		HOTSET
		ALCO
26	RELIEF / PURGE VALVE	BRASSOMATIC
27	THERMOSTATS	HONEYWELL AUTOMATION
		RANCO
		PENN
		DANFOSS
		INDFOSS
		JHONSON CONTROL
		RANUTROL
28	HUMID STAT	JHONSON CONTROL
		HONEYWELL AUTOMATION
		PENN
29	ANTI FREEZE THERMOSTAT	RANCO
		HONEYWELL AUTOMATION
		PENN
		DANFOSS
		INDFOSS
30	PRESSURE/ DP/ VACUUM/ TEMPERATURE SWITCH	BELLS CONTROLS LTD
		DANFOSS
		DK INSTRUMENTS
		DRESSER
		SOR INC
		VASU
		SWITZER INSTRUMENT LTD.
		INDFOSS
		TRAFAG
		GIC
		ASHCROFT INDIA PVT LTD.
		KASTURBA UDYOG
		BARKSDALE GMBH
		PRECISION MASS PRODUCTS
		MITTAL REFRIGERATION
31	TEMPERATURE SWITCH	INDFOSS
		SIEMENS
		DANFOSS
		DK INSTRUMENTS
		SOR INC
		VASU
		DRESSER
		TOSHNIWAL

		SWITZER INSTRUMENT LTD.
32	FLOW SWITCH	SWITZER INSTRUMENT LTD.
		LEVCON
		DK INSTRUMENTS
		SBEM
		V AUTOMAT
		SIEMENS
34	SIGHT FLOW INDICATORS	SIGMA
		LEVCON
		V AUTOMAT
		TELLACE
		EUREKA INDUSTRIAL EQUIPMENTS PVT.LTD.
		TATA HONEYWELL
		BLISS ANAND
		SCIENTIFIC DEVICES
		BK EQUIPMENTS
		INSTRUMENTATION ENGINEERS
35	RH SENSOR/TEMP SENSOR	HONEYWELL AUTOMATION
		JOHNSON
		SIEMENS
		GENERAL INSTRUMENT CONSORTIUM
36	ANNUNCIATOR	ICC
		PECON
		PROCON
37	LT ADAPTER BOX FOR AL TO CU CABLE CONVERTOR	CONTROL DEVICE
		SYSTEM POWER CONTROL
		JACKSON ENGINNEERS
		UNILEC
		ELECTRIC ALLIED PRODUCT
38	WATER SOFTENING PLANT	THERMAX
		ION EXCHANGE
		DOSI ION
39	ROTAMETER	CHEMTROLS SAMIL (INDIA) PVT LTD.
		EUREKA INDUSTRIAL EQUIPMENTS PVT.LTD.
		IL
		TRANSDUCERS AND CONTROL

NOTES:

1. THE SUB VENDOR LIST ABOVE IS INDICATIVE ONLY AND IS SUBJECT TO BHEL AND CUSTOMER APPROVAL DURING DETAILED ENGINEERING STAGE WITHOUT ANY COMMERCIAL & DELIVERY IMPLICATION TO BHEL. BIDDER TO PROPOSE SUB VENDOR WITHIN 4 WEEKS OF PLACEMENT OF LOI. THEREAFTER NO REQUEST FOR ADDITIONAL SUB-VENDOR SHALL BE ENTERTAINED.
2. THE INSPECTION CATEGORY WILL BE INTIMATED AFTER AWARD OF CONTRACT BY BHEL/CUSTOMER. HOWEVER, THE SAME WILL BE ADHERED BY THE BIDDER WITHOUT ANY COMMERCIAL AND DELIVERY IMPLICATION TO BHEL/ CUSTOMER.
3. PLEASE ALSO REFER RESPECTIVE SUB-SECTION C-2, C-3 & C-4 FOR ELECTRICAL, C&I AND HANDLING RELATED EQUIPMENT LIST OF MAKE.

SL No	ITEM	VENDOR
1	AIR WASHER & UAF*	HYDERABAD POLUTION CONTROL
		SK SYSTEM
		ADVANCE VENTILATION
		DRAFT AIR
		BLUE STAR
		VOLTAS
		STERLING WILSON
		ROOTS COOLING SYSTEM
		C DOCTOR
		TAP
		PACK PLAST
		INDUSTRIAL PROJECTS AND PRODUCTS
2	CENTRIFUGAL FAN	FLAKT
		KRUGER
		DRAFT AIR
		HYDERABAD POLUTION CONTROL
		ADVANCE VENTILATION
		PATEL AIR
		NICOTRA
		SK SYSTEM
		MARATHON
		CB DOCTOR
		SARLA
		COMEFRI
3	FRESH AIR/ SUPPLY/ EXHAUST/ RE UNIT FANS / PROPELLAR	HYDERABAD POLUTION CONTROL
		SK SYSTEM
		ADVANCE VENTILATION
		KRUGER
		NICOTRA
		MARATHON
		FLAKT
		CB DOCTOR
		SARLA (SITAL)
		PATEL AIR
		KHAITAN
4	PUMPS	BEST & CROMPTON
		JYOTI
		SAM TURBO

		KBL
		KSB
		M&P
		VOLTAS
		BEACON-WEIR
		WORTHINGTON
		FLOWMORE
		SULZER PUMPS INDIA LTD.
		BHARAT PUMPS & COMPRESSORS LTD
		FLOWSERVE INDIA CONTROL PVT LTD
		V-FLOW PUMPS & SYSTEMS CO
		KISHORE PUMPS
5	LV MOTORS (FLAME PROOF)	SIEMENS
		ABB
		CGL
		MARATHON
		KEC
		BHARAT BIJLEE
		BHARAT ELECTRIC
		NGEF
		JYOTI
		LHP
6	LV MOTORS (NON FLAME PROOF)	SIEMENS
		ABB
		CGL
		MARATHON
		KEC
		BHARAT BIJLEE
		BHARAT ELECTRIC
		NGEF
		JYOTI
		LHP
7	AIR FILTER	PUROLATOR
		FMI
		ANFILCO
		TENACITY
		JOHN FOWLER
		SPECTRUM
		AIR TECH
		PUROMATIC
8	INSULTATION MATERIAL	BEARDSHEL

		K-FLEX
		PARAMONT
		ARMAFLEX
		SUPREME
		LLOYDS
		UP TWIGA
		AEROCELL
9	FIRE DAMPER	TSC
		CARRYAIRE
		RAVISTAR (SYSTEM AIR)
10	BUTTERFLY VALVES	AUDCO
		FOURESS ENGG
		INTER VALVE
		BDK
		WEIR BDK
		TYCO
		CRANE PROCESS
		KEYSTONE
		FLUIDLINE
		INSTRUMENTATION LTD
		R AND D MULTIPLES (METAL CAST) PVT LTD
		SURYA VALVES AND INSTRUMENTS MFG CO
		PENTAIR VALVES AND CONTROLS INDIA PRIVATE LIMITED
		UPADHAYA VALVES MANUFACTURERS PRIVATE LIMITED
		VENUS PUMPS AND ENGG. WORKS
11	NON RETURN VALVE	LEADER VALVES
		H SARKAR
		FLUIDLINE
		HI-TECH
		CRESCENT VALVES
		A V VALVES
		BANKIM
		SHIVADURGA
		SURYA VALVES AND INSTRUMENT MANUFACTURING
		ATAM VALVES
		GM DAULI & SONS
		KBL
		VENUS PUMPS AND ENGINEERING WORKS

12	STEEL GATE/GLOBE/NR VALVES(WATER SYSTEM)	CRESCENT VALVES
		BDK
		AUDCO
		FOURESS ENGG
		KIRLOSKAR BROTHERS LTD.
		SANT VALVES
		BOMBAY METAL & ALLOYS
		BANKIM
		LEADER VALVES
		H SARKAR
		AV VALVES
		VENUS PUMPS
		FLUIDLINE
		HI –TECH
		SHIVADURGA
		SURYA VALVES AND INSTRUMENT MANUFACTURING
		ATAM VALVES
		GM DAULI & SONS
		KBL
13	Pipes (MS/GI) - ERW	SURYA ROSHNI
		TISCO
		DADU PIPES
		INDUS TUBES
		WELSPUN
		TATA
		BST
		JINDAL
		SAIL
		PSL
		LALIT PROFILE
		SAMSHI PIPE INDUSTRIES
		S MUKUT PIPES
		MANN INDUSTRIES
		SURENDRA ENGINEERING
		PRATIBHA PIPES AND STRUCTURES PVT LTD
		JCO GAS PIPES
		NUKAT TANK AND VESSELS
		GOODLUCK TUBES
		ADVANCE STEEL TUBES
		BIHAR TUBES

		HITECH PIPES
		RATNAMANI
		MAHARASHTRA SEAMLESS
14	GI SHEETS FOR DUCTING	TISCO
		INDIAN IRON & STEEL CO
		RASHTRIYA ISPAT NIGAM LIMITED
		ESSAR
		ISPAT INDUSTRIES
		JSW
		LLOYDS
		BHUSHAN STEELS
		TATA
		SAIL
		JINDAL
15	GRILL/DIFFUSER/VOLUME CONTROL DAMPER	AIR FLOW
		TSC
		AIR MASTER
		CARRYAIRE
		RAVISTAR (SYSTEM AIR)
16	HUMID STAT	JHONSON CONTROL
		HONEYWELL AUTOMATION
		PENN
20	PRESSURE/ DP/ VACUUM/ TEMPERATURE SWITCH	BELLS CONTROLS LTD
		DANFOSS
		DK INSTRUMENTS
		DRESSER
		SOR INC
		VASU
		SWITZER INSTRUMENT LTD.
		INDFOSS
		TRAFAG
		GIC
		ASHCROFT INDIA PVT LTD.
		KASTURBA UDYOG
		BARKSDALE GMBH
		PRECISION MASS PRODUCTS
		MITTAL REFRIGERATION
23	Y / POT STRAINER	MULTITEX
		GREAVES COTTON
		JAYPEE
		SANT VALVES

		OTOKLIN
		GRAND PRIX
		GUJARAT OTOLIFT
		DS ENGG
		SAROJINI ENTERPRISE
		BHATIA ENGINEERING
		FILTERATION ENGINEERS INDIA PVT LTD
		SUNGOV ENGINEERING
24	LOCAL CONTROL PANEL	INDUSTRIAL CONTROL & APPLIANCE
		PYROTECH ELECTRONICS PVT. LTD.
		POSITRONICS PVT. LTD.
		CONTROL & SWITCHGEAR
		SIEMENS
		L&T
		GE POWER
		RITTAL
		HOFFMAN

NOTES:

1. *Designed by Hyderabad Pollution Control / SK SYSTEM/ ADVANCE VENTILATION / DRAFT AIR/BLUE STAR/ VOLTAS/ STERLING WILSON/ROOTS COOLING SYSTEM/ C DOCTOR/ TAP/ Pack Plast/ Industrial projects and products & fabricated by their approved fabricator.

2. THE SUB VENDOR LIST ABOVE IS INDICATIVE ONLY AND IS SUBJECT TO BHEL AND CUSTOMER APPROVAL DURING DETAILED ENGINEERING STAGE WITHOUT ANY COMMERCIAL & DELIVERY IMPLICATION TO BHEL. BIDDER TO PROPOSE SUB VENDOR WITHIN 4 WEEKS OF PLACEMENT OF LOI. THEREAFTER NO REQUEST FOR ADDITIONAL SUB-VENDOR SHALL BE ENTERTAINED.

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4. PLEASE ALSO REFER RESPECTIVE SUB-SECTION C-2, C-3 & C-4 FOR ELECTRICAL, C&I AND HANDLING RELATED EQUIPMENT LIST OF MAKE.

