Singrauli MPH
Structure Erection

VOLUME-IA

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Package-A: Erection, Alignment, Bolting/Welding, Roofing & Cladding, BOIs Work including handling of materials at BHEL / Client's Stores / Storage yard and Transportation and Scope of work includes supply of all Material (As per TCC and BOQ), Consumables, labour, tools and plants, Touch-up painting as and where required (including supply of paints) for Unit-1 Main Power House structure & BOIs as per BOQ at 2X800 MW NTPC Singrauli STPP Stage-III, Sonebhadra, UP

Package-B: Erection, Alignment, Bolting/Welding, Roofing & Cladding, BOIs Work including handling of materials at BHEL / Client's Stores / Storage yard and Transportation and Scope of work includes supply of all Material (As per TCC and BOQ), Consumables, labour, tools and plants, Touch-up painting as and where required (including supply of paints) for Unit-2 Main Power House structure, CCR (Common control room) and BOIs as per BOQ at 2X800 MW NTPC Singrauli STPP Stage-III, Sonebhadra, UP

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
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1.0 Project Information:

Sl. No.	Description	Details
1	**Project Title**	2X800MW Singrauli Super Thermal Power Project, Stage-III
2	**Customer**	National Thermal Power Corporation Limited (NTPC Limited)
3	**Location**	Singrauli Super Thermal Power Station (Singrauli STPS) is located in Sonebhadra District of Uttar Pradesh. The Project is located at 118 Km towards South of District Head Quarters Robertsganj and is well connected by State Highway SH-5A. Nearest National Highway NH-39 is at a distance of about 5 Km from the Project. Nearest major city is Renukoot, located at a distance of 60 Km to the project. The nearest Railway Station is Shaktinagar at 3 Km. The nearest major town is Robertsganj, which is approximately 118 Km from the project. The Sonebhadra District is bounded by the State of Chhattisgarh to the South, Madhya Pradesh to the West & Jharkhand to the East. The nearest airport is Lal Bahadur Shastri International Airport, Varanasi at a distance of about 220 Km from project site.
4	**Nearest Airport**	Nearest Commercial Airport is Lal Bahadur Shastri International Airport, Varanasi About 220 Km from Singrauli STPP.
5	**Nearest Railway link**	Nearest Railway Station is Shaktinagar Station which is About 3.0 Km from Singrauli STPP. Other Nearby Important Stations are Renukoot Junction About 60 Km, Mirzapur Station About 198 Km, Mughal Sarai Junction About 196 Km and Varanasi Cantt About 202 Km.
6	**Access By Road/Major Cities**	Nearest National Highway NH-39 is at a distance of about 5 Km from the Project. Nearest major city is Renukoot, located at a distance of 60 Km to the project.
7	**Temperature**	Meteorological data from nearest observatory is placed as a **Annexure-G** (Attached)

8	**Seismic Zone**	As per Annexure of NTPC Technical Specifications, Section-VI, part-B (**Annexure-G attcahed**).
9	**Wind Speed**	Meteorological data from nearest observatory is placed as a **Annexure-G (attached)**.

2.0

	INSTRUCTIONS TO BIDDERS
1.1	The Bidder shall visit project site and acquire full knowledge and information about conditions prevailing at site and in & around the plant premises, together with site conditions, transportation routes, various distances, all the statutory, obligatory, mandatory requirements of various authorities and all information that may be necessary for preparing the bid and entering into the Contract. All costs for and associated with site visits shall be borne by the bidder.
1.2	Other contractors would be working in this area and their structures are to be protected. The material brought and stacked for construction should not make hindrance to other contractors.
1.3	The information given herein 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.
1.4	The contractor, in the event of this work awarded to him, shall establish an office at site and keep posted an authorized, responsible officer with valid Power of Attorney Attorney for the purpose of the contract. Any order or instructions of the `Engineer' or his duly authorized representative, communicated to the contractor's representative at site office will be deemed to have been communicated to the contractor at his legal address.
1.5	No claim will be entertained by BHEL on ground of lack of knowledge and the contractor's rates shall be deemed to have taken this into account.
1.6	Bidders may fix up their site visit in consultation with below mentioned contact person:

Name:	Mr. Ajay Singh	Mr. Amrendra Kumar Thakur
Designation:	AGM	Manager
Location:	2X800 Singrauli Project	PSNR Noida
Email:	ajaysingh@BHEL.in	pmgakthakur@BHEL.in
Ph. No.	(+91) 9650 590 899	(+91) 954 069 0700

2.0	**Scope of Works:**
2.1	Scope- Erection, Alignment, Bolting/Welding, Roofing & Cladding, BOIs Work of Main Power House (PH#1&2) and CCR (Common Control Room) Structure including handling of materials at BHEL / Client's Stores / Storage yard and Transportation and Scope of work includes supply of all Material (As per TCC and BOQ), Consumables, labour, tools and plants, Touch-up painting as and where required (including supply of paint) for Unit #1 & 2 at 2X800 MW NTPC Singrauli STPP Stage-III, Sonebhadra, UP Complete scope of work will be awarded to one agency. However, for ease of operation of the scope of work, in Technical conditions of contract (TCC), complete scope (tonnage) will be bi-furcated into two packages viz. package-A and package-B as following: 1. **Package-A:** Complete scope for Erection of Main Power House Unit#1 structure & BOIs as per BOQ at 2X800 MW NTPC Singrauli stage-III Project. 2. **Package-B:** Complete scope for Erection of CCR (Common control room) & Main Power House Unit#2 structure and BOIs as per BOQ at 2X800 MW NTPC Singrauli stage-III Project **Note:** Package A & B shall be treated as separate contract. For each item, item rate shall be derived. Payment shall be made on actual execution of work on item rate basis. In case of any dispute in scope of work between the packages, BHEL Site in-charge decision shall be final and binding to the agency. Before commencement of any work, the bidders have to check with Civil/Mechanical/Electrical drawings jointly with concerned BHEL Engineers.
2.2	**The scope of works includes: -** a. **Bolted Type Structural steel works** (i.e. Pre-Assembly, Erection, Grouting, Alignment, Bolting and touch-up painting (including supply of paints), other allied works of structural Building and Associates structure as mentioned in 2.2.1.
2.2.1	The scope of works covers Bolted Type Structural steel works (i.e. Pre-Assembly, Erection, Grouting, Alignment, Bolting and touch-up painting other allied works) of structural Building and Associates structure as mentioned below. Scope of work includes supply of all Material (As per TCC and BOQ), Consumables, labour, tools and plants. **BHEL shall provide structural steel/pre-fabricated structures, BOIs like handrails, gratings, bolts, deck sheet, etc. as per TCC/BOQ for incorporation in the permanent works as free supply**. The scope of supply shall be as mentioned in BOQ/Rate schedule. The scope of work is indicative but not limited to the given below. a. Erection of structure as per BOQ b. Supply & installation of items as per BOQ.

c. Fixing/erection of BOI Items as mentioned in BOQ

d. Erection of Miscellaneous Structure in buildings including Monorail, girder, platforms, etc.

List of Buildings for Structure Erection:

Sl No	Name of Structural Building/System	Tentative Weight of Structures (In MT)	Remarks
1	Main Power House Unit 1	7291	Package A
2	CCR (Common control room) Building	3900	Package B
3	Main Power House Unit 2	7291	Package B
4	BOIs	2009	Package A & B
Total		**20,491**	

Following BOIs will be supplied by BHEL Free of cost and fixing/erection shall be part of contractor scope as mentioned in BOQ:

a. Metal Deck sheet
b. Side cladding
c. Roof sheeting
d. HSFG Bolts/Bolts
e. Gratings
f. Handrails

Note- 1. Above scope is tentative only and may vary
2. Site connections are bolted; however, welding connections also come in some areas fall under the scope of this tender (tentative 500 MT). Contractor shall do the welding within the quoted rate for completion of work.
3. Erection of TG/miscellaneous platform (BHEL free supply materials) in Power House or Control Room area may come which shall be executed by contractor (tentative 100 MT). Payment of such erection shall be paid as per item rate of structure erection.

2.2.2 Field connections are Bolted and fabricated structure will be supplied by BHEL free of cost. Erection shall be part of scope of this tender.

2.3 The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the complete work of handling, loading and transporting of materials from project stores sheds / storage yards to site of erection or preassembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and levelling of foundations, providing packers and shims/pre-assembling of equipment at the preassembly yard, inspection, minor rectification, preservation, erection, levelling, and

	other adjustments, cutting, edge / surface preparation, bolting, welding (if applicable), grinding, radiography, LPI/MPI/UT/PAUT/CRT testing wherever needed, heat treatment, including inter connection of all the termination points, and handing over of floors, roof etc., completion of structure erection for PH#1&2 and CCR, BOIs.
2.4	The work under this contract shall be carried out as per BOQ Cum Rate Schedule and in compliance of tender conditions including technical specifications and approved drawings/ documents.
2.5	**GENERAL**
2.5.1	Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.
2.5.2	The drawings enclosed with this tender are intended to give the tenderer a general idea of the type and extent of work involved. The drawings are as such only indicative and not to be considered as the exact construction drawings.
2.5.3	Further this is to be noted that the drawings and the documents furnished along with this specification are the sole property of BHEL. It must not be used directly or indirectly in any way detrimental to the interest of the company.
2.5.4	Scope of work includes furnishing all labor, materials, supervision, consumables, construction plans, equipment, supplies, transport, to and fro the site, fuel, compressed air, transit and storage insurance (for contractor T&Ps and items) and all other incidental items and temporary works not shown on specified but reasonably implied or necessary for the proper completion, maintenance and handing over the works in accordance with the stipulations laid down in the contract documents and additional stipulations, as may be provided by the engineer during the course of works, is in the scope of bidder at no extra cost to BHEL.
2.5.5	Void.
2.5.6	The area of work shall be maintained cleared of all vegetation, rubbish and other objectionable matter and materials by contractor. No separate payment for these operations shall be made for such works.
2.5.7	All the works areas shall be adequately illuminated to the satisfaction of the Engineer-in-Charge when the work is in progress.
2.5.8	Drawings showing enough details for the construction as per the specification shall be furnished to the contractor in a phased manner
2.5.9	All necessary arrangement for safety like Hard Barricading with scaffolding pipes and providing of safety net is in bidder's scope.
2.5.10	The Customer may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of

	works at no extra cost to BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.
2.5.11	Giving all notices, paying all fees, taxes etc., in accordance with the general conditions of contract, that is required for all works including temporary works shall be in the scope of contractor.
2.5.12	Carrying out establish levels and coordinates at suitable intervals from existing grid levels and coordinates furnished by the owner established bench marks, setting out the locations and levels of proposed structures, marking of reference pillars and other identification works etc. The contractor shall provide the owner/BHEL such an assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used.
2.5.13	Arrangement for joint checking (with BHEL / BHEL's Customer / Consultant) of all site construction activities, Preparation of joint protocols for each & every activity and maintaining quality records for audit/inspection as per approved FQP by BHEL.
2.5.14	Medical/First aid center/medicine purchased for emergency/Doctor purpose along with ambulance services with fuel and operator (round the clock) shall be arranged by BHEL for handling medical emergencies. Cost against these facilities shall be distributed/shared among the vendors working in the Project site proportionately based on contract value. (Reference HSE plan for Singrauli project-Annexure C).
2.5.15	The complete works shall be carried out as per BOQ cum Rate schedule. If any work covered in the scope of contract cannot be executed using items available in BOQ, additional / extra items shall be made and rates for such items shall be worked out as per GCC clause 2.15.7. However, contractor shall be bound to execute all the works under the scope of the contract and decision whether an extra item is applicable or not, shall be taken by BHEL Engineer which will be binding on the contractor.
2.5.16	Any activity which is necessarily required for satisfactory execution of any item of BOQ in line with technical specifications shall be deemed to be included in BOQ item even if it is not described in the item description and no extra payment shall be made against such activity.
2.6	**Tentative Technical Staff Requirement for each package:**
2.6.1	Contractor shall deploy and maintain pool of sufficient experienced staff of Technical and administrative manpower for execution of work at site. Experienced manpower like Site In-charge, Project Manager, Engineers, Planning, Billing, Stores, Accounts, Quality, Safety, Operators, Helpers, security guards etc. as staff shall be deployed by contractor in sufficient numbers for execution of each package Note: Contractor shall augment manpower to meet the project schedule/ milestones. Deployment of manpower shall be progressive to meet the project schedule. Relevant experience is subject to decision of BHEL site in-charge.

2.6.2	Deputation of man-power shall be jointly decided at site in line with construction Schedule.
2.6.3	Engineer/ supervisor for required for proper execution are to be provided as per site requirement
2.6.4	Contractor shall deploy experienced manpower for execution of the job. BHEL reserves the right to reject or approve the list of personnel proposed by the contractor. The persons whose bio-data have been approved by BHEL will have to be posted at site and deviation in this regard will not be permitted unless specific & reasonable justification is made.
2.6.5	N.A.
2.6.6	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organization shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organization shall be headed by a competent construction manager having sufficient authority to take decisions at site.
2.7	**Supervisors / Engineer and Computer for exclusive use of BHEL:**
2.7.1	The Contractor shall depute **supervisors / Engineers**, acceptable to BHEL Site, with sufficient computer knowledge (knowledge of MS office) to whom works (Planning, Billing, reconciliation, documentation etc.) will be assigned in consultation and acceptance of BHEL for original contract and extended period.
2.7.2	Void
2.7.3	The bidder will have to provide **One (01) No. of Laptops** (X-86 Architecture Based, 64-Bit Supported, Microprocessor with minimum 8 cores, On-board Graphics feature compatible with supplied OS, Minimum 8 GB RAM 2666 MHZ SDRAM upgradeable to 16 GB, 512 GB SSD M.2 Hard Drive or higher, 13" - 14" (both included) high definition anti-glare LED back lit Screen, OEM USB Optical Travel Mouse, Integrated High definition audio with integrated speakers and volume control (Hardware/Software). Single audio jack (single pin) for connecting ear phones and mic, Built-In HD Webcam with Built-In Microphone, integrated 100/1000 Mbps port, Integrated Wi-Fi 6, supporting industry standard IEEE 802.11ax + Bluetooth 5.0 or higher, Minimum 2xUSB 3.1 Ports, 1xType C, Stereo headphone/ microphone combo jack,1 x HDMI Port. 1 x RJ – 45, Minimum 3-cell battery capable of providing 6 hours or more backup in standard business environment, ACPI Compliant, OEM AC Adaptor suitable for 230V supply, Should come pre-installed with Windows 11 Professional Edition or latest version with 64bit latest service pack, OEM carry bag to be supplied with OS Certification from Microsoft and required software able to open/edit drawings & documents of BHEL like MS Office, AutoCAD, ADOBE PDF **with one laser jet printer compatible for A4 and A3 size printing with power backup at places, as per instruction of BHEL,** for original and extended contract period.
2.7.4	These laptops/ printers shall remain contractor's property/ownership for all legal/technical purposes. However, contractor will be allowed to take out the same after completion of the site works on obtaining permission from BHEL. The computer/printer

	shall remain at BHEL offices or at place decided by BHEL Engineer during the contract period/ extended period (if any).
2.7.5	This facility has to be provided as directed by BHEL till completion of site works or as decided by BHEL. If contractor fails to provide computer/ printer as per requirement, for a continuous period of fifteen days or more, BHEL shall have the right to purchase it on behalf of contractor and recover the expenses incurred from the dues payable to contractor. Recoveries shall be actual expenses incurred plus 5% overheads.
2.7.6	Void
2.8	**Field Quality Assurance:**
2.8.1	The contractor shall be responsible for day-to-day quality checks for works and other building materials in line with approved Field Quality Plan (FQP) and Manufacturing Quality Plan (MQP) during the progress of work. All quality records and log sheets shall be maintained as per the requirement of BHEL/CUSTOMER and as per FQP/MQP approved by BHEL/CUSTOMER.
2.9	**Erection Clause:**
2.9.1	The work to be carried out at quoted / accepted rates by the Contractor under the scope of these specifications covers the complete work of handling, loading and transporting of materials from project stores sheds / storage yards to site of erection or preassembly yard and unloading at pre-assembly area/erection site, checking, cleaning chipping and levelling of foundations, providing packers and shims/pre-assembling of equipment at the preassembly yard, inspection, minor rectification, preservation, erection, levelling, and other adjustments, cutting, edge / surface preparation, bolting, welding (if applicable), grinding, radiography, LPI/MPI/UT/PAUT/CRT testing wherever needed, heat treatment, including inter connection of all the termination points, and handing over of floors, roof etc., completion of structure erection for PH#1&2 and CCR, BOIs.
2.9.2	The works to be performed under this contract consist of providing all labour, supervision, material, scaffolding, construction equipment's, tools and plants, temporary works, supplies including Consumables, transportation and all incidental items not shown or specified but reasonably implied or necessary for the proper completion of work in all respects. Testing of all materials etc. are included on the rates of items of work. Works shall be carried out only with approved structural erection drawings. The unit rates shall include all resources, consumables, equipment, fixtures, labour, construction plant, temporary works and everything whether of permanent or temporary nature necessary for the completion of job in all respects.
2.9.3	The bidder should fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon pattern, local conditions, soil strata and site-specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may have not been specifically brought out in the specifications.
2.9.4	The quantities indicated in the tender specification are approximate and are liable for variation at the discretion of BHEL. 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. Quantity variation shall be governed as per GCC clause 2.14.

2.9.5	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 agency unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies.
2.9.6	It shall be specially noted that, the contractor may have to work round the clock (24x7) or may have to deploy additional manpower/resources to achieve the completion schedules / plans / targets during the entire course of erection and commissioning works, which may involve considerable expenses including overtime. Hence contractor's quoted rate shall take into consideration of all expenses that will be incurred for such arrangement of personnel including labours, engineers / supervisors, T&Ps etc. Time is the essence of contract. Night shift working is envisaged for works not hazardous in nature with due permission of BHEL like- Erection works at low heights, Material shifting, Preassembly works etc.
2.9.7	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.
2.9.8	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 affected from contractor's bill towards expenditure incurred including BHEL's overhead charges (5%).
2.9.9	Considering the area constraint in the subject project, Contractor has to work in close co-ordination with other erection/Civil 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 project milestone events are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.
2.9.10	No member of the already erected structure/ platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer. In case it is necessary to cut, the contractor shall rectify / repair in a manner acceptable to BHEL / Customer without any additional cost.
2.9.11	The storage yard is located in multiple locations. All other materials have to be transported from storage yard to construction area by the contractor at his own cost, using own **Pick & Carry Crane (Farrana),** crane and trailer. Bidders are advised to visit site to ascertained all these aspects before quoting.
2.9.12	**Painting: Touch-up Painting** All structures/ components shall be supplied from BHEL units/ workshops with finish coats of paint. Therefore, final painting is not applicable in the scope of contractor for Unit/shop supplied items (***until specifically mentioned in the tender***). However, touch up painting (wherever required), incidental to the work, shall have to be done. Payment for application of Primer & Paint, including its supply, for touch-up

	works in shop fabricated structure shall be paid separately as per BOQ. Scaffolding & other consumables for such works has to be arranged by Contractor within the quoted rates.
2.9.13	During the course of erection, certain rework / modification / rectification / repairs / fabrication etc will be necessary on account of feedback/revision from various relevant sources, and also on account of design discrepancies/ alterations, manufacturing defects, site operations/ maintenance requirements. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repairs etc promptly and expeditiously. This shall be dealt as per GCC clause 2.15 of GCC.
2.9.14	The scope of work covered under this specification is of highly sophisticated nature, height work, critical structure for housing sophisticated machines, heavy lifting etc. and hence, requiring the best quality workmanship, engineering and construction management **including high standard safety management (as per relevant clause of tender document) and (Project Management, HSE & Quality etc.).** Power House and Common Control Room building are most critical structures and required experienced manpower in handling work at height, heavy structures, heavy liftings, scaffolding etc. The contractor should ensure successful and timely completion of the work. The contractor must have adequate quantity of tools, construction aids, equipments etc., in his possession. He must also have on his rolls adequately trained, qualified and experienced supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works. **(Refer HSE Manual).** Contractor shall execute the work as per sequence and procedure prescribed by BHEL at site. The erection manuals 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/sequence of erection adopted in erection of similar jobs or for any reason whatsoever.
2.9.15	N.A.
2.9.16	N.A.
2.9.17	Furnishing samples of all materials required by the engineers for testing/inspection and approval for use in the works. The samples may be retained by the engineer for final incorporation in the works.
2.9.18	Furnishing test reports for the products used or intended to be used, if called for the specifications or if so desired by the engineer.
2.9.19	Giving all notices, paying all fees, taxes, statutory clearances/license/Certificates (like T&P load test, etc), etc., in accordance with the general conditions of contract, that is required for all works including temporary works is in the scope of bidder.
2.9.20	Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.

