TALCHER THERMAL POWER PROJECT STAGE-III
(2 X 660 MW)

TECHNICAL SPECIFICATION
FOR
STORAGE TANKS FOR CHLORINE DIOXIDE DOSING SYSTEM

SPECIFICATION NO.: PE-TS-497-154-13000-A001

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

CONTENT

PROJECT INFORMATION

TALCHER TPP STAGE-III (2X660 MW)

1.00.00 BACKGROUND

Talcher Thermal Power Project is situated near Talcher town in Angul district of Orissa having capacity of 460 MW (4x60 MW + 2x110 MW). The project was implemented by Orissa State Electricity Board (OSEB). Subsequently TTPS was taken over by NTPC on 03.06.1995. The present proposal is for expansion of TTPS by adding 2 units of 660 MW.

2.00.00 PROJECT HIGHLIGHTS

2.01.00 Location

The proposed site is located near Talcher town in Angul district of Orissa having latitude and longitude as 20°55' N and longitude 85°25' E respectively. The site is approachable from Banarpal–Talcher section of National Highway No. 23 at a distance of about 1 km from Anand Bazar. Nearest railway station is at Talcher on Talcher-Cuttack section of North Eastern Railway at about 4 Kms. The nearest commercial airport is Bhubaneswar at about 90 km.

Vicinity Plan of the proposed project is placed at **Annexure-I**.

3.00.00 BASIC INPUTS

3.01.00 Land

The plant facilities for this expansion stage would be accommodated within the land available in the existing power station and ash disposal shall be in mine voids.

3.02.00 Water

Make up water requirement for Talcher Thermal power project, Stage-III expansion (2x660 MW) would be about 40 Cusec with ash water recirculation system. Water requirement for the project will be met from upstream of the Samal barrage discharge on the River Brahmani and shall be pumped to the raw water reservoir located about 28 kms from intake well.

3.03.00 FUEL

3.03.01 Coal Requirement, Availability and Linkage

The Coal Linkage for the project granted by SLC(LT) and CLOA has allocated 5.854 MMTPA coal from MCL.

The primary fuel for the main steam generator shall be coal. The domestic coal quality parameters are indicated in **Annexure-IV-2** and imported coal parameters are indicated in **Annexure-IV-4** are to be considered for steam generator design.

3.03.03 Coal Transportation

The envisaged mode of coal transportation from the coal mines to the power plant is through Indian Railways network and will be unloaded in underground RCC Track Hoppers.

3.03.03 Fuel Oil

The fuel oil to be used for start-up, coal flame stabilization and low load operation of the steam generator shall be Light Diesel oil (LDO) having the characteristics given at **Annexure-IV-1** and HSD Oil characteristics given at **Annexure-IV-3**.

4.00.00 STEAM GENERATOR TECHNOLOGY

The steam generators shall be super critical once through type, water tube, direct pulverized coal fired, top supported, balanced draft furnace, single reheat, radiant, dry bottom type, suitable for outdoor installation. The gas path arrangement shall be single pass (Tower type) or two pass type.

5.00.00 FLUE GAS DESULPHURIZATION SYSTEM (FGD) & SCR ready system:

The project is envisaged with Flue Gas Desulfurization (FGD) system and DeNOx ready system meeting Ministry of Environment, Forest & Climate Change notification dated 07.12.2015. Limestone to be used for design of FGD system shall be as per the characteristic given at **Annexure-IV-5.**

6.00.00 CAPACITY

Talcher TPP, Stage-III : 2x660 MW - Present proposal

7.00.00 BENEFICIARY STATES

The project is being implemented as a regional project for meeting the power demand of Eastern Region Beneficiaries including Orissa – the home-state. The exact allocation of power shall be subject to the approval of Ministry of Power, Govt. of India.

8.00.00 METEOROLOGICAL DATA

The meteorological data from nearest observatory is placed at **Annexure-II.**

9.00.00 Plant Water Scheme

The Plant water scheme is included in Part-E of Technical Specification.

9.01.00 Condenser Cooling (CW) Water System

It is proposed to adopt a recirculating type cooling water system with cooling towers for the project. For the re-circulating type CW system it is proposed to supply clarified water as make up. Circulating water from CW pumps to TG area and from TG area to cooling tower will be carried through pipes/ducts. Cooled water from cooling tower will be led to CW pump house through the cold water channel by gravity.

9.02.00 Equipment Cooling Water (ECW) System (Unit Auxiliaries)

All plant auxiliaries shall be cooled by De-mineralized water (DM) in a closed circuit. The primary circuit DM water shall be cooled through plate type heat exchangers by Circulating Water tapped from CW system in a closed secondary circuit. The hot secondary circuit cooling water shall be cooled in the cooling towers and shall be returned back to the system.

It is proposed to provide independent primary cooling water circuit for TG & its auxiliaries and Steam Generator & auxiliaries (including station auxiliaries) on Unit basis.

9.03.00 Other Miscellaneous Water Systems

CW system blow down water shall be used for the FGD process requirement, ash slurry pumps sealing, sealing of Vacuum pumps (if applicable) of Ash Handling plant, make-up to fire water system. The service water shall be taken from clarified water tank of Pre-treatment plant. The service (wash water) water collected from various areas and coal handling plant shall be treated as per requirement and reused. The drinking water requirement shall be provided from water treatment plant.

POWER EVACUATION SYSTEM

In view of above and considering the present capacity of the project (1320 MW), it is proposed to adopt the step-up/power evacuation voltage as 400kV. Accordingly provision for 4 Nos. of 400 kV line bays has been considered in the generation switchyard. Station supply shall be derived directly from 400kV voltage level through 400kV Class station transformers. The issue of power evacuation of the project shall be taken up with appropriate Transmission Utility as per regulatory provision, based on final power allocation received from Ministry of Power.

Criteria for Earthquake Resistant Design of Structures and Equipment

All power plant structures and equipment, including plant auxiliary structures and equipment shall be designed for seismic forces as given in Part-B of this section.

Criteria for Wind Resistant Design of Structures and Equipment

All structures and equipment of the power plant, including plant auxiliary structures and equipment, shall be designed for wind forces as given as given in Part-B of this section.

Vulnerability Atlas of India(VAI), prepared by Building Materials, Training and Promotion Council (BMTPC) under Ministry of Housing and Urban Affairs, is a comprehensive document which provides existing hazard scenario for the entire country and presents the digitized State/UT-wise hazard, maps with respect to earthquakes, winds and floods for district-wise identification of vulnerable areas. It also includes additional digitized maps for thunderstorms, cyclones and landslides. The main purpose of this Atlas is its use for disaster preparedness and mitigation at policy planning and project formulation and construction stage. The VAI provides necessary information for risk analysis and hazard assessment and is available at website www.bmtpc.org.

As per Government's directive, it is mandatory for the bidders to refer VAI for multi-hazard risk assessment and include the relevant hazard proneness specific to project location while planning, designing and execution of the project in terms of following details:

i) Seismic zone (II to V) for earthquakes
ii) Wind velocity
iii) Area liable to floods and Probable max. surge height
iv) Thunderstorms history
v) Number of cyclone storms/sever cyclone storms and max sustained wind specific to coastal region
vi) Landslides incidences with Annual rainfall normal
vii) District wise Probable Max. Precipitation

Accordingly, bidder should refer VAI while planning, designing and execution of the project.

