DG-L07-166-A103

FIRST ANGLE PROJECTION

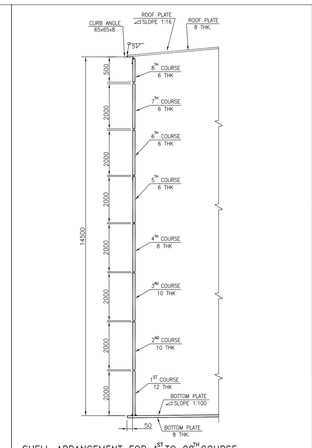
ALL DIMENSIONS ARE IN MM

DRAWING No. PE-DG-434-166-A004

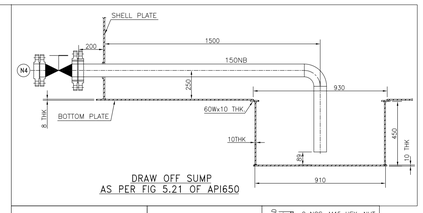
CUSTOMER'S DRAWING No.



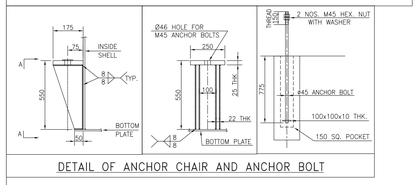
TANK ELEVATION VIEW



SHELL ARRANGEMENT FOR 1ST TO 08TH COURSE



DRAW OFF SUMP
AS PER FIG 5.21 OF API650



DETAIL OF ANCHOR CHAIR AND ANCHOR BOLT

DESIGN DATA

DESCRIPTION	UNIT	DETAIL
DESIGN CODE	-	API 650
STORED PRODUCT	-	HFO
SPECIFIC GRAVITY OF PRODUCT STORED	kg/m3	890 to 950
TYPE OF TANK	-	VERTICAL CYLINDRICAL, SUPPORTED CONE ROOF
NUMBER OF TANKS	no	TWO (2)
DIAMETER OF TANK (ID)	mm	18000
HEIGHT OF TANK	mm	14500
TANK EMPTY WEIGHT	kg	94366
TANK FILLED WEIGHT	kg	3313036
NET WORKING CAPACITY	m3	3014 (AS PER FIG 5.4 OF API650)
MAXIMUM TANK CAPCITY	m3	3219 (AS PER FIG 5.4 OF API650)
BASIC WIND SPEED	m/s	39
DESIGN TEMPERATURE	°C	120
INTERNAL DESIGN PRESSURE	KPa	18 AS PER API650
OPERATING PRESSURE	-	ATMOSPHERIC
CORROSION ALLOWANCE	mm	2.0
PEAK GROUND ACCELERATION (SP)	-	0.41
SEISMIC MOMENTS	KNM	RING WALL MOMENT -26195.11, SLAB MOMENT - 36818.88
WIND LOAD & WIND MOMENT	KN & KNM	421.9 & 6015.63
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	600
RATE OF EMPTYING OF TANK (MAX)	m3/hr	120

Name of Manufacturer:

TANK NOMINAL DIAMETER	18.0 M
TANK NOMINAL HEIGHT	14.5 M
MAXIMUM CAPACITY	3219 M3
DATE OF MANUFACTURE	2017
DESIGN LIQUID LEVEL	12.655 M
DESIGN CODE	API650
MAXIMUM OPERATING PRESS.	AMBIENT
MAXIMUM OPERATING TEMP.	50 DEGC
DESIGN TEMPERATURE	60 DEGC
MATERIAL OF TANK	IS 2062 GR A/B