2.9.21	The contractor shall provide the owner/BHEL such an assistance, instruments, machines, labour and materials as are normally required for examining, measuring and testing any work and the quality, weight or quantity of any material used.
2.9.22	Providing all incidental items not shown or specified but reasonably implied or necessary for the successful completion of the work in accordance with contract.
2.9.23	Arranging for joint checking (with BHEL / BHEL's Customer / Consultant) of all site construction activities Preparation of joint protocols for each & every activity and maintaining quality records for audit/inspection as per approved FQP by BHEL.
2.9.24	Contractor shall set up suitable guarded storage facilities. Any theft or missing of BHEL material/Tools & Plant from contractor's custody shall be recovered from contractor's dues along with BHEL's applicable overheads.
2.9.25	The drawings/documents enclosed with this tender are intended to give the tenderer a general idea of the type and extent of work involved. The drawings are as such only indicative and not to be considered as the exact construction drawings. Further this is to be noted that the drawings and the documents furnished along with this specification are the sole property of BHEL. It must not be used directly or indirectly in any way detrimental to the interest of the company.
2.9.26	The scope of work will also include such other related works although they may not be specifically mentioned above and all such incidental items not specified but reasonably imply and necessary for completion of the job as a whole all as desired and as directed by the engineer.
2.9.27	The detail scope of work covered above is not a comprehensive list of items of work involved. The detail scope of work may vary considerably depending on the actual requirements.
2.9.28	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 yard and contractor's material storage area etc. at his cost.
2.9.29	**Adequate water less/Bio urinals (at least 1 no. per 100 nos of manpower, at locations identified by BHEL site in-charge)** shall be arranged by the contractor within quoted rates, at site of construction at different level and different areas with proper disposal arrangement.
2.9.30	Vendors have to comply requirements of HSE & Statutory requirement in line with BHEL HSE plan, NTPC Safety requirement, State/Central statutory requirement.
2.9.31	Preparation of method statement, HIRA, Job Safety analysis, permit to work, lifting plans, and all supporting documents as required for starting & continuation of work/job is in vendor's scope.
2.9.32	Scaffolding pipes, clamps, safety nets, floor grills for working platforms are to be made of good quality with proper certifications as per IS Codes.
2.10	**Consumables**

2.10.1	Field connections are bolted. However, all the required electrodes (in Contractor scope) as approved by BHEL shall be arranged by contractor at his cost for carrying out welding required as per FQP/drawings for completion of scope of work. It shall be the responsibility of the contractor to obtain prior approval of BHEL site, before procurement regarding, suppliers, type of electrodes etc. 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.
2.10.2	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 (**structural steel, sleepers, concrete blocks etc**) hardware items etc. required for temporary works such as supports, scaffoldings, **pre-assembly bed etc.** can be issued from BHEL on returnable basis subject to availability with BHEL site store. In case of non-availability same has to be arranged by agency.
2.10.3	All the shims, gaskets and packing, which go finally as part of equipment, shall be supplied by BHEL free of cost.
2.10.4	All the required gases like Oxygen / Acetylene / argon / Nitrogen required for work shall be supplied by the Contractor at his cost. It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of these gases. Non-availability of gases cannot be considered as reason for not attaining the required progress. BHEL reserves the right to reject the use of any gas in case required purity is not maintained.
2.10.5	The contractor shall submit quarterly statement report regarding consumption of all consumables for cost analysis purposes.
2.10.6	The contractor shall ensure safe keeping of the inflammable cylinder at a separate place away from normal habitat with proper security etc.
2.10.7	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.
2.10.8	Storage of electrodes shall be done in an air conditioned / controlled humidity room as per requirement, at his own cost by the contractor.
2.10.9	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.
2.10.10	**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 subsequent bills at market value plus 5% overheads.**
2.10.11	BHEL reserves the right to reject the use of any electrodes at any stage, if found defective because of bad quality, improper storage, date expiry, unapproved type of electrodes etc. It shall be the responsibility of the contractor to replace at his cost without loss of time.
2.10.12	Self-drilling screws / Self taping screws for sheeting works shall be provided by the agency within the quoted price/rates.
2.11	**HEIRARCHY:**

2.11.1	In case of any conflict/deviations amongst various documents, the order of precedence shall be as follows: 1. Corrigendum (if any) 2. Items Description in BOQ Cum Rate Schedule. 3. Technical Conditions of Contract (TCC). 4. Technical Specifications for Customer (Section-C). 5. IS Standard. 6. BHEL's Standard Specification (Section-D). 7. Special Condition of Contract/ General Condition of Contract

Sl. No	Description PART I	Scope		Remarks (for details refer relevant clause of tender document)
		BHEL	Bidder	
3.1	**Establishment:**			
3.1.1	**For Construction Purpose:**			
a	Open space for office (as per availability within project premises)	Yes		Location will be finalized after joint survey with owner.
b	Open space for storage (as per availability within project premises)	Yes		Location will be finalized after joint survey with owner.
c	Open space for fabrication(if any)/pre-assembly (as per availability within project premises)	Yes		Location will be finalized after joint survey with owner.
d	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
e	Bidder's all office equipment, office / store / canteen consumables		Yes	
f	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
g	Firefighting equipment like buckets, extinguishers etc.		Yes	
h	Cordoning-off of storage area, office, canteen etc. of the bidder		Yes	
3.1.2	**For living purpose of the bidder:**			
a	Open space for labour colony		Yes	Contractor has to make his own arrangements for shelter and transportation of labours as per requirement.
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	Construction Plan shall be approved by BHEL (Refer relevant Annexures in respect of construction of Labour colony)

Sl. No	Description PART I	Scope		Remarks (for details refer relevant clause of tender document)
		BHEL	Bidder	
3.2	**Electricity:**			
3.2.1	**Electricity for construction purposes (for Site/Project works only) 3 Phase 415/440 V** within project premises			
a	Single point source	**Yes**		**Free of Cost.** Shall be provided at adequate points near the site at a distance of approx. 500 meter.
b	Further distribution including all materials, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances, if applicable	Yes		
3.2.2	**Electricity for office, stores, canteen etc. of the bidder (Chargeable) within project premises**			
a	Single point source (Chargeable)	**Yes**		Chargeable at **prevailing tariff on project site at** One point near the site at a distance of approx. 500 meter.
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances, if applicable		Yes	
3.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors, labour Hutment etc.**			**Contractor has to make his own arrangements**
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Payment/Duties and deposits including statutory clearances if applicable		Yes	
3.3	**Water Supply:**			
3.3.1	**For construction purposes:**			

Sl. No	Description PART I	Scope		Remarks (for details refer relevant clause of tender document)
		BHEL	Bidder	
a	Making the water available at single point	Yes		Free of cost by BHEL.
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.2	**Water supply for bidder's office, stores, canteen etc.**			
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.3.3	**Water supply for Living Purpose**			**Contractor has to make his own arrangement**
a	Making the water available at single point		Yes	
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
3.4	**Lighting**			General area lighting through high mast and other fixtures shall be in the scope of BHEL. However, localized area lighting for bidder's construction site/ storage yard/pre-assembly yard/ material handling location, etc. shall be in scope of contractor.
a	For construction work (supply of all the necessary materials) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	

Sl. No	Description PART I	Scope		Remarks (for details refer relevant clause of tender document)
		BHEL	Bidder	
b	For construction work (execution of the lighting work/ arrangements) 1. At office/storage area 2. At the preassembly area 3. At the construction site /area		Yes	
c	Providing the necessary consumables like bulbs, switches, etc. during the course of project work		Yes	
d	Lighting for the living purposes of the bidder at the colony / quarters		Yes	
3.5	***Communication facilities for site operations of the bidder***			
a	Telephone, fax, internet, intranet, e-mail etc.		Yes	
3.6	**Compressed air wherever required for the work**			
a	Supply of Compressor and all other equipments required for compressor & compressed air system including pipes, valves, storage systems etc.		Yes	
b	Installation of above system and operation & maintenance of the same		Yes	
c	Supply of the all the consumables for the above system during the contract period		Yes	
3.7.1	**Demobilization of all the above facilities**		Yes	
3.7.2	***Transportation***			
A	For site personnel of the bidder		Yes	
B	For bidder's equipment and consumables (T&P, Consumables etc.)		Yes	
3.7.3	**Erection Facilities**			
3.7.3.1	Engineering works for construction:			
a	Providing the erection/constructions drawings for all the equipment covered under this scope.	Yes		**Shall be provided progressively.**
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL

Sl. No	Description PART I	Scope		Remarks (for details refer relevant clause of tender document)
		BHEL	Bidder	
c	As-built drawings wherever deviations observed and executed and also based on the decisions taken at site		Yes	Changes are to be marked in drawing & handover to BHEL on completion of work.
d	Shipping lists etc. for reference and planning the activities	Yes		
e	Preparation of site erection schedules and other input requirements asper Form-14.		Yes	In consultation with BHEL
f	Review of performance and revision of site erection schedules in order to achieve the end dates and other commitments	Yes	Yes	In consultation with BHEL
g	Weekly erection schedules based on Sl. No. e		Yes	In consultation with BHEL
h	Daily erection / work plan based on Sl. No. g		Yes	In consultation with BHEL
i	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	
j	Preparation of pre-assembly bay		Yes	Materials required for preassembly shall be in agency scope. However, if available, BHEL may provide such material on free returnable basis, which shall be returned without any damage.

3.8	**Land/Open Space:**
3.8.1	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's agencies. BHEL shall provide free of charge limited open space for office, storage shed and laydown area as and where made available by Customer. It is the responsibility of the contractor to construct facilities such as sheds, fabrication/Preassembly yard, provide all utilities and dismantle and clear the site after completion of work or as and when required, as a part of his scope of work.
3.9	**Labour and Staff Colony:** **Following are in the Bidder's scope of work for labour & staff colony:**
3.9.1	Labour colony is to be developed by bidder for all the labours required to be deployed for the works. All labour colony set-up is to be developed as per attached customer drawing (Annexure-B), BHEL's standard guidelines (Annexure-A) for worker's accommodation/establishment and in compliance of statutory requirements. Contractor shall construct/arrange Labour Hutment as per minimum specifications mentioned in the attached drawing/guidelines, for which no separate payment shall be made by BHEL. Modifications if any proposed in the Hutment shall be in consent with BHEL/Customer. Ownership of the labour hutment shall be of the contractor and contractor shall keep BHEL indemnified from any statutory obligations/ legal compliances w.r.t. labour hutment establishment during as well as after the completion of contract.
3.9.2	In case labour hutment is not completed as per the drawings, BHEL's guidelines and specification and any penalty is imposed by Customer, same shall be recovered from contract's RA Bill. Rectification and Corrections in labour hutment as pointed out by BHEL/Customer shall be bidder's responsibility and any cost incurred by BHEL to complete the works, in case of non-compliance of the instructions, same shall be recovered from his RA Bills along with 5% overheads.
3.9.3	Land for labor colony shall be arranged by Contractor at their own cost as per availability outside project area preferably within 5Km, Necessary levelling/dressing of land shall be done by the contractor. All arrangement for electricity and drinking/service water to be arranged by the contractor within his quoted price. All expenses towards installation of transformer, depositing requisite fees etc if required shall be borne by vendor.
3.9.4	Development of Bidder's temporary staff colony and labour colony having adequate no. of Bio Urinals.
3.9.5	All Civil and Structural work associated with drinking and service water for Bidder's labour and other personnel at the work site/colony/offices including pump houses, pipes, overhead tank, tube wells etc.

3.9.6	Providing and maintaining facilities for safety, welfare, drinking water and sanitation, hygiene, health check-up etc. for construction workers at their workplaces as well as at labour & staff colonies.
3.9.7	Development and maintenance of above facilities for construction workers deployed by the Contractor shall solely rest with the Contractor.
3.9.8	Contractor shall follow the BHEL's standard guidelines and customer drawings in respect of construction and maintenance of labour colony/accommodation attached with this tender at the direction of BHEL's engineer
3.10	Installation of necessary amenities- and temporary infrastructure for construction activities at Project site locations. Following are the minimum amenities to be provided by the bidder within the quoted price including removal/disposal of the same in environment friendly manner after its intended use/completion of scope of work: i. Labour rest sheds near work spot. ii. Canteen facility creation. iii. Drinking water facility. iv. Labour Bio toilets near work spot in sufficient nos. with regular cleaning & maintenance arrangement. v. Labour colony should have all hygienic condition, dining hall, toilets, proper sewerage system, good drinking water arrangements. vi. Regular fogging in the work place and labour colony to avoid mosquitoes. vii. Royalty challan (if applicable) and statutory documents shall be submitted along with RA Bills for processing of Bills.
3.11	**Construction Power:**
3.11.1	Construction power (three phase, 415 V/ 440 V) will be provided near the site at a distance of approx. 500M **free of cost**. Further, distribution shall be arranged by the contractor at his own cost and services. Construction power (three phase, 415 V/ 440 V) for office, stores, canteen etc. within the site premises will be provided on **chargeable basis** near the site at a distance of approx. 500M. Further, distribution shall be arranged by the contractor at his own cost and services.

3.11.2	Contractor shall deploy and install required energy meter (wherever applicable), cables, fuses, distribution boards, switchboards, bus bars, earthing arrangements, protection devices and any other installation as specified by statutory authority/act. Contractor shall provide at his own cost necessary calibrated energy meters (tamper proof, suitably housed in a weather proof box with lock & key arrangement) at point of power supply along with calibration certificate from authorized/ accredited agency for working out the power consumption. In case of recalibration required for any reason the necessary charges including replacement by calibrated meters is to be borne by the contractor. Contractor is advised to maintain the calibrated energy measuring instruments.
3.11.3	Sufficient power factor compensation equipment like capacitor shall be provided by contractor for reactive loads like welding machines etc. In case of any fine/penalty on account of low power factor, same shall be shared by contractor proportionately according to power consumption.
3.11.4	Contractor shall make necessary arrangements for onward distribution of construction power taking due care of surrounding construction activities like movement of cranes & vehicles, civil work, fabrication/construction/assembly/ erection etc. and safety of personnel. It may become necessary to relocate some of the installations to facilitate work by other agencies or by him.
3.11.5	It shall be the responsibility of the Contractor to provide, maintain the complete installation on the load side of the supply with due regard to the safety requirements at site. All cabling and installations shall comply in all respects with the appropriate statutory requirements. The installation and maintenance of this shall be done by licensed and experienced electrician.
3.11.6	While reasonable efforts will be made to ensure continuous electric power supply, interruptions cannot be ruled out and no claim from the Contractor shall be entertained on this account such as idle labour, extension of time etc. The Contractor shall adjust his working shift accordingly and deploy additional manpower, if necessary, so as to achieve the target.
3.11.7	Contractor shall be well equipped with back-up power supply arrangement like DG set and diesel operated welding machine etc. to tackle situations arising due to failure of supplied power, so as to ensure continuity and completion of critical processes that are underway at the time of power failure or important activities planned in immediate future.
3.11.9	BHEL is not responsible for any loss or damage to the Contractor's equipment as a result of variations in voltage or frequency or interruptions in power supply.
3.11.10	The bidder shall be responsible for General illumination system/arrangements during construction right from start of his work. This system will include temporary pole lighting,

	within the quoted price. The illumination should be such that minimum illumination requirement as specified by Indian standards for general illumination is maintained.
3.11.11	VOID
3.11.12	Supply of electricity shall be governed by Indian Electricity Act and Installation Rules and other Rules and Regulation as applicable. The contractor shall ensure usage of electricity in an efficient manner and the same may be audited by BHEL time to time. In case of any major deviation from normally accepted norms is observed, BHEL will reserve the right to impose penalty as deemed fit for such cases.
3.12	**Construction Water:**
3.12.1	Construction water shall be provided by BHEL on free of cost basis. Bidder has to make arrangement of further distribution of water at his own cost. No extra payment shall be made under this account.
3.12.2	The Contractor should make arrangements for storage of sufficient quantity of water required for construction purposes.
3.12.3	Contractor to satisfy himself that the water drawn by him is fit for construction / consumption purposes.

4.0 Tools and Plants: Number of T&Ps to be deployed at site shall be decided w.r.t. monthly plan and review format (F-14) based on site requirement.

4.1 **Major T&P:** The following **Major Tools & Plants** (T&P) shall be arranged by the Contractor for execution of work as per Technical Conditions of Contract of this tender within the quoted rate.

For Package A:

S.N.	DESCRIPTION OF MAJOR T&Ps	CAPACITY	QUANTITY	REMARKS
1.	Crawler/Tyre mounted	80 MT	01 Nos.	Crane to be made available as per instruction from BHEL Site in-charge Tentative schedule: from Start of structure Erection till completion

For Package B:

S.N.	DESCRIPTION OF MAJOR T&Ps	CAPACITY	QUANTITY	REMARKS
1.	Crawler/Tyre Mounted	80 MT	01 No.	Crane to be made available as per instruction from BHEL Site in-charge Tentative schedule: from Start of structure Erection till completion

Note for clause 4.1:

1. Contractor shall mobilise aforementioned cranes/T&Ps at site, in case stated capacity crane could not be made available, for any reason what so ever, a higher capacity crane shall be mobilised by the contractor without any extra cost.
2. Agency shall Mobilize / de-mobilize/ re-mobilise the Major T&Ps as per BHEL instruction without any extra cost to BHEL.

4.2 **Other T&P:** The following **Other Tools & Plants** (T&P) shall be arranged by the Contractor for execution of work **under Package A & B (i.e. for each package)** as per Technical Conditions of Contract of this tender within the quoted rate. Below given Quantities are tentative for planning purposes by the bidder.

