# VOLUME – IA
# Part I & II

# TECHNICAL CONDITIONS OF CONTRACT (TCC)

**BHARAT HEAVY ELECTRICALS LIMITED**

# CONTENTS

# VOLUME - IA PART – I CHAPTER – I
# PROJECT INFORMATION

KOTHAGUDEM TPS UNIT 12 [1 x 800 MW] is being set up by TELANGANA STATE GENERATION CORPORATION at a site in Paloncha Village near Kothagudem district, Telangana, India. The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given here in under is for general guidance and shall not be contractually binding on BHEL/Owner. All relevant site data /information as may be necessary shall have to be obtained /collected by the Bidder.

| | | |
|---|---|---|
| 1 | Name of the Project | KOTHAGUDEM THERMAL POWER STATION STAGE-VII, UNIT#12 |
| 2 | Station Capacity | 1X800 MW (Coal Based) |
| 3 | Owner | Telangana State Power Generation Corporation Limited ( TSGENCO ) |
| 4 | Site Location | The mentioned plant has been installed adjacent to the existing D colony of Kothagudem thermal power station at Kothagudem. |
| 5 | Latitude | 17° 37' N |
| 6 | Longitude | 80° 42' E |
| 7 | Nearest Town | Kothagudem |
| 8 | Nearest Railway Station | Bhadrachalam Road (Known as Kothagudem) |
| 9 | Nearest Airport | 180 Kms (Vijayawada) |
| 10 | Site Conditions | |
| A | Daily Minimum (Average) | 12.9 Deg C |
| B | Daily Maximum (Average) | 44.9 Deg C |
| C | Design Ambient Temperature | 50 Deg C |
| D | Ambient Temperature (for Efficiency Guarantee) | 38 Deg C |
| E | Relative Humidity for design / efficiency | 35-82% |
| F | Plant Elevation above MSL | 89 m above MSL |
| G | Mean Wind Speed | 5.8 km/h |
| H | Wind Pressure | As per the latest revision of IS 875/1987 |
| I | Earthquake Zone | Zone-III as per IS- 1893 (Part-IV) |

# VOLUME- IA PART – I CHAPTER – II
# SCOPE OF WORKS

PACKAGE: FLUE GAS DESULPHURISATION SYSTEM (FGD) AT UNIT-12,1X 800 MW, KOTHAGUDEM TPS

THE SCOPE OF THE WORK WILL COMPRISE OF BUT NOT LIMITED TO THE FOLLOWING:
(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

The Work to be carried out under the scope of these specifications is broadly as under: -

(A) Material Handling, verification, stacking, re-shifting of materials, Tracking location of materials along with associated documentation in the computerized MM / SCMS package with BHEL and manual registers & preservation of materials / components of Flue Gas Desulphurization System (FGD), components of Steel Supplies like TMT Bars, Plate materials / structural steel / reinforcement steel / Tools and Plants, BHEL office furniture, miscellaneous items, etc.,

(B) Erection, testing, commissioning, trial run and handing over of the FGD system (Mechanical) as per the tender specifications. This FGD system consists of mainly E & C of Ducts (Tap off from Existing Flue gas duct, Duct from Absorber to Chimney inlet & Duct inside chimney till flue can connection), Absorber tower along with oxidation blowers, Gas-Gas Heater (GGH), Booster fans, Lime stone grinding and slurry preparation system consist of Wet ball mills, Lime stone silos, Slurry pumps, Gypsum dewatering system, Various Tanks and associated piping and also other auxiliaries i.e. Fire protection system, Equipment cooling water system (ACW and ECW pumps), fabrication and erection of Tanks of various sizes, removal& application of insulation, etc.& Painting of the FGD equipment at Kothagudem FGD 1X 800 MW.

(C) Erection, alignment, welding, supply and application of painting of the prefabricated structural works at TP -9 at 1x800MW TPS, Kothagudem which include transportation of the fabricated structures from the fabrication yard to the site of erection. The detailed BOQ of prefabricated structures is indicated in the Chapter-IX. The quantity is indicative, however the contractor has to complete the balance works in TP-9 in all respect as per the drawings/BHEL Engineer Instruction and handover, within the quoted rates.

(D) Attending the faults, rectification, breakdown / planned maintenance for 11KV construction power supply by deploying one C-Grade Licensed Supervisor along with qualified electricians round the clock.

The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the complete work of receipt, unloading and handling of materials from Trucks/ Trailers etc. to project stores sheds / storage yards, loading and transporting from Stores/storage yards to site of erection or pre-assembly yard, fabrication and erection of Tanks of various sizes etc. and unloading at fabrication yard, pre-assembly area/erection site, checking, cleaning, chipping and leveling of foundations, providing packers and shims/pre-assembling of equipment at the pre-assembly yard, inspection, minor rectification, preservation, erection, leveling, and other adjustments, cutting, edge / surface preparation, welding, grinding, radiography, LPI/ MPI/ UT testing wherever needed, heat treatment, carrying out Commissioning tests as specified by BHEL including inter connection of all the termination points, erection and dismantling of all temporary piping, valves, pumps, tanks etc., required for the above operations, all pre-commissioning tests and trial runs of the Absorber Tower and Associated Systems, GGH, & other Misc. items and supply and application of Painting of the FGD system wherever applicable as per the Tender Conditions of the Contract.

**1.2** Scope of Works with respect to Material Handling (A) is as follows: -

1.2.1. The number of storage yard may be one or more. All the yards shall be divided into many locations and shall be marked visibly (Grid marking).

1.2.2. Each location shall be identified by a display board which shall be visible from distant locations. All the materials and consumables required for this shall also be in the scope of the contractor. The contractor shall submit the yard layout with grid positions marked drawing to BHEL Engineer prior to commencement of first unloading.

1.2.3. It would be the responsibility of the contractor to keep in contact with the BHEL authorities at site to find out the arrival of the consignments. The lorry way bill/ truck way bill for the consignments would be handed over to the contractor immediately on receipt.

1.2.4. The contractor shall examine the packages, consignments etc., on arrival and bring to the notice of Transport authorities and BHEL authorities regarding loss/ damages, if any observed in the consignments proposed to be taken delivery of, before, taking delivery, particularly of consignment in ―smalls the weight of the packages and any discrepancies shall be reported immediately to BHEL/ Transport authorities. In case it becomes necessary to take open delivery from the authorities, contractor should make all arrangements for taking open deliveries. All expenses connected there with shall be to the account of the contractor. Any loss that occurs to BHEL on account this will be recovered from his progress bills.

1.2.5. Deployment of Manpower for day to day working at stores and updating of the data in SMCS or any system deemed fit and followed at site for maintaining the records of the materials.

Details of manpower to be deployed: -

a) Computer Operator- 1 nos
b) Clerical Staff- 1 nos
c) Supervisor- 1 nos
d) Helper- 1 nos

1.2.6. Contractor shall examine all the shipment and notify BHEL Engineer immediately for the purpose of engineer's information. The contractor shall submit a report every week detailing in this regard.

1.2.7. In case of apparent damages / shortage to consignment / packing noticed by the contractor such cases shall be brought to the notice of BHEL and cleared only with BHEL's knowledge / approval.

1.2.8. Any discrepancy / shortage / damage found in the consignment after taking delivery from the carriers after giving clear receipt would be the responsibility of the contractor and the amount liable to be lost by BHEL on such amount is recoverable from the contractor.

1.2.9. Also, reporting the incidents of thefts if any to police and supporting BHEL to get the documents like FIR required to raise Insurance Claim, if the theft happens while the material is in BHEL Stores/ Storage Yard.

1.2.10. The contractor is required to find out from concerned authorities, regarding arrival of consignment prior to the receipt of consignment note, if any, and take delivery of the same on "Indemnity Bond". Indemnity Bonds would be executed by BHEL, when intimation regarding arrival of consignment is furnished by the contractor.

1.2.11. Detailed verification of materials with reference to packing list / Loading advise slip / etc., after unpacking of boxes & crates; repacking where called for, after detailed verification; preparation of receipt inspection reports etc. shall be carried out within the quoted rate within 30 days of the unloading. If the verification is not carried out within 30 days for reasons attributable to the contractor, then BHEL is having right to carry out the verification at the risk and cost of the contractor.

1.2.12. Consignment coming on Sundays and Holidays are also required to be handled by the contractor on the same day. Since the offices and go downs will probably remain closed on these days, it will be the responsibility of the contractor to contact the Site Engineer /his authorized representative at BHEL at their residence and obtain instructions.

1.2.13. Since the consignment are expected to arrive during any time of the day or night contractor shall have his workmen round-the-clock at site as well as other places as required to unload the materials. Contractor's quoted rate shall include all such contingencies.

1.2.14. Unloading of materials / components at the storage yard, using contractor's own Lorries, Trailers and other equipment with valid road permits for their operation, unloading and

stacking handling at storage yard for verification shall be the responsibility of the contractor under this contract.

1.2.15. Unloading from Transport equipment's, transportation, unloading at storage area / work site of heavy sophisticated equipment like heavy motors, modules, heavy bearings, fans, Transformers, Electricals Panels, components of FGD, etc., shall be done in the presence of and as per the direction of BHEL representative including stacking and restacking if necessary.

1.2.16. All the materials shall be stored at minimum of 6'' height above the ground level by the use of concrete or wooden sleepers or wooden logs. No material shall be allowed to remain on ground at any time. Materials shall not be stacked in low lying areas, where it is likely to get flooded during rain.

FOR STACKING THE MATERIALS ABOVE THE GROUND LEVEL, WOODEN / CONCRETE SLEEPERS, WOODEN LOGS, CONCRETE BLOCKS AND FIRE RESISTANT COVERING MATERIAL (TARPAULINS) ETC, WHEREVER DEEMED NECESSARY, WILL BE ARRANGED BY BHEL FREE OF COST AS DECIDED BY BHEL ENGINEER. However, for unloading the materials, wooden sleepers shall be provided by the contractor.

1.2.17. Stacking of the materials shall be done as per the instructions and to the satisfaction of BHEL Engineers. The materials shall be stacked so that it should facilitate easy handling during erection and also enable traceability and "ready to lift" position in the stacked area for civil / mechanical / electrical/ other contractors. In case any negligence or improper stacking is noticed, it shall be the responsibility of the contractor to re-stack at his cost. Failure to do so may force BHEL to get the job done through other agencies and recover the same from the contractor.

1.2.18. Under the scope of this contract, it shall be the responsibility of the contractor to provide facilities to open the package in the presence of BHEL Engineers verifying the same, repacking wherever and whenever necessary properly stacking them as may be directed by BHEL so as to facilitate proper handling and verification.

1.2.19. The contractor shall execute the work in the most substantial and workmen like manner. The stores shall be handled with care and diligence. Any loss to BHEL due to contractor's lapse shall have to be made good by the contractor.

1.2.20. General cleaning, grass cutting and upkeep of storage yard, stores area shall be carried our within the quoted rates for unloading, verification, identification and storage. The grass cutting shall be done once in 3 months on an average.

1.2.21. As per instruction of BHEL Engineer, on receipt of "Stores Issue Voucher" the contractor shall locate, identify the material and shall keep it in ready to lift position immediately

1.2.22. The contractor, with his manpower shall update and maintain the documents and records of BHEL 's Material Management department as per the instruction of the BHEL

engineer. Entering the data in the BHEL computer as per the instruction of the BHEL engineer is also in the scope of the contractor.

1.2.23. Handling and loading of outgoing materials those are to be sent to other destinations shall be carried out by the contractor. Similarly, in case of any requirement, the shifting of the stacked materials to a new location also shall be carried out by the contractor. "Loading of outgoing materials (or) Shifting of the stacked materials" shall be paid to the contractor at the item rate quoted for handling.

1.2.24. In case of delay in unloading / fail to unload the equipment immediately, BHEL reserve the right to unload the equipment's / components through other agencies at the risk and cost of the contractor.

1.2.25. The owner / employer or his authorized agents may inspect stores, storage yard, etc. during the currency of the contract awarded to him. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / employer without any extra cost to the owner / employer. No cost whatsoever such duplication of inspection of work be entertained.

1.2.26. The contractor will arrange for gate passes and any other permits required for carrying out his work from the respective agencies at his own cost. He will also comply with regulations of the customer within the project area, any of the State Government and other Government agencies.

1.2.27. Materials shall be stacked neatly, preserved and stored in the stores in an orderly manner.

1.2.28. From the area / delivery points of all materials / components pertaining to generating units, auxiliaries, piping, miscellaneous plants and equipments, panels, cables and other electrical equipments, oil drums, tools, plants or any other items and equipments meant for erection, commissioning, and office equipment / furniture and miscellaneous items, contractor to use his own cranes, tractor / trailers, trucks, lorries, slings, jacks, lifting tackles and any other equipments for this job. Handling of equipments for verification of components including opening of cases / crates / boxes and repacking / stacking after verification shall also be the responsibility of the contractor.

1.2.29. Compliance with statutory obligations as well as any other requirements / provisions with respect to contractor 's manpower, equipment including insurance, medical facilities, minimum wages, safety requirements, accommodations etc., to be the responsibility of the contractor.

1.2.30. The contractor shall provide the necessary resources like trained PC operators, clerical / secretarial staff / helpers for maintaining the Computerized Material Management Package provided by BHEL and carry out all operations of maintenance of documentation (soft as well as hard copies) including housekeeping for the works covered under this tender. The computer terminals for this purpose will be provided by

BHEL. 1no. computer with latest configuration may be provided by the Contractor for stores data entry.

1.2.31. For material preservation at BHEL Storage Yard before issue for erection, all the preservative consumables like paint, grease etc. contractor has to arrange for application of preservatives with their own T&P, consumables like brush, emery sheet, manpower etc. including paint within the quoted rates

**1.2.32. RESHIFTING AND RESTACKING OF MATERIALS / COMPONENTS:**

1.2.32.1. Resifting and restacking of the materials / components shall be carried out by the contractor as per the instruction of BHEL engineer without any delay.

1.2.32.2. In case it is necessary to shift and re-stack the materials kept at work area/ site to enable other agencies to carry out their work, same shall be done by the contractor and shall be considered as Re shifting and restacking of materials / components.

**1.2.33. ONLINE SITE CONSTRUCTION MANAGEMENT SYSTEM (SCMS):**

If applicable for the project, Contractor has to update the BHEL's online material management system, reporting of daily progress, billing and other similar activities, within the quoted rate.

**1.2.34. EXCLUSIONS:**

1.2.34.1. Unloading of materials received through rail in RAKES.

1.2.34.2. Supply of preservation materials like paints, grease etc.

Note: FOR FURTHER DETAILED SCOPE OF WORKS, REFER RELEVANT CHAPTERS IN THIS BOOK

**1.3 Scope of Works with respect to FGD Erection and Commissioning (B) is as follows: -**

The scope of work under these specifications for Erection, testing, commissioning, trial Operation, and fabrication and erection of Tanks of various sizes, etc., Painting & handing over of FGD system(Mechanical) and Other Related Mechanical Auxiliaries for 1X800 MW Kothagudem TPS FGD. Scope of work broadly consists of but not limited to following:

1.3.1 Handling of materials at BHEL/Client stores/storage yard and transportation to site of erection, Testing & Assistance for commissioning and Trial Operation including supply and application of final painting of FGD system (Mechanical), Fire protection and ECW system etc.

1.3.2 Tapping off Duct from existing Flue Gas Duct up to Booster Fan Inlet Gate with related supports for one unit and erection of Flue Gas by pass Damper.

**Scope Involves Following: -**

1.3.2.1. Making Suitable scaffolding arrangements to reach out at the duct location for Safely removal of insulation, cutting and removal of duct portion.

1.3.2.2. Removal of Insulation (Cladding sheet & Insulation wool) at different locations for the Unit to facilitate for cutting & removal of existing duct for erection of bypass damper & tap off ducts.

1.3.2.3. Cutting and removal of portion of existing duct.

1.3.2.4. Pre-Assembly of steel bed for assembly of bypass damper different modules as per the drawing.

1.3.2.5. Erection, alignment, welding and NDT of Duct/damper, supporting structure of the damper along with approach platforms as per the drawings are included in the scope of the works.

1.3.2.6. Any additional works if required to be done for the erection of the By-pass dampers shall be done by vendor, no additional payments shall be made for the same.

1.3.3 The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the checking, cleaning chipping and leveling of foundations, providing packers and shims/pre-assembling of equipment at the preassembly yard, inspection, minor rectification, preservation, erection, leveling, and other adjustments, cutting, edge / surface preparation, welding, grinding, radiography, LPI/ MPI/ UT testing wherever needed, heat treatment, carrying out air tightness test by soap solution / kerosene, hydraulic test, including supply and application of final painting.

1.3.4 The quantities indicated in the tender specification are approximate and are liable for variation and alteration at the discretion of BHEL. The quoted unit rate shall be applicable for any additional product group also, if included at a later date integral to the main scope of work / package envisaged. The work executed shall be measured and priced as per the unit rate arrived at for each work area as mentioned in the relevant clauses.

1.3.5 The PG wise breakup of FGD and Auxiliaries etc. are indicated in the relevant chapters of this tender specification, but the contractor is required to erect actual tonnage which may be necessary to complete the work in all respects as detailed in the tender

specifications, for which payments shall be released on finally settled rates. The weights and dimensions of material shown are approximate and are liable to vary. No increase in quoted / accepted rates / prices shall be allowed due to change in weights and dimensions of the equipment / materials.

1.3.6 The weights given in the Chapter-IX are approximate and these are subject to change as per site conditions.

1.3.7 During the course of execution of work, certain rework / modification / rectification /repairs / fabrication etc. will be necessary on account of feedback from various relevant sources, and also on account of design discrepancies/ alterations, manufacturing defects, site operations/ maintenance requirements. Contractor shall carry out such rework / modification / rectification / fabrication / repairs etc. promptly and expeditiously. Daily log sheets indicating the details of work carried out, man-hours etc. shall be maintained by the contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per conditions of contract and payments will be released as per the agreed rates.

1.3.8 Supervisors/ Engineers, consumables etc., required for the scope of work shall be provided by the contractor. All the expenditure including taxes and incidentals in this connection will have to be borne by him unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies.

1.3.9 It shall be specially noted that the contractor's labour and staff may have to work round the clock to meet the completion schedules / plans, which may involve payment of considerable overtime. The contractor's quoted rates should be inclusive of all such contingencies.

1.3.10 The terminal points can be inferred from the relevant drawings and any further clarifications can be obtained / decided by BHEL and that is final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals. Carrying out work as per the specification between equipments constituting terminal points, whether the terminal equipments fall within the scope of work/specification, contractor shall carry out the terminal joints at either end. Also where the piping connection to the terminal points involve flanged joints, matching of flanges, fixing gaskets, bolting and tightening as per BHEL Engineers instruction is in the scope of work. In case piping connected to equipment, matching of flanges for achieving the parallelism and alignment at the equipment end, by suitably resorting to heat correction or other method as instructed by BHEL Engineer, with in the quoted rate.

1.3.11 The work shall conform to dimensions and tolerances given in various drawings and quality manuals provided by BHEL. If any portion of work is found to be defective in workmanship not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost, failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be effected from contractor's bill towards expenditure incurred including BHEL's overhead charges.

1.3.12 The work covered under this specification is of highly sophisticated nature requiring the best quality of workmanship, engineering and construction management. The contractor should ensure timely completion of the work. The contractor must have the adequate quantity of tools, construction aids, equipments, etc., in this possession. He must also on his rolls adequate trained, qualified and experienced supervisory staff and skilled personnel.

1.3.13 Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. The erection manuals or guidelines for FGD system, which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any failure to comply with the above might lead to rework and the cost for the same shall be borne by the contractor only. BHEL engineer, depending upon the availability of materials, fronts etc. will decide the sequence of erection and methodology. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs or for any reason whatsoever.

1.3.14 Contractor has to work in close co-ordination with other erection agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less/more at a particular given time. Activities and erection program have to be planned in such a way that the milestone events are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.

1.3.15 No member of the already erected structure/ platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer.

1.3.16 The storage yard can be located within the plant boundary or outside the plant boundary as per the space allocated by Customer. All materials have to be transported from storage yard to construction area by the contractor at his own cost.

1.3.17 Contractor should visit site and acquire full knowledge and information about site conditions. The bidder must visit site, to acquaint themselves with the conditions

prevailing at site and in and around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.

The FGD system shall be based on Wet Limestone Forced Oxidation process and unit shall be provided with an independent absorber. The scope of works is detailed below.

1.3.18 Gas from terminal point on ID fan discharge duct shall be taken directly to the absorber through Booster Fans. In the absorber, SO2 in flue gas shall be removed by a spray of recirculating slurry, pumped by slurry recirculation pumps.

1.3.19 Compressed oxidation air shall be blown through the slurry in the oxidation tank, to oxidize the Calcium Sulphite to gypsum.

1.3.20 Clean gas from the absorber shall be taken to the Wet Chimney through three stage mist eliminators.

1.3.21 Limestone to the absorbers of the units shall be supplied by a wet limestone grinding system, common for the units. Limestone shall be fed to the Limestone day silos which in turn will feed the Limestone to wet ball mill through a gravimetric feeder.

1.3.22 The gypsum from the absorber(s) shall be pumped by dedicated gypsum bleed pumps to a common Gypsum Dewatering system consisting of two streams (2x100%) of primary and secondary hydro cyclone and vacuum belt filters for gypsum dewatering. The water removed from the absorber shall be recycled to the absorbers. The waste water from the system shall be collected and neutralized using lime and neutralized effluent shall be pumped at required pressure to waste water terminal point.

1.3.23 The brief list of the major equipment to be erected under the FGD system but not limited to following:

A. Absorber System along with supporting structures

B. Booster Fans & isolation gates

C. Tanks of various sizes

D. Lime stone grinding and slurry preparation system consist of lime stone silos, bunker, gravimetric feeder, wet ball mills, hydro cyclones

E. Slurry pumps (Absorber Slurry recirculation pumps, Gypsum Bleed pumps, limestone Slurry feed pumps)

F. Gypsum Dewatering system consists of Vacuum belt filter, hydro cyclones

G. Process water and cooling water storage system

H. Thermal Insulation and cladding sheets

I. Sump Pumps

J. Piping system

K. Equipment Cooling Water System (PHEs, DMCW pumps)

L. Miscellaneous platforms, galleries, handrails

M. Fire Protection System including hydrant, MVWS, HVWS

N. Equipment Handling System

O. Ducting System including Gates & Dampers

Tentative weight to be erected for the FGD System shall be 6655 MT

1.3.24 FLUE GAS & ABSORPTION SYSTEM-

Flue Gas from the Boiler is tapped off at the ID Fan outlet common discharge duct to Chimney. The total gas pressure loss in the FGD plant is compensated by Booster Fans. Bypass Damper is provided to permit isolation of FGD plant or flexible operation of Boiler and FGD plant.

1.3.25 BOOSTER FAN

The FGD Booster Fan shall be single stage axial reaction type with Actuator with linkage for blade pitch control. The Fan shall be provided with Rotor assembly, Static parts, Anti-friction Bearings, Pedestal for fan bearings, coupling between Fans & Motor and Forced oil lubricating system.

1.3.25.1. There will be 2 numbers of Booster Fan for FGD system along with drive Motor and relevant accessories.

1.3.25.2. The duct from Booster Fan outlet upto GGH inlet shall be of carbon steel.

1.3.25.3. The duct from GGH outlet to Absorber inlet shall be of Carbon steel with adequate thickness of The Glass Flake Lining.

1.3.25.4. The duct from Absorber outlet to GGH inlet shall be of Carbon steel with adequate thickness of Glass Flake Lining.

1.3.25.5. The duct from GGH outlet to Common discharge duct to Chimney shall be Carbon steel with adequate thickness of Glass Flake Lining.

1.3.25.6. The application of the Glass Flake Lining is excluded from the scope of the Bidder, however the necessary assistance for the application of the lining is included in scope.

1.3.25.7. Thermal insulation of lightly Resin Bonded rock wool of density 100 kg/m3 for duct work along with Aluminium Cladding materials.

### 1.3.26 GATES AND DAMPERS

The following Gates & Bi-plane dampers along with applicable actuators as mentioned below will be provided for the boilers.

| SL No | Location | Type | Actuator | Qty |
|---|---|---|---|---|
| 1.0 | FGD Inlet Gate | Guillotine | Electrical | 2 |
| 2.0 | Booster Fan Outlet Gate | Guillotine | Electrical | 2 |
| 3.0 | FGD bypass Damper | Biplane Damper | Pneumatic | 2 |
| 4.0 | FGD Outlet Gate | Guillotine | Electrical | 2 |

### 1.3.27 GAS-GAS GEATER (GGH)

1.3.27.1 One number of Rotary Regenerative type GGH will be provided along with associated accessories.

1.3.27.2 GGH shall be designed so that the flue gas temperature at GGH outlet to stack shall be > 85 deg C under guarantee point condition.

1.3.27.3 The GGH components shall be made up of corrosion resistant materials to withstand the acidic atmosphere encountered in FGD operation.

1.3.27.4 The treated flue gas from absorber enters the gas-gas heater to be reheated.

1.3.27.5 In GGH, there is an intrinsically pattern to form a sealing mechanism so that the untreated gas leakage to the treated gas side can be minimized.

1.3.27.6 Untreated gas is leaked into the treated gas side due to space contained by a rotor sector and two sector plates at the rotor turning.

1.3.27.7 To reduce fly ash and gas leakage of GGH, a scavenging Fan is installed.

1.3.27.8 Soot Blowing system is installed to wash fly ash on the heating elements. The heating elements are washed by steam periodically. Further to soot blowing system by steam, a GGH high pressure washing system and GGH low pressure washing system are installed.

1.3.27.9 The GGH high pressure washing system starts automatically if GGH differential pressure
High-High is initiated. The low pressure washing is conducted during FGD plant is out of service if necessary.

1.3.27.10 The inside of the GGH is to be protected by a Glass Flake Lining Material. The application of the Glass Flake Lining is excluded from the scope of the Bidder, however the necessary assistance for the application of the lining is included in scope.

1.3.27.11 No hot work is permitted inside the Absorber Area including GGH and other auxiliaries after the completion of the Glass Flake Lining. Vendor must ensure that all the works are completed inside the absorber before releasing the same for the lining.

**1.3.28 ABSORBER**

1.3.28.1 One number of Absorber system complete with internals Spray Pipes, Spray Nozzles, Jet Air Sparger (JAS), Agitator and Mist eliminator will be provided.

1.3.28.2 The Absorber tower and oxidation Tank shall be made up of carbon steel with adequate thickness of Glass Flake lining to take care of corrosion.

1.3.28.3 The Glass Flake Lining of the Absorber is excluded from the scope of vendor, however the assistance for the lining shall be provided by vendor within the rates quoted.