3 MM THK. MATERIAL - SS

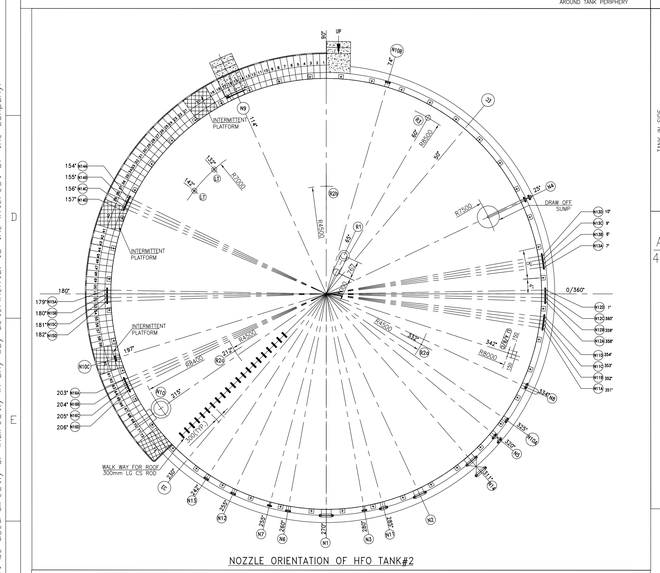
NAME PLATE DETAIL

SHELL NOZZLES & APPURTENANCES FOR TANK#2

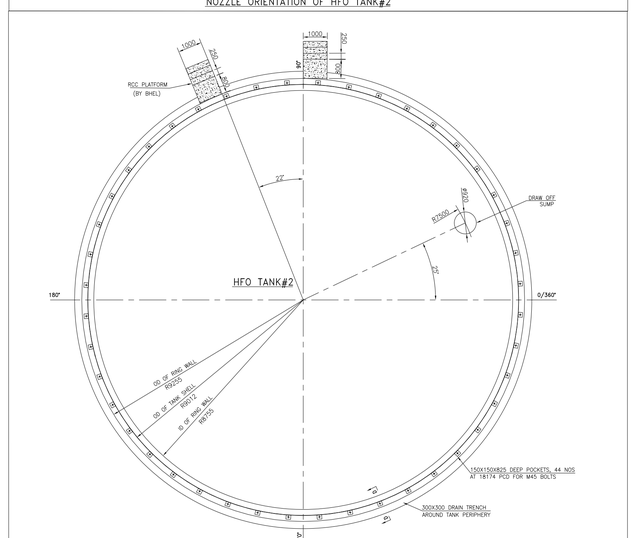
MARK	SIZE NB	QTY. (NO.)	FLANGE TYPE, RATING	NOZZLE CENTRE ELE FROM TOP OF BOTTOM PLATE AS PER TABLE 5.6a OF API650	PROJ. DIST. FROM SHELL OF PLATE AS PER TABLE 5.6a OF API650	NOZZLE THK IN MM AS PER TABLE 5.6a OF API650	SERVICE
N1	400	1	SORF,150#	13500.0	250	12.70	INLET
N2	400	1	SORF,150#	550	250	12.70	OUTLET (SUCTION HEATER)
N3	50	1	SORF,150#	550	175	7.62	RETURN FROM TANK TO DOT
N4	150	1	SORF,150#	250	200	10.97	DRAW-OFF SUMP
N5	350	1	SORF,150#	550	250	12.7	INTER TANK TRANSFER
N6	200	1	SORF,150#	13500.0	200	10.97	HFO RETURN FROM BOILER
N7	80	1	SORF,150#	13500.0	150	5.54	OIL RETURN FROM DWS/DOT
N8	400	1	SORF,150#	13203.0	250	12.70	OVERFLOW
N11	400	1	SORF,150#	13500.0	250	12.70	SPARE (BLIND FLANGE)
N12	400	1	SORF,150#	13500.0	200	12.70	SPARE INLET (BLIND FLANGE)
N13	400	1	SORF,150#	13500.0	200	12.70	SPARE INLET (BLIND FLANGE)
N14	400	1	SORF,150#	550.0	200	12.70	SPARE OUTLET (WITH VALVE)
N10A/B/C	150	3	SORF,150#	13500.00	200	10.97	FOAM POURER
N11 A/B/C/D	40	4	SORF,150#	475.0	150	5.54	STEAM INLET TO FLOOR COIL HEATER
N12 A/B/C/D	40	4	SORF,150#	475.0	150	5.54	STEAM INLET TO FLOOR COIL HEATER
N13 A/B/C/D	40	4	SORF,150#	475.0	150	5.54	STEAM INLET TO FLOOR COIL HEATER
N14 A/B/C/D	40	4	SORF,150#	255.0	150	5.54	CONDENSATE OUT OF FLOOR COIL HEATER
N15 A/B/C/D	40	4	SORF,150#	255.0	150	5.54	CONDENSATE OUT OF FLOOR COIL HEATER
N16 A/B/C/D	40	4	SORF,150#	255.0	150	5.54	CONDENSATE OUT OF FLOOR COIL HEATER
TE+TT	M33X2 - SOCKET	3	-	600	-	-	TEMPERATURE ELEMENT+TRANSMITER
N9	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#2

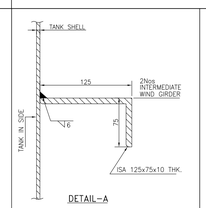
MARK	SIZE NB	QTY. (NO.)	FLANGE TYPE, RATING	NOZZLE CENTER DISTANCE FROM ROOF CENTER	PROJ. DIST. FROM SHELL OF PLATE AS TABLE 5.6a OF API650	NOZZLE THK IN MM AS PER TABLE 5.6a OF API650	SERVICE
R1	250	1	SORF, #150	1000	200	12.7	VENT
R2 a/b/c	25	3	-	4500	-	-	25 DIA HOLES FOR HEAT DETECTION
R3	200	1	SORF, #150	8500	200	12.7	GAUGE WELL FOR GAUGE HATCH
LT	40	2	SORF, #150	7000	175	7.62	LEVEL TRANSMITTERS (ULTRA SONIC)
LI A/B/C	40	3	SORF, #150	8000	150	6.35	LEVEL INDICATOR (FLOAT & ARROW TYPE)
N10	600	1	AS PER FIG 5.16 OF API650	8400	150	6	ROOF MANHOLE WITH COVER



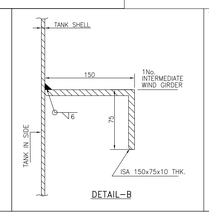
NOZZLE ORIENTATION OF HFO TANK#2



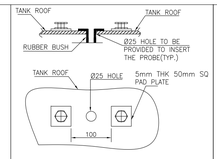
RINGWALL FOUNDATION PLAN FOR HFO TANKS #2