S.N.	DESCRIPTION OF OTHER T&Ps	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
1	Crawler crane 40 MT	40 MT	Minimum 01/APR	
2	Tyre mounted Crane/Farana	12/14/18/20/22 MT	Minimum 04/APR	Capacity is tentative and same shall be

S.N.	DESCRIPTION OF OTHER T&Ps	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
				decided with BHEL engineer during execution of work
3	Trailers with pulling unit	40 MT	Minimum 01/APR	APR
4	Trailers with pulling unit	20 MT	Minimum 01/APR	APR
5	Tractor Trolley	APR	Minimum 01/APR	APR
6	DG Set	250 kVA	APR	
7	Power Winches	2/3/5/10/15 MT	Minimum 06/APR	APR
8	Hand winch	0.5 /1.0 MT	APR	APR
9	Welding Machine	APR	APR	APR
10	Baking/Heating Oven	APR	Minimum 01/APR	APR
11	Portable Oven	APR	APR	APR
12	Portable grinding machine of various sizes	APR	APR	APR
13	Calibrated Power driven bolt tightening machines	Desired Sizes	Minimum 5/APR	
14	Manual Torque tightening machine	Desired Sizes	Minimum 05/APR	
15	Torque calibrator	APR	APR	APR
16	Bolt Tension Calibrator	APR	APR	APR
17	Impact wrench with socket (Pneumatic)	Desired Sizes	APR	APR
18	Steel tape/steel ruler/Wrenches	APR	APR	
19	3-phase distribution board with complete set up for drawl of construction power	APR	APR	Required Since start of work
20	Power cable for drawl of construction power	APR	APR	
21	Self-drilling cum tapping machine for screws	APR	APR	APR
22	Radiography arrangement with radioactive isotope source	APR	APR	APR
23	Gas cutting sets	APR	APR	
24	Chain pulley blocks	APR	APR	Of different capacities

S.N.	DESCRIPTION OF OTHER T&Ps	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
25	Scaffolding materials with clamps for cladding fixing, etc works	APR	APR	Sufficient numbers for parallel working/joints
26	Hoisting and pulley devices/pulleys	APR	APR	
27	SPANNERS / EYE BOLTS (OF ALL SIZES)	APR	APR	
28	Wooden/Concrete sleeper 1.5-2.0 Mtr length	APR	APR	
29	Sufficient quantity of steel ladders for approach up to the top of each erected column to be required during erection of columns.	APR	APR	
30	Suspended working platform Size :7mX1mX0.5m, Rated load 800 kg to 1000 Kg,	APR	APR	APR
31	Theodolite of required accuracy	APR	Minimum 02/APR	
32	Air compressor/blower (electric/diesel operated)	210 CFM, 7 KG/CM2	APR	
33	Slings/Special Slings for Erection of Ceiling Beams & other heavy components	APR	APR	
34	Elcometer for paint thickness checking		As required	
35	Various sizes of clamps/ fixtures for assembling		As required	
36	Dewatering pumps(Electrical & Diesel engine operated)	As required	As required	
37	Welding rectifiers (electrical)	As required	As required	
38	Self-drilling cum tapping machine for screws of PH roof & Cladding sheets and Deck Sheet	As required	As required	
39	Radiography film viewer	As required	As required	
40	Safety ladder for sheet laying	As required		
41	Man lifter	As Per Requirement	As Per Requirement	As Per Requirement
42	Painting equipment/sets	As Per Requirement	As Per Requirement	
43	Dewatering pumps	As required	As required	

S.N.	List of suggestive safety Equipments /PPEs to be included in List of minimum T&P:	Remarks
1.	Safety Net (Conforming IS 11057:1984) Safety Net (Net Size: 10m x 5m, Mesh Size: 25 mm, Mesh Rope: 2mm double cord, Border/Tie Cord: 12mm diameter polypropylene rope (tested as per IS: 5175). Two meters length shall be provided at all four corners.	Min-40 Nos
2.	**Fall Arrester** 'Rope grab fall arrester' & anchorage line. Anchorage Line: 14mm- 16 mm diameter, three strand twisted Polyamide rope. Rope Grab fall arrester: Openable & Guided type Fall Arrestor (on flexible line) conforming EN 353-2 & works on 14-16 mm diameter polyamide rope. Material: Nickel Chrome plated Steel Connector: Karbiner conforming to EN 362 (Minimum Strength 22 KN), material: Steel Retractable Fall arrestor Block (Range 6 Mtr to 15 Mtr)	Min. 50 nos. of Rope Grab Fall arrester' and Karbiner each. Min 25 nos. anchorage line, 30 metre long each, 10 nos. anchorage line, 40 metre long each Min50 Nos
3.	**Horizontal life line** Stainless Steel Wire rope of 8mm diameter. Minimum six nos. of steel U-bolt clips are required for clamping each wire rope to a rigid support (03 nos. of U-bolt clips at each end).	Min 10 nos. of wire rope, each 40 metre long Min 25 nos. of wire rope, each 25 metre long.
4.	**Ladders on column** The minimum design live load on metallic ladder shall be a single concentrated load of 100 kilo grams. All rungs shall have a minimum diameter of 16mm to 25 mm, and minimum clear length of rungs shall be 40.6 centimetres. The distance between rungs shall not exceed 30.5 centimetres. Each ladder shall have maximum height of 9.0 metre. The ladder shall have proper fastenings for attaching it to a column using positive means such as bolt, weld or other type of fasteners.	As per requirement based on BHEL engineers instructions
5.	Height Rescue Kit and Confined space rescue kit	1 No each
6.	Lux Meter & Breathe Analyser	01 No (if required)
7.	Multi Gas Meter	1 No
8.	ELCB & RCCB Tester	1 No
9.	Earth Resistance meter	1 No
10.	Scaffolding materials as per EN 74 for hard barricading	As per requirement

11.	Oxygen Meter	1 No
12.	Fire Blanket	APR
13.	**Fire resistant tarpaulins**	APR
14.	**Safety Posters as per BHEL Guidelines**	As per requirement and instruction of BHEL
15.	**Fire Extinguishers:** ABC – 6 Kg: 50 Nos, Co2 – 4.5 Kg: 20 Nos, Foam – 9 Kg: 5 Nos Fire Bucket (set of ¾ buckets) with stand – 10 Nos	
16.	Rubber Mat as per IS 15652	Min 200 Sqm
17.	Electrical rubber gloves	As per requirement
18.	Water Sprinkling tanker for dust suppression	As per requirement

- APR – As per requirement

Note- Please refer BHEL Singrauli site HSE plan (Annexure-C) in respect of safety equipment/PPEs. Separate annexure issued to all contractor at the time of execution of work by Safety officer of BHEL with approval of construction manager/ GM/ PD. PPEs Quantity annexure issued by site are final and agency must fulfill the same during execution of work.

4.3	**Measuring and Monitoring Equipment (MMEs):** To be finalized as per site requirement.
4.3.1	**All above T&Ps are to be deployed by contractor as and when required as per instruction of BHEL engineer. If works gets delayed due to non-availability of above T&Ps, BHEL reserves the right to deploy the same and recover the charges thereof from the contractor** as per prevailing market rate/hiring rate/BHEL internal hiring rates + 5% overhead rates.
4.3.2	**Heavy Equipments (cranes, winch etc.) manufactured less than 15 Yrs. from the current Year shall be only allowed to be used at project Site.**
4.3.3	**Hydras are not permitted for the scope of work. Contractor shall deploy and use pick & carry crane of TRX/Farana or equivalent type only for the above purpose. Quantity and capacity of Farana/Pick & Carry crane mentioned above under sl no 4.2(1) is tentative and both shall be mutually decided by BHEL Engineer and contractor at site during execution of work as per the requirement.**
4.3.4	**Tandem operation towards material handling is also not permitted in the project premises.**
4.3.5	Necessary electrical / water / air connection required for operation of any of the tools & tackles shall be to Contractor's account.
4.3.6	Contractor has to submit the Calibration certificates of all the precision Equipment to BHEL. BHEL may ask for recalibration of the MMEs /precision equipment for ensuring

	quality of work. Contractor must re-ascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.
4.3.7	All Measuring and Monitoring Devices (MMD) used for the work in scope of these tender specifications shall be calibrated by the accredited agencies that are approved by BHEL or calibration tractability is established upto National Physical Laboratory.
4.3.8	Contractor has to arrange slings of all sizes for completing the works covered under these specifications.
4.3.9	In the event of need of change of type of any of major T&Ps, approval shall be taken from BHEL Engineer in-charge prior to mobilization. The decision of Number of T&P required due to replacing the enlisted T&P as per above table, shall be taken after analysing the production capacity and suitability of both the T&Ps.
4.3.10	The contractor shall submit the valid test certificate/calibration certificates for all the T&Ps before put into actual use at site. The certificates shall be renewed time to time as instructed by BHEL Engineer.
4.3.11	Crane operators deployed by the contractor shall be offered for testing by BHEL before they are allowed to operate the cranes.
4.3.12	The above list as mentioned in S.No. 4.2 (Other than mentioned in S.No. 4.1 Major T&Ps) is only indicative and these T&Ps may not be required for entire contract period but contractor shall ensure the availability of the T&Ps as per work requirement and T&P Deployment schedule. T&P Deployment schedule shall be finalized at site in consultation with BHEL Engineer based on the work fronts/work requirement. BHEL decision shall be final and binding regarding the T&P deployment schedule. Contractor shall mobilize / maintain the T&P's as per the deployment schedule notified time to time by BHEL Engineer.
4.3.13	APR (As per Requirement) - Contractor has to deploy T&P, MMD, IMTE as per requirement of site and as decided by BHEL Engineer.
4.3.14	Apart from above mentioned T&P, any additional item required in addition to above mentioned T&P for proper execution of scope of work, contractor has to arrange such T&P within quoted rate on the instruction of BHEL in writing in a reasonable period within two weeks from the written instruction from BHEL.
4.3.15	If the work related to T & Ps mentioned above is completed then, BHEL can release that T&P during contract period / extended period (if any). However, written permission shall be taken by contractor from BHEL Construction Manager and gate pass formalities shall be followed by the contractor for releasing the T&P.
4.3.16	In the eventuality of contractor not deploying / abnormal down time of T&P/cranes in his scope during the period specified above, and BHEL arranges for the same [BHEL's own cranes], prevailing BHEL Corporate Crane hire charges (which may vary from time to time) shall be recovered from the contractor's running bills. Corresponding pages of Corporate Crane hire charges are enclosed as part of tender document as File titled "**Annexure D- BHEL T&P Hire Charges"**. (Please note that these charges are as valid up to Aug, 2025 and may get revised further). In case BHEL arrange the T&P/Crane through hiring, actual hiring charges with 5% over head shall be recovered from the contractor's running bills.
4.3.17	The loading, unloading and transportation of contractors T&Ps shall be in the scope of contractor. All necessary items such as Trailers, Cranes, Winches, welding generators, slings, jacks, sleepers, rails etc., are to be arranged by the contractor at his own cost.

4.3.18	All the T&Ps required for this scope of work, except the Tools & Plants mentioned in **Chapter V of TCC: T&Ps to be provided by BHEL**, are to be arranged by the contractor with in the quoted rates.
4.3.19	All operators (for crane, winch etc.) deployed by contractor shall have valid licence from applicable authority (which ever applicable).
4.3.20	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.
4.4.1	T&Ps shown in the above in S.No. 4.2 mentioned list is suggestive requirement. However, mobilization schedule as mutually agreed at site for T&Ps, have to be adhered to. Numbers/time of requirement will be reviewed from time to time at site and contractor will provide required T&Ps/equipment to ensure completion of entire work within schedule/target date of completion without any additional financial implication to BHEL.
4.4.2	Contractor will give advance intimation & certification regarding capacity etc. prior to dispatch of heavy equipment. Also on completion of the respective activity, demobilization of T&Ps in total or in part can be done with the due approval of Engineer-In-Charge. Retaining of the T&Ps during the contract period will be mutually agreed in line with construction requirement.
4.5	The contractor shall arrange operator, diesel, petrol and other consumables including electrical / water / air connections required for the tools and plants, equipment such as crane, winch, temporary Jhoola, 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 T&Ps shall be provided by the contractor within his quoted rate.
4.6	Required consumables like electrodes, all gases, and other materials for this scope of work are to be arranged by the contractor at their cost.
4.7	**Penalty due to T&Ps:** In order to meet the site requirement and in line with monthly plan and review format (F-14), Contractor has to mobilise their T&Ps and made available at site for required activities. For Major T&Ps, if contractor fails due to either of the case mentioned hereunder, BHEL shall be entitled to impose penalty on Contractor till any alternate arrangement is made by Contractor OR BHEL (on cost recovery basis). Case 1: Contract fails to mobilise the same within the mobilisation period of 30 days from the date of intimation. OR Case 2: After mobilisation of T&P at site, the work is getting hampered due to non-availability of T&P for more than 5 days from the date of such intimation, Penal rate for Major T&Ps is mentioned hereunder: a. 80 MT Crane – Rs. 2000/day

5.1 LIST OF T&Ps TO BE PROVIDED BY BHEL FREE OF HIRE CHARGES ON SHARING BASIS:

SL NO	DESCRIPTION & CAPACITY OF T&P	QUANTITY	REMARKS
1	Cranes	As decided by BHEL	All cranes (**except Contractor scope as mentioned in Clause 4.1**), required for mentioned work, will be arranged by BHEL as per requirement.

5.2	All the T&Ps mentioned in clause 5.1 above shall be given to contractor on sharable basis and the allotment is made by BHEL on need basis. Contractor shall plan activities well in advance and inform BHEL Engineer in charge/ Construction Manager seven (07) days prior to the date of actual use. The decision of BHEL Engineer in-charge/CM on this will be final and binding.
5.3	Contractor shall provide assistance to transport from BHEL stores, install, operate, carry out maintenance, dismantle after use and return to BHEL stores all T&Ps mentioned in Sr no 5.1 for his use.
5.4	Cranes provided by BHEL are only for erection purpose and shall not be available for transportation purpose. Contractor shall make their own arrangements for material transportation to erection site.
5.5	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.
5.6	The contractor at his cost shall arrange for grouting of anchor points of T&Ps issued to agency. Necessary grout materials are to be arranged by the contractor at his cost.
5.7	The day-to-day and routine maintenance including replacement of spares for the BHEL T&Ps will be carried out by the contractor at his own cost. However, BHEL shall supply spare parts free of charges for normal wear and tear only.
5.8	Any loss/damage of tools by the contractor shall have to be replaced or otherwise cost thereof shall be recovered from the contractor.
5.9	T&Ps provided by BHEL will be on sharing basis with other agencies / contractors of BHEL. The allocation of T&Ps shall be the discretion of BHEL engineer, which shall be binding on the contractor. T&Ps will be deployed at appropriate time as decided by BHEL for suitable duration and intended purpose. Augmentation of BHEL T&P under special circumstances shall be discretion of BHEL.
5.10	**All the Hydras/Frannas required for execution of work shall be arranged by contractor within quoted rates.**
Note	**For BHEL Owned or hired Crane:**
	1. The cranes may be BHEL owned or may be obtained on hiring basis including operating and maintenance crew.
	2. Operator and O&M for BHEL owned crane will be provided by BHEL.
	3. Contractor shall provide the fuel for BHEL provided cranes (Hired/owned) for his use.

	4. Contractor shall make necessary arrangements like laying of special sleeper beds and steel plates (**Plates for BHEL owned/ hired cranes shall be provided by the BHEL**), assembly and dismantling of heavy attachment, boom, jib etc. for movement and operation of the crane. Contractor shall provide necessary manpower assistance for initial and final assembly & dismantling and for subsequent operations of boom extension and reduction during execution of work. Levelled area will be provided by BHEL/customer for the movement of BHEL cranes. Further Consolidation of the ground with hard-crusting of Area required for movement of contractor's crane (including civil work with material) for placing crane for operation shall be facilitated by BHEL. Necessary plates required for marching operation shall be provided by the BHEL only for BHEL owned cranes.

<table>
<tr><td>6.1</td><td colspan="3">Time Schedule and Mobilization:</td></tr>
<tr><td rowspan="2">6.1.1</td><td colspan="3">Initial Mobilization and Time Schedule:</td></tr>
<tr><td colspan="3">After issue of LOA (though Fax/courier/email) the contractor shall report to the Construction Manager/Site In-Charge of BHEL at site within Two weeks (14 days) from date of LOA and make a Kick of meeting (KOM) for mobilization of manpower, T&Ps and date of start of work and detailed completion program etc. Contractor shall submit detailed mobilization plan to start work within 15 days from date of LOA; unless instructed otherwise by BHEL in writing.

The activities for Erection etc. shall be started as per directions of Construction Manager of BHEL. The contractor has to subsequently augment his resources in such a manner that the project milestones are completed on specified schedules and entire work completed within the entire contract period, as specified in the following clause from the date of start of work, in a manner required by BHEL to match with the project schedule.</td></tr>
<tr><td rowspan="2">6.1.2</td><td colspan="3">COMMENCEMENT OF CONTRACT PERIOD</td></tr>
<tr><td colspan="3">Erection/placement on its designated foundation / location, of the first major permanent equipment / component / column covered in the scope of these specifications, (whichever is earlier as decided by BHEL) shall be recognized as “Start of contract period” for Each Package.

Smaller items like packer plates, shims, anchors, inserts etc. will not be considered as start of contract period. The date of Start of contract period shall be the mutually agreed date between the contractor and BHEL engineer to start the work. In case of discrepancy, the decision of BHEL engineer will be considered final.

Based on the availability of civil foundations, drawings and material from BHEL, contractor may have to advance the erection activity after getting clearance from Construction Manager, or the erection activity may get delayed due to site conditions.