SECTION-I
SUB SECTION -E

ANNEXURE-II

MANDATORY SPARES LIST

MANDATORY SPARES

NAME OF PROJECT:	**1X800MW STAGE-VII UNIT#12 KOTHAGUDAM TPS (FGD SYSTEM)**
NAME OF PACKAGE:	**HVAC FOR FGD**
TECHNICAL SPECIFICATION No:	**PE-TS-439-(571-13000-A)-A001**

SL NO	DESCRIPTION	QTY
1	Field Instruments	
a)	Transmitters/ Gauges/ Switches etc. along with relevant accessories	5 % of total or at least one (whichever is higher) for each type along with accessories
b)	Temperature Element (RTD/Thermo-couple) with thermowell	5% of each type, range and immersion length. Minimum 2 nos.
2	Wall mounted supply/ Exhaust fan	
a)	Fan-motor Bearing	1 set for each rating of fan
b)	Vibration Isolators	1 set for each fan
c)	Fan Motor	1 set for each rating of fan
3	Package Air Conditioners	
a)	Vibration Isolators	2 Sets for each category
b)	Filters	2 sets for each PAC unit
c)	Bearings	2 sets for each rating of PAC unit (both for condenser & Indoor Unit)
d)	Condenser fan Impeller	2 sets for each PAC unit
e)	Expansion valve	2 sets for each rating of PAC unit
f)	Any other spare parts recommended by the Manufacturer	2 sets for each rating of PAC unit
4	Split Air Conditioners	
a)	Fan-motor bearing for outdoor unit	1 set for each rating of SAC unit
b)	Vibration Isolators	1 set each for outdoor unit & Indoor unit for each SAC unit
c)	Pre-filters and fine filters	1 set for each SAC unit
d)	Expansion valve	1 set for each rating of SAC unit
6	Chain Pulley Block	

a)	Load chain wheel	1 No.
b)	Load chain stripping fork	5 Nos
c)	Hand chain wheel	2 Nos.
d)	Ratchet pawl	1 No.
e)	Locking ratchet wheel	2 Nos.
f)	Guide roller	2 Nos.
g)	Brake disc	2 Nos.

SECTION-I

SUB SECTION E

ANNEXURE-III

PAINTING & COLOUR SCHEME
(REFER SECTION C2)

- For painting please refer the section C2.
- Color shall be as per IS 5.

ANNEXURE-IV

LIST OF TOOLS & TACKLES
REFER SUGGESTIVE PRICE FORMAT

SECTION-I

SUB-SECTION-E

ANNEXURE-V

MASTER DRAWING LIST WITH SCHEDULE OF SUBMISSION

Sl. No.	DRG./ DOC. TITLE	SCH. WEEK (FROM DATE OF LOI)
1*	HEAT LOAD CALCULATION FOR A/C SYSTEM OF FGD CONTROL BUILDING	3
2*	HEAT LOAD CALCULATION for Ventilation System of FGD Building	3
3	TECHNICAL DATA SHEET & G.A. DRAWING OF FIRE DAMPER WITH ACTUATOR FOR A/C & VENTILATION SYSTEM	8
4*	TECHNICAL DATA SHEET & G.A DRAWING OF AIR-COOLED PACKAGE AIR CONDITIONING UNIT FOR FGD CONTROL BUILDING	6
5	TECHNICAL DATA SHEET & G.A. DRAWING FOR HEATER PACKAGE AND PAN HUMIDIFIER	10
6*	TECHNICAL DATA SHEET & G.A. DRAWING OF AXIAL AIR FANS FOR A/C & VENTILATION SYSTEM ALONGWITH FIXING DETAILS AND GA OF PROPELLER FAN	10
7	GA OF SUPPLY/RETURN AIR DIFFUSER/GRILL FOR A/C SYSTEM	8
8	TECHNICAL DATA SHEET FOR SPLIT AIR CONDITIONERS	6
9	TECHNICAL DATA SHEET FOR THERMAL & ACCOUSTIC INSULATION FOR A/C & VENTILATION SYSTEM	6
10*	A/C EQUIPMENT LAYOUT WITH COMPLETE FOUNDATION DETAIL FOR FGD CONTROL BUILDING	7
11	PG TEST PROCEDURE FOR A/C SYSTEM	12
12*	OPERATION & MAINTENANCE MANUAL FOR A/C & VENTILATION SYSTEM	12
13	A/C DUCT LAYOUT DRAWING FOR FGD CONTROL BUILDING AND OTHER MISC. CONTROL ROOMS	9
14	TECHNICAL DATA SHEET OF GI SHEET FOR AC SYSTEM	4
15	TECHNICAL DATA SHEET AND GA OF FILTERS FOR AC AND VENTILATION SYSTEM	5
16	SPLIT AC SCHEDULE ALONGWITH HEAT LOAD CALCULATION FOR AUXILIARY BUILDING OF AC SYSTEM	10
17	VENTILATION FAN SCHEDULE	10
18	VENT. ARRANGEMENT FOR VARIOUS AUXILIARY BUILDING	11
19	MQP OF PACKAGE AC UNIT	6
20	MQP OF FILTERS	6
21	MQP OF THERMAL INSULATION GLASS WOOL/ ROCK WOOL	6
22	DATA SHEETS OF INSTRUMENTS, JBs ALONG WITH CATALOGUES	10
23	INSTRUMENT & DRIVE LIST WITH SET POINTS & LOCATION DATA	10
24	FIELD JB/LIE/LIR TERMINATIONS /GROUPING DOCUMENT	11
25	RECOMMENDED CONTROL SCHEMES / LOGIC DIAGRAMS (TO BE IMPLEMENTED IN DDCMIS)	6
26	INPUT / OUTPUT SIGNAL LIST (ANALOG & BINARY)	5

27	CABLE SCHEDULE (IN BHEL EXCEL FORMAT) & CABLE INTERCONNECTION DETAILS	12
28	HMI PICTURES/ PLANT SCHEMATICS/SYSTEM CONFIGURATION DIAGRAM	6

Notes:

1. The above drawing list is tentative and shall be finalized with the successful bidder after placement of order. While some of the drawings indicated above may not be applicable, some additional drawings may also be required based on scope of work.
2. Drawings shall be prepared in Auto-Cad latest edition. Required no. of hard and soft copies (editable) of the drawings shall be furnished as per requirement specified elsewhere in the specification.
3. Only manual calculation with authentic supporting literature (e.g. extracts of hand Book/ standard/codes) shall be acceptable. All design calculations and drawings shall be in SI system only.
4. All the drawings and documents including general arrangement drawing, data sheet, calculation etc. to be furnished to the customer during detailed engineering stage shall include / indicate the following details for clarity w.r.t. Inspection, construction, erection and maintenance etc.: -

    a) All drawings and documents shall indicate the list of all reference drawings including general arrangement.

    b) All drawings shall include / show plan, elevation, side view, cross - section, skin section, blow - up view; all major self-manufactured and bought out items shall be labeled and included in BOQ / BOM in tabular form.

    c) Painting schedule shall also be made as a part of general arrangement drawing of each equipment / items indicating at least 3 trade names.

    d) All the drawings required to be furnished to customer during detailed engineering stage shall include technical parameters, details of paints and lubrication, hardness and BOQ / BOM in tabular form indicating all major components including bought out items and their quantity, material of construction indicating its applicable code / standard, weight, make etc.

    e) Drawings/ documents to be submitted for purchaser's review/ approval shall be under Revision A, B, C… etc. while drawings /documents to be submitted thereafter for customer's approval after purchaser's approval shall be under R-0, 1, 2, 3 …. etc.

    f) Drawings and documents not covered above but required to check safety of machines/ system, shall be submitted during detailed engineering stage without any commercial implication.

    g) All drawings shall include "B.O.M" and indicate quantity, material of construction, make along with IS/BS No., Technical parameters, dimensions, hardness, machining symbol and tolerance, requirement of radiography and hydraulic tests, painting details, elevation, side view, plan, skin section and blow-up view for clarity.

h) All drawings shall be prepared as per BHEL's title block and shall bear BHEL's drawing No.

i) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's/ Customer's/ Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.

j) Bidder to follow the following the drawing submission schedule:

k) 1st submission of drawings from date of LOI as per the submission schedule.

l) Every revised submission incorporating comments – within 7 days.

m) Bidder to submit revised drawings complete in all respects incorporating all comments. 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 for across the table discussions/ finalizations/ submissions of drawings.

n) Documents marked with '*' in the above MDL shall be considered as Basic Engineering Documents.

SECTION-I

SUB-SECTION-E

ANNEXURE-VI

FORMAT FOR OPERATION AND MAINTENANCE MANUAL

Project name :
Project number :
Package Name :
PO reference :
Document number :
Revision number :

Sl.no. & Sections	Description	Tick (√)if included in Manual			Remarks
		Yes	No	Not Applicable	
1.	**COVER PAGE**				
1.1	Project Name				
1.2	Customer/consultant Name				
1.3	Name of Package				
1.4	Supplier details with phone, FAX ,email address , Emergency Contact number				
1.5	Name and sign of prepared by , checked by & approved by				
1.6	Revision history with approval Details				
2.0	**INDEX**				
2.1	showing the sections & related page nos All the pages should be numbered section wise				
3.0	**DESCRIPTION OF PLANT/SYSTEM**				
3.1	Description /write up of operating principle of system equipment/ associated sub-systems & accessories/controls system , operating conditions, performance parameters under normal , start up and special cases				
3.2	Equipment list and basic parameter with Tag numbers				
3.3	Data sheets approved by Customer/for information and catalogues provided by original manufacturer				
3.4	Associated other packages and Interface /terminal points				
3.5	P&ID & Process Diagrams				
3.6	GA Layout drawings, As-built drawings , Actual photograph of items/system (Drawings of A2 & bigger sizes are to be attached in the last)				
3.7	Single line/wiring diagrams				
3.8	Control philosophy /control write-ups				

Sl.no. & Sections	Description	Tick (√)if included in Manual			Remarks
		Yes	No	Not Applicable	
4.0	**COMMISSIONING ACTIVITIES (IF NOT COVERED IN SEPARATE DOCUMENT I.E. ERECTION MANUAL, COMMISSIONING MANUAL)**				
4.1	Pre-Commissioning Checks				
4.2	handling of items at site				
4.3	Storage at site				
4.4	Unpacking & Installation procedure				
5.0	**OPERATION GUIDELINES FOR PLANT PERSONAL/USER/OPERATOR**				
5. 1	Interlock & Protection logic along with the limiting values of protection settings for the equipment along with brief philosophy behind the logic, drawings etc. to be provided.				
5. 2	Start up, normal operation and shut down procedure for equipments along with the associated systems in step by step mode. Valve sequence chart, step list, interlocks etc. with Equipment isolating procedures to be mentioned.				
5. 3	Do's & Don't of the equipments.				
5. 4	Safety precautions to be taken during normal operation. Safety symbols, Emergency instructions on total power failure condition/lubrication failure/any other condition				
5. 5	Parameters to be monitored with normal values and limiting values				
5. 6	Trouble shooting with causes and remedial measures				
5. 7	Routine operational checks, recommended logs & records				
5. 8	Changeover schedule if more than one auxiliary for the same purpose is given				
5. 9	Painting requirement and schedule				
5. 10	Inspection, repair , Testing and calibration procedures				
6.0	**MAINTENANCE GUIDELINES FOR PLANT PERSONAL**				