However, for design of structures/facilities and equipment, the criteria for earthquake resistant design of structures and equipment, the criteria for Wind Resistant Design of Structures and Equipment and design parameters for drainage facilities, stipulated in the Technical Specification shall be followed.

For other information like area liable to floods, probable max. surge height, landslide, thunderstorm, cyclone etc. agencies are required to refer the VAI.

ANNEXURE-II

जलवायवी सारणी
CLIMATOLOGICAL TABLE

स्टेशन : अंगुल STATION : Angul — अक्षांश LAT. 20°50' — देशांतर LONG. 85°06' — समुद्री तल सतह से ऊंचाई HEIGHT ABOVE M.S.L. 139 METRES — वर्षों BASED ON OBSERVATIONS 1971-2000

माह MONTH	स्टेशन का सतह दाब STATION LEVEL PRESSURE	वायु तापमान AIR TEMPERATURE — MEAN: शुष्क बल्ब DRY BULB	MEAN: गीला बल्ब WET BULB	MEAN: दैनिक अधिकतम का माह का औसत DAILY MAX	MEAN: दैनिक न्यूनतम का माह का औसत DAILY MIN	MEAN: माह के उच्चतम तापमान का औसत HIGHEST IN THE MONTH	MEAN: माह के निम्नतम तापमान का औसत LOWEST IN THE MONTH	EXTREMES: उच्चतम HIGHEST	EXTREMES: उच्चतम की तारीख और वर्ष DATE AND YEAR	EXTREMES: निम्नतम LOWEST	EXTREMES: निम्नतम की तारीख और वर्ष DATE AND YEAR	HUMIDITY: सापेक्ष आर्द्रता RELATIVE HUMIDITY	HUMIDITY: वाष्प दाब VAPOUR PRESSURE	CLOUD AMOUNTS: औसत मेघाच्छादन Oktas of sky	CLOUD AMOUNTS: निम्न मेघ LOW CLOUDS	वर्षा RAINFALL: औसत मासिक योग MONTHLY TOTAL	वर्षा: वर्षा के दिनों की संख्या NO. OF RAINY DAYS	वर्षा: सर्वाधिक वर्षा वाले माह का योग TOTAL IN WETTEST MONTH WITH YEAR	वर्षा: सर्वाधिक शुष्क माह का योग TOTAL IN DRIEST MONTH WITH YEAR	वर्षा: 24 घंटों में सर्वाधिक वर्षा HEAVIEST RAIN IN 24 HOURS	वर्षा: दिनांक और वर्ष DATE AND YEAR	औसत पवन गति MEAN WIND SPEED
	hPa	°C	°C	°C	°C	°C	°C	°C		°C		%	hPa	Oktas		mm		mm	mm	mm		Kmph
जनवरी JAN	1021.2 997.6	17.9 25.7	15.4 18.5	27.9	15.6	31.0	11.3	35.1	29 1994	5.5	2 1971	76 47	15.8 15.6	1.2 1.1	0.5 0.5	9.0	0.7	61.7 1906	0.0	48.8	22 1995	
फरवरी FEB	999.1 995.4	21.1 29.0	18.0 19.9	30.9	18.2	35.3	12.7	39.3	23 1967	8.8	16 1971	72 41	18.3 16.0	2.0 1.6	1.1 0.9	20.9	1.6	370.1 1961	0.0	118.1	6 1961	
मार्च MAR	996.7 992.6	25.3 33.5	21.0 22.1	35.5	21.0	39.2	15.9	40.1	31 1999	10.2	2 1971	67 35	21.7 17.4	1.5 1.8	0.8 1.1	25.0	1.7	206.0 1990	0.0	115.0	30 1990	
अप्रैल APR	993.1 988.4	29.7 35.6	24.4 24.4	38.9	24.4	42.5	20.0	45.6	2 1941	14.4	19 1971	70 38	27.3 21.5	1.7 2.6	0.7 1.6	35.9	2.3	152.4 1997	0.0	67.2	2 1965	
मई MAY	990.4 985.7	30.6 36.6	25.9 25.7	39.8	26.0	44.3	21.6	47.2	24 1921	15.6	24 1964	68 42	29.7 24.2	1.9 3.2	0.9 2.0	75.6	3.6	333.1 1995	0.0	105.0	30 1990	
जून JUN	985.8 982.5	29.7 32.8	26.0 26.3	36.2	25.9	42.5	21.7	47.2	15 1967	17.4	1 1964	74 62	30.7 29.0	4.3 5.1	2.8 3.7	210.1	8.5	528.2 1990	39.4 1965	161.2	15 1990	
जुलाई JUL	986.1 983.1	27.9 29.4	25.4 25.9	32.1	24.4	36.2	22.4	41.1	3 1982	18.3	20 1971	81 76	30.5 30.7	5.4 5.9	3.6 4.6	350.3	12.1	552.5 1932	102.4 1985	243.8	25 1932	
अगस्त AUG	986.5 983.9	27.5 28.8	25.3 25.8	31.4	23.9	34.5	21.3	37.7	22 1983	14.3	28 1974	83 78	30.6 31.1	5.5 5.9	4.0 4.6	325.3	13.4	826.0 1931	96.5 1937	257.3	21 1931	
सितम्बर SEP	990.9 987.8	27.5 28.9	25.2 25.6	32.1	24.1	34.8	20.5	36.1	7 1977	12.8	24 1974	83 76	30.5 30.3	4.5 5.3	3.1 4.0	206.5	10.2	569.7 1921	96.1 1919	148.8	6 1939	
अक्टूबर OCT	993.8 992.1	26.2 29.3	23.6 24.3	32.3	20.7	34.4	18.6	37.7	21 2000	12.0	28 1974	80 66	27.2 26.5	2.9 3.3	1.7 2.3	100.8	5.1	404.5 1973	0.0	134.2	18 1999	
नवम्बर NOV	992.4 990.8	22.4 27.3	19.4 20.9	30.0	18.2	32.5	13.6	35.1	26 1997	5.6	30 1970	75 54	20.5 19.7	1.8 1.9	0.9 1.0	25.7	1.3	161.5 1930	0.0	101.4	6 1990	
दिसम्बर DEC	1021.7 997.8	17.8 24.7	15.3 17.9	27.7	15.1	30.3	11.5	32.1	23 1995	3.5	4 1974	75 49	15.5 15.3	1.0 1.1	0.4 0.4	3.1	0.3	39.8 1991	0.0	40.8	14 1997	
वार्षिक योग या वर्ष का औसत ANNUAL TOTAL OR MEAN	993.8 990.2	25.2 30.1	22.0 23.1	32.9	21.5	44.1	9.1	47.2 5	24 1921	3.5 12	4 1974	75 56	24.9 23.2	2.8 3.3	1.7 2.2	1330.1	60.9	2693.4 1990	756.1 1957	257.3 8	21 1931	
वर्षों की संख्या NUMBER OF YEARS	26	18	18	17	17	17	17	89		89		18	18	26	26	30	30	94	94	100		

SECTION-I

TECHNICAL SPECIFICATION

1. INTENT OF SPECIFICATION

This specification is intended to cover SUPPLY PART comprising of design, engineering, manufacture, fabrication, assembly, inspection & testing at vendor's works, surface preparation, painting, forwarding, supply and delivery at site properly packed for transportation, preparation and submission of drawings including as built drawings of STORAGE TANKS FOR HCl & NaClO2 and fume absorbers for CHLORINE DIOXIDE (ClO_2) DOSING SYSTEM as per scope defined in tender technical specification, amendment & agreements till placement of order of **STORAGE TANKS FOR CHLORINE DI OXIDE (ClO2) DOSING SYSTEM (2 X 660MW TALCHER THERMAL POWER PROJECT STAGE-III)**

2. REFERENCE DOCUMENTS LIST

S. No.	Document Title
a.	P & ID FOR CHLORINE DI OXIDE DOSING SYSTEM
b.	DATASHEET – A
c.	NOZZLE SCHEDULE
d.	CIVIL INPUT DRAWING FOR CLO2 DOSING SYSTEM

3. SCOPE OF SUPPLY

Brief Scope of supply for STORAGE TANKS FOR HCl & NaClO2 and fume absorbers for CHLORINE DIOXIDE (ClO_2) DOSING SYSTEM has been given below. However, bidder to consider additional items/ requirements to make the system complete in all respect.