1.3.28.4 No hot works are allowed inside the Absorber once the absorber is released for application of the Glass Flake Lining.

1.3.28.5 The Absorber wet-dry interface shall be made of Carbon steel material lined with alloy C 276.

1.3.28.6 There will be one level of slurry spray system designed to achieve a desired L/G ratio required to meet the guaranteed removal efficiency.

1.3.28.7 Absorber Recirculation Pumps (4 working +1 standby) to spray slurry inside the absorber and absorb SO2.

1.3.28.8 The Absorber Recirculation Tank will be provided with two (2) numbers of side mounted Agitators for keeping the slurry under suspension during shut down and maintenance.

1.3.28.9 Oxidation Air Blowers (2 working + 1 standby) for absorber will be provided for oxidation of Calcium sulphite to Calcium sulphate.

1.3.28.10 One number of Passengers cum Goods Elevator of capacity 1000 kgs shall be provided with adequate landings for absorber. The erection and commissioning of the Elevator is in Elevator Vendor Scope. Lift Structure and other supporting structure is included in the scope of this contract.

1.3.28.11 In case of abnormal situations due to electrical blackout, failure of absorber recirculation pumps etc. the absorber internals will be protected by emergency cooling system. One emergency cooling tank will be provided to meet the emergency requirement. Erection of the same is included in the scope of vendor. Required TnP required for the same are to be arranged by vendor.

1.3.28.12 A two Stage Mist Eliminator is located between the absorber and Stack. A washing Spray System is installed to intermittently wash down the mist eliminator element surfaces and there by prevent any deposit build-up on them.

1.3.28.13 Complete ducting System from ID fan outlet duct to absorber tower and duct from absorber outlet to chimney.

a) The Duct from FGD Tapping Point at by pass duct (ID Fan Common Discharge duct to Chimney) up to Booster Fan Inlet shall be of Carbon Steel of 6 mm thickness.
b) The Duct from Booster Fan outlet to GGH inlet shall be 6 mm think Carbon Steel.
c) The Duct from GGH outlet to Absorber inlet shall be of 7 mm thick Carbon steel with 1.20 mm thickness of Glass Flake lining.
d) The Duct from Absorber outlet to GGH inlet shall be of 6 mm thick Carbon steel with 1.20 mm thickness of Glass Flake lining.
e) The Duct from GGH outlet to bypass duct shall be of 6 mm thick Carbon steel with 1.2 mm thickness of Glass Flake lining.
f) Thermal insulation of Lightly resin bonded rock wool of density 100 kg/m3 for duct work along with aluminium cladding material.

1.3.28.14 Installation, erection and commissioning of the 3 nos of Electric Hoist including receipt at site, installation of Supporting and Main Structure of the Hoist, Erection and Commissioning of the Hoists at the locations identified in the drawing.

## 1.3.29 LIMESTONE GRINDING SYSTEM

1.3.29.1. Ball Mill System

1.3.29.1.1 Limestone of <250mm size is stored in Unloading hoppers and crushed in Limestone handling area. Crushed Limestone of size (<20mm) is conveyed to the inlet of Limestone storage day silo.

1.3.29.1.2 There will be 2 numbers (2x100 %) of Limestone storage day silo for storage capacity of 8 hours Limestone stone requirement. Fabrication and erection of the 2 nos of Limestone Storage Silos complete with Supporting Steel structure, platforms, Staircase, air canons, power operated gates, gravimeter feeders etc. The Limestone storage day silo is made up of carbon steel of adequate thickness and the hopper cones will be provided with 4 mm of SS lining.

1.3.29.1.3 One number of Gravimetric feeders will be provided under each hopper.

1.3.29.1.4 One number of Bunker outlet chute with motorized shut off gate will be provided for feeding Limestone to the feeder.

1.3.29.1.5 Two (2) numbers (2x100 %) Wet Ball Mill System along with complete accessories will be provided for grinding of Limestone.

1.3.29.1.6 Each Ball Mill shall be designed to meet maximum limestone requirement at Design point- BMCR Indian coal. Each mill shall be fed from an independent Limestone Bunker. Each mill shall be complete with the following items, as some minimum requirements: -

a) A Bunker Outlet gate.
b) A gravimetric limestone feeder along with its drive and all other auxiliaries
c) One no. separator tank with agitator(s).
d) 2x100% Mill circuit pump.
e) One set of hydro-cyclone
f) A peripheral/central drive system with motor, speed reduced gearbox and other auxiliaries.
g) Complete lubricating system
h) Lube oil pumps, coolers, duplex oil filters, connecting piping

i) All connecting pipes/chutes along with necessary valve between various systems of the mills.
j) Limestone Grinding System.

### 1.3.30 LIMESTONE SLURRY STORAGE SYSTEM

1.3.30.1 One (1) number of Limestone Slurry tank each designed for a storage capacity of 8 hours' continuous limestone requirement.

1.3.30.2 The slurry tank shall be made up of carbon steel of adequate thickness of glass flake lining.

1.3.30.3 The Slurry Tank will be provided with one number of centre mounted Agitator.

1.3.30.4 Two (2) numbers of Limestone slurry pumps (1 working + 1 standby) will be provided.

### 1.3.31 GYPSUM DEWATERING SYSTEM

1.3.31.1 There will be two stages of Gypsum dewatering system consisting primary stage of sets of hydro-cyclones and secondary stage of vacuum belt filters for dewatering of Gypsum.

1.3.31.2 2x100% Primary hydro cyclone consisting of Hydro Cyclone Clusters along with Anchor Bolts, Nuts and washers, flanges, accessory piping with skid will be provided. The underflow of Primary hydro cyclone is sent to vacuum belt filter. The hydro cyclone shall be made up of carbon steel with adequate rubber lining/lining material. The clusters of the Hydro cyclone will be made up of polyurethane.

1.3.31.3 The overflow of primary hydro cyclones will be fed to one number of Secondary Hydro cyclone feed tank.

1.3.31.4 There will be 2 numbers of vacuum Belt Filters (2x100 %) complete with Accessories including discharge chute, Drivers (VFD and LCP) and driving motors (IE3) with inverter panel, cloth spray nozzles, rubber belt etc. for Gypsum dewatering. Each vacuum belt filter shall be designed to meet maximum gypsum produced at Design point- BMCR Indian coal.

1.3.31.5 2x100% Secondary Hydro cyclone consisting of Hydro Cyclone Clusters along with Anchor Bolts, Nuts and washers, flanges, accessory piping with skid will feed the slurry

from Secondary hydro cyclone feed tank to secondary hydro cyclones. The underflow is fed to the filtrate water tank. The overflow is fed to the waste water tank.

1.3.31.6 2 nos of Vent fan including enclosure and its arrangement and 2 nos of Vacuum receivers with anchor bolts, nuts and washer are included in the scope.

1.3.31.7 1 nos of Belt Filter Washing vertical tank of Size 3X3.5 (Dia X H) is supplied for the Gypsum Dewatering System.

1.3.31.8 2 nos of Belt Filter Washing Pump with motor which is used for the cake wash and sealing of the vacuum pump is included in the scope of vendor.

1.3.31.9 All interconnecting piping (slurry, air and water pipes) which includes the requisite pipe support materials, fittings, gasket, flange materials, bolting along with valves for the entire Gypsum Dewatering System and the expansion Joints at the suction and discharge of each pump is included in the scope of vendor.

1.3.31.10 Neutralization tank is provided to control pH of waste water slurry before discharging to ash pond.

1.3.31.11 The Gypsum cake from the belt filter will be discharged from the first floor to Gypsum storage shed at Ground floor in Gypsum Dewatering building. Customer to stock gypsum in Gypsum storage shed using front end loaders. Gypsum storage shed of 3 days storage capacity will be provided.

1.3.31.12 The agency shall receive the material at site as per identified scope of supply, which includes unloading at site and storing and preserving it till the time it is handed over to customer.

1.3.31.13 Calibration of skid supplied instrumentation (PSVs, Gauges, and Transmitters etc.) is in the scope of Erection Agency.

1.3.31.14 Erection Agency has to ensure that proper storage and preservation requirements shall be followed as per OEM Recommendations & O&M Manuals of respective equipment, the project bid specifications and standard design practices.

1.3.31.15 Erection consumables such as welding electrodes, fillers etc. shall be in scope of Erection Agency.

1.3.31.16 Quantity of painting & Coating material for equipment / systems above shall be in the scope of Erection Agency as per project requirements. Quantity of wrapping & coating material for above equipment / systems are minimal in quantity and hence Erection Agency to take-up the supply of same accordingly.

1.3.31.17 E&C of Above GDW package shall be in Erection Agency Scope. This includes Storage, In-plant transportation, fabrication, erection, testing (as applicable), painting, commissioning, Handing Over is by Erection Agency.

1.3.31.18 The complete GDW Package shall be supplied either in Semi Knocked Down/Completely Knocked down condition. Assembling them as per the instruction shall be done by the erection vendor as per the applicable drawings and as per the instructions of the BHEL engineer.

### 1.3.32 TANKS

1.3.32.1 The Following tanks (Slurry and Water) Fabrication, Erection, Commissioning and Final Hand over to end customer are included in the scope of the bidder.

| Sl No | Slurry Tanks (Mild Steel Tanks, Internally Lined with Protective Layer) | Dimensions (Each) Dia X Height in meters | Quantity | Weight (Each Tank) MT |
|---|---|---|---|---|
| 1 | Auxiliary Absorbent Tank | 13.6 x 13.6 | 1 | 75 |
| 2 | Lime Stone Slurry Storage Tank | 11.2 x 11.2 | 2 | 75 |
| 3 | Secondary Hydro Cyclone Feed Storage Tank | 4.2 x 5.4 | 1 | 18 |
| 4 | Waste Water Tank | 5.8 x 7 | 1 | 32 |

| Sl No | Water Storage Tanks | Dimensions (Each) Dia X Height in meters | Quantity | Weight (Each Tank) MT |
|---|---|---|---|---|
| 1 | Process Water Tank | 4.5 x 4.5 | 1 | 16 |

All the slurry tanks will be glass flake lined and drain sumps are made of RCC with epoxy painting.

1.3.32.2 Supply of Tank Materials (Plates, Structural, Name Plates, Nozzles, Flanges/Counter Flanges, Stud nuts, Foundation Bolts etc.) for all FGD Storage Tanks as listed above shall be by BHEL free of cost.

1.3.32.3 BHEL Will provide on the GA Drawings for the tanks, the fabrication drawings are to be submitted by vendor along with the cutting plan according to the plates supplied by BHEL. The allowable wastage shall be vetted by BHEL Engineer during the cutting plan approval. Scrap generated during the erection shall be returned back to BHEL.

1.3.32.4 Brief list of system / sub system to be erected by the contractor & approximate weight are given elsewhere in this booklet are meant for giving general idea to the tenderer. The plates are sent in parts for convenient transportation / layout requirements. They are to be cleaned, pre- assembled in stage, welded, erected and aligned as per the drawing dimensions / tolerance and instructions of BHEL engineers.

1.3.32.5 Receipt of materials / component to be erected by the contractor, loading and transportation from the storage yard to the project site, stacking, storage and preservation.

1.3.32.6 Fabrication and E&C of all the above storage tanks including Storage, In-Plant Transportation, Fabrication, erection, radiography testing as per IS Codes IS 803, Hydro Testing, Painting, Commissioning, Handing Over to end customer is included in the scope of bidder.

1.3.32.7 Painting including the Supply of Paint, and Application including Surface Preparation Internal and External as per the applicability of all the Storage Tanks. The Painting shall be done strictly as per the approved painting schedule/specifications as provided by BHEL/Customer.

1.3.32.8 The terminal points are given as per drawing /decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.

1.3.32.9 Surface preparation of all the tanks external and internal shall be carried out by the bidder.

1.3.32.10 Painting includes the external surface of all the slurry storage tanks and external and internal surfaces of process water storage tank.

1.3.32.11 Surface area of all the tanks is approx. 6,500 Sq Mts which is subjected to change to 15% on positive/negative side.

1.3.32.12 All the slurry pipes shall be of CSRL/ FRP material.

1.3.32.13 General scope of system covered under scope of work includes

a) Cutting, edge preparation, rolling, erection, full welding, punch points clearance & testing of fixed roof storage tanks.

b) Fabrication and erection of structural supports for all Tanks as per approved drawings.

c) Erection of Ready-made Gratings, Platforms & fabrication and erection of hand railing.

d) Fabrication and erection of SS/MS pipe nozzles arrangement to the tank.

e) Vacuum Box Test, Hydro testing, Pneumatic Testing etc. required for Tanks as per API-650/IS-803 to be carried out in accordance with the laid down procedure of tanks etc.

f) Tanks Radiography is in the scope of Contractor.

1.3.33 AGITATORS, DOSING SYSTEM and MATERIAL HANDLING Equipments

1.3.33.1 The erection, testing and commissioning of the Agitators for the Tanks is included in the scope of vendor. List of actuators are attached and are indicative only.

| SL No | Description | Quantity | Unit | Dimensions (each) L X B X H (M)/Dia | Weight (Each) Tons | Remarks |
|---|---|---|---|---|---|---|
| 1 | Auxiliary Absorbent Tank Agitator (1 nos Tank) | 3 Agitators in 1 tank | Nos | 2.0 m X 1.5 m (H) | 1.5 | 1) Horizontal Type<br>2) Each Agitator has a gear box and drive motor<br>3) 3 nos Agitator per tank |
| 2 | Limestone Slurry Storage Tank Agitator | 2 | Nos | 2.0 m X 10 m (H) | 5 | 1) Vertical Type<br>2) Each Agitator has a gear box |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | and drive motor |
| 3 | Secondary Hydro Cyclone Feed Tank Agitator | 1 | Nos | 4.0 m X 5.0 m (H) | 1.5 | 1) Vertical Type 2) Each Agitator has a gear box and drive motor. |
| 4 | FILTRATE Water Sump Agitator | 1 | Nos | 3.6 m X 4.0 m (H) | 1 | 1) Vertical Type 2) Each Agitator has a gear box and drive motor. |
| 5 | Waste Water Tank Agitator | 1 | Nos | 5.0 m X 6.0 m (H) | 1.5 | 1) Vertical Type 2) Each Agitator has a gear box and drive motor. |
| 6 | Absorber Area Drain Sump Agitator | 1 | Nos | 3.6 m X 4.0 m (H) | 1 | 1) Vertical Type 2) Each Agitator has a gear box and drive motor. |
| 7 | Gypsum Area Drain Sump Agitator | 1 | Nos | 3.6 m X 4.0 m (H) | 1 | 1) Vertical Type 2) Each Agitator has a gear box and drive motor. |
| 8 | Limestone Area Drain Sump Agitator | 1 | Nos | 3.6 m X 4.0 m (H) | 1 | 1) Vertical Type 2) Each Agitator has a gear box and drive motor. |
| 9 | Process water Tank Agitator | 1 | Nos | 4.5 x 4.5 | 1 | 1) Vertical Type 2) Each Agitator has a gear box and drive motor. |

1.3.33.2 Erection of Dosing System for Waste Water Neutralization is included in the scope of works of the vendor.

1.3.33.3 Following Material Handling Equipments are included in scope of works

| SL No | Description | Quantity | Unit | Dimensions (each) L X B X H (M)/Dia | Weight (Each) Tons | Operating Weight |
|---|---|---|---|---|---|---|
| 1 | Electric Hoist for Cake | 1 | Nos | 2X2X2 | 1.5 | 10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | and Cloth Washing Pump | | | | | |
| 2 | Electric Hoist for Vacuum Pump | 1 | Nos | 2X2X2 | 1.5 | 5 |
| 3 | Electric Hoist for Vacuum Belt Filter | 1 | Nos | 1.5X1.5X1.5 | 1 | 5 |
| 4 | Electric Hoist for Hydro Cyclone | 1 | Nos | 1.5X1.5X1.5 | 1 | 3 |
| 5 | Special Manual Hoist | 2 | Nos | 1X1X1 | 1 | 2 |

The material handling equipments are supplied in as a package, the fabrication, of the structure, erection of the hoists as per the approved drawing and commissioning is included in the scope of work.

1.3.33.4 Agency shall receive the material at site as per identified scope of supply, which includes unloading at site and storing and preserving it till the time it is handed over to customer.

1.3.33.5 Ensuring the proper storage and preservation requirements shall be followed as per OEM recommendations and O&M Manuals of respective equipment, the project specifications and standard design practices.

1.3.33.6 Supply of paint and paint of the structure including the touch up of the equipment is in the scope of the vendor.

1.3.33.7 Supply of consumables: 1 to 2 liters of IS VG 46 grade oil is required as lubricant for gear box of agitator assembly of one tank. Total there are 9 to 10 nos of agitators applicable, accordingly 25 liters of oil shall be considered for the agency for supply.

## 1.4 Scope of work with respect to execution of the prefabricated structural works at TP -9 at 1x800MW TPS, Kothagudem

1.4.1 Handling of the materials at fabrication yard, transportation to site of erection, erection, alignment, welding, supply and application of painting of the prefabricated structural works at TP -9 at 1x800MW TPS, Kothagudem.

1.4.2 The detailed BOQ of prefabricated structures is indicated in the Chapter-IX. The quantity is indicative, however the contractor has to complete the balance works in TP-9 in all respect as per the drawings/BHEL Engineer Instruction and handover, within the quoted rates.

1.4.3 82 MT of Structural members including the Columns, Bracing and Tie Beams in fabricated and painted conditions are kept ready for erection. Erection for the same are to be carried out from EL +56.940 m to 75m by arranging suitable higher capacity crane. The crane alone shall be provided by BHEL for the erection of the structure, all other TnP shall be arranged by the vendor for completion of the structure.

1.4.4 Fixing the balance 877 Sqm of cladding sheet from EL +56.940 to +75 m. any patch work apart from the mentioned 877 Sq Mts shall also to be completed by the contractor with in the quoted rates.

1.4.5 Fixing the balance 5 MT of GI hand rails from EL +56.940 to +75 m.

1.4.6 Any other works required to be completed in the existing structure for the final handing over of the structure to the end customer shall be completed by the contractor as per the direction of the BHEL Engineer.

**1.5 Scope of Works with respect to carry out Operation & Maintenance and Attending the faults, rectification, breakdown / planned maintenance for 11KV construction power supply system by Deploying One C-Grade Licensed Supervisor along with qualified electricians round the clock.**

(D): -

1.5.1 TSGENCO/KTPS has provided 11KV power supply source point from 33KV/11KV substation for FGD construction works. BHEL/KTPS has carried out the civil foundation work for 500KVA transformer, HT cable laying from substation to transformer, erection of LT kiosk and commissioned the transformer & LT kiosk.

1.5.2 There may be frequent outage of 11KV power supply due to earth fault during construction activities. Supervisory services are required for attending the faults, rectification, breakdown / planned maintenance, to carry out the activities, site requires experienced manpower for Operation & Maintenance and attending the faults, rectification, breakdown/planned maintenance for 11KV construction power supply.

1.5.3 The deployed supervisor shall have a valid C-Grade License which shall be valid during the time of deployment and shall be extended thereafter for the duration of the contract.

1.5.4 The total duration for deployment of above manpower shall be the same as the time duration of the main contract. However, BHEL at its own discretion may discontinue the services with one-month prior notice to contractor.

1.5.5 The payment to the above manpower at the end of the month shall be made in terms of man-day accounted for the month calculated as per the actual deployment of the personals at site.

1.5.6 BHEL shall provide the required spare materials to the contractor on free of cost for attending/ rectification of electrical faults. However, the required minimum electrician tools like spanners set, Allen key set, ELCB tester, IR tester (having range 500V, 1000V & 2.5KV), multi meter, consumables like insulation tapes, cotton waste etc. may be provided by the contractor.

1.5.7 Deployment of Manpower required is as below.

a) Supervisor having C grade license – 1no.

b) Electricians for operating in 2 shifts – 2nos. (1no. in each shift).

**1.6 Painting:** The scope of work shall include supply and application of touch up, preservative and final painting for all the components under the scope of work for the FGD equipments as per the contract.

# VOLUME-IA PART – I CHAPTER – III
# FACILITIES & CONSUMABLES IN THE SCOPE OF CONTRACTOR / BHEL
# (SCOPE MATRIX)

| Sl. No. | Description | Scope to be taken care by | | Remarks |
|---|---|---|---|---|
| | | BHEL | Bidder | |
| **1.3.1.1.0** | **ESTABLISHMENT** | | | |
| 1.3.1.1.1 | FOR CONSTRUCTION PURPOSE: | | | |
| A | Open space for office | Yes | | Free of charges as provided by TSGENCO |
| B | Open space for T&P | Yes | | Free of charges as provided by TSGENCO |
| C | Construction of bidder's office, canteen and storage building including supply of materials and other services | | Yes | At bidder's own cost |
| D | Bidder's all office equipment's, office / store / canteen consumables | | Yes | At bidder's own cost |
| E | Canteen facilities for the bidder's staff, supervisors and engineers etc. | | Yes | At bidder's own cost |
| F | Firefighting equipment's like buckets, extinguishers etc. | | Yes | At bidder's own cost |
| G | Fencing of storage area, office, canteen etc. of the bidder | | Yes | At bidder's own cost |
| 1.3.1.1.2 | FOR LIVING PURPOSES OF THE SUCCESSFUL BIDDER'S PERSONNEL | | | |
| A | Open space for labour colony | | Yes | |
| B | Living accommodation | | Yes | |

| Sl. No. | Description | Scope to be taken care by | | Remarks |
|---|---|---|---|---|
| | | BHEL | Bidder | |
| **1.3.1.2.0** | **ELECTRICITY** | | | |
| 1.3.1.2.1 | Electricity For construction purposes | Yes | | Free of charges as provided by TSGENCO |
| 1.3.1.2.1.1 | Single point source | Yes | | |
| 1.3.1.2.1.2 | Further distribution for the work to be done which include supply of materials and execution | | Yes | At bidder's own cost |
| 1.3.1.2.2 | Electricity for the office, stores, canteen, labour colony, etc. of the bidder which include: | | Yes | At bidder's own cost |
| 1.3.1.2.2.1 | Distribution from single point including supply of materials and service | | Yes | At bidder's own cost |
| 1.3.1.2.2.2 | Supply, installation and connection of material of energy meter including operation and maintenance | | Yes | At bidder's own cost |
| 1.3.1.2.2.3 | Duties and deposits including statutory clearances for the above | | Yes | At bidder's own cost |
| 1.3.1.2.2.4 | Demobilization of the facilities after completion of works | | Yes | At bidder's own cost |
| 1.3.1.2.3 | Electricity for living accommodation of the bidder's staff, engineers, supervisors etc. on the above lines. (in case BHEL provides this facility, the scope should be given without ambiguity) | | Yes | |
| **1.3.1.3.0** | **WATER SUPPLY** | | | |
| 1.3.1.3.1 | For construction purposes: | Yes | | Free of charges as provided by TSGENCO |

| Sl. No. | Description | Scope to be taken care by | | Remarks |
|---|---|---|---|---|
| | | BHEL | Bidder | |
| 1.3.1.3.1.1 | Making the water available at single point | Yes | | Free of charges as provided by TSGENCO |
| 1.3.1.3.1.2 | Further distribution as per the requirement of work including supply of materials and execution | | Yes | At bidder's own cost |
| 1.3.1.3.2 | Water supply for bidder's office, stores, canteen, labour colony, etc. | | Yes | At bidder's own cost |
| 1.3.1.3.2.1 | Making the water available at single point | | Yes | At bidder's own cost |
| 1.3.1.3.2.2 | Further distribution as per the requirement of work including supply of materials and execution | | Yes | At bidder's own cost |
| **1.3.1.4.0** | **LIGHTING** | | | |
| 1.3.1.4.1 | For construction work (supply of all the necessary materials)<br>At office storage area<br>At the construction site / area | | Yes | At bidder's own cost |
| 1.3.1.4.2 | For construction work (Execution of the lighting work / arrangements)<br>At office storage area<br>At the construction site /area<br>At the labour hutment | | Yes | At bidder's own cost |
| **1.3.1.5.0** | **COMMUNICATION FACILITIES for site operations of the bidder** | - | | |
| 1.3.1.5.1 | Telephone, Fax, internet, intranet, email etc. | | Yes | At bidder's own cost |

| 1.3.2. | **CONSTRUCTION FACILITIES** | | | |
|---|---|---|---|---|
| 1.3.2.1.0 | Engineering works for construction | | | |
| 1.3.2.1.1 | Providing the construction drawings for all the equipment covered under this scope | | | NA |
| 1.3.2.1.2 | Detailing of drawings for construction | | | NA |
| 1.3.2.1.3 | As-built drawings – wherever deviations observed and executed and also based on the decisions taken at site- example – routing of small-bore pipes | | | NA |
| 1.3.2.1.4 | Shipping lists etc. for reference and planning the activities | Yes | Yes | ” |
| 1.3.2.1.5 | Preparation of site construction schedules and other input requirements | | | NA |
| 1.3.2.1.6 | Review of performance (Form-14) and revision of site construction schedules in order to achieve the end dates and other commitments. | | Yes | NA |
| 1.3.2.1.7 | Weekly construction schedules based on Sl No 1.3.2.1.5 | | Yes | NA |
| 1.3.2.1.8 | Daily construction / work plan based on Sl No 1.3.2.1.7 | | Yes | For daily monitoring meeting at site |
| 1.3.2.1.9 | Periodic visit of the senior official of the bidder to site to review the progress so that works is completed as per schedule. It is suggested this review by the senior official of the bidder should be done once in every two months. | | Yes | On intimation by BHEL at Bidder’s Cost. |
| 1.3.2.1.10 | Preparation of preassembly bay, if any required | | | NA |
| 1.3.2.1.11 | Laying of racks for gantry crane if provided by BHEL or brought by the contractor / bidder himself | | | NA |

### 1.3.3 OPEN SPACE:

Open space, as provided by TSGENCO, will be provided to the bidder free of cost. Availability of land within plant boundary is very limited and the contractor has to plan and use the existing land considering the use of land by other Civil /mechanical/ electrical contractors and the storage of plant machineries and materials. The existing land shall be shared by all erection agencies. Land will be allocated with certain time frame and to the extent available/ considered necessary, and will be reviewed by BHEL depending upon the area availability. Area within plant premises for office, storage area etc. for construction purpose shall be provided as per availability free of cost. The contractor will be responsible for handing over back all lands, as handed over to him by BHEL.

Land for labor colony shall be provided by BHEL approximately nearer to site (outside plant boundary), on chargeable basis, as provided by TSGENCO. The contractor shall provide adequate water arrangement for drinking/washing/bathing with required toilets, drainage system, and electrification etc. in labour colony at his own cost. Suitable paved area, as & if directed by customer based on hygiene requirement of labour, to be provided in the labour colony at the cost of contractor.

