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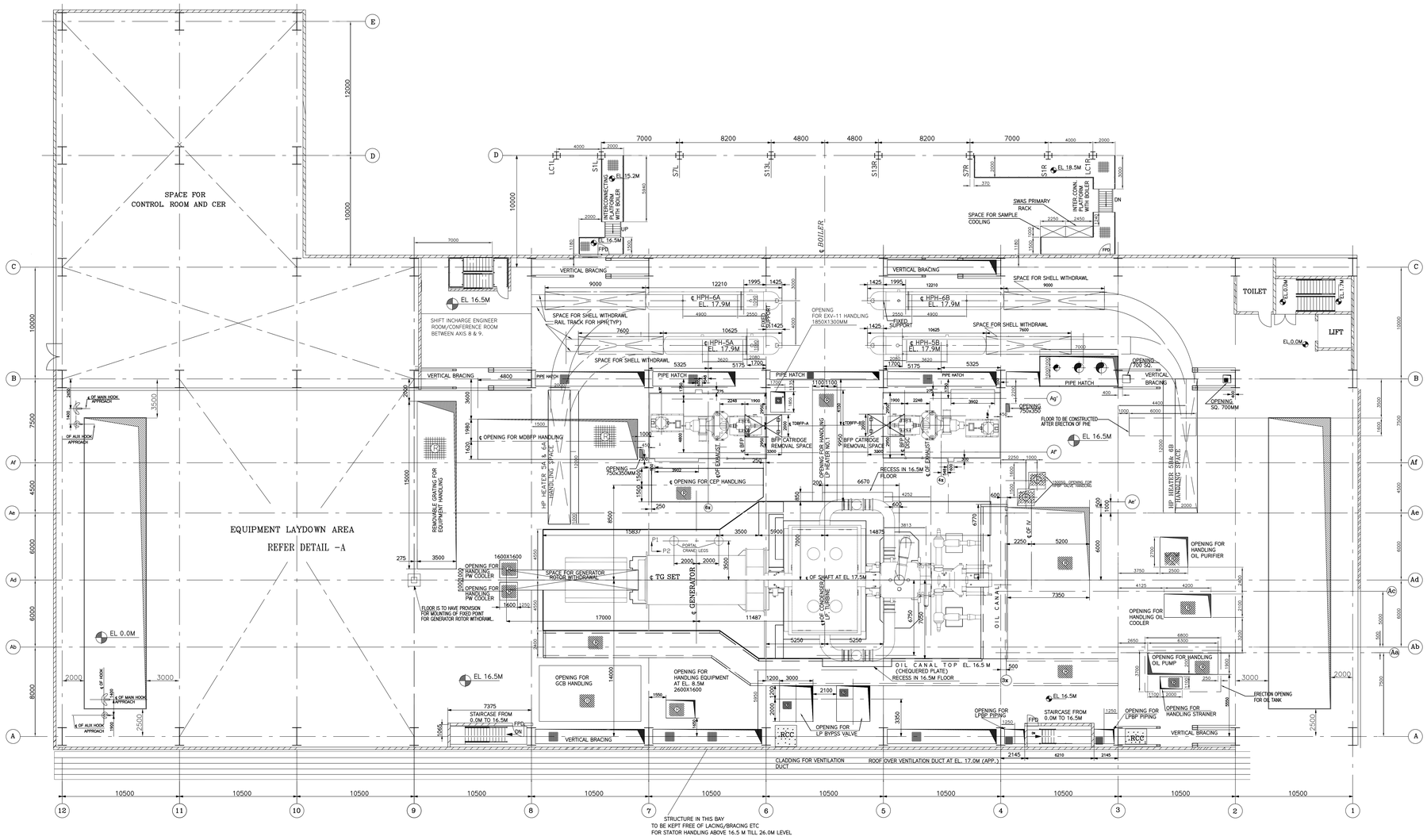
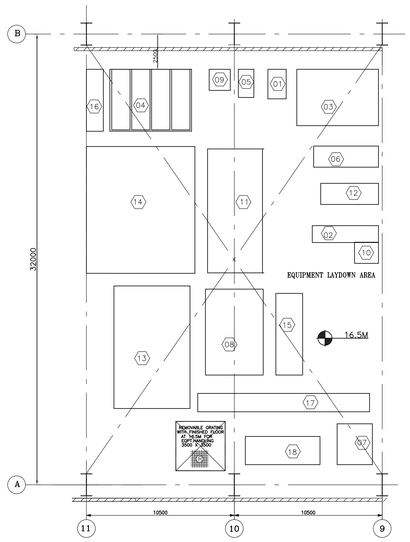


PLAN AT +16.5M



DETAIL - A

DETAIL OF LAY-DOWN SPACE FOR TG COMPONENTS.

S.No	DESCRIPTION	WT.IN Kg.	AREA M x M
01	PEDESTAL COVER-HP	750	2.1 X 1.3
02	HP SHAFT	14800	4.7 X 1.2
03	EXCITER HOUSING	3500	5.8 X 4.0
04	HYDROGEN COOLER (4 NOS.)	2500x4	4.3 X (1.4x4) = 4.3 X 5.6
05	PEDESTAL COVER HP – IP	700	2.0 X 1.1
06	IP SHAFT	22000	4.6 X 1.5
07	IPT INNER CASING UPPER HALF	13000	2.9 X 2.5
08	IPT OUTER CASING UPPER HALF	30000	4.1 X 6.1
09	PEDESTAL COVER IP – LP	1200	1.5 X 1.5
10	PEDESTAL COVER LP – G	1100	1.7 X 1.5
11	LP SHAFT	100000	8.8 X 4.0
12	LP INNER CASING I UPPER HALF	14000	1.5 X 4.1
13	LP INNER CASING II UPPER HALF	45000	5.4 X 8.7
14	LP OUTER CASING UPPER HALF	41000	9.0 X 7.7
15	END SHIELD UPPER HALF (TS)	25000	1.9 X 5.8
16	END SHIELD UPPER HALF (ES)	6800	1.2 X 4.4
17	GENERATOR – ROTOR	68000	12.2 X 1.3
18	EXCITER	35000	5.3 X 2.0

NOTES:–

1. ALL ELEVATIONS MARKED ARE W.R.T.FINISHED FLOOR ELEVATION OF 0.0M WHICH CORROSPONDS TO RL. +107.0M.
2. ALL ELEVATIONS ARE IN MM AND LEVELS ARE IN METERS UNLESS STATED OTHERWISE.
3. FPD: FIRE PROOF DOOR
4. EQUIPMENTS & FACILITIES SHOWN FOR PACKAGES OTHER THAN TG PACKAGE ARE SUGGESTIVE ONLY. HOWEVER IT IS PREFERRED THAT SIMLAR DETAILS BE ENSURED FORM RESPECTIVE PACKAGE VENDORS.

REFERENCE DRAWING:

1. MAIN EQUIPMENT LAYOUT PLAN	PE-DG-401-100-M002
2. EQUIPMENT PLAN AT 0.0M	PE-DG-401-100-M003
3. EQUIPMENT PLAN AT 8.5M	PE-DG-401-100-M004
4. EQUIPMENT PLAN AT 23.5M, 31.25M, 35.5M & 47.0M	PE-DG-401-100-M006
5. MAIN PLANT CROSS SECTION	PE-DG-401-100-M007
6. CONDENSER ASSEMBLY (G. A.)	–
7. EQUIPMENT LAYOUT PLAN AT 16.5M (NTPC)	–
8. GENERAL ARRANGEMENT OF TDBFP SET	–
9. G.A.DRG. OF H.P.HTER 5A	–
10. G.A.DRG. OF H.P.HTER 5B	–
11. G.A.DRG. OF H.P.HTER 6A	–
12. G.A.DRG. OF H.P.HTER 6B	–

LEGEND:

- CHEQUERED PLATE FLOORING
- REMOVABLE CHEQUERED PLATE
- GRATED FLOORING
- REMOVABLE GRATING
- RCC CONCRETE BLOCK
- HAND RAILING
- PARAPET WALL
- GLASS PARTITION
- CUT OUTS
- BRICK WALL

NTPC DRG. No. 1450-001R-TGPE-PVM-F-005
NBPPL DRG. No.

PROJECT: FEROZE GANDHI UNCHAHAR THERMAL POWER PROJECT STAGE-IV 1X500MW

OWNER: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)

EPC VENDOR: NTPC BHEL Power Projects Private Limited (A Joint Venture Company of NTPC & BHEL) Y.S.R. Puram, Village Mannavaram, Sri Kalahasti Mandal, Distt. Chittoor - 517620 (A.P.)