BILL OF QUANTITY (SUPPLY)				
SL. NO.	ITEM DESCRIPTION	SIZE	QTY.	UNIT
a.	Acid Storage Tanks	35 m3 (effective capacity)	3	Nos.
b.	Sodium Chlorite Storage Tanks	35 m3 (effective capacity)	3	Nos.
c.	Accessories for each tank (Refer Datasheet-A)	As per requirement		
d.	Fume Absorber (for HCl tanks)	As per requirement	3	Nos.
e.	U clamp, nuts, bolts, flanges, counter flanges, anchor fastener, foundation bolts, chemical filling pipes inside each tank, Manholes in each tank, nozzles etc.	As per requirement		

3.1 Painting shall be in bidder's scope.
3.2 Tanks shall be provided with manhole on the conical roof and approach shall be provided for it by bidder.
3.3 Tools and tackles required for Erection and commissioning.
3.4 Erection and Commissioning spares, if applicable shall be in bidder's scope.
3.5 Blind flange to be provided for all nozzles.
3.6 Sticker mentioning nozzle no. & nozzle size will be stick for all nozzles.
3.7 Permanent approach ladder, platform with handrailing over the top of tanks shall be provided.
3.8 Name plate (MOC SS 304) for tanks and fume absorber.
3.9 Minimum 4 nos. FRP gusset will be provided for all nozzles.

4. DESIGN CRITERIA

APPLICABLE CODES AND STANDARDS:

4.1 Tank shall be designed and manufactured as per the below codes only
- Code: BS-EN 13121-1 latest edition
- BS-EN 13121-2 latest edition
- BS-EN 13121-3 latest edition
- IS 1893 for Seismic loading.
- IS 875 for wind load.

4.2 Wind load and seismic load shall be considered for tank and fume absorber design calculation.

4.3 For wind load design calculation basic wind speed of 50 m/s to be considered.

4.4 For inspection and testing follow QAP of storage tank and fume absorber provided elsewhere in tender specification.

4.5 The tank shall be designed for a service life of minimum 25 years.

4.6 Shell bottom & top must be FRP (Vinyl Ester Resin).

4.7 All flanges are drilled as per ANSI B16.5 150#.

4.8 Vendor must supply as build drawing of FRP tanks

4.9 Top roof shall be reinforced with FRP stiffeners.

4.10 All atmospheric tanks shall have sufficient free board above the “Level High”/ “Normal Level” as the case may be. The overflow level shall be kept at least 20 cm or 10% of vessel height above the “Level High”/” Normal Level” for all the tanks. Further, a minimum 100 mm free board shall be provided above the top of overflow level to the bottom of roof of the tank.

4.11 All the tanks shall be provided with vent, overflow, drain and sample connections. Effective capacity for chemical tanks means the capacity between the bottoms of the overflow nozzle to the top of the outlet nozzle. Outlet nozzle centre line shall be kept at least 200 mm from the bottom Invert Level of the chemical tanks.

4.12 Bidder to start manufacturing of storage tanks and fume absorber after approval of fabrication drawings and respective quality plan.

4.13 Tanks and absorbers Foundations are already constructed on site, details are shown in civil input drawing. Bidder to adhere the same.

4.14 Bidder to dispatch of storage tanks and fume absorber after inspection by BHEL.

4.15 Bidder has to submit the inspection and test plan to BHEL for approval to ensure quality of final products as per relevant standard. Test/ Inspection which are to be carried out by the manufacturer as per QAP.

4.16 Engineering design charges shall be payable to successful bidder as per GCC terms and conditions after completion of approval of all engineering documents.

4.17 Hydraulic testing shall be in bidder’s scope

4.18 Safe transportation of the tank is completely in vendor scope. In case of any damage during transportation, bidder shall be responsible for carrying out any rectification post-delivery. The same is in bidder scope.

5. DRAWING/DOCUMENTS

After award of LOI, the drawing documents listed in MDL are minimum drawing/documents, which shall be submitted by the bidder for BHEL and Customer approval. However, any additional drawing/document if found necessary for completion of the engineering, the same shall be submitted by bidder without any commercial & delivery implication to BHEL.

The bidder has to submit the revised drawing/document along with the compliance sheet indicating enumerate reply to all BHEL and customer comments or observations. Without compliance sheet the submission of the drawings/documents will not be considered and the delay on this account

will be solely on bidder's side only. Bidder to comply with the observations of the BHEL and CUSTOMER without price & delivery implication.
Every revised submission incorporating BHEL/Customer comments shall be resubmitted within 7 day by bidder.
BHEL will furnish comments/approval on documents within 10 days of submission by bidder including customer comments/approval.
Bidder to further note that the submitted drawings/revised drawing, should be complete in all respects. Any incomplete drawing submitted shall be treated as non-submission with delays attributable to bidder's account. For any clarification/ discussion required to complete the drawings, the bidder shall himself depute his personal to BHEL's /Customer's office for across the table discussions/ finalizations/ submissions of drawings.

Following drawing/documents shall be submitted by bidder:

MASTER DRAWING LIST (MDL)

S. No.	BHEL DRG NO	SCHEDULE OF SUBMISSION FROM LOI IN WEEKS	SCHEDULE OF SUBMISSION FROM LOI IN WEEKS	DRG / DOC SIZE
1	PE-V0-497-154-13000-A003	THICKNESS CALCULATION, SIZING AND DESIGN CALCULATION OF STORAGE TANKS AND FUME ABSORBER	2	A4
3	PE-V0-497-154-13000-A008	GA DRAWING OF STORAGE TANK AND FUME ABSORBER*	5	A3
4	PE-V0-497-154-13000-A026	FABRICATION DRAWING OF STORAGE TANK AND FUME ABSORBER	5	A3
5	PE-V0-497-154-13000-A303	MANUFACTURING QUALITY PLAN FOR STORAGE TANK AND FUME ABSORBER	2	A4

*Fabrication Drawing includes Nozzle data, orientation and location, support details, dimensions for interfacing, Design data and material of construction etc

- List and schedule of drawings/documents to be submitted after award of contract shall be as per MDL.
- Bidder to submit soft copies of all the drawing and document along with quality plans for BHEL review and approval.
- Editable copy of all the drawings and documents shall be provided.
- All the drawings shall be prepared on computer auto cad and other documents (like datasheet etc.) on MS office software. Bidder not complying to the requirement shall not be considered. For the execution of the contract regular meeting (generally once in 15 days or as per project requirement) is required.
- Vendor to come for meeting with the concerned dealing persons as per BHEL or customer requirement in a short notice.
- Bidder to also furnish the auto cad copy/MS-Excel/MS-word (as applicable) of the following documents after award of contract. However, any other auto cad copy/MS-Excel/MS-word of any other document as per the insistence of BHEL and customer will also be submitted by the bidder without any delivery and commercial implication to BHEL and customer.