### 1.3.4 ELECTRICITY:

1.3.4.1 Construction power will be provided to the contractor free of cost at one single point within the plant area by BHEL as provided by TSGENCO. The contractor has to provide necessary meter for measuring the power consumption. The contractor shall make his own arrangement for further distribution with necessary isolator/LCB. The contractor shall make his own arrangement for further distribution with necessary isolator/LCB etc.

1.3.4.2 Necessary “Capacitor Banks” to improve the Power factor to a minimum of 0.9 shall be provided by the contractor at his cost. Penalty if any levied by customer on this account will be recovered from contractor’s bills.

1.3.4.3 Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards contractor’s office shed also all such expenditure shall be borne by the contractor.

1.3.4.4 Provision for distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

1.3.4.5 BHEL is not responsible for any loss or damage to the contractor’s equipment as a result of variations in voltage / frequency or interruptions in power supply.

1.3.4.6 Contractor has to make their own arrangements for electricity requirement for labour colony at his own cost.

1.3.4.7 As there are bound to be interruptions in regular power supply, power cut/ load shedding in any construction sites, contractor should make his own arrangement for alternative source of power supply. No separate payment shall be made for this contingency.

**1.3.5 WATER:**

1.3.5.1 Water (Raw water) required for construction purposes will be provided at one single point within the plant area free of cost as provided by TSGENCO. The required pumps & accessories, pipes for drawing water from the given point and further distribution will be arranged by the contractor at their cost to go on without interruptions.

1.3.5.2 In case of non-availability of water, the contractor shall make his own arrangements of water suitable for construction purpose to have uninterrupted work. No separate payment shall be made for any contingency arrangement made by contractor, due to delay / failure for providing water supply.

**1.3.6 DRINKING WATER**

Bidder shall provide drinking water at their cost.

**1.3.7 ONLINE SITE CONSTRUCTION MANAGEMENT SYSTEM [SCMS]:**

Contractor has to provide minimum 1 computer [along with one operator per PC] for online material management, reporting of daily progress, billing and other similar activities, within the quoted rate. Computers shall have minimum configuration of Windows 7 OS, 4GB RAM and Internet Explorer 8 or above.

**1.3.8 MATERIAL SUPPLY:**

BHEL will supply the materials/equipments indicated in the weight schedule from their respective manufacturing units which are to be executed/incorporated in the permanent system. In addition, the material such as lube oil, grease, Ammonia required for commissioning the erected equipments and chemicals required for chemical cleaning of equipments will be supplied free of cost by BHEL. Raw material will be supplied by BHEL for fabrication and erection works.

**1.3.9 LIGHTING FACILITY:**

Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, pre assembly/fabrication yard and contractor's material storage area etc. at his cost.

### 1.3.10 CONSUMABLES:

Such of those consumables as indicated as consumables provided by BHEL alone will be provided to the contractor by BHEL free of charge for erection activities. Other required consumables like electrodes, all gases, and other materials for this scope of work are to be arranged by the contractor at their cost. On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch number and date of expiry etc.

The bidder shall use the Customer approved quality welding electrodes only. The contractor shall provide within finally accepted price / rates, all consumables like welding electrodes (including alloy steel and stainless steel), all gases (inert, welding, and cutting), soldering material, dye penetrants, radiography films. Other erection consumables such as tapes, jointing compound, grease, mobile oil, M-seal, Araldite, petrol, CTC / other cleaning agents, grinding and cutting wheels are to be provided by the contractor. Steel, H&S, packers, shims, wooden planks, scaffolding and pre-assembly materials, hardware items etc required for temporary works such as supports, scaffoldings, bed are to be arranged by him. Sealing compounds, gaskets, gland packing, wooden sleepers for temporary work, required for completion of work except those which are specifically supplied by manufacturing unit are also to be arranged by him.

All the shims, gaskets and packing, which go finally as part of equipment, shall be supplied by BHEL free of cost.

### 1.3.11 ELECTRODES SUPPLY AND STORAGE

(1) The bidder shall use the Customer approved quality welding electrodes only.

(2) It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding suppliers, type of electrodes etc. On receipt of the electrodes at site, it shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL, details regarding type of electrodes, batch number and date of expiry etc.

(3) Shortage of any of the electrodes or the equivalent suggested by BHEL shall not be quoted as reason for deficiency in progress or for additional rate.

(4) Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at their own cost by the contractor.

(5) Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at their own cost by the contractor.

(6) All low hydrogen electrodes shall be baked / dried in the electrode drying oven (range 375 deg. C - 425 deg. C) to the temperature and period specified by the BHEL Engineer before they are used in erection work and each welder should be

provided with one portable electrode drying oven at the work spot. Electrode drying oven and portable drying ovens shall be provided by contractor at his cost.

(7) In case of improper arrangement of procurement of above electrodes BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bills at market value plus departmental charges of BHEL communicated from time to time. Postponement of such recovery is not permitted.

(8) BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date of expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.

### 1.3.12 OTHER FACILITIES

Adequate water less urinals [at least 2 nos per level at suitable locations] shall be arranged by the contractor within quoted rates, at site of construction at different level and different areas with proper disposal arrangement.

### 1.3.13 BID DRAWINGS

Bid drawings published in this tender specification are for information and this may get revised during execution.

# VOLUME-IA PART – I CHAPTER – IV
# T&P'S AND MMES TO BE DEPLOYED BY CONTRACTOR

1.4.1 All other tools & plants required for execution of this scope of work are to be arranged by the contractor within the quoted rates except the T&Ps to be made available by BHEL to contractor free of hire charges on sharable basis.

1.4.2 Tentative List of minimum major Tools & Plants to be deployed by the contractor is mentioned below:

| Sl No | T&P Description | Capacity in MT | Qty in Nos |
|---|---|---|---|
| 1 | Next Gen Pick and Carry Cranes | Minimum Capacity 14 MT (Mobile) | As required |
| 2 | Trailer | Minimum Capacity 20 MT | As required |
| 3 | Hydro Test pump for hydro | up to 50 Kg/Sq.cm | As required |

1.4.3 Fill pumps shall be arranged by the contractor, wherever required.

1.4.4 For Hydro testing, necessary Hydraulic Test pumps/ Hand pumps are to be arranged by the contractor as indicated above.

1.4.5 All the T & P, lifting tackles including wire ropes, slings, shackles and electrically operated equipment shall be got approved by BHEL Engineer before they are actually put on use. Test certificates obtained from the statutory authority should be submitted before their usage.

1.4.6 For handling at store and transportation, contractor shall make his own arrangement.

1.4.7 Contractor shall ensure that all the T&Ps deployed shall be in good working condition which includes the T&Ps viz. Blast cleaning accessories with compressor along with Corrugated Galvanized Iron shed, Painting Equipment along with accessories, Plate Bending machine, Ultrasonography or Radiography or any other NDT equipments as required for fabrication of tanks and structural works.

1.4.8 The contractor has to furnish a list of Tools and plants including cranes / tractors / trailers / trucks etc. which he has proposed to deploy for this work.

1.4.9 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes. The crane load test has to be conducted as per statutory guidelines before deployment.

1.4.10 The contractor shall arrange crane operator, diesel, petrol and other consumables required for their tools and plants, equipments etc. Preventive and routine maintenance of T & P are also to be arranged by the contractor at his cost without any delay. Required number of

experienced mechanics and helpers for routine maintenance of the above cranes shall be provided by the contractor within his quoted rate.

1.4.11 If work gets delayed due to non-availability of any T & P, BHEL reserves the right to get the work done at the risk and cost of contractor.

1.4.12 In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make alternative arrangement at the risk and cost of the contractor.

1.4.13 In the event of non-mobilization of Tools, Plants, Machinery, Equipment, Material or non-availability of the same owing to breakdown and as a result progress of work suffered, BHEL reserves the right to make alternative arrangement (available or higher capacity) in line with SCC clause no. 4.2.1.7 and hire charges shall be applicable as under:

Case 1: BHEL provides its own Capital T&P: If BHEL provides owned T&P then BHEL, hire charges (as per BHEL norms) will be recovered from the contractor as per the prevailing BHEL Corporate hire charges applicable (as enclosed in Chapter 4 of Part II Volume IA-Technical Conditions of Contract Volume I Book I) as per following cases:

- In case the T&P is specifically listed in "T&Ps to be deployed by Contractor", 'Rates of hire charges applicable to outside agencies other than contractors working for BHEL' will apply.
- In case the T&P is not specifically listed in "T&Ps to be deployed by Contractor", 'Rates of hire charges applicable to contractors working for BHEL' will apply.
- The hire charges of Capital Tools & Plants are exclusive of operating expenses e.g., Operator, fuel & Consumables and the same shall be arranged by the contractor at his cost.

Case 2: BHEL provides hired T&P: In all cases other than that specified in Case 1 above, actual expenses incurred by BHEL along with applicable overheads will be back-charged to the contractor

- The present rates of BHEL's Corporate Crane hire charge, are enclosed in Chapter _ of part II of Technical Conditions of Contract (Volume-IA Book-I). This may get revised further as per the BHEL corporate guidelines. The prevailing rates as on date of execution shall be applicable.

1.4.14 T&Ps mentioned above is tentative requirement considering parallel working in all areas mentioned in the scope of work. However, mobilization schedule and quantity / numbers as mutually agreed at site for major T&Ps, have to be adhered to. Numbers/ time of requirement of T&Ps will be reviewed time to time by BHEL site and contractor will provide required T&Ps / equipments to ensure completion of entire work within schedule / target date of completion without any additional financial implication to BHEL. Vendor will give advance intimation and certification regarding capacity etc. prior to dispatch of heavy equipments. Also on completion of the respective activity, demobilization of T&P in total or in part can be done with the due approval of the engineer incharge. Retaining of the T&Ps during the contract period will be mutually agreed in line with construction requirement.

# VOLUME IA PART – I CHAPTER V
# T&Ps AND MMEs TO BE DEPLOYED BY BHEL ON SHARING BASIS

1.5.1 List of T&Ps to be made available by BHEL to contractor free of hire charges on sharable basis are as below:

| Sl No | Description | Quantity |
|---|---|---|
| 1 | In addition to the cranes to be provided by the contractor, BHEL will provide cranes of 75T or above capacity to the contractor as per site requirement on sharing basis free of hire charges. | As decided by BHEL |
| 2 | Air Blower for Air Leak Test | As Required |
| 3 | Venturimeter | As Required |

1.5.2 All the T&Ps mentioned in clause 1.5.1 above shall be given to contractor on sharable basis and the allotment is made by BHEL on need basis. Decision of BHEL engineer will be final on the above.

1.5.3 Besides the T & P mentioned above, which is being made available to the contractor on free of hire charges, any other T & P which may be required for successful and timely execution of the work covered within the scope of this tender shall be arranged and provided at site by the contractor at his cost. In case if the contractor fails to provide such equipment's, BHEL will arrange for the same and the cost will be recovered from the contractor's bill with BHEL overheads, as applicable from time to time which may vary even during contract period.

1.5.4 Levelled land in FGD area will be provided by BHEL/Customer for the cranes. Consolidation of the ground, if required, and preparation (including civil works and supply of required consolidation materials) for placing crane for operation shall be done by the contractor, at his cost. Necessary plates / sleepers if any required for marching and placing of crane for operation shall also be provided by the contractor within quoted rates.

1.5.5 BHEL may provide either owned cranes or hired cranes at the discretion of BHEL as below:

1.5.5.1 In the event of providing BHEL Cranes:

1.5.5.1.1 For all BHEL's crane, BHEL shall provide crane operator, free of charges. Fuel to be provided by the contractor within the quoted rate. All consumables for the BHEL crane maintenance shall be provided by the contractor within the quoted rates.

1.5.5.1.2 Tentative list of consumables required to be provided by contractor is as below:

- Engine Oil 15 W 40
- Fuel Filters
- Air Filters
- Hydraulic Filters
- Hydraulic Oil –Servo 68
- Gear Oil- Servo 90
- Engine oil Filter
- Oil Separator Filter
- Rope- CRG 100 Grease
- Grease- Servo Multi-Purpose Grease

1.5.5.1.3 Maintenance for the BHEL crane shall be carried out by BHEL. Bidder shall extend support (if required) required for routine maintenance works

1.5.5.2 In the event of providing hired cranes:

1.5.5.2.1 Crane Operators for hired cranes will be provided by BHEL, on free of charges.

1.5.5.2.2 Fuel for cranes is to be arranged by the contractor within the quoted rate.

1.5.6 All the distribution boards, connecting cables, hoses etc., and temporary connection work including electrical connections for the BHEL issued T & Ps shall have to be arranged by the contractor at his cost.

1.5.7 Any loss / damage of tools by the contractor shall have to be replaced or otherwise cost thereof shall be recovered from the contractor.

1.5.8 In case of non-availability of these equipments, due to any reason i.e., unavoidable breakdown, major overhaul or any other reason etc., the contractor should make arrangement at his own cost to meet the erection targets. No extra claim will be admitted due to non-availability of any of the above equipments. No delay in execution of work shall be accepted on this account.

# VOLUME – IA PART – I CHAPTER-VI
# TIME SCHEDULE

## 1.6.1 TIME SCHEDULE

1.6.1.1 The entire work covering erection of FGD, fabrication and erection of tanks for FGD, Material handling & balance erection of TP-9, including Supply & Application of all types of Painting including the Final Painting and the Supervision Services for Deployment of Supervisor to maintain the Construction Power as elaborated in relevant chapter of this book in accordance to the rate schedule as detailed in the Tender Specification shall be completed within 15 (Fifteen Months) from the date of commencement of work at site.

1.6.1.2 During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL and the program of milestone events

1.6.1.3 The work shall be commenced on the mutually agreed date between the bidder and BHEL engineer and shall be deemed as completed in all respect only when the unit is in operation. The decision of BHEL in this regard shall be final and binding on the contractor. The scope of work under this contract is deemed to be completed only when so certified by the site Engineer.

1.6.1.4 The contractor is required to refer Form F15 in Volume-I Book -II for all the instructions to be taken immediately after receipt of LOI.

## 1.6.2 MOBILISATION

1.6.2.1 Contractor shall mobilize necessary resources as per letter of Intent or as per directive of Construction manager. Contractor shall also follow the Technical Conditions of Contract (Volume-IA Book- I) and in case of discrepancy the decision of BHEL engineer is final and binding on contractor.

1.6.2.2 In order to meet the schedule in general, and any other intermediate targets set, to meet customer/ project schedule requirements, Contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL Engineer.

1.6.2.3 The activities for erection, testing etc. shall be started as per directions of Construction manager of BHEL. The contractor has to augment their resources in such a manner that following major milestones of erection & commission are achieved on specified schedules:

1.6.2.4 In case the project is to be advanced, the erection works in the scope of the contractor is to be advanced to meet the project requirement. No extra payment whatsoever shall be paid on this account.

1.6.2.5 The Contractor has to subsequently augment his resources in such a manner that following major milestones of erection & commission are achieved on specified schedules. The schedule of important milestones is as follows:

| Milestone Activity | FGD Package |
|---|---|
| Erection Start | 1st Month |
| Air Tightness Test for Complete Ducting | 9th Month |
| Completion of Erection work of FGD System | 10th Month |
| Commissioning of FGD | 12th Month |
| Balance work completion, pending points, punch points liquidation | 15th Month |
| **Intermediate Milestones** | |
| Air Tightness Test for Complete Ducting **(M1)** | 9th Month |
| Commissioning of FGD **(M2)** | 12th Month |

**PENALTY FOR INTERMEDIATE MILESTONES**

| |
|---|
| M1 and M2 shall be intermediate for respective works under each package. |
| In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones with reference to Form 14. |
| Incase delay in achieving M1 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to Maximum 2% executable contract value will be withheld. |
| Incase delay in achieving M2 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to maximum 3% of executable contract value will be withheld. |
| Amount already withheld, if any, against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 milestone. |
| Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance amount (if any) shall be withheld @ 10% of RA Bill amount from subsequent RA bills. |
| Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion / closure of contract. Withheld amount, if any due to slippage of intermediate milestones shall be adjusted against LD or released as the case may be. |
| In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted in to recovery. |
| Note: * Executable contract value-value of work for which inputs/fronts were made available to contractor and were scheduled for execution till the date of achievement of that milestone. |

1.6.3 **COMMENCEMENT OF CONTRACT PERIOD**

The date of commencement of contract period shall be the mutually agreed date between the bidder and BHEL engineer to start the work. In case of discrepancy the decision of BHEL engineer is final.

1.6.4 **CONTRACT PERIOD**

The contract period for completion of entire work under scope shall be 15 (Fifteen months only) months from the –COMMENCEMENT OF CONTRACT PERIOD as specified earlier.

1.6.5 **GUARANTEE PERIOD**

The guarantee period of Twelve months for workmanship shall commence from the date of handing over of the FGD to Customer (Provided all erection, testing, and commissioning works are completed in all respects).

# VOLUME-IA PART-I CHAPTER - VII
# TERMS OF PAYMENT

1.7.1 **Terms of Payments for the Material Handling Contract (A)**

1.7.1.1 The accepted 'Rate per MT of materials' shall be paid on completion of the activities mentioned in the following table on pro-rata basis.

| Sl. No | Description of Activity | % of payment |
|---|---|---|
| 1 | **COMPLETION OF THE FOLLOWING ACTIVITIES OF THE UNLOADED MATERIALS RECEIVED THROUGH TRUCKS / TRAILERS:** | |
| 1.a | Unloading / Loading / Shifting of materials at open/ covered | 62% |
| 1.b | Updating of receipt or dispatch or shifting details, in store material registers / | 10% |
| 1.c | Stacking and /or verification | 10% |
| 1.d | Updating of verification details in material stock registers, submission of reports as per specified formats for shortage/ open delivery, lodging of police report, documents for insurance claims etc., and preparation of material receipt certificates in prescribed formats wherever applicable | 10% |
| 1.e | Identification of material in ready to lift position for issue to BHEL / erection agency, or to dispatch or to shift and updating of issue details in stores records / BHEL MM System | 5% |
| 1.f | Completion of contractual obligations | 3% |
| | **Total** | **100%** |
| 2 | **PENALTY LEVIABLE IN MONTHLY RA BILL IN CASE OF FOLLOWING NON COMPLIANCES-** | |
| 2.a | Removal of grass / weeds and other plant growth in the store area | 1% |
| 2.b | Safety + temporary illumination of working area where materials are handled | 1% |
| 2.c | Completion of Documentation planned for the month, related to MM system | 2% |
| 2.d | Penalty per truck per day (over and above two days) for not unloading the materials within two days of receipt delay is | Rs.500.00 |
| 2.e | Loss of materials, damages due to carelessness, negligence of the contractor | 2% |
| 2.f | Completion of Loading of outgoing materials to be dispatched to other places based on BHEL instruction | 1 % |

1.7.1.2 No other payment shall be paid for the other / additional T & Ps deployed for carrying out the work as per the scope of this tender.

1.7.1.3 The contractor shall submit his bills once in a month duly furnishing the following minimum information along with other details as applicable.

a. The gross weight as per RR/LWB / PWB

b. RR/PWB/LWB Number

c. Wagon/Vehicle/truck number and number of bundles/boxes/piece in each vehicle/ truck / Wagon

d. Shortage / damage reports in BHEL's standard material / management form.

e. Rate / per tonne

f. Amount claimed.

g. Recoveries such as hire charges etc.,

h. RR Incase materials are received in railway wagons

i. Crane and trailer log sheets

j. Compliance report of the audit that shall be conducted every month by BHEL nominated committee. The audit shall be carried out for compliance with respect to the BHEL"s procedure for material stacking, preservation etc., covered under the scope of this tender.

k. Upto date updating of Receipt / Issue details on BHEL MM Package / SCMS System as decided by BHEL.

**1.7.2 Terms of Payments for the Erection Testing and Commissioning of FGD Mechanical (B)- Progressive payment against Monthly running bills will be made to 85% of the value of the erected Pro-rata as per Cl No 1.7.2.1.1 to 1.7.2.1.10 of the following table :-**

1.7.2.1Pro Rata Payment

| **Sl NO** | **Rate Schedule Identification** | **Structure** **1A** | **Non-Pressure Parts (Ducts/Dampers etc.)** **2A** | **Rotating M/c** **3A** | **Pre Fabricated Tanks-Erection** **4A** | **Tanks-Fabrication and Erection** **4B** | **Insulation a. Iron Components b. Wool Mattress c. Al Sheets** **(5A,5B,5C)** | **Piping** **CS Piping** **SS Piping** **6A,6B)** |
|---|---|---|---|---|---|---|---|---|
| 1.7.2.1 | Pro Rata Payment (85%) | | | | | | | |
| 1.7.2.1.1 | On Pre Assembly wherever applicable (if not applicable, this portion shall be clubbed with placement in position) | 20% | 20% | 15% | 20% | Marking and Cutting -10% Edge Preparation- 10% Rolling- 10% | | 15% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 1.7.2.1.2 | Placement in position of preassembled (equipment/pipe/instruments wherever applicable) | 20% | 20% | 20% | 20% | | 50% | 15% |
| 1.7.2.1.3 | Alignment | 20% | 20% | 20% | 20% | | 15% | 15% |
| 1.7.2.1.4 | Welding, Bolting/Grouting/Fixing | 20% | 20% | 20% | 25% | 10% | 20% | 20% |
| 1.7.2.1.5 | Completion of non-destructive examination & Stress Relieving/Heat Treatment (If applicable, then this portion to be paid along with welding | 5% | 5% | | | 10% | | 5% |
| 1.7.2.1.6 | Hangers & Support etc. whichever is necessary as per dwg. | | | | | | | 5% |
| 1.7.2.1.7 | Surface preparation of tanks for painting | | | | | 10% | | |
| 1.7.2.1.8 | Painting | | | | | 10% | | 5% |
| 1.7.2.1.9 | Hydraulic Test | | | | | 15% | | 5% |
| 1.7.2.1.10 | Equipment Trial Run | | | 10% | | | | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Total pro rata payments Total 85% | 85% | 85% | 85% | 85% | 85% | 85% | 85% |

1.7.2.2 Further 15% payment on pro-rata basis common to all PGs shall be released on achievement of the following stage/milestone events (as per clause no 1.7.2.1.1 to 1.7.2.1. of the following table) for the tonnage erected.

| **1.7.2.2** | **Stage/Milestone payments (15%)** | **% Payment** |
|---|---|---|
| 1.7.2.2.1 | Completion of Air & Gas Tightness test for ducts | 2% |
| 1.7.2.2.5 | Commissioning/Trial Run of FGD System | 5% |
| 1.7.2.2.6 | Area Cleaning, Temporary Structures Removal and cutting/removal and return of Scrap | 2% |
| 1.7.2.2.7 | Punch Point Completion | 2% |
| 1.7.2.2.8 | Material Reconciliation | 2% |
| 1.7.2.2.9 | Completion of Contractual Obligation | 2% |

### 1.7.3 Terms of Payment for the completion of the TP-9 Structure-Part (C)

| 1.7.3 | Stage/Milestone payments | % Payment |
|---|---|---|
| 1.7.3.1 | Erection completion of the Structure including placement, alignment and Welding of the structure. | 50% |
| 1.7.3.2 | Final Handing over of the Structure after completion of painting, sheeting and completion of punch points | 50% |

### 1.7.4 Terms of Payment for Maintenance of LT Construction Power Supply-Part (D)

| 1.7.4 | Payment for Supervisory Services | Payment/Per Month |
|---|---|---|
| 1.7.4.1 | Monthly rate for maintaining the Construction power supply by deploying the required personnel as per the tender conditions | 100% |

# VOLUME-IA PART-I CHAPTER-VIII
# TAXES AND DUTIES

### 1.8.1 Goods and Service Tax (GST) & Cess

1.8.1.1 The successful bidder shall furnish proof of GST registration with GSTN Portal in the State in which the Project is being executed, covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by the successful bidder on BHEL for this project/ work.

1.8.1.2 Contractor's price/rates shall be exclusive of GST & Cess (if applicable) (herein after termed as GST). Contractor shall submit to BHEL the GST compliant tax invoice/debit note/revised tax invoice on the basis of which BHEL will claim the input tax credit in its return. Since this is a works contract, the applicable rate shall be @ 18% GST, as applicable presently.

1.8.1.3 Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules wherein the 'Bill To' details will be as below:

BHEL GSTN: 36AAACB4146P1ZG

NAME - BHARAT HEAVY ELECTRICALS LIMITED

ADDRESS – BHEL SITE OFFICE, KOTHAGUDEM THERMAL POWER STATION STAGE-VII, UNIT#12, PALONCHA KOTHAGUDEM, TELANGANA

1.8.1.4 GST charged in the tax invoice/debit note/revised tax invoice by the contractor shall be released separately to the contractor only after contractor files the outward supply details in GSTR-1 on GSTN portal and input tax credit of such invoice is matched with corresponding details of outward supply of the contractor and has paid the GST at the time of filing the monthly return.

1.8.1.5 In case BHEL has to incur any liability (like interest / penalty etc.) due to denial/reversal / delay of input tax credit in respect of the invoice submitted by the contractor, for the reasons attributable to the contractor, the same shall be recovered from the contractor.

1.8.1.6 Further, in case BHEL is deprived of the Input tax credit due to any reason attributable to contractor, the same shall not be paid or Recovered if already paid to the contractor.

1.8.1.7 Tax invoice/debit Note/revised tax invoice shall contain all such particulars as prescribed in GST law and comply to the timelines for issue of the same. Invoices shall be submitted on time to the concerned BHEL Engineer In Charge.

1.8.1.8 TDS under GST (if/ as & when applicable) shall be deducted at prevailing rates on gross invoice value from the running bills.

1.8.1.9 E-way bills / Transit passes / Road Permits, if required for materials / T&P etc., bought into the project site is to be arranged by the Contractor only.

1.8.1.10 BHEL shall not reimburse any amounts towards any interest / penalty etc., incurred by contractor. Any additional claim at a later date due to issues such as wrong rates / wrong classification by contractor shall not be paid by BHEL.

1.8.2 All taxes and duty other than GST & Cess

The contractor shall pay all (except the specific exclusion viz GST & Cess) taxes, fees, license charges, deposits, duties, tools, royalty, commissions, Stamp Duties, or other charges / levies, which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract and the same shall not be reimbursed by BHEL. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

1.8.3 Statutory Variations

Statutory variations are applicable under the GST Acts, against production of proof. The changes implemented by the Central / State Government during the tenure of the contract viz. increase / decrease in the rate of taxes, applicability, etc. and its impact on upward revision / downward revision are to be suitably paid/ adjusted from the date of respective variation. The bidder shall give the benefit of downward revision in favour of BHEL. No other variations shall be allowed during the tenure of the contract.