QBTGM: BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NEW DELHI

DEPT CODE		NAME	SIGN	DATE
M	DRN	GS		30.12.2013
	DES	AKS/AMT		30.12.2013
	CHD	RNT/AMT		30.12.2013
	APPD	AMH		30.12.2013

JOB NO. 401
STATUS CONTRACT
DISTRIBUTION

TO				
No. OF				
REV.	DATE	ALTD	CHD	APPD

TITLE: TG EQUIPMENT PLAN AT 16.5 M

DEPT. SCALE 1:150 DRAWING NO. PE-DG-401-100-M005
SIGN
DATE
SHEET 1 OF 1 REV. 0

FORMAT SIZE A0

ELECTRONIC FILE NAME: 401_100_M005_R0

DRAWING NO. PE-DG-401-100-M004

FIRST ANGLE PROJECTION | ALL DIMENSIONS ARE IN MM

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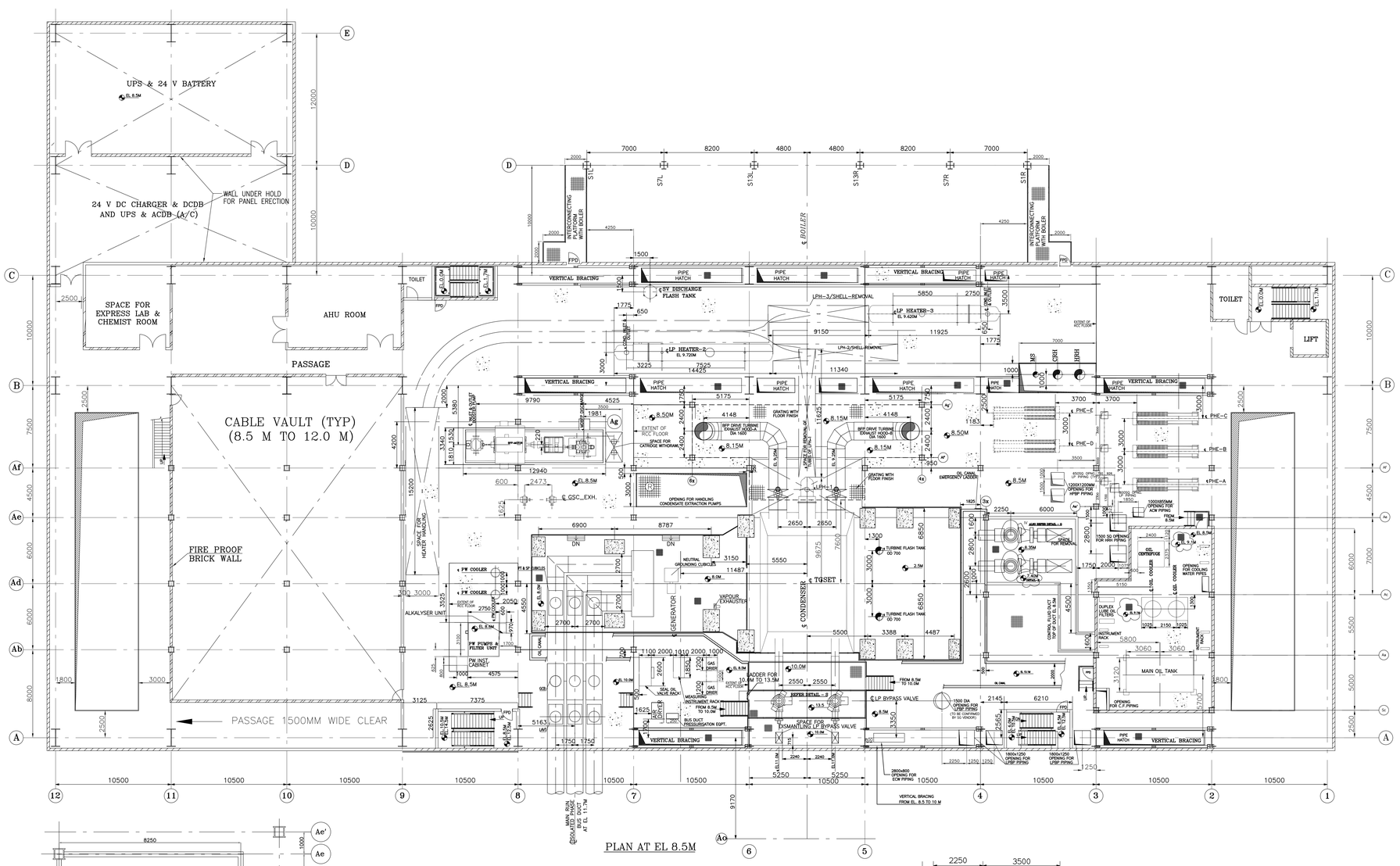
ELECTRONIC FILE NAME: 401_100_M004_R0



PLAN AT EL 8.5M

NOTES:–

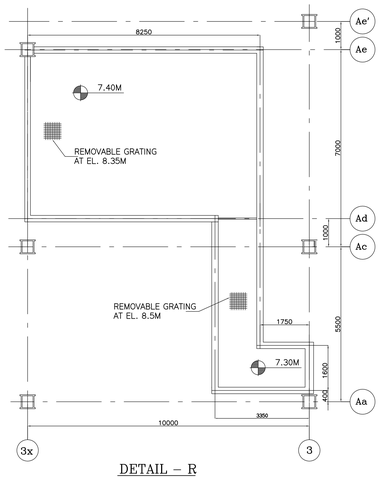
1. ALL ELEVATIONS MARKED ARE W.R.T.FINISHED FLOOR ELEVATION OF 0.0M WHICH CORROSPONDS TO RL. +107.0M.
2. ALL ELEVATIONS ARE IN MM AND LEVELS ARE IN METERS UNLESS STATED OTHERWISE.
3. FPD: FIRE PROOF DOOR
4. EQUIPMENTS & FACILITIES SHOWN FOR PACKAGES OTHER THAN TG PACKAGE ARE SUGGESTIVE ONLY. HOWEVER IT IS PREFERRED THAT SIMLAR DETAILS BE ENSURED FORM RESPECTIVE PACKAGE VENDORS.
5. GRATING SHOWN IN DETAILS P,Q,R,S & IN OIL ROOM – ARE IN BHEL SCOPE.
6. SUPPLY OF MISCE LLANEOUS PLATEFORM SHALL BE BY BHEL (AS PER APPLICABLE SCOPE OF CONTRACT).

REFERENCE DRAWING:

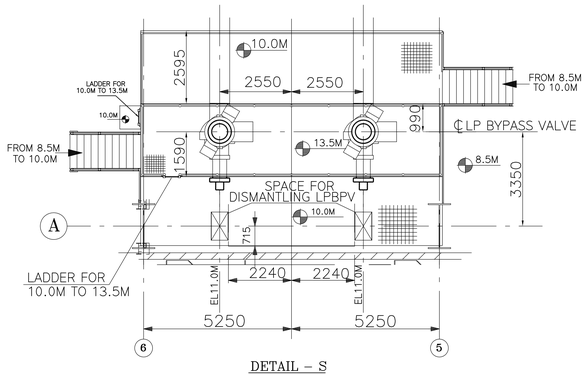
1. MAIN EQUIPMENT LAYOUT PLAN	PE-DG-401-100-M002
1. EQUIPMENT PLAN AT 0.0M	PE-DG-401-100-M003
2. EQUIPMENT PLAN AT 16.5M	PE-DG-401-100-M005
3. EQUIPMENT PLAN AT 23.5M, 31.25M, 35.5M & 47.0M	PE-DG-401-100-M006
4. MAIN PLANT CROSS SECTION	PE-DG-401-100-M007
5. CONDENSER ASSEMBLY (GENERAL ARRANGEMENT)	–
6. GENERATOR OUTLINE	–
7. OIL ROOM ARRANGEMENT	–
8. VALVE ROOM ARRANGEMENT	–
9. MAIN PLANT EQPT. LAYOUT PLAN AT 8.5M,16.5	–
10. OIL ROOM ARRENGEMNT WITH LOADING DATA (PLAN DETAILS)	–
11. GA OF LP HEATER No.–1	–
12. G.A.OF L.P.HEATER 2 WITH FOUNDATION AND LOADING DATA	–
13. G.A. OF L.P.HEATER 3 WITH FOUNDATION AND LOADING DATA	–
14. GA OF FWSVD FLASH TANK	–
15. GA OF MDBFP	–
16. GA OF TDBFP	–
17. LPBP VALVE AND ITS CONTROL RACK ARRGMNT.	–

LEGEND:

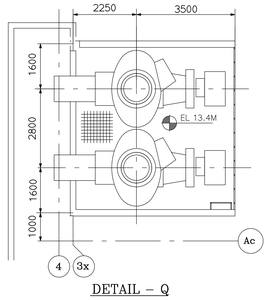
- CHEQUERED PLATE FLOORING
- REMOVABLE CHEQUERED PLATE
- GRATED FLOORING
- REMOVABLE GRATING
- CONCRETE BLOCK
- HAND RAILING
- PARAPET WALL
- CUT OUTS
- BRICK WALL



DETAIL – R
DETAILS OF VALVE ROOM AT EL 7.4M



DETAIL – S
FLOOR DETAILS OF LPBP VALVE



DETAIL – Q
DETAILS OF VALVE ROOM AT EL 13.4M

JOB NO.	401
STATUS	CONTRACT
DISTRIBUTION	

NO. OF REV.	DATE	ALTD	CHD	APPD
TG				

NTPC DRG. No. 1450–001R–TGPE–PVM–F–004
NBPPL DRG. No.

PROJECT: FEROZE GANDHI UNCHAHAR THERMAL POWER PROJECT STAGE–IV 1X500MW

OWNER: एन टी पी सी NTPC — *NTPC Limited* (A GOVERNMENT OF INDIA ENTERPRISE)

EPC VENDOR: NBPPL — **NTPC BHEL Power Projects Private Limited** *(A Joint Venture Company of NTPC & BHEL)* Y.S.R. Puram, Village Mannavaram, Sri Kalahasti Mandal, Distt. Chittoor - 517620 (A.P.)

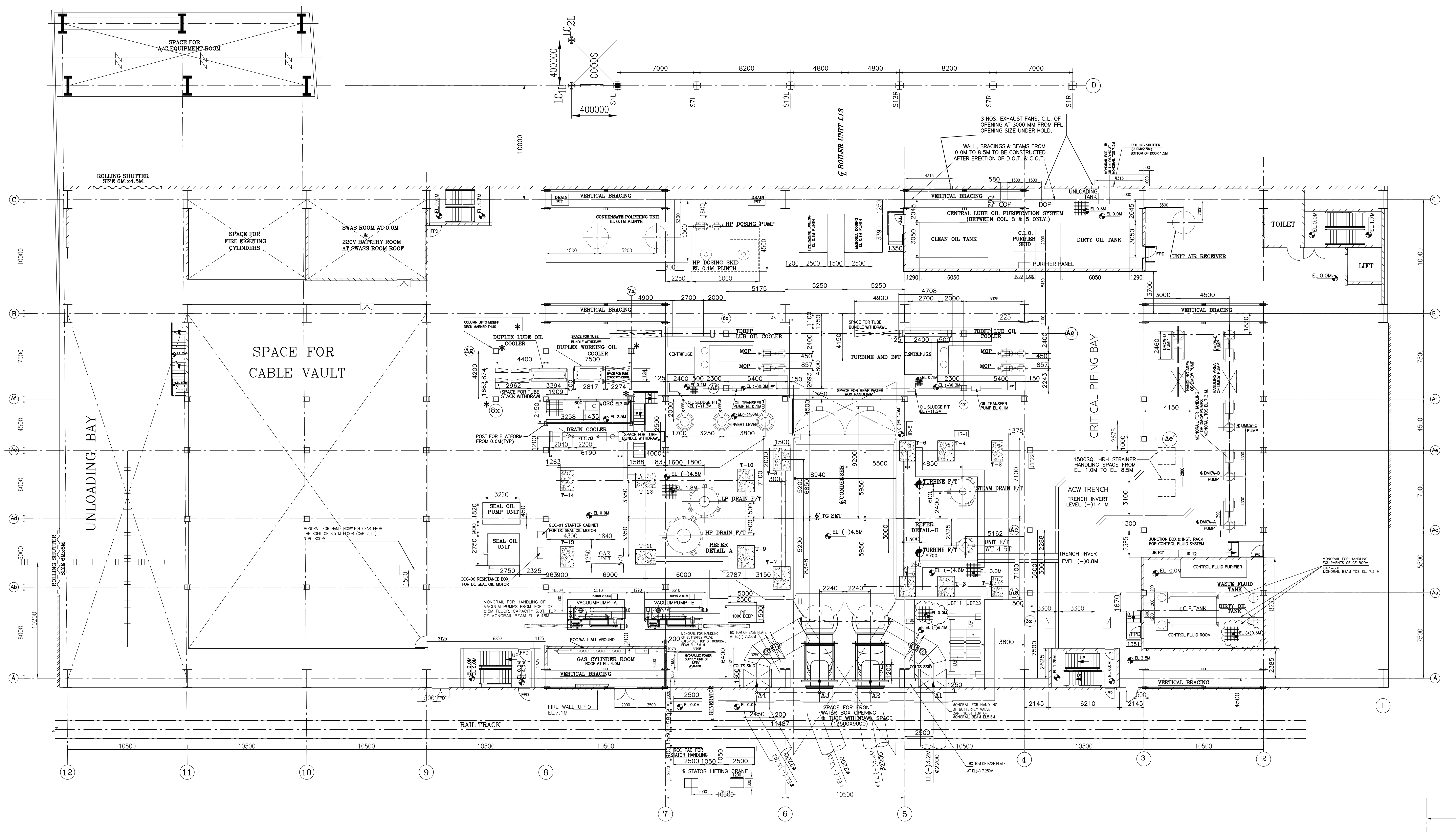
QBTGM: BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NEW DELHI