    - Thickness calculation, sizing and design calculation of storage tanks and fume absorber
    - GA drawing of storage tank and fume absorber
    - Fabrication drawing of storage tank and fume absorber
    - Manufacturing quality plan for storage tank and fume absorber

6. EXCLUSIONS

7.1 Valve, piping (except filling pipe), instruments, counter flange, fittings with respect to Bulk tanks of HCl and NaClO2.
7.2 All civil structural, architectural & construction works, pedestal, piping of system.
7.3 Erection & commissioning of storage tanks and absorber

7. DATSHEET-A

1.0	**ACID STORAGE TANKS**	
1.1	Numbers	Three (3) Numbers (3X100%)
1.2	Chemical handled	33 % HCl
1.3	Location	Outside
1.4	Type	Vertical Cylindrical, atmospheric
1.5	Effective capacity	35 M3
1.6	Diameter	3200mm
1.7	Material of Construction	FRP with UV protection
1.8	Minimum Thickness of Shell & Dished Ends	12 mm (minimum), however higher thickness, if required, as per design guidelines needs to be considered by bidder
1.9	Accessories	Accessories such as nozzles, vents with breather, overflow, Manholes, staircase, operating platforms, ladders etc. shall be provided by bidder for each tank.
1.10	MOC of Bolts & Nuts	Mild Steel Galvanized
1.11	Support	Resting on concrete foundation with anchor Chair & bolt. Filling material/ item between tank bottom and RCC foundation shall be provided by bidder.
2.0	**SODIUM CHLORITE STORAGE TANKS**	
2.1	Numbers	Three (3) Numbers (3X100%)
2.2	Chemical handled	31 % NaClO2
2.3	Location	Outdoor under shed
2.4	Type	Vertical Cylindrical, atmospheric
2.5	Effective capacity	35 M3
2.6	Diameter	3200mm
2.7	Material of Construction (Shell and dished ends)	FRP with UV protection
2.8	Minimum Thickness of Shell & Dished Ends	12 mm (minimum), however higher thickness, if required, as per design guidelines needs to be considered by bidder
2.9	Accessories	Accessories such as nozzles, vents, overflow, Manholes, staircase, operating platforms, ladders etc. shall be provided by bidder for each tank.
2.10	MOC of Bolts & Nuts	Mild Steel Galvanized
2.11	Support	Resting on concrete foundation with anchor Chair & bolt. Filling material/ item between tank bottom and RCC

		foundation shall be provided by bidder.

8. NOZZLE SCHEDULE

A) NOZZLE SCHEDULE FOR HCL STORAGE TANKS (Class 150#)		
Nozzle No.	Description	Size (NB)
N1	Vent to fume absorber	25
N2	Chemical inlet	50
N3	Silica gel breather vent	50
N4/N5	Level transmitter	50
N6	Spare	25
N7/N8/N9/N10	Level gauge	25
N11	Chemical outlet	40
N12	Drain	25
N13	Overflow	50
N14/N15/N16/N17	Level gauge	25
B) NOZZLE SCHEDULE FOR NaClO2 STORAGE TANKS (Class 150#)		
Nozzle No.	Description	Size (NB)
N1	Chemical inlet	50
N2	Vent	25
N3	Spare	25
N4/N5	Level transmitter	50
N6	Spare	25
N7/N8/N9/N10	Level gauge	25
N11	Chemical outlet	40
N12	Drain	25
N13	Overflow	50
N14/N15/N16/N17	Level gauge	25

C) NOZZLE SCHEDULE FOR FUME ABSORBER (Class 150#)		
Nozzle No.	Description	Size (NB)
N1	Service water inlet	25
N2	Vent	25
N3	Overflow from HCl storage tank	50
N4	Drain	25
N5	Overflow (Fume absorber)	40

QUALITY ASSURANCE PLAN FOR STORAGE TANK AND FUME ABSORBER

STORAGE TANK AND FUME ABSORBER

SL. NO.	COMPONENT/ OPERATION	CHARAC-TERISTICS	QUANTUM OF CHECK		REFERENCE DOUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	D	AGENCY		REMARKS
			M	N					M	N	
A) RAW MATERIAL / BOUGHT OUT ITEM CHECKS											
1.0	Resin	Gel Time	100 %		*Tender/PO specs/approved DRG/ DS*		TC/IR		P	V	
2.0	Chopped strand Mat, Woven Roving Mat, Surface Mat	Density	100%		*Tender/PO specs/approved DRG/ DS*		TC/IR		P	V	
3.0	Fibre Glass	Mass per unit area, Loss on ignition, Determination of resistivity, Glass Content, Moisture content, Tensile strength	100 %		*Tender/PO specs/approved DRG/ DS*		TC/IR		P	V	
4.0	Gaskets &Fasteners	Visual & Dimension	100%		*Tender/PO specs/approved DRG/ DS*		TC/IR		P	V	
B) PROCESS/ASSEMBLY CHECK											
1.0	Lay Up Sequence	Lamination	100%		*Tender/PO specs/approved DRG/ DS*		TC/IR		P	V	
2.0	Curing	Hardness	100%		*Tender/PO specs/approved DRG/ DS*		TC/IR		P	V	