Sl.no. & Sections	Description	Tick (√)if included in Manual			Remarks
		Yes	No	Not Applicable	
6.1	List of Special Tools and Tackles required for Overhaul/Trouble shooting including special testing equipment required for calibration etc.				
6.2	Stepwise dismantling and re-assembly procedure clearly specifying the tools to be used, checks to be made, records to be maintained, clearances etc. to be mentioned. Tolerances for fitment of various components to be given.				
6.3	Preventive Maintenance & Overhauling schedules linked with running hours/calendar period along with checks to be given				
6.4	Long term maintenance schedules especially for structural, foundations etc.				
6.5	Consumable list along with the estimated quantity required during commissioning, normal running and during maintenance like Preventive Maintenances and Overhaul. Storage/handling requirement of consumables/self-life.				
6.6	List of lubricants with their Indian equivalent, Lubrication Schedule, Quantity required for each equipment for complete replacement is to be given				
6.7	List of vendors & Sub-vendors with their latest addresses, service centres ,Telephone Nos., Fax Nos., Mobile Nos., e-mail IDs etc.				
6.8	List of mandatory and recommended spare parts list				
6.9	Tentative Lead time required for ordering of spares from the equipment supplier				
6.10	Guarantee and warranty clauses				
7.0	**Statutory and other specific requirements considerations.**				
8.0	**List of reference documents**				
9.0	**Binding as per requirement**				

SECTION-I

SUB-SECTION-E

ANNEXURE-VII

SITE STORAGE AND PRESERVATION

SITE STORAGE AND PRESERVATION GUIDELINES

FOR

MECHNANICAL BOPs

(Doc No: PE-DC-SSG-A001 REV.00)

PROJECT ENGINEERING MANAGEMENT, POWER SECTOR

BHARAT HEAVY ELECTRICALS LIMITED-NOIDA

CONTENT

1. SCOPE OF THE DOCUMENT

This guideline is prepared in intent to provide proper site storage and preservation of the Mechanical, Electrical and C & I items / equipment supplied under various bought out packages/items. This storage procedure shall be followed at different power plant sites by concerned agency for storage and preservation from the date of equipment received at site until the same are erected and handed over to the customer.

2. PURPOSE OF STORAGE & PRESERVATION

Many of the items may be required to be kept in stores for long period. It shall therefore be essential that proper methods of storage and preservation be applied so that items do not deteriorate, loose some of their properties and become unusable due to atmospheric conditions and biological elements.

3. MEASURES TO BE TAKEN FOR STORAGE, HANDLING & PRESERVATION

a) GENERAL STORAGE REQUIREMENTS

1. To the extent feasible, materials should be stored near the point of erection. The storage areas should have adequate unloading and handling facilities with adequate passage space for movement of material handling equipment such as cranes, fork lift trucks, etc. The storage of materials shall be properly planned to minimise time loss during retrieval of items required for erection.
2. The outdoor storage areas as well as semi-closed stores shall be provided with adequate drainage facilities to prevent water logging. Adequacy of these facilities shall be checked prior to monsoon.
3. The storage sheds shall be built in conformity with fire safety requirements. The stores shall be provided with adequate lights and fire extinguishers. ‘No smoking’ signs shall be placed at strategic locations. Safety precautions shall be strictly enforced.
4. Adequate lighting facility shall be provided in storage areas and storage sheds and security personnel positioned to ensure enforcement of security measures to prevent theft and loss of materials.
5. Adequate number of competent stores personnel and security staff shall be deployed to efficiently store and maintain the equipment / material.
7. The equipment shall be stored in an orderly manner, preserving their identification slips, tags and instruction booklets, etc., required during erection. The storage of materials shall be equipment-wise. Loose parts shall be stored in sheds on racks,

preserving the identification marks and tags in good condition. The group codes shall be displayed on the racks

6. At no time shall any materials be stored directly on ground. All materials shall be stored minimum 200 mm above the ground preferably on wooden sleepers

b) GENERAL PRESERVATION REQUIREMENTS

1. All special measures to prevent corrosion shall be taken like keeping material in dry condition, avoiding the equipment coming in contact with corrosive fluid like water, acid etc.
2. Materials which carry protective coating shall not be wrapped in paper, cloth, etc., as these are liable to absorb and retain moisture. The material shall be inspected and in case of signs of wear or damages to protective coating, that portion shall be cleaned with approved solution and coated with an approved protective paint. Complete record of all such observations and protective measures taken shall be maintained.
3. Generally equipment supplied at site are properly greased or rust protective oil is applied on machined/ fabricated components. However periodic inspection shall be carried out to ensure that protection offered is intact.
4. While handling the equipment, no dragging on the ground is permitted. Avoid using wire rope for lifting coated components. Use polyester slings (if possible) otherwise protective material (e.g. clothes, wood block etc.) should be used while handling the components with rope / slings
5. For Equipment supplied with finished paint, touch paint shall be done in case any surface paint gets peeled off during handling. Otherwise such surfaces shall necessarily be wrapped with polythene to avoid any corrosion. Further for equipment wherein finish coat is to be applied at site, site to ensure that equipment is received with primer coat applied.
6. It shall be ensured by periodic inspection that plastic inserts are intact in tapped holes, wherever applicable.
7. Pipes shall be blown with air periodically and it shall be ensured that there is no obstruction.
8. Silica gel or approved equivalent moisture absorbing material in small cotton bags shall be placed and tied at various points on the equipment, wherever necessary.
9. Heavy rotating parts in assembled conditions shall be periodically rotated to prevent corrosion/jamming due to prolonged storage.

10. All the electrical equipment such as motors, generators, etc. shall be tested for insulation resistance at least once in three months and a record of such measured insulation values shall be maintained.

11. Following preservatives/preservation methods can be used depending upon type of equipment

    a. Rust preventive fluid (RPF)

    b. Rust protective paints

    c. Tarpaulin covers, in case of outdoor storage

    d. De-oxy aluminate for weld-ments

c) GENERAL INSPECTION REQUIREMENTS

1. Period inspection of materials with specific reference to –

    - Ingress of moisture and corrosion damages.
    - Damage to protective coating.
    - Open ends in pipes, vessels and equipment -
        - In case any open ends are noticed, same shall be capped.

2. Any damages to equipment / materials.

    - In case of any damages, these shall be promptly notified and in all cases, the repairs / rectification shall be carried out.
    - Any items found damaged or not suitable as per project requirements shall be removed from site. If required to store temporarily, they shall be clearly marked and stored separately to prevent any inadvertent use.

4. TYPE OF STORAGE FOR VARIOUS EQUIPMENT

The types of storage are broadly classified under the following heads:

i **Closed storage with dry and dust free atmosphere**. (C)

The closed shed can be constructed by using cold-rolled / tubular components for structure and corrugated asbestos sheets / galvanised iron sheets for roofing. Brick walls / asbestos sheets can be used to cover all the sides. The floor of the shed can be finished with plain cement concrete suitably glazed. The shed shall be provided with proper ventilation and illumination.

ii **Semi-closed storage**. (S)

The semi closed shed can be constructed by using cold-rolled / tubular components for structure and corrugated / asbestos sheets for roofing. The floor shall be brick paved. If required a small portion of sides can be covered to protect components from rainwater splashing onto the components.

iii Open storage (O)

The open yard shall be levelled, well consolidated to achieve raised ground with the provision of feeder roads for crane approach along with access roads running all sides. One part of the open yard shall be stone pitched, levelled and consolidated with raised ground suitable for storing / stacking heavier and critical components with due space to handle them by cranes etc . Adequate number of sleepers, concrete block etc. to be provided to make raised platforms to stack critical materials.

A separate yard to be identified as “scrap yard” slightly away from main open yard to store wooden/steel scraps, which are to be disposed off. This is required to avoid mix up with regular components as well as to avoid fire hazard.

Some of the components, which are having both machined & un-machined surfaces and are bulky, shall be stored in open storage area on a raised ground and suitably covered with water proof / fire retardant tarpaulin.

The equipment listed below shall be stored and inspected as per requirement mentioned in the table below.

Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
Raw material /mechanical items like pipes, plates, structure sections etc.)				
1.	Steel pipes (lined/unlined)	S	Damage , paint, corrosion, rubber lining peeling	Provide end cap
2.	MS Plates	S	Damage, paint, corrosion	
3.	SS Plates	S	Damage	
4.	Non-metallic pipes	S	Damage, cracks	Provide end cap
5.	Stainless steel pipes	S	Damage ,	Provide end cap
6.	MS sections, beams	S	Damage, paint, corrosion	
7.	Cable trays	S	Damage, condition of preservations	
8.	Insulation sheets	S	Damage	
9.	Insulation	C	Damage, packing	
10.	Hangers Rods	S	Damage, paint, packing	
11.	Tubes	S	Damage, paint , packing	Provide end cap
12.	Hume pipes	O	Damage	
13.	Castings	O	Damage, paint, corrosion	
Fabricated mechanical items (pressure vessels, tanks etc.)				
14.	Pressure vessels (unlined)	O	Damage, paint, corrosion,	Covered nozzles
15.	Atmospheric storage tanks (unlined)	O	Damage, paint, corrosion	Covered nozzles

Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
16.	Pressure vessels (lined)	S	Damage, paint, corrosion, rubber lining	
17.	Atmospheric storage tanks(lined)	S	Damage, paint, corrosion, rubber lining	
18.	Support structures	O	Damage , paint, corrosion	
19.	Flanges	C	Damage , paint, corrosion	
20.	Fabricated pipes	S	Damage , paint, corrosion	Provide end cap
21.	Vessels internals	C	Damage , paint, corrosion ,packing	
22.	Grills	S	Damage , paint, corrosion	
23.	Angles	S	Damage , paint, corrosion	
24.	Bridge mechanism/clarifier mechanism	O	Damage , paint, corrosion	
25.	Cranes, rails	S	Damage , paint, corrosion	
26.	Stair cases	O	Damage , paint, corrosion	
27.	Ladders/handrails	O	Damage , paint, corrosion	
28.	Fabricated ducts	S	Damage , paint, corrosion	
29.	Isolation Gates	O	Damage , paint, corrosion	
30.	Fabricated boxes/panels	S	Damage , paint, corrosion	
Mechanical components like valves, fittings, cables glands, spares etc.)				
31.	Valves	S	Damage , packing	

Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
32.	Fittings	S	Damage , packing	Provide end cap
33.	Cable glands	C	Damage , packing	
34.	Tools & tackles	C	Damage , packing	
35.	Nut , bolts, washers,	C	Damage , packing	
36.	Gasket & Packings	C	Damage , packing	
37.	Copper tubes	C	Damage , packing, corrosion	Provide end cap
38.	SS tubing	C	Damage , packing	Provide end cap
Rotating assemblies (pumps, blowers, stirrers, fans, compressors etc.)				
39.	Pumps	S	Damage , packing, corrosion	Shaft rotation
40.	Blowers/Compressors	S	Damage , packing, corrosion	Shaft rotation
41.	Agitators/stirrers/radial launders	C	Damage , packing, corrosion	Shaft rotation
42.	Rollers for chlorine tonner mounting	C	Damage , packing, corrosion	
43.	Centrifuge	S	Damage , packing,	
44.	Gear box	C	Damage , packing, corrosion	
45.	Bearings	C	Damage , packing, corrosion	
46.	Fans	S	Damage , packing, corrosion	
47.	Dosing skids	S	Damage , packing, corrosion	
48.	Pump assemblies	S	Damage , packing, corrosion	
49.	Air washers(INTERNALS)	S	Damage , packing	
50.	Air conditioners (split)	C	Damage , packing	

Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
51.	Elevators(CONTAINERIZED)	O	Damage , packing, corrosion	
52.	Chillers/VA machines	S	Damage , packing	
53.	Air handling Unit/Package unit	S	Damage , packing	
54.	Chlorinators & Evaporators	C	Damage , packing	
55.	Ejectors	C	Damage , packing	
56.	Electrolyser	C	Damage , packing	
Miscellaneous items like chain pulley blocks, hoists etc.				
57.	Chain pulley blocks	S	Damage, Packing	
58.	Electric hoists	S	Damage, Packing	
59.	Fire extinguishers	C	Damage, expiry date	
60.	Fork Lift Truck	S	Damage, Packing	
61.	Hydraulic Mobile Crane	O	Damage, Packing	
62.	Mobile Pick Up & Carry Crane	O	Damage, Packing	
63.	Motor boats	O	Damage, Packing	
64.	Safety showers	S	Damage, Packing	
65.	Diffusers/dampers	S	Damage, Packing	
Chemicals and consumables (acid, alkali, paints, oils, reagents and special chemicals)				
66.	Hydro Chloric Acid (HCl)	Store in canes/ storage tank in dyke area	Date of production/ leakage/fumes	hazardous chemical
67.	Sulphuric acid (H_2SO_4)	Store in canes/ storage tank in dyke area	Date of production/ leakage/fumes	hazardous chemical

Sl. No.	Description of the equipment	Type of Storage	Check for	Remarks
68.	Sodium hydroxide (NaOH)	Store in canes/ storage tank in dyke area	Date of production/ leakage/ fumes/ breather	hazardous chemical ,breather to be checked for air ingress
69.	Sodium hypo chlorite	To be stored under shed	Date of production/ leakage/ fumes	hazardous chemical ,self-life normally 15-30 days after which strength of chemical decays
70.	Ammonia	S	Date of production/ leakage/ fumes	Store in closed storage tanks, hazardous chemical
71.	CW treatment chemicals	S	Date of production , Self-life	Store in closed canes
72.	RO/UF cleaning chemicals	S	Date of production , Self-life	Store in closed canes
73.	Lime	C	Damage to packing , seepage	Prevent moisture, rain
74.	Alum bricks	C	Damage to packing	Prevent moisture, rain
75.	Poly electrolyte	S		Store in closed storage tanks
76.	Laboratory chemicals(powder)	C	Damage, Packing self-life	
77.	Laboratory chemicals(liquid)	C	Damage, Packing self-life	
78.	Lubrication oils	C	Leakage	
79.	Paints	S	Leakage ,air tightness	
80.	Sand	O	Damage of packing	No hooks
81.	Salt (NaCl)	C	Damage of packing, water ingress	Prevent moisture, rain
82.	Anthracite	S	Damage of packing	
83.	Activated carbon	S	Damage of packing	

Sl. No.	**Description of the equipment**	**Type of Storage**	**Check for**	**Remarks**
84.	Thermal insulation	S	Damage of packing	
85.	Cement	C	Damage of packing	Prevent moisture, rain
86.	Gravels	O	Damage of packing	
87.	ION exchange resins	C	Damage , packing	Refer manufacturer guidelines
88.	RO membranes	C	Damage , packing	Refer manufacturer guidelines
89.	UF membranes	C	Damage , packing	Refer manufacturer guidelines
90.	Cleaning chemicals	C	Damage , packing	Refer manufacturer guidelines
91.	Chemicals for analysers/calibration	C	Damage , packing	Refer manufacturer guidelines
Electrical and C & I items (motors, cables etc.)				
92.	Motors	C	Damage , packing	
93.	Cable drums	O	Damage	
94.	Control Panel /control desk, UPS ,JB	S	Damage, Packing	
95.	Instruments(gauges/analysers)	C	Damage	
Special items		As per Manufacturer's item, like Hydrogen cylinders, Ozonator, Analyser, Chlorine dioxide generators etc.		

5. CONCLUSION

Concerned storage agency at site should make sure that loss in equipment performance and wear & tear are minimised through proper storage and preservation. The above are broad guidelines and cover major equipment / materials. However specific storage practices shall be followed as per manufacturer recommendation. All the necessary measures even in addition to the ones mentioned above, if found necessary, should be taken to achieve the objective.

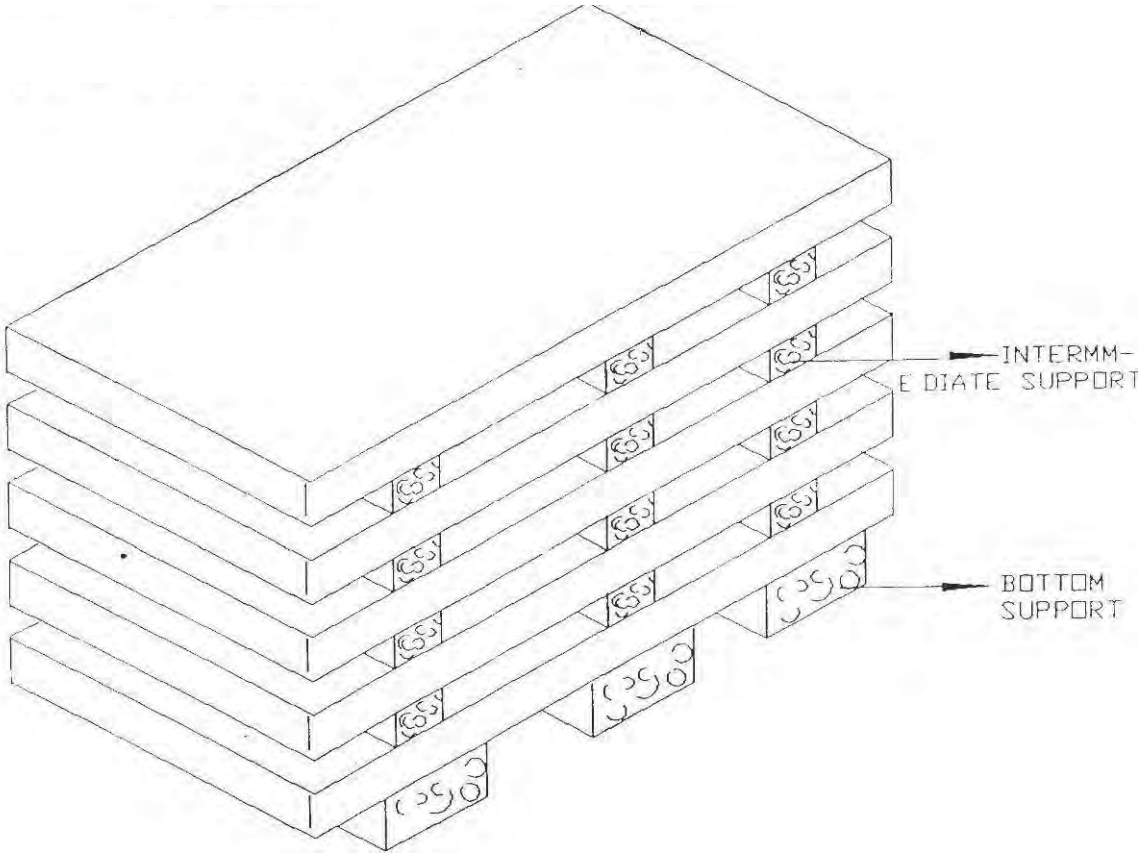


Figure – 1 – PLATE STACKING ARRANGEMENT

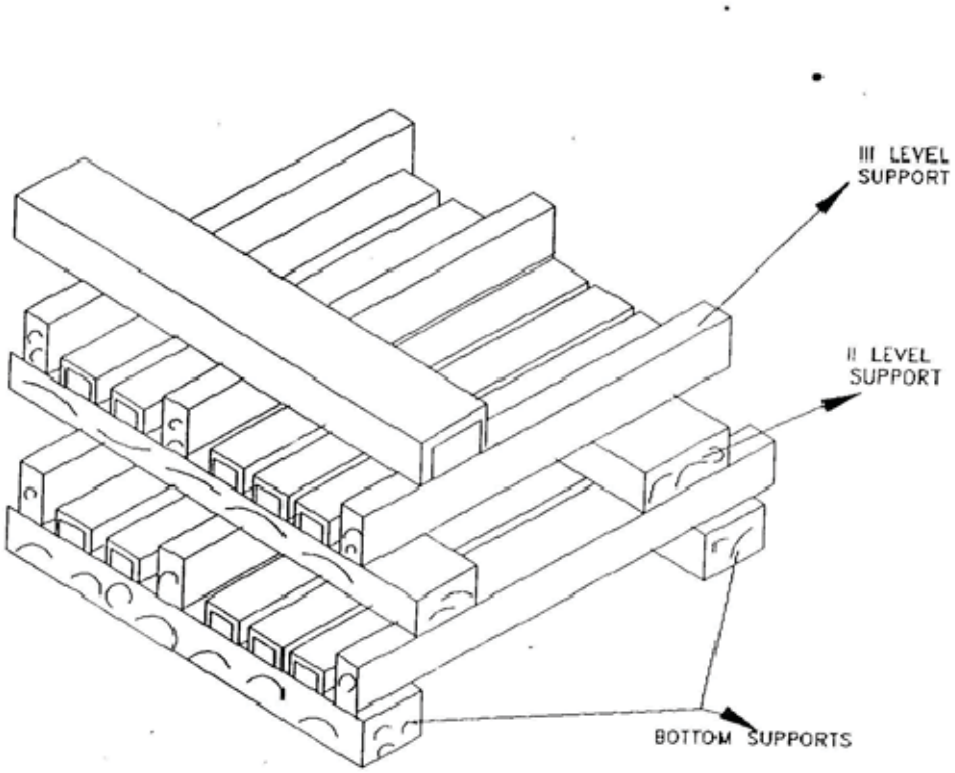


Figure – 2 – STRUCTURAL STEEL STACKING ARRANGEMENT

SECTION II

SECTION-II

SUB-SECTION-1

INSPECTION AND TESTING

1.01.00 Inspection and Tests during Manufacture.

1.01.01 The method and techniques to be used by the Bidder for the control of quality during manufacture of all plant and equipment shall be agreed with the Owner.

1.01.02 The Owner's general requirements with respect to quality control and the required shop tests are set out elsewhere in this specification.

1.01.03 Before any item of plant or equipment leaves its place of manufacture the Owner shall be given the option of witnessing inspections and tests for compliance with the specification and related standards.

1.01.04 Advance notice shall be given to the Owner as agreed in the Contract, prior to the stage of manufacture being reached, and the piece of plant must be held at this stage until the Owner has inspected the piece, or has advised in writing that inspection is waived. If having consulted the Owner and given reasonable notice in writing of the date on which the piece of plant will be available for inspection, the Owner does not attend the Bidder may proceed with manufacture having forwarded to the Owner duly certified copies of his own inspection and test results.

The owner's representative shall have at all reasonable times access to bidder's or his sub-vendor's premises and shall have power to inspect/ examine materials and workmanship or equipment under manufacture.

The Bidder shall forthwith forward to the engineer duly certified copies of the Test Certificates in six copies (one to the Purchaser and five to the Consulting Engineer) for approval. Further nine (9) copies of Shop Test Certificates shall be bound with Instruction Manuals referred to elsewhere.

For electrical equipment, routine tests as per relevant IS spec are to be carried out on all equipment. Type tests are also to be carried out on selected equipment as detailed in the specs of concerned electrical equipment.

1.01.05 Under no circumstances any repair or welding of castings be carried out without the consent of the Engineer. Proof of the effectiveness of each repair by radiographic and/or other non-destructive testing technique, shall be provided to the Engineer.

1.01.06 All the individual and assembled rotating parts shall be statically and dynamically balanced in the works.
Where accurate alignment is necessary for component parts of machinery normally assembled on site, the Bidder shall allow for trial assembly prior to despatch from place of manufacture.