The contractor shall have to mobilize his resources before the start of contract period for preparatory work like taking over of Foundations, drawing & materials and chipping of foundations, blue-matching, grouting of packer plates etc. and start of pre-assembly. The contractor shall complete all the works in the scope of this contract within the contract period. Pending points identified by the customer/BHEL during the execution of the contract are to be liquidated during the contract period itself.</td></tr>
<tr><td rowspan="3">6.1.3</td><td colspan="3">Schedule of Completion:</td></tr>
<tr><td colspan="3">The contract period for completion of entire work under scope shall be as mentioned hereunder, from the “START OF CONTRACT PERIOD” as specified earlier for completion of the entire work in respective Package.</td></tr>
<tr><td colspan="3"><table>
<tr><th>S.No.</th><th>Package</th><th>Contractual Schedule (Month)</th></tr>
<tr><td>1.</td><td>Package A: Structure Erection of Main Power House Unit-1 along with BOIs as per BOQ at 2X800 MW NTPC Singrauli stage-III Project.</td><td>14 Months</td></tr>
</table></td></tr>
</table>

	2.	**Package B:** Structure Erection of CCR (Common Control Room) and Main Power House Unit-2 along with BOIs as per BOQ at 2X800 MW NTPC Singrauli stage-III Project.	18 Months

6.2 The schedule of important milestones is as follows:

6.2.1	**Package A** **Activity**	**Schedule of completion from date of start of work**
6.2.1.1	Main Power House Column Erection works	4th Month
6.2.1.2	Erection of Floor beams at EL(+) 17.00 M Floor	5th Month
6.2.1.3	EL(+) 17.00 M Floor Structure clearance for floor casting/ Civil Work	5th to 6th Month
6.2.1.4	Readiness of Structure for EOT crane installation	7th Month
6.2.1.5	Cladding along 'A' row	9th Month
6.2.1.6	Cladding along 'C' row	11th Month
6.2.1.7	Cladding along Gable end row	12th Month
6.2.1.8	Completion of balance structural works	14th Month
6.2.2	**Package B** **Activity**	**Schedule of completion from date of start of work**
6.2.2.1	CCR structure erection start	1st Month
6.2.2.2	Main Power House Column Erection works	8th Month
6.2.2.3	Erection of Floor beams at EL(+) 17.00 M Floor	9th Month
6.2.2.4	EL(+) 17.00 M Floor Structure clearance for floor casting/ Civil Work	9th to 10th Month
6.2.2.5	Readiness of Structure for EOT crane installation	11th Month
6.2.2.6	Cladding along 'A' row	12th Month
6.2.2.7	Cladding along 'C' row	13th Month
6.2.2.8	Cladding along Gable end row	16th Month

6.2.2.9	Completion of balance structural works	18th Month

6.3	The above schedule is only tentative. The above schedule shall be advanced, if there are requirements to advance the project to meet the project requirement. No extra payment whatsoever shall be paid on this account.	
6.4	In order to meet the above 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 w.r.t. monthly plan and review format (F-14).	
6.5	**Intermediate milestones:**	
6.5.1	Two Major Intermediate Milestones are identified as M1 and M2 above.	
	Milestones for Package A	**Schedule of completion from start of work**
M1	Readiness of unit-1 PH Structure for EOT crane installation	7th Month
M2	TG hall cladding	12th Month
	Milestones for Package B	**Schedule of completion from start of work**
M1	Readiness of unit-2 PH Structure for EOT crane installation	11th Month
M2	TG hall cladding	16th Month
6.6	**Provision of Penalty in case of slippage of Intermediate Milestones:**	
	In case of slippage of Two Major Intermediate Milestones, mentioned as M1 & M2 above, delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to F-14.	
6.6.1	In case delay in achieving M1 Milestone is solely attributable to the contractor, 0.5% per week of executable contract value*, limited to maximum 2% of executable contract value, will be withheld.	
6.6.2	In case 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.	
6.6.3	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.	
6.6.4	Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment (corresponding RA Bill) and balance amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.	
6.6.5	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 identified intermediate milestone(s) shall be adjusted against LD or released as the case may be.	

6.6.6	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 into recovery.
6.6.7	Contractor shall make all possible efforts to expedite the activities, in case of delay of any intermediate milestone, to maintain overall project completion schedule.
6.7	**COMPLETION OF WORK AND COMMENCEMENT OF GUARANTEE PERIOD**
6.7.1	The works shall be completed to the entire satisfaction of the Engineer and in accordance with the completion schedule as specified in the Contract, and all unused stores and materials, tools, plant, equipment, temporary buildings, site office, labor hutments and other things shall be removed and the site and work cleared of rubbish and all waste materials and delivered up clean and tidy to the satisfaction of the Engineer at the Contractor's expenses.
6.7.2	BHEL shall have power to take over from the Contractor from time to time such sections of the work as have been completed to the satisfaction of the Engineer. Such work however shall not be treated as have been completed until the remaining / pending works are executed to the satisfaction of Engineer.
6.7.3	BHEL Engineer shall certify to the contractor the date on which the work is completed and the date thereof for commencement of Guarantee Period. The work shall be deemed to be completed upon completion of work as per contract or As per the Clause no 2.7.8 of GCC, whichever is earlier, minor pending works/punch point liquidation/defects (if any) which are not likely to affect overall performance of the system may be excludes as per the discretion of BHEL Engineer. The decision of BHEL Engineer shall be final and binding on the vendor.
6.8	The contractor shall submit and a detailed area/structure wise L3 schedule within 25 days from date of LOA, in consultation with BHEL, based on the tentative schedule provided as above. The detailed L3 schedule shall be approved by BHEL and same shall be implemented. Bidder shall submit L3 schedule in MS Projects and excel to meet the agreed project schedule covering various mile stone activities and their split up details such as mobilization, procurement of materials & erection activities. This schedule shall also clearly indicate the interface facilities / inputs applicable in each package. Bidders shall submit Resource deployment plan Area wise with detailed program in line with above schedule in the form of Bar Chart/ MS project planner along with their offer.
6.9	The under mentioned Records/ Log-books/ Registers applicable to be maintained.
	I. Hindrance Register.
	II. Site Order Book.
	III. Test Check of measurements.
	IV. Records of Test reports of Field tests.
	V. Records of manufacture's test certificates.
	VI. Records of disposal of scraps generated during and after the work completion.
6.10	**Control and monitoring of progress of work**
6.10.1	Refer forms F -14 to F-18 of volume I D (Forms & Procedure) of volume - I BCD. Plan and review will be done as per the formats.

6.10.2	The progress reports shall indicate the progress achieved against plan, indicating reasons for delays, if any. The report shall also give remedial actions which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original plan the slippages do not accumulate and affect the overall programme.
6.10.3	It is the responsibility of the contractor to provide all relevant information on a regular basis regarding progress of work, labour availability, equipment deployment, testing, etc.
6.10.4	Contractor is required to draw mutually agreed monthly work 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.
6.10.5	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.
6.10.6	The contractor shall submit quarterly progress reports, manpower reports, 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.
6.10.7	The contractor shall submit quarterly statement report regarding consumption of all consumables for cost analysis purposes.
6.10.8	The contractor shall submit a report of any damage, shortage, discrepancy etc., every week detailing in this regard. 'Non-submission of report' would be considered as 'no shortage of materials'.
6.10.9	The manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.
6.11	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, bolting/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	Availability report of cranes.
e	Safety implementation report in the format.
f	Pending material and any other inputs required from BHEL for activities planned during the subsequent month.
6.12	**Site Data Digitalisation (SDD):** Daily Activity Log, M-Book and Subcontracting Billing Module: -
a	Refer Vendor Portal System with links: for ref. https://pshq.bhel.in/sddvp/
b	Login ID and Password shall be provided by respective package manager.
c	Contractor by clicking 'Daily Work Photos', shall upload area wise photos on daily basis.
d	Contractor by clicking 'Daily Activity Log', shall update site activities on daily basis.

e	Contractor by clicking 'Measurement Book', shall enter Measurement Book in Format and BOQ.
f	**Contractor shall raise their RA Bills along with supporting documents (such as Quality and HR Document – Vetted by Customer Etc.) and checklist through SDD portal only.**
g	Contractor shall comply the system requirement.
h	Refer Vendor Manual for further details.
i	Note: The contractor shall be required to provide all facilities including manpower for the aforementioned activities, without any cost implications to the BHEL.
6.13	Agency shall extend all support towards inputs for IPMS system/Project Management consultancy for project monitoring and control.

7.0	**Terms of Payment:**
7.1	**Progressive Payment/ Final Payment:** The payments for works under the scope of this contract for both the packages shall be operated be as per clause no 2.6; 2.22; 2.23 of General Conditions of Contract, Chapter-X of SCC and below mentioned terms
7.1.1	**Documents required for RA Bill:** • GST Complied Invoice of the work done as per approved BBU. • WAM -6 for RA Bill. • Jointly signed Measurement sheet. • Power of Attorney before submission of Bill. • Validity of Bank Guarantees as applicable under the contract. • Monthly HSE Compliance Certificate certified by BHEL- Safety • Compliance of guidelines for worker's accommodation/establishment of BHEL-project sites • Material re-conciliation statement duly approved by BHEL (bi monthly basis) • HR/IR compliance documents: i. Wages payment sheet as per applicable minimum wages. ii. Proof of PF contribution submission. iii. Proof of ESI/ WC contribution submission iv. Proof of Bonus payment as per Bonus Act if applicable. v. Proof of EL payment if applicable. vi. Any other statutory document if applicable.
7.1.2	**Documents required for Final Bill:** The final bill is drawn as soon as the entire work is completed. From the final amount due, all amounts already claimed up to the previous running account bill will be deducted. It should be ensured that in the final bill the following additional particulars have been provided: • Final Bill in WAM-7 Format. • 'No claim' certificate from the contractor. • Clearance certificates where ever applicable viz. Clearance Certificates from Customer, various Statutory Authorities like Labour department, PF Authorities, Commercial Tax Department etc. • Final Material re-conciliation statement duly approved by BHEL. • Indemnity Bond as per prescribed format. • Deviation statement showing the difference between the actuals and as per the contract.

	• Final Delay Analysis.
7.1.3	Contractor shall raise their RA Bills along with supporting documents and checklist through BHEL's SDD (Site Data Digitalization) portal or as per instructions of BHEL Engineer only. The payment for running bills will be released after submission of running bill complete in all respects with all documents. It is the responsibility of the contractor to make his own arrangements for making timely payments towards labour wages, statutory payments, outstanding dues etc. and other dues in the meanwhile. No interest shall be payable for the delayed payment (if any). Few points of consideration are as below: **i.** The measurements sheets of work done in a month shall be submitted in triplicate duly agreed/signed by BHEL Engineer. The contractor shall extend all necessary assistance for verification of measurements of works without any extra cost. **ii.** Material reconciliation shall be complied on monthly basis. **iii.** The RA bill payments are interim payments and bills shall be submitted in prescribed formats. **iv.** Recoveries on account of electricity, water, statutory deductions etc. shall be made as per terms of contract. **v.** BHEL will release payment through Electronic Fund Transfer (EFT)/RTGS. **vi.** Final bill shall be submitted after completion of works and upon material reconciliation along with all prescribed formats. Quoted Rates are inclusive of all labour, contractor's equipment, temporary works, consumables and all matters and things of whatsoever nature, charges for Safety Aspects/Compliance to Safety Rules including operations and maintenance services (if applicable) etc., and other services, as identified in the tender Documents, as necessary for the proper execution of the subject work.
7.2	**a.** Terms of Payment for Erection of structure (BHEL supplied materials), mentioned in MT in BOQ/rate schedule, for both the packages Progressive Payment against monthly running bills will be made up-to 85 % of the value of the erected tonnage Pro-rata as per following table.

S no	Description	Percentage
7.2.1	On pre-assembly wherever applicable (if not applicable, this portion shall be clubbed with placement in position)	20%
7.2.2	Placement in position	30%
7.2.3	Alignment with Grouting (wherever applicable)	15%
7.2.4	Welding / bolting / fixing	15%
7.2.5	Readiness of floors for concrete pouring as applicable (if not applicable, then this portion to be paid along with welding/bolting / fixing)	5%
7.2.6	**TOTAL**	**85%**

In case, any of the description in not applicable, then the allotted percentage shall be added in subsequent description for payment.

Further 15 % payment on pro-rata basis shall be released on achievement of the following stage / milestones events for the tonnage erected.

S no	Description	Percentage
7.2.7	Structure readiness for EOT load test	5%
7.2.8	Readiness of structure with side cladding in AB row. Payment shall be released on (bay wise) pro rata Basis.	5%
7.2.9	Area cleaning, temporary structures cutting/removal and return of scrap	2%
7.2.10	Punch List points/pending points liquidation	2%
7.2.11	Material Reconciliation	1%
7.2.12	**TOTAL**	**15%**
	Total of 7.2.6 and 7.2.12	**100%**

b. Payment of BOIs where, supply and fixing, are in contractor scope shall be done as per item rate mentioned in Bill of quantities/rate schedule

After a Milestone is achieved, allotted percentage shall be added in subsequent erection monthly payments.

7.5 **SECURED RECOVERABLE ADVANCES:**

Interest Free Secured Mobilization Advance as per GCC Clause No. 2.13.1 will be payable under exceptional circumstances on certification of BHEL Construction Manager at Site. Interest Free Mobilization Advance shall be disbursed in specifically mentioned stages of major respective resource mobilization as specified hereunder:

Package A:

1. For Mobilization of 01 no. of Crawler/Tyre Mounted Crane of 80 MT capacity - 2.0% of Contract value of package.
2. For Mobilization of required T&Ps as per F-14 and resources at site to start the work - 1.5% of Contract value of package.
3. For Installation and Erection of Site Infrastructure by contractor i.e. site office stores, bio-urinals etc. - 1.5% of Contract value of package.

Package B:

1. For Mobilization of 01 no. of Crawler/Tyre Mounted Crane of 80 MT capacity - 2.0% of Contract value of package.
2. For Mobilization of required T&Ps as per F-14 and at site to start the work - 1.5% of Contract value of package.
3. For Installation and Erection of Site Infrastructure by contractor i.e. site office stores, bio-urinals etc. - 1.5% of Contract value of package.

	Note: 1. BHEL Site Construction Manager shall be the deciding authority for assessing the admissibility of advance payment to contractor. 2. In case contractor do not fulfil the agreed conditions of payment of 1st mobilization advance, BHEL Site Construction Manager will have the authority to not allow the 2nd mobilization advance to contractor.

8.0	**TAXES & DUTIES**
8.1	The contractor shall pay all (save the specific exclusions as enumerated in this clause) taxes, fees, license, charges, deposits, duties, tools, royalty, commissions, other charges, etc. which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes/duties, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit. However, provisions regarding **GST** on output supply (goods/service) and TDS/TCS as per Income Tax Act shall be as per following clauses.
8.2	**GST (Goods and Services Tax)**
8.2.1	GST as applicable on output supply (goods/services) are excluded from contractor's scope; therefore, contractor's price/rates shall be **exclusive** of GST. Reimbursement of GST is subject to compliance of following terms and conditions. BHEL shall have the right to deny payment of GST and to recover any loss to BHEL on account of tax, interest, penalty etc. for non-compliance of any of the following condition.
8.2.2	The admissibility of GST, taxes and duties referred in this chapter or elsewhere in the contract shall be limited to direct transactions between BHEL & its Contractor. BHEL shall not consider GST on any transaction other than the direct transaction between BHEL & its Contractor.
8.2.3	Contractor shall obtain prior written consent of BHEL before billing the amount towards such taxes. Where the GST laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL shall have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.
8.2.4	Contractor has to submit GST registration certificate of the concerned state. Contractor also needs to ensure that the submitted GST registration certificate should be in active status during the entire contract period.
8.2.5	Contractor/Vendor has to issue Invoice/Debit Note/Credit Note indicating HSN/SAC code, Description, Value, Rate, applicable tax and other particulars in compliance with the provisions of relevant GST Act and Rules made thereunder.
8.2.6	Vendor has to submit GST compliant invoice within the due date of invoice as per GST Law. In case of delay, BHEL reserves the right of denial of GST payment if there occurs any hardship to BHEL in claiming the input thereof. In case of goods, vendor has to provide scan copy of invoice & GR/LR/RR to BHEL before movement of goods starts to enable BHEL to meet its GST related compliances. Special care should be taken in case of month end transactions.
8.2.7	Vendor has to ensure that invoice in respect of such services which have been provided/completed on or before end of the month should not bear the date later than last working day of the month in which services are performed.

8.2.8	Subject to other provisions of the contract, GST amount claimed in the invoice shall be released on fulfilment of all the following conditions by the Contractor: - a. Supply of goods and/or services have been received by BHEL. b. Original Tax Invoice has been submitted to BHEL. c. Contractor/ Vendor has submitted all the documents required for processing of bill as per contract/ purchase order/ work order. d. In cases where e-invoicing provision is applicable, vendor/contractor is required to submit invoice in compliance with e-invoicing provisions of GST Act and Rules made thereunder. e. Contractor has filed all the relevant GST return (e.g. GSTR-1, GSTR-3B, etc.) pertaining to the invoice submitted and submit the proof of such return along with immediate subsequent invoice. In case of final invoice/ bill, contractor has to submit proof of such return within fifteen days from the due date of relevant return. f. Respective invoice has appeared in BHEL's GSTR - 2A for the month corresponding to the month of invoice and in GSTR-2B of the month in which such invoices has been reported by the contractor along with status of ITC availability as "YES" in GSTR-2B. Alternatively, BG of appropriate value may be furnished which shall be valid at least one month beyond the due date of confirmation of relevant payment of GST on GSTN portal or sufficient security is available to adjust the financial impact in case of any default by the contractor. g. Contractor has to submit an undertaking confirming the payment of all due GST in respect of invoices pertaining to BHEL.
8.2.9	Any financial loss arises to BHEL on account of failure or delay in submission of any document as per contract/purchase order/work order at the time of submission of Tax invoice to BHEL, shall be deducted from contractor's bill or otherwise as deemed fit.
8.2.10	TDS as applicable under GST law shall be deducted from contractor's bill.
8.2.11	Contractor shall comply with the provisions of e-way bill wherever applicable. Further wherever provisions of GST Act permits, all the e-way bills , road permits etc. required for transportation of goods needs to be arranged by the contractor.
8.2.12	Contractor shall be solely responsible for discharging his GST liability according to the provisions of GST Law and BHEL will not entertain any claim of GST/interest/penalty or any other liability on account of failure of contractor in complying the provisions of GST Law or discharging the GST liability in a manner laid down thereunder.
8.2.13	In case declaration of any invoice is delayed by the vendor in his GST return or any invoice is subsequently amended/altered/deleted on GSTN portal which results in any adverse financial implication on BHEL, the financial impact thereof including interest/penalty shall be recovered from the Contactor's due payment.

8.2.14	Any denial of input credit to BHEL or arising of any tax liability on BHEL due to non-compliance of GST Law by the Contractor in any manner, will be recovered along with liability on account of interest and penalty (if any) from the payments due to the Contactor.
8.2.15	In the event of any ambiguity in GST law with respect to availability of input credit of GST charged on the invoice raised by the contractor or with respect to any other matter having impact on BHEL, BHEL's decision shall be final and binding on the contractor.
8.2.16	**Variation in Taxes & Duties:** Any upward variation in GST shall be considered for reimbursement provided supply of goods and services are made within schedule date stipulated in the contract or approved extended schedule for the reason solely attributable to BHEL. However downward variation shall be subject to adjustment as per actual GST applicability. In case the Government imposes any new levy/tax on the output service/goods after price bid opening, the same shall be reimbursed by BHEL at actual. The reimbursement under this clause is restricted to the direct transaction between BHEL and its contactor only and within the contractual delivery period only. In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer but before opening of the price Bid, the Bidder/Contractor must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of price bid. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.
8.3	**Income Tax:** **TDS/TCS** as applicable under Income Tax Act, 1961 or rules made thereunder shall be deducted/collected from contractor's bill.