STORAGE TANK AND FUME ABSORBER

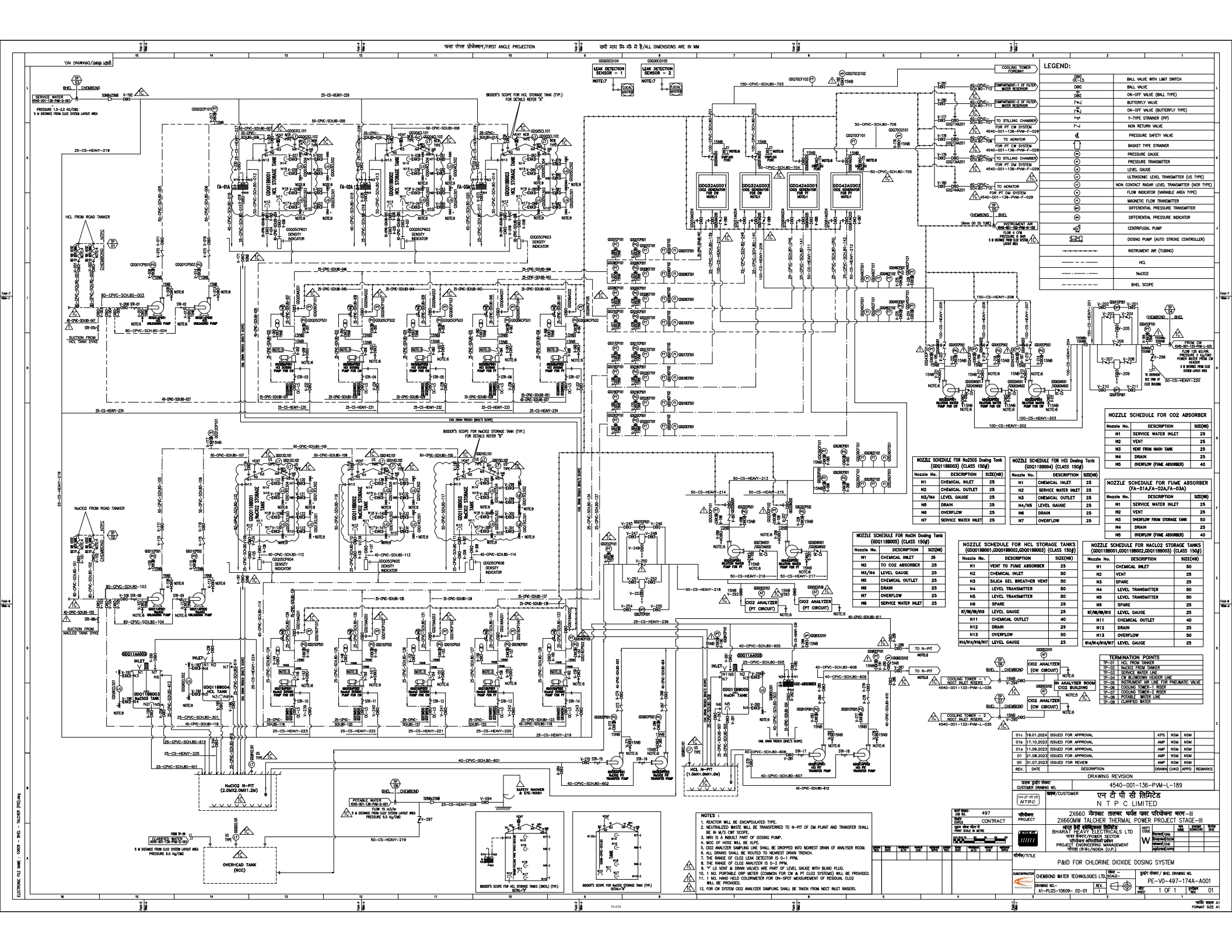
SL. NO.	COMPONENT/ OPERATION	CHARAC-TERISTICS	QUANTUM OF CHECK		REFERENCE DOUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	D	AGENCY		REMARKS
			M	N					M	N	
C) FINISHED PRODUCT/FINAL NSPECTION											
1.0	Integral FRP Coupon*	Lap shear, Glass Content, Barcol Hardness, Tensile Strength	1/lot		*Tender/PO specs/approved DRG/ DS/BS4994*		IR/TC		P	V	
2.0	Finished Tank	Visual & Dimensional	100%		*Tender/PO specs/approved DRG/ DS*		IR/TC		P	V	
3.0	Nozzle & lifting lug	Orientation & dimensions	100%	10%	*Tender/PO specs/approved DRG/ DS*		IR/TC		P	V	
4.0	Acetone Test	Tackiness	1/lot		*Tender/PO specs/approved DRG/ DS*		IR/TC		P	V	
5.0	Water Fill Test	Leakage Test	100%		*Tender/PO specs/approved DRG/ DS*		Inspection Report	-	P	V	

Notes :-

1. Y mark in Column 'D' means such document shall be furnished by the manufacturer / supplier.
2. Calibrated equipments required for performing the tests in presence of NTPC or authorized representative, shall be arranged by the supplier without any extra cost.
3. Witness by NTPC/authorized representative (wherever applicable) shall be on randomly chosen sample/s. For balance, NTPC shall review the TCs /IRs.
4. Reference and Acceptance norms shall be derived from following in the same sequence-
   a) Approved drawing / data sheet b) tech specs c) Purchase Order d) Relevant national standard e) Relevant International standard
   f) Manufacturer's standard g) Good Engineering practices

Abbreviations :-

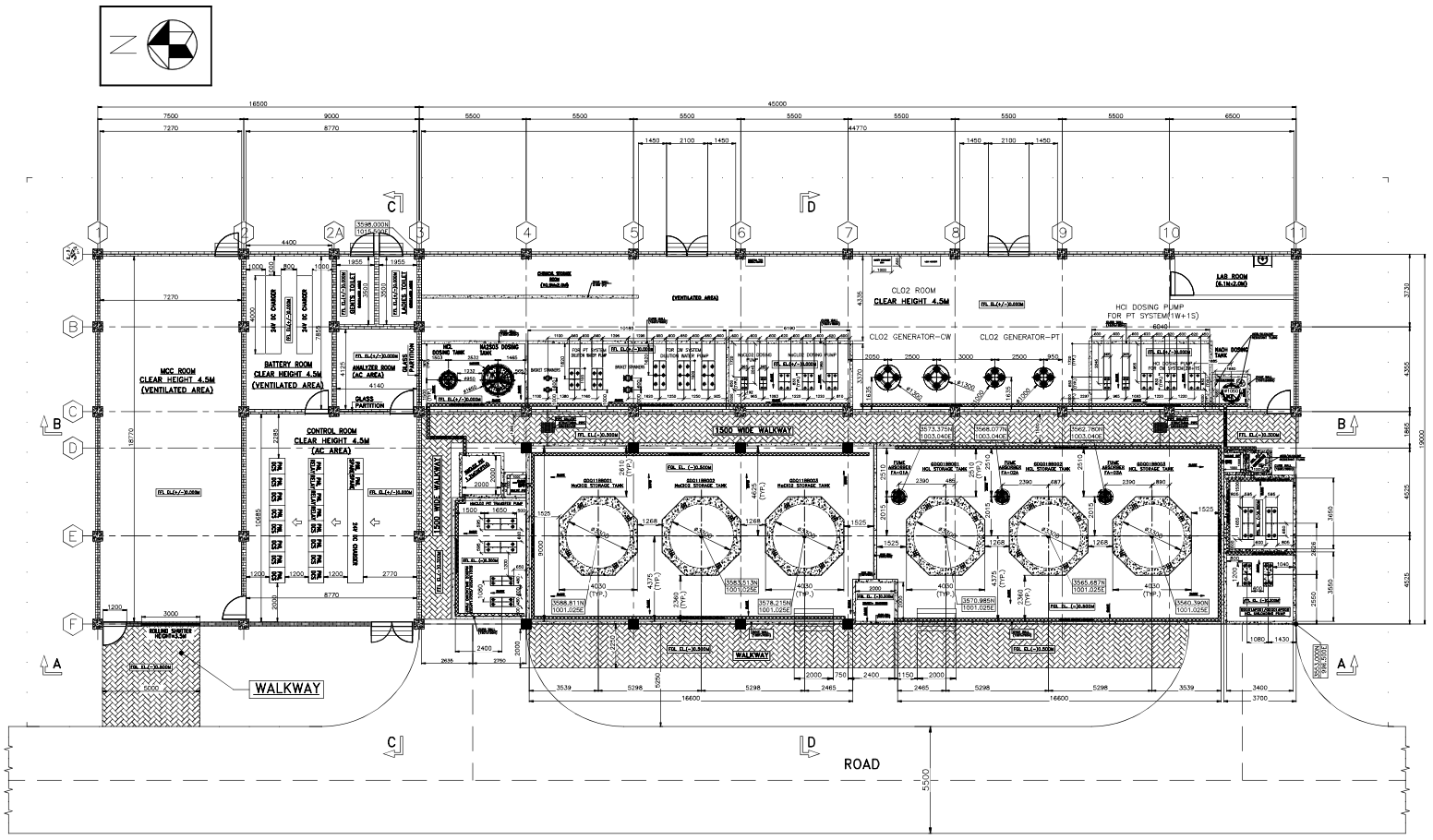
M	***Manufacturer***		***P***	***Perform***		***IR***	***Inspection Record / Report***
N	***NTPC/BHEL/Authorized representative***		***W***	***Witness***		***TC***	***Test Certificate***
DS	***approved Data Sheet***		***V***	***Review of records***		***MTC***	***Manufacturer's Test Certificate***
TS	***Technical Specifications***		***PO***	***Purchase Order***		***DRG***	***Drawing***