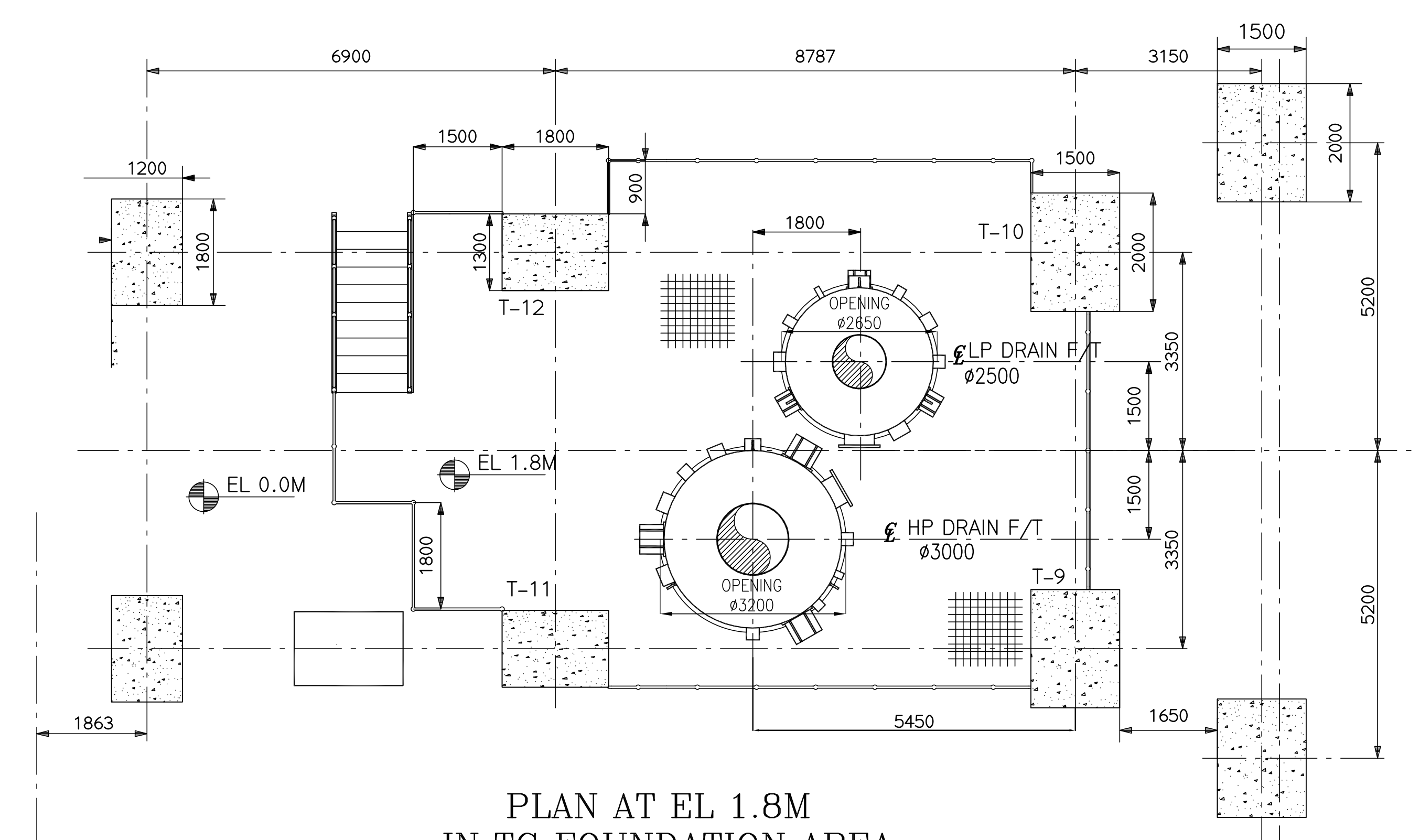
DEPT CODE		NAME	SIGN	DATE
M	DRN.	GS		30.12.2013
	DES.	AKS/AMT		30.12.2013
	CHD	RNT/AMT		30.12.2013
	APPD	AMH		30.12.2013

TITLE: TG EQUIPMENT PLAN AT 8.5M

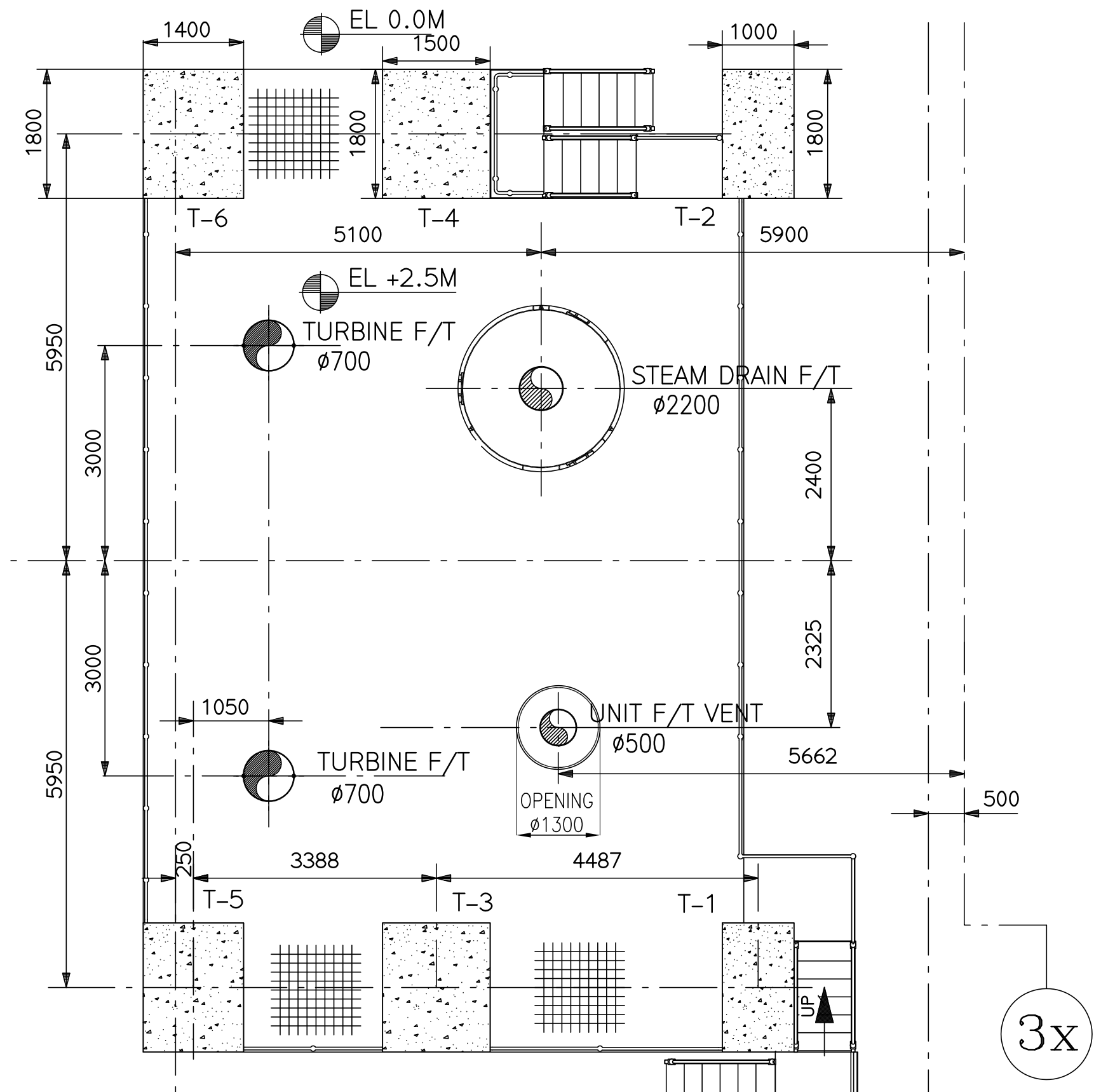
DEPT. | SIGN | DATE | SCALE 1:150 | DRAWING NO. PE-DG-401-100-M004 | SHEET 1 OF 1 | REV. 0