8.4 BOCW Act & Cess Act

8.4.1 BOCW Cess is not to be borne by contractor. Refer Annexure-3 for BOCW Act & Cess Act.

	Annexure-3:
Bidder may please note that the sub-contractor/bidder of BHEL engaging building or construction worker in connection with building or other construction work, are required to follow the procedures enumerated below:	
1.	It shall be the sole responsibility of the contractor as employer to ensure compliance of all the statutory obligations under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
2.	It shall be sole responsibility of the contractor engaging Building Workers in connection with the building or other construction works in the capacity of employer to apply and obtain registration

	certificate specifying the scope of work under the relevant provisions of the Building and Other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 from the appropriate Authorities.
3.	It shall be responsibility of the contractor to furnish a copy of such Registration Certificate within a period of one month from the date of commencement of Work.
4.	It is responsibility of the contractor to register under the Building and other Construction Workers' Welfare Cess Act, 1996 and deposit the required Cess for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 at such rate as the Central Government may, by notification in the Official Gazette, from time to time specify. However, before registering and deposit of Cess under the Building and other Construction Workers' Welfare Cess Act, 1996, the contractor will seek written prior approval from the Construction Manager.
5.	It shall be sole responsibility of the contractor as employer to get registered every Building Worker, who is between the age of 18 to 60 years of age and who has been engaged in any building or other construction work for not less than ninety days during the preceding twelve months as Beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996.
6.	It shall be sole responsibility of the contractor as employer to maintain all the registers, records, notices and submit returns under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.
7.	It shall be sole responsibility of the contractor as employer to provide notice of poisoning or occupation notifiable diseases, to report of accident and dangerous occurrences to the concerned authorities under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the rules made thereunder and to make payment of all statutory payments & compensation under the Employees' Compensation Act, 1923.
8.	It shall be the responsibility of the sub-contractor as employer to make payment/deposit of applicable cess amount on the extent of work involving building or construction workers engaged by the sub-contractor within a period of one month from the receipt of payment. It shall also be responsibility of the Contractor to furnish BHEL on monthly basis, Receipts/ Challans towards Deposit of the Cess under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder along with following statistics: i) Number of Building Workers employed during preceding one month. ii) Number of Building workers registered as Beneficiary during preceding one month. iii) Disbursement of Wages made to the Building Workers for preceding wage month. iv) Remittance of Contribution of Beneficiaries made during the preceding month

9.	**BHEL shall reimburse the contractor the Cess amount deposited for the purposes of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 under the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.** However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.
10.	It shall be responsibility of the Building Worker engaged by the Contractor and registered as a beneficiary under the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 to contribute to the Fund at such rate per mensem as may be specified by the State government by notification in the Official Gazette. Where such beneficiary authorizes the contractor being his employer to deduct his contribution from his monthly wages and to remit the same, the contractor shall remit such contribution to the Building and other construction Workers' Welfare Board in such manner as may be directed by the Board , within the fifteen days from such deduction.
11.	**Bidders may please note that though the quoted price is exclusive of BOCW (which will be reimbursed by BHEL as per sub-clause 9 above) , however, If at any point of time during the contract period, non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder is observed, BHEL reserves the right to deduct the applicable cess (1%) on the contract value and penalty (if any, imposed by Cess Authorities) from the payables on account of non-compliance.**
12.	The contractor shall declare to undertake any liability or claim arising out of employment of building workers and shall indemnify BHEL from all consequences / liabilities / penalties in case of non-compliance of the provisions of the Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 and the Building and other Construction Workers' Welfare Cess Act, 1996 and the rules made thereunder.

9.1	**Bill of Quantities (BOQ)** as per scope of work is listed as below.
9.2	The weights/Quantities/dimensions mentioned are approximate and are liable to vary as per design consideration. There will be change in weight, description etc. However, payments will be made for the tonnage actually erected as per the quoted rate. Quantity Variation will be dealt as per clause 2.14 of General Conditions of Contract.
9.3	Rate Schedule Identified are based on envisaged material specification. Payment shall be made on the basis of material specification of actual material received and erected at site. BHEL's decision in this regard shall be final.

2X800MW NTPC SINGRAULI STPP STAGE-III					
BOQ FOR STEEL STRUCTURE PH-1&2, CCR AND IT'S BOIs					
ST NO.	**Item Description**	**Unit**	**Total Quantity (Pkg-A+Pkg-B)**	**Quantity Package-A (PH1)**	**Quantity Package-B (CCR+PH2)**
A.	**Erection/Installation of items mentioned hereunder (Supply under BHEL Scope)**				
2300	**STRUCTURAL WORKS: Structural steel Erection works including all labour, material, consumables, T&Ps (unless otherwise specified in BOQ/TCC contract specification), handling etc. at all level as per specification, drawings and as directed by engineer - in - charge.**				
A2301	Taking delivery of steel from BHEL stores / store yard, loading, transportation, unloading, pre-assembly and erection, bolting, welding of shop fabricated Medium and High Tensile structural steel (Grade designation E250/E350, conforming to IS 2062, with rolled section / built up section / combination of both conforming to IS:2062, pipes conforming to IS:1161/ IS:1239, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, gantry girders, bunkers, silos, hoppers, roof trusses, portals, laced purlins, space frames, hangers, struts, monorails, galleries, stiffeners, wall beams, sheeting runners, brackets, stub columns, bracings, cleats, trestles, base plates, splice plates, chequered plate flooring, decking and seal plates, steel frame grid over false ceiling, walkway platforms, ladders, stairs, stringers, toe-guard/kick plate, grizzly gratings, treads, landings, hand-rails etc., welding electrodes and other	MT	18,482.0	7,291.0	11,191.0

	consumables, alignment, erection bolts & nuts (weight of erection bolts, nuts and welds not payable), assembly, edge preparation,.erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, setting column bases, surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable)				
2307	Transportation,erection and alignment, fabrication where required of factory made electroforged galvanised grating units with mild steel having minimum galvanisation conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.				
a	Minimum galvanisation of 610 g/sqm	MT	407.0	162.8	244.2
2308	Transportation,erection and alignment, fabrication where required of factory made galvanised welded grating units(minimum 610 g/sqm galvanisation) with mild steel conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	MT	0.5	0.3	0.3
2311	Fixing in position of permanent mild steel bolts (class 4.6 as per IS : 1367 and grade `C' as per IS: 1363) and nuts, washers etc. up to and inclusive of 39 mm diameter and upto 300mm long for structural steel work etc all complete.	MT	1.8	0.7	1.1
2312	Fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	MT	277.2	110.9	166.3

A2312	Fixing in positing of high strength structural bolts (of property class 10.8/10.9 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	MT	462.1	184.8	277.2
2320	Fabrication and fixing of stainless steel pipe hand railing conforming to SS 409 of 32 mm/40 mm dia including transportation, loading/unloading, painting etc. all complete.	MT	11.0	4.4	6.6
A2322	Fabrication and fixing of galvanised MS pipe hand railing (Min. 1000 mm high) of 32mm/40mm/50mm dia (Medium Class) including transportation, loading/unloading, painting etc. all complete	MT	30.0	12.0	18.0
1500	**ROOFING / SIDE CLADDING: Roofing / side cladding work including all labour, material, consumables, T&Ps (unless otherwise specified in BOQ/TCC contract specification), equipment, transportation, handling, scaffolding, laps, hooks, washers, corner pieces etc. at all level as per specification, drawings and as directed by engineer - in - charge.**				

A1502	METAL DECK SHEET Type-I, Fixing permanently color coated galvanised MS troughed metal sheet decking plate (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) of approved colour over roof purlins for cast-in-situ roof slab as per relevant IS code and Grade as per specification. Bare metal thickness(BMT) of deck plate shall be minimum **0.8mm** with minimum trough depth of 44mm (or as per design whiever is higher) of grade G250 as per AS1397/grade SS255 as per ASTM A653M/ grade S250GD as per EN 10326 with zinc coating to class Z275 and shall serve as permanent shuttering to the roof slab 40mm - 100mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 100 kg/sqm (for two span condition) during construction between beams as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to beams, side lapping, end lapping etc. all complete for below mentioned spans. The sheet shall be permanently coated with silicon modified polyster(SMP silicon content 30%-50%) paint or super polyster paint of minimum 20 micron DFT on exposed surface (facing operating floor) over primer coat of minimum 5 micron(nominal) and minum 10 micron (nominal) SMP or super polyester paint over primer coat of minum 5 micron (nominal) on other face. SMP and polyster paint system sahll be of idutrial finish of product type 4 of AS/NZ2728, including fixing of sheet to top flange of beam with drawn arc welding of headed shear anchor studs @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant.The shear anchor studs shall confirm to type B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 16 mm dia & 65 mm length manufactured from cold drawn round steel bars confirming to ASTM A 29 of grade designation 1010 through 1020 of standard quality with either semi killed or killed welded by drawn arc stud welding through metal deck sheet. **(Metal Deck Sheet shall be issued by BHEL free of cost)**				
a	Span Upto 1800mm	MT	86.9	34.7	52.1

B1502	METAL DECK SHEET Type-II, Fixing permanently color coated galvanised MS troughed metal sheet decking plate (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) of approved colour over roof purlins for cast-in-situ roof slab as per relevant IS code and Grade as per specification. Bare metal thickness(BMT) of deck plate shall be minimum 0.8mm with minimum trough depth of 44 mm (or as per design whiever is higher) of grade G250 as per AS1397/grade SS255 as per ASTM A653M/ grade S250GD as per EN 10326 with zinc coating to class Z275 and shall serve as permanent shuttering to the floor slab 150 mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 100 kg/sqm (for two span condition) during construction between beams as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to beams, side lapping, end lapping etc. all complete for below mentioned spans. The sheet shall be permanently coated with silicon modified polyster(SMP silicon content 30%-50%) paint or super polyster paint of minimum 20 micron DFT on exposed surface (facing operating floor) over primer coat of minimum 5 micron(nominal) and minum 10 micron (nominal) SMP or super polyester paint over primer coat of minum 5 micron (nominal) on other face. SMP and polyster paint system sahll be of idutrial finish of product type 4 of AS/NZ2728, including fixing of sheet to top flange of beam with drawn arc welding of headed shear anchor studs @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant.The shear anchor studs shall confirm to type B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 19 mm dia & 100 mm length manufactured from cold drawn round steel bars confirming to ASTM A 29 of grade designation 1010 through 1020 of standard quality with either semi killed or killed welded by drawn arc stud welding through metal deck sheet. **(Metal Deck Sheet shall be issued by BHEL free of cost)**				
a	Span Upto 1800mm	MT	362.5	145.0	217.5
b	Span Exceeding 1800mm and upto 2500 mm	MT	87.3	34.9	52.4

A1505	Fixing External/ Inner sheet of Permanent colour coated metal cladding / roofing with troughed M.S. sheets of minimum **0.5 mm** bare metal thickness of min. grade G350 as per AS1397/grade SS340 class 4 or as per ASTM A792M/ grade S350 GD as per EN 10326 with zinc coating to class Z275 / aluminium zinc alloy coating to class AZ150 on both sides (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) including fixing to supports / rails by concealed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing, etc. all complete over columns, beams, bracings etc. at all levels. The exposed face the sheet shall be permanently coated with silicon modified polyester(SMP silicon content 30%-50%) paint or super polyester paint of minimum 20 micron DFT on exposed surface over primer coat of minimum 5 micron and **minimum** 10 micron SMP or super polyester paint over primer coat of minimum 5 micron on other face. SMP tc. all complete for below mentioned spans. The sheet shall be permanently coated. Self drilling/self tapping screws/fastners shall be supplied by contractor. **(Cladding/roofing sheet shall be issued by BHEL free of cost)**	MT	207.5	83.0	124.5
A1519	Fixing Factory made (Continuous Line) prefabricated sandwiched Permanent colour coated metal cladding comprising top sheet as troughed(minimum depth of trough shall be 30 mm) (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) permanently colour coated sheet & bottom sheet as plain permanently colour coated for covering of exposed metal/concrete / brick surfaces with insulation shall be of Polyurethane type of minimum 50mm thick (excluding trough). The polyurethane shall be Chlorofluorocarbon (CFC) free and self-extinguishing and shall conform to IS 12436: 1988. It shall have Modular Density 40 +/- 2 Kg/m3 and Thermal Conductivity @ 10 Deg.C 0.017 - 0.020 W/M 0k, Water absorption (% by vol) 3.1, Critical Oxygen Index 23 and Compressive Strength 1.2 Kg/sq.cm, sandwiched between the two sheets, each sheet shall be high strength tensile **steel sheet 0.5mm bare metal thickness (minimum)** of YS350 as per IS 15961 /grade G350 as per AS1397 / grade SS340	MT	75.5	30.2	45.3

	class 4 as per ASTM A792M / grade S350GD as per EN 10326 with zinc coating to class Z 275 / aluminium-zinc alloy coating to class AZ150 on both sides, both sheet shall be permanently coated with silicon modified polyester (SMP with silicon content of 30% to 50%) paint of minimum 20 micron DFT on exposed surface on 5 microns (min.) epoxy primer/phosphate primer coat and 10 micron (min.) SMP on 5 micron (min.) epoxy primer/phosphate primer on other face, SMP paint system shall be of industrial finish of product type 4 of AS/NZS 2728,troughed sheet shall be of approved profile, sectional properties, (suitable for the specified loading / deflection and purlins / runner spacing), colour and shade, at all levels, including all labour, materials, equipment, handling, transportation, special coated fastener conforming to corrosion resistant Class 3 of AS3566 and tested for 1000 hours salt spray test, fixing insulated sandwiched metal sheet with the structural members below for supporting the sheeting system, scaffolding, equipment, end and side laps, cutting of openings, preparation of working drawings, testing, etc., all complete, as per specifications. Sealant used for cladding shall be butyl based, two parts poly sulphide or equivalent approved, non stainless material and be flexible enough not to interface with fit of the sheets. Coated surface shall be provided with a protected guard film (polyethylene) of about 40 microns to avoid any damage to the coating during handling. Overlap shall be min. 100 mm or as specified by manufacturer. Self drilling/self tapping screws/fastners shall be supplied by contractor. **(Cladding/roofing sheet shall be issued by BHEL free of cost)**				
			20,491	**8,095**	**12,397**
B.	**Other items mentioned hereunder (Supply+Fixing under contractor scope)**				
A904	Providing and fixing single or double steel door shutters with 35mm (min) thk flush design shutter comprising of two outer sheets of 18 gauge steel sheets rigidly connected and reinforced inside with continuous vertical 20 gauge stiffeners, spot welded in position at not more than 150mm on centres including void filled with mineral wool (density as per specification), all fittings, Godrej or equivalent	SQM	150	60.0	90.0

	make mortice lock with handle on both sides, shop and final painting etc all complete.				
A909	Providing and fixing anodised aluminium work of Jindal, Hindalco or other equivalent approved make for door frames, windows, ventillators, partitions, railing etc with extruded standard tubular and other sections(of minimum 2mm wall thickness) including all fittings & fixtures and accessories of approved make conforming to IS733 and IS1285, anodised and electro color dyed to required shade according to IS 1868 (minimum anodic coating of grade AC15), fixed with rawl plugs, expansion fasteners, SS screws or with fixing clips, including necessary filling of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt for bi-metalic protection etc. including preperation of working drawings, aluminium cleat angle, aluminium snap-on-beading for glazing/panelling, stair case tread nosing, with all fittings and fixtures (like tower bolts, handles, door stopper with rubber shoes, 'L' drops, stays, floor springs, hydraulic door closures etc.), CP brass/stailess steel screws, providing and fixing hinges/pivots, and making provision for fixing of fitting wherever required including cost of PVC/neoprene gasket, all complete as per drawing, specification and instructions of engineer in charge (Glazing and panelling shall be paid seperately).Weight of aluminium section only shall be measured	Kg	15040	6,016.0	9,024.0
A912	Providing and fixing pressed steel frames(complying general requirements of IS 4531) fabricated from 1.2 mm thick M.S sheet mortised, reinforced drilled and tapped for hinges and locks bolts strikes, hold fasts adjustable floor anchors, floor tiles/weather bars ,paintings etc all complete as per specifications.	Kg	2976	1,190.4	1,785.6

A913	Providing and fixing in position rolling shutter of hot rolled double dipped galvanised steel lath section of 18 SWG tested mild steel strips at 75mm rolling centres interlocked together through their entire length and jointed together at the end by end locks mounted on specially designed pipe shaft with brackets, side guides of 75mm wide and 3mm thick(min.) and arrangements for inside and outside locking with push and pull operation including wire springs, top/hood cover 0.9mm thick (min.) , factory galvanized, primed & field painted, partly grilled (as required) with approved enamel paint etc, all complete as per IS 6248 and specification of approved make of following types: The bottom lath shall be coupled to a lock plate fabricated from 3mm thick galvanised steel plate and securely rivetted with stiffening angles.(partly coiled and lath/full lath).				
c	Electrically & Mechanically operated	SQM	350	140.0	210.0
915	Providing, fixing and fitting of glazing of first grade class in steel/aluminium/wooden frames, where ever required, cleaning after fixing including hardware, gaskets, clips, beadings etc. all complete.				
h (a)	6 mm thick clear reflective toughened safety glass of Saint Gobain(India) or Asahi (India) or equivalnet make and should have solar factor 25% or less, Maximum U-vlaue 3.3W/SQMK, VLT min 30%, light reflection internal 10 to 15%, light reflection external 10 to 20%, shading coefficient (0.25-0.28) (including supply)	SQM	1,098	439.0	658.6
Ah	6 mm thick clear toughened glass conforming to IS 5437	SQM	1,115	446.0	669.1
AhB	8 mm thick clear toughened glass	SQM	75	30.0	45.0
AhC	8 mm thick clear toughened fire resistant glass	SQM	75	30.0	45.0
A1503	Providing and fixing shear anchor studs for fixing metal deck sheet to floor structural beams conforming to Type-B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 19mm diameter and 100mm length manufactured from cold drawn round steel bars conforming to the requirement of ASTM A 29, of grade designation 1010 through 1020, of standard quality with either semi-killed or killed, welded by Drawn Arc Stud Welding through metal deck sheet etc all complete as per specification.	QUINTAL	156	62.4	93.6

B1503	Providing and fixing shear anchor studs for fixing metal deck sheet to roof structural purlins conforming to Type-B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 16mm diameter and 65mm length manufactured from cold drawn round steel bars conforming to the requirement of ASTM A 29, of grade designation 1010 through 1020, of standard quality with either semi-killed or killed, welded by Drawn Arc Stud Welding through metal deck sheet etc all complete as per specification.	QUINTAL	26	10.4	15.6
A2318	Providing and fixing in position PTFE type sliding bearings of reputed manufacturer for required vertical load and end displacement/rotation as per approved construction draiwngs. PTFE bearing shall be sliding against highly polished stainless steel and the coefficient of friction between them shall be less than 0.06 at 55 kg/sq.cm. In order to prevent cold flow in PTFE surface it shall be rigidly bonded by a special high temperature resistance adhesive to the stainless steel substrata. The stainless steel surface that slides against the PTFE is mirror polished. The stainless steel shall be bonded to the top plate by special high strength adhesive. The thickness of stainless steel plate shall be between 1.0 mm to 1.5 mm.				
b	25 Tons	EACH	10	5.0	5.0
c	40 Tons	EACH	8	4.0	4.0
d	50 Tons	EACH	4	2.0	2.0
e	60 Tons	EACH	6	3.0	3.0
f	100 Tons	EACH	4	2.0	2.0
2328	Supply, fixing lightning arrester and air terminal over roof of power house building, pump house and other structures inluding all materials, labour, electrodes etc complete (all materials to be supplied by the contractor).	EACH	10	5.0	5.0
C.	Touch-up Painting				
i	Surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, Providing and applying **two component moisture curing zinc (ethyl) silicate primer coat** (having minimum 80% of metallic Zinc content in dry film, solid by volume minimum 60% ±2%) of minimum 70 micron DFT to be applied over surface conforming to Sa 2 ½ finish of SO 8501-1 with surface profile 40-60 Micron. The primer coat shall be applied by	MT	1000	500.0	500.0

	airless spray technique. Zinc dust composition and properties shall be Type-II as per ASTM D520-00 all complete (1 MT = 24 Sqm considered for this tender)				
ii	Surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, Providing and applying (with airless spray technique) **intermediate coat** of **two component polyamide cured epoxy with MIO Content** (containing lamellar MIO minimum 30% on pigment, solid by volume minimum 80% ±2%) of minimum 100 micron DFT to be applied after an interval of minimum 24 hours (from the application of primer coat by airless spray technique.) and of approved make including protection and cleaning, scoffolding etc. all complete as per specification for all structures . (1 MT = 24 Sqm considered for this tender)	MT	1000	500.0	500.0
iii	Surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, Providing and applying **Finish coat** of **two-pack aliphatic Isocyanate cured acrylic finish paint** (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT shall be applied after an interval of minimum 10 hours (from the application of sealer coat), Colour and shade of the coat shall be as approved by the Employer) over steel sections already having intermediate coats including protection and cleaning, scoffolding etc. all complete as per specification for all structures . (1 MT = 24 Sqm considered for this tender)	MT	1000	500.0	500.0