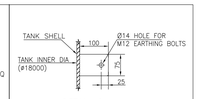
DETAIL-A



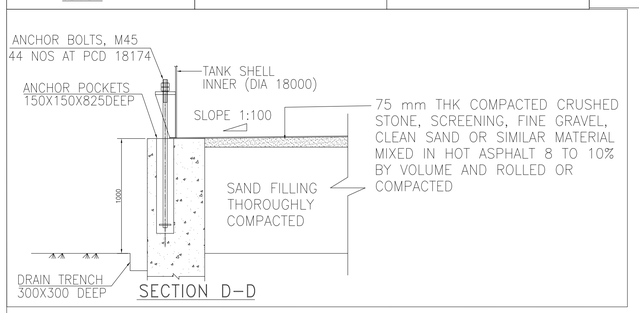
DETAIL-B



MOUNTING DETAILS OF PROBE
TYPE HEAT DETECTOR



DETAIL-C
EARTHING CLIT
AS PER FIG 5.23 OF API650



SECTION D-D

NOTES:-

1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METRE UNLESS OTHER WISE SPECIFIED.
2. 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.
3. VERTICAL SHELL JOINTS SHALL BE OFFSET FROM EACH OTHER WITH A MINIMUM DISTANCE OF 5 TIMES THE THICKNESS OF SHELL COURSE UNDER CONSIDERATION.
4. 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.
9. EARTHING LUG AND NAME PLATE SHALL BE WELDED TO THE TANK AS PER SITE REQUIREMENT.
10. ALL THE INLET PIPING SHALL BE EXTENDED UPTO BOTTOM OF TANK AND CLEARANCE BETWEEN THE BOTTOM OF TANK AND THE THE EDGES OF INLET PIPING SHALL BE 500 MM MAXIMUM.
11. WEIR PLATE SHALL BE PROVIDED AT THE BOTTOM OF ALL THE INLET PIPES INSIDE TANK TO AVOID EROSION OF BOTTOM PLATE.
12. TREAD AND RISE FOR STAIRCASE OF THE TANK SHALL BE 250 AND 200 MM RESPECTIVELY.
13. LEVEL INDICATOR SUPPORTS SHALL BE PROVIDED ON THE SHELL & ROOF.
14. NOZZLE FOR FOAM POURER, HOLES FOR HEAT DETECTOR ON TANK ROOF, PAD PLATES ON TANK FOR SUPPORTING FOAM POURER PIPE AND MVW SPRAY SYSTEM SHALL BE PROVIDED BY VENDOR AS PER FIRE PROTECTION SYSTEM DRAWING.
15. FINAL PAINTING SHALL BE CARRIED OUT AS PER APPROVED PAINTING SCHEDULE AFTER HYDRO TEST OF TANK.
16. TANK NOZZLE FLANGES SHALL BE PROVIDED WITH COUNTER FLANGES ALONG WITH NUTS & BOLTS BY TANK VENDOR.
17. OPERATING PLATFORMS SHALL BE PROVIDED BY TANK VENDOR FOR ALL THE INACCESSIBLE VALVES AND FOAM POURER OF TANK
18. FABRICATION, ERECTION AND TESTING SHALL BE AS PER API650/IS 803.
19. FOR MANUAL WELDING PROCESSES, FILLET WELD LEGS OR GROOVE WELD DEPTHS GREATER THAN 6MM SHALL BE MULTIPASS.
20. ALL TANK SHELL WELD INTERSECTIONS WHERE VERTICAL JOINTS MEET THE HORIZONTAL JOINTS SHALL BE RADIOGRAPHED, REGARDLESS OF THICKNESS.
21. ALL RADIOGRAPHY OR OTHER NDE AND ANY WELDING SHALL BE COMPLETED PRIOR TO HYDROSTATIC TESTING.
22. 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.
23. ALL INLET PIPING TO THE TANK SHALL BE PROVIDED WITH SUITABLE SIPHON BREAKER.
24. MANHOLE FOR ROOF AND SHELL OF TANK SHALL BE HINGED TYPE.
25. NOZZLE ORIENTATION OF TANK#1 IS MIRROR IMAGE OF TANK#2
26. INSULATION SHALL BE PROVIDED ON COMPLETE SHELL OF THE HFO TANKS.
27. TANK NOZZLE SIZES AND ORIENTATION ARE TENTATIVE SAME SHALL BE FINALIZED DURING DETAIL ENGINEERING.

MATERIAL SPECIFICATION

ITEM	MATERIAL
SHELL, BOTTOM, ROOF, RF PL	IS:2062 GR. B
NOZZLES	API 5L GR. B ERW (PLAIN ENDS FOR PIPE SIZES 50NB & BELOW AND BW ENDS FOR PIPE SIZES ABOVE 50 NB)
MANWAYS NECK	IS:2062 GR. B
NOZZLE FLANGES	ASTM A105 AS PER ANSI 16.5
HAND RAILING (40NB)	IS:1239 MS GALVANIZED (MEDIUM CLASS)
GASKETS	TEFLON
BOLTING (NUTS & BOLTS)	ASTM A194 GR. 2H / ASTM A193 GR. B7
STRUCTURALS	IS:2062 GR A/B
FITTINGS OF 50 NB & BELOW (SW END)	ASTM A105, SW TO ANSI B16.11
FITTINGS ABOVE 50 NB (BW END)	ASTM A234 GR. WPB, BW TO ANSI B16.9
NAME PLATE AND EARTHING CLIT	SS 304

REFERENCE DRAWINGS

S.N	TITLE	NTPC DRG No	BHEL DRG No.
1.	DESIGN/CALCULATION OF TANKS FOR FDHS (HFO, LDO & LDO DAY TANK)	9585-001-130-PVM-U-003	PE-DC-434-166-A003
2.	P&IDs OF FDHS (HFO, LDO, STEAM, CONDENSATE & DAY TANK SYSTEM)	9585-001-130-PVM-L-001	PE-DG-434-166-A001
3.	PLOT PLAN	9585-001-999-PQC-F-001	PE-DG-434-100-M001

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

434

CONTRACT

DISTRIBUTION

TO						
No. OF						
REV.	DATE	ALTD	CHD	APPD		

NTPC DRG No.	9585-001-130-PVM-B-004
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT: –	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE		NAME	SIGN	DATE
M	DRN	SC	Sd/-	21.07.2018
	DESN	SC/RG	Sd/-	21.07.2018
	CHD	HK	Sd/-	21.07.2018
	APPD	PK	Sd/-	21.07.2018

TITLE: GA/Nozzle Orientation of HFO Storage Tank

DEPT. / SIGN / DATE

SCALE

DRAWING No. PE-DG-434-166-A004

SHEET 01 OF 03 REV 00

SIZE-A1

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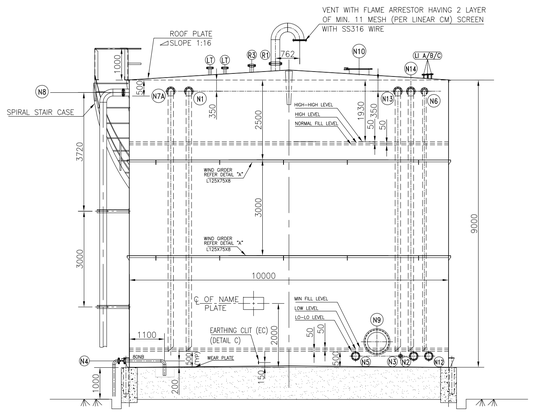
COMPUTER FILE NAME PE-DG-434-166-A004

FIRST ANGLE PROJECTION

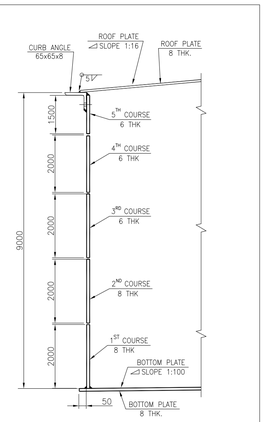
ALL DIMENSIONS ARE IN MM

DRAWING No. PE-DG-434-166-A004

CUSTOMER'S DRAWING No.