FORMAT SIZE A0



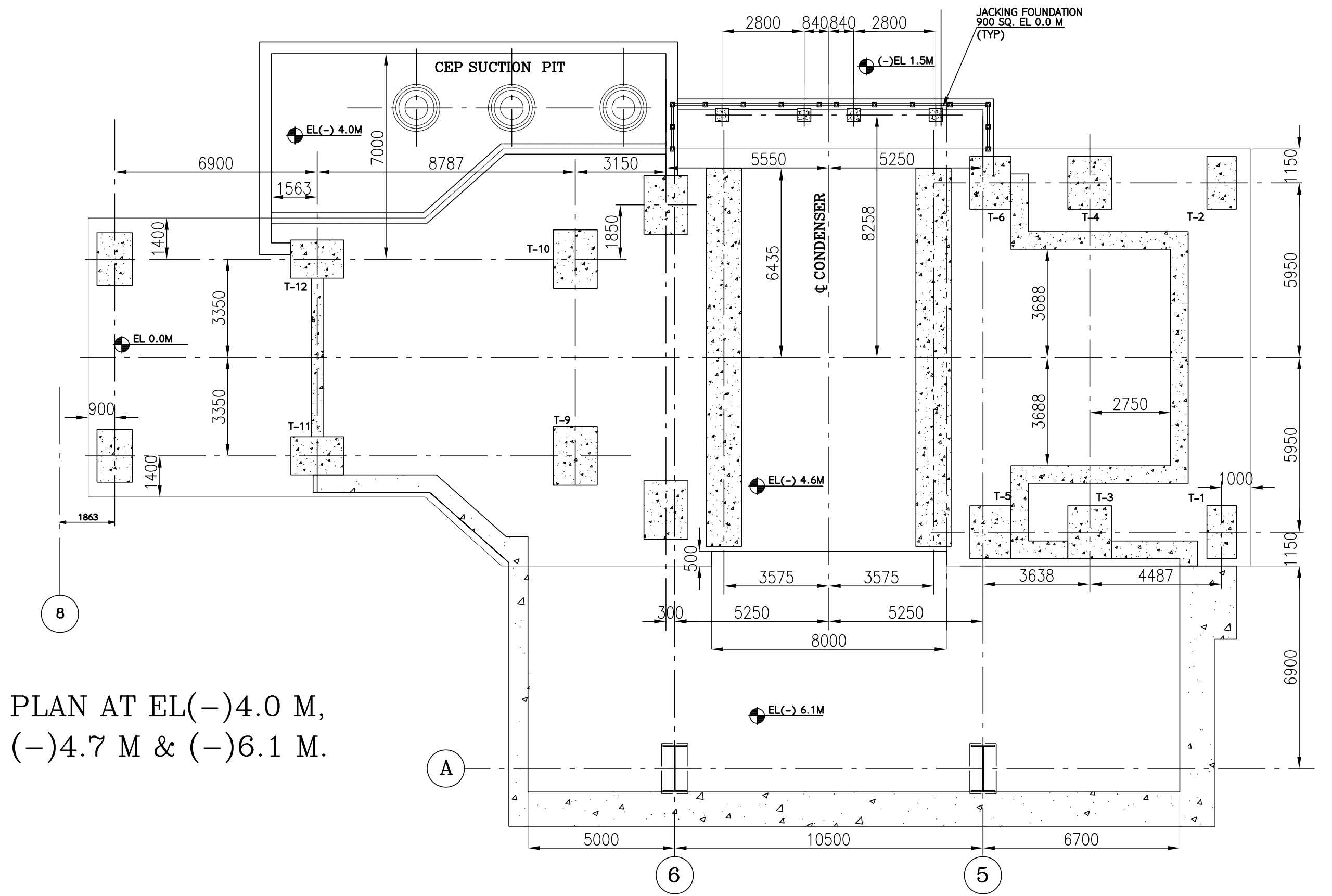


PLAN AT EL 1.8M IN TG FOUNDATION AREA (DETAIL –'A')



PLAN AT EL 2.5M IN TG FOUNDATION AREA (DETAIL –'B')

3x



PLAN AT EL(–)4.0 M, (–)4.7 M & (–)6.1 M. IN TG FOUNDATION AREA

NOTES:–

1. ALL ELEVATIONS MARKED ARE W.R.T.FINISHED FLOOR ELEVATION OF O.OM WHICH CORROSPONDS TO RL. +107.0M.
2. ALL ELEVATIONS ARE IN MM AND LEVELS ARE IN METERS UNLESS STATED OTHERWISE.
3. FPD: FIRE PROOF DOOR
4. EQUIPMENTS & FACILITIES SHOWN FOR PACKAGES OTHER THAN TG PACKAGE ARE SUGGESTIVE ONLY. HOWEVER IT IS PREFERRED THAT SIMLAR DETAILS BE ENSURED FORM RESPECTIVE PACKAGE VENDORS.
5. SUPPLY OF MISCELLANEOUS PLATEFORM SHALL BE BY BHEL (AS PER APPLICABLE SCOPE OF CONTRACT).

REFERENCE DRAWING:

1. MAIN EQUIPMENT LAYOUT PLAN	PE-DG-401-100-M002
1. EQUIPMENT PLAN AT 8.5M	PE-DG-401-100-M004
2. EQUIPMENT PLAN AT 16.5M	PE-DG-401-100-M005
3. EQUIPMENT PLAN AT 23.5M, 31.25M, 35.5M & 47.0M	PE-DG-401-100-M006
4. MAIN PLANT CROSS SECTION	PE-DG-401-100-M007
5. CONDENSER ASSEMBLY (GENERAL ARRANGEMENT)	-
6. GENERATOR OUTLINE	-
7. CONTROL FLUID COOLER - GA	-
8. CONTROL FLUID ROOM ARRENGEMENT WITH FLOOR LOADING DATA	-
9. G.A.OF DRAIN COOLER WITH FOUNDATION AND LOADING DATA	-
10. GA OF GLAND STEAM CONDENSER	-
11. GA OF CLEAN OIL TANK	-
12. GA OF DIRTY OIL TANK	-
13. GA OF HP FLASH TANK	-
14. GA OF LP FLASH TANK	-
15. GA OF SD FLASH TANK	-
16. GA OF UNIT FLASH TANK	-
17. GENERAL ARRANGEMENT OF OIL UNLOADING TANK	-
18. HP DOSING SKID GA OF CEP	-

HOLD UPs:–

VACUUM PUMPS, CLO PURIFIER SKID

LEGEND:

▩	CHEQUERED PLATE FLOORING	☐	CONCRETE BLOCK
Ⓡ	REMOVABLE CHEQUERED PLATE	◸	CUT OUTS
▦	GRATED FLOORING	─o─o─	HAND RAILING
Ⓡ	REMOVABLE GRATING	┬┬┬	PARAPET WALL
		─/─	GLASS PARTITION
		///	BRICK / RCC WALL

NTPC DRG. No.	1450–001R–TGPE–PVM–F–003
NBPPL DRG. No.	
PROJECT	FEROZE GANDHI UNCHAHAR THERMAL POWER PROJECT STAGE–IV 1X500MW
OWNER	NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE)
EPC VENDOR	NTPC BHEL Power Projects Private Limited (A Joint Venture Company of NTPC & BHEL) Y.S.R. Puram, Village Mannavaram, Sri Kalahasti Mandal, Distt. Chittoor - 517620 (A.P.)
QBTGM	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NEW DELHI

JOB NO.	401
STATUS	CONTRACT
DISTRIBUTION	
TO	
No. OF	

REV.	DATE	ALTD	CHD	APPD

DEPT CODE		NAME	SIGN	DATE
M	DRN	GS		30.12.2013
	DESN	AKS/AMT		30.12.2013
	CHD	RNT/AMT		30.12.2013
	APPD	AMH		30.12.2013

TITLE

TG EQUIPMENT PLAN AT 0.0M

DEPT.	SCALE 1:150	DRAWING NO. PE–DG–401–100–M003
SIGN		
DATE		SHEET 1 OF 1 REV. 0

FORMAT SIZE A0

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ELECTRONIC FILE NAME: 401_100_M003_R0

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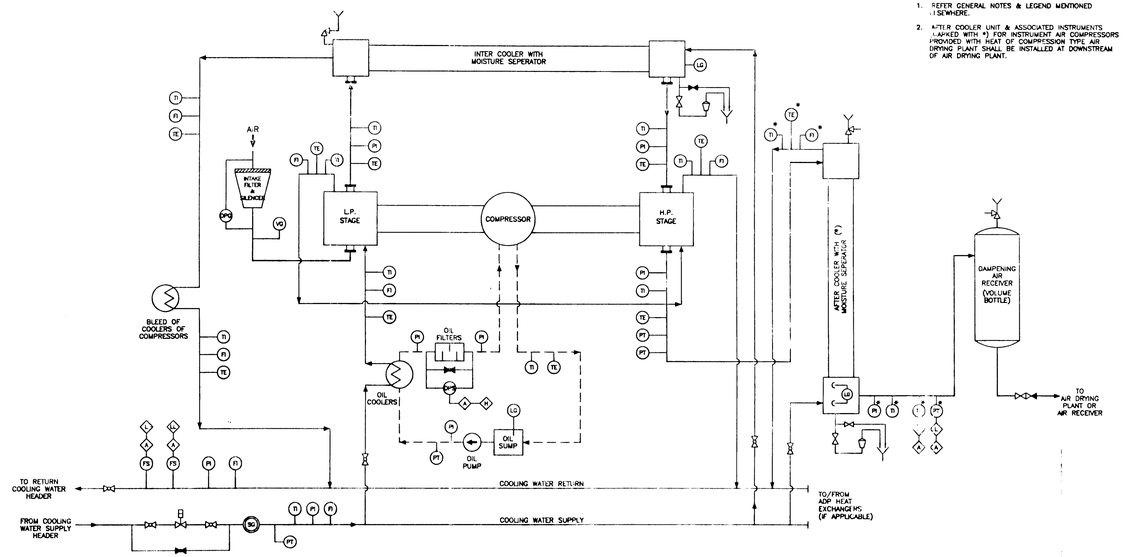
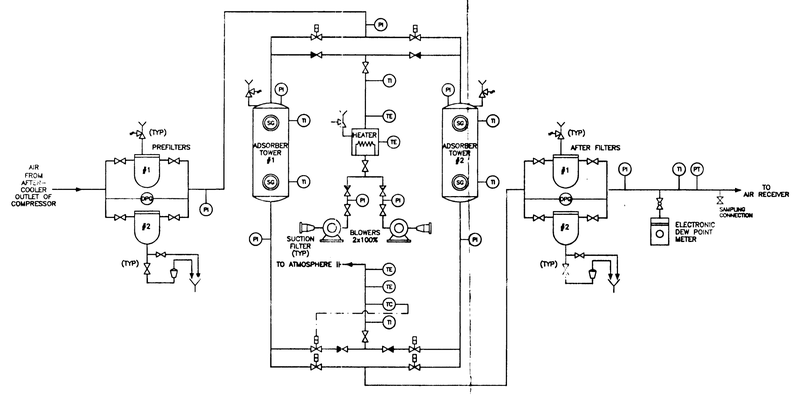
TYPICAL SCHEME OF COMPRESSOR BLOCK



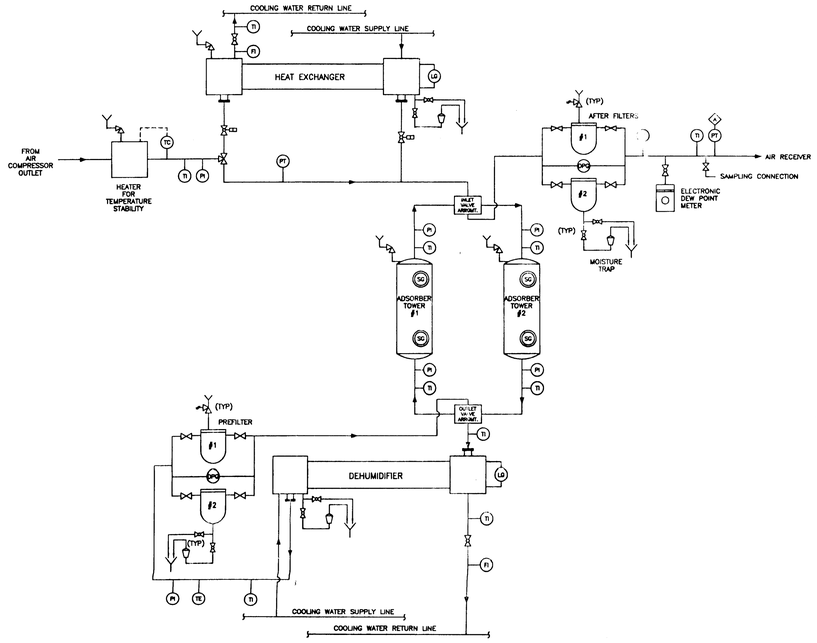
NOTES :

1. REFER GENERAL NOTES & LEGEND MENTIONED ELSEWHERE.
2. AFTER COOLER UNIT & ASSOCIATED INSTRUMENTS (MARKED WITH *) FOR INSTRUMENT AIR COMPRESSORS PROVIDED WITH HEAT OF COMPRESSION TYPE AIR DRYING PLANT SHALL BE INSTALLED AT DOWNSTREAM OF AIR DRYING PLANT.