LEGEND:
BALL VALVE WITH LIMIT SWITCH
BALL VALVE
ON-OFF VALVE (BALL TYPE)
BUTTERFLY VALVE
ON-OFF VALVE (BUTTERFLY TYPE)
Y-TYPE STRAINER (PP)
NON RETURN VALVE
PRESSURE SAFETY VALVE
BASKET TYPE STRAINER
PRESSURE GAUGE
PRESSURE TRANSMITTER
LEVEL GAUGE
ULTRASONIC LEVEL TRANSMITTER (US TYPE)
NON CONTACT RADAR LEVEL TRANSMITTER (NCR TYPE)
FLOW INDICATOR (VARIABLE AREA TYPE)
MAGNETIC FLOW TRANSMITTER
DIFFERENTIAL PRESSURE TRANSMITTER
DIFFERENTIAL PRESSURE INDICATOR
CENTRIFUGAL PUMP
DOSING PUMP (AUTO STROKE CONTROLLER)
INSTRUMENT AIR (TUBING)
HCL
NaClO2
BHEL SCOPE
NOZZLE SCHEDULE FOR CO2 ABSORBER
NOZZLE SCHEDULE FOR FUME ABSORBER (FA-01A/FA-02A/FA-03A)
NOZZLE SCHEDULE FOR NaClO2 STORAGE TANKS (GDQ11BB001,GDQ11BB002,GDQ11BB003) (CLASS 150#)
NOZZLE SCHEDULE FOR Na2SO3 Dosing Tank (GDQ11BB003) (CLASS 150#)
NOZZLE SCHEDULE FOR HCl Dosing Tank (GDQ11BB004) (CLASS 150#)
NOZZLE SCHEDULE FOR NaOH Dosing Tank (GDQ11BB005) (CLASS 150#)
NOZZLE SCHEDULE FOR HCL STORAGE TANKS (GDQ01BB001,GDQ01BB002,GDQ01BB003) (CLASS 150#)
TERMINATION POINTS
NOTES :
1. REACTOR WILL BE ENCAPSULATED TYPE.
2. NEUTRALIZED WASTE WILL BE TRANSFERRED TO N-PIT OF DM PLANT AND TRANSFER SHALL BE IN M/S CWT SCOPE.
3. NRV IS A INBUILT PART OF DOSING PUMP.
4. MOC OF HOSE WILL BE XLPE.
5. CO2 ANALYZER SAMPLING LINE SHALL BE DROPPED INTO NEAREST DRAIN OF ANALYSER ROOM.
6. ALL DRAINS SHALL BE ROUTED TO NEAREST DRAIN TRENCH.
7. THE RANGE OF CLO2 LEAK DETECTOR IS 0-1 PPM.
8. THE RANGE OF CLO2 ANALYZER IS 0-2 PPM.
9. 'V' LC VENT & DRAIN VALVES ARE PART OF LEVEL GAUGE WITH BLIND PLUG.
10. 1 NO. PORTABLE GRP MCTER (COMMON FOR CW & PT CLO2 SYSTEMS) WILL BE PROVIDED.
11. 1 NO. HAND HELD COLORIMETER FOR ON-SPOT MEASUREMENT OF RESIDUAL CLO2 WILL BE PROVIDED.
12. FOR CW SYSTEM CO2 ANALYZER SAMPLING SHALL BE TAKEN FROM NDCT INLET RASERS.
DRAWING REVISION
4540-001-136-PVM-L-189
एन टी पी सी लिमिटेड
N T P C LIMITED
2X660 मेगावाट तालचर थर्मल पावर परियोजना चरण–III
2X660MW TALCHER THERMAL POWER PROJECT STAGE–III
P&ID FOR CHLORINE DIOXIDE DOSING SYSTEM
PE-V0-497-174A-A001

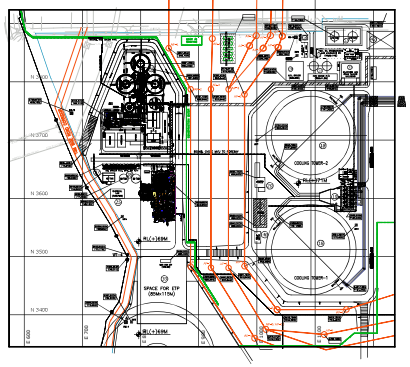
फर्स्ट एंगल प्रोजेक्शन/FIRST ANGLE PROJECTION

सभी माप मि. मी. मे है/ALL DIMENSIONS ARE IN MM

शीट शीट/SHEET NO.



KEY PLAN



EQUIPMENT LIST

MARK	DESCRIPTION	CAPACITY	MOC	QTY	STATIC LOAD (KG APPROX)	DYNAMIC LOAD
GDQ01BB001/ GDQ01BB003/ GDQ01BB003	HCL STORAGE TANK	35000 Ltr.	FRP	3W	85	775
GDQ01AP001/ GDQ01AP002	HCL UNLOADING PUMP	10 m3/hr	PP	1W+1S	90	120
GDQ05AP501/ GDQ05AP502/ GDQ05AP503	HCL DOSING PUMP FOR CW	6x420 LPH	PP	2W+1S	75	90
GDQ06AP501/ GDQ06AP502	HCL DOSING PUMP FOR PT	0x65 LPH	PP	1W+1S	90	120
GDQ81AP001/ GDQ81AP002	HCL PIT TRANSFER PUMP	5 m3/hr	PP	1W+1S	90	120
GDQ11BB001/ GDQ11BB002/ GDQ11BB003	NaClO2 STORAGE TANK	35000 Ltr.	FRP	3W	125	1125
GDQ11AP001/ GDQ11AP002	NaClO2 UNLOADING PUMP	10 m3/hr	PP	1W+1S	90	120
GDQ15AP001/ GDQ15AP002/ GDQ15AP003	NaClO2 DOSING PUMP FOR CW	6x420 LPH	PP	2W+1S	75	90
GDQ16AP001/ GDQ16AP002	NaClO2 DOSING PUMP FOR PT	0x65 LPH	PP	1W+1S	90	120
GDQ82AP001/ GDQ82AP002	NaClO2 PIT TRANSFER PUMP	5 m3/hr	PP	1W+1S	90	120
GDQ32AP001/ GDQ32AP002/ GDQ32AP003	DILUTION WATER PUMP FOR CW	50 m3/hr	SS304	2W+1S	90	120
GDQ42AP001/ GDQ42AP002	DILUTION WATER PUMP FOR PT	6,5 m3/hr	SS304	1W+1S	90	120
GDQ32AG001/ GDQ32AG002	ClO2 GENERATOR FOR CW	75 kg/hr	CPVC	2W	750	1050
GDQ42AG001/ GDQ42AG002	ClO2 GENERATOR FOR PT	10 kg/hr	CPVC	1W+1S	400	550
GDQ11BB003	Na2SO3 TANK	5,0 m3	FRP	1	475	5550
GDQ11BB004	HCL TANK	0,2 m3	FRP	1	95	775
GDQ11BB005	NaOH TANK	0,3 m3	FRP	1	125	1125