10.1	**Site Visit** The bidder shall, prior to submitting his tender for the work, visit and examine the site of works and its surroundings at his own expense, and obtain and ascertain for himself on his own responsibility all information that may be necessary for preparing his tender and entering into a contract, and take the same into account in the quoted contract price for the work.
10.2	The bidder shall satisfy themselves about the following factors: i) Site conditions including access to the site, existing and required roads and other means of transport/communication for use by him in connection with the work including diverting and re-routing of services. ii) Requirement and availability of land and other facilities for his enabling works, establishment of his nursery, office, stores etc. iii) Ground conditions including those bearing upon transportation, disposal, handling and storage of materials required for the work or obtained there-from. iv) Source and extent of availability of suitable materials, including drinking water etc., and labour (skilled and unskilled) required for work, and laws and regulations governing their use and employment. v) Geological, meteorological, topographical and other general features of the site and its surroundings as are pertaining to and needed for the performance of the work. vi) The type of equipment and facilities needed, for and in the performance of the work. vii) The extent of lead and lift required for the work in complete form over the entire duration of the contract, and all other information pertaining to and needed for the work including information as to the risks, contingencies and other circumstances, which may influence or affect the work or the cost thereof under this contract.
10.3	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 approach platforms or scaffolding works or as bed for pre-assembly works. Contractor shall arrange himself all such materials. The Contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work. Contractor shall arrange necessary steel (angles, channels, beams, plates etc) for such usage as normal scope of work without any cost implication on BHEL. 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. However, if available with BHEL (in form of scrap/good steel), vendor may be allowed to use on returnable basis on discretion of BHEL.
10.4	Contractors shall ensure that all their Staff / Employees are exposed to periodical training programme conducted by qualified agencies / personnel on ISO 9001 – latest Standards.
10.5	Contractor has to clear the front, expeditiously and promptly as instructed by BHEL Engineer for other agencies, like Civil for casting floors, TG- for Turbine & Generator Erection, Boiler, Piping, 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.
10.6	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.
10.7	All necessary certificates and licenses, permits & clearances to carry out this work from the respective authorities/statutory/ local authorities/ etc are to be arranged by the Contractor, if required, at his cost in time to ensure smooth progress of work and render all assistance, service required in this regard.
10.8	All registration and statutory inspection fees, if any, in respect of his work pursuant to this Contract shall be to the account of the Contractor. However, any registration, statutory inspection fees lawfully pay-able under the provisions of any other statutory laws and its amendments from time to time during erection in respect of the plant equipment ultimately to be owned by the customer, shall be to the account of the customer. Should any such inspection or registration need to be re-arranged due to the fault of the Contractor, the additional fees for such inspection and/or registration shall be borne by the Contractor.
10.9	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.
10.10	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.
10.11	The intent of specification is to provide services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the Contractor of the responsibility of providing such facilities to complete the work without any extra compensation.
10.12	Contractor shall erect structure as per the sequence & methodology prescribed by BHEL depending upon the technical requirements. Availability of materials and fronts will decide this. BHEL Engineer's decision regarding correctness of the work and method of working shall be final and binding on the Contractor. No claims for extra payment from the Contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.
10.13	The Contractor shall perform any services, tests etc. which may not be specified but nevertheless, required for the completion of work within quoted rates.
10.14	The Contractor shall execute the work in the most substantial and workman like manner. The stores shall be handled with care and diligence.

10.15	BHEL reserves right to recover from the Contractor any loss which arises out of undue delay / discrepancy / shortage / damage or any other causes due to Contractor's lapse during any stage of work. Any loss to BHEL due to Contractor's lapse shall have to be made good by the Contractor as per GCC.
10.16	All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc. as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the Contractor as part of the work within the quoted rates.
10.17	The Contractor shall take delivery of the components, equipment, etc. from the BHEL stores/ storage area after getting the approval of BHEL Engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipment after usage shall be submitted to the BHEL and reconciled periodically.
10.18	Plant materials should not be used for any temporary supports / scaffolding/ preparing pre-assembly bed etc. The details of equipments to be erected under this contract are generally as per the schedule given in relevant appendices. These details are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. Actual quantum and type of equipments will be based on the relevant erection documents which will be furnished to the Contractor in due course of erection and the weight and quantity as per the relevant engineering documents will only be admissible for the billing purpose.
10.19	In installation of various equipments it may become necessary to install these on temporary supports/ hanger due to various reasons including non-availability of suspension materials. Contractor shall install such temporary suspensions/hangers and later on shift the relevant equipments to their respective permanent hangers/ suspensions/ supports as incidental to work. Requisite materials for such temporary arrangements will be provided by BHEL on free -returnable basis which shall be returned to BHEL after the use.
10.20	Interconnection/ hookup, if any, with the existing system shall form part of work. Such interconnections, hookups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.
10.21	Contractor shall regulate flow of material to and from site in such a manner and sequence, that material accumulation at site does not lead to congestion at site. In case it is necessary to shift and restack the materials kept at work areas / site to enable other agencies to carry out their work or further any other reason, it shall be done by the Contractor most expeditiously. No claim for extra payment for such work will be entertained.
10.22	It may so happen that certain components may be supplied in loose conditions. They need to be assembled as per relevant drawings or as per advice of BHEL engineer prior to erection. This forms the part of the scope of work.

10.23	The Contractor shall have total responsibility for all equipment and materials in his custody at Contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer's instructions. The component surfaces should be covered.
10.24	BHEL is operating web based computerized E-store system that includes, inter-alia, issue of materials, daily progress reporting, Contractor's running monthly billing and material reconciliation through a computerized data management system. Contractor shall install necessary hardware to hook-up with the BHEL's system and use the same for his scope of work. In the event the computerized E-store/SOMS is inoperative for any reasons, the Contractor shall take delivery of materials from the storage area/sheds of BHEL/customer after getting the approval of the engineer/customer on standard indent forms to be specified by BHEL/customer. All these records however shall be updated in the E-store/SOMS as and when the E-store/SOMS is reactivated/ normalized.
10.25	Gases like argon, oxygen, acetylene etc that are required for erection related activities shall be arranged by the Contractor at his cost.
10.26	It is not the intent to specify herein all details of all material. Any item related this work not covered by this but necessary to complete the system will be deemed to have been included in the scope of the work.
10.27	Site testing wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations.
10.28	The work shall be executed under the usual conditions without affecting power plant construction / operation and in conjunction with other operations and contracting agencies at site. The contractor and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.
10.29	Contractor shall, transport all materials to site and unload at site / working area for inspection and checking. All material handling equipment required shall be arranged by the contractor.
10.30	Contractor shall retain all T&P / Testing instrument / Material handling equipment's etc. at site as per advice of BHEL engineer and same shall be taken out from site only after getting the clearances from engineer in charge. The contractor at his cost shall arrange necessary security measures for adequate protection of his machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor's construction equipment and materials.

10.31	**Housekeeping/Area Cleaning** The contractor has to do area cleaning on every day on daily basis. Non-compliance of the above cleaning shall call for penal recovery **on each instance** and at the same time, cleaning of the area shall be done by BHEL at Cost recovery basis with **applicable overheads**. No excuses on this above account shall be entertained by BHEL on whatsoever account. The contractor shall ensure that his premises are always kept clean and tidy to the extent possible. Any untidiness noted on the part of the contractor shall be brought to the attention of the contractor's site representative who shall take immediate action to clean the surroundings to the satisfaction of the Engineer in- Charge. 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 at various work fronts. Contractor shall remove all scrap materials periodically generated from his working area and collect the same at one place earmarked for the same. Load of scraps is to be shifted to a place earmarked by BHEL. Failure to collect the scrap is likely to lead to accidents and as such BHEL reserves the right to collect and remove the scrap at Cost recovery basis with 5% overheads, if there is any failure on the part of contractor in this respect.
10.32	Completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and levelled and debris shall be removed as per instruction 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 with 5% overhead. The decision of BHEL Engineer in this regard is final
10.33	The contractor's work shall not hinder other work, either underground or over ground, such as electrical, phone lines, water or sewage lines, etc. In areas of overlap, the contractor shall work in coordination with other related contractors.
10.34	Any damage to the other contractor's/customer's work will be penalized and contractor shall be responsible for cost for such damages
10.35	Contractor at his cost shall carryout all necessary temporary works required for erection works.
10.36	**SITE INSPECTION** **a)** The owner / employer or his authorized agents may inspect various stages of work 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. **b)** BHEL / Customer will have full power and authority to inspect the works at any time, either on the site or at the contractor's premises. The contractor shall arrange every

	facility and assistance to carry out such inspection. On no account will the contractor be allowed to proceed with work of any type unless such work has been inspected and entries are made in the site inspection register by customer / BHEL. **c)** Wherever the performance of work by the contractor is not satisfactory in respect of workmanship, deployment of sufficient labour or equipment, delay in execution of work or any other matter, BHEL shall have the right to engage labour and get the work executed through other agency and debit the cost to the contractor with 5% overhead. Contractor shall have no right to claim compensation thereof. In such a case, BHEL shall also have the right to utilize the materials and tools brought by the contractors for the same work.
10.37	**AS BUILT DRAWING:** After successful completion of installation work, Purchaser's drawings / documents shall be updated in line with the actual work carried out and as built drawings / documents shall be submitted by the contractor as agreed for the project. Contractor shall be supplied with one extra copies of the layout / isometrics drawings. Contractor to incorporate in one of the copy with red ink all the changes / deviations / alterations etc., carried out at site due to various reasons, with site engineer's endorsement. Marked up drawings shall be submitted to BHEL for approval.
10.38	**PLATFORMS, CROSSOVERS & CANOPIES** Platforms, ladders, crossovers and canopies shall also be provided at places where it has not been shown in drawings but if felt necessary by site engineer. Contractor has to fabricate and install structures at places as instructed by BHEL Engineer etc. Platforms, ladders, crossovers, canopies, etc shall have to be fabricated and erected by contractor from raw materials supplied by BHEL as per instruction of BHEL and shall be paid as per accepted tonnage rate for "structures"
10.39	**Support for Handing Over of T&P, spares to BHEL/Customer, diversion to other BHEL Sites/Units** Vendor will assist in handing over of Special T&Ps for Erection/commissioning which were issued to them free of charge for returning to BHEL /Customer store.
10.40	**Dewatering** Small dewatering works involved in Low Lying areas like lift pits, Powerhouse working areas (except CW Pit), other low-lying areas (as per scope applicability) is in bidders' scope. For this vendor has to arrange and maintain adequate no. of Diesel & electrical pumps of suitable capacities, operators, necessary manpower with sufficient quantity of suction & discharges hoses, pipes, Clamps, cables, Electrical panels/starters, diesel, consumables without any extra commercial implication on BHEL treating as normal scope of work. Dewatering pumps will be required to run to ensure job progress is not hampered &, if required, pumps are to be run on round the clock basis on working days & holidays including Sunday.
10.41	**Material to be issued by BHEL (Free of Cost) as per BOQ cum Rate Schedule:** **1. Fabricated Structural Steel for Erection**

	2. **Structural Steel Including MS Plates, Rolled Sections, SS Plates, Gratings, Hand Rails etc.** 3. **Bought Out Items** (Deck sheets, Cladding, Gratings, Handrails, Structural Bolts etc.) as per BOQ 4. **Any other as per BOQ/TCC**
10.42	All other materials required for proper completion of job shall be provided by the contractor and is deemed to be inclusive in the quoted price. BOIs those are under scope of contractor for Supply and fixing are mentioned in BOQ and shall be operated accordingly.
10.43	**Recovery of Materials:** 1.The recovery of any wastage of Steel material shall be as 1.05 times the actual cost to BHEL 2. For Bought Out Items (which are in BHEL scope of supply as free of cost as per BOQ Cum Rate Schedule), recovery for excess wastage / consumption beyond the theoretical consumptions as per drawings will be 1.05 times the actual cost to BHEL.
10.44	**Void**
10.45	**Void**
10.46	**<u>Reconciliation of Materials:</u>** a) The contractor shall submit a reconciliation statement of steel issued to the contractor with RA Bill (bi-monthly basis). b) 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 material is available in the contractor custody at site. c) All materials as specified in relevant BOQ shall be issued free of cost by BHEL for use in the work covered in this contract from BHEL stores/storage yard. The contractor shall collect these materials from BHEL stores/storage yard at specified places at his own cost and store the same at his stores as per standard norms. Materials issued will be used only for construction of permanent works. d) The contractor shall in no case be entitled for any compensation (other than explicitly mentioned in the tender conditions) on account of any delay in supply or non-supply thereof for all or any such materials. However, in case of non-availability of any specific section(s) which delays the completion of work, such cases shall be recorded separately in monthly planning format (F 14) and shall be considered for time extension of contract in line with GCC. e) Contractor will have to make his own arrangement at his own cost for procurement of any other materials except as mentioned above/ BOQ, as required for the works and of such quality as acceptable to BHEL. f) The contractor shall maintain proper store account for all the BHEL issued materials and shall give reconciliation statement of such account showing

	total receipt, consumption and balance at site to the BHEL. BHEL Engineer's certification for the reconciliation of steel shall be final. g) Contractor shall also carryout in complete association with BHEL, the material management functions and execution like day-to-day update of materials, issued to contractor, accounting for surplus/scrap material returned etc. These functions shall also be carried out through computerized system utilizing suitable software. Contractor shall engage experienced software personnel to associate on dedicated basis for efficient discharge of the same in time. h) BHEL issued materials, shall not be under any circumstances whatsoever, and shall be taken out of the project site unless otherwise permitted by BHEL for outside job. i) BHEL reserves the right to recover from the contractor any loss arising out of damage/ theft or any other causes or during verification/stacking or at any time under the custody of the contractor. j) The contractor shall take care of material issued by BHEL and shall protect the same from damage and weathering. k) The contractor shall solely be responsible for the safety & security of material after it is handed over and issued to contractor by the BHEL l) At the time of submission of bills, 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. m) If at any point of time, BHEL finds there is a difference in physical and theoretical balance, where the contractor fails to provide necessary reconciliation, the decision of penal recovery/withhold of amount at penal rate by BHEL shall be final and binding to the contractor till proper records are submitted to and verified by BHEL. **n)** The reference drawings for actual material consumption to be used for the purpose of reconciliation shall be drawings approved/provided by BHEL.
10.47	**Void**
10.48	All relevant provisions/responsibilities of contractors as mentioned in any of the chapter of this specification (same or different chapter) shall also be applicable, mutatis-mutandis, to any other chapter of this specification.

11	**PREPARATION OF FOUNDATIONS, AND GROUTING**
11.1	Building foundations and other necessary civil works for supporting structures, equipments etc will be provided by BHEL / Customer. The checking of dimensional accuracy, axes, elevation, levels etc, with reference to bench marks of foundations and anchor bolt pits have to be checked and logged by the Contractor. The permanent benchmark / reference marks will have to be transferred to new locations with sufficient care to maintain the accuracy and protected / preserved with adequate care (to enable rechecking at later dates) as per BHEL instruction.
11.2	Minor adjustment of foundation level, dressing and chipping of foundation surfaces and blue-matching (wherever required) for of all equipments as per BHEL Engineers instructions, should be done by the Contractor as part of the work. Contractor/BHEL shall prepare protocols before taking over the foundations. Dressing and chipping of foundations as per instructions of BHEL Engineer for achieving proper levels will be within the scope of work/specification.
11.3	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. 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.
11.4	All temporary foundations and anchor points required for erection of Structure, Supports, etc (until otherwise explicitly mentioned in the tender) are in the scope of Contractor. All building materials like cement, steel including re-enforcement bars, grits cements etc for such temporary foundations shall have to be arranged by the Contractor within the quoted rates. All such foundations shall be demolished and normal ground conditions restored after the usage.
11.5	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.
11.6	Complete grouting of Columns, Structures, equipments, including anchor/ foundation bolts, beneath base, base hollows, etc, as may be applicable, is included in the scope of Contractor. Arranging all labour, building materials including cement, ordinary portland as well as quick setting – free flow - non-shrink grout mix (e.g. conbextra GP-1/GP-2/GP-3), form work, shuttering, and any other requirements is in the Contractor's scope. Contractor shall obtain approval of BHEL for cement (Ordinary Portland as-well-as quick setting – free flow- non-shrink grout mix) prior to use. Cleaning of foundation surfaces, pocket holes and anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials

	by soda washing, water washing, compressed air and other approved methods are within the scope of this specification/ work.
11.7	After the grouting has finally set and cured, alignment of equipments involved shall be checked again to verify for any disturbance or any other reason. If required, de-coupling of equipments has to be done for conducting the verification. In case any disturbance is noticed the cause, if any, shall be removed and re-alignment done as part of work.
11.8	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. If required, 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.
11.9	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.
11.10	The certificates of the grout are to be submitted to 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.
11.11	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.
11.12	Foundation for the equipment 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 equipment / plants shall be carried out by the contractor.
11.13	**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.

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.)

12.1	Loading at BHEL / Customer stores and storage yard, transport to site, unloading at site / working area of equipment, placement on respective foundation / location, pre-assembly bay or at working area are in the scope of work. The scope includes taking materials / Equipments from customer stores / storage yard also. Contractors Quoted / Accepted rate shall be inclusive of the same. Required cranes, tractors, trailer or trucks/ slings/ tools and tackles / labour including operators, fuel, lubricants, consumables, etc. for loading & unloading of materials will be in the scope of contractor.
12.2	Transportation of all items including ODC items from BHEL Store/Yard to Erection site shall be in the contractor's scope. However, in some cases, consignments including ODC may be unloaded near erection site as per space availability and site requirements.
12.3	Loading at storage yard and transporting to site, unloading at site / pre assembly area or at working area, is in the scope of work. Required cranes for loading & unloading of materials, trailer shall be in the scope of contractor. The contractor shall provide any fixtures, concrete blocks & wooden sleepers, sandbags which are required for temporary supporting of the components at site.
12.4	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 congestion/damage / loss of such equipment at site.
12.5	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.
12.6	Sometimes it may become necessary for the contractor to handle certain unrequired/non-sequential 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.
12.7	Contractor shall plan and transport equipments/components from storage yard to erection site in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. However, in specific cases "as a special case to expedite the job" the consignment received at BHEL stores can directly be diverted to the work site, as decided by BHEL, following issuance procedure of BHEL. Such direct issues shall be as per the Challan/dispatch document/LR received with the consignment.
12.8	All materials issued by BHEL shall be stacked neatly, preserved, stored in the contractor's shed / work area above ground level by use of concrete or wooden sleepers. No materials shall remain on ground at any time. All concrete or wooden sleepers required for stacking the materials shall be arranged by contractor at his own cost within the quoted rates. 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.