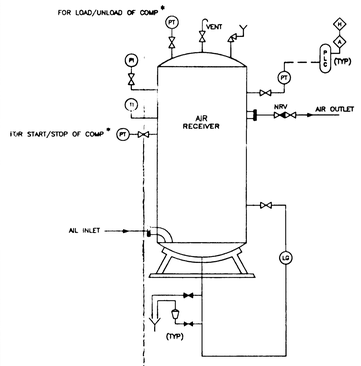
TYPICAL SCHEME OF AIR DRYING PLANT OF OPEN THROUGH TYPE



TYPICAL SCHEME OF AIR DRYING PLANT OF HEAT OF COMPRESSION TYPE



TYPICAL AIR RECEIVER BLOCK



NOTES :

1. THE PRESSURE SWITCHES MARKED (*) , (WHICH ARE REQUIRED FOR LOAD/UNLOAD & START/STOP) ARE NOT APPLICABLE FOR UNIT AIR RECEIVERS & DM PLANT AIR RECEIVERS.
2. NRV (NON RETURN VALVE) AT THE OUTLET OF AIR RECEIVER IN THE SCHEME SHALL NOT BE APPLICABLE FOR THE UNIT AIR RECEIVERS & DM PLANT AIR RECEIVERS.
3. THE ALARMS "PRESSURE LOW" & "HIGH" SHALL BE SHOWN IN THE COMPRESSOR HOUSE CONTROL PANEL FOR UNIT AIR RECEIVERS. THESE ALARM SHALL BE PROVIDED IN RESPECTIVE UNIT CONTROL ROOMS BY THE CONTRACTOR. COMPLETE CABLING ETC. SHALL BE PROVIDED BY THE CONTRACTOR.

LEGEND :

- ISOLATION VALVE (GATE OR BUTTERFLY TYPE)
- GLOBE VALVE
- NON RETURN VALVE
- AUTOMATIC VALVE (ELECTRICAL/SOLENOID OPERATED)
- RELIEF/SAFETY VALVE
- MOISTURE SEPERATOR WITH AUTOMATIC DRAIN TRAP UNIT

PI	–	PRESSURE INDICATOR
PS	–	PRESSURE SWITCH
PT	–	PRESSURE TRANSMITTER
FS	–	FLOW SWITCH
FI	–	FLOW INDICATOR
SG	–	SIGHT GLASS
TI/TE	–	TEMPERATURE INDICATOR/TRANSMITTER
LG	–	LEVEL GAUGE
DPG/DPT	–	DIFFERENTIAL PRESSURE GAUGE/TRANSMITTER
VG	–	VACCUM GAUGE
H	–	HIGH ALARM
L	–	LOW ALARM

NOTES :

1. THE P&I DIAGRAM SHALL BE READ IN CONJUNCTION WITH TECHNICAL SPECIFICATION.
2. ALL CONTROLS, INTERLOCKS & PROTECTIONS REQUIRE FOR SAFE, RELIABLE AND EFFICIENT OPERATION & MAINTENANCE OF AIR COMPRESSORS & ADP SHALL BE IMPLEMENTED IN CONTROLLERS OF CONTROL SYSTEM.
3. ANY OTHER ADDITIONAL INSTRUMENTS TO MEET THE SYSTEM REQMT. & FOR SAFE OPERATION OF THE PLANT & EQUIPMENT SHALL BE INCORPORATED IN THE SCHEME BY CONTRACTOR AT NO ADDITIONAL COST TO EMPLOYER.
4. THE SCHEME DOES NOT SHOW THE CIRCUIT, INSTRUMENTS, VALVES ETC. FOR LOADING/UNLOADING OF COMPRESSORS, REPRESSURISATION / DEPRESSURISATION OF ADSORBER TOWER OF ADP & THE SAME SHALL BE PROVIDED BY THE CONTRACTOR.

FOR TENDER PURPOSE ONLY

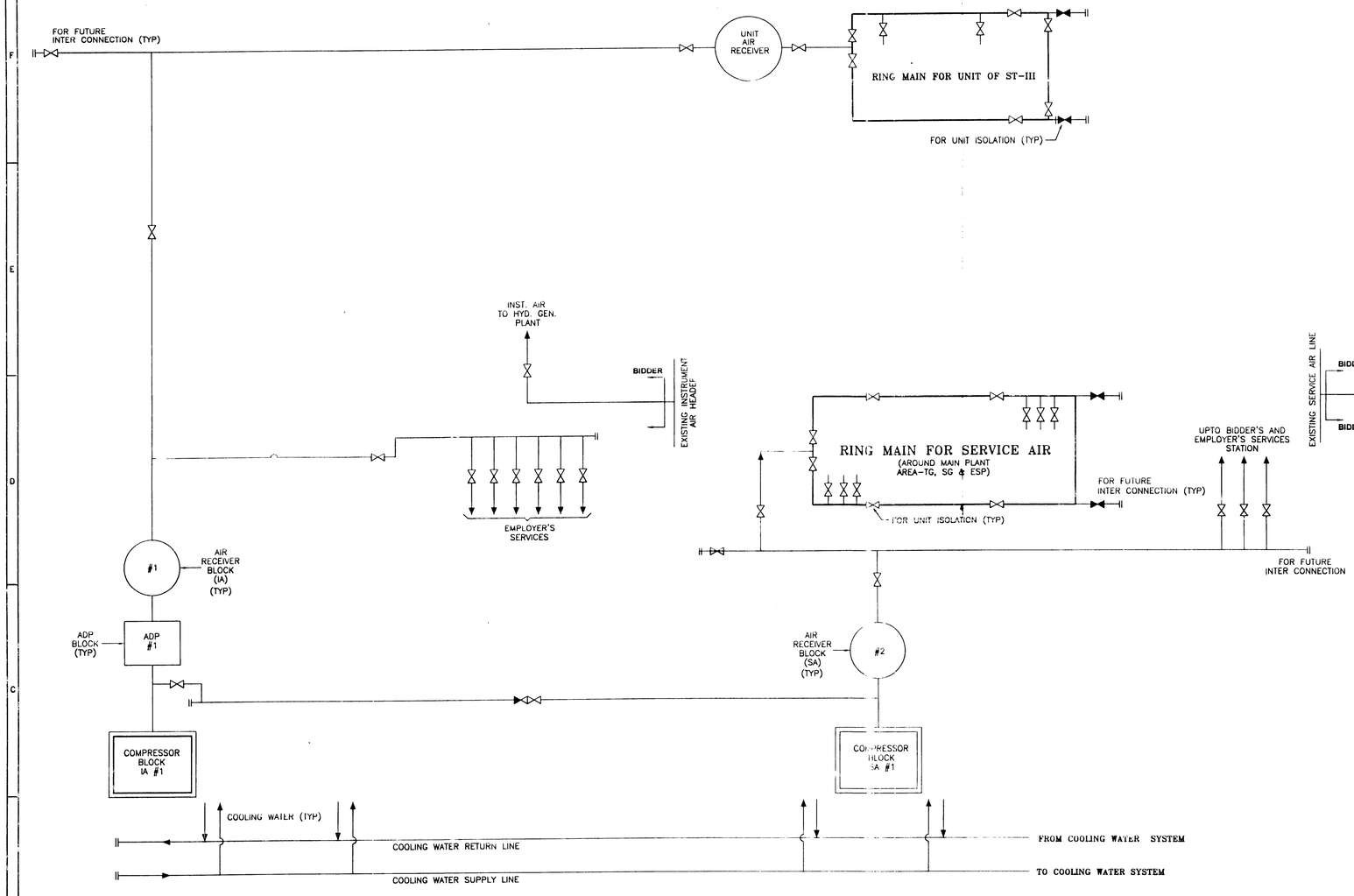
एन टी पी सी NTPC — नेशनल थर्मल पावर कार्पोरेशन लि. / National Thermal Power Corporation. Ltd. (A GOVT. OF INDIA ENTERPRISE) ENGINEERING DIVISION

PROJECT: SINGRAULI SUPER THERMAL POWER PROJECT STAGE-III (1X500 MW)

TITLE: P&I DIAGRAM OF COMPRESSED AIR SYSTEM

REV.	DESCRIPTION	DR'MN	DESIGN	CHKD.	C	W	E	C&I CLEARED BY	APPD	DATE
A	RELEASED FOR TENDER									

SIZE: AO | SCALE: --- | DRG.NO. 1150-001-POM-A-045 (SHEET 1 OF 2) | REV. A



LEGEND :

REFER SHEET 1 OF 2 OF THE P&I DIAGRAM FOR LEGEND

IA – INSTRUMENT AIR COMPRESSOR

SA – SERVICE AIR COMPRESSOR

HYD. GEN. PLANT – HYDROGEN GENERATION PLANT

NOTES :