1.01.07 All materials used for the manufacture of equipment covered under this specification shall be of tested quality. Relevant test certificates shall be made available to the Purchaser. The certificates shall include tests for mechanical properties and chemical

analysis of representative material. Equipment or parts coming under any statutory Regulations shall be certified by a Competent Authority under the regulations in the specified format.

1.01.08 All pressure parts connected to pumping main shall be subjected to hydraulic testing at a pressure of 150% of shut-off head for a period not less than one hour. Other parts shall be tested for one and half times the maximum operating pressure, for a period not less than one hour.

1.01.09 All necessary non-destructive examinations shall be performed to meet the applicable code requirements.

1.01.10 All welding procedures adopted for performing welding work shall be qualified in accordance with the requirements of Section-IX of ASME code or IBR as applicable. All welded joints for pressure parts shall be tested by liquid penetrant examination according to the method outlined in ASME Boiler and Pressure Vessel code. Radiography, magnetic particle examination magnuflux and ultrasonic testing shall be employed wherever necessary/ recommended by the applicable code. At least 10% of all major but welding joints shall be radiographed unless otherwise stipulated.

Statutory payments in respect of IBR approvals including inspection shall be made by the bidder. Bidder's scope shall include to preparation of all necessary documents, co-ordination and follow-up for above approval. Owner shall only forward assistance/endorsement of documents /design /drawings /reports/records to be submitted for approval as stipulated/ required by Statutory Authorities till registration of the unit and clearance for commercial operation.

1.02.00 Performance Tests at Site

1.02.01 The full requirements for testing the system shall be agreed between the Owner and the Bidder prior to Award of Contract. The completely erected System shall be tested by the Bidder on site under normal operating conditions. The Bidder shall also ensure the correct performance of the System under abnormal conditions, i.e. the correct working of the various emergency and safety devices, interlocks, etc.

1.02.02 The Bidder shall provide complete details of his normal procedures for testing, for the quality of erection and for the performance of the erected plant. These tests shall include site pressure test on all erected pipe work to demonstrate the quality of the piping and the adequacy of joints made at site.

1.02.03 The Bidder shall furnish the quality procedures to be adopted for assuring quality from the receipt of material at site, during storage, erection, pre-commissioning to tests on completion and commissioning of the complete system/equipment.

1.03.00 For details of specific tests required on individual equipment refer to respective section of this specification.

All Statutory testing / clearance is in Bidder's scope including payment of all fees, etc. as required

QAP FORMAT

BHARAT HEAVY ELECTRICALS LIMITED

CORPORATE QUALITY ASSURANCE

PROJECT: SYSTEM :

VENDOR : ITEM :

SL NO	COMPONENT /OPERATION OPERATIONS	CHARACTERISTICS CHECKED	CATEGORY	TYPE /METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY P	AGENCY W	AGENCY V	REMARKS
1	2	3	4	5	6	7	8	9	10			11

Legend: 1. BHEL 2. Vendor 3. Sub-Vendor

QP No	CQS/SQP/31	Signature	Date		
	Rev		Name		
Page No	1 of 1		Party	Customer/Consultant	Bhel

BIDDER SHOULD SUBMIT THE SIGNED AND STAMPED COPY OF THE FOLLOWING DOCUMENTS:

1. Compliance cum confirmation certificate
2. Guaranteed power consumption (In the format attached in the spec mentioning KW rating).
3. Un priced format for Main package, Mandatory Spares, Tools and Tackles, Commissioning Spares (mentioning quoted/not quoted against each item)
4. Deviation schedule /No deviation certificate in attached format 'Deviation sheet (Cost of withdrawal)'.

COMPLIANCE CUM CONFIRMATION CERTIFICATE

The bidder shall confirm compliance with following by signing / stamping this compliance certificate (every sheet) and furnish same with the offer.

a) The scope of supply, technical details, construction features, design parameters etc. shall be as per technical specification & there are no exclusions, other than those mentioned under "exclusion and those resolved as per 'Schedule of Deviations', with regard to same.

b) There are no other deviations w.r.t. specifications other than those furnished in the 'Schedule of Deviations'. Any other deviation, stated or implied, taken elsewhere in the offer stands withdrawn unless specifically brought out in the 'Schedule of Deviations'

c) Bidder shall submit QP in the event of order based on the guidelines given in the specification & QP enclosed therein. QP will be subject to BHEL / CUSTOMER approval & 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. This is within the contracted price without any extra implications to BHEL after award of the contract.

d) All drawings/ data-sheets / calculations etc. submitted along with the offer shall not be taken cognizance off.

e) The offered materials shall be either equivalent or superior to those specified in the specification & shall meet the specified / intended duty requirements. In case the material specified in the specifications is not compatible for intended duty requirements then same shall be resolved by the bidder with BHEL during the pre-bid discussions, otherwise BHEL / Customer's decision shall be binding on the bidder whenever the deficiency is pointed out.

For components where materials are not specified, same shall be suitable for intended duty, all materials shall be subject to approval in the event of order.

f) The commissioning spares shall be supplied on 'As Required Basis' & prices for same included in the base price itself.

g) All sub vendors shall be subject to BHEL / CUSTOMER approval in the event of order.

h) Guarantee for plant/equipment shall be as per relevant clause of GCC / SCC / Other Commercial Terms & Conditions

i) In the event of order, all the material required for completing the job at site shall be supplied by the bidder within the ordered price even if the same are additional to approved billing break up, approved drawing or approved Bill of quantities within the scope of work as tender specification. This clause will apply in case during site

commissioning, additional requirements emerges due to customer and / or consultant's comments. No extra claims shall be put on this account

j) Schedule of drawings submissions, comment incorporations & approval shall be as stipulated in the specifications. The successful bidder shall depute his design personnel to BHEL's / Customer's / Consultant's office for across the table resolution of issues and to get documents approved in the stipulated time.

k) As built drawings shall be submitted as and when required during the project execution.

l) The bidder has not tempered with this compliance cum confirmation certificate and if at any stage any tempering in the signed copy of this document is noticed then same shall be treated as breach of contract and suitable actions shall be taken against the bidder.

m) Successful bidder shall furnish detailed erection manual for each of the equipment supplied under this contract at least 3 months before the scheduled erection of the concerned equipment / component or along with supply of concerned equipment / component whichever is earlier.

n) Document approval by customer under Approval category or information category shall not absolve the vendor of their contractual obligations of completing the work as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to customer for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.

o) In case vendor submits revised drawing after approval of the corresponding drawing, any delay in approval of revised drawing shall be to vendor's account and shall not be used as a reason for extension in contract completion.

PRE-BID CLARIFICATION SCHEDULE

S. NO.	SECTION/CLAUSE/PAGE NO.	STATEMENT OF THE REFERRED CLAUSE	CLARIFICATION REQUIRED

The bidder hereby clarifies that above mentioned are the only clarifications required on the technical specification for the subject package.

Signature: _____

Name: _____

Designation: _____

Company: _____

Date: _____

Company Seal

DEVIATION SHEET (COST OF WITHDRAWAL)

ANNEXURE-II: DEVIATION SHEET (COST OF WITHDRAWAL)

PROJECT:- 1X800MW KOTHAGUDEM THERMAL POWER STATION STAGE-VII UNIT#12 - (FGD SYSTEM)

PACKAGE:- HVAC 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 WITHDRAWL OF DEVIATION	REFERENCE OF PRICE SCHEDULE ON WHICH COST OF WITHDRAWL OF DEVIATION IS APPLICABLE	NATURE 0F COST OF WITHDRAWL OF DEVIATION (POSITIVE/ NEGATIVE)	REASON FOR QUOTING DEVIATION
TECHNICAL DEVIATIONS									
COMMERCIAL DEVIATIONS									
PARTICULARS OF BIDDERS/ AUTHORISED REPRESENTATIVE									
NAME				**DESIGNATIONS**		**SIGN & DATE**			

NOTES:

1. Cost of withdrawal of deviation will be applicable on the basic price (i.e. excluding taxes, duties & freight) only.
2. All the bidders have to list out all their Technical & Commercial Deviations (if any) in detail in the above format.
3. Any deviation not mentioned above and shown separately or found hidden in offer, will not be taken cognizance of.
4. 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. In the absence of same, such deviation(s) shall not be considered and offer shall be considered in total compliance to NIT.
5. Bidder shall furnish price copy of above format along with price bid.
6. The final decision of acceptance/ rejection of the deviations quoted by the bidder shall be at discretion of the Purchaser.
7. Bidders to note that any deviation (technical/commercial) not listed in above and asked after Part-I opening shall not be considered.
8. For deviations w.r.t. Credit Period, Liquidated damages, Firm prices if a bidder chooses not to give any cost of withdrawal of deviation loading as per Annexure-VII, 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.
9. Any deviation mentioned in priced copy of this format, but not mentioned in the un-priced copy, shall not be considered.
10. 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.
11. Cost of withdrawal is to be given separately for each deviation. In no event bidder should cub 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.
12. In case nature of cost of withdrawal (positive/negative) is not specified it shall be assumed as positive.
13. In case of discrepancy in the nature of impact (positive/ negative), positive will be considered for evaluation and negative for ordering.