1.8.4 New Taxes/Levies

In case Government imposes any new levy / tax after submission of bid during the tenure of the contract, BHEL shall reimburse the same at actual on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract.

1.8.5 Direct Tax

BHEL shall not be liable towards Income Tax of whatever nature including variations thereof arising out of this contract as well as tax liability of the bidder and their personnel. Deduction of tax at source at the prevailing rates shall be effected by BHEL before release of payment as a statutory obligation, unless exemption certificate is produced by the bidder. TDS certificate will be issued by BHEL as per the provisions of Income Tax Act.

# VOLUME – IA PART – I CHAPTER –IX
# WEIGHT SCHEDULE

1.9.1 Weight Schedule for Part A- Material Management

The Weight Schedule for the Material Unloading contract is Broadly mentioned in the table attached.

| Sl No | Unit | Broad Description of item | Weight in tonnage |
|---|---|---|---|
| 1 | BAP Ranipet | FGD, GGH, Piping, Structures, Gates Dampers, JAS, Nozzles, Agitator, Fan Etc | 3000 MT |
| 2 | CFP Rudrapur | HT Bus Duct | 50 MT |
| 3 | EDN Bangalore | Control Equipment, DCS Panels and C&I instruments | 70 MT |
| 4 | EPD Bangalore | LT Pannels and Ducts | 10 MT |
| 5 | HEP Bhopal | HT Switchgear, Motors | 50 MT |
| 7 | Trichy Valves | Valves | 10 MT |
| 8 | Piping Centre | Piping System | 20 MT |
| 9 | HPEP Hyderabad | RC Pump, Day Silo, Wet Bowl Mills. | 1400 MT |
| 10 | PE& SD Hyderabad | Agitator tanks, Tanks, Fire Fighting System | 350 MT |
| 11 | TP Jhansi | Transformer | 20 MT |
| 12 | PEM | Mechanical and electrical BOI | 20 MT |
| 13 | PSSR | Structural & Reinforcement Steel | 3000 MT |
| | **TOTAL TONNAGE( APPROXIMATELY)** | | **8,000 MT** |

1.9.1.1 NOTE for MM works:

i) The product list and the manufacturing units indicated above are indicative for estimation purpose only. The weight mentioned above is approximate and liable to vary as per design consideration of the manufacturing unit.

ii) The payment for Material handling works will be made at the quoted / accepted rates for the tonnage actually handled.

iii) Besides the products indicated above there is likelihood in addition of any products integral to FGD and its auxiliaries. Tenderers quoted rate shall be applicable for such products also.

iv) For the purpose of payment for Material handling works, the gross weight indicated in RR/LWB/PWB will be taken into account for calculating the tonnage handled. However, in

case of full truck / Lorry load, Gross weight indicated in shipping / dispatch documents will be taken into account for this purpose. Where gross weight is not available in these documents, gross weight as assessed by BHEL Engineers will be taken into account and which is final for the purpose of payment.

v) Preservation and storage of components will have to be done as per the instruction of BHEL engineers under Material handling works.

Note for weight schedule of fabrication, erection and commissioning works:

1. The weights mentioned above are approximate and liable to vary as per design consideration. There will be change in PG, weight, description etc. However, payments will be made for the tonnage actually erected at the quoted rate. Quantity Variation will be dealt as per clause 2.14 of General Conditions of Contract (Volume I Book II).
2. Besides PG / PGMA indicated in the weight schedule, there is likelihood of addition of product groups integral to FGD and its auxiliaries. The quoted rates shall be applicable for such product groups also.
3. The erection & dismantling of temporary piping, pumps, tanks, dummy plates & other miscellaneous equipment etc. for pre-commissioning and commissioning activities like hydraulic test, gas tightness test etc. are covered in this contract and shall be carried out as a part of work. There will not be any separate payment for these works.
4. The Erection of FAN MOTORS are covered in this scope of contract.
5. The erection and dismantling of air blowers and connecting pipes and ducts, providing blanks / dummies at the required locations and conducting gas tightness test is in the scope of the contract and shall be carried out within the quoted rate.

### 1.9.2 Weight Schedule for Part B- FGD Mechanical

| SL No | Description | Weight (MT) | Rate Schedule |
|---|---|---|---|
| 1 | Structure | 2686.88 | 1A |
| 2 | Non Pressure Parts/Ducts/Dampers | 906.37 | 2A |
| 3 | Rotating Components/Machines | 2212.15 | 3A |
| 5 | Fabrication and Erection of the Tanks from the Structural Materials (Plates, Structural Components) and Hydro Cyclones and Other Miscellaneous items | 421.00 | 4A |
| 6 | Mineral Wool | 105.05 | 5A |
| 7 | Fixing Components | 132.62 | 5B |
| 8 | Aluminium Sheet & Sealing Compound | 36.70 | 5C |
| 9 | CS Piping | 146.99 | 6A |

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|---|---|---|---|
| 10 | SS Piping | 8.00 | 6B |
| | **Total** | **6655.76** | **MT** |

**BILL OF QUANTITY**

| Sl No | Unit | PGMA | PGMA Description | Est/ Rel Wt (in Kgs.) | Rate Schedule |
|---|---|---|---|---|---|
| 1 | BAP | 52000 | SPECIAL TOOLS/CONTRA | 270.00 | 1A |
| 2 | BAP | 55081 | BUF FIX MATERIAL | 3870.00 | 1A |
| 3 | BAP | 55082 | BUF STAIR & HND RAIL | 1580.00 | 1A |
| 4 | BAP | 55089 | BUF MOTOR CANOPY | 1320.00 | 1A |
| 5 | BAP | 57466 | PLATFORMS AND LADDERS | 18820.00 | 1A |
| 6 | BAP | 57566 | PLATFORMS AND LADDERS-FGD GD | 3990.00 | 1A |
| 7 | BAP | FW209 | MAN HOLE DOOR FOR ABSORBER | 9000.00 | 1A |
| 8 | BAP | FW214 | ABS BAFFLE GRATING | 1800.00 | 1A |
| 9 | BAP | FW219 | ABSORBER SYSTEM-BASE | 20640.00 | 1A |
| 10 | BAP | FW221 | ABSORBER SYSTEM-CASING BOTTOM | 74830.40 | 1A |
| 11 | BAP | FW222 | ABSORBER SYSTEM-CASING TOP | 117921.60 | 1A |
| 12 | BAP | FW231 | ABSORBER SHEAR PLATE | 4500.00 | 1A |
| 13 | BAP | FW232 | DUCT SUP BYP & BUF/GGH | 45000.00 | 1A |
| 14 | BAP | FW233 | DUCT SUPPORT BUF/GGH & ABS | 54000.00 | 1A |
| 15 | BAP | FW234 | DUCT SUP ABS & STACK/BYP | 54000.00 | 1A |
| 16 | BAP | FW235 | SPECIAL FASTNERS | 3600.00 | 1A |
| 17 | BAP | FW236 | STRUCTURES FOR RC PUMP HOUSE | 133081.60 | 1A |
| 18 | BAP | FW238 | HOOK UP DUCT WITH STRUCTURE | 22500.00 | 1A |
| 19 | BAP | FW255 | DUCT BYP & BUF/GGH/ABS | 68570.00 | 1A |
| 20 | BAP | FW256 | DUCT BUF/GGH & ABS | 76180.40 | 1A |
| 21 | BAP | FW257 | DUCT ABS & BYP/STACK | 48020.00 | 1A |
| 22 | BAP | FW258 | DUCT BETWEEN GGH AND DUCT OUT | 332271.60 | 1A |
| 23 | BAP | FW259 | GGH INTERCONNECT DUCT | 54000.00 | 1A |
| 24 | BAP | FW260 | DUCT STR BYP & BUF/GGH/ABS | 57030.00 | 1A |

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|---|---|---|---|---|---|
| 25 | BAP | FW261 | DUCT STR BUF/GGH & ABS | 52150.00 | 1A |
| 26 | BAP | FW262 | DUCT STR ABS & BYP/STACK | 110581.60 | 1A |
| 27 | BAP | FW263 | DUCT STRUCTURE BETWEEN GGH | 80020.40 | 1A |
| 28 | BAP | FW280 | FOUNDATION MATL FOR DUCT STRUC | 20340.00 | 1A |
| 29 | BAP | FW281 | FOUNDATION MATL FOR ABS | 2380.00 | 1A |
| 30 | BAP | FW282 | FOUNDATION MATL FOR ELEVATOR | 3270.00 | 1A |
| 31 | BAP | FW283 | FOUNDATION MATL RC PUMP SHED | 4500.00 | 1A |
| 32 | BAP | FW285 | SUPRTING STR FOR EMERGENCY QWT | 13500.00 | 1A |
| 33 | BAP | FW297 | PLATFORM FOR DUCT | 9000.00 | 1A |
| 34 | BAP | FW298 | PLATFORM FOR G&D | 9000.00 | 1A |
| 35 | BAP | FW299 | MISCELLANEOUS-FGD SYSTEM | 4640.00 | 1A |
| 36 | BAP | FW300 | ABSORBER COLUMNS | 133081.60 | 1A |
| 37 | BAP | FW301 | ABSORBER BEAMS AND BRACINGS | 133081.60 | 1A |
| 38 | BAP | FW302 | ABSORBER LOWER FLOORS | 90000.00 | 1A |
| 39 | BAP | FW303 | ABSORBER UPPER FLOORS | 90000.00 | 1A |
| 40 | BAP | FW304 | ABSORBER FLOOR GRILLS | 58500.00 | 1A |
| 41 | BAP | FW305 | ABSORBER STAIRS & HANDRAILS | 31500.00 | 1A |
| 42 | BAP | FW306 | ABSORBER HSFG FASTNERS | 4500.00 | 1A |
| 43 | BAP | FW307 | ABSORBER MISCELLANEOUS | 9000.00 | 1A |
| 44 | BAP | FW310 | STRU FOR BOOSTER FAN HANDLING | 72000.00 | 1A |
| 45 | BAP | FW380 | ELEVATOR COLUMN | 54000.00 | 1A |
| 46 | BAP | FW381 | ELEVATOR BEAM AND BRACING | 22500.00 | 1A |
| 47 | BAP | FW382 | ELEVATOR FLOORS | 22500.00 | 1A |
| 48 | BAP | FW383 | ELEVATOR STAIR AND HAND RAIL | 9000.00 | 1A |
| 49 | BAP | FW384 | ELEVATOR FLOOR GRILL | 9000.00 | 1A |
| 50 | BAP | FW385 | ELEVATOR M/C ROOM & GUIDE , | 9000.00 | 1A |
| 51 | BAP | FW386 | INTER-CONNECTING PLTF TO ABS | 9000.00 | 1A |
| 52 | BAP | FW610 | GALLARIES & RAIL FOR ABSORBER | 9430.00 | 1A |
| 53 | BAP | FW611 | GALLARIES AND RAILINGS FOR GGH | 45000.00 | 1A |
| 54 | BAP | FW612 | GALLARIES AND RAILINGS FOR DAM | 9000.00 | 1A |
| 55 | BAP | FW613 | GALLARIES AND RAILINGS FOR DUC | 9000.00 | 1A |
| 56 | BAP | FW709 | TRENCH COVER PLATE | 4500.00 | 1A |
| 57 | BAP | FW710 | MONORAIL FOR HOIST & CRANES | 36000.00 | 1A |
| 58 | BAP | FW713 | CHAIN PULLEYS | 18000.00 | 1A |
| 59 | BAP | FW714 | HOISTS | 45000.00 | 1A |
| 60 | BAP | FW717 | MAN HOLE DOOR | 13500.00 | 1A |

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|---|---|---|---|---|---|
| 61 | BAP | FW718 | ROOF SHEETING | 9000.00 | 1A |
| 62 | BAP | FW779 | SUPPORTS FOR CABLE TRAYS/CONTR | 18570.00 | 1A |
| 63 | BAP | FW781 | START STOP PUSH BUTTON | 900.00 | 1A |
| 64 | BAP | FW991 | SPECIAL WELDING ELECTRODE | 4500.00 | 1A |
| 65 | BAP | FW996 | TOOLS & TACKLES | 9000.00 | 1A |
| 66 | HPEP-Hyd | 13365000002-00 | vent silencer supporting structure | 1053.00 | 1A |
| 67 | HPEP-Hyd | 13365000003-00 | DISCHARGE SILENCER SUPPORTING STRUCTURE | 815.00 | 1A |
| 68 | HPEP-Hyd | 13365000004-00 | MAINTENANCE PLATFORM | 260.00 | 1A |
| 69 | HPEP-Hyd | 13365000005-00 | SUCTION FILTER SUPPORTING ARANG | 200.00 | 1A |
| 70 | HPEP-Hyd | 13365000001-P1 | MAIN PLATFORM BRACING | 104.00 | 1A |
| 71 | HPEP-Hyd | 13365000001-P2 | FILTER SUPPORT BRACING | 104.00 | 1A |
| 72 | HPEP-Hyd | AA1014883040 | PLT CS 6 CHQD,1*2500.00*1000.00MM | 133.00 | 1A |
| 73 | HPEP-Hyd | AA1014883040 | PLT CS 6 CHQD,2*2000.00*1000.00MM | 212.80 | 1A |
| 74 | HPEP-Hyd | AA1014883040 | PLT CS 6 CHQD,1*2500.00*600.00MM | 79.80 | 1A |
| 75 | HPEP-Hyd | AA1014883040 | PLT CS 6 CHQD,2*2000.00*600.00MM | 127.68 | 1A |
| 76 | HPEP-Hyd | 33365000002-00 | HAND RAIL | 313.00 | 1A |
| 77 | HPEP-Hyd | 13365000002-00 | vent silencer supporting structure | 1053.00 | 1A |
| 78 | HPEP-Hyd | 13365000003-00 | DISCHARGE SILENCER SUPPORTING STRUCTURE | 815.00 | 1A |
| 79 | HPEP-Hyd | 13365000004-00 | MAINTENANCE PLATFORM | 260.00 | 1A |
| 80 | HPEP-Hyd | 13365000005-00 | SUCTION FILTER SUPPORTING ARANG | 200.00 | 1A |
| 81 | HPEP-Hyd | 13365000001-P1 | MAIN PLATFORM BRACING | 104.00 | 1A |
| 82 | HPEP-Hyd | 13365000001-P2 | FILTER SUPPORT BRACING | 104.00 | 1A |

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|---|---|---|---|---|---|
| 83 | HPEP-Hyd | AA1014883040 | PLT CS 8 CHQD,1*2500.00*1000.00MM | 172.25 | 1A |
| 84 | HPEP-Hyd | AA1014883040 | PLT CS 8 CHQD,2*2000.00*1000.00MM | 275.60 | 1A |
| 85 | HPEP-Hyd | AA1014883040 | PLT CS 8 CHQD,1*2500.00*600.00MM | 103.35 | 1A |
| 86 | HPEP-Hyd | AA1014883040 | PLT CS 6 CHQD,2*2000.00*600.00MM | 127.68 | 1A |
| 87 | HPEP-Hyd | 33365000002-00 | HAND RAIL | 313.00 | 1A |
| 88 | HPEP-Hyd | 33352500135-00 | LIFTING TOOL FOR END COVER | 60.00 | 1A |
| 89 | HPEP-Hyd | 33352500136-00 | LIFTING TOOL FOR SHEAR RING & C.COVERS | 24.00 | 1A |
| 90 | HPEP-Hyd | TC9752404014 | SUPPORT FRAME FOR DIAPHR(400 SERIES ) | 200.00 | 1A |
| 91 | HPEP-Hyd | TC9752414010 | HYD EQPT FOR COUPLIN ASY/DISASY FIXT | 15.00 | 1A |
| 92 | HPEP-Hyd | TC9752414028 | HYD CYL- ENERPAC NO. RC 106 | 6.00 | 1A |
| 93 | HPEP-Hyd | Silo | Day Silo Fabricated Items | 130000.00 | 1A |
| 94 | PESD | Material Handling | Electric Hoists for Cake & cloth washing Pump | 1500.00 | 1A |
| 95 | PESD | Material Handling | Electric Hoist for Vacuum Pump | 1500.00 | 1A |
| 96 | PESD | Material Handling | Electric Hoist for Vacuum belt filter | 1000.00 | 1A |
| 97 | PESD | Material Handling | Electric host for Hydro cyclone | 1000.00 | 1A |
| 98 | PESD | Material Handling | Manual Hoists | 2000.00 | 1A |
| 99 | BAP | 52041 | HOT END CONN PLATE | 34200.00 | 2A |
| 100 | BAP | 52042 | COLD END CONN PLATE | 30600.00 | 2A |
| 101 | BAP | 57141 | SEAL AIR HAG AND ID FAN OUTGATE | 10370.00 | 2A |
| 102 | BAP | 57209 | MTG BKT FOR CL DAMPER AIR CYL | 1090.00 | 2A |
| 103 | BAP | 57497 | KNIFE GATE VALVE | 1230.00 | 2A |
| 104 | BAP | 57540 | GATE-FGD BOOSTER FAN INLET | 61530.00 | 2A |
| 105 | BAP | 57550 | GATE-FGD BOOSTER FAN OUTLET | 62650.00 | 2A |

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| 106 | BAP | 57570 | GATE-FGD OUTLET | 61910.00 | 2A |
| 107 | BAP | 57577 | ELECT ACTUATOR FOR GATE,DAMPER | 17400.00 | 2A |
| 108 | BAP | 57578 | ELECTRICAL ITEMS FOR GATE,DAMP | 20.00 | 2A |
| 109 | BAP | 57583 | DAMPER FGD BYPASS | 44470.00 | 2A |
| 110 | BAP | FW201 | ABSORB. RC PUMP NOZZLE | 9000.00 | 2A |
| 111 | BAP | FW202 | ABS NOZL NB 300 & ABOVE | 9000.00 | 2A |
| 112 | BAP | FW203 | NOZZLE NB25 TO NB250 | 9000.00 | 2A |
| 113 | BAP | FW207 | OUTLET GUIDE VANE | 9000.00 | 2A |
| 114 | BAP | FW213 | ABSORBER SYSTEM INTERNALS | 45000.00 | 2A |
| 115 | BAP | FW215 | MIST ELIMINATOR & ACCESSORIES | 36000.00 | 2A |
| 116 | BAP | FW216 | ABS BAFFLE GRATING SUPP | 36000.00 | 2A |
| 117 | BAP | FW217 | ABS ME SUPPORT | 36000.00 | 2A |
| 118 | BAP | FW218 | ABS SPRAY PIPE SUPP | 27000.00 | 2A |
| 119 | BAP | FW225 | ABSORBER SYSTEM- LINING | 27000.00 | 2A |
| 120 | BAP | FW228 | ABSORBER-W/D INTERFACE | 8100.00 | 2A |
| 121 | BAP | FW229 | W/D WASH SYSTEM | 7200.00 | 2A |
| 122 | BAP | FW241 | ABSORBER AGITATOR | 13500.00 | 2A |
| 123 | BAP | FW251 | EXPNSN JNT METALLIC | 29320.00 | 2A |
| 124 | BAP | FW252 | EXPNSN JNT NON METALLIC | 4500.00 | 2A |
| 125 | BAP | FW264 | LINING FOR GGH | 1800.00 | 2A |
| 126 | BAP | FW265 | LINING OF DUCT | 9000.00 | 2A |
| 127 | BAP | FW293 | ELEVATOR AND ACCESSORIES | 7200.00 | 2A |
| 128 | BAP | FW322 | ABSORBER SYSTEM-CASING INTERM | 72000.00 | 2A |
| 129 | BAP | FW725 | NOZZLES & FLANGES | 27000.00 | 2A |
| 130 | BAP | FW798 | AIR RECEIVERS | 4500.00 | 2A |
| 131 | BAP | FW816 | MANL BTRFLY VALV- UTLTY | 2250.00 | 2A |
| 132 | BAP | FW817 | MOTOR BTRFL VALV-UTLTY | 1800.00 | 2A |
| 133 | BAP | FW818 | PNEM BTRFLY VALV-UTLTY | 900.00 | 2A |
| 134 | BAP | FW819 | MAN BTRFLY VALV-LS SLRY | 2700.00 | 2A |
| 135 | BAP | FW820 | MOTOR BTRFLY VALV-LS SLRY | 5400.00 | 2A |
| 136 | BAP | FW821 | PNEUM BTRFLY VALV-LS SLRY | 1800.00 | 2A |
| 137 | BAP | FW822 | MAN BTRFLY VALV-GYP SLRY | 4500.00 | 2A |
| 138 | BAP | FW823 | MOTOR BTRFLY VALV -GYP SLRY | 13500.00 | 2A |
| 139 | BAP | FW828 | MAN GATE VALV-UTLTY | 18000.00 | 2A |
| 140 | BAP | FW829 | MOTOR GATE VALV-UTLTY | 4500.00 | 2A |
| 141 | BAP | FW834 | MAIN GLOBE VALV-UTLTY | 9000.00 | 2A |

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|---|---|---|---|---|---|
| 142 | BAP | FW840 | CERAMIV VALVES | 900.00 | 2A |
| 143 | BAP | FW841 | CONTROL VALVES | 900.00 | 2A |
| 144 | BAP | FW842 | MAN PINCH VALV-GYP SLRY | 900.00 | 2A |
| 145 | BAP | FW845 | BALL VALVES- WATER | 900.00 | 2A |
| 146 | BAP | FW848 | CHECK VALVES- WATER | 900.00 | 2A |
| 147 | BAP | FW851 | DIAPHRAGM VALV-SLURRY | 900.00 | 2A |
| 148 | BAP | FW854 | ROOT VALV INSTRMNTN | 4500.00 | 2A |
| 149 | BAP | FW988 | COMMISSIONING SPARES | 18000.00 | 2A |
| 150 | Trichy Valves | XXXX | Valves from Size 1inch to 10 inch | 12924.00 | 2A |
| 151 | HPEP-Hyd | TC9756446013 | SUCTION AIR FILTER SILENCER 16"#150RF | 320.00 | 2A |
| 152 | HPEP-Hyd | TC9756448016 | DISCHARGE SILENCER OX BLOWER 14"150RF | 1480.00 | 2A |
| 153 | HPEP-Hyd | TC9756446013 | SUCTION AIR FILTER SILENCER 16"#150RF | 320.00 | 2A |
| 154 | HPEP-Hyd | TC9756445017 | BUTEERFLY VALVE CS 14"#150RF WAFER TYPE | 60.00 | 2A |
| 155 | HPEP-Hyd | AA5710004006 | ISO VG 46 GRADE OIL | 1260.00 | 2A |
| 156 | HPEP-Hyd | TC9752549004 | DIAPHRAGM ASSY/DIS-ASSLY FIX. W/O HD EQP | 130.00 | 2A |
| 157 | HPEP-Hyd | BA9789132000 | COMPLETE AGITATOR ASSEMBLY-WBM 2958 | 200.00 | 2A |
| 158 | HPEP-Hyd | BA9789132000 | COMPLETE AGITATOR ASSEMBLY-WBM 2958 | 200.00 | 2A |
| 159 | HPEP-Hyd | BA9750140010 | BF SHUTOFF GATE WITH ELECTRIC ACTUATOR | 135.00 | 2A |
| 160 | PESD | Gypsum Dewatering System | Vacuum pumps with driver (IE3 motor), All connection bolts/nuts/washers for installation, Required instruments and any safety device. Necessary vibration isolators shall be provided to prevent the transmission of the dynamic loads on to the building structure.- 2 Nos | 16000.00 | 2A |
| 161 | PESD | Gypsum Dewatering System | Vent fan including enclosure and its arrangement- 2 Nos | 2000.00 | 2A |
| 162 | PESD | Agitators | Auxiliary Absorbent Tank Agitator (1 No. Tank) | 4500.00 | 2A |

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| 163 | PESD | Agitators | Lime Stone Slurry Storage Tank Agitator- 2NOS | 10000.00 | 2A |
| 164 | PESD | Agitators | Secondary Hydro cyclone Feed Tank Agitator | 1500.00 | 2A |
| 165 | PESD | Agitators | FILTRATE WATER Sump AGITATOR | 1000.00 | 2A |
| 166 | PESD | Agitators | WASTE WATER TANK AGITATOR | 1500.00 | 2A |
| 167 | PESD | Agitators | ABSORBER AREA DRAIN SUMP AGITATOR | 1000.00 | 2A |
| 168 | PESD | Agitators | GYPSUM AREA DRAIN SUMP AGITATOR | 1000.00 | 2A |
| 169 | PESD | Agitators | LIMESTONE AREA DRAIN SUMP AGITATOR | 1000.00 | 2A |
| 170 | PESD | Dosing | Dosing System | 5000.00 | 2A |
| 171 | BAP | 52010 | LARG AH-ROTOR ASSY | 81000.00 | 3A |
| 172 | BAP | 52024 | COLD BASKET&ELEMENT | 282000.00 | 3A |
| 173 | BAP | 52030 | LARG AH-ROTORHOUSING | 20250.00 | 3A |
| 174 | BAP | 52101 | LARG AH-AUX ROTDRIVE | 4950.00 | 3A |
| 175 | BAP | 52220 | LARG AH-GENS DETAILS | 11700.00 | 3A |
| 176 | BAP | 52988 | LARG AH COMMISSIONING SPARE | 90.00 | 3A |
| 177 | BAP | 55000 | FAN TOOL & FIXTURE | 410.00 | 3A |
| 178 | BAP | 55084 | BUF C & S AIR FAN | 2700.00 | 3A |
| 179 | BAP | 55287 | 1 STG BUF ROTOR | 16890.00 | 3A |
| 180 | BAP | 55587 | 1 STG BUF HOUSING | 73170.00 | 3A |
| 181 | BAP | 55880 | BUF CPLNG | 1800.00 | 3A |
| 182 | BAP | 55980 | BUF LUBE OIL SYS | 3150.00 | 3A |
| 183 | BAP | 55983 | BUF ACTUATOR | 72.00 | 3A |
| 184 | BAP | 57491 | BLOWER WITH MOTOR | 3070.00 | 3A |
| 185 | BAP | FW701 | SLURRY PUMPS & ACCESSORIES | 67500.00 | 3A |
| 186 | BAP | FW702 | WATER PUMPS & ACCESSORIES | 27000.00 | 3A |
| 187 | BAP | FW753 | SLURRY PIPE ACCESSORIES | 187081.60 | 3A |
| 188 | BAP | FW815 | RC PUMP INLT & OUTLT VALVE | 54000.00 | 3A |
| 189 | HPEP-Hyd | ZC01-1044503200 | BLOWER TRAIN& B.PLATE WITH PIPING ASY | 35302.14 | 3A |
| 190 | HPEP-Hyd | 23321200155-00P3 | C2-COUPLING SPACERS AND LOOSE PARTS | 2.00 | 3A |
| 191 | HPEP-Hyd | 23321200155-00P20 | C2-CPLG SET OF SPARES (BOLTS,NUTS&SHIMS) | 1.00 | 3A |
| 192 | HPEP-Hyd | 23321100057-00P6 | C1-COUPLING SPACERS AND LOOSE PARTS | 4.00 | 3A |