TANK ELEVATION VIEW



SHELL ARRANGEMENT FOR 1ST TO 05TH COURSE

Name of Manufacturer:	
TANK NOMINAL DIAMETER	10.0 M
TANK NOMINAL HEIGHT	9.0 M
MAXIMUM CAPACITY	555 M3
DATE OF MANUFACTURE	
DESIGN LIQUID LEVEL	7.07 M
DESIGN CODE	API650
MAXIMUM OPERATING PRESS.	AMBIENT
MAXIMUM OPERATING TEMP.	AMBIENT
DESIGN TEMPERATURE	50 DEGC
MATERIAL OF TANK	IS 2062 GR A/B

3 MM THK. MATERIAL – SS

200

NAME PLATE DETAIL

SHELL NOZZLES & APPURTENANCES FOR TANK#2

MARK	SIZE NB	QTY. (NO.)	FLANGE TYPE, RATING	NOZZLE CENTRE ELE FROM TOP OF BOTTOM SHELL 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	150	1	SORF,150#	8650	200	10.97	INLET
N2	200	1	SORF,150#	350	200	12.70	OUTLET
N4	80	1	SORF,150#	350	175	7.62	DRAW-OFF SUMP
N3	50	1	SORF,150#	200	150	5.54	DRAIN TO DOT
N5	200	1	SORF,150#	350	200	12.7	INTER TANK TRANSFER LINE
N6	100	1	SORF,150#	8650	175	8.56	LDO RETURN FROM BOILER
N7 A/B/C	100	1	SORF,150#	8650	175	8.56	FOAM POURER
N8	200	1	SORF,150#	8609	200	12.70	OVERFLOW
N9	600	1	AS PER FIG 5.16 OFAPI650	800.0	150	8.0	SHELL MANHOLE WITH BLIND FLANGE
N12	200	1	SORF,150#	350	200	12.70	SPARE OUTLET WITH VALVE
N13	150	1	SORF,150#	8650	200	10.97	SPARE INLET (BLIND FLANGE)
N14	150	1	SORF,150#	8650	200	10.97	SPARE INLET (BLIND FLANGE)
EC	–	2	AS PER DETAIL C	–	–	–	EARTHING CLIT

ROOF NOZZLES & APPURTENANCES FOR TANK#2

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	200	1	SORF, #150	1000	200	12.7	VENT
R2 a/b/c	25	3	–	2500	–	–	25 DIA HOLES FOR HEAT DETECTION
R3	200	1	SORF, #150	4500	200	12.7	GAUGE WELL FOR GAUGE HATCH
LT	40	2	SORF, #150	3500	175	7.62	LEVEL TRANSMITTERS (ULTRA SONIC)
LI A/B/C	40	3	SORF, #150	4500	150	6.35	LEVEL INDICATOR
N10	600	1	AS PER FIG 5.16 OFAPI650	4400	150	6	ROOF MANHOLE WITH COVER

MATERIAL SPECIFICATION

ITEM	MATERIAL
SHELL, BOTTOM, ROOF, RF PL	IS:2062 GR. B
NOZZLES	API 5L GR. B ERW (PLAIN ENDS FOR PIPE SIZES 50NB & BELOW AND BW ENDS FOR PIPE SIZES ABOVE 50 NB)
MANWAYS NECK	IS:2062 GR. B
NOZZLE FLANGES	ASTM A105 AS PER ANSI 16.5
HAND RAILING (40NB)	IS:1239 MS GALVANIZED (MEDIUM CLASS)
GASKETS	TEFLON
BOLTING (NUTS & BOLTS)	ASTM A194 GR. 2H / ASTM A193 GR. B7
STRUCTURALS	IS:2062 GR A/B
FITTINGS OF 50 NB & BELOW (SW END)	ASTM A105, SW TO ANSI B16.11
FITTINGS ABOVE 50 NB (BW END)	ASTM A234 GR. WPB, BW TO ANSI B16.9
NAME PLATE AND EARTHING CLIT	SS 304

DESIGN DATA

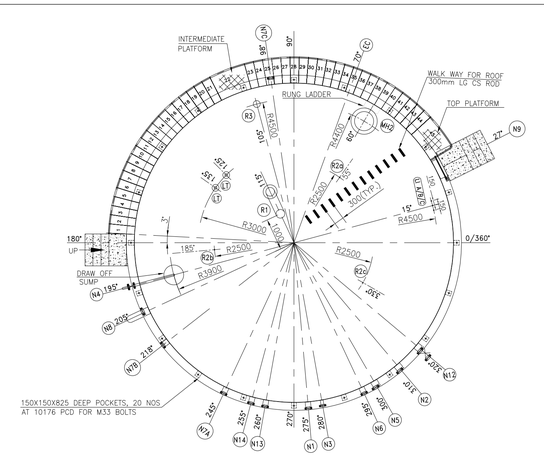
DESCRIPTION	UNIT	DETAIL
DESIGN CODE	–	API 650
STORED PRODUCT	–	LDO
SPECIFIC GRAVITY OF PRODUCT STORED	kg/m3	820 to 870
TYPE OF TANK	–	VERTICAL CYLINDRICAL, SUPPORTED CONE ROOF
NUMBER OF TANKS	no	TWO (2)
DIAMETER OF TANK (ID)	mm	10000
HEIGHT OF TANK	mm	9000
TANK EMPTY WEIGHT	kg	30793
TANK FILLED WEIGHT	kg	737293
NET WORKING CAPACITY	m3	500 (AS PER FIG 5.4 OF API650)
MAXIMUM TANK CAPCITY	m3	544 (AS PER FIG 5.4 OF API650)
BASIC WIND SPEED	m/s	39
DESIGN TEMPERATURE	°C	50
INTERNAL DESIGN PRESSURE	KPa	18 AS PER API650
OPERATING PRESSURE	–	ATMOSPHERIC
CORROSION ALLOWANCE	mm	2
PEAK GROUND ACCELERATION (SP)	–	0.41
ROOF LOAD (UNIFORM LIVE)	kg/m2	150
TESTING	–	AS PER CL7.3 AND SECTION 8 OF API650