1. REFER SHEET 1 OF 2 OF THIS P&I DIAGRAM FOR SCHEME OF COMPRESSOR BLOCK, ADP BLOCK & AIR RECEIVER BLOCK.
2. UNIT AIR RECEIVER (FOR IA SYSTEM) SHALL BE LOCATED IN BC BAY OF TG BUILDING, AIR RECEIVER BLOCK.
3. INSTRUMENT AIR SYSTEM
   a) AS SHOWN IN THIS DRAWING, CONTRACTOR TO PROVIDE RING MAINS AROUND THE TURBINE BUILDING AND INSTRUMENT AIR SUPPLY SHALL BE TAPPED FROM THE UNIT AIR RECEIVER TO BE LOCATED IN "BC-BAY". BIDDER'S REQUIREMENTS OF INSTRUMENT AIR OF UNITS SHALL BE TAPPED FROM THE RING MAIN. THE RING MAINS OF ALL THE UNITS SHALL BE INTERCONNECTED THROUGH ISOLATION VALVE AT REQUIRED LOCATIONS.
   b) IN ADDITION, CONTRACTOR SHALL PROVIDE INSTRUMENT AIR CONNECTIONS WITH ISOLATION VALVE AT ALL ELEVATIONS AND AT EVERY 100 METERS SPACING AROUND THE PERIPHERY OF TURBINE BUILDING AND STEAM GENERATOR AREA FOR EMPLOYER'S USE.
   c) FOR ALL THE STATION AUXILIARIES UNDER THE SCOPE OF THE BIDDER, INSTRUMENT AIR SUPPLY SHALL BE PROVIDED FROM A SEPARATE HEADER AS SHOWN IN THE DRAWING.
   d) BIDDER SHALL PROVIDE MINIMUM ONE INSTRUMENT AIR CONNECTION OF MINIMUM 25mm NB SIZE WITH AN ISOLATION VALVE NEAR EMPLOYER'S FACILITY/BUILDINGS SUCH AS WATER PRE TREATMENT FOR WATER PRE TREATMENT PLANT, HYDROGEN GEN. PLANT, AND ANY OTHER FACILITY OF BIDDER/EMPLOYER INSTRUMENT AIR REQUIREMENT MAY BE TAPPED OFF FROM THE EXISTING INSTRUMENT AIR PIPING HEADER IF AVAILABLE AS PER THE SITE CONDITION.
3. SERVICE AIR SYSTEM:
   a) AS SHOWN IN THIS DRAWING, CONTRACTOR TO PROVIDE RING MAIN AROUND THE TURBINE BUILDING, STEAM GENERATOR AND ESP AREA AND SERVICE AIR SUPPLY FOR THE RING MAIN SHALL BE TAPPED FROM COMPRESSOR HOUSE. BIDDER'S REQUIREMENTS OF SERVICE AIR SHALL BE TAPPED FROM THE RING MAIN. THE RING MAINS SHALL BE PROVIDED WITH ISOLATION AT REQUIRED LOCATIONS.
   b) IN ADDITION, CONTRACTOR SHALL PROVIDE SERVICE AIR CONNECTIONS WITH ISOLATION VALVE AT ALL ELEVATIONS AND AT EVERY 45 METERS SPACING AROUND THE PERIPHERY OF TURBINE BUILDIN, STEAM GENERATOR AND ESP AREA FOR EMPLOYER'S USE.
   c) FOR ALL THE STATION AUXILIARIES UNDER THE SCOPE OF BIDDER, SERVICE AIR SHALL BE TAPPED FROM THE COMPRESSOR HOUSE AS PER BIDDER'S REQUIREMENT HOWEVER MINIMUM ONE NO. PIPE CONNECTION OF 40mm NB SIZE WITH AN ISOLATION VALVE SHALL BE PROVIDED AT ALL BIDDER'S FACILITIES FOR EMPLOYER'S USE.
   d) BIDDER SHALL PROVIDE MINIMUM ONE SERVICE AIR CONNECTION OF MINIMUM 45mm NB SIZE WITH AN ISOLATION VALVE, NEAR EMPLOYER'S FACILITIES/BUILDINGS SUCH AS WATER PRE TREATMENT, CT SWITCHGEAR ROOMS AND SWITCHYARD CONTROL ROOM. FOR WATER PRE TREATMENT PLANT SERVICE AIR REQUIREMENT MAY BE TAPPED OFF FROM THE EXISTIN SERVICE AIR PIPING HEADER.

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

एनटीपीसी NTPC
नेशनल थर्मल पावर कार्पोरेशन लि०
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: SINGRAULI SUPER THERMAL POWER PROJECT
STAGE-III (1x500MW)

TITLE: P&I DIAGRAM OF COMPRESSED AIR SYSTEM

SIZE	SCALE	DRG.NO.	(SHEET 2 of 2)	REV.
A1	--	1150-001-POM-A-045		A

CAD FILE NAME : 1150-001-POM-A-045

FIRST ANGLE PROJECTION ALL DIMENSIONS ARE IN MM

DRAWING NO. PE-DC-401-555-A001

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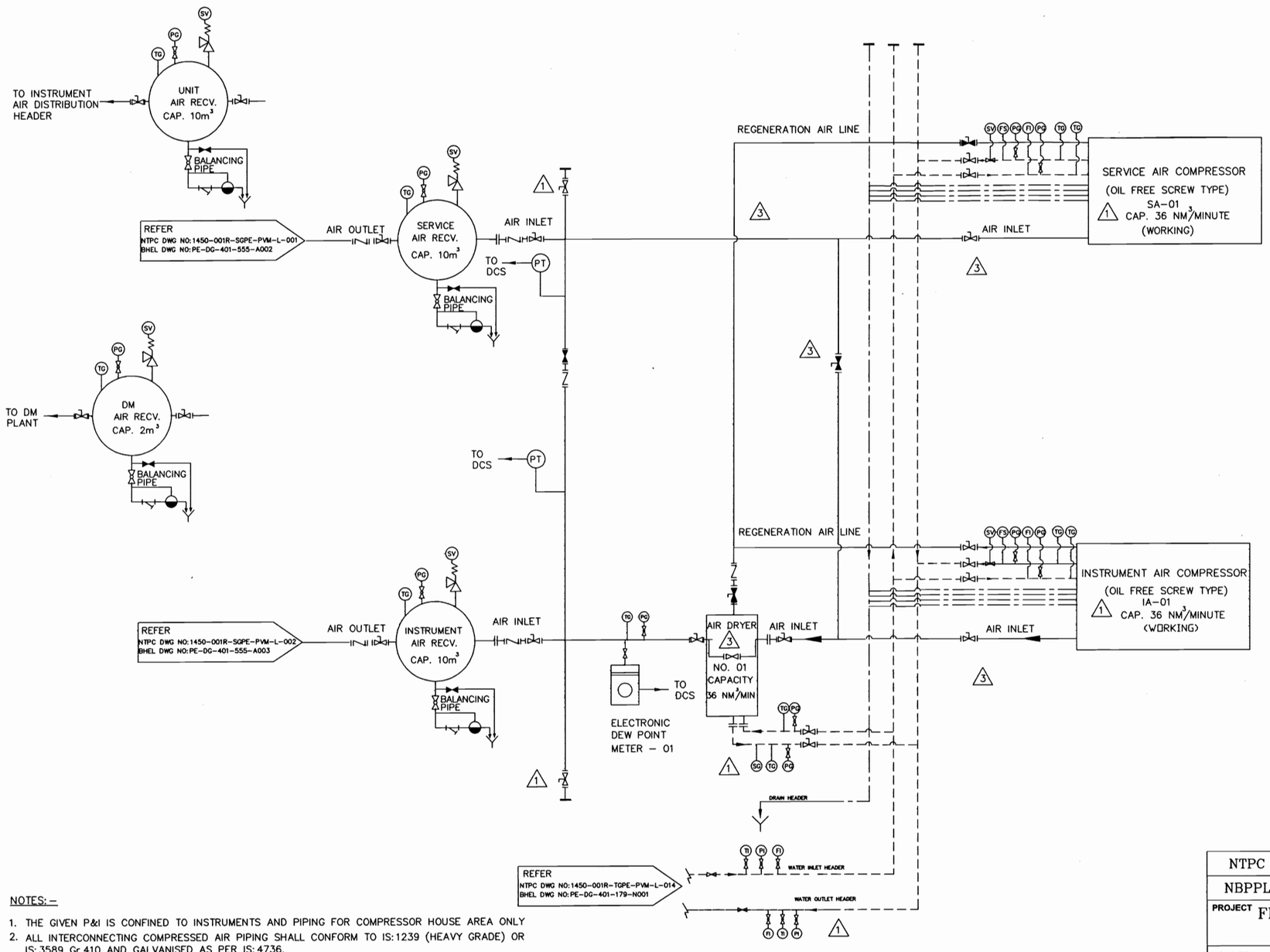
FOLD



L E G E N D			
	BALL VALVE (OPEN)	TG	TEMP. GAUGE
	BAL VALVE (CLOSED)		NON RETURN VALVE
	ISOLATION VALVE		WATER
	GLOBE VALVE (OPEN)		AIR
	GLOBE VALVE (CLOSED)		DRAIN
	RELIFE/SAFETY VALVE		'Y' TYPE FUNNEL
PG	PRESSURE GAUGE	FS	FLOW SWITCH
FI	FLOW INDICATOR	PT	PRESSURE TRANSMITTER
ADT ASSLY.	AUTO DRAIN TRAP ASSEMBLY		CONTROL VALVE

ALTERNATIVE – I

NOTES: –

1. THE GIVEN P&I IS CONFINED TO INSTRUMENTS AND PIPING FOR COMPRESSOR HOUSE AREA ONLY
2. ALL INTERCONNECTING COMPRESSED AIR PIPING SHALL CONFORM TO IS:1239 (HEAVY GRADE) OR IS: 3589 Gr.410 AND GALVANISED AS PER IS: 4736.
3. ALL COOLING WATER PIPING WILL BE CONFORMING TO IS:1239 (PART–I, HEAVY GRADE).
4. FITTINGS FOR AIR PIPING SHALL BE CONFORMING TO RELEVANT BIS STANDARD AND GRADE EQUIVALENT THAT OF PARENT PIPE GRADE.
5. COMPRESSED AIR PIPING HANDLING HOT AIR WILL BE SUITABLY INSULATED SO AS TO RESTRICT SURFACE TEMPERATURE TO 60 deg C.
6. ALL PRESSURE & TEMPERATURE GAUGE SHALL 150 mm DIAL TYPE.
7. DRAIN PIPING UPTO THE NEAREST DRAIN POINT WITHIN THE AIR COMPRESSOR ROOM SHALL BE PROVIDED.

TO No. OF	REV.	DATE	ALTD	CHD	APPD
	03	24.06.14	RK	HK	SKB

DRAWING REVISED AS PER NTPC's COMMENTS RECEIVED VIA TRANSMITTAL DATED 20.06.2014..

TO No. OF	REV.	DATE	ALTD	CHD	APPD
	01	04.06.14	RK	HK	SKB

DRAWING REVISED AS PER NTPC's COMMENTS RECEIVED VIA TRANSMITTAL DATED 15.05.2014.