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| 193 | HPEP-Hyd | 23321100057-00P20 | C1-CPLG SET OF SPARES(BOLTS.NUTS&SHIMS) | 1.00 | 3A |
| 194 | HPEP-Hyd | TC9754322090 | CHARGING & TESTING KIT FOR ACCUMULATOR | 10.00 | 3A |
| 195 | HPEP-Hyd | 33360035026-00 | SPREADER BAR L=5100 | 604.00 | 3A |
| 196 | HPEP-Hyd | AA7111124014 | BOLT HEX M20X65-8.8 | 7.07 | 3A |
| 197 | HPEP-Hyd | AA7111122240 | BOLT HEX M16X50-8.8 | 3.89 | 3A |
| 198 | HPEP-Hyd | HY9603163171 | SPRING SUPPORT VAR (PEDESTAL)630/150 | 46.00 | 3A |
| 199 | HPEP-Hyd | ZC01-1044503300 | BLOWER TRAIN& B.PLATE WITH PIPING ASY | 35310.64 | 3A |
| 200 | HPEP-Hyd | 23321200155-00P3 | C2-COUPLING SPACERS AND LOOSE PARTS | 2.00 | 3A |
| 201 | HPEP-Hyd | 23321200155-00P20 | C2-CPLG SET OF SPARES (BOLTS,NUTS&SHIMS) | 1.00 | 3A |
| 202 | HPEP-Hyd | 23321100057-00P6 | C1-COUPLING SPACERS AND LOOSE PARTS | 4.00 | 3A |
| 203 | HPEP-Hyd | 23321100057-00P20 | C1-CPLG SET OF SPARES(BOLTS.NUTS&SHIMS) | 1.00 | 3A |
| 204 | HPEP-Hyd | 33360035026-00 | SPREADER BAR L=5100 | 604.00 | 3A |
| 205 | HPEP-Hyd | AA7111124014 | BOLT HEX M20X65-8.8 | 7.07 | 3A |
| 206 | HPEP-Hyd | AA7111122240 | BOLT HEX M16X50-8.8 | 3.89 | 3A |
| 207 | HPEP-Hyd | TC9756447010 | VENT SILENCER INLET PIPE SIZE 250NB | 548.00 | 3A |
| 208 | HPEP-Hyd | HY9603163171 | SPRING SUPPORT VAR (PEDESTAL)630/150 | 46.00 | 3A |
| 209 | HPEP-Hyd | TC9765601018 | QUENCHING NOZZLE WITH PIPE&FLANGE ASBLY | 20.00 | 3A |
| 210 | HPEP-Hyd | 43353900060-01MC | SHIM 0.1 | 1.09 | 3A |
| 211 | HPEP-Hyd | 43353900060-02MC | SHIM 0.2 | 2.18 | 3A |
| 212 | HPEP-Hyd | 43353900060-03MC | SHIM 0.5 | 5.43 | 3A |

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|---|---|---|---|---|---|
| 213 | HPEP-Hyd | 43353900060-04MC | SHIM 1.0 | 10.87 | 3A |
| 214 | HPEP-Hyd | 43353900060-01MC | SHIM 0.1 | 1.09 | 3A |
| 215 | HPEP-Hyd | 43353900060-02MC | SHIM 0.2 | 2.18 | 3A |
| 216 | HPEP-Hyd | 43353900060-03MC | SHIM 0.5 | 5.43 | 3A |
| 217 | HPEP-Hyd | 43353900060-04MC | SHIM 1.0 | 10.87 | 3A |
| 218 | HPEP-Hyd | TC9752402011 | CLEARANCE CHECK FIXTURE FOR ROTOR | 100.00 | 3A |
| 219 | HPEP-Hyd | TC9752415016 | COUPL ASSY&DISASSY FIXTURE FOR HUB D 50 | 50.00 | 3A |
| 220 | HPEP-Hyd | TC9752441017 | HI. PR.OIL INJECT.PUMP ASSY.INCL.PR.GUAG | 12.00 | 3A |
| 221 | HPEP-Hyd | TC9752515010 | ROTOR ALIGNMENT FIXTURE DIA40,50 DBSE450 | 12.50 | 3A |
| 222 | HPEP-Hyd | TC9754302006 | TOOL KIT FOR IT | 60.00 | 3A |
| 223 | HPEP-Hyd | 43353900001-00 | FOUNDATION STUD M36X3X1000 | 241.80 | 3A |
| 224 | HPEP-Hyd | 43353900059-01 | SQ.WASHER(M36x3) | 69.42 | 3A |
| 225 | HPEP-Hyd | 43353900004-00 | LEVELING BLOCK | 88.40 | 3A |
| 226 | HPEP-Hyd | 43353900005-00 | SOLE PLATE | 295.26 | 3A |
| 227 | HPEP-Hyd | 43353900001-00 | FOUNDATION STUD M36X3X1000 | 241.80 | 3A |
| 228 | HPEP-Hyd | 43353900059-01 | SQ.WASHER(M36x3) | 69.42 | 3A |
| 229 | HPEP-Hyd | 43353900004-00 | LEVELING BLOCK | 88.40 | 3A |
| 230 | HPEP-Hyd | 43353900005-00 | SOLE PLATE | 295.26 | 3A |
| 231 | HPEP-Hyd | GT9754229074 | CONNECTOR TUBE MALE 1/2"X1/2" | 1.00 | 3A |
| 232 | HPEP-Hyd | GT9754229988 | CONNECTOR TUBE FEMALE1/2"X1/2" | 0.20 | 3A |

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|---|---|---|---|---|---|
| 233 | HPEP-Hyd | GT9754229015 | UNION TUBE 1/2" | 0.40 | 3A |
| 234 | HPEP-Hyd | TC9755820566 | SMART WP DPT 0- 0.13- 1.3 KG/CM2 | 15.00 | 3A |
| 235 | HPEP-Hyd | TC9755802010 | SMART TEMP TRANSMITTER, WP | 5.00 | 3A |
| 236 | HPEP-Hyd | AA7322031628 | NI/CR-NI/ALTCTD,SD8,L=219,DUP,M20X1.5-M | 0.80 | 3A |
| 237 | HPEP-Hyd | AA7326005141 | THERMOWELL,SS,MP BLB 8,L1-150,N1=75 | 0.40 | 3A |
| 238 | HPEP-Hyd | HY2859993029 | SIG CBL,1PX1.5,N-IS,CU,PVC/FRLS,IND SHLD | 14.80 | 3A |
| 239 | HPEP-Hyd | HY7240193462 | O RING VITON OD 1002 ID 988 TH 7 | 0.45 | 3A |
| 240 | HPEP-Hyd | HY7240193446 | O RING VITON OD 962 ID 948 TH 7 | 0.21 | 3A |
| 241 | HPEP-Hyd | HY7240193284 | O RING VITON OD 356.3 ID 342.3 TH 7 | 0.08 | 3A |
| 242 | HPEP-Hyd | HY7240198766 | O RING VITON OD273.35 ID266.29 THK3.53 | 0.02 | 3A |
| 243 | HPEP-Hyd | HY7240198782 | O RING VITON OD 261 ID 247 THK 7 | 0.05 | 3A |
| 244 | HPEP-Hyd | HY7240193039 | O RING VITON OD 36.81 ID 29.75 TH 3.53 | 0.00 | 3A |
| 245 | HPEP-Hyd | HY5960261014 | SILICON DIA 2.62 | 0.15 | 3A |
| 246 | HPEP-Hyd | TC9762673026 | SET OF RTDS FOR GEARBOX-BHUSAWAL FGD | 2.00 | 3A |
| 247 | HPEP-Hyd | 06221500021-00 | CHEEK WITH TRUNNION DE_DIA 2.9 M | 6120.00 | 3A |
| 248 | HPEP-Hyd | 06221500022-00 | CHEEK WITH TRUNNION NDE_DIA 2.9 M | 6107.00 | 3A |
| 249 | HPEP-Hyd | 06221500038-00 | MILL HALF SHELL MACHINING-DE | 8430.00 | 3A |
| 250 | HPEP-Hyd | 06221500039-00 | MILL HALF SHELL MACHINING-NDE | 8410.00 | 3A |
| 251 | HPEP-Hyd | 06221500038-00 | MILL HALF SHELL MACHINING-DE | 8430.00 | 3A |

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|---|---|---|---|---|---|
| 252 | HPEP-Hyd | 06221500039-00 | MILL HALF SHELL MACHINING-NDE | 8410.00 | 3A |
| 253 | HPEP-Hyd | BA9789123000 | WBM LINERS FOR 17.15 TPH | 1.00 | 3A |
| 254 | HPEP-Hyd | BA9789121008 | TROMMEL SCREEN ASSEMBLY 17.15 TPH WBM | 1.00 | 3A |
| 255 | HPEP-Hyd | BA9789047010 | GIRTH GEAR FOR WBM 2958 | 7200.00 | 3A |
| 256 | HPEP-Hyd | BA9789110006 | MILL CIRCUIT PUMP FOR WBM 2958 | 700.00 | 3A |
| 257 | HPEP-Hyd | BA9789125003 | HYDRO CYCLONE ASSY 17.15TPH WBM | 1.00 | 3A |
| 258 | HPEP-Hyd | BA9789119003 | BALL CHARGE 17.15 TPH WBM | 546000.00 | 3A |
| 259 | HPEP-Hyd | BA9789107005 | LIME STONE WEIGH FEEDER&PNEMUNATIC DIV | 8000.00 | 3A |
| 260 | HPEP-Hyd | BA9789123000 | WBM LINERS FOR 17.15 TPH | 1.00 | 3A |
| 261 | HPEP-Hyd | BA9789121008 | TROMMEL SCREEN ASSEMBLY 17.15 TPH WBM | 1.00 | 3A |
| 262 | HPEP-Hyd | BA9789047010 | GIRTH GEAR FOR WBM 2958 | 7200.00 | 3A |
| 263 | HPEP-Hyd | BA9789110006 | MILL CIRCUIT PUMP FOR WBM 2958 | 700.00 | 3A |
| 264 | HPEP-Hyd | BA9789125003 | HYDRO CYCLONE ASSY 17.15TPH WBM | 1.00 | 3A |
| 265 | HPEP-Hyd | BA9789119003 | BALL CHARGE 17.15 TPH WBM | 546000.00 | 3A |
| 266 | HPEP-Hyd | BA9789107005 | LIME STONE WEIGH FEEDER&PNEMUNATIC DIV | 8000.00 | 3A |
| 267 | HPEP-Hyd | 06221500021-00 | CHEEK WITH TRUNNION DE_DIA 2.9 M | 6120.00 | 3A |
| 268 | HPEP-Hyd | 06221500022-00 | CHEEK WITH TRUNNION NDE_DIA 2.9 M | 6107.00 | 3A |
| 269 | HPEP-Hyd | BA9789047029 | PINION FOR WBM 2958 | 650.00 | 3A |
| 270 | HPEP-Hyd | BA9711322153 | LOW SPEED COUPING | 300.00 | 3A |
| 271 | HPEP-Hyd | BA9789046006 | MAIN REDUCER WITH LUBE OIL SYS | 5500.00 | 3A |

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|---|---|---|---|---|---|
| 272 | HPEP-Hyd | 16270350682-00 | BASE PLATE(MAIN REDUCER) | 374.00 | 3A |
| 273 | HPEP-Hyd | 46270350886-00 | SPACER(MAIN MOTOR) | 3.14 | 3A |
| 274 | HPEP-Hyd | 26270350469-00 | GAURD FOR COUPLING(MAIN REDUCER TO COUNT | 65.24 | 3A |
| 275 | HPEP-Hyd | 26270350467-00 | COUPLING HOUSING(MAIN REDUCER TO MAIN MO | 38.70 | 3A |
| 276 | HPEP-Hyd | BA9711322145 | HIGH SPEED COUPING | 300.00 | 3A |
| 277 | HPEP-Hyd | BA9750053001 | G. G. GREASING SYSTEM | 200.00 | 3A |
| 278 | HPEP-Hyd | BA9710100025 | BALL FEEDING ASSEMBLY | 1687.00 | 3A |
| 279 | HPEP-Hyd | BA9789080000 | FOUNDATION FASTNERS SET FOR WBM 2958 | 21.00 | 3A |
| 280 | HPEP-Hyd | BA9789047029 | PINION FOR WBM 2958 | 650.00 | 3A |
| 281 | HPEP-Hyd | BA9711322153 | LOW SPEED COUPING | 300.00 | 3A |
| 282 | HPEP-Hyd | BA9789046006 | MAIN REDUCER WITH LUBE OIL SYS | 5500.00 | 3A |
| 283 | HPEP-Hyd | 16270350682-00 | BASE PLATE(MAIN REDUCER) | 374.00 | 3A |
| 328 | HPEP-Hyd | 46270350886-00 | SPACER(MAIN MOTOR) | 3.14 | 3A |
| 284 | HPEP-Hyd | 26270350469-00 | GAURD FOR COUPLING(MAIN REDUCER TO COUNT | 65.24 | 3A |
| 285 | HPEP-Hyd | 26270350467-00 | COUPLING HOUSING(MAIN REDUCER TO MAIN MO | 38.70 | 3A |
| 286 | HPEP-Hyd | BA9711322145 | HIGH SPEED COUPING | 300.00 | 3A |
| 287 | HPEP-Hyd | BA9750053001 | G. G. GREASING SYSTEM | 200.00 | 3A |
| 288 | HPEP-Hyd | BA9710100025 | BALL FEEDING ASSEMBLY | 1687.00 | 3A |
| 289 | HPEP-Hyd | BA9750140010 | BF SHUTOFF GATE WITH ELECTRIC ACTUATOR | 135.00 | 3A |
| 290 | HPEP-Hyd | FP9760327015 | SLURRY RC.PUMP,KTPS 1X800MW,12500,18.4 | 12000.00 | 3A |

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| 291 | HPEP-Hyd | FP9760327015 | SLURRY RC.PUMP,KTPS 1X800MW,12500,18.4 | 12000.00 | 3A |
| 292 | HPEP-Hyd | FP9760327015 | SLURRY RC.PUMP,KTPS 1X800MW,12500,18.4 | 12000.00 | 3A |
| 293 | HPEP-Hyd | FP9760327015 | SLURRY RC.PUMP,KTPS 1X800MW,12500,18.4 | 12000.00 | 3A |
| 294 | HPEP-Hyd | FP9760327015 | SLURRY RC.PUMP,KTPS 1X800MW,12500,18.4 | 12000.00 | 3A |
| 295 | Bhopal | xxxx | Motor-Booster Fan | 18000.00 | 3A |
| 296 | Bhopal | xxxx | Motor-Wet Ball Mill | 6850.00 | 3A |
| 297 | Bhopal | xxxx | Motor-Oxidation Blower | 5300.00 | 3A |
| 298 | Bhopal | xxxx | Motor-RC Pump | 6600.00 | 3A |
| 299 | PESD | Gypsum Dewatering System | Belt filter washing pump with motor | 4000.00 | 3A |
| 300 | BAP | FW226 | EMERGENCY QUENCH WATER TANK | 14400.00 | 1A |
| 301 | BAP | FW227 | EMERGENCY QUENCH SYSTEM | 7200.00 | 1A |
| 302 | HPEP-Hyd | BA9789130007 | MILL CIRCUIT TANK- WBM 2958 | 3400.00 | 1A |
| 303 | HPEP-Hyd | BA9789130007 | MILL CIRCUIT TANK- WBM 2958 | 3400.00 | 1A |
| 304 | PESD | Gypsum Dewatering System | Belt filter washing tank | 10000.00 | 1A |
| 305 | PESD | Gypsum Dewatering System | Primary hydro cyclone Consisting of Hydro cyclone clusters along with the Anchor bolts, nuts and washers, flanges, Accessory piping within the skid.- 2 Sets | 2000.00 | 4A |
| 306 | PESD | Gypsum Dewatering System | Secondary hydro cyclone consisting of Hydro cyclone clusters along with the Anchor bolts, nuts and washers, flanges, Accessory piping within the skid.- 2 Sets | 2000.00 | 4A |
| 307 | PESD | Gypsum Dewatering System | Vacuum belt filters complete with Accessories including discharge chute, Drivers (VFD with LCP) and driving motors(IE3) with inverter panel, cloth | 120000.00 | 4A |

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| | | | spray nozzles, rubber belt , cloth etc.- 2 Nos | | |
| 308 | PESD | Gypsum Dewatering System | Vacuum receivers with Anchor bolts, nuts and washers- 2 Nos | 4000.00 | 4A |
| 309 | PESD | Slurry Tank | Auxiliary Absorbent Tank (AAT) | 75000.00 | 4A |
| 310 | PESD | Slurry Tank | Lime Stone Slurry Storage Tank (LSST)-2 nos | 152000.00 | 4A |
| 311 | PESD | Slurry Tank | Secondary Hydro Cyclone Feed Storage Tank (SHCFT) | 18000.00 | 4A |
| 312 | PESD | Slurry Tank | Waste Water Storage Tank (WWT) | 32000.00 | 4A |
| 313 | PESD | Water Storage Tank | Process Water Storage Tank (PWT) | 16000.00 | 4A |
| 314 | BAP | FW268 | FIXING COMP FOR DUCT | 68950.00 | 5A |
| 315 | BAP | FW295 | FIXING COMP FOR GGH INSUL | 36000.00 | 5A |
| 316 | PC-Trichy | 81-318 | FIX COM FOR MISCELLANEOUS PPG INSULATION | 100.00 | 5A |
| 317 | BAP | FW267 | INSULATION MATERIALS FOR DUCT | 99022.63 | 5B |
| 318 | BAP | FW294 | INSUL MATL FOR GGH | 31500.00 | 5B |
| 319 | PC-Trichy | 81-325 | MINERAL WOOL MATTRESS | 2000.00 | 5B |
| 320 | PC-Trichy | 81-341 | SEALING COMPOUND FOR INSL | 100.00 | 5B |
| 321 | BAP | FW269 | CLADDING SHEET FOR DUCT | 22500.00 | 5C |
| 322 | BAP | FW296 | CLADDING SHEET FOR GGH | 13500.00 | 5C |
| 323 | PC-Trichy | 81-350 | ALUMINIUM CLADDING FOR INSULATION | 700.00 | 5C |
| 324 | PC-Trichy | 80-340 | AUX STEAM HEADER | 13000.00 | 6A |
| 325 | PC-Trichy | 80-463 | TG AUX COOLING WATER | 52000.00 | 6A |
| 326 | PC-Trichy | 80-477 | SERVICE WATER PIPING | 69000.00 | 6A |
| 327 | PC-Trichy | 80-901 | SUB DELIVERY VALVES FOR LIGHT UP | 100.00 | 6A |
| 328 | PC-Trichy | 80-921 | H AND S FOR LIGHT UP STEAM LINE | 2000.00 | 6A |

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|---|---|---|---|---|---|
| 329 | PC-Trichy | 80-992 | WELDING ELECTRODES-1 | 100.00 | 6A |
| 330 | HPEP-Hyd | ZC02-1044503200 | COMPRESOR SUCTION PIPING | 82.66 | 6A |
| 331 | HPEP-Hyd | ZC03-1044503200 | COMPRESOR DISCHARGE PIPING | 973.24 | 6A |
| 332 | HPEP-Hyd | TC9756447010 | VENT SILENCER INLET PIPE SIZE 250NB | 548.00 | 6A |
| 333 | HPEP-Hyd | 23362100387-03 | DISCHARGE SILENCER DRAIN | 12.00 | 6A |
| 334 | HPEP-Hyd | ZC03-1044503300 | COMPRESOR DISCHARGE PIPING | 768.24 | 6A |
| 335 | HPEP-Hyd | ZC02-1044503300 | COMPRESOR SUCTION PIPING | 82.66 | 6A |
| 336 | HPEP-Hyd | TC9756444010 | DUAL PLATE NRV 14"#150RF CS - FGD-AIR | 145.00 | 6A |
| 337 | HPEP-Hyd | TC9756448016 | DISCHARGE SILENCER OX BLOWER 14"150RF | 1480.00 | 6A |
| 338 | HPEP-Hyd | 23362100387-03 | DISCHARGE SILENCER DRAIN | 12.00 | 6A |
| 339 | HPEP-Hyd | AA5710004006 | ISO VG 46 GRADE OIL | 1260.00 | 6A |
| 340 | HPEP-Hyd | TC9765577010 | ANNUBAR 14" 150RF, CS BODY,SS INTERNAL | 40.00 | 6A |
| 341 | HPEP-Hyd | HY7242502730 | LR ELBOWS 90DEG. CS 14"SCH 30BW | 276.00 | 6A |
| 342 | HPEP-Hyd | HY7242511488 | CS TEE 14"SCH STD/30 BW | 60.00 | 6A |
| 343 | HPEP-Hyd | HY7246361774 | WN FLANGE,CS , 14" SCH 30,#150 RF | 50.00 | 6A |
| 344 | PESD | Gypsum Dewatering System | All Interconnected piping (slurry, air and water pipes), which includes the requisite pipe support materials, fitting's, gasket, flange materials, Bolting. | 2000.00 | 6A |
| 345 | PESD | Gypsum Dewatering System | Valves for the entire Gypsum Dewatering System-1 Lot | 2000.00 | 6A |
| 346 | PESD | Gypsum Dewatering System | Expansion Joints at suction & discharge of each pump and also for other equipment wherever applicable | 1000.00 | 6A |

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| 347 | PC-Trichy | 80-610 | SERVICE AIR-COMP SUCT AND DIS TO RECEI | 3700.00 | 6B |
| 348 | PC-Trichy | 80-614 | INST AIR COMP SUC AND DIS TO RECEIVER | 3000.00 | 6B |
| 349 | PC-Trichy | 80-478 | DRINKING WATER PIPING | 1300.00 | 6B |

### 1.9.3 Weight Schedule for Part C- TP-09 Structure Erection

| Sl No | Description | UOM | Rate Schedule |
|---|---|---|---|
| 1 | Structure Erection | 82 MT | LS |
| 2 | Cladding Sheet | 877 Sq Mts | LS |
| 3 | GI Hand Rails | 5 MT | LS |

# VOLUME-IA PART-I CHAPTER -X

# GENERAL

**1.10.0.0 The scope of the work will comprise of but not limited to the following.**

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified).

1.10.1.0 **a. The successful bidder shall furnish the following at PSSR-HQ, Chennai immediately after release of Letter of Intent (LOI)/Detailed LOI**

I. Unqualified Acceptance for LOI/Detailed LOI/ Work Order, as applicable.

II. Security Deposit.

III. Rs.100/- Stamp Paper for preparation of Contract Agreement.

1.10.1.1 **b. The successful bidder shall furnish the proof of documents for the following at PSSR- Site.**

I. PF Regn No.

II. Labour License No.

III. Workmen Insurance Policy No.

1.10.1.2 In addition to the clause 2.8 of General Conditions of Contract (Volume-1C of Book-II), the contractor shall comply with the following:

1.10.1.3 The Contractor shall conform to the provisions of Indian Boiler Regulation, State Government Factory Laws, Indian Electricity Act and rules made there under, and any other acts of legislature relating to the work and to the regulations and bye-laws of any national or local authority and of any water, lighting and other companies and/or authorities with whose systems the plant/structure is proposed to be connected and shall before making any variations from the drawings or specifications that may be necessitated by so conforming, giving to the Purchaser/Consultant written notice, specifying the variations proposed to be made and the reason for making if any apply for instructions thereof.

1.10.1.4 For any work involving repair & maintenance underground, the Contractor shall follow the safety procedural orders/instruction issued by BHEL Site Engineer/End User. The Contractor shall ensure supervision of such jobs by

competent persons within the meaning of Factories Act & Rules.

All persons engage on such jobs shall have to have proper training instructions as required under Factories Act & Rules.

1.10.1.5 The Contractor shall abide by the provisions of Factories Act, State Factory Rules, Employee Compensation Act, Payment of Wages Act, Contract Labour (Regulation) Act etc. and keep BHEL/End User indemnified of provision the above Acts and Rules.

**1.10.2.0 BOCW Act & BOCW Welfare Cess Act**

**1.10.2.1 BOCW Act & BOCW Welfare Cess Act**

1.10.2.1.1 The Contractor should Register their Establishment under BOCW Act 1996 read with rules 1998 by submitting Form I (Application for Registration of Establishment) and Form IV (Notice Of Commencement / Completion of Building other Construction Work) to the respective Labour Authorities i.e.,

a) Assistant Labour Commissioner (Central) in respect of the project premises which is under the purview of Central Govt.- NTPC, NTPL etc.

b) Appropriate State authorities in respect of the project premises which is under the purview of State Govt.

1.10.2.1.2 The Contractor should comply with the provisions of BOCW Welfare Cess Act 1996 in respect of the work awarded to them by BHEL.

1.10.2.1.3 The contractor should ensure compliance regarding Registration of Building Workers as Beneficiaries, Hours of work, welfare measures and other conditions of service with particular reference to Safety and Health measures like Safety Officers, safety committee, issue of Personal protective equipments, canteen, rest room, drinking water, Toilets, ambulance, first aid centre etc.

1.10.2.1.4 The contractor irrespective of their nature of work and manpower (Civil, Mechanical, Electrical works etc) should register their establishment under BOCW Act 1996 and comply with BOCW Welfare Cess Act 1996.

1.10.2.1.5 Contractor shall make remittance of the BOCW cess as per the Act in consultation with BHEL as per the rates in force (presently 1%). BHEL shall reimburse the same upon production of

documentary evidence. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.

1.10.2.1.6 Non-compliance to Provisions of the BOCW Act & BOCW Welfare Cess Act is not acceptable. In case of any non-compliance, BHEL reserves the right to withhold any sum as it deems fit. Only upon total compliance to the BOCW Act and also discharge of total payment of Cess under the BOCW Cess Act by the Contractor, BHEL shall consider refund of the Amounts

**1.10.3.0 PROVIDENT FUND**

1.10.3.1 The contractor is required to extend the benefit of Provident Fund to the labour employed by you in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due implementation of the same, you are hereby required to get yourself registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and furnish to us the code number allotted to you by the Provident Fund authorities within one month from the date of issue of the letter of intent. In case you are exempted from such remittance an attested copy of authority for such exemption is to be furnished. Please note that in the event of your failure to comply with the provisions of said Act, if recoveries therefore are enforced from payments due to us by the customer or paid to statutory authorities by us, such amount will be recovered from payments due to you.