NOTES:–

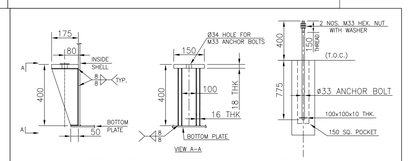
1. ALL DIMENSIONS ARE IN MM., ELEVATIONS ARE IN METRE UNLESS OTHER WISE SPECIFIED.
2. TANK SURFACE SHOULD BE CLEANED THOUGHLY AFTER FABRICATION FROM LOOSE SUBSTANCES AND FOREIGN MATERIALS SUCH AS DIRT, RUST, SCALE, OIL, GREASE AND WELDING FLUX ETC.
3. VERTICAL SHELL JOINTS SHALL BE OFFSET FROM EACH OTHER WITH A MINIMUM DISTANCE OF 5 TIMES THE THICKNESS OF SHELL COURSE UNDER CONSIDERATION.
4. 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.
9. EARTHING LUG AND NAME PLATE SHALL BE WELDED TO THE TANK AS PER SITE REQUIREMENT.
10. ALL THE INLET PIPING SHALL BE EXTENDED UPTO BOTTOM OF TANK AND CLEARANCE BETWEEN THE BOTTOM OF TANK AND THE THE EDGES OF INLET PIPING SHALL BE 500 MM MAXIMUM.
11. WEIR PLATE SHALL BE PROVIDED AT THE BOTTOM OF ALL THE INLET PIPES INSIDE TANK TO AVOID EROSION OF BOTTOM PLATE.
12. TREAD AND RISE FOR STAIRCASE OF THE TANK SHALL BE 250 AND 200 MM RESPECTIVELY.
13. LEVEL INDICATOR SUPPORTS SHALL BE PROVIDED ON THE SHELL & ROOF.
14. NOZZLE FOR FOAM POURER, HOLES FOR HEAT DETECTOR ON TANK ROOF, PAD PLATES ON TANK FOR SUPPORTING FOAM POURER PIPE AND MVW SPRAY SYSTEM SHALL BE PROVIDED BY FO VENDOR AS PER FIRE PROTECTION SYSTEM DRAWING.
15. FINAL PAINTING SHALL BE CARRIED OUT AS PER APPROVED PAINTING SCHEDULE AFTER HYDRO TEST OF TANK.
16. TANK NOZZLE FLANGES SHALL BE PROVIDED WITH COUNTER FLANGES ALONG WITH NUTS & BOLTS BY TANK VENDOR.
17. OPERATING PLATFORMS SHALL BE PROVIDED BY TANK VENDOR FOR ALL THE INACCESSIBLE VALVES AND FOAM POURER OF TANK
18. FABRICATION, ERECTION AND TESTING SHALL BE AS PER API650/IS 803.
19. FOR MANUAL WELDING PROCESSES, FILLET WELD LEGS OR GROOVE WELD DEPTHS GREATER THAN 6MM SHALL BE MULTIPASS.
20. ALL TANK SHELL WELD INTERSECTIONS WHERE VERTICAL JOINTS MEET THE HORIZONTAL JOINTS SHALL BE RADIOGRAPHED, REGARDLESS OF THICKNESS.
21. ALL RADIOGRAPHY OR OTHER NDE AND ANY WELDING SHALL BE COMPLETED PRIOR TO HYDROSTATIC TESTING.
22. 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.
23. ALL INLET PIPING TO THE TANK SHALL BE PROVIDED WITH SUITABLE SIPHON BREAKER.
24. MANHOLE FOR ROOF AND SHELL OF TANK SHALL BE HINGED TYPE.
25. NOZZLE ORIENTATION OF TANK#1 IS MIRROR IMAGE OF TANK#2.
27. TANK NOZZLE SIZES AND ORIENTATION ARE TENTATIVE SAME SHALL BE FINALIZED DURING DETAIL ENGINEERING.

REFERENCE DRAWINGS

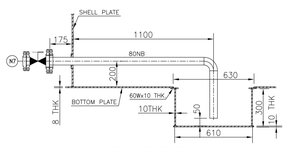
S.N	TITLE	NTPC DRG No	BHEL DRG No.
1.	DESIGNCALCULATION OF TANKS FOR FOHS (HFO, LDO & LDO DAY TANK)	9585-001-130-PVM-U-003	PE-DC-434-166-A003
2.	P&IDs OF FOHS (HFO, LDO, STEAM, CONDENSATE & DAY TANK SYSTEM)	9585-001-130-PVM-L-001	PE-DG-434-166-A001
3.	PLOT PLAN	9585-001-999-POC-F-001	PE-DG-434-100-M001