SECTION-II

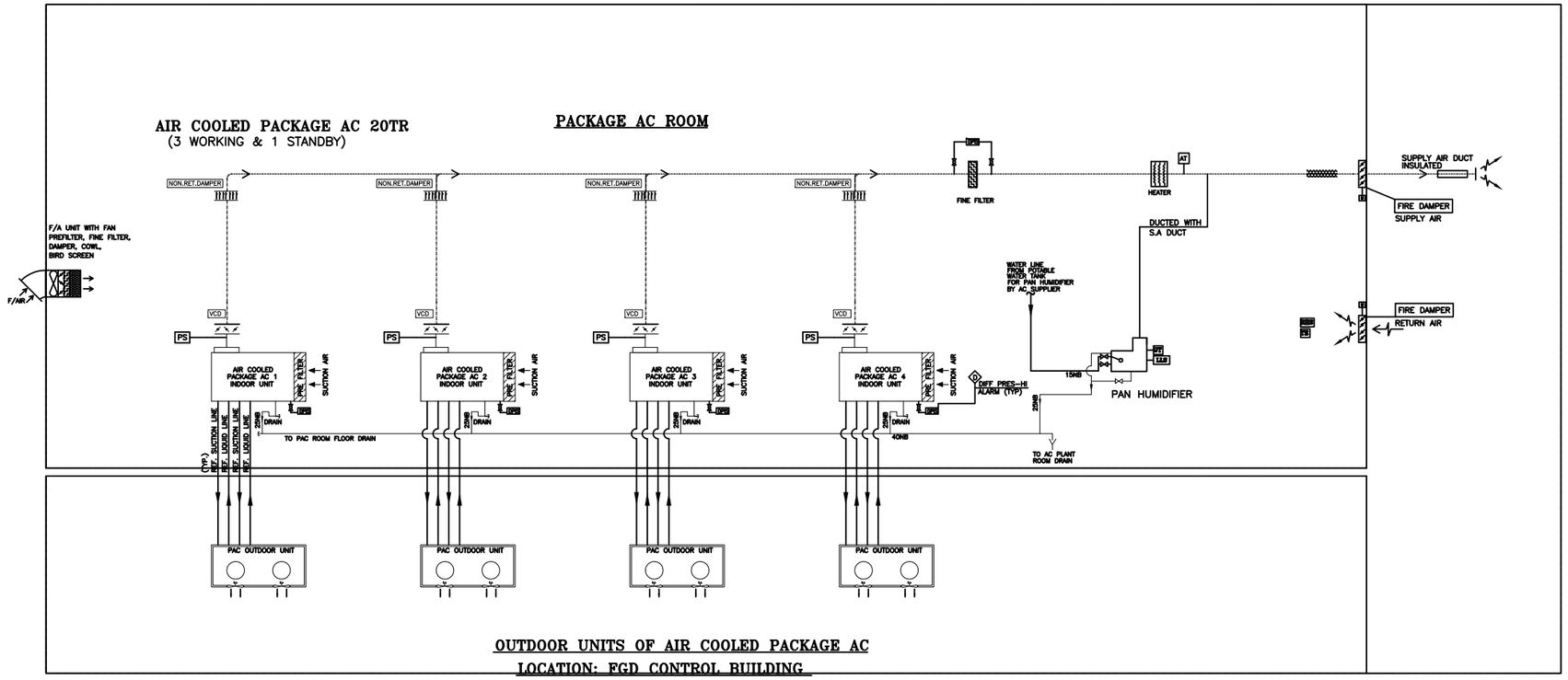
SUB-SECTION-6

GUARANTEE POWER CONSUMPTION

1X800MW KOTHAGUDEM THERMAL POWER STATION STAGE-VII UNIT#12 – (FGD SYSTEM) HVAC SYSTEM							
GUARANTEED POWER CONSUMPTION							
SL NO	DESCRIPTION	Capacity	QUANTITY (WORKING)		POWER CONSUMPTION AS GUARANTEED (KW) AT MOTOR INPUT TERMINAL	DUTY FACTOR	TOTAL POWER CONSUMPTION AS GUARANTEED (KW)
			(WORKING)	(STANDBY)			
(1)	(2)		(3A)	(3B)	(4)	(5)	(6)=(3A)x(4)X(5)
A	**Air Conditioning System for FGD Control Room**						
1	Air Cooled Package Air Conditioning Units	20 TR	3	1		1	
2	Fresh air fan for PAC Room		1	0		1	
3	Split AC	2 TR	2	1		1	
B	**Ventilation System for Non AC Areas of FGD Control Building**						
1	Axial flow supply fans	10000 CMH, 30mm Static	38	0		1	
2	Axial flow exhaust fans (Bifurcated type)	10000 CMH, 15mm Static	2	0			
C	**Ball Mill Building**						
1	Axial flow exhaust fans	15000 CMH, 10mm Static	13	0		1	
2	Axial flow exhaust fans	10000 CMH, 10mm Static	6	0		1	
D	**Gypsum Dewatering Building**						
1	Axial flow exhaust fans	15000 CMH, 10mm Static	14	0		1	
2	Axial flow exhaust fans	10000 CMH, 10mm Static	2	0		1	
E	**ACW/DMCW Pump House**						
1	Axial flow exhaust fans	6000 CMH, 10mm Static	2	0		1	
2	Axial flow supply fans	7500 CMH 30mm Static	2	0		1	

F	**SO2 Analyzer Room**						
1	Split AC	2 TR	2	1			
					TOTAL CONSUMPTION (KW)		
	Estimated power consumption (EPC) figure for the system (for working drives only) has been considered as **196 KW**. So long bidder's quoted guaranteed power consumption (GPC) above remains within this EPC, there will be no technical loading of bid on power consumption for evaluation. However, if bidder's quoted GPC exceeds EPC, there shall be technical loading of bid for evaluation **@ Rs. 2,00,000/-** per KW of additional power over EPC. Bidder's guaranteed power consumption at motor input terminals (not shaft power) as furnished in relevant schedule shall be demonstrated by the successful bidder during performance testing at works/ site. In case power consumption is noted higher than EPC / bidder's quoted GPC whichever is higher, during inspection/ PG test, penalty **@** Rs**. 2,00,000/-** per KW shall be levied on vendor. In case of change in building size during detail engg leading to increase/decrease in no. of equipment, GPC of HVAC system for such building shall be adjusted suitably based on GPC value deduced from figure quoted by the bidder in this format						

P & I DIAGRAM FOR AC SYSTEM
AIR COOLED PACKAGE AC FOR FGD CONTROL BUILDING



LEGEND					
SYMBOL	DESCRIPTION	TAG	SYMBOL	DESCRIPTION	TAG
PH	PAN HUMIDIFIER	PH		NON RETURN DAMPER	NRD
LLS	LOW LEVEL SWITCH	LLS		FIRE DAMPER (MOTOR OPERATED)	FD
DPIS	DIFFERENTIAL PRESSURE SWITCH	DPS		VOLUME CONTROL DAMPER.	VCD
TE	TEMPERATURE ELEMENT	TE		LEVEL SWITCH (LOW/HIGH)	LS
'T'	DESCALING TEE	–		HEATER	–
AT	AIRSTAT	AT	GT	GEYSER THERMOSTAT	GT
TE	TEMPERATURE ELEMENT	TE		SIGNAL TO DCS	D
RHS	HUMIDITY SENSOR	RHS			
	SUPPLY AIR DUCT				

NOTES:
1. ALL SUPPLY DUCT SHALL BE INSULATED AS PER SPECIFICATION.
2. ALL PIPING AND VALVES OF SIZE 50NB & BELOW SHALL BE PROVIDED AS PER SYSTEM REQUIREMENT.
3. ALL PRESSURE GAUGES, PRESSURE SWITCHES, DIFFERENTIAL PRESSURE SWITCHES SHALL BE PROVIDED WITH ISOLATION VALVE.
4. TEMPERATURE SENSOR (TS) & RELATIVE HUMIDITY SENSOR (RHS) SHALL BE PROVIDED IN EACH PAC ROOM.
5. ALL INSTRUMENT AND TEST POINTS SHALL BE PROVIDED WITH ISOLATING ROOT VALVE
6. ALL EQUIPMENT DRAIN SHALL BE CONNECTED TO NEAREST BUILDING / PLANT ROOM DRAIN.
7. ONE NO. DRY BULB & WET BULB THERMOMETER WITH PSYCHOMETRIC CHART SHALL BE PROVIDED IN EACH AIR CONDITIONED ROOM.
8. ALL VALVES SHALL BE LOCATED AT GRADE / MAN APPROACHABLE HEIGHT. METALLIC STOOL / LADDER TO BE PROVIDED BY AC SUPPLIER FOR ACCESSING VALVES / EQUIPMENTS.
9. NUMBER AND SIZE OF REFRIGERANT LINES BETWEEN INDDOR AND OUTDOOR UNIT OF AIR COOLED PACKAGE AC SHALL BE AS PER MANUFACTURER GA DRAWING.
10. EQUIPMENT / VALVES / INSTRUMENTS IN THE REFRIGERANT LINES BETWEEN INDOOR AND OUTDOOR UNIT OF AIR COOLED PACKAGE AC SHALL BE AS PER MANUFACTURER GA DRAWING.

For Tender Purpose Only

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
E	DRN	TKG	-SD-	26.11.21
	DESN	TKG	-SD-	26.11.21
	CHD	VK	-SD-	26.11.21
	APPD	SG	-SD-	26.11.21

TITLE: P&ID FOR AIR COOLED PACKAGE AC IN FGD CONTROL ROOM BUILDING

DEPT. / SIGN / SCALE

DRAWING NO. PE-DG-439-571-13000A-A001
SHEET 1 OF 1 REV. 00

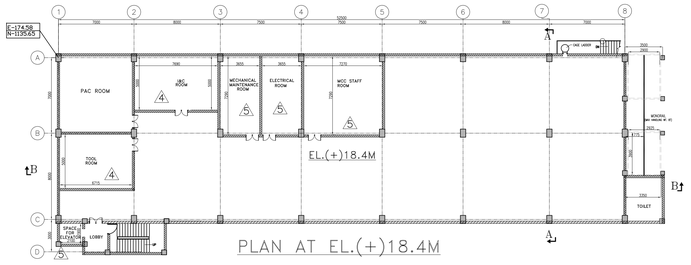
SIZE-A1

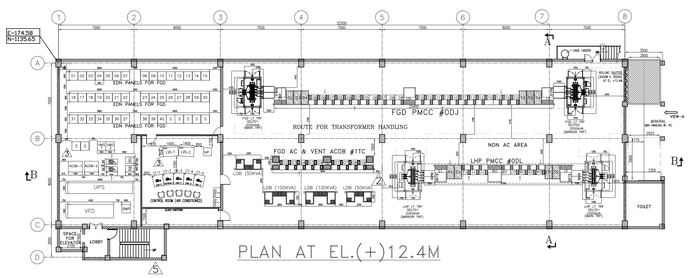
DRAWING NO. PE-DG-439-100-E008

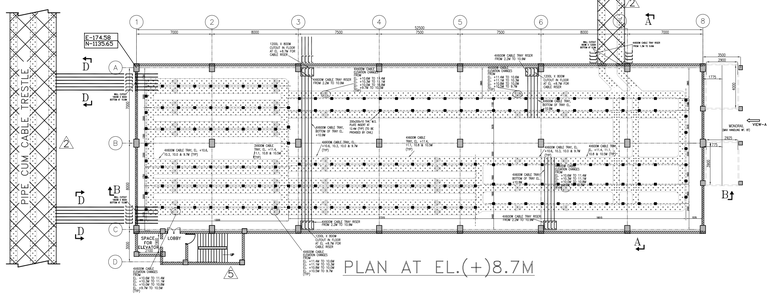
FIRST ANGLE PROJECTION — ALL DIMENSIONS ARE IN MM

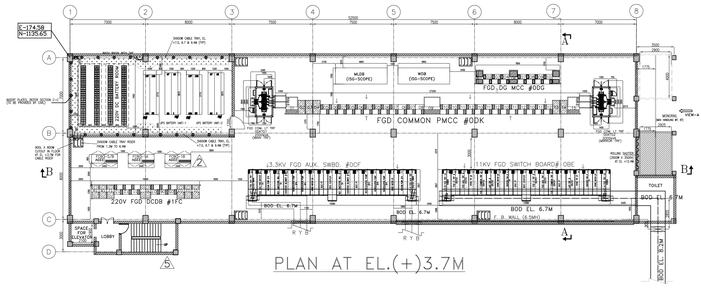
CUSTOMER'S DRAWING NO.

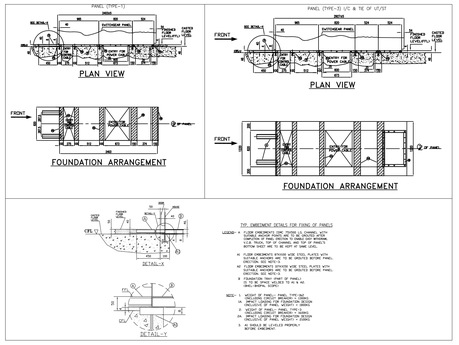
NORTH

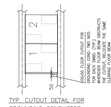


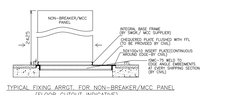


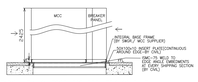


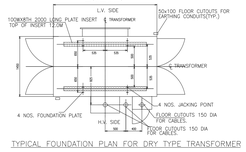












LEGENDS:–

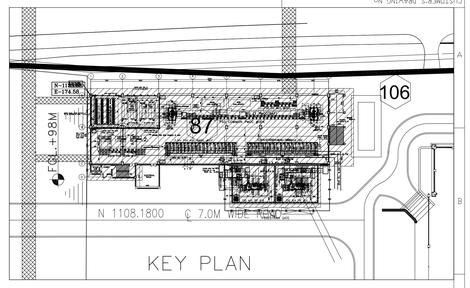
- ROLLING SHUTTER (3000Wx3000H)
- OPERATING FRONT OF THE PANEL
- PEDESTRIAN GATE
- REMOVABLE FENCING
- FGD TRANSFORMER'S FENCING (3.0M HEIGHT)
- SWITCHYARD FENCING
- FIRE BARRIER WALL
- BUND WALL
- RAIL TRACK
- CABLE DUCT BANK WITH PULL PIT
- TOWER
- LA — LIGHTNING ARRESTOR
- MOORING POST
- JACKING POINTS
- CABLE TRENCH
- PIPE/CABLE TRESTLE
- CHANGE OF SPB EL.