12.9	The contractor shall take necessary measures to see that all the machined surfaces are preserved and covered. Contractor has to arrange required fire proof tarpaulins to protect the machined components / assembled parts drawn from BHEL store before and after erection as required at their cost.
12.10	The contractor shall take all such measures as may be reasonably necessary to ensure that its arrangements and those of its sub-contractors with respect to the transport of Goods, Materials and Labour to the site do not interfere with local traffic in the vicinity of the site and where such interference is unavoidable shall make such special arrangements as may be reasonably required to minimize the effect of such interference.
12.11	The contractor shall solely be responsible for the safety & security of material after it is handed over and issued to contractor by the BHEL. BHEL reserves the right to recover from the contractor any loss arising out of damage/ theft or any other causes or during verification/stacking or at any time under the custody of the contractor.
12.12	Open land for storage purposes shall be provided by BHEL on free of cost/as available basis for storage of materials issued to contractor (if required). Temporary barbed wire fencing (if required), as required, of the open storage yard is to be done by the contractor and is included under the scope of his work. Contractor shall also remove grass, bushes etc as a required off the land provided to agency and shall make proper continuous up keeping of the open yard /land by removing grass, bushes trees etc and same is included under the scope of his work & No extra payment shall be made to the contractor in this regard. The bidder shall make complete arrangement of necessary security personnel's to safeguard all such materials in his custody. The contractor shall take care of material issued by BHEL and shall protect the same from theft, damage and weathering. In case, loss of any materials for whatsoever reasons attributable to the contractor, then cost of such materials shall be recovered from the running bill payment with applicable overheads.
12.13	All surplus materials shall be returned to BHEL store. All wastage / scrap (including melting scrap, wastage, and unusable scrap) shall be returned to the stores on weighment basis in consultation with BHEL Engineer and a receipt obtained for material accounting purposes. Scrap materials shall be sorted section-wise and returned separately at a place directed by BHEL Engineer within the project area. Return of such materials will not be entitled for any handling and incidental charges.

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.)

13.1	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.
13.2	The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work.
13.3	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.
13.4	Approach road in the vicinity of Powerhouse area only for their scope of work, to be maintain by Contractor.
13.5	In the case of structural members, 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
13.6	All structural items including bracings, gussets, beams, etc. shall be supplied after fabrication. Hence Fit-ups, edge preparation including welding of stubs, if required,, shall be included in the contractor's scope. No separate payment will be made for the same.
13.7	All the equipments /material to be taken inside the plant building shall be cleaned thoroughly before taking them inside. The contractor shall clean, wherever necessary and do touch up paint inside surfaces of the structures and other components as per instruction of BHEL Engineer during erection.
13.8	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 which shall be payable as per BOQ.
13.9	Preparation of preassembly bed is very much essential for preassembly of truss, supporting structures, etc etc. on consolidated ground and to avoid sagging and shrinking the temporary supports are to be provided.
13.10	The column, girder pieces, primary beams, are to be measured individually to check for camber, sweep etc. The level markings on the columns to be checked before erection. The verticality stickers are to be fixed over individual column pieces on both the flanges (90 degrees apart in two places). Arranging these stickers shall be done by the contractor.
13.11	Tier by tier erection method is to be followed. Columns are to be tied up with horizontal and diagonal bracing in each tier before proceeding to next/adajacent level. Log sheets are to be maintained in line with log sheets which are available with BHEL. After grouting the first tier columns, second tier erection is to be taken up. Adequate curing of the grout is to be ensured. Verticality of the columns is to be ensured by plumb bob & theodolite. The tolerance shall be

	as indicated in BHEL's erection drawings. Care should be taken while erecting the vertical and diagonal bracings to maintain the work points as per drawing.
13.12	Measuring and test equipments with proper calibration certificates are to be made available by the contractor before taking up the structural erection. Periodic calibration of the measuring instruments is to be done once in six months and certificate for the same to be submitted to BHEL for records.
13.13	The tightening procedures for MS/HSFG bolts are to be obtained from BHEL at site before taking up the work. Normally it is done by turn of nut method. Torque wrenches also can be used . The bolted joints will be checked jointly by BHEL/Customer engineers for required tightness and retightening is to be done as per requirement. The tightened bolts will be marked with colour paints. Facility for random checking by torque wrench will have to be done. The required calibrated torque wrench will be provided by the contractor.
13.14	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 fabricated clamping type ladders. No temporary welding on any structural members is permitted except under special circumstances with the approval of BHEL. The necessary materials for the ladders are to be arranged by bidder within quoted rate.
13.15	Certain adjustments in length/width of steel members may be necessary while erecting different structural members, and the contractor should remove the extra lengths to suit the final layout after preparing edges afresh and adopting specified heat treatment procedures at no extra cost, wherever indicated. Depending upon the type of deviation BHEL will consider the reimbursement at man hour rates. If the drawing provides for erection allowance, then it becomes part of the work and no compensation is payable.
13.16	In case of any class of work for which there is no such specifications laid down in the contract , the work shall be carried out in accordance with instructions and requirements of the BHEL engineer at the quoted rates only.
13.17	Additional platforms for approaching different elevations/positions/equipment as per the site requirement and to meet O&M requirements, which may not be indicated in drawings, shall be fabricated and erected by contractor. However, the contractor shall be paid for this work on accepted tonnage rate as per Rate schedule. 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.
13.18	Work such as minor rectification of foundation bolts, reaming/enalarging of holes, drilling, matching of bolts and nuts, making new holes, etc. are covered in the scope of work
13.19	In some cases, the structural material will be supplied in random lengths, which have to be fabricated to suit the requirement as incidental to work. Also, it may sometimes be necessary to remove some of the erected members to facilitate erection of bigger/ pre-assembled equipments. In such cases, the removal and re-erection of such members as agreed by the BHEL Engineer, will have to be done by the Contractor as incidental to work.

13.20	Contractor shall arrange materials required for temporary cat ladders & working platforms during erection of columns, platforms and other structural components. Such arrangements shall, as far as possible, be only of clamping & bolting type as welding on columns etc will not be permitted. After the completion of work these shall be removed.
13.21	All the hand rails and toe guards shall be provided as per drawings and site requirement. hand rails supplied in running lengths shall be suitably cut, edge prepared and welded. Also, hand rails/ guards may have to be provided from the safety point of view in certain places though not indicated in the erection drawings. The weld joints of hand rails shall be ground smooth to flush finish.
13.22	Void
13.23	Void
13.24	All welded joints, if any, should be painted with anticorrosive paint / primer immediately after completion of all work (incl radiography and stress relieving works). Necessary paints and other consumables for the above work are in the scope of the Contractor.
13.25	Touch up and preservative painting of all components issued to and/or erected by Contractor shall form part of scope of work. The Contractor shall arrange consumables, T&P and facilities.
13.26	Void
13.27	All materials as specified in relevant BOQ shall be issued free of cost by BHEL for use in the work covered in this contract from BHEL stores/storage yard. The contractor shall collect these materials from BHEL stores/storage yard at specified places at his own cost and store the same at his stores as per standard norms. Materials issued will be used only for construction of permanent works.
13.28	The contractor shall in no case be entitled for any compensation (other than explicitly mentioned in the tender conditions) on account of any delay in supply or non-supply thereof for all or any such materials. However, in case of non-availability of any specific section(s) which delays the completion of work, such cases shall be recorded separately in monthly planning format (F 14) and shall be considered for time extension of contract in line with GCC.
13.29	Contractor will have to make his own arrangement at his own cost for procurement of any other materials except as mentioned above/ BOQ, as required for the works and of such quality as acceptable to BHEL.
13.30	The contractor shall maintain proper store account for all the BHEL issued materials and shall give **Three (03) copies reconciliation statement** of such account showing total receipt, consumption and balance at site to the BHEL. BHEL Engineer's certification for the reconciliation of steel shall be final.
13.31	Any other connected material supply which is not covered in BOM but required to complete the system shall be erected by the vendor and payment in this case shall be made as per applicable item rate.
13.32	All transport equipment, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables etc, except otherwise specified as BHEL scope of free

	issue, required for this scope of work shall be provided by the Contractor. All expenditure including taxes and incidentals in this connection will have to be borne by Contractor unless otherwise specified in the relevant clauses. The Contractor's quoted rates should be inclusive of all such contingencies.
13.33	**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.

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.)

14.1	Complete structure of Powerhouse, CCR, Pipe racks, associated structures, etc as per the scope shall be pre-fabricated and shall be have bolted field connection. However, any kind of Welding, NDT (RT, UT, etc), Heat Treatment, etc if required during course of work, incidental to different situation, shall have to be carried out by contractor within the quoted rates.
14.2	**Field Quality Plan (FQP):-** Relevant FQP for Welding, NDT, Heat Treatment, etc. has to be followed as per instruction of BHEL engineer.
14.3	Welding sequence shall be adopted in such a way so as to minimize the distortion due to welding shrinkage. Contractor shall indicate in his drawing the sequence of welding proposed by him, which should meet prior approval of the Engineer.
14.4	All welders shall be BHEL / customer / consultant qualified as per the approved quality plan / field quality plan which will be submitted by the successful bidder during detail engineering stage. WPS and PQR shall be submitted by the successful bidder to BHEL / customer / consultant for review and approval.
14.5	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.
14.6	All welders including tack welders, structural and others welders 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.
14.7	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 welder's identification code as approved by the BHEL Engineer shall be stamped by the welder on each joint done by them. The contractor will be responsible for the periodic renewal, retesting of the welders as demanded by BHEL statutory requirements.
14.8	BHEL Engineer is entitled to stop any contractor's welders from his work if his work is unsatisfactory for any technical reason or there is a high percentage of rejection of joints welded by him which in the opinion of BHEL Engineer, will adversely affect the quality of

	welding. Even though the welder has earlier passed the tests it does not relieve the contractor from his contractual obligations, to check the performance of the welders.
14.9	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.
14.10	Pre -heating, radiography and other NDT tests, post heating and stress relieving after welding, 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.
14.11	The contractor shall conduct nondestructive tests like radiography dye penetrant tests, magnetic particle test etc., on weld joints and other equipments etc., as per drawing / welding schedule.
14.12	The Contractor shall maintain a record in the form as prescribed by BHEL for all operations carried out on each weld and maintain a record indicating the number of welds, the name of welders who welded the same, date and time of start and completion, preheat temperature, radiographic results, rejections if any, percentage of rejection, etc., and submit copies of the same to the BHEL Engineer as required.
14.13	All expenses for testing of contractor's welders (pre-production test) including destructive and Non- destructive tests conducted by BHEL or by the inspecting authority at site or at laboratory shall have to be borne by the contractor only. Necessary pipe material and the welding TIG wire, if any, will be arranged by BHEL and all testing/facilities will have to be arranged by contractor with in the quoted rate.
14.14	All welded joints shall be subjected to acceptance by BHEL Engineer.
14.15	The technical particulars, specifications and other general details of work shall be in accordance with ASME / BHEL welding, Heat treatment and NDE manuals or equivalent as decided by BHEL Engineer.
14.16	The Contractor shall carryout Radiography, if any, as per welding Manual booklet applicable. However, percentage radiography shown in the respective drawings shall be final and binding on the contractors.
14.17	Low speed high contrast fine grain films (D7 or equivalent) in 10 cm width only should be used for weld joint radiography. Film density shall be between 1.5. to 2.00
14.18	All radiographs shall be free from mechanical, chemical or process marks to the extent they shall not confuse the radiographic image and noticed.
14.19	Penetrometer as per ASME / ISO shall be used for all exposures.
14.20	Lead numbers and letters (generally of 6mm size) are to be used for identification of radiographic contract No., joints identification, sources used, welders identification, SFD used are to be noted down in the paper cover of radiography. Lead intensifying screens for front and back of the film shall be used as per the instructions of BHEL Engineer.

14.21	Void.
14.22	The contractor shall be fully equipped with radiography equipments, films, chemicals and other dark room facilities. There must be a number of radiographic personnel with sufficient experience and certified by BARC for field radiographic inspection. Further, the contractor must follow strictly the safety rules laid down by BARC, from time to time, contractor's radiographers shall also be registered with BARC for film badge service.
14.23	Void
14.24	If the contractor does not carry out radiography work in time due to non- availability of film, chemical etc. BHEL shall get the work done through some other agency and same shall be debited from the contractor with 5% overhead.
14.25	All the radiographs shall be properly preserved in air-conditioned rooms and shall become the property of BHEL. They are to be reconciled with the work done, joints radiographed and submitted to BHEL/customer.
14.26	Radiography of joints shall be so planned after welding that the same is done either on the same day or next day of the welding to assess the performance of welders. If the performance of the welder is unsatisfactory, he shall be replaced immediately.
14.27	The defects as pointed out by the Engineer shall be rectified immediately to the satisfaction of Engineer and Re-radiographed. The decision of Engineer regarding acceptance or otherwise of the joint shall be final and binding on the contractor.
14.28	Wherever radiographs are not accepted on account of poor exposure, joints shall be re-radiographed and new film submitted for evaluation. Radiographs shall be taken again on joints after carrying out repairs. However, if the defect persists after first repair as per radiograph, carrying out radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radiographed at contractor's cost.
14.29	carrying out ultrasonic testing of welded joints wherever required is the part of scope.
14.30	The welded surface irrespective of place of welding shall be cleaned of slag and painted at the center with primer paint to prevent corrosion at no extra cost towards this including supply of Paint for this purpose. All welds shall be painted with primer as specified in the painting schedule, once radiography and stress reliving works are over.
14.31	**void**
14.32	consumables, filler wires, electrodes, gas etc. are to be arranged by the contractor at his cost. Weight of above welding consumables will not be considered for any payment.
14.33	void
14.34	Pre-heating / post heating and stress relieving after welding, where ever applicable, are part of erection work and shall be performed by the contractor in accordance with the instructions of BHEL Engineer within the quoted rates. All required heating equipment, recording devices, thermocouples, recorders etc. shall be arranged by contractor.
14.35	Any discrepancy in process, procedures provided, BHEL engineer decision is final.

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.)

15.1	**Touch-up Painting:** Though the final painting is not there in the scope of the contractor, however, in case any shop painted structure/component is required to be repainted due to the reasons incidental to the work etc, such re-painting/finish painting of the components/structures shall have to done by contractor. Payment for application of Primer & Paint, including it's supply, for touch-up works in shop fabricated structure shall be paid separately as per BOQ. All required consumables & deployment of tools e.g wire brush, paint brush, Spray M/c, cleaning agents etc. are in the scope of contractor. Contractor shall carry out surface preparation and touch-up painting works as per BHEL/Customer specification and instruction of BHEL engineer at site.
15.2	Paints and painting work carried at site shall confirm to the following codes and standards: IS:5 – Colour for ready mixed paints and enamels IS : 101 Part 1 to 9 – Methods of sampling and test for paints, varnishes and related products IS : 1477 Part I&II – Code of practice for painting of ferrous metals in building IS : 2932 – Specifications for enamel, synthetic and exterior, a) Under Coating b) Finishing Contractor shall satisfy himself, availability of all information in the specifications for proper selection of the paints and ensure their applications as per Codes.
15.3	**Primer Painting: (**wherever applicable incidental to touch-up painting & preventive painting**)** a) After surface preparation, two coats of **zinc primer** shall be applied. Primer shall be applied by either spraying or brushing ensuring a continuous film without "holidays". Primer coat shall be immediately applied without any time lag after the surface preparation. b) All structure shall be carefully examined and where ever the primer coat is damaged shall be recoated with primer. However over the field welds, bolts and nuts etc. two primer coats as per a) shall be applied.
15.4	**Finish Painting (**wherever applicable incidental to touch-up painting & preventive painting**)**

	a) After the primer coat has dried out, the surface shall be cleaned of dust without scratching or in any way damaging the primer coat. Over this, dry surface finish painting shall be carried out. b) Intermediate coat/Finish painting shall be carried out in two coats. Dry film thickness of each coat shall be as per the recommendation of the primer/paint manufacturer/BHEL Engineer. Minimum thickness including primer and paint coating shall be as per specification. c) Paint shall be applied either by brushing or spraying. It shall be ensured that brush marks are a minimum and the requirements of workmanship are as specified in IS: 1477 (for site painting works on systems, structures and components). d) Paint used shall be stirred frequently to keep the pigment in suspension. Paint shall be of ready mixed type in original sealed containers as packed by the paint manufacturer. Addition of thinners shall not be permitted. e) No painting shall be done in frost/foggy weather or when the humidity is high enough to cause condensation on the surface to be painted. Paint shall not be applied when the temperature of the surface to be painted is 5^{o} C or below.
15.5	**Touch-up painting on damaged areas –** a) For coatings damaged up to metal surface preparation shall be carried out by manual cleaning. Minimum 6 inches adjoining area with existing coating shall be roughened by wire brushing, emery paper rubbing etc., for best adhesion of patch primer. Primer coat of touch-up primer has to be applied by brush immediately after the surface preparation. b) Over this primer coat, intermediate/finish coat and final finish coat shall be applied as covered above by brush within maximum seven (7) days of application of touch up primer. Payment for application of Primer & Paint, including it's supply, for touch-up works in shop fabricated structure shall be paid separately as per BOQ. Supply of paint shall also be in the scope of contractor.
15.6	Painting of welded areas / painting of areas exposed after removal of temporary supports / touch-up painting on damaged areas of employer's structures, where inter-connection, welding / modification etc. has been carried out by the bidder. Clean the surface to remove flux spatters and loose rust, loose coatings in the adjoining areas of weld seams by wire brush and emery paper. Painting procedure to be followed for touch-up painting on damaged areas.

15.7	The scope of work includes colour bands, stencilling, marking and signs for direction of flow/rotation, names etc of approved colours as per the standard colour codes and specifications specified in tender specification or as advised by BHEL/Customer engineer at site for the equipments / components covered in these specifications.
15.8	In certain isolated instances where it is not possible to clean the equipments as explained above, cleaning by grinding might have to be resorted to. No damage to the equipment/components should be caused.
15.9	Surface to be painted should be free of oil and grease. It should be removed by using suitable cleaning agents including permitted solvents. Surface cleaned by chemical agent, if required, shall be treated further as prescribed in use of such cleaning agents.
15.10	During the preparation of surface, if the shop coat is damage by chemical or by mechanical means, contractor shall repair the same free of cost.
15.11	Specified drying time shall be permitted from one to another coat.
15.12	This work requires working at higher altitudes from ground level. Contractor shall take sufficient precautions to avoid any accident and hazard in all respects. The ropes, ladders, scaffolding materials, clamps etc and climber used should be of standard quality for safe and smooth execution of work.
15.13	Contractor shall carry out the work in such a way that other erected equipment, structure, civil foundations and other property are not damaged. For damages in any of such cases due to lapses by Contractor, BHEL shall have the right to recover the cost of such damages from the Contractor.
15.14	Contractor shall take due care to cover/protect the equipment which are already painted while carrying out the painting of other adjacent equipment. If so happens, it shall be cleaned and repainted by the Contractor without any extra charges.
15.15	Final painting work shall be started after obtaining clearance from BHEL engineers and as per his instructions.
15.16	Acceptance of Final Painting for required thickness shall be as per the thickness measured by Elcometer by customer/BHEL Engineer. Contractor shall have to carry out painting till the required thickness is achieved.

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.)