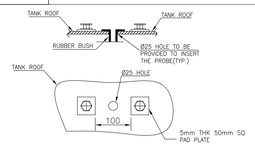
NOZZLE ORIENTATION OF LDO TANK#2



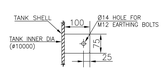
DETAIL OF ANCHOR CHAIR AND ANCHOR BOLT



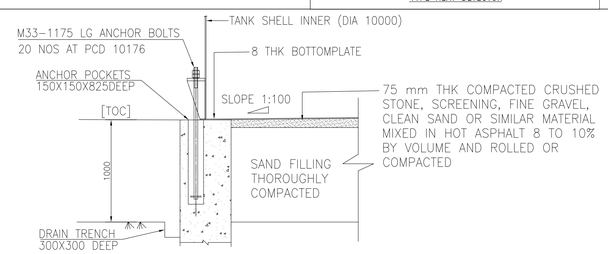
DRAW OFF SUMP AS PER FIG 5.21 OF API650



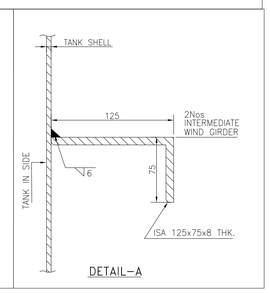
MOUNTING DETAILS OF PROBE TYPE HEAT DETECTOR



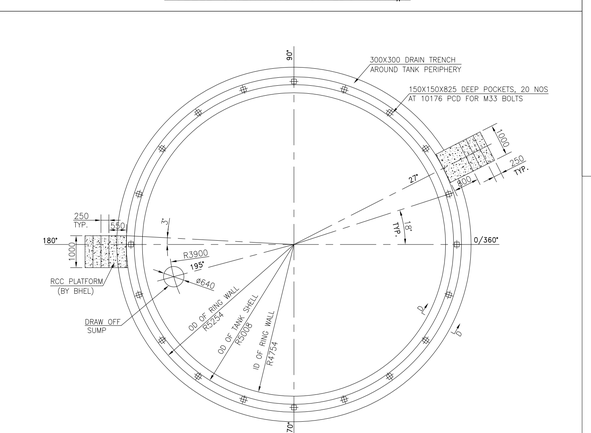
DETAIL–C
EARTHING CLIT
AS PER FIG 5.23 OF API650



SECTION D–D



DETAIL–A



RINGWALL FOUNDATION PLAN FOR LDO TANK # 2

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

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TO							
No. OF							
REV.	DATE	ALTD		CHD		APPD	

NTPC DRG No.	9585-001-130-PVM-B-004
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT: –	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE		NAME	SIGN	DATE
M	DRN	SC	Sd/–	21.07.2018
	DESN	SC/RG	Sd/–	21.07.2018
	CHD	HK	Sd/–	21.07.2018
	APPD	PK	Sd/–	21.07.2018

TITLE: GA/Nozzle Orientation of LDO Storage Tank

DEPT. / SIGN / DATE / SCALE

DRAWING No. PE-DG-434-166-A004

SHEET 02 OF 03 REV 00

SIZE-A1

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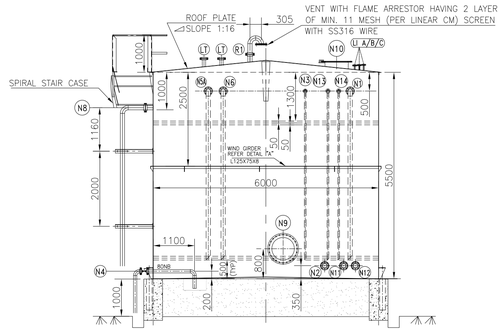
COMPUTER FILE NAME PE-DG-434-166-A004

FIRST ANGLE PROJECTION

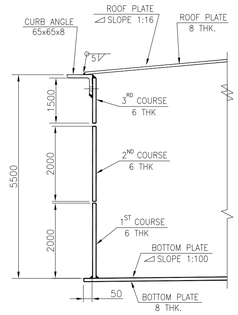
ALL DIMENSIONS ARE IN MM

DRAWING NO. PE-DG-434-166-A004

CUSTOMER'S DRAWING NO.



TANK ELEVATION VIEW



SHELL ARRANGEMENT FOR 1ST TO 03RD COURSE

Name of Manufacturer:	
TANK NOMINAL DIAMETER	10.0 M
TANK NOMINAL HEIGHT	9.0 M
MAXIMUM CAPACITY	119 M3
DATE OF MANUFACTURE	
DESIGN LIQUID LEVEL	4.2 M
DESIGN CODE	API650
MAXIMUM OPERATING PRESS.	AMBIENT
MAXIMUM OPERATING TEMP.	AMBIENT
DESIGN TEMPERATURE	50 DEGC
MATERIAL OF TANK	IS 2062 GR A/B