1.10.3.2 The final bill amount would be released only on production of clearance certificate from PF / ESI and labour authorities as applicable

**1.10.4.0 OTHER STATUTORY REQUIREMENTS**

1.10.4.1 The Contractor shall submit a copy of Labour License obtained from the Licensing Officer (Form VI) u/r25 read with u/s 12 of

Contract Labour (R&A) Act 1970 & rules and Valid WC Insurance copy or ESI Code (if applicable) and PF code no. along with the first running bill.

1.10.4.2 The contactor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) u/r78(1)(a)(1) of Contract Labour Rules, copies of monthly return of PF contribution with remittance Challans under Employees Provident Fund Act 1952 and copy of renewed WC Insurance policy or copies of monthly return of ESI contribution with Challans under ESI Act 1948 (if applicable) in respect of the workmen engaged by them.

1.10.4.3 The Contractor should ensure compliance of Sec 21 of Contract Labour (R&A) Act 1970 regarding responsibility for payment of Wages. In case of "Non-compliance of Sec 21 or non-payment of wages" to the workmen before the expiry of wage period by the contractor, BHEL will reserve its right to pay the workmen under the orders of Appropriate authority at the risk and cost of the Contractor.

1.10.4.4 The Contractor shall submit copies of Final Settlement statement of disbursal of retrenchment benefits on retrenchment of each workmen under I D Act 1948, copies of Form 6-A (Annual Return of PF Contribution) along with copies of PF Contribution Card of each member under PF Act and copies of monthly return on ESI Contribution – Form 6 under ESI Act 1948 (if applicable) to BHEL along with the Final Bill.

1.10.4.5 In case of any dispute pending before the appropriate authority under ID Act 1948, WC Act 1923 or ESI Act 1948 and PF Act 1952, BHEL reserve the right to hold such amounts from the final bills of the Contractor which will be released on submission of proof of settlement of issues from the appropriate authority under the act.

1.10.4.6 In case of any dispute prolonged / pending before the authority for the reasons not attributable to the contractor, BHEL reserves the right to release the final bill of the contractor on submission of Indemnity bond by the contractor indemnifying BHEL against any

claims that may arise at a later date without prejudice to the rights of BHEL.

**1.10.5.0 DEPLOYMENT OF SKILLED / SEMI-SKILLED TRADESMEN**

The following clause is applicable in case the contract value / contract price is Rs. Five crores and above.

The contractor shall, at all stages of work deploy skilled / semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute / Industrial Training. Institute / National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed / certified by State / Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled / semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

**1.10.6.0 OTHER GENERAL REQUIREMENTS:**

The scope of the work will comprise of but not limited to the following. All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.

1.10.6.1 Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. The applicable erection manuals which are available with BHEL site office are to be referred for compliance and guidance before taking up the work. Any rework on this failure to comply with will be to account of contractor only. BHEL engineer, depending upon the availability of materials, fronts etc., will decide the sequence of erection and methodology. No claims

for extra payment from the contractor will be entertained on the grounds of deviation from the method of erection adopted in erection of similar jobs in other projects or for any reason whatsoever.

1.10.6.2 Contractor has to work in close co-ordination with other erection agencies at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less / more at a particular given time. Activities and erection program have to be planned in such a way that the milestones are achieved as per schedule / plans. Contractor shall arrange & augment the resources accordingly.

1.10.6.3 The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe / tubes, and handrails etc. for any temporary supporting or scaffolding works or as bed for pre-assembly works. Contractor shall arrange himself all such materials. In case of such misuse of BHEL materials, a sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.

1.10.6.4 All the works such as cleaning, leveling, aligning, trial assembly, dismantling of certain components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting-up etc., as may be applicable in such erection works and are necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rate. Major machining work, which is only to be carried out in workshops, will be arranged by BHEL.

1.10.6.5 The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management. The contractor should ensure successful and timely operation of equipment installed. The contractor must have adequate quantity of tools, construction aids, equipments etc., in his possession. He must also have on his rolls adequate trained, qualified and experienced supervisory staff and skilled personnel.

1.10.6.6 The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work. If the contractor has drawn materials in excess of design requirements, recoveries will be effected for such excess drawls at the rate prescribed by manufacturing units.

1.10.6.7 No member of the already erected structure, platform, pipes, grills, other component and auxiliaries should be cut without specific approval of BHEL engineer.

1.10.6.8 No temporary supports shall be welded on the pressure parts of piping. Welding of temporary supports, cleats, etc. on the boiler columns shall be avoided. In case of absolute necessity contractor shall take prior approval from BHEL Engineer. Further, any cutting or alternation of member of the structure of platform or other equipment shall not be done without specific prior approval of BHEL Engineer.

1.10.6.9 Contractors shall ensure that all their Staff / Employees are exposed to periodical training program conducted by qualified agencies / personnel on ISO 9001 – 2015 Standards.

1.10.6.10 Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer for other agencies, like piping, Turbine, Generator erection, Cabling, instrumentation, insulation etc., to commence their work from / on the equipments coming under this scope. Sometimes, more than one agencies may have to work in same location. Sometimes it may be required to re-schedule the activities to enable other agencies to commence / continue the work so as to keep the overall project schedule.

1.10.6.11 The terminal points decided by BHEL are final and binding on the contractor for deciding the scope of work and effecting the payment for the work done up to the terminals.

1.10.6.12 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.

1.10.6.13 If applicable, all boiler, piping layout drawings received from BHEL for pipeline erection to be submitted to Boiler Inspector for approval. After approval of the above drawing, Erection of pipe line to be started. Inspection fee and registration fee as mentioned in Chapter VIII of Special Conditions of contract (Volume-IB in Volume-I Book-II) shall be paid by BHEL.

1.10.6.14 Contractor should obtain the formal statutory clearance from Chief Inspector of Boilers to carry out erection & Welding of piping under IBR purview. Arrangement for the visit of Boiler inspector for field inspection, hydraulic test etc., is in the scope of contractor, and necessary drawing / details only will be given by BHEL.

1.10.6.15 Contractor shall arrange the necessary clearance from statutory authorities like IBR, Electrical Inspectorate, Explosive, etc. including the load test on Hoists/Handling as required for installation of the plant and equipment and render all assistance, service required in this regard.

1.10.6.16 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

1.10.6.17 Contractor shall submit a copy of license to undertake construction / repair of Boilers & Piping issued by Boiler inspectorate before commencement of Pressure Parts / Piping Erection.

1.10.6.18 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

1.10.6.19 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

1.10.6.20 Upon completion of daily work, the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.

1.10.6.21 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient, BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.

1.10.6.22 On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

1.10.6.23 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.

1.10.6.24 If applicable, all boiler, piping layout drawings received from BHEL for pipeline erection to be submitted to Boiler Inspector for approval. After approval of the above drawing, Erection of pipe line to be started. Inspection

fee and registration fee as mentioned in Chapter VIII of Special Conditions of contract (Volume-IB in Volume-I Book-II) shall be paid by BHEL.

1.10.6.25 Contractor should obtain the formal statutory clearance from Chief Inspector of Boilers to carry out erection & Welding of piping under IBR purview. Arrangement for the visit of Boiler inspector for field inspection, hydraulic test etc., is in the scope of contractor, and necessary drawing / details only will be given by BHEL.

1.10.6.26 Contractor shall arrange the necessary clearance from statutory authorities like IBR, Electrical Inspectorate, Explosive, etc. including the load test on Hoists/Handling as required for installation of the plant and equipment and render all assistance, service required in this regard.

1.10.6.27 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

1.10.6.28 Contractor shall submit a copy of license to undertake construction / repair of Boilers & Piping issued by Boiler inspectorate before commencement of Pressure Parts / Piping Erection.

1.10.6.29 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

1.10.6.30 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

1.10.6.31 Upon completion of daily work, the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.

1.10.6.32 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient, BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.

1.10.6.33 On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard

is final.

1.10.6.34 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.

1.10.6.35 If applicable, all boiler, piping layout drawings received from BHEL for pipeline erection to be submitted to Boiler Inspector for approval. After approval of the above drawing, Erection of pipe line to be started. Inspection fee and registration fee as mentioned in Chapter VIII of Special Conditions of contract (Volume-IB in Volume-I Book-II) shall be paid by BHEL.

1.10.6.36 Contractor should obtain the formal statutory clearance from Chief Inspector of Boilers to carry out erection & Welding of piping under IBR purview. Arrangement for the visit of Boiler inspector for field inspection, hydraulic test etc., is in the scope of contractor, and necessary drawing / details only will be given by BHEL.

1.10.6.37 Contractor shall arrange the necessary clearance from statutory authorities like IBR, Electrical Inspectorate, Explosive, etc. including the load test on Hoists/Handling as required for installation of the plant and equipment and render all assistance, service required in this regard.

1.10.6.38 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

1.10.6.39 Contractor shall submit a copy of license to undertake construction / repair of Boilers & Piping issued by Boiler inspectorate before commencement of Pressure Parts / Piping Erection.

1.10.6.40 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

1.10.6.41 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

**1.10.7.0** Upon completion of daily work, the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.

1.10.7.1 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient, BHEL will induct required additional workmen to improve the progress and recover all charges incurred

on this account including all expenses together with BHEL overheads from contractor's bills.

1.10.7.2 On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

1.10.7.3 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.

1.10.7.4 If applicable, all boiler, piping layout drawings received from BHEL for pipeline erection to be submitted to Boiler Inspector for approval. After approval of the above drawing, Erection of pipe line to be started. Inspection fee and registration fee as mentioned in Chapter VIII of Special Conditions of contract (Volume-IB in Volume-I Book-II) shall be paid by BHEL.

1.10.7.5 Contractor should obtain the formal statutory clearance from Chief Inspector of Boilers to carry out erection & Welding of piping under IBR purview. Arrangement for the visit of Boiler inspector for field inspection, hydraulic test etc., is in the scope of contractor, and necessary drawing / details only will be given by BHEL.

1.10.7.6 Contractor shall arrange the necessary clearance from statutory authorities like IBR, Electrical Inspectorate, Explosive, etc. including the load test on Hoists/Handling as required for installation of the plant and equipment and render all assistance, service required in this regard.

**1.10.8.0** All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

1.10.8.1 Contractor shall submit a copy of license to undertake construction / repair of Boilers & Piping issued by Boiler inspectorate before commencement of Pressure Parts / Piping Erection.

1.10.8.2 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

1.10.8.3 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

1.10.8.4 Upon completion of daily work, the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.

**1.10.9.0** During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient, BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.

1.10.9.1 On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

1.10.9.2 For the purpose of planning, contractor shall furnish the estimated requirement of power (month wise) for execution of work in terms of maximum KW demand.

1.10.9.3 If applicable, all boiler, piping layout drawings received from BHEL for pipeline erection to be submitted to Boiler Inspector for approval. After approval of the above drawing, Erection of pipe line to be started. Inspection fee and registration fee as mentioned in Chapter VIII of Special Conditions of contract (Volume-IB in Volume-I Book-II) shall be paid by BHEL.

1.10.9.4 Contractor should obtain the formal statutory clearance from Chief Inspector of Boilers to carry out erection & Welding of piping under IBR purview. Arrangement for the visit of Boiler inspector for field inspection, hydraulic test etc., is in the scope of contractor, and necessary drawing / details only will be given by BHEL.

1.10.9.5 Contractor shall arrange the necessary clearance from statutory authorities like IBR, Electrical Inspectorate, Explosive, etc. including the load test on Hoists/Handling as required for installation of the plant and equipment and render all assistance, service required in this regard.

1.10.9.6 All the necessary certificates and licenses required to carry out this scope of work are to be arranged by the contractor then and there at no extra cost.

1.10.9.7 Contractor shall submit a copy of license to undertake construction / repair of Boilers & Piping issued by Boiler inspectorate before commencement of

Pressure Parts / Piping Erection.

1.10.9.8 Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

1.10.9.9 The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

1.10.9.10 Upon completion of daily work, the contractor shall remove from the vicinity of work all scrap packing materials, rubbish, unused and other materials and deposit them in places to be specified by BHEL Engineer.

1.10.9.11 During the course of erection, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians employed are not sufficient, BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.

**1.10.9.12** On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

**1.10.10.0 UTILITY POINTS**

**1.10.10.1** Number of utility points (Service / plant air, service / plant water, service / washing steam, inert gas (N2) etc., shall be indicated in the P & I diagram. Contractor to locate the utility points as advised by site engineer and shall route the piping to these points as per site conditions, and shall submit as built layout with 'BILL OF MATERIAL' to BHEL for approval.

**1.10.10.2** The utility points shall be located at convenient point to handle and to be terminated with brass / bronze valve with suitable connection for hose pipe.

**1.10.11.0 DOCUMENTATION**

**1.10.11.1** The following information shall be furnished by the bidder within two weeks of

award of contract for purchaser's approval:

a) Bar chart covering planned activities at site
b) Detailed organization chart
c) Details of T&P available with contractors with documents proofs

**1.10.11.2** The following information shall be furnished by the bidder after testing and inspection:

Test certificates of various tests conducted at site. All inspection and test certificates shall be signed by BHEL representative also.

**1.10.12.0 RECORDS TO BE MAINTAINED AT SITE:**

**1.10.12.1** Record of Quantity of FREE/Chargeable items issued by BHEL must be maintained during contract execution. Also reconciliation statement to be prepared at regular intervals.

**1.10.12.2** The under mentioned Records/ Log-books/ Registers applicable to be maintained.

a. Hindrance Register.
b. Site Order Book.
c. Test Check of measurements.
d. Supply and Consumption Daily Register of Cement and Steel
e. Records of Test reports of Field tests.
f. Records of manufacture's test certificates.
g. Records of disposal of scraps generated during and after the work completion.

# VOLUME-IA PART-I CHAPTER -XI

# FOUNDATIONS AND GROUTING

1.11.1. The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.11.1.1 Foundation for the equipments to be erected shall be provided by BHEL / clients of BHEL. The dimensions of the foundations and anchor bolt pits shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark etc. All adjustments of foundations surfaces, enlarging the pockets in foundations etc. as may be required for the erection of equipments / plants shall be carried out by the contractor.

1.11.1.2 Cleaning of foundation surfaces, pocket holes and anchor bolt pits etc., dewatering, making them free of oil, grease, sand and other foreign materials by soda wash, water wash, compressed air or any other approved methods etc., form / shuttering work are within the scope this work.

1.11.1.3 It shall be contractor's responsibility to check the various equipment foundations for their correctness with respect to level, orientation, dimensions etc., and ascertained dimensions shall be measured and submitted to BHEL for approval before erection. Also minor chipping, dressing of foundations up to 30 mm for obtaining proper face for packer plates / shims, as may be required for the erection of the equipment / plants will have to be carried out by the contractor without extra cost

1.11.1.4 The surface of foundations shall be dressed to bring the surface of the foundations to the required level and smoothness prior to placement of equipments / equipments based on the foundations including shear lug provisions/openings.

1.11.1.5 Foundation pockets are to be cleaned thoroughly before placing the supports / columns / equipments. Verticality of foundation bolts to be checked along with correctness of the threads and freeness of the nuts movement. If required cleaning of the threads to be done with proper dies.

1.11.1.6 The concrete foundation, surfaces shall be properly prepared by chipping, as required to bring the top of such foundation to the required level to provide the necessary roughness for bondage and to ensure enough bearing strength. All laitance and surface film shall be removed and cleaned and the packers placed with suitable mortar prior to erection of the equipment. Packer plates should not only be blue matched with foundation but also inter-packer contact surfaces between the packers and foundation frame etc., shall also be blue matched by Prussian Blue match checks and required percentage contact shall be achieved by chipping and scrapping as per BHEL Engineer's instructions.

1.11.1.7 Total grouting of the columns / equipments including pocket grouting, grouting at the gap between foundation and base plates top surface of column / equipments is in the scope of the contractor. All the grouting should be carried out by non-shrink cement like conbextra GPI / Conbextra GP II / Shrinkkomp or its equivalent etc. This special non-shrink cement shall be arranged by the contractor at his cost. The quoted rate shall be inclusive of the same.

1.11.1.8 The contractor shall arrange for grouting of foundation bolt holes of equipment and final grouting of equipment as per the drawings / specification as advised by the Engineer or BHEL after preparing the foundation surface for grouting. The contractor has to arrange, a representative from the supplier of special cement for witnessing the grouting and other works at their cost including any miscellaneous expenditure for this activity. BHEL will not pay any service and incidental charges for arranging the supplier representative. The contractor to take note of this aspect and quote accordingly.

1.11.1.9 All equipment bases and structural steel bases and foundations pockets shall be grouted and finished as per these specifications after surface preparation unless otherwise recommended by the equipment manufacturers. The surface preparation includes soda washing of the foundations to remove oil, grease etc. to ensure proper grouting.

1.11.1.10 The certificates of the grout are to be submitted BHEL. If necessary, test cubes are to be made and tested at site to ensure the quality of the grout as per relevant IS standards. In case grouting with Portland cement is approved, necessary cement, sand etc. to be arranged by the contractor including the fine aggregates.

1.11.1.11 All the materials required for grouting including special cements as approved by BHEL and other materials like Portland cement, sand, chips, gravel, etc., are to be arranged by the contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of grouting cements before procurement of grouting cements.

1.11.1.12 Certain packer plates and shims over and above the quantity received as part of supplies from manufacturing units of BHEL will have to be cut out from steel plates / sheets at site by the contractor to meet site requirement. However, machining of the packers, wherever necessary, will be arranged by BHEL at free of cost.

1.11.2 PROCEDURE FOR GROUTING:

Contractor has to carry out the grouting as per the work instructions for grouting available at site or the grouting is to be carried out as per the supplier's recommendation / IS standard. Copy of those recommendations is to be submitted to BHEL for records.

# VOLUME-IA PART-I CHAPTER- XII

# ERECTION

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

## 1.12.1 Erection

1.12.1.1 The contractor will have to follow the instructions provided in the technical manuals, drawings, and specifications provided by BHEL, to the contractor from time to time. In case of ambiguity or deviation the decision/clarification of BHEL engineer will have to be followed.

1.12.1.2 In case of any class of work for which there is no such specifications as laid down in the contract such as blue matching, welding of stainless steel parts etc., the work shall be carried out in accordance with instructions and requirements of the BHEL engineer at the quoted rates only.

1.12.1.3 The temporary structures/ items welded to permanent members/pipes are to be cut and removed without any damage. Any damage so to permanent members/ pipes to be made good by the contractor at his cost.

1.12.1.4 All welded joints shall be subjected to acceptance by BHEL Engineer.

1.12.1.5 The equipments / materials from the storage yard shall be moved in sequence to the actual site of erection /location at the appropriate time as per the direction of BHEL Engineer so as to avoid damage/loss of such equipment at site.

1.12.1.6 Sometimes it may become necessary for the contractor to handle certain unrequired components in order to take out the required materials. The contractor has to take this contingency also into account. No extra payment is payable for such contingencies.

1.12.1.7 Materials shall be stacked neatly, preserved and stored in the contractor's shed/work area in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work area/site to enable other agencies to carry out their work, same shall be done by the contractor at no extra cost.

1.12.1.8 All pipe and tube ends shall be covered with plastic caps or will be closed with wooden plugs as the case may be.

1.12.1.9 Contractor has to arrange required fire proof tarpaulins to protect the machined components / assembled parts drawn from BHEL before and after erection at their cost.

1.12.1.10 Any fixtures, scaffolding materials, approach ladders, concrete block supports, steel structures required for temporary supporting, pre assembly, checking, welding,

lifting & handling during pre-assembly and erection shall be arranged by the contractor at his cost.

1.12.1.11 In the case of structural members / ducts in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length / prepare the edges to suit the matching profiles, weld / bolt connects the joints at no extra cost.

1.12.1.12 Fine fittings and other small bore piping have to be routed according to site conditions and hence shall be done only in position as per the site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines when after completion, to suit the site conditions. The contractor should absorb this cost in his quoted rate.

1.12.1.13 Work such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin, etc. are covered in the scope of work.

1.12.1.14 It shall be the responsibility of the contractor to provide ladders on column for initial works till such time stairways are completed. For this the ladder should not be welded on the column and should be pre-fabricated clamping type ladders. No temporary welding on any structural member is permitted except under special circumstances with the approval of BHEL.

1.12.1.15 Pipes above 2" diameter have to be cleaned by means of wire brush as per the instruction of BHEL Engineer and subsequently flushed with air before lifting them into position. For pipes below 2" diameter, shall be sponge cleaned with air flushing.

1.12.1.16 In case of piping connected to equipment, matching of flanges for achieving the parallelism and alignment at equipment end by suitably resorting to heat correction or other method as instructed by BHEL Engineer is within scope of work.

1.12.1.17 All piping items including pipes, valves, flanges, fittings etc. shall be supplied as commercially available. Hence Fit-ups, edge preparation including welding of stubs, shall be included in the contractor's scope.

1.12.1.18 Wherever elbows of 45 deg or any other angle are required, the same shall be cut from 90 deg. elbow supplied and used. No extra cost shall be paid.

1.12.1.19 Erection of flow switches, filters, flow meters, other metering elements, flow orifices, flow indicators, control valves supplied either by BHEL or customer forming part of the system is in the scope of work. This will include collecting from BHEL/Customer stores, transport to site, suitably cutting the erected piping, cleaning, erection, welding, radiography and stress relieving and commissioning.

1.12.1.20 Contractor shall also weld small length of piping with root valve to the pressure, flow and level tapping points on piping or flow nozzles/orifices/ metering elements fixed on piping as per the instructions of BHEL Engineer.

1.12.1.21 Welding of pressure and temperature instrumentation points and all other instrumentation points on piping/ducting for permanent system as well as for performance guarantee test is in the scope of work.

1.12.1.22 Plate / Pipe shoes for piping supports shall be fabricated at site by the contractor at no extra cost. Other supports namely Hangers, U-clamps etc., shall be supplied by BHEL duly bent and threaded. Assembly and necessary cutting work etc., shall be carried out at site by contractor within the quoted rate.

1.12.1.23 Wherever hanger and support materials are not received from manufacturing unit in time to suit the erection schedule, contractor shall erect the system on temporary supports to ensure the progress of work. The required structural steel materials will be issued on free of charges by BHEL, either from scrap/spare materials. The same shall be removed and returned to BHEL store after erection of permanent supports. The erection of temporary support is in the scope of contractor at no extra cost.

1.12.1.24 No separate payment will be made for the edge preparation of pipes, Standard fittings such as bends, Tees etc.,

1.12.1.25 Contractor has to carryout fabrication works such as welding of stubs / nipples, attachments etc., preparation of surface for rust preventive coating and application of rust preventive is within the quoted / accepted rate.

1.12.1.26 All the equipments /material to be taken inside the plant building shall be cleaned thoroughly before taking them inside and erect. The contractor shall clean, wherever necessary and paint inside surfaces of the equipments like coolers, oil tanks, Rubber expansion joints assemblies and other components as per instruction of BHEL Engineer during erection at the quoted rate.

1.12.1.27 Contractor shall engage separate gangs throughout the contract period, exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity.

1.12.1.28 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.

1.12.1.29 Prior to erection of any components inspection to be done for any foreign materials and damages and they are to be removed / attended as per BHEL engineer.

1.12.1.30 Field Quality Assurance Formats: -

It is the responsibility of the contractor to collect and fill up the relevant FQA log sheets of BHEL and present the same to BHEL after carrying out the necessary checks as per the log sheets and obtaining the signature of BHEL and customer as token of their acceptance. Payment to the contractor will be linked with the submission of these FQA log sheets.

1.12.2 ERECTION OF FGD

1.12.2.1 Brief list of System / sub-system to be erected by the contractor & approximate weight of individual PGMA's & items are given in this tender elsewhere and are meant for giving general idea to the tender only about magnitude of the work involved. This should not be taken for billing or any other claims. All weights for such purposes will have to be taken from design documents only (shipping list). This section also gives general idea about various components to be erected with expected accuracy level. However, the contractor is requested to get the correct details from the engineer to avoid mistakes and rework.

1.12.2.2 All normal erection and assembly techniques necessary for completion of works under this specification and magnitude have to be carried out. It is not possible to specifically list out all of them. Absence of any specific reference will not absolve the contractor of his responsibility for the particular operation. These would include

a) Scaffolding and rigging operations

b) Machine / flame / electric cutting, grinding, welding, radiography and stress relieving.

c) Fitting, fettling, filing, straightening, chamfering chipping, scrapping, reaming, cleaning, checking, leveling, blue matching, aligning and assembly.

d) Machining, surface grinding, drilling, doweling, shaping

e) Temporary erections for alignment, dismantling of certain equipment for checking, cleaning, servicing and site fabrication

1.12.2.3 Preparation of preassembly bed is arranged wherever required for preassembly of FGD components on consolidated ground. The preassembled component should be supported to avoid sagging. No separate payment will be made.

1.12.2.4 Ducts / expansion pieces are dispatched to site in loose walls / plates and these are to be assembled at site before erection. (Walls with stiffeners in welded condition will be provided)

1.12.2.5 All the dampers, valves, lifting equipments, power cylinders, etc., shall be serviced and lubricated to the satisfaction of BHEL engineer before erecting the same and also during pre-commissioning. The bearings of dampers shall be properly cleaned, serviced and lubricated before commissioning at no extra cost. Even after commissioning the equipments, if there are problems in the operation they have to be attended by the contractor during the tenure of the contract.

1.12.2.6 In case of any class of work for which there is no such specifications as laid down in the contract such us blue matching, welding of stainless steel parts etc., the work shall be carried out in accordance with instructions and requirements of the BHEL engineer at the quoted rates only.

1.12.2.7 Spring suspensions / constant load hangers have to be preassembled and adjusted for the required loading and erected as per instructions, of BHEL Engineer. Any adjustments, removal of temporary arrestors / lockers, etc., have to be carried out as and when required at no extra cost to BHEL.

1.12.2.8 The contractor shall carry out necessary preservative painting, periodic application of preservations on Rotating parts and other equipments during erection / after erection until completion of work. Necessary preservatives / paints, other consumables are to be arranged by the contractor at his cost

1.12.2.9 Contractor shall provide necessary crew with all items like wire brushes, paint brushes, emery paper, cotton waste, scaffolding materials etc., at his cost.

1.12.2.10 All hangers, supports and anchors (including concreting or welding) shall be installed as per drawing to obtain a reliable and complete pipe installation as per instructions of BHEL Engineer. Normally supports are issued in running meters. Any additional supports as called for by BHEL Engineer shall be fabricated by the contractor and provided at no extra cost. However, the raw material required for fabrication of such supports shall be supplied by BHEL free of cost. (Any machining or threading is involved will only be done by BHEL).

1.12.2.11 Fabricated pipes are sent in standard length and will be cut to suit the site conditions and the layouts. Tubes or pipes wherever deemed to be convenient will be sent in running lengths with sufficient bends. Bends up to NB 65 mm will have to be fabricated at site adopting specified heat treatment procedures, wherever required at no extra cost.