EQUIPMENTS DETAILS AT 3.7M EL (TENTATIVE)

S.NO.	DESCRIPTION	DESIGNATION	SIZE(MM) LXBXH	SCOPE
01	11 kV FGD SWBD.	0BE	16380X2403X2800	BHOPAL
02	415V FGD AC & VENTILATION MCC	1TC	9400X1300X2425	PEM
03	220V FGD DCDB	1FC	10000X1300X2425	PEM
04	UHP PMCC	0DL	12700X1600X2200	ISG
05	415V FGD COMMON PMCC	0DK	27200X1600X3000	RANIPET
06	FGD DG MCC	0DG	7800X1300X2200	PEM
07	220V DC BATTERY	8X27 CELLS	----------	PEM
08	UPS BATTERY 1&2	180 CELLS	----------	EDN
09	220V FCBC CHARGER	1A, 1B & S/B	2400X800X2100	PEM
10	UHP LT TRF(11/0.433kV)–ANC(2000kVA)	0DJ101/0DJ102	2820X1650X3300	JHANSI
11	COM. LT TRF(11/0.433kV)–ANC(2500kVA)	0DK101/0DK102	3300X1650X3300	JHANSI
12	MLDB	---	4820X1500X2200	ISG
13	#DB	---	4820X1500X2200	ISG

EQUIPMENTS DETAILS AT 12.4M EL (TENTATIVE)

S.NO.	DESCRIPTION	DESIGNATION	SIZE(MM) LXBXH	SCOPE
01	3.3 kV FGD AUX. SWBD.	0CF	15580X2403X2800	BHOPAL
02	415V FGD PMCC	0DJ	25900X1600X3000	RANIPET
03	FGD PANELS (40 NOS)	---	800X800X2067	EDN
04	ACDB-1&2	---	1300X1000X2115	EDN
05	BELT WATCH PANEL	BWP	800X800X2000	ISG
06	ENGG WORK STATION	EWS	1500X750X735	EDN
07	VMS PANEL	VMS1 & VMS2	800X800X2000	EDN
08	UPS	---	6000X1000X2115	EDN
09	NETWORK PANEL	NP PANEL	750X750X2000	EDN
10	WBRO FEEDER PANEL (2NOS)	---	1000X500X1500	ISG
11	LVS PANEL	LVS1 & LVS2	1400X850X2000	EDN
12	COMPUTER TABLE (5NOS)	---	1050X1000X735	EDN
13	PRINTER	PRN	900X650X735	EDN
14	LDB (100kVA)	ACN	2800X1200X2200	PEM
15	LDB (50kVA)	ACN	2350X1200X2200	PEM
16	FGD LT TRF(11/0.433kV)–ANC(2000kVA)	0DJT01/0DJT02	2800X1600X3000	JHANSI
17	HV DATA CONCENTRATOR	HV DC	800X600X2000	EDN
18	LV DATA CONCENTRATOR	LV DC	800X600X2000	EDN
19	VFD PANEL FOR RC PUMP	VFD	4250X1260X2800	EDN

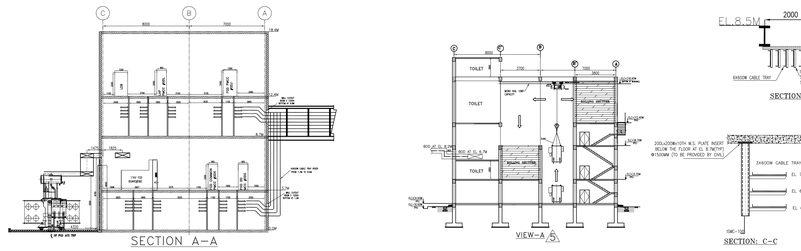


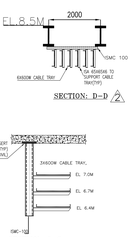
REFERENCE DRAWINGS:

SL NO.	TITLE	DRG NO	SOURCE
1.	PLOT PLAN	PY–LQ–0–M112–1252–01	BHEL/PESD
2.	ESLD FOR FGD AUX POWER DISTRIBUTION	PE–DG–439–565–E001	PEM/ELECT
3.	SLD OF 400 kV SWITCHYARD	TB–G–377–510–001	BHEL/ TBG
4.	400 kV SWITCHYARD PLAN & SECTIONAL ELEVATION	TB–G–377–510–002	BHEL/ TBG
5.	OGA OF FGD TRANSFORMER(40MVA, 400/11.5KV)	3 460 00 01216	BHEL/BHOPAL
6.	OGA OF FGD AUX TRANSFORMER (8MVA, 11/3.6KV)	14560051042	BHEL/JHANSI
7.	FOUNDATION PLAN OF FGD TRANSFORMER(40MVA, 400/11.5KV)	3 460 00 01218	BHEL/BHOPAL
8.	FOUNDATION PLAN OF FGD AUX TRANSFORMER, (8MVA, 11/3.6KV)	24560051260	BHEL/JHANSI
9.	SPBD LAYOUT & FOUNDATION OF KOTHAGUDAM FGD	02461810001	BHEL/RUDRAPUR
10.	GA DRAWING OF NGR(11KV & 3.3KV)	PE–VG–439–506–E279	BHEL/PEM
11.	RECOMMENDED LAYOUT OF FGD CONTROL ROOM	(RECD. ON 30.01.19)	BHEL/RANIPET
12.	GA DRAWING OF LDB	----------	BHEL/PEM
13.	LAYOUT FLOOR PLAN & KEY DIAGRAM FOR 11KV FGD SWBD#0BE	3 521 00 5 6366	BHEL/BHOPAL
14.	LAYOUT FLOOR PLAN & KEY DIAGRAM FOR 3.3KV FGD AUX. SWBD#0CE	3 521 00 5 6367	BHEL/BHOPAL
15.	GA DRAWING OF 415V FGD PMCC#0DJ	----------	BHEL/EPD
16.	GA DRAWING OF 415V FGD COMMON PMCC#0DK	----------	BHEL/EPD
17.	GA DRAWING OF 415V LHP PMCC#0DL	----------	BHEL/ISG
18.	GA DRAWING OF 415V FGD CONTROL ROOM AC & VENT ACDB	----------	BHEL/EPD
19.	GA DRAWING OF 415V FGD DG MCC#0DG	----------	BHEL/EPD
20.	GA DRAWING OF 220V FGD DCDB#1FC	----------	BHEL/EPD
21.	GENERAL ARRANGEMENT OF 220V BATTERY BANK	----------	BHEL/PEM
22.	OUT LINE GENERAL ARRANGEMENT OF 2000KVA 11/0.433KV DRY TYPE TRANSFORMER	34730052589	BHEL/JHANSI
23.	OUT LINE GENERAL ARRANGEMENT OF 2000KVA 11/0.433KV DRY TYPE TRANSFORMER (MIRROR IMAGE)	34730052617	BHEL/JHANSI

NOTES:

1. ALL DIMENSIONS ARE IN MM AND ELEVATIONS ARE IN METRES.
2. ALL ELEVATIONS MARKED ARE W.R.T. FINISHED FLOOR LEVEL (FFL) OF POWER HOUSE BUILDING GROUND FLOOR IS EL. 0.00M WHICH CORRESPONDS TO 0.5M (R.L. 99.5M) ABOVE FGL. PAVED LEVEL IS EL(–)0.1M WHICH CORRESPONDS TO RL(+)99.4M.
3. THIS DRG. IS TO BE REFERRED FOR LAYOUT OF TRANSFORMERS AND ASSOCIATED EQUIPMENT. FOR DETAILED LAYOUT ARRGT. OF OTHER MECHANICAL PLANTS /PIPING /FACILITIES LOCATED IN TRANSFORMER YARD, RELEVANT LAYOUT DRAWINGS SHALL BE REFERRED.
4. FIRE BARRIER WALLS WILL BE 355 MM THICK BRICKWORK OR 200 MM THICK CONCRETE, AS PER CIVIL DESIGN AND WILL PROJECT MINIMUM 600 MM BEYOND THE OIL CONTAINING PART OF THE TRANSFORMER.
5. APPROX. QUANTITY OF OIL AND WEIGHT OF EACH TRANSFORMER IS AS UNDER:
   TOTAL QUANTITY OF OIL FOR FGD TRANSFORMER – 36660 Kg.
   TOTAL QUANTITY OF OIL FOR FGD AUX TRANSFORMER– XXXXX LTR
   TOTAL WEIGHT OF FGD TRANSFORMER – 132810 Kg.
   TOTAL WEIGHT OF FGD AUX TRANSFORMER – XXXXX Kg.
6. FOLLOWING CIVIL DETAILS SHALL BE DECIDED SEPARATELY BY CIVIL.
   a) SOAK PIT INVERT LEVEL OF TRANSFORMERS, FOUNDATIONS FOR TRANSFORMERS/ RAIL TRACKS/ RADIATORS/COOLERS AS PER TRANSFORMER FOUNDATION PLANS AND OTHER PIPE SUPPORT ARRANGEMENT. INVERT LEVEL OF SOAK PIT SHALL BE FIXED IN LINE WITH TRANSFORMER OIL QUANTITY AND QUANTITY OF WATER SPRAY (TO BE INDICATED SEPARATELY BY FIRE FIGHTING SYSTEM ENGINEER).
   b) DRAINAGE SYSTEM FROM SOAK PITS OF INDIVIDUAL TRANSFORMERS TO COMMON OIL COLLECTION PIT (INCLUDING EXACT LOCATION AND DIMENSIONS OF THE PIT), ROOF SHALL BE PROVIDED FOR THE BURNT–OIL PIT. ACCESS MANHOLES, ACCESS LADDER INTO THE PIT & PROVISION FOR SUMP PUMPS SHALL BE SUITABLY ENSURED FOR THE PITS.
   c) MOORING POSTS AND JACKING POINTS (SUITED TO 400KV/11.5KV FGD TRANSFORMER JACKING REQUIREMENTS AT DIFFERENT RAIL TRACK CROSSINGS). DISTANCE BETWEEN TWO MOORING POSTS SHALL BE 15M MAXIMUM.
   d) FENCING DETAILS.
   e) CABLE PITS/ CABLE PULL PITS/ CABLE TRENCHES.
7. SPB LAYOUT SHOWN IN THIS DRAWING IS FOR THE PURPOSE OF ESTABLISHING THE GENERAL ROUTING AND LAYOUT. FOR DETAILED LAYOUT & DETAILS OF CUTOUTS IN CLADDING/ WALL FOR BUSDUCT ENTRY, FOUNDATION SUPPORTS ETC., MANUFACTURER'S DRAWINGS SHALL BE APPLICABLE.
8. FOR NEUTRAL GROUNDING RESISTOR ONLY SPACE PROVISION IS INDICATED PRESENTLY. FINAL DETAILS OF FOUNDATION/ SUPPORT ARRANGEMENT SHALL BE AS PER APPROVED OGA.
9. TOP OF FOUNDATION FOR LA's SHALL BE AT 0.0M AND THEIR SUPPORTING STRUCTURE SHALL BE REMOVABLE TYPE TO FACILITATE WITHDRAWAL OF TRANSFORMERS WHEREVER REQUIRED.THE LOCATION OF LAs AS MARKED IN THE DRAWING IS BASED ON SWITCHYARD LAYOUT DRAWING OF BHEL–TBG.
10. CABLE DUCT BANKS MAY BE ADJUSTED TO SUIT BUSDUCT SUPPORT LOCATIONS FOR CLEARING ALL FOUNDATION CIVIL WORKS.
11. CABLE DUCT BANK SHALL BE LAID ATLEAST 200MM (CLEAR) BELOW GROUND LEVEL.
12. CABLES TO RESPECTIVE TRANSFORMER CABLE BOX/ MARSHALLING BOX WITHIN THE TRANSFORMER SOAK PIT SHALL BE LAID IN CABLE TRAYS TO BE ROUTED LOCALLY AT SITE TO SUIT LAYOUT IN 50/ 100/ 150 MM WIDE CABLE TRAYS FIXED TO THE INNER FACE OF SOAK PIT WALL.
13. THE TOP & BOTTOM ELEVATION OF CABLE TRENCHES/ DUCT BANKS/ CABLE SLITS ETC. INDICATED IN DWG. ARE TENTATIVE ONLY. THE SAME SHALL BE FIXED BY CIVIL (PEM) BASED ON THE REQUIREMENT OF OTHER UTILITIES RUNNING ACROSS THESE, LIKE GROUND DRAINAGE OIL DRAIN PIPES, FIRE HYDRANT TRENCHES, V'MET TANKS, ROAD ETC.
14. ACID PROOF FLOORING SHALL BE PROVIDED IN BATTERY ROOM.
15. WALLS OF BATTERY ROOM UPTO DOOR LEVEL HEIGHT SHALL BE PROVIDED WITH TILES & ABOVE THIS WALL SHALL BE PAINTED WITH ACID PROOF PAINT.
16. ALL PANELS ARE MADE SUITABLE FOR BOTTOM ENTRY OF POWER AND CONTROL CABLES.
17. ALL CABLE SHAFTS SHALL BE COVERED WITH BRICK WORK AFTER COMPLETION OF CABLE LAYING.
18. SP BUSDUCT LAYOUT SHOWN IS INDICATIVE & FOR THE PURPOSE OF INDICATION OF LOCATION OF PANELS WHERE BUSDUCTS ARE TO BE TERMINATED.
19. BUSDUCT TERMINATION FOR PANELS SHALL BE FROM TOP.
20. FOR DETAILS OF BUSDUCTS LAYOUT BHEL (RUDRAPUR) DRAWING SHALL BE REFERRED.
21. PHASE CROSS OVER DETAILS:–
   A) PHASE CROSS OVER IS REQUIRED IN TIE/INCOMER PANEL WHEREVER MARKED THUS (#).
   B) PHASE CROSS OVER FOR INTER SWBD. TIE (WHEREVER REQUIRED) SHALL BE ADDRESSED BY SWGR MANUFACTURER, AS PER SWITCHGEAR BUS BAR DISPOSITION.
22. FOR PANEL FIXING AND FLOOR OPENING (FOR CABLES), SWGR OGA/FOUNDATION PLAN, DRAWINGS OF MANUFACTURER TO BE REFERRED.TYPICAL DETAILS ARE INDICATED IN THIS DRAWING.