JOB NO.	401
STATUS	CONTRACT
DISTRIBUTION	

NTPC DRG. No. 1450-001R-SGPE-PVM-K-001

NBPPL DRG. No. NBPPL-4-SGP-P4M-K-001

PROJECT FEROZE GANDHI UNCHAHAR THERMAL POWER PROJECT STAGE–IV 1X500MW

OWNER: एन टी पी सी NTPC — *NTPC Limited* (A GOVERNMENT OF INDIA ENTERPRISE)

CONTRACTOR: NBPPL — **NTPC BHEL Power Projects Private Limited** *(A Joint Venture Company of NTPC & BHEL)* Y.S.R. Puram, Village Mannavaram, Sri Kalahasti Mandal, Distt. Chittoor - 517620 (A.P.)

ENGG / SUB CONTRACTOR: BHEL — BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NEW DELHI

DEPT CODE		NAME	SIGN	DATE
M	DRN	RK	-sd-	25.02.14
	DESN	HK	-sd-	25.02.14
	CHD	SS	-sd-	25.02.14
	APPD	SKB	-sd-	25.02.14

TITLE: P & I DIAGRAM FOR IA & SA SYSTEM WITH ROTARY DRUM HOC AIR DRYER

DEPT. | SCALE | DRAWING NO. PE-DG-401-555-A001

SIGN | DATE | SHEET OF | REV. 03

FORMAT SIZE A3

DRAWING NO. PE-DG-401-555-A001

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FOLD

NOTES: –

1. THE GIVEN P&I IS CONFINED TO INSTRUMENTS AND PIPING FOR COMPRESSOR HOUSE AREA ONLY
2. ALL INTERCONNECTING COMPRESSED AIR PIPING SHALL CONFORM TO IS:1239 (HEAVY GRADE) OR IS: 3589 Gr.410 AND GALVANISED AS PER IS: 4736.
3. ALL COOLING WATER PIPING WILL BE CONFORMING TO IS:1239 (PART–I, HEAVY GRADE).
4. FITTINGS FOR AIR PIPING SHALL BE CONFORMING TO RELEVANT BIS STANDARD AND GRADE EQUIVALENT THAT OF PARENT PIPE GRADE.
5. COMPRESSED AIR PIPING HANDLING HOT AIR WILL BE SUITABLY INSULATED SO AS TO RESTRICT SURFACE TEMPERATURE TO 60 deg C.
6. DRAIN PIPING UPTO THE NEAREST DRAIN POINT WITHIN THE AIR COMPRESSOR ROOM SHALL BE PROVIDED.

ALTERNATIVE – II

INSTRUMENT AIR COMPRESSOR
(OIL FREE SCREW TYPE)
IA–1
CAP. 36 NM³/MINUTE
(WORKING)

SERVICE AIR COMPRESSOR
(OIL FREE SCREW TYPE)
SA–1
CAP. 36 NM³/MINUTE
(WORKING)

COOLING WATER RETURN
COOLING WATER SUPPLY
HOT AIR
HOT AIR TO ADP
HOT AIR TO ADP
SERVICE AIR TO PLANT
AIR INLET
AIR OUTLET
TO DCS
ELECTRONIC DEW POINT METER – 01
BALANCING PIPE
DRAIN HEADER

HEAT OF COMPRESSION TYPE ADP#1 (WORKING)
CAPACITY
36 NM³/MINUTE

INSTRUMENT AIR RECV. NO. 1 CAP.10m³

REFER
NTPC DWG NO: 1450–001R–SGPE–PVM–L–001
BHEL DWG NO:PE–DG–401–555–A002

SERVICE AIR RECV. NO. 1 CAP.10m³

REFER
NTPC DWG NO: 1450–001R–SGPE–PVM–L–002
BHEL DWG NO:PE–DG–401–555–A003

REFER
NTPC DWG NO: 1450–001R–TGPE–PVM–L–014
BHEL DWG NO:PE–DG–401–179–N001

WATER OUTLET HEADER
WATER INLET HEADER

UNIT AIR RECV. NO. 1 CAP.10m³
TO INSTRUMENT AIR DISTRIBUTION HEADER

DM PLANT AIR RECV. NO. 1 CAP.2m³
TO DM PLANT AIR OUTLET

L E G E N D

	BALL VALVE (OPEN)	TG	TEMP. GAUGE
	BAL VALVE (CLOSED)		NON RETURN VALVE
	ISOLATION VALVE		WATER
	GLOBE VALVE (OPEN)		AIR
	GLOBE VALVE (CLOSED)		DRAIN
	RELIFE/SAFETY VALVE		'Y' TYPE FUNNEL
PG	PRESSURE GAUGE	FS	FLOW SWITCH
FI	FLOW INDICATOR	PT	PRESSURE TRANSMITTER
ADT ASSLY.	AUTO DRAIN TRAP ASSEMBLY	M	MOTORISED VALVE

JOB NO.	401
STATUS	CONTRACT
DISTRIBUTION	

TO					TO				
No. OF					No. OF				
REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
03	24.06.14	RK	HK	SKB	01	04.06.14	RK	HK	SKB
	DRAWING REVISED AS PER NTPC's COMMENTS RECEIVED VIA TRANSMITTAL DATED 20.06.2014..					DRAWING REVISED AS PER NTPC's COMMENTS RECEIVED VIA TRANSMITTAL DATED 15.05.2014.			

NTPC DRG. No. 1450-001R-SGPE-PVM-K-001

NBPPL DRG. No. NBPPL-4-SGP-P4M-K-001

PROJECT FEROZE GANDHI UNCHAHAR THERMAL POWER PROJECT
STAGE–IV 1X500MW

OWNER: NTPC

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

CONTRACTOR: NBPPL

ENGG / SUB CONTRACTOR: BHEL

NTPC BHEL Power Projects Private Limited
(A Joint Venture Company of NTPC & BHEL)
Y.S.R. Puram, Village Mannavaram, Sri Kalahasti Mandal, Distt. Chittoor - 517620 (A.P.)

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NEW DELHI

DEPT CODE		NAME	SIGN	DATE
M	DRN	RK	-SD-	25.02.14
	DESN	HK	-SD-	25.02.14
	CHD	SS	-SD-	25.02.14
	APPD	SKB	-SD-	25.02.14

TITLE: P & I DIAGRAM FOR IA & SA SYSTEM
WITH CONVENTIONAL TWIN TOWER TYPE HOC AIR DRYER

DEPT. | SCALE
SIGN
DATE

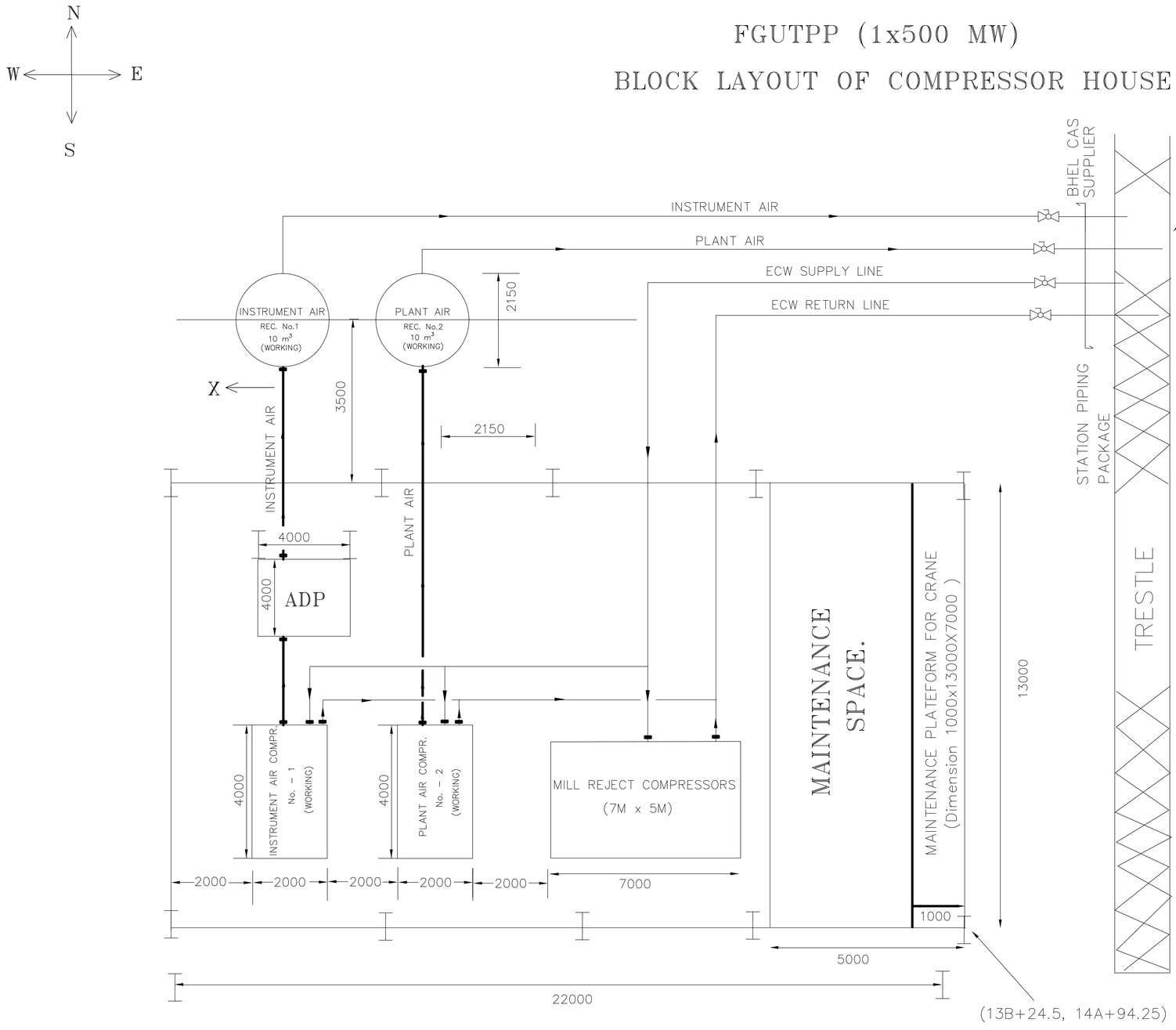
DRAWING NO. PE-DG-401-555-A001

SHEET OF | REV. 03

FORMAT SIZE A3

FGUTPP (1x500 MW)

BLOCK LAYOUT OF COMPRESSOR HOUSE



TP FOR IA/SA TO COMPRESSOR HOUSE (13B+25.5, 15A+10)

TP FOR ECW TO COMPRESSOR HOUSE (13B+25.5, 15A+0.5)