16.1	At all stages of work, equipments/materials in the custody of Contractor, including those erected, will have to be preserved as per the instructions of BHEL. Necessary preservation agents including the primer & paint, for the above work shall be provided by the Contractor.
16.2	The Contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipments from theft/fire/pilferage and any other damages and losses.
16.3	The entire surplus, damaged, unused materials, packaging materials / containers, special transporting frames, gunny bags, etc shall be returned to BHEL stores by the Contractor.
16.4	The Contractor shall not waste any materials issued to agency. In case it is observed at any stage that the wastage/excess utilisation of materials is not within the permissible limits, recovery for the excess quantity used or wasted will be effected with departmental charges from the Contractor. Decision of BHEL on this will be final and binding on the Contractor.
16.5	For any class of work for which no specifications have been laid down in these specifications, work shall be executed as per the instructions of BHEL.

Package Description: Erection, Alignment, Bolting/Welding, Roofing & Cladding, BOIs Work of Main Power House (PH#1&2) and CCR (Common Control Room) Structure including handling of materials at BHEL / Client's Stores / Storage yard and Transportation and Scope of work includes supply of all Material (As per TCC and BOQ), Consumables, labour, tools and plants, Touch-up painting as and where required (including supply of paint) for Unit #1 & 2 at 2X800 MW NTPC Singrauli STPP Stage-III, Sonebhadra, UP

Table-20.1

ST NO.	Item Description	Unit	Total Quantity (Pkg-A+Pkg-B)	Weightage
A.	Erection/Installation of items mentioned hereunder (Supply under BHEL Scope)			
2300	STRUCTURAL WORKS: Structural steel Erection works including all labour, material, consumables, T&Ps (unless otherwise specified in BOQ/TCC contract specification), handling etc. at all level as per specification, drawings and as directed by engineer - in - charge.			
A2301	Taking delivery of steel from BHEL stores / store yard, loading, transportation, unloading, pre-assembly and erection, bolting, welding of shop fabricated Medium and High Tensile structural steel (Grade designation E250/E350, conforming to IS 2062, with rolled section / built up section / combination of both conforming to IS:2062, pipes conforming to IS:1161/ IS:1239, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, gantry girders, bunkers, silos, hoppers, roof trusses, portals, laced purlins, space frames, hangers, struts, monorails, galleries, stiffeners, wall beams, sheeting runners, brackets, stub columns, bracings, cleats, trestles, base plates, splice plates, chequered plate flooring, decking and seal plates, steel frame grid over false ceiling, walkway platforms, ladders, stairs, stringers, toe-guard/kick plate, grizzly gratings, treads, landings, hand-rails etc., welding electrodes and other consumables, alignment, erection bolts & nuts (weight of erection bolts, nuts and welds not payable), assembly, edge preparation,.erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, setting column bases, surface preparation by means of manual or mechanical power tools as per IS:1477 part 1,	MT	18,482.0	0.81147078

	rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable)			
2307	Transportation,erection and alignment, fabrication where required of factory made electroforged galvanised grating units with mild steel having minimum galvanisation conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.			
a	Minimum galvanisation of 610 g/sqm	MT	407.0	0.01786974
2308	Transportation,erection and alignment, fabrication where required of factory made galvanised welded grating units(minimum 610 g/sqm galvanisation) with mild steel conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	MT	0.5	0.00002195
2311	Fixing in position of permanent mild steel bolts (class 4.6 as per IS : 1367 and grade `C' as per IS: 1363) and nuts, washers etc. up to and inclusive of 39 mm diameter and upto 300mm long for structural steel work etc all complete.	MT	1.8	0.00008114
2312	Fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	MT	277.2	0.01217206
A2312	Fixing in positing of high strength structural bolts (of property class 10.8/10.9 and product grade `C' as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8' as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 300 mm long for structural steel work etc all complete.	MT	462.1	0.02028677
2320	Fabrication and fixing of stainless steel pipe hand railing conforming to SS 409 of 32 mm/40 mm dia including transportation, loading/unloading, painting etc. all complete.	MT	11.0	0.00048297

A2322	Fabrication and fixing of galvanised MS pipe hand railing (Min. 1000 mm high) of 32mm/40mm/50mm dia (Medium Class) including transportation, loading/unloading, painting etc. all complete	MT	30.0	0.00131718
1500	ROOFING / SIDE CLADDING: Roofing / side cladding work including all labour, material, consumables, T&Ps (unless otherwise specified in BOQ/TCC contract specification), equipment, transportation, handling, scaffolding, laps, hooks, washers, corner pieces etc. at all level as per specification, drawings and as directed by engineer - in - charge.			
A1502	METAL DECK SHEET Type-I, Fixing permanently color coated galvanised MS troughed metal sheet decking plate (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) of approved colour over roof purlins for cast-in-situ roof slab as per relevant IS code and Grade as per specification. Bare metal thickness(BMT) of deck plate shall be minimum 0.8mm with minimum trough depth of 44mm (or as per design whiever is higher) of grade G250 as per AS1397/grade SS255 as per ASTM A653M/ grade S250GD as per EN 10326 with zinc coating to class Z275 and shall serve as permanent shuttering to the roof slab 40mm - 100mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 100 kg/sqm (for two span condition) during construction between beams as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to beams, side lapping, end lapping etc. all complete for below mentioned spans. The sheet shall be permanently coated with silicon modified polyster(SMP silicon content 30%-50%) paint or super polyster paint of minimum 20 micron DFT on exposed surface (facing operating floor) over primer coat of minimum 5 micron(nominal) and minum 10 micron (nominal) SMP or super polyester paint over primer coat of minum 5 micron (nominal) on other face. SMP and polyster paint system sahll be of idutrial finish of product type 4 of AS/NZ2728, including fixing of sheet to top flange of beam with drawn arc welding of headed shear anchor studs @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant.The shear anchor studs shall confirm to type B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 16 mm dia & 65 mm length manufactured from cold drawn round steel bars confirming to ASTM A 29 of grade designation 1010 through 1020 of standard quality with either semi killed or killed welded by drawn arc stud			

	welding through metal deck sheet. (Metal Deck Sheet shall be issued by BHEL free of cost)			
a	Span Upto 1800mm	MT	86.9	0.00381368
B1502	METAL DECK SHEET Type-II, Fixing permanently color coated galvanised MS troughed metal sheet decking plate (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) of approved colour over roof purlins for cast-in-situ roof slab as per relevant IS code and Grade as per specification. Bare metal thickness(BMT) of deck plate shall be minimum 0.8mm with minimum trough depth of 44 mm (or as per design whiever is higher) of grade G250 as per AS1397/grade SS255 as per ASTM A653M/ grade S250GD as per EN 10326 with zinc coating to class Z275 and shall serve as permanent shuttering to the floor slab 150 mm thick measured over crest of metal decking & shall have adequate strength to support weight of green concrete and imposed loads of min 100 kg/sqm (for two span condition) during construction between beams as per manufacturer's recommendations/ calculations/ test certificates for approval including fixing of plates to beams, side lapping, end lapping etc. all complete for below mentioned spans. The sheet shall be permanently coated with silicon modified polyster(SMP silicon content 30%-50%) paint or super polyster paint of minimum 20 micron DFT on exposed surface (facing operating floor) over primer coat of minimum 5 micron(nominal) and minum 10 micron (nominal) SMP or super polyester paint over primer coat of minum 5 micron (nominal) on other face. SMP and polyster paint system sahll be of idutrial finish of product type 4 of AS/NZ2728, including fixing of sheet to top flange of beam with drawn arc welding of headed shear anchor studs @ 260mm c/c in the trough and stich screws between two adjacent sheets and sealing with epoxy sealant.The shear anchor studs shall confirm to type B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 19 mm dia & 100 mm length manufactured from cold drawn round steel bars confirming to ASTM A 29 of grade designation 1010 through 1020 of standard quality with either semi killed or killed welded by drawn arc stud welding through metal deck sheet. (Metal Deck Sheet shall be issued by BHEL free of cost)			
a	Span Upto 1800mm	MT	362.5	0.01591549
b	Span Exceeding 1800mm and upto 2500 mm	MT	87.3	0.00383256

A1505	Fixing External/ Inner sheet of Permanent colour coated metal cladding / roofing with troughed M.S. sheets of minimum 0.5 mm bare metal thickness of min. grade G350 as per AS1397/grade SS340 class 4 or as per ASTM A792M/ grade S350 GD as per EN 10326 with zinc coating to class Z275 / aluminium zinc alloy coating to class AZ150 on both sides (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) including fixing to supports / rails by concealed fixing system, corrosion resistant self tapping / self drilling type fasteners with suitable cap, flashing, etc. all complete over columns, beams, bracings etc. at all levels. The exposed face the sheet shall be permanently coated with silicon modified polyester(SMP silicon content 30%-50%) paint or super polyester paint of minimum 20 micron DFT on exposed surface over primer coat of minimum 5 micron and minimum 10 micron SMP or super polyester paint over primer coat of minimum 5 micron on other face. SMP tc. all complete for below mentioned spans. The sheet shall be permanently coated. Self drilling/self tapping screws/fastners shall be supplied by contractor. (Cladding/roofing sheet shall be issued by BHEL free of cost)	MT	207.5	0.00911083
A1519	Fixing Factory made (Continuous Line) prefabricated sandwiched Permanent colour coated metal cladding comprising top sheet as troughed(minimum depth of trough shall be 30 mm) (including preparing erection drawings showing cut outs, fixing details, overlaps of sheets etc. and getting it approved from BHEL) permanently colour coated sheet & bottom sheet as plain permanently colour coated for covering of exposed metal/concrete / brick surfaces with insulation shall be of Polyurethane type of minimum 50mm thick (excluding trough). The polyurethane shall be Chlorofluorocarbon (CFC) free and self-extinguishing and shall conform to IS 12436: 1988. It shall have Modular Density 40 +/- 2 Kg/m3 and Thermal Conductivity @ 10 Deg.C 0.017 - 0.020 W/M 0k, Water absorption (% by vol) 3.1, Critical Oxygen Index 23 and Compressive Strength 1.2 Kg/sq.cm, sandwiched between the two sheets, each sheet shall be high strength tensile steel sheet 0.5mm bare metal thickness (minimum) of YS350 as per IS 15961 /grade G350 as per AS1397 / grade SS340 class 4 as per ASTM A792M / grade S350GD as per EN 10326 with zinc coating to class Z 275 / aluminium-zinc alloy coating to class AZ150 on both sides, both sheet shall be permanently coated with silicon modified polyester (SMP with silicon content of 30% to 50%) paint of minimum 20 micron DFT on exposed surface on 5 microns (min.) epoxy primer/phosphate primer coat and 10 micron (min.) SMP on 5 micron (min.) epoxy primer/phosphate primer on other face, SMP paint system shall be of industrial finish of product type 4 of	MT	75.5	0.00331646

	AS/NZS 2728,troughed sheet shall be of approved profile, sectional properties, (suitable for the specified loading / deflection and purlins / runner spacing), colour and shade, at all levels, including all labour, materials, equipment, handling, transportation, special coated fastener conforming to corrosion resistant Class 3 of AS3566 and tested for 1000 hours salt spray test, fixing insulated sandwiched metal sheet with the structural members below for supporting the sheeting system, scaffolding, equipment, end and side laps, cutting of openings, preparation of working drawings, testing, etc., all complete, as per specifications. Sealant used for cladding shall be butyl based, two parts poly sulphide or equivalent approved, non stainless material and be flexible enough not to interface with fit of the sheets. Coated surface shall be provided with a protected guard film (polyethylene) of about 40 microns to avoid any damage to the coating during handling. Overlap shall be min. 100 mm or as specified by manufacturer. Self drilling/self tapping screws/fastners shall be supplied by contractor. (Cladding/roofing sheet shall be issued by BHEL free of cost)			
B1.	Other items mentioned hereunder (Supply+Fixing under contractor scope)			
A904	Providing and fixing single or double steel door shutters with 35mm (min) thk flush design shutter comprising of two outer sheets of 18 gauge steel sheets rigidly connected and reinforced inside with continuous vertical 20 gauge stiffeners, spot welded in position at not more than 150mm on centres including void filled with mineral wool (density as per specification), all fittings, Godrej or equivalent make mortice lock with handle on both sides, shop and final painting etc all complete.	SQM	150	0.00429711
A909	Providing and fixing anodised aluminium work of INDAL, Jindal, Hindalco or other equivalent approved make for door frames, windows, ventillators, partitions, railing etc with extruded standard tubular and other sections(of minimum 2mm wall thickness) including all fittings & fixtures and accessories of approved make conforming to IS733 and IS1285, anodised and electro color dyed to required shade according to IS 1868 (minimum anodic coating of grade AC15), fixed with rawl plugs, expansion fasteners, SS screws or with fixing clips, including necessary filling of gaps at junctions, at top, bottom and sides with required PVC/neoprene felt for bi-metalic protection etc. including preperation of working drawings, aluminium cleat angle, aluminium snap-on-beading for glazing/panelling, stair case tread nosing, with all fittings and fixtures (like tower bolts, handles, door stopper with rubber shoes, 'L' drops, stays, floor springs, hydraulic door closures etc.), CP brass/stailess steel	Kg	15040	0.02448086

	screws, providing and fixing hinges/pivots, and making provision for fixing of fitting wherever required including cost of PVC/neoprene gasket, all complete as per drawing, specification and instructions of engineer in charge (Glazing and panelling shall be paid seperately).Weight of aluminium section only shall be measured			
A912	Providing and fixing pressed steel frames(complying general requirements of IS 4531) fabricated from 1.2 mm thick M.S sheet mortised, reinforced drilled and tapped for hinges and locks bolts strikes, hold fasts adjustable floor anchors, floor tiles/weather bars ,paintings etc all complete as per specifications.	Kg	2976	0.00227578
A913	Providing and fixing in position rolling shutter of hot rolled double dipped galvanised steel lath section of 18 SWG tested mild steel strips at 75mm rolling centres interlocked together through their entire length and jointed together at the end by end locks mounted on specially designed pipe shaft with brackets, side guides of 75mm wide and 3mm thick(min.) and arrangements for inside and outside locking with push and pull operation including wire springs, top/hood cover 0.9mm thick (min.) , factory galvanized, primed & field painted, partly grilled (as required) with approved enamel paint etc, all complete as per IS 6248 and specification of approved make of following types: The bottom lath shall be coupled to a lock plate fabricated from 3mm thick galvanised steel plate and securely rivetted with stiffening angles.(partly coiled and lath/full lath).			
c	Electrically & Mechanically operated	SQM	350	0.01147041
915	Providing, fixing and fitting of glazing of first grade class in steel/aluminium/wooden frames, where ever required, cleaning after fixing including hardware, gaskets, clips, beadings etc. all complete.			
h (a)	6 mm thick clear reflective toughened safety glass of Saint Gobain(India) or Asahi (India) or equivalnet make and should have solar factor 25% or less, Maximum U-vlaue 3.3W/SQMK,	SQM	1,098	0.00539587

	VLT min 30%, light reflection internal 10 to 15%, light reflection external 10 to 20%, shading coefficient (0.25-0.28) (including supply)			
Ah	6 mm thick clear toughened glass conforming to IS 5437	SQM	1,115	0.00596783
AhB	8 mm thick clear toughened glass	SQM	75	0.00048979
AhC	8 mm thick clear toughened fire resistant glass	SQM	75	0.00245795
A1503	Providing and fixing shear anchor studs for fixing metal deck sheet to floor structural beams conforming to Type-B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 19mm diameter and 100mm length manufactured from cold drawn round steel bars conforming to the requirement of ASTM A 29, of grade designation 1010 through 1020, of standard quality with either semi-killed or killed, welded by Drawn Arc Stud Welding through metal deck sheet etc all complete as per specification.	Kg	15600	0.00904141
B1503	Providing and fixing shear anchor studs for fixing metal deck sheet to roof structural purlins conforming to Type-B studs specified in AWS D1.1/D1.1M or equivalent as shear connector of 16mm diameter and 65mm length manufactured from cold drawn round steel bars conforming to the requirement of ASTM A 29, of grade designation 1010 through 1020, of standard quality with either semi-killed or killed, welded by Drawn Arc Stud Welding through metal deck sheet etc all complete as per specification.	Kg	2600	0.00150690
A2318	Providing and fixing in position PTFE type sliding bearings of reputed manufacturer for required vertical load and end displacement/rotation as per approved construction draiwngs. PTFE bearing shall be sliding against highly polished stainless steel and the coefficient of friction between them shall be less than 0.06 at 55 kg/sq.cm. In order to prevent cold flow in PTFE surface it shall be rigidly bonded by a special high temperature resistance adhesive to the stainless steel substrata. The stainless steel surface that slides against the PTFE is mirror polished. The stainless steel shall be bonded to the top plate by special high strength adhesive. The thickness of stainless steel plate shall be between 1.0 mm to 1.5 mm.			
b	25 Tons	EACH	10	0.00053384
c	40 Tons	EACH	8	0.00049631
d	50 Tons	EACH	4	0.00027166

e	60 Tons	EACH	6	0.00046496
f	100 Tons	EACH	4	0.00034957
2328	Supply, fixing lightning arrester and air terminal over roof of power house building, pump house and other structures inluding all materials, labour, electrodes etc complete (all materials to be supplied by the contractor).	EACH	10	0.00010999
B2.	Touch-up Painting			
i	Surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, Providing and applying two component moisture curing zinc (ethyl) silicate primer coat (having minimum 80% of metallic Zinc content in dry film, solid by volume minimum 60% ±2%) of minimum 70 micron DFT to be applied over surface conforming to Sa 2 ½ finish of SO 8501-1 with surface profile 40-60 Micron. The primer coat shall be applied by airless spray technique. Zinc dust composition and properties shall be Type-II as per ASTM D520-00 all complete (1 MT = 24 Sqm considered for this tender)	MT	1000	0.00123083
ii	Surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, Providing and applying (with airless spray technique) intermediate coat of two component polyamide cured epoxy with MIO Content (containing lamellar MIO minimum 30% on pigment, solid by volume minimum 80% ±2%) of minimum 100 micron DFT to be applied after an interval of minimum 24 hours (from the application of primer coat by airless spray technique.) and of approved make including protection and cleaning, scoffolding etc. all complete as per specification for all structures . (1 MT = 24 Sqm considered for this tender)	MT	1000	0.01473367
iii	Surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, Providing and applying Finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT shall be applied after an interval of minimum 10 hours (from the application of sealer coat), Colour and shade of the coat shall be as approved by the Employer) over steel sections already having intermediate coats including protection and cleaning,	MT	1000	0.01473367

	scoffolding etc. all complete as per specification for all structures .(1 MT = 24 Sqm considered for this tender)			

18.1 THIS TENDER SPECIFICATION CONSISTS OF FOLLWING ANNEXURE:

Sl. No	DESCRIPTION
Annexure-A	BHEL's standard guidelines for worker's accommodation/establishment
Annexure-B	Workers accommodation drawings of customer
Annexure-C	HSE Plan for Singrauli site
Annexure-D	T&P Hire Charges
Annexure-E	HSFG Bolt Tightening procedure
Annexure-F	NTPC Technical specification part
Annexure-G	Site Meteorological data

NOTE- ALL THE ABOVE-MENTIONED ANNEXURE ARE UPLOADED ON E-PROCUREMENT PORTAL