NOTES:–

1) ALL DIMENSIONS ARE IN MILIMETERS, LEVELS & CO-ORDINATES ARE IN METERS. UNLESS OTHERWISE NOTED.
2) CHEMICAL SPILLAGE TO BE ROUTED TO RESPECTIVE NEUTRALIZATION PIT, HOWEVER STROM WATER DRAIN SHALL BE ROUTED TO PLANT DRAIN.
3) ALL CIVIL WORKS ARE IN BHEL'S SCOPE.
4) NaClO2 DOSING TANKS SHALL BE UNDER SHED OF CLEAR HEIGHT 8.5M.
5) PUMP WHICH ARE MOUNTING OUTSIDE OF PUMP HOUSE IS WITH CANOPY.
6) EL 0.0m corresponds to RL(+)71.50m
7) DYKE SHALL BE OF RCC.
8) NaClO2 STORAGE TANK SHED WILL BE IN BHEL SCOPE.
9) INDICATED COLUMNS AND TIE-UP BEAMS ARE TENTATIVE & TO BE VERIFIED WITH STRUCTURE DESIGN
10) CLO2 ROOM CLEAR HEIGHT = 4.5MTR.
11) PIPE CROSSOVER SHOWN HERE SHALL BE IN CWT SCOPE OF SUPPLY AND ERECTION.
12) N-PIT DOSING TANKS, ALL PUMP MOUNTING DIMENSIOND AND ITS POCKET DETAILLS ARE ON HOLD.

CONCRETE

BRICK WALL

WALKWAY

REFERENCE DOCUMENTS:–

SR. NO	DESCRIPTION	DRAWING NO.
1	P&ID FOR CHLORINE DIOXIDE DOSING SYSTEM	A1-PLGS-10609-02-01
2	PROCESS SIZE CALCULATION	A4-PLGS-10609-04-01

REV.	DATE	DESCRIPTION	DRAWN	CHKD	APPD	REMARKS
00	14.12.2023	ISSUED FOR REVIEW	SHG	AMP	NSM	

DRAWING REVISION

ग्राहक ड्राइंग संख्या/CUSTOMER DRAWING NO. 4540-001-136-PVM-B-182

ग्राहक/CUSTOMER एन टी पी सी लिमिटेड N T P C LIMITED

परियोजना/PROJECT 2X660 मेगावाट तालचर थर्मल पावर परियोजना चरण-III 2X660MW TALCHER THERMAL POWER PROJECT STAGE-III

भारत हेवी इलेक्ट्रिकल्स लिमिटेड BHARAT HEAVY ELECTRICALS LTD पावर सेक्टर/POWER SECTOR परियोजना अभियांत्रिकी प्रबंधन PROJECT ENGINEERING MANAGEMENT नोएडा (उ.प्र.)/NOIDA (U.P.)

शीर्षक/TITLE CIVIL INPUT DRAWING OF CHLORINE DIOXIDE DOSING SYSTEM

SUBCONTRACTOR OHMBOND WATER TECHNOLOGIES LTD. DRAWING NO.-A4-PLGS-10609-13-01 REV. 0A

स्केल/SCALE –

ड्राइंग संख्या / BHEL DRAWING NO. PE-V0-497-174A-A020

शीट/SHEET 1 OF 2 पुनरीक्षण/REV. 00

कार्य संख्या/JOB NO.	497
स्थिति/STATUS	CONTRACT

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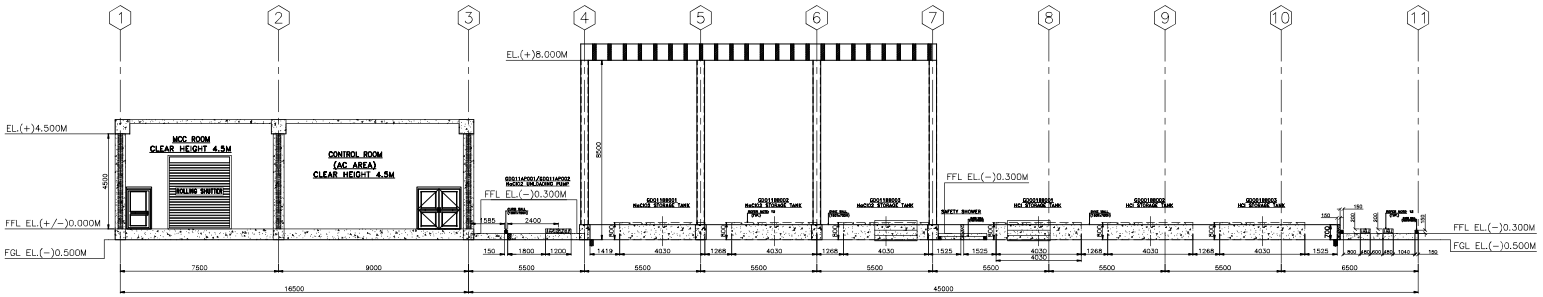
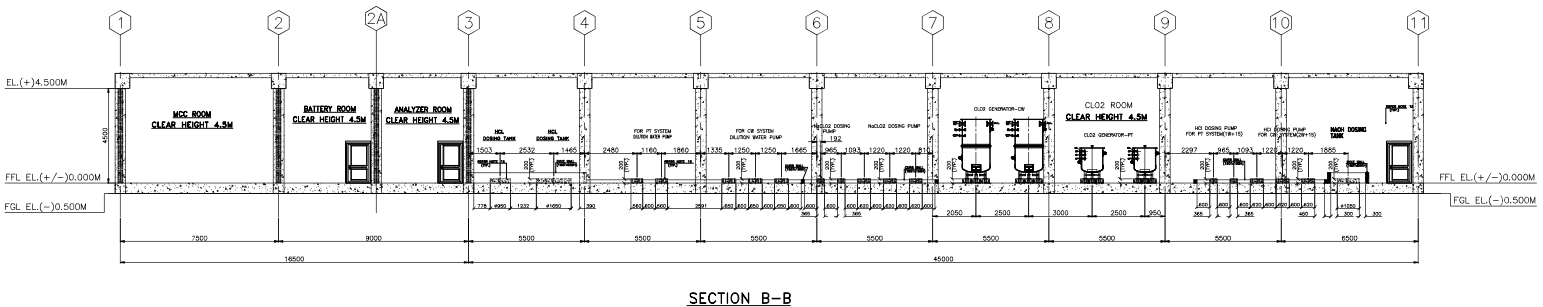
फॉर्मेट/FORMAT A1



SECTION A–A



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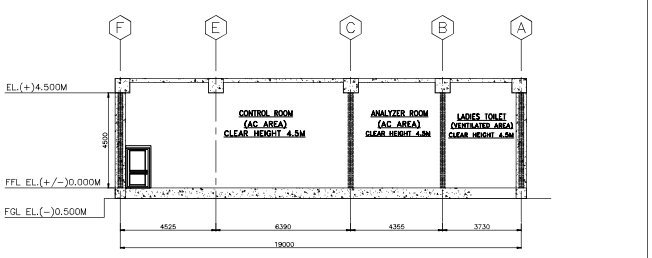

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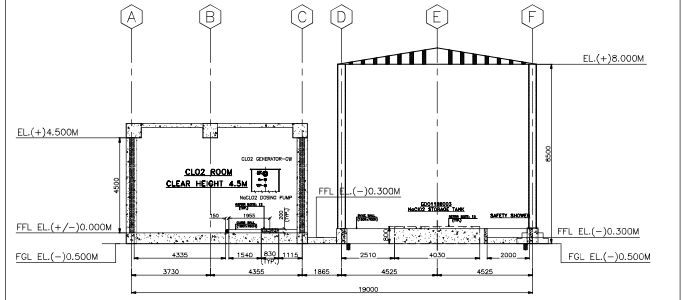