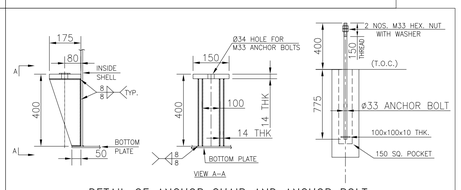
3 MM THK. MATERIAL – SS

150 200

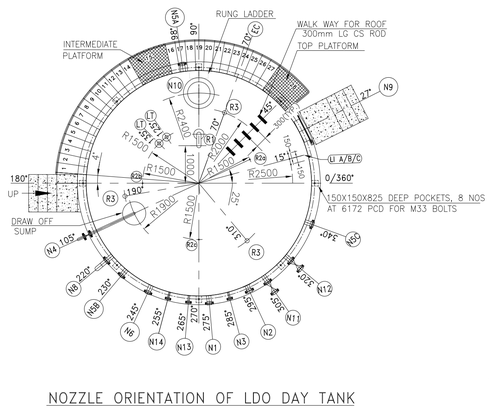
NAME PLATE DETAIL

DESIGN DATA

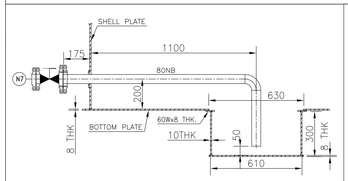
DESCRIPTION	UNIT	DETAIL
DESIGN CODE	–	API 650
STORED PRODUCT	–	LDO
SPECIFIC GRAVITY OF PRODUCT STORED	kg/m3	820 to 870
TYPE OF TANK	–	VERTICAL CYLINDRICAL, SUPPORTED CONE ROOF
NUMBER OF TANKS	no	ONE (1)
DIAMETER OF TANK (ID)	mm	6000
HEIGHT OF TANK	mm	5500
TANK EMPTY WEIGHT	kg	10365
TANK FILLED WEIGHT	kg	165795
NET WORKING CAPACITY	m3	102 (AS PER FIG 5.4 OF API650)
MAXIMUM TANK CAPCITY	m3	119 (AS PER FIG 5.4 OF API650)
BASIC WIND SPEED	m/s	39
DESIGN TEMPERATURE	°C	50
INTERNAL DESIGN PRESSURE	KPa	18 AS PER API650
OPERATING PRESSURE	–	ATMOSPHERIC
CORROSION ALLOWANCE	mm	2.0
PEAK GROUND ACCELERATION (SP)	–	0.41
ROOF LOAD (UNIFORM LIVE)	kg/m2	150
TESTING	–	AS PER CL7.3 AND SECTION 8 OF API650



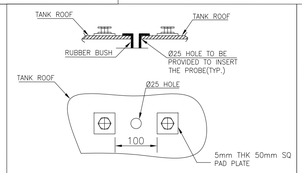
DETAIL OF ANCHOR CHAIR AND ANCHOR BOLT



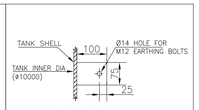
NOZZLE ORIENTATION OF LDO DAY TANK



DRAW OFF SUMP AS PER FIG 5.21 OF API650



MOUNTING DETAILS OF PROBE TYPE HEAT DETECTOR



DETAIL–C
EARTHING CLIT
AS PER FIG 5.23 OF API650

NOTES:–

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3. VERTICAL SHELL JOINTS SHALL BE OFFSET FROM EACH OTHER WITH A MINIMUM DISTANCE OF 5 TIMES THE THICKNESS OF SHELL COURSE UNDER CONSIDERATION.
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9. EARTHING LUG AND NAME PLATE SHALL BE WELDED TO THE TANK AS PER SITE REQUIREMENT.
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24. MANHOLE FOR ROOF AND SHELL OF TANK SHALL BE HINGED TYPE.
27. TANK NOZZLE SIZES AND ORIENTATION ARE TENTATIVE SAME SHALL BE FINALIZED DURING DETAIL ENGINEERING.

SHELL NOZZLES & APPURTENANCES

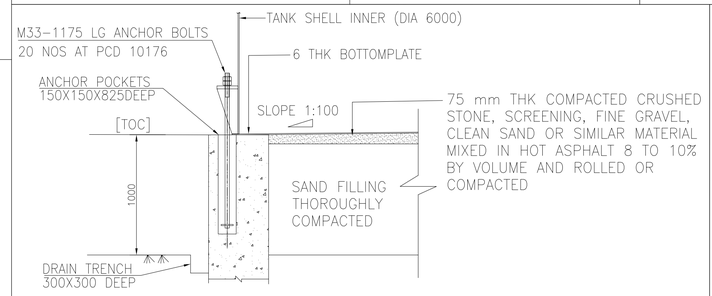
MARK	SIZE NB	QTY. (NO.)	FLANGE TYPE, RATING	NOZZLE CENTRE ELE FROM TOP OF BOTTOM PLATE AS PER TABLE 5.6a OF API650	PROJ. DIST. FROM SHELL PLATE AS PER TABLE 5.6a OF API650	NOZZLE THK IN MM AS PER TABLE 5.6a OF API650	SERVICE
N1	100	1	SORF,150#	5000	175	8.56	INLET
N2	100	1	SORF,150#	350	175	8.56	OUTLET
N3	40	1	SORF,150#	5000	150	5.08	LDO RETURN FROM BOILER
N4	80	1	SORF,150#	200	175	7.62	DRAW OF SUMP
N5 A/B/C	100	1	SORF,150#	5000.0	175	8.56	FOAM POURER
N6	100	1	SORF,150#	5000	175	8.56	SPARE INLET (BLIND FLANGE)
N8	100	1	SORF,150#	4557	175	8.56	OVERFLOW
N9	600	1	AS PER FIG 5.16 OFAPI650	800.0	150	6.0	SHELL MANHOLE WITH BLIND FLANGE
N11/12	100	1	SORF,150#	350	175	8.56	SPARE OUTLET WITH VALVE
N13/14	40	1	SORF,150#	5000	150	5.08	SPARE INLET (BLIND FLANGE)
EC	–	2	AS PER DETAIL C	–	–	–	EARTHING CLIT

ROOF NOZZLES & APPURTENANCES

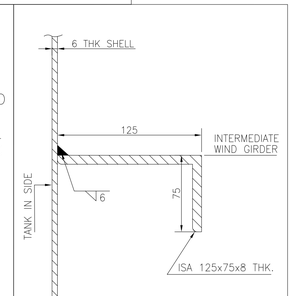
MARK	SIZE NB	QTY. (NO.)	FLANGE TYPE, RATING	NOZZLE CENTRE DISTANCE FROM ROOF CENTRE	PROJ. DIST. FROM SHELL PLATE AS TABLE 5.6a OF API650	NOZZLE THK IN MM AS PER TABLE 5.6a OF API650	SERVICE
R1	100	1	SORF, #150	1000	175	8.56	VENT
R2 a/b/c	25	3	–	1500	–	–	25 DIA HOLES FOR HEAT DETECTION
R3	100	1	SORF, #150	2000	175	8.56	GAUGE WELL FOR GAUGE HATCH
LT	40	2	SORF, #150	1500	150	7.62	LEVEL TRANSMITTERS (ULTRA SONIC)
LI A/B/C	40	3	SORF, #150	2500	150	6.35	LEVEL INDICATOR
N10	600	1	AS PER FIG 5.16 OFAPI650	2400	150	6	ROOF MANHOLE WITH COVER