1.12.2.12 In the case of structural members / ducts in certain cases, the raw material will be supplied in random lengths and the contractor will have to make up the length / prepare the edges to suit the matching profiles, weld / bolt, connect the joints at no extra cost. Normally, the machine profile will be cut out for the structural members but the contractor will have to carry out suitable alteration / adjustments at site, without any extra payment in case it becomes necessary.

1.12.2.13 Erection & welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow nozzles and control valves etc., both for regular measurements and performance testing to be provided are covered with in scope of this tender, will also be the responsibility of the contractor and the same will be done as per the instructions of BHEL Engineer. The erection and welding of all above items will be contractor's responsibility even if, (a) Product group under

which these items are released are not covered in the scope of this tender, (b) Items are supplied by an agency other than BHEL if they are integral to the scope envisaged under this package. Payment will be regulated as per the settled terms and conditions.

1.12.2.14 The contractor shall fabricate piping, install lube oil systems and carry out the acid cleaning of fabricated piping. The contractor shall also service the lube oil system, carry out the pressure test of oil coolers. etc.,

1.12.2.15 All the tubes and pipes shall be cleaned and blown with compressed air and shown to the Engineer before lifting. Bigger size pipes should be cleaned with flexible wire brush, wherever necessary. After cleaning is over, the end caps shall be put back in tube openings till such time they are welded to other tubes. Required compressors shall be arranged by the contractor at his cost.

1.12.2.16 It is the responsibility of the contractor to do the alignment, checking, etc., if necessary, repeatedly to satisfy BHEL Engineer / customer Engineers with all the necessary tools and tackles manpower, etc., without any extra cost. The alignment will be complete only when jointly certified so, by the BHEL Engineer & customer. Also the contractor should ensure that the alignment is not disturbed afterwards.

1.12.2.17 Fine fittings, trim piping, oil system and other small bore piping have to be routed according to site conditions and hence shall be done only in position. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipelines when after completion, to suit the site conditions. The contractor should absorb this cost in his quoted rate.

1.12.2.18 Additional platforms for approaching different equipments as per the site requirement, which may not be indicated in drawings, shall be fabricated, assembled and erected by contractor. However, the contractor shall be paid for this work on accepted tonnage rate for erection of structure. The steel materials required for these works shall be supplied by BHEL free of cost and the contractor will have to install them to suit the requirement. Works of major nature not covered under this clause.

1.12.2.19 Work such as minor rectification of foundation bolts, reaming of holes, drilling of dowels, matching of bolts and nuts, making new dowel pin, etc. are covered in the scope of work.

1.12.2.20 Certain extra lengths of various tubes/pipes and fabricated ducts are provided as erection allowance and the same have to be cut/adjusted to suit the site conditions and layouts or certain small lengths may have to be added for adjustments to suit the site conditions. For any mismatch while matching the joints in tubes, the cutting,

adjusting, re-welding, addition spool pieces should be done by the contractor to match site conditions without any extra payment.

1.12.2.21 Assistance for "calibrating / testing the power cylinders / valves, gauges, instruments, etc. and setting of actuators" shall be provided by contractor within the quoted rates.

1.12.2.22 The contractor has to erect the Gas Gas-heater as per the drawings, procedures and as suggested by BHEL Engineer.

1.12.2.23 All Rotating machineries and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary dismantling and refitting before erection. If in the opinion of BHEL Engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period, all such works are to be carried out by contractor at his cost.

1.12.2.24 The fans shall be checked for blade clearance and other vital tolerances. The Flow control devices in fans like IGV/Damper units shall be serviced. Necessary assistance for balancing of equipment during trial run shall be provided by the contractor.

1.12.2.25 Vital clearance of mill should be checked at site and adjusted if required.

1.12.2.26 The HT Electric motor bearings shall be blue matched at site and checked for bearing clearance. Scrapping of bearing housing, if required to any extent shall be carried out by the contractor. No extra claim for blue matching of any two surfaces will be entertained. The HT Electric motors will also be checked for air gap and adjustment of stator / rotor to magnetic center shall be carried out as part of erection.

1.12.2.27 The contractor shall fabricate piping, install lube oil systems and carry out the acid cleaning of fabricated piping. The contractor shall also service the lube oil system, carry out the hydraulic test of oil coolers. etc.,

1.12.2.28 The contractor shall take all reasonable care to protect the materials and equipment during erection. Touch up painting required to be done on any equipment or part during the course of erection will have to be done by the contractor.

1.12.2.29 Contractor shall engage separate gangs throughout the contract period, exclusively for proper housekeeping of the site. The contractor has to make necessary arrangements for collection and for bringing down the scrap from, all locations and taking them away from the erection areas to various locations as indicated by BHEL Engineer. The house keeping must be a routine and continuous activity. If the contractor does not do this job satisfactorily, BHEL will arrange for the same at the cost of the contractor. Periodical payments to the contractor for the work done will be considered only if the housekeeping is certified as satisfactory by the customer.

1.12.3 APPLICATION OF INSULATION

1.12.3.1 Handling at site stores / storage yard, Transportation to site of work, Application of Insulation materials and connected works for ducts etc., and binding and cladding with sheets etc., using their own tools plants, tackles, all consumables, supervisor and men as enumerated in the scope of contract. Insulation works include application of wool insulation, sheet metal cladding, welding of hooks / supports to hold insulation under this contract but are not limited to the following.

1.12.3.2 All insulations materials including iron components and other sheets, casing materials, etc., required as per drawing will be supplied by BHEL and the same have to be erected / applied as per the drawings and specifications of BHEL by the contractor.

1.12.3.3 Clean the Surface to be insulated from Rust, Dust, Grease, Loose scale, Oil, Moisture, etc. Care shall be taken that flexible insulation is not unduly compressed. After insulating the equipment, the gaps / joints shall be filled with loose wool/ molded insulation as applicable.

1.12.3.4 Painting of inner side of sheet metal covering over the insulation walls with two coats of anti-corrosive paint (IS-158) to be applied to the entire satisfaction of BHEL Engineer and application of bituminous sealing compound on cladding/ sheet metal joints shall also be carried out by the contractor. For which the required amount of paint, and other accessories for painting, cleaning the surfaces etc., shall be supplied by the contractor within the quoted rate.

1.12.3.5 Bituminous sealing compound will be provided by BHEL free of cost which is supplied by the respective Mfg. Units.

1.12.3.6 Wastages allowance for the materials issued are envisaged as follows:

i. Wool mattresses 2%

ii. Cladding sheets 5%

# VOLUME-IA PART-I CHAPTER - XIII

# WELDING, HEAT TREATMENT & RADIOGRAPHY AND NON-DESTRUCTIVE TESTING

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.13.1 The equipments and piping shall be erected in conformity with the standard / specification in practice in BHEL. The method of welding (viz) Arc, TIG or other methods as indicated in the detailed drawing or as instructed by BHEL Engineer shall be followed. BHEL Engineer will have the option to change the method to suit site conditions. All the prepared / patched edges will have to be suitably protected to prevent rusting or foreign material ingression.

1.13.2 All welders including tack welders, structural and high pressure welder shall be tested and approved by BHEL Engineer before they are actually engaged on work even though they may possess a valid certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The contractor shall maintain the records of qualification and performance of welders. BHEL Engineer will issue all the welders qualified for the work, an identity card. The welder will keep the same with him at work place at all times. He may be stopped from work if he is not found in possession of the same.

1.13.3 All welders shall be tested and approved by BHEL Engineer before they are quality ensured on work though they may possess the requisite certificates. BHEL reserves the right to reject any welder without assigning any reason. The contractor will be responsible for the periodic renewal, retesting of the welders as demanded by BHEL statutory requirements.

1.13.4 BHEL Engineer may stop any welder from the work if his performance is unsatisfactory for any technical reason or if there is a high percentage of rejection in the joints welded by him.

1.13.5 Faulty welds caused by the poor workmanship shall be cut and re-welded at the contractor’s expense. The engineer prior to any repair being made shall approve the procedure for the repair of defective welds. After the repair has been carried out, the compliance shall be submitted to the quality engineer.

1.13.6 Pre -heating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, etc. wherever necessary are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer and as specified in Erection Welding Schedule, Welding, Heat Treatment & NDT manuals and FQP. Contractor at his cost shall arrange all equipment and consumables essential for carrying out the above process.

1.13.7 The contractor shall conduct tests like radiography dye penetrant tests, magnetic particle test etc., on weld joints, castings, and other equipments etc., as per drawing / welding schedule.

# VOLUME-IA PART-I CHAPTER - XIV

# TESTING AND COMMISSIONING

The scope of the work will comprise of but not limited to the following:

1.14 TESTING, PRE – COMMISSIONING & COMMISSIONING AND POST COMMISSIONING

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.14.1 The Contactor shall carry out all the required tests and pre-commissioning and commissioning activities in the FGD equipments under the scope of this contract which required for their successful and reliable operation of the system. These broadly would include Air leak test, hydraulic test, air flow test, Water fill test/ vacuum box test of tanks, trial run of pumps/ blowers/ ball mills/ feeders/ vacuum belt filter/ hydro cyclones, chemical cleaning of piping, water washing, oil flushing of oil system, etc. as per the Drgs/FQPs/manuals, etc. and as instructed by BHEL using contractors own consumables, labour and scaffoldings etc. Air leak test shall be carried out to check and rectify the various leakage and defects etc. All the chemicals required for carrying out these activities will be supplied by BHEL free of cost. Specific omission of any test which is required for the successfully commissioning of all the equipment's covered under scope does not absolve the contractor of its responsibilities of performing of that test.

1.14.2 All required tests (Mechanical and electrical) indicated by BHEL and their clients for successful commissioning are included in the scope of these specifications though some of the tests / activities are not listed in these specifications.

1.14.3 After completion of erection of ducts and Gas Gas heaters, a test shall be performed by the contractor to establish the tightness of the erected equipment from the outlet of Forced Draught (FD) fan through the steam generator upto stack.

1.14.4 All the tests may have to be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages. The contractor shall do all the repairs in the erected equipment arising out of the failure during testing.

1.14.5 Raw materials for all temporary piping necessary for conducting Hydraulic test, Chemical cleaning, oil Flushing, effluent disposal, etc. will be provided by BHEL free of cost. However, fabrication, servicing, erection and dismantling the same and return of the temporary piping, flanges, valves etc. to BHEL stores is the responsibility of the contractor without any extra charges.

1.14.6 The scope of pre-commissioning activities covers installation of all necessary equipments including temporary piping, supports, valves, blanking, pumps, tanks, with access platforms valves, along with accessories required for hydro test, chemical cleaning, or for any other tests. The scope also covers the offsite disposal of effluents.

1.14.7 Contractor at his cost shall lay all necessary temporary piping, install the pumps, blanks, valves required for the test, pressure gauges etc. Required pipes, valves, plates etc., will be given by BHEL. On completion, Temporary piping, pumps, valves, flanges, blanks, tanks, etc. shall be removed by him and returned to BHEL. All thermowells points are to be seal welded, with plug in position. All Temperature Element points are to be provided with blanks and welded. Necessary blanks will be provided by BHEL.

1.14.8 All items / material required for conducting the above tests will be supplied by BHEL / its customer. However, servicing, dismantling and returning of the same to stores is the responsibility of the contractor who is erecting the equipment / piping. The contractor may note that no separate payment shall be released for any temporary works that are to be carried out for conducting pre-commissioning and commissioning tests. Bidders are advised to include expenses on temporary works along with the rates being quoted by them. Broadly the work on temporary systems will be as under:

- Erection of all temporary piping including valves, tanks, effluent pumps, electrical control panel, etc. and cabling along with insulation and supports for Air leak test, chemical cleaning, & any testing required for FGD, etc. and effluent disposal are to be carried out as part of work. Contractor will be responsible for their operation and any servicing required during the pre-commissioning activities. He will also service the equipment and handover the equipment to the other agency for further erection / commissioning activities. All the pumps, motors and electrical control panels/ switch gear, valves and actuators will be furnished to the contractor after due servicing.
- Blowers, blanks, etc. and putty, temporary fixtures & ducts required for conducting air tightness test, etc are to be installed. (Putty to be procured by the contractor).
- Dismantling of the temporary equipment, piping and return the same to the BHEL stores is also included in the scope of work.

The above is only a broad breakup of the temporary works. The engineer at site will make final break up. His decision will be final and binding by all the parties.

1.14.9 Contractor shall lay all necessary electric cables and switches etc. required for the hydraulic test and other tests, flushing etc., and maintain the system till the tests are completed satisfactorily.

1.14.10 It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers along with Supervisors during pre-commissioning, commissioning and post commissioning of equipment and attending any problem in the equipment erected by the contractor till handing over. The contractor will provide necessary consumables, T&Ps, IMTEs etc., and any other assistance required during this period. Association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.

1.14.11 It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning, commissioning and post-commissioning period along with BHEL Engineers. Hence contractor's quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including engineers/supervisors.

1.14.12 It shall be specifically noted that the employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractors finally accepted rates should be inclusive of all these factors also.

1.14.13 In case, any rework is required because of contractor's faulty erection, which is noticed during pre-commissioning and commissioning, the same has to be rectified by the contractor at his cost. If any equipment / part is required to be inspected during pre-commissioning and commissioning, the contractor will dismantle / open up the equipment / part and reassemble / redo the work without any extra claim.

1.14.14 During commissioning, opening / closing of valves, changing of gaskets, Re-alignment of Rotating and other equipment, attending to leakage and adjustments of erected equipment may arise. The finally accepted price /rates shall also include all such work.

1.14.15 In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc., the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and re-alignment are necessary, the contractor at his cost shall do the same as per Engineer's instructions including repair, rectification and replacement work. The parts to be replaced shall be provided by BHEL.

1.14.16 The contractor shall carry out cleaning and servicing of valves and valve actuators prior to pre-commissioning tests and / or trial operations of the plant. A system for recording of such servicing operations shall be developed and maintained in a

manner acceptable to BHEL Engineer to ensure that no valves and valve actuators are left un-serviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap / grind valve seats.

1.14.17 Cleaning and servicing of all the filters / strainers, in the system shall be done by the contractor within the accepted price. All types of oils and greases provided by BHEL to be filled in the main equipments as first fill and subsequent topping up's.

1.14.18 At the time of each inspection, the contractor shall take note of the decisions/ changes proposed by the Engineer and incorporate the same at no additional cost.

1.14.19 Welding and stress relieving of temporary blanks or suitably fixing temporary blank flanges with gaskets and fasteners and welding and providing suitable deaeration / venting / draining points with valves as per BHEL Engineer's instructions, for performing hydro-test of piping and other equipments is within the scope of work. Gaskets, valves, fasteners will be provided free of cost by BHEL. Contractor shall cut steel blanks from steel provided within quoted rate. After completion of hydraulic test, welded blanks shall be cut and removed and weld burrs ground finished and cavities / scars of cutting weld filled and ground as per BHEL Engineer's instructions.

1.14.20 The hydraulic testing of the equipment and piping, covered under this scope of work has to be carried out by the contractor as per instructions of BHEL Engineer. The contractor shall provide all facilities required for hydraulic testing.

1.14.21 Transportation of oil drums from customer/ BHEL's stores, filling of lubricants and filling of oil for flushing and first filling and subsequent topping up during commissioning and post commissioning is included in the scope of this contract. The contractor shall have to return all the empty drums to the customer / BHEL stores. Similarly, transport of chemicals, gas cylinders etc, for various pre-commissioning activities / processes mentioned in the above clauses and returning of remaining and / or the empty containers of the chemicals to customer / BHEL stores is the responsibility of the contractor.

1.14.22 Replacing / cleaning of filters, nozzles of the erected equipments, piping system etc. during pre-commissioning / commissioning stage are within the scope of work.

1.14.23 Laying of insulation of this temporary equipments are to be carried out by the contractor within quoted rate, and required insulation materials will be provided by BHEL. Required NDT tests in welding joints in the temporary pipe lines are to be carried out as part of work as per customer / BHEL requirement.

1.14.24 The contractor as per BHEL requirements will suitably make preservation of cleaned surfaces.

1.14.25 Contractor may have to replace old/damaged gaskets / packing etc. for equipments and the same shall be carried out by contractor as per requirement. Materials will be given by BHEL.

1.14.26 In case any erection defect is detected during various tests / operations, trial runs as detailed above such as loose components, undue noises or vibration, strain on connected equipment, gas or oil or water leakage etc. the contractor shall immediately attend these defects and take necessary corrective measures. The parts to be replaced shall be provided by BHEL free of cost. If the insulation is to be removed to attend any of the defects the cost of removal and reapplication of insulation should be borne by the contractor.

1.14.27 Necessary scaffolding and approaches for conducting the above shall also be within the scope of the contract.

1.14.28 The contractor shall carryout any other test as desired by BHEL Engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning, commissioning, and operation, to demonstrate the completion of any part or whole work performed by the contractor.

1.14.29 During this period though the BHEL's / Client's staff will also be associated in the work, the contractor's responsibility will be to arrange required tools, man and plants till such time the commissioned units are taken over by BHEL's client.

1.14.30 Contractor shall cut / open works if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over. This contingency shall be included within the quoted value. During commissioning, opening of valves, changing of gaskets, attending to leakages, minor modification / rectification works may arise. The contractor has to carry out these works at his cost by providing required manpower in all the three shifts. In case any rework is required because of contractor's faulty erection and which is noticed during commissioning the same has to be rectified by the contractor at his cost.

1.14.31 For conducting gas tightness test, it may be required to erect the blowers and connecting ducts and commission the same for tightness test. It is the responsibility of the contractor to erect the blowers & dismantle once the test is over. Contractor shall carry out the work within the quoted rate and BHEL will provide blowers and dummies free of cost for conducting the test.

1.14.32 Contractor to provide necessary commissioning assistance from pre-commissioning state onwards and up to continuous operation of the unit & handing over to customer. The category of personnel to be as per site requirement and to meet the various pre-commissioning and commissioning programme made to achieve the schedule agreed with customer.

1.14.33 After the commissioning activities, trial operations will continue up to handing over of the unit. Contractor shall provide the manpower for three months from trial operation completion or submission of final bill with material reconciliation whichever is later. It shall be the responsibility of the contractor to provide various categories of workers in sufficient numbers as per the work requirement along with supervisors including necessary consumables, tools etc., during this period. The rate quoted shall indicate all these contingencies also. The various categories of workers required for pre-commissioning, commissioning and post-commissioning activities are as follows:

a) Pipe fitters
b) Millwright Fitters
c) HP& structural welders
d) Riggers
e) Unskilled workers
f) Supervisors
g) Electricians
h) Laggers
i) Sheet metal fabricator/fitter
j) Any other category of workers as may be required.

Further in addition to the above, contractor has to arrange the following minimum manpower exclusively for assisting BHEL commissioning engineers during stabilization and trial operation period. This manpower will be directly controlled by BHEL commissioning engineers.

1. One supervisor per shift for three shifts
2. One fitter per shifts for three shifts
3. Three helpers per shift for three shifts
4. One electrician per shift for three shifts

It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL commissioning Engineers and hence, overtime, may be involved. The contractor ‘s quoted rate shall be inclusive of all these factors also.

1.14.34 During commissioning any improvement or rectification due to design requirement is involved and if the contractor is asked to carry out the job, they shall be paid at man-day rates. For this purpose, daily labour report indicating therein nature of work carried out, consumables used, etc. shall be maintained by contractor, and got signed by BHEL Engineer every day. It is not obligatory on the part of BHEL to get

the works done by the contractor. They can employ any other agency if they so desire at that time.

1.14.35 During commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement / requirement is involved, the same shall be carried out by the contractor promptly and expeditiously.

1.14.36 The contractor has to provide required man power assistance during pre-commissioning and commissioning checks of motor operated valves, actuators, control valves etc. without any extra charges.

1.14.37 D.S.L / equivalent system for hoisting equipment's are also to be erected and commissioned including load testing by the contractor within the quoted rates. Required manpower including electricians is to be arranged by the contractor for carrying out commissioning of electrical hoist and load testing of electrical hoist. Statutory inspection if any required to be arranged by the contractor. Required loads will be provided by BHEL free of cost.

# VOLUME-IA PART- I CHAPTER-XV

# PAINTING

The scope of the work will comprise of but not limited to the following:

1.15.1 FINAL PAINTING

1.15.1 The scope of work shall also include supply and application of final painting of all the erected equipments as required and specified in painting schedules for the components of FGD including Rotating machines etc.

1.15.2 Required paints other consumable such as wire brush, brush etc. shall have to be arranged by the contractor at their own cost. The required manpower, other required consumables, T & P etc. shall be provided by the contractor within the quoted rate. The arrangement of primer/paint will be in contractor's scope.

1.15.3 All welded joints should be painted with anti-corrosive paint, once radiography and stress relieving works are over.

1.15.4 In the case of steel fabricated items, raw steel after fabrication has to be cleaned and subsequent painting to be carried out.

1.15.5 All the exposed metal parts of the equipments including piping, structures, hangers etc., wherever applicable after installation unless otherwise specified the surface protected, are to be first painted with at least one coat of suitable primer and required number of finish coats as indicated in the Painting Specification which matches the shop primer paint used, after thoroughly cleaning the dust, rust, scales, grease oil, and other foreign materials by wire brushing scrapping and chemical cleaning and the same being inspected and approved by BHEL engineers for painting. Afterwards the above parts shall be finished with as per the instructions of BHEL/Customer official.

1.15.6 Normally Paint shall be applied by brushing as per the instruction of BHEL Engineer. It shall be ensured that brush marks are minimum. If needed and insisted either by BHEL / Customer in certain cases, spray painting has to be carried out within the Quoted rates. Spray painting gun and compressed air arrangement has to be made by the contractor himself within the Quoted rates.

1.15.7 All surfaces shall be thoroughly cleaned, free from scales, dirt and other foreign matter. Each coat shall be applied in an even & uniform film free from lumps, streaks, runs, sags and uncoated spots.

1.15.8 Each coat (Primer, intermediate, finish) shall have a minimum thickness of dry film thickness (DFT) in microns and the DFT of finish paint shall not be less than the specified. Necessary instrument for measuring the thickness of paint applied is to be arranged by the contractor.

1.15.9 Finish coat paint, no. of coat and DFT shall be as indicated in the painting specification enclosed in this tender / relevant BHEL document/ customer's

specifications. The painting specification which is forming part of this tender as in TCC shall be used as guidelines to be followed.

1.15.10 The actual color to be applied shall be approved by the customer before starting of actual painting work.

1.15.11 Primer & finish paint shall be of reputed paint supplier approved by BHEL / Customer. Contractor has to procure paints from the BHEL / Customer approved agencies only, and the paints should be as per the customer painting specification. The quality of the finish paint shall be as per the standards of IS or equivalent as approved by BHEL / Customer. Before procurement of paint the contractor has to obtain the clearance from BHEL authorities. The batch certificates of paints to be submitted to BHEL Engineer before using the same.

1.15.12 No paint shall be applied when the surface temp is above 55 deg. Centigrade or below 10 deg. Centigrade, and when the humidity is greater than 90% to cause condensation on the surface or frost / foggy weather.

1.15.13 Before commencement of final painting, contractor has to obtain written clearance from BHEL / Customer for effective completion of surface preparation.

1.15.14 Before applying the subsequent coats, the thickness of each coat shall be measured and recorded with BHEL / Customer.

1.15.15 Wherever applicable, supply and application of primer / final painting of all the insulation items erected under the scope of this tender. The painting shall be as required and specified in the painting schedule, which forms the part of this tender book.

1.15.16 Painting of inner side of sheet metal covering over the insulation walls with two coats of anti-corrosive paint (IS-158) to be applied to the entire satisfaction of BHEL Engineer and application of bituminous sealing compound on cladding/ sheet metal joints shall also be carried out by the contractor. Retainer type ‘A’ must be coated with Aluminium paint. For which the required amount of paint, other consumables & accessories for painting, cleaning the surfaces etc., shall be arranged by the contractor within the quoted rate.

1.15.16.1 The contractor shall effectively protect the finished work from action of weather and from damage of defacement and shall cover the finished parts, then and there, for their protection.

1.15.17 PRESERVATION / TOUCH UP PAINTING

1.15.17.1 Contractor shall carryout cleaning and preservation / touch up painting for the materials / equipments under this tender specification right from pre- assembly stage to till the equipment is cleared for final painting. The primer paint shall be matching shop primer.

1.15.17.2 Any rust on the materials shall be cleaned and painted before erection of the material. Cleaning of rust and painting shall be done by the contractor within the rates awarded in the contract and no additional cost will be provided for the same.

1.15.17.3 Any equipment which has been given the shop coat of primer shall be carefully examined after its erection in the field and shall be treated with touch up coat of same primer wherever the shop coat has been abraded, removed or damaged during transit / erection, or defaced during welding.

1.15.17.4 Mostly the equipment / items / components will be supplied with one coat of primer paint and one coat of finish paint. However, during storage and handling, the same may get peeled off / deteriorate. All such surfaces are to be thoroughly cleaned and to be touch up painted with suitable approved primer and finish paint matching with shop paint / approved final color.

1.15.17.5 Required paints, other consumable such as wire brush, brush etc. shall have to be arranged by the contractor at their own cost. The required manpower, other required consumables, T & P etc. shall be provided by the contractor within the quoted rate. The arrangement of primer/paint will be in contractor's scope

1.15.17.6 Painting of portions of Employer's structures wherever connection/welding is carried out by contractor for supporting structures.

1.15.17.7 All rectification including painting of Employer's structure which are damaged by contractor during his work.

1.15.17.8 Respective Painting scheme to be followed for the items fabricated and erected.

# VOLUME-IA PART - I CHAPTER – XVI
# ACCOUNTING OF MATERIALS ISSUE
# (FABRICATION & ERECTION)

1.16.1 ISSUE OF STEEL

1.16.1.1 The steel shall be issued to the contractor on the following basis:

| Sl. No. | Description | Basis |
|---|---|---|
| (a) | Structural Steel | Weighment basis (Unit – MT) |

1.16.1.2 All the structural steels issued by BHEL shall be properly accounted for. The total quantity of steel required for the work will be calculated from the approved, fabrication drawings and sketched etc. The measurement for payment as well as for accounting (issue, reconciliation and return of materials) shall be based on the sectional weights as indicated in the following IS standards. No rolling tolerance shall be accepted in any case for issue, reconciliation, return of materials and payment purposes

IS: 808-1964 Beams, Channels and Angles

IS: 1730-1961 Plates, Sheets and Strips / Flats

1.16.1.3 The steel issued to the contractor shall be mainly in standard length and sections as received from the supplier. However, the contractor shall be bound to accept the steel in length as available in the project stores no claims for extra payment because of issue of non-standard length will be entertained.

