

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - I: Project Information

Salient Details of NIT		
S. No.	Issue	Description
1.	Job	Detailed drawing preparation based on Input design drawings provided by BHEL/PEM for 4 Nos Coal Bunker Silos (Total quantity 828 MT approx.) Including Ring Girder, shell, SS cladded hopper and supporting structures etc. and getting approval from BHEL PEM/PVUNL, Fabrication and supply of finished product to Patratu site (Raw steel will be supplied by BHEL as per TCC) for this Package as per BOM/Drawings for Unit# 3 of 3 X 800MW PVUNL Patratu site.
2.	E - Tender No	2201133

2201133

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BHARAT HEAVY ELECTRICALS
LIMITED



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Chapter - I: Project Information

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2.1 Project Information

Project Name: 3x800 MW Patratu Vidyut Utpadan Nigam Ltd. (PVUNL) Patratu STPP

The proposed site is located near Patratu town in Ramgarh district of Jharkhand.

The latitudes and longitudes of the site are as follows:

Main Plant & Township:

Corner name	Latitude	Longitude
Top Corner	23° 39 ' 00" N	85° 17' 51.5" E
Bottom Corner	23° 38 ' 12.5" N	85° 17' 27" E
Left Corner	23° 38 ' 22.5" N	85° 17' 10.6" E
Right Corner	23° 38 ' 40" N	85° 17' 57" E

Nearest Town : Patratu (3Km)

Nearest City : Ranchi (35Km)

Nearest Rly Station : Patratu (4Km)

Nearest Airport : Ranchi (45Km)

Nearest Seaport : Kolkata (424 Km)

The vicinity map of the project is shown below



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The bidder is advised to visit and examine the site of works and its surroundings and obtain for himself on his own responsibility 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.

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2.0 Scope of work

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

Detailed drawing preparation based on Input design drawings provided by BHEL/PEM for 4 Nos Coal Bunker Silos (Total quantity 828 MT approx.) including Ring Girder, shell, SS clad hopper and supporting structures etc and getting approval from BHEL PEM/PVUNL, Fabrication and supply of finished product to Patratu site (Raw steel will be supplied by BHEL as per TCC) for this Package as per BOM/Drawings for Unit# 3 of 3 X 800MW PVUNL Patratu site.

Detail scope & Qty is as mentioned below:

Boq No	Item Description	Unit	Quantity
AC2301	Supply and fabrication of structural steel of Coal Bunkers (cylindrical shell & conical hopper) and ring beam at shop in grade E 250/E350 in rolled/ built up conforming to IS:2062, connection design & preparation of fabrication drgs, straightening, cutting, bending, rolling, grinding, machining, drilling, welding, electrodes and other consumables, alignment, assembly, edge preparation, preheating , post heating, testing of welders, inspection of welds, visual inspection, non-destructive and special testing, rectification and correction of defective welding works, production test plate, inspection and testing, erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, surface preparation by means of manual or mechanical power tools as per IS:1477 part 1, rectification, blast cleaning of steel surface, application of primer, intermediate, final and final finish coat of paint etc all complete, as per drawing, specification & instructions of engineer in charge. Cost of blast cleaning, providing & applying primer, intermediate coat and finish coat as per specification is included in this item. (BHEL will supply Structural Steel at vendor works/ factory free of cost as per TCC)	MT	800
A2317	Supply & fabrication of minimum 4 mm thick stainless steel liner conforming to ASTM A 240 S304 (Type 304) ; Finish Grade 2B (Cold rolled, Annealed & Pickled and Skin passed) on M.S. plate for inside surfaces of hopper & mouth of hopper of bunkers including fixing with stainless steel studs, bolting (including countersunk), welding with electrode classification E308L for welding of stainless steel to stainless steel and E309 for stainless steel to mild steel, fabrication detailed drawing etc. all complete. (The measurement for the item of stainless steel liner in hopper shall be based on the actual finished weight of SS liner over hopper) (BHEL will supply SS liner free of cost as per TCC)	MT	28

BHEL-PSWR

Tender Specification No: 2201133

Technical Conditions of Contract –Volume I A (Part I: Contract Specific Details)

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Note: All Materials shall be procured from the PVUNL Patratu approved sources only. List enclosed separately

1. Based on input design/**engineering** drawings of Coal bunker silo, Preparation of detailed drawings, bill of materials, material codification, obtaining approvals from BHEL Project Engineering Management / PVUNL.
 - a. Preparation of fabrication drawings, joint design calculations and all other general and special requirements, including appointment of a separate agency for **checking of detailed engineering drawing the above work**, approved by BHEL for review.
 - b. Approval of fabrication drawings from BHEL Project Engineering Management / PVUNL. (Approval of fabrication drawing does not relieve the bidder from the responsibility of its correctness and accuracy).
2. **Supply of finished materials at site** as per BOM/Drawings of scope of supply work consisting of following:

BHEL will issue Raw material directly to vendor work either from the BHEL Steel supplier or from any BHEL Source.