MATERIAL SPECIFICATION

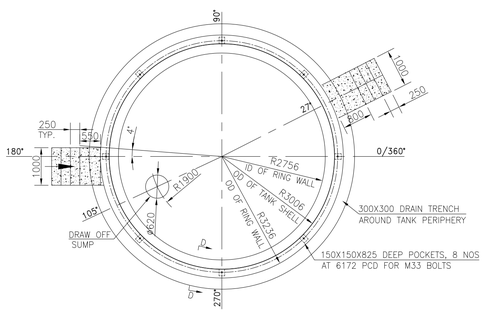
ITEM	MATERIAL
SHELL, BOTTOM, ROOF, RF PL	IS:2062 GR. B
NOZZLES	API 5L GR. B ERW (PLAIN ENDS FOR PIPE SIZES 50NB & BELOW AND BW ENDS FOR PIPE SIZES ABOVE 50 NB)
MANWAYS NECK	IS:2062 GR. B
NOZZLE FLNAGES	ASTM A105 AS PER ANSI 16.5
HAND RAILING (40NB)	IS:1239 MS GALVANIZED (MEDIUM CLASS)
GASKETS	TEFLON
BOLTING (NUTS & BOLTS)	ASTM A194 GR. 2H / ASTM A193 GR. B7
STRUCTURALS	IS:2062 GR A/B
FITTINGS OF 50 NB & BELOW (SW END)	ASTM A105, SW TO ANSI B16.11
FITTINGS ABOVE 50 NB (BW END)	ASTM A234 GR. WPB, BW TO ANSI B16.9
NAME PLATE AND EARTHING CLIT	SS 304



SECTION D–D



DETAIL–A



RINGWALL FOUNDATION PLAN FOR LDO DAY TANK

REFERENCE DRAWINGS

S.N	TITLE	NTPC DRG No	BHEL DRG No.
1.	DESIGNCALCULATION OF TANKS FOR FOHS (HFO, LDO & LDO DAY TANK)	9585-001-130-PVM-U-003	PE-DC-434-166-A003
2.	P&IDs OF FOHS (HFO, LDO, STEAM, CONDENSATE & DAY TANK SYSTEM)	9585-001-130-PVM-L-001	PE-DG-434-166-A001
3.	PLOT PLAN	9585-001-999-POC-F-001	PE-DG-434-100-M001

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

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TO							
No. OF							
REV.	DATE	ALTD		CHD		APPD	

NTPC DRG No.	9585-001-130-PVM-B-004
CUSTOMER	NTPC Limited (A GOVT. OF INDIA ENTERPRISE)
PACKAGE:	FUEL OIL UNLOADING AND STORAGE SYSTEM.
PROJECT: –	**3x800 MW Patratu Super Thermal Power Station Expansion Phase-I**

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE		NAME	SIGN	DATE
M	DRN	SC	Sd/–	21.07.2018
	DESN	SC/RG	Sd/–	21.07.2018
	CHD	HK	Sd/–	21.07.2018
	APPD	PK	Sd/–	21.07.2018

TITLE: GA/Nozzle Orientation of LDO Day Oil Storage Tank

DEPT. / SIGN / DATE / SCALE

DRAWING No. PE-DG-434-166-A004

SHEET 03 OF 03 REV 00

SIZE-A1

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COMPUTER FILE NAME PE-DG-434-166-A004

D2	**Back Wash Waste Water Recirculation cum disposal pump (Vertical Sump Pumps)**	
1)	Location	In Filter Backwash Sump
2)	Total Number of Pumps	Two (2)(2x100%)(1W+1S)
3)	Guaranteed Flow of each pump	Capacity to evacuate the pit in 2 hrs.
4)	Total head	As reqd.
5)	Type of pump	---Vertical, non-clog, Sump pumps --
6)	Type of Working Fluid	---Drains with particle size up to 40 mm
7)	Type of impeller	---------- Open ----------
8)	Suction Bell /Casing	ASTM A 351 CF8M, SS– 316
9)	Impeller , Shaft, Sleeves	ASTM A 351 CF8M, SS– 316
10)	Column pipe & Discharge Pipe	SS– 316
11)	Shaft enclosing tube (if applicable)	SS– 316

16.00.00 **DM WATER STORAGE TANKS**

1)	Type	Vertical Cylindrical atmospheric
2)	Design Standard	IS :803
3)	Numbers required	Three (3)
4)	Shell material	Mild Steel as per specified code
5)	Shell thickness (minimum)	Bottom most Course -10 mm Balance Courses – 8 mm
6)	Bottom Plate Thickness (minimum)	10 mm
7)	Roof Plate Thickness (minimum)	8 mm

8)	Internal Protection	Solvent free epoxy coating
9)	External painting	Epoxy Paint
10)	Manholes	Minimum 2 numbers (one on the shell and other on the roof)
11)	Accessories	a) Stair-case & platform b) Vent, Overflow and drain connections c) Overflow seal d) CO_2 absorbers in vent line e) Hand railing on the roof of the tank all around the tank
12)	Additional connections	Minimum Two (2) Numbers one of 250 NB size & another of 150 NB size at bottom level (for suction). Minimum Two(2) numbers one of 150 NB size & another of 100 NB size at the top level (for future filling)

17.00.00 **RO & MB PLANT**

A	**ULTRAFILTRATION UNIT**	
No	**Descriptions**	**Parameter /Data**
1)	Nos. of trains	2x50 %
2)	Feed Temperature	20-36 Deg. C
3)	Recovery from UF	Not less than 95%
4)	UF Treated (Filtrate) Flow	Capacity of each UF to match with gross capacity of RO + Water required for backwashing of UF membrane Chemical preparation requirements Plus 5% margin over the above total requirements. (Not less than 100 Cu.m/hr.)
5)	Mode of Operation	Dead End/Cross Flow
6)	Type of Operation	Automatic Back wash