1.16.1.4 The contractor shall satisfy himself of the quality and quantity of the materials at the time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by the contractor from BHEL stores.

1.16.1.5 The contractor shall submit to the engineer, a statement indicating estimated quantity of steel required during a quarter, at least two months in advance of the quarter. In addition, the contractor shall also furnish the estimated requirement of steel during a month by the third week of the previous month indicating his requirement.

1.16.1.6 Following shall be limit for the maximum quantity of BHEL issue materials that would be with the contractor at any point of time when work is in progress (excluding what has already been incorporated in the works).

| SL. | Issue of Materials | Maximum Quantity in contractor's store. |
|---|---|---|
| 1 | Structural Steel | Requirement of one month |

Bidders to ensure that no lamination materials are taken over by them from BHEL.

Fabrication wastage, if any due to above, shall not be compensated by BHEL.

1.16.2 RETURN OF MATERIALS

1.16.2.1 All surplus steel and all wastage materials will be taken back on weighment basis.

1.16.2.2 Surplus, unused and untampered steel shall be sorted section-wise and returned separately for a place directed by BHEL/Engineer within the project area. Return of such materials will not be entitled to any handling and incidental charges.

1.16.2.3 All wastage / scrap (including melting scrap, wastage, and unusable scrap) shall be promptly returned to the stores and a receipt obtained for material accounting purposes. Return of such material will not be entitled to any transportation and incidental charge. Bidder shall use the scrap materials for their use in the permanent works as embedment / inserts etc. after necessary store issue formalities and site clearance.

1.16.3 SCRAP & SERVICEABLE MATERAILS:

1.16.3.1 All Structural steel of length above 2 M except M.S. Plate shall be considered as serviceable materials provided the materials is in good and acceptable condition. Structural steel in length less than 2 M shall be treated as scrap.

1.16.3.2 Plates having both sides greater than 1 M or if any side is less than 1 M but greater than 0.5 M and the total area is equal or greater than 2 Sq. M shall be considered as serviceable.

1.16.3.3 All pipes measuring 2 M and above in length shall be treated as serviceable materials provided they are in good and acceptable condition. Pipe in less than 2 M length shall be treated as scrap.

1.16.3.4 All TMT measuring 3 M and above in length shall be treated as serviceable materials provided they are in good and acceptable condition. TMT in less than 3 M length shall be treated as scrap.

1.16.4 STEEL CONSUMPTION AND WASTAGE

1.16.4.1 STRUCTURAL STEEL, (ROLLED SECTION, PLATES ETC.) CONSUMPTION & WASTAGE.

a) CONSUMPTION.

The theoretical consumption of various sections shall be based on approved drawings. Weights shall be calculated considering the sectional weights as per Indian standard. No extra shall payable to the contractor for any deviation in weights for the two different procedures adopted for issue and calculation of the theoretical consumption including rolling tolerances.

i). Actual consumption = Issue – Surplus.

ii). Surplus = Untampered, unused, uncut quantity of steel and Serviceable materials as stipulated under clause "Scrap and Serviceable Materials returned by the contractor to BHEL store along with relevant documents.

iii). Wastage = Actual consumption – Theoretical consumption.

b) WASTAGE

Allowable wastage: - 8% (EIGHT percent) of the theoretical consumption shall be considered. Wastage shall be considered as cut pieces and scrap material, measured as per actual weighment basis. Invisible wastage (max limit to 0.5%), if any, shall be considered to be included in the specified 8% allowable wastage.

| Sl. No. | CONSUMPTION OF STRUCTURAL STEEL (ROLLED SECTION, PLATES & SS liner) | BASIS OF ISSUE |
|---|---|---|
| S-1 | Theoretical consumption (without Considering any wastage, scrap or loss) as per spec. & drawing. | Free |
| S-2 | Wastage limited to plus Eight percent (+8%) of the aforesaid theoretical consumption (S-1) towards allowable wastage. | Free |
| S-3 | Wastage beyond Eight percent (8%) of the aforesaid theoretical consumption (S-1). | Penal Rate |

1.16.5 RECONCILIATION OF MATERIALS

1.16.5.1 The contractor shall submit a reconciliation statement of steel issued to him and steel procured by him with each RA Bill.

1.16.5.2 At the time of submission of bills, the contractor shall properly account for the material issued to him as specified herein to the satisfaction of BHEL certifying that the balance materials are available with contractor's custody at site.

1.16.5.3 At the time of submission of bills by the contractor, if it is noticed by BHEL that the wastage is high and calls recovery at the penal rate, then, BHEL will proceed for recovery for the excess wastage as per penal recovery rates as specified.

1.16.5.4 The reference drawings for actual material consumption to be used for the purpose of reconciliation shall be drawings prepared by the BHEL and drawings approved by BHEL for fabrication works and such other drawings approved by BHEL. This shall also include the bar bending schedule prepared by the contractor and approve by BHEL.

1.16.6 RECOVERY OF MATERIAL

If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly Running Account Bill at the Penal Rate.

PENAL RATE OF MATERIALS

| | | |
|---|---|---|
| A | STRUCTURAL STEEL<br>MS plates, MS flats, rolled steel joists, channels, and angles, MS pipes, Chequered Plates, etc in sizes and lengths as available | Rs. 72,755/- per MT plus GST |

# VOLUME-IA PART-I CHAPTER - XVII
# PROGRESS OF WORK

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.17.1 Refer forms F -14 to F-18 of volume I D (Forms & Procedure) of volume -I Book-II. Plan and review will be done as per the formats.

1.17.2 Contractor is required to draw mutually agreed monthly erection programs in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.

1.17.3 Progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of nonconformities.

1.17.4 Tenderers have to furnish a list of Tools and Plants including cranes, Tractor / Trailers etc., which they propose to deploy for this work.

1.17.5 The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases / electrodes) report, cranes availability report and other reports as per Performa considered necessary by the Engineer. The periodicity of the reports will be decided by BHEL Engineer at site.

1.17.6 The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

1.17.7 The contractor shall submit a report of any damage, shortage, discrepancy etc., every week detailing in this regard.

1.17.8 The manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

1.17.9 The monthly report as a booklet shall be submitted at the end of every month and shall contain the following details: -

a. Progress photographs in colour.

b. Erection progress in terms of tonnage, welding joints, radiography, stress relieving, etc., completed as relevant to the respective work areas against planned.

c. Site Organization chart of engineers & supervisors as on the last day of the month with further mobilization plan.

d. Category- wise man hours engaged during the previous month under the categories of fitters, welders, riggers, khalasis, grinder-men, gas-cutters, electricians, crane operators and helpers. Data shall be split up under the work areas like FGD, Insulation etc.

e. Consumables report giving consumption of all types of gases and electrodes during the previous month.

f. Availability report of cranes.

g. Safety implementation report in the format.

h. Pending material and any other inputs required from BHEL for activities planned during the subsequent months

# VOLUME – IA PART-I CHAPTER-XVIII

# PRESERVATION

SCOPE OF WORK FOR PRESERVATION OF MATERIALS AT STORES, IF REQUIRED

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.18.1 Contractor shall carryout cleaning and preservation / touch up painting for the materials / equipments under this tender specification, wherever deficiency in painting / rusting is noticed. The primer paint shall be matching shop primer. The required manpower, consumables, T & Ps etc. shall be provided by the contractor with in the quoted rate.

1.18.2 Components are received duly painted from manufacturing unit. Due to handling or deterioration due to life of paint or deterioration due to climatic / storage condition etc., paint may get peeled off or rubbed off. This needs preservation to avoid further rusting of components. Also, during this activity, the painting / repainting of W.O. No. and other relevant particulars that may need to be painted on the components is also covered with in the scope of work.

1.18.3 This may call for handling /re handling of materials. All required T&Ps shall be arranged by the contractor at their cost BHEL will not provide any T & P, for this scope of Work.

1.18.4 The contractor is expected to submit periodic reports on the preservation carried out for perusal by BHEL Engineer, in the formats as specified by BHEL Engineer.

1.18.5 The contractor shall be responsible for any damages of materials / components due to mishandling in his custody. All precaution shall be taken to handle components safely.

1.18.6 BHEL‘s engineer decision shall be final regarding the process of surface preparation of the area to be painted, type and nature of painting to be done on the components and also for arranging the components sequentially to suit erection requirement.

1.18.7 Before applying the subsequent coats, the thickness of each coat shall be measured and recorded with BHEL/ Customer.

1.18.8 Preservation of materials in accordance with the BHEL‘s preservation manual and / or as per BHEL‘s instruction shall be within the quoted rate.

# VOLUME – IA PART-I CHAPTER-XIX

# PROCEDURES RELATED TO MATERIAL HANDLING, STORAGE & OTHER RESPONSIBILITIES AT BHEL STORES

1.19.1 PROCEDURE TO BE ADOPTED BY THE CONTRACTOR IN CASE OF SHORT / DAMAGED NON DELIVERED CONSIGNMENTS DESPATCHED BY ROAD

1.19.1.1 PROCEDURE FOR NON DELIVERED CONSIGNMENTS

1.19.1.1.1 Apply for and obtain a certificate of Non-delivery from the Road carriers.

1.19.1.1.2 File a Notice of claim on the carriers sending the same to their registered office by Registered Post A.D. and forwarding a copy to their delivery office, immediately or within 6 months from the date of Lorry way Bill.

1.19.1.1.3 The following documents should be obtained and submitted to BHEL in charge at site.

I. Original and Non-delivery certificates.
II. Copy of claim notice filed on the carriers.
III. Postal acknowledgement card or reply received for the claim notice.
IV. If the package originally non-delivered is traced and offered for delivery at a later date, apply and obtain open delivery in respect of the same before clearance.

1.19.1.2 PROCEDURE FOR SHORT DELIVERY (Non delivery of a few packages in the consignment)

1.19.1.2.1 Obtain a certificate of short delivery from the Road Carriers.

1.19.1.2.2 File a notice of claim on the carriers sending the same to their Registered Office by Registered post with A.D. and forwarding a copy to their delivery office immediately or within 6 months from the date of Lorry Way Bill.

1.19.1.2.3 Documents to be submitted to BHEL Site Engineer

I. Original short delivery certificate.
II. Copy of claim notice filed on the carriers.
III. Postal acknowledgement or reply received, for the claim notice.
IV. If the package originally short delivered is traced out and offered for delivery at a later date, apply for and obtain open delivery in respect of the same before clearance

1.19.1.3 PROCEDURE FOR SHORT/DAMAGE IN PACKAGES DELIVERED FROM THE ROAD CARRIERS

1.19.1.3.1 Apply for and obtain open delivery from the road carriers.

1.19.1.3.2 If open delivery is refused.

I. Arrange for survey at the carrier's Godown by a licensed insurance surveyor after giving notice in writing.
II. Take delivery under protest in writing against acknowledgement or by Registered Post with A.D.
III. Make necessary endorsement regarding the loss/damage on the reverse of the consignee copy of the lorry way bill before surrendering it to the carriers.

1.19.1.3.3 File a notice of claim on the carriers sending the same to their registered office by Registered Post with A.D. and forwarding a copy to the delivery office immediately or within 6 months from the date of lorry way bill.

1.19.1.3.4 Documents to be submitted to BHEL site In charge.

I. Claim Form.
II. Insurance Policy / Certificate in Original (If specific document is issued).
III. Original open delivery certificate and report of Insurance survey if any conducted to the final destination
IV. Additional documents required in the event of refusal of open delivery by the carriers

a. Copy of notice given to the carriers advising about the survey at their Godown before clearance.
b. Survey report of the licensed insurance surveyor with the bill/receipt for payment of survey fee and expenses.
c. Copy of letter of protest extended to the carriers with the postal acknowledgement received thereto.
d. Photocopy of the lorry way bill with the endorsement of the discrepancies made thereon.

# VOLUME-IA PART-II CHAPTER-1

## CORRECTIONS / REVISIONS IN SPECIAL CONDITIONS OF CONTRACT, GENERAL CONDITIONS OF CONTRACT AND FORMS & PROCEDURES

**Sl. No.: 1**

**Following Clauses in General Conditions of Contract (GCC) are modified/ revised/ added:**

| S.No | GCC Clause Reference | Modification / Revision / Addition in GCC Clause |
|---|---|---|
| 1. | GCC Clause 1.9.1, Sl. No. (ii) | The following mode of deposit, Sl. No. (e) is added:<br>e) Insurance Surety Bonds |
| 2. | GCC Clause 1.10.3, Sl. No. (vi) | **The following Clause, Sl. No. (vi) is deleted**:<br>Security deposit can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required security deposit is collected. However, in such cases at least 50% of the required Security Deposit, including the EMD, should be deposited in any form as prescribed before start of the work and the balance 50% may be recovered from the running bills as described above |
| 3. | GCC Clause 1.10.3, Sl.No.(vii) | The following mode of deposit, Sl. No. (vii) is added:<br>e) Insurance Surety Bonds |
| 4. | Note mentioned under the GCC Clause 1.10.3 | Note mentioned under GCC Clause 1.10.3 is revised as below:<br>Note: **(1)** BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.<br>**(2)** In case of delay in submission of security deposit, enhanced security deposit which would include interest (Repo rate +4%) for the delayed period, shall be submitted by the bidder. |
| 5. | GCC Clause 1.10.8 | **GCC Clause 1.10.8 is revised as below:**<br>Bidder agrees to submit security deposit required for execution of the contract within the time period mentioned. In case of delay in submission of security deposit, enhanced security deposit which would include interest (Repo rate+4%) for the delayed period, shall be submitted |

| S.No | GCC Clause Reference | Modification / Revision / Addition in GCC Clause |
|---|---|---|
| | | by the bidder. Further, if security deposit is not submitted till such time the first bill becomes due, the amount of security deposit due shall be recovered as per terms defined in NIT / contract, from the bills along with due interest |
| 6. | GCC Clause 2.13.6 | **GCC Clause 2.13.6 is revised as:**<br>The rate of interest applicable for the above advances shall be the repo rate prevailing on the date of release of advance plus 4%, and such rate will remain fixed till the total advance amount is recovered |
| 7. | GCC Clause 2.22.1 | **GCC Clause 2.22.1 is revised as:**<br>Retention Amount shall be 5% of the Contract Value and shall be furnished through BG in line with clause 1.12 of GCC before payment of first RA Bill. The validity of the said BG shall be initially for the contract period & shall be extended, if so required, up to acceptance of final bill. In case of increase in contract value, additional BG for 5% of differential amount shall be submitted by Contractor before payment of next RA Bill due.<br>Retention Amount can also be recovered at the rate of 10% of the gross amount progressively from each of the running bills of the contractor till the total amount of the required retention amount is collected.<br>In case, contractor opts cash deduction from RA bills in the beginning & subsequently offers to submit BG later on, then refund of deducted retention amount may be permitted against submission of BG for 5% of the Contract Value. |
| 8. | New Clause for "Breach of Contract, Remedies and Termination" is added in place of existing clause of Risk & Cost (i.e. 2.7.2.1 to 2.7.3) | **Clause 2.7.2 and 2.7.3 are revised as:**<br><br>**2.7.2 <u>Breach of Contract, Remedies and Termination</u>**<br>**2.7.2.1** BHEL shall terminate the contract after due notice of a period of 14 days in any of the following cases, which if not rectified/ improved within the time period mentioned in the notice, then, 'Breach of Contract' will be considered to have been established: |

| S.No | GCC Clause Reference | Modification / Revision / Addition in GCC Clause |
|---|---|---|
| | | i). Contractor's poor progress of the work vis-à-vis execution timeline as stipulated in the Contract, backlog attributable to contractor including unexecuted portion of work does not appear to be executable within balance available period considering its performance of execution.<br>ii). Withdrawal from or abandonment of the work by contractor before completion of the work as per contract.<br>iii). Non-completion of work by the Contractor within scheduled completion period as per Contract or as extended from time to time, for the reasons attributable to the contractor.<br>iv). Repeated failure of contractor in deploying the required resources, to comply the statutory requirements etc. even after given by BHEL is writing.<br>v). Strike or Lockout declared is not settled within a period of one month.<br>vi). Termination of Contract on account of any other reason (s) attributable to Contractor.<br>vii). Assignment, transfer, subletting of Contract without BHEL's written permission.<br>viii). Non-compliance to any contractual condition or any other default attributable to Contractor.<br><br>**2.7.2.2 <u>Remedies in case of Breach of Contract is established</u>**<br>In case 'Breach of Contract' is established, Security Deposit and Retention Amount shall be encashed/ forfeited. This is without prejudice to BHEL's right to levy of liquidated damages, debarment etc. which shall be applied as per the provisions of the contract. Sequence of recovery to be made in case of breach of contract is established, is as below:<br>a) In case the value of Security Deposit & Retention |

| S.No | GCC Clause Reference | Modification / Revision / Addition in GCC Clause |
|---|---|---|
| | | Amount, available for the Contract, is less than 10% of the Contract Value, the balance amount shall be recovered from dues available in the form of Bills payable to contractor, BGs against the same contract etc.<br>b) Demand notice for deposit of balance recovery amount shall be sent to contractor, if funds are insufficient to effect complete recovery against dues indicated in (a) above.<br>c) If contractor fails to deposit the balance amount to be recovered within the period as prescribed in demand notice, following action shall be taken for balance recovery:<br>i) Dues payable to contractor against other contracts in the same Region shall be considered for recovery.<br>ii) If recovery cannot be made out of dues payable to the contractor as above, balance amount to be recovered, shall be informed to other Regions/Units for making recovery from the Unpaid Bills/Running Bills/SD/BGs/Final Bills of contractor.<br>iii) In-case recoveries are not possible with any of the above available options, Legal action shall be initiated for recovery against contractor.<br>Note:<br>1) In addition to above, levy of liquidated damages, debarment, termination, short-closure etc. shall be applied as per provisions of the contract.<br>2) If tendering is done for the balance work, the defaulted contractor (including all the members/partners in case of JV/ partnership firm) shall not be eligible for either executing the balance work or to participate in the tender(s) for executing the balance work.<br><br>**2.7.3** In case Contractor fails to deploy the resources as per requirement informed by BHEL in writing to expedite |

| S.No | GCC Clause Reference | Modification / Revision / Addition in GCC Clause |
|---|---|---|
| | | the work, BHEL can deploy own/hired/otherwise arranged resources and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads or as defined in TCC. |
| 9. | GCC Clause 2.7.7 | **GCC Clause 2.7.7 is revised as:**<br>BHEL may permit or direct contractor to demobilize and remobilize at a future date as intimated by BHEL in case of following situations for reasons other than Force majeure conditions and not attributable to contractor:<br>i) suspension of work(s) at a Project either by BHEL or Customer,<br>or<br>ii) where work comes to a complete halt or reaches a stage wherein worthwhile works cannot be executed and there is no possibility of commencement of work for a period of not less than three months<br><br>In such cases, charges towards demobilization and remobilization shall be as decided by BHEL after successful remobilization by contractor at site, and decision of BHEL shall be final and binding on the contractor. After remobilization, all conditions as per contract shall become applicable. In case Contractor does not remobilize with adequate resources or does not start the work within the period as intimated, then BHEL reserves the right to terminate the contract and effect remedies under Clause 2.7.2.2. Duration of the contract/time extension shall be revised suitably. In case of any conflict, BHEL decision in this regard shall be final and binding on the contractor. |
| 10. | GCC Clause 2.11.3 | **GCC Clause 2.11.3 is revised as:**<br>However, if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take under clause 2.7.2 of GCC i.e. "Breach of Contract, Remedies and |

| S.No | GCC Clause Reference | Modification / Revision / Addition in GCC Clause |
|---|---|---|
| | | Termination". |
| 11. | GCC Clause 2.19.1 | **GCC Clause 2.19.1 is revised as:**<br>The contractor will be fully responsible for all disputes and other issues connected with his labour. In the event of the contractor's labour resorting to strike or the Contractor resorting to lockout and if the strike or lockout declared is not settled within a period of one month, it may be considered as 'Breach of Contract' under Clause 2.7 and the remedies under Clause 2.7.2.2 may be executed, at the discretion of BHEL. |
| 12. | GCC Clause 2.24.1 | **GCC Clause 2.24.1 is revised as:**<br>Even though the work will be carried out under the supervision of BHEL Engineers the Contractor will be responsible for the quality of the workmanship and shall guarantee the work done for a period of Twelve months from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good workmanship and shall rectify free of cost all defects due to faulty erection detected during the guarantee period. In the event of the Contractor failing to repair the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs of such defective works, by itself, without prejudice to any other rights and recover the cost incurred for the same along with 5% overheads from the Security Deposit. |

**S.No.:2**

In addition to The EARNEST MONEY DEPOSIT (EMD) clause 1.9 and The SECURITY DEPOSIT (SD) clause 1.10 published in General Conditions of Contract (Volume I Book II) following is added for FDR:

1. FDR should be Lien marked in favour of M/s BHEL.
2. Bank issuing FDR should agree to the following conditions and submit duly signed letter addressed to BHEL, confirming the following points:
   a) There is no Lock in Period for Encashment of the Said FDR

b) The amount under the Said FDR would be paid to BHEL-PSSR on Demand, at any point of Time before, or upon Maturity, without any reference to the …….. (Contactor Name).

c) Encashment whether premature or otherwise would not require any clearance from any other authority /Person.

d) FDR will be auto renewed for such period/s initially mentioned in the FDR and the intimation of Such renewal shall be sent to BHEL, PSSR and …… (Contractor), immediately after the renewal.

e) FDR will not be closed, Encashed, Changed or Discharged without the Written permission/Confirmation from M/s BHEL PSSR.

f) Bank to acknowledge and agree that the Lien created on the FDR shall be in Force until M/s BHEL PSSR, gives a Discharge Letter in this regard.

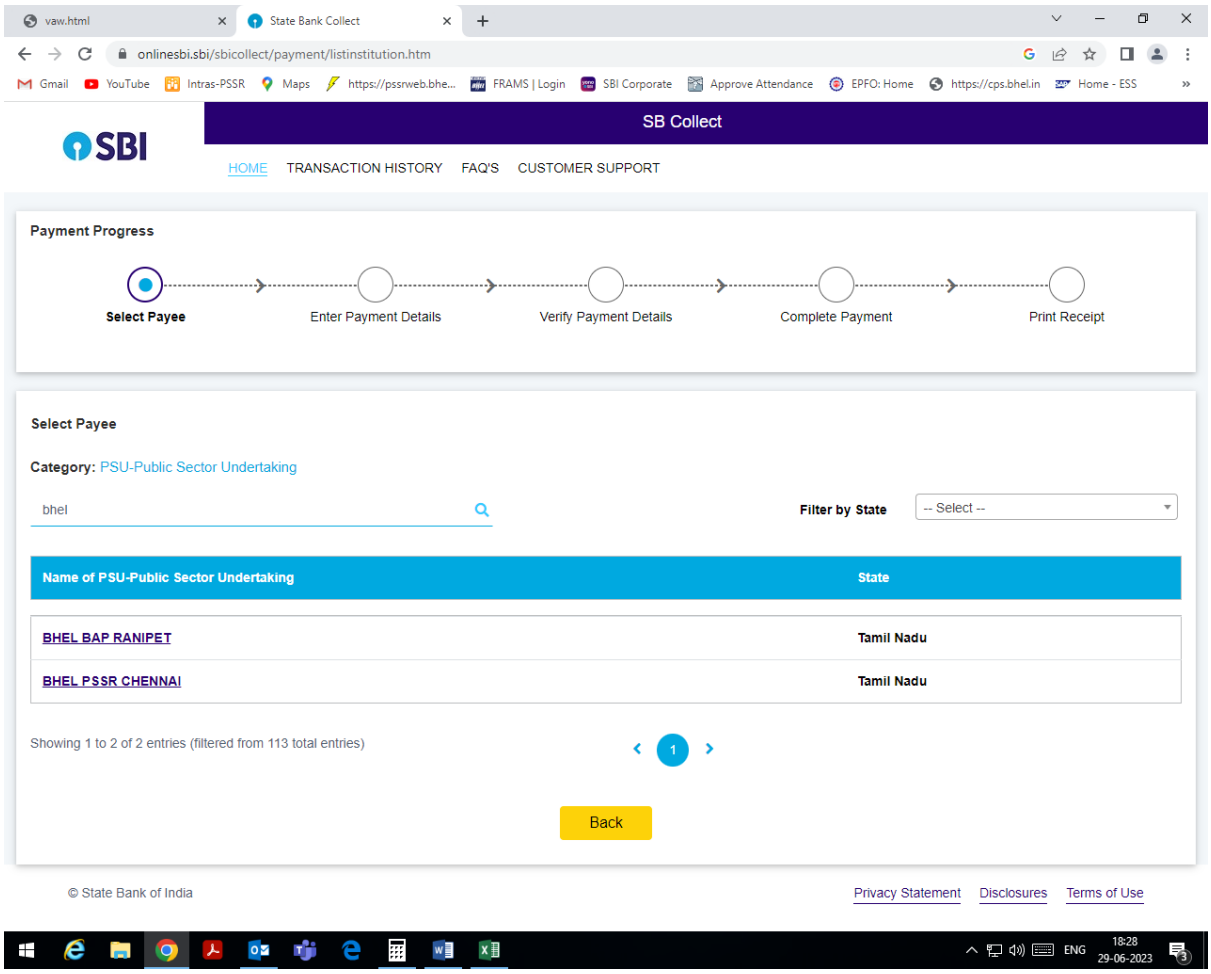
**S. No.:3**

**Detailed Instruction for EMD / Security deposits through SBI e-collect:**

**Step 1: Vendors may visit SBI collect website**, the URL of which is https://www.onlinesbi.sbi/sbicollect where they get the home page with various categories of institutions.

**Step 2: Select PSU - Public Sector Undertakings** – leading to a page with list of PSUs

**Step 3: Type BHEL and search**, they get to see all BHEL divisions wherein they shall select BHEL PSSR Chennai. The screen shot of the same is given below.




**Step 4: Select EMD receipts.** Having selected the Payee in the Payment Progress, it will lead to the payment details – a drop down list of values. From that list, vendors shall select EMD receipts. Upon clicking the entry EMD receipts, a form will open asking for the remitters details and the details of the tender.

**Step 5: Confirm details and pay**

Fill in all the details correctly, verify the details, and complete the payment as it is leading to the payment gateway.

**Step 6: Take a printout** on completing the payment and enclose the copy of the same along with the bid submission. Store the copy of receipt for future reference.

# VOLUME-IA PART – II CHAPTER 2 to 4
# In the next pages as below:

| CHAPTER | Details | No. of sheets |
|---|---|---|
| CHAPTER 2 | Technical specification, Painting scheme, Drawings & Welding procedure specification | 238 |
| CHAPTER 3 | T&P Charges | 12 |
| CHAPTER 4 | HSE Plan For Site Operations By Subcontractor | 131 |