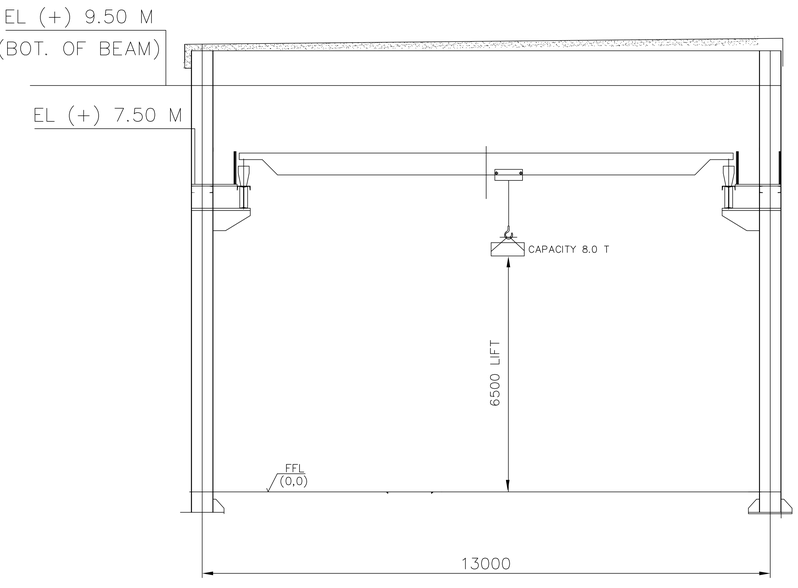
COOLING WATER REQUIREMENT=105 M3/HR

ECW INLET PRESSURE AT TP= 5 KG/CM2 (maximum)

ECW INLET WATER TEMPERATURE= 36 DEG C

RISE IN TEMPERATURE= 10 DEG C

PRESSURE DROP ACROSS SYSTEM=10MWC



SECTION XX

NOTE

1. ALL THE INTERNAL DIMENSIONS ARE IN MM AND ARE TENTATIVE.
2. THIS BLOCK LAYOUT IS FOR PLANNING THE SPACE REQUIREMENT OF COMPRESSOR HOUSE ONLY.

STATUS: PRELIMINARY INPUT FOR COMPRESSOR HOUSE

SKETCH No. PE-401-555-ASK1 Rev 00

09740

CLAUSE NO.	ERECTION CONDITIONS OF CONTRACT
45.00.00	**FOUNDATION DRESSING & GROUTING FOR EQUIPMENT/ EQUIPMENT BASES**
45.01.00	The surfaces of foundations shall be dressed to bring the top surface of the foundations to the required level, prior to placement of equipment/equipment bases on the foundations.
45.02.00	All the equipment/ equipment bases, shall be grouted and finished by bidder as per these specifications unless otherwise recommended by the equipment manufacturer.
45.03.00	The concrete foundation surfaces shall be properly prepared by bidder by chipping, grinding as required to bring the top of such foundation to the required level, to provide the necessary roughness for bondage and to assure enough bearing strength.
45.04.00	**Grout** The grout for equipment foundation shall be high strength grout having a minimum characteristic compressive strength of 60 N/mm2 at 28 days. The grout shall be ready mix non-shrink, chloride - free, cement based, free flowing, non-metallic grout as recommended by equipment manufacturer. The ready mix grout shall be of reputed make as approved by the Employer. The Grout shall have good flowability even at very low water/ grout powder ratio. The Grout shall have characteristics of controlled expansion to be able to occupy its original volume to fill the voids and to compensate for shrinkage. Grout shall be of pre-mix variety so that only water needs to be added before use. The mixing of the Grout shall conform to the recommendations of the manufacturer of the Grout.
45.05.00	**Placing of Grout**
45.05.01	After the base has been prepared, its alignment and level has been checked and approved and before actually placing the grout, a low dam shall be set around the base at a distance that will permit pouring and manipu-lation of the grout. The height of such dam shall be at least 25mm above the bottom of the base. Suitable size and number of chains shall be introduced under the base before placing the grout, so that such chains can be moved back & forth to push the grout into every part of the space under the base.
45.05.02	The grout shall be poured either through grout holes if provided or shall be poured at one side or at two adjacent sides to make the grout move in a solid mass under the base and out in the opposite side. Pouring shall be continued until the entire space below the base is thoroughly filled and the grout stands at least 25 mm higher all around than the bottom of the base. Enough care should be taken to avoid any air or water pockets beneath the bases.
45.05.03	In addition to the above, recommendations of Grout manufacturer shall also be followed.

NTPC BHEL POWER PROJECTS PRIVATE LIMITED NBPPL

CLAUSE NO.	ERECTION CONDITIONS OF CONTRACT
45.06.00	**Finishing of the Edges of the Grout** The poured grout should be allowed to stand undisturbed until it is well set. Immediately thereafter, the dam shall be removed and grout which extends beyond the edges of the structural or equipment base plates shall be cut off, flushed and removed. The edges of the grout shall then be pointed and finished with 1:2 cement mortar pressed firmly to bond with the body of the grout and smoothened with a tool to present a smooth vertical surface. The work shall be done in a clean and scientific manner and the adjacent floor spaces, exposed edges of the foundations, and structural steel and equipment base plates shall be thoroughly cleaned of any spillage of the grout.
45.07.00	**Checking of Equipment After Grouting** After the grout is set and cured, the Contractor shall check and verify the alignment of equipments, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores, couplings, etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during such post grouting check- up and verifications. Such pre and post grout records of alignment details shall be maintained by the Contractor in a manner acceptable to the Employer.
46.00.00	**SHAFT ALIGNMENTS** All the shafts of rotating equipment shall be properly aligned to those of the matching equipments to as perfect an accuracy as practicable. The equipment shall be free from excessive vibration so as to avoid overheating of bearings or other conditions which may tend to shorten the life of the equipment. The vibration level of rotating equipments measured at bearing housing shall not exceed forty (40) microns and shall conform to VDI 2056. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.
47.00.00	**DOWELLING** All the motors and other equipment shall be suitably doweled after alignment of shafts with tapered machined dowels as per the direction of the Employer.
48.00.00	**CHECK OUT OF CONTROL SYSTEMS** After completion of wiring, cabling furnished under separate specification and laid and terminated by the Employer, the Contractor shall check out the operation of all control systems for the equipment furnished and installed under these specifications and documents.
49.00.00	**COMMISSIONING SPARES**
49.01.00	It will be the responsibility of the Contractor to provide all commissioning spares including consumable spares required for initial operation till the Completion of Facilities. The Contractor shall furnish a list of all commissioning spares within 60 days from the date of Notification of Award and such list shall be reviewed by the Employer and

BHEL POWER PROJECTS PRIVATE LIMITED NTPC NBPPL

1X500 MW UNCHAHAR TPP (SG Package)
COMPRESSED AIR SYSTEM
GUIDELINE FOR ALLOCATION OF PRICE IN BBU

ANNEXURE-IX

Sl. No.	DESCRIPTION	Qty.	Unit	Percentage value of Total Price (Supply + E&C)
1.0	**BREAK -UP OF MAIN SUPPLY PRICE (EXCLUDING MANDATORY SPARES PRICE) FOR MAJOR COMPONENTS OF COMPRESSED AIR SYSTEM (Specification no: PE-TS-401-555-A001)**			
1.1	Instrument Air & Plant air Compressor (oil free Screw type)	2	NOS	54% OF THE TOTAL EX-WORKS SUPPLY PRICE
1.2	Air Dryer (HOC Type)	1	no.	15% OF THE TOTAL EX-WORKS SUPPLY AND E&C PRICE
1.3	Air Receivers	4	NOS	4% OF THE TOTAL EX-WORKS SUPPLY AND E&C PRICE
1.4	Piping & Valves	1	Lot	2.5% OF THE TOTAL EX-WORKS SUPPLY AND E&C PRICE
1.5	Field instruments as specified	1	Lot	2.0% OF THE TOTAL EX-WORKS SUPPLY AND E&C PRICE
1.6	Temperature transmitters as specified(for RTD & BTD element)	10	NOS	1.0% OF THE TOTAL EX-WORKS SUPPLY AND E&C PRICE
1.7	Miscellaneous items including commissioning spares, E&C Spares, requirements as per site condition	1	Lot	1.5% OF THE TOTAL EX-WORKS SUPPLY AND E&C PRICE
1.8	E&C Charges	1	Lot	20% OF THE TOTAL EX-WORKS SUPPLY AND E&C PRICE
2.0	**Mandatory Spares**	1	Lot	Actual price

(TENTATIVE) ANNEXURE-X

LOAD TITLE	RATING (KW)		UNIT (U)/STN (S)	Nos.		VOLTAGE CODE*	FEEDER CODE**	EMER. LOAD (Y)	CONT.(C)/ INTT.(I)	STARTING TIME >5 SEC (Y)	LOCATION	BOARD NO.	CABLE		BLOCK CABLE DRG. No.	CONTROL CODE	REMARKS	LOAD No.
	NAME PLATE	MAX. CONT. DEMAND (MCR)		RUNNING	STANDBY								SIZE CODE	NOs				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Instrument Air Compressor	330			1	0	C	U		C		Compressor House							
Service Air Compressor	330			1	0	C	U		C		Compressor House							
Instrument Air & Service air Compressor Control Panel	3.0			2	0	D	S		C		Compressor House							
Instrument Air & Service air Compressor Fan Motor	5.0			2	0	D	U		C		Compressor House							
Air Dryer	2.0			1	0	D	S		C		Compressor House							
AUTO DRAIN TRAP	0.3			4		E	S		I		2 nos. feeders in compressor house. 1 nos. feeders in TG bldg at EL.0.0 M in B-C bay (one for each unit) & 1 no. feeder near DM plant bldg.							

NOTES:

1. COLUMN 1 TO 12 & 18 SHALL BE FILLED BY THE REQUISITIONER (ORIGINATING AGENCY); REMAINING COLUMNS ARE TO BE FILLED UP BY PEM (ELECTRICAL)
2. ABBREVIATIONS : * VOLTAGE CODE (7):- (ac) A=11 KV, B=6.6 KV, C=3.3 KV, D=415 V, E=240 V (1 PH), F=110 V (cc): G=220 V, H=110 V, J=48 V, K=+24V, L=-24 V
   : ** FEEDER CODE (8):- U=UNIDIRECTIONAL STARTER, B=BI-DIRECTIONAL STARTER, S=SUPPLY FEEDER, D=SUPPLY FEEDER (CONTACTER CONTROLLED)

BHEL	**LOAD DATA (ELECTRICAL)**	JOB NO.	401	ORIGINATING AGENCY		PEM (ELECTRICAL)
		PROJECT TITLE	1x500 MW UNCHAHAR	NAME		DATA FILLED UP ON
		SYSTEM / S		SIGN.		DATA ENTERED ON
		DEPTT. / SECTION		SHEET 1 OF 1	REV. 00	DE'S SIGN. & DATE