REV.	DATE	ALTD	CHD	APPD
05	01.12.21	AR/CR	KG	OMK

1) REVISED AS PER CUSTOMER COMMENTS RECEIVED THROUGH PEDM DATED–13.11.21.

REV.	DATE	ALTD	CHD	APPD
04	27.10.21	AR/CR	KG	OMK

1) REVISED AS PER CUSTOMER COMMENTS RECEIVED THROUGH PEDM DATED–01.10.21.

REV.	DATE	ALTD	CHD	APPD
03	22.09.21	AR/CR	KG	OMK

1) REVISED AS PER CUSTOMER COMMENTS RECEIVED THROUGH PEDM DATED–23.08.21.

REV.	DATE	ALTD	CHD	APPD
02	07.08.21	AR/CR	KG	OMK

1) REVISED AS PER CUSTOMER COMMENTS RECEIVED THROUGH PEDM DATED–21.06.21.

REV.	DATE	ALTD	CHD	APPD
01	26.05.21	AR/CR	KG	OMK

1) DRAWING REVISED AS PER REVISED FGD CONTROL ROOM INPUT RECEIVED FROM BHEL–RANIPET, DTD–20.02.21
2) DRAWING REVISED AS PER DISCUSSION HELD IN ERM DTD–19/03/21 AT TSGENCO OFFICE, HYD.
3) DRAWING REVISED AS PER REVISED INPUT RECEIVED FROM BHEL–EDN DTD–11.05.21,15.05.21 & 25.05.21.

DEVELOPMENT CONSULTANTS PRIVATE LIMITED

Reviewed only for general conformance with contract drawings and specifications.

ACTION			
1	Approved	4	Disapproved
1*	Approved with Comments		
2	Approved except as noted. Forward final drawing	5*	For information and record with comments
3	Approved except as noted. Resubmission required	5	For information and Record

Contractor to be responsible for any errors and for fulfillment of detailed requirements of contract documents.

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE–VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

JOB NO. 439
STATUS CONTRACT
DISTRIBUTION

DEPT.		NAME	SIGN	DATE
CDDE	DRN	AR	–SD–	18.04.19
E	DSN	CR	–SD–	18.04.19
	CHD	KG/AKR	–SD–	18.04.19
	APPD	MS	–SD–	18.04.19

TITLE: ELECTRICAL EQPT & CABLING LAYOUT IN FGD CONTROL ROOM BUILDING (INCLUDING SPBD LAYOUT)

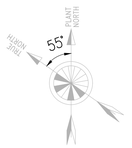
DEPT. | SCALE | SIGN

DRAWING NO. PE–DG–439–100–E008

SHEET 1 OF 2 REV. 05

SIZE–A1

COMPUTER FILE NAME



WIND ROSE DIAGRAM

CONSTRUCTION YARD & LAYDOWN AREA

FGL.+98

Railway Line Over Bridge

MAIN GATE

SECURITY OFFICE

SHED

PARKING

PARKING SPACE

4.0M WIDE ROAD

7.0M WIDE ROAD

12.0M WIDE ROAD

Durga Ma Temple

EXIST. PYLON

53B FO & LDO FORWARDING PUMP HOUSE

LIMESTONE STORAGE AREA

IDENTIFICATION NUMBER	DESCRIPTION
87	FGD CONTROL ROOM
88	LIME STONE GRINDING BUILDING
89	GYPSUM DEWATERING BUILDING
90	GYPSUM STORAGE
91	UNCRUSHED LIMESTONE STORAGE
92	LIMESTONE UNLOADING HOPPER
⚠ 93	VOID
94	LIMESTONE SLURRY STORAGE TANK
95	PROCESS WATER TANK
96	WASTE WATER TANK
97	SECONDARY HYDROCYCLONE FEED TANK
98	ABSORBER
99	GGH
100	BOOSTER FAN
101	OXIDATION BLOWER
102	RC PUMP
103	AUX ABSORBENT TANK
104	PIPE RACK
⚠ 105	VOID
106	SPACE FOR DG SET FOR FGD
107	TRANSFORMER FOR FGD
108	ACW/DMCW P/H FOR FGD
109	FRP COOLING TOWER FOR FGD
110	GYPSUM SUMP
111	EMERGENCY QUENCH TANK
⚠ 112	ABSORBER SUMP

LEGEND:–

FGL – FINISHED GROUND LEVEL
FFL – FINISHED FLOOR LEVEL

– PIPE&CABLE RACK
– CABLE RACK

NOTES:–

1. ALL DIMENSIONS AND CO-ORDINATES ARE IN METER UNLESS NOTED OTHERWISE.
2. THE FINISHED FLOOR LEVEL (FFL) OF POWER HOUSE BUILDING GROUND FLOOR IS EL. 0.00M WHICH CORRESPONDS TO 0.5M (RL. 99.5M) ABOVE FGL.
3. THE EXISTING BUILDINGS SHOWN IN SHADED LINE IN THE POWER PLANT AREA, ETC. AND AS REQUIRED FOR THE CONSTRUCTION OF THE FACILITIES FOR UNIT #12 ARE TO BE DISMANTLED.
4. THE PIPE RACK SHOWN IS INDICATIVE ONLY.
5. 400KV OUTGOING LINES ARE TO BE ALIGNED DULY CLEARING THE RE-ROUTED 220KV LINES RUNNING ALONG THE PLANT BOUNDARY.
6. RE-ROUTING OF EXISTING 400KV LINE NEAR PROPOSED SWITCHYARD AND CHP AREA TO BE SUITABLY INCORPORATED IN THIS DRAWING BY TSGENCO.
7. CUST. GRIDS HAVE BEEN CONVERTED TO PLANT GRIDS. REFERENCE POINT HAS BEEN INDICATED.
8. DUE TO REVISED MARSHALLING YARD, RAIL TRACKS ARE COMING OVER RAW WATER PIPES. HENCE, CULVERT TO BE PROVIDED AS INDICATED IN THE PLOT PLAN AND NECESSARY APPROVAL FROM RITES/ OTHER AGENCIES TO BE ARRANGED BY TSGNECO.
9. MARSHALLING YARD, RAIL TRACKS ARE CONSIDERED AT FGL 104.0M
10. THE CORDINATES OF APPROACH ROADS NOT SHOWN IN THIS REVISION SHALL BE INDICATED IN FURTHER REVISION OF PLOT PLAN AS PER RESPECTIVE FACILITY REQUIREMENTS.
11. REFER PLOT PLAN DRAWING (PE-DG-410-100-M001)FOR IDENTIFICATION NUMBER 1~86.
12. CONTINUATION OF THE POWER DUCT IS ON THE EXISTING PIPE RACK AND SAME IS TO BE REFFRED IN BHEL DWG NO : PE-DG-439-100-E008 .
13. THE HOLD ON THE REFERENCE LEVELS SHALL BE UPDATED AFTER THE RECEIPT OF SURVEY REPORT.
14. THE ACCESS WAY BETWEEN THE FGD CONTROL ROOM AND THE RC PUMP HOUSE SHALL BE A PAVED AREA.
15. THE EXISTING PARTIAL DRAIN BETWEEN NEAR CHIMNEY AREA SHALL BE RE-ROUTED TO OUTSIDE THE FGD PLOT AREA.

REFERENCE DWG. :–

⚠1. PLOT PLAN – PE-DG-439-100-M001
2. CONTROL ROOM LAYOUT PLAN – PE-DG-439-100-E008
⚠3. YARD PIPING AND TRESTLE LAYOUT FOR FGD PLANT – PE-DG-439-181-M004

REV.	DATE	ALTD	CHD & APPD	REMARKS
05	03.02.2022	RAM	UDAY KUMAR V	REVISED TO ACCOMMODATE THE 220 KV HT LINES.
04	17.06.2021	RAM	UDAY KUMAR V	NO ALTERATION.
03	05.06.2021	RAM	UDAY KUMAR V	REVISED AS PER CUSTOMER COMMENTS.
02	13.05.2021	RAM	UDAY KUMAR V	REVISED AS PER LATEST IMPUTS.
01	15.04.2021	RAM	V.U.K	Revised as per latest inputs and customer comments
0.0				

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA, INDIA
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
PROJECT ENGINEERING & SYSTEM DIVISION
Maharatna Company

	DEPT.	NAME	SIGN	DATE
DSN	RA		–Sd–	13.01.2017
DES	GSF		–Sd–	13.01.2017
CHD	RKA		–Sd–	13.01.2017
APPD	JJ		–Sd–	13.01.2017

TITLE: FGD PLOT PLAN

SCALE: 1:575

DRAWING NO. PY-LQ-0-M112-1252-01

SHEET 1 OF 1 REV. 05

SIZE-A0