Vendor will have to unload the Material at their place of work earmarked specifically for BHEL Raw material. Material shall be stored properly in order to avoid any foreign defect. Proper watch and ward shall be in place for the BHEL Raw material.

Fabricator shall have in House weigh bridge facility or third party tie up within the factory vicinity of 5 KM. Such weighbridge capacity shall not be less than 40 MT.

Fabricator must provide exclusive manpower for generation of Material Receipt Voucher (MRV). MRV –Document format will be provided BHEL afterward of Work to successful supplier. MRV will be duly verified by BHEL Resident engineer.

BHEL resident engineer shall duly verify the material sent by BHEL steel supplier or from any BHEL Source, LR receipt of BHEL Steel supplier shall counter verified and signed by Fabricator and BHEL resident engineer. MRV & RIV (Receipt issue Voucher) will be separate RIV will be issued to Fabricator by BHEL Resident engineer.

Suitable transportation facility shall be arranged for BHEL Resident engineer for "TO and Fro" movement from residing Location to Fabrication Location.

Weighment tolerance shall be 70 Kg for minimum truck load of 20 MT and above.

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- a. Unloading and Receipt of steel materials (raw materials supplied by BHEL) from vehicles using bidder's own T & P and manpower at bidder's facilities / works/ factory, stacking, stock keeping, watch & ward etc. including weight of raw materials section wise and transportation of finished products.
- b. Fabrication, welding, destructive, non-destructive and any other tests as per approved QP / PVUNL/ BHEL requirement.
- c. Painting as per PVUNL/NTPC Specifications.
- d. Straightening, making cutting plan, cutting, bending, rolling, grinding, drilling, bolting, temporary pre assembly- full length column height (**Trial assembly**), edge preparation, preheating (min preheat and interpass temperature of 20 degree C for welding over 20 mm and up to 40 mm & 66 degree C for welding over 40 mm and up to 63 mm & 110 degree C for thickness over 63 mm & use of low hydrogen/ radiogenic electrodes), post heating, testing of welders, inspection of welds, visual inspection, non-destructive and special testing, rectification and correction of defective welding works, production test plate, inspection and testing as per erection scheme.
- e. **Trial assembly** of finished material at bidder's works / factory as per BHEL instructions / approved drawings.
- f. Delivering finished products from works / factory to PVUNL Patratu STPP project site as per **BOQ of rate schedule** - specification, drawings and instructions of the Engineer.

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Specific for Fabrication and Supply Contract

2.1) Raw steel will be supplied by BHEL against Bank Guarantee Equivalent to 50% of steel value as the work will be carried out at sub-contractor / agency / fabricators premises.

Raw steel will be delivered to fabricators workshop/premises directly by BHEL.

Separate storage area and Engineer shall be allotted by Bidder for BHEL Material. BHEL will post resident engineer, **BHEL** employee for supervision of day to day work.

The total quantity of steel required for the work will be calculated from the approved fabrication drawings. In case any such sectional weights are not available in the above documents, the manufacturer recommendation / BHEL Engineer instruction shall be binding. BHEL reserves the right to reject any fabricated material not found satisfactory.

1. Items covered under this contract shall be subjected to Inspection / Testing and Quality Surveillance. The inspection agency shall at reasonable times, have access to vendor's works. Quality control records. All reasonable facilities required for carrying out the inspection and testing efficiently, shall be provided by the vendor, free of cost. The method of inspection shall be agreed upon in the Approved "Quality Plan" which shall form part of the contract. Wherever possible, standard quality plan, by way of minimum requirements, are included in the bid specification as a guideline.
2. The bidder shall abide fully by all the clauses of Shop inspection and tests covered in Technical Specification. BHEL reserves the right to consider any stage of inspection / test as a "Hold Point", beyond which work shall not proceed without acceptance of that stage.
3. The minimum Inspection / Testing requirements shall conform to relevant codes / standards as well as Statutory Regulations applicable, whether or not specifically mentioned in the specification, in addition to those normally carried out by the vendor.
4. Unless the Inspection / Test is waived, the inspection agency shall attend the Inspection / Test within 15 days of the date of receipt of notice from the vendor, failing which the vendor may proceed with the Inspection / Test and shall forward duly certified copies of the Inspection / Test Reports. After successful completion of the Inspection / Test or receipt of Vendor's Test reports mentioned above, the Inspection agency shall issue within 15 days, the acceptance certificate.
5. Wherever Customer / Consultant "Hold Points" are indicated in the approved Quality Plan an additional 