SECTION C–C

REFERENCE DOCUMENTS:–

SR. NO	DESCRIPTION	DRAWING NO.
1	P&ID FOR CHLORINE DIOXIDE DOSING SYSTEM	A1–PLGS–10609–02–01
2	PROCESS SIZE CALCULATION	A4–PLGS–10609–04–01

REV.	DATE	DESCRIPTION	DRAWN	CHKD	APPD	REMARKS
00	14.12.2023	ISSUED FOR REVIEW	SHG	AMP	NSM	

DRAWING REVISION

ग्राहक ड्राईंग संख्या/CUSTOMER DRAWING NO. 4540–001–136–PVM–B–182

ग्राहक/CUSTOMER: एन टी पी सी लिमिटेड / N T P C LIMITED

परियोजना/PROJECT: 2X660 मेगावाट तालचर थर्मल पावर परियोजना चरण–III / 2X660MW TALCHER THERMAL POWER PROJECT STAGE–III

भारत हेवी इलेक्ट्रिकल्स लिमिटेड / BHARAT HEAVY ELECTRICALS LTD
पावर सेक्टर/POWER SECTOR
परियोजना अभियांत्रिकी प्रबंधन / PROJECT ENGINEERING MANAGEMENT
नोएडा (उ.प्र.)/NOIDA (U.P.)

शीर्षक/TITLE: CIVIL INPUT DRAWING OF CHLORINE DIOXIDE DOSING SYSTEM

SUBCONTRACTOR: OHEMBOND WATER TECHNOLOGIES LTD.

स्केल/SCALE: –

ड्राईंग संख्या / BHEL DRAWING NO.: PE–VO–497–174A–A020

DRAWING NO.–A4–PLGS–10609–13–01

REV. 00

शीट/SHEET: 2 OF 2

पुनरीक्षण/REV.: 00

फॉर्मेट/FORMAT A1

SECTION-II

LIST OF DOCUMENTS TO BE SUBMITTED ALONG WITH BID

Bidder to furnish following documents/information along with the bid

- Compliance certificate. (Stamped & Signed)
- Schedule of Declaration. (Stamped & Signed)
- Un Price Schedule duly filled in. (Stamped & Signed)
- Schedule of deviations with cost of withdrawal. (Stamped & Signed)

Any other documents submitted by bidder except as asked in the bid's specification shall not be evaluated & considered as null & void.

NOTES:

1) Any item/work either supply of equipment or erection material which have not been specifically mentioned but are necessary to complete the works for trouble free and efficient operation of the plant shall be deemed to be included within the scope of this specification. The bidder without any extra charge shall provide the same.

2) All drawings/documents shall be approved by BHEL/Customer during detailed engineering stage. Successful Bidder shall comply with the comments of the customer/BHEL without any price & delivery implication.

COMPLIANCE CUM CONFIRMATION CERTIFICATE

The bidder shall confirm compliance with following by signing/ stamping this compliance certificate and furnishing same with the offer:

1. The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions/ deviations with regard to same.
2. QP/ test procedures shall be submitted in the event of order based on the guidelines given in the specification & QP enclosed therein.
3. QP will be subject to BHEL/Customer approval in the event of order & customer hold points for inspection/ testing shall be marked in the QP at the contract stage. Inspection/ testing shall be witnessed as per same apart from review of various test certificates/ Inspection records etc. The charges for 3rd party inspection (Lloyds, TUV or equivalent) for imported components shall be included in the base price of the equipment by the bidder.
4. All drawings/data – sheets etc. to be submitted during contract shall be subject to BHEL/Customer review/approval. GA drawings, as submitted with offer at tender stage are for reference purpose only and shall be subject to approval during contract stage.
5. The offered materials shall be either equivalent or superior to those specified. Also, for components where material is not specified it shall be suitable for intended duty, materials shall be subject to approval in the event of order.
6. The commissioning spares (if any) are supplied on 'As Required Basis' & prices for same included in the base price (If bidders reply to this is "No commissioning spares are required" and if some spares are actually required during commissioning same shall be supplied by bidder without any cost to BHEL and Customer).
7. All sub vendors shall be subject to BHEL/CUSTOMER approval.
8. Any special tools & tackles, if required, shall be in bidder's scope.
9. Performance guarantee test parameters shall stand valid till the satisfactory completion of Performance guarantee test and its acceptance by BHEL and Customer.

PRE-BID CLARIFICATION SCHEDULE

All clarification from the Technical Specification shall be filled in by the BIDDER clause by clause in this format only.

VOLUME	SECTION	CLAUSE NO.	PAGE NO.	SPECIFICATION REQUIREMENT	CLARIFICATION	REASONS FOR CLARIFICATION

SCHEDULE OF DECLARATION

I …… certify that all the technical data and information pertaining to this specification are correct and are true representation of the equipment/system covered by our format proposal number Dated …….. and there is no deviation to the specification.

I hereby certify that I am duly authorized representative of the Bidder's company whose name appears above my signature.

Bidders Company Name …….

Authorized Representative's Signature …….

Name …….

Bidder's Name …….

The bidder hereby agrees to fully comply with the requirements and intent of this specification for the price indicated.

SCHEDULE OF DEVIATIONS WITH COST OF WITHDRAWAL

PROJECT:- TALCHER THERMAL POWER PROJECT
STAGE-III (2X660 MW)

STORAGE TANKS FOR CHLORINE DIOXIDE DOSING SYSTEM

TENDER ENQUIRY REFERENCE:-

NAME OF VENDOR:-

SL NO	VOULME/ SECTION	PAGE NO.	CLAUSE NO.	TECHNICAL SPECIFICATION/ TENDER DOCUMENT	COMPLETE DESCRIPTION OF DEVIATION	COST OF withdrawal OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF withdrawal OF DEVIATION IS APPLICABLE	NATURE OF COST OF withdrawal OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
TECHNICAL DEVIATIONS									
COMMERCIAL DEVIATIONS									

PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE

NAME	**DESIGNATIONS**	**SIGN & DATE**	

NOTES:

1. For self manufactured items of bidder, cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. For directly dispatchable items, cost of withdrawal of deviation will be applicable on the basic price including taxes, duties & freight.
3. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
4. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
5. Bidder shall submit duly filled unpriced copy of above format indicating "quoted" in "cost of withdrawal of deviation" column of the schedule above along with their Techno-commercial offer, wherever applicable.
6. Bidder shall furnish price copy of above format along with price bid.
7. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
8. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
9. For deviations w.r.t. Payment terms, Liquidated damages, Firm prices and submission of E1/ E2 forms before claiming 10% payment, if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VIII of GCC, Rev-06 will apply. For any other deviation mentioned in un-priced copy of this format submitted with Part-I bid but not mentioned in priced copy of this format submitted with Priced bid, the cost of withdrawal of deviation shall be taken as NIL.
10. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be accepted.
11. All techno-commercial terms and conditions of NIT shall be deemed to have been accepted by the bidder, other than those listed in unpriced copy of this format.
12. Cost of withdrawal is to be given seperately for each deviation. In no event bidder should club cost of withdrawal of more than one deviation else cost of withdrawal of such deviations which have been clubbed together shall be considered as NIL.
13. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
14. In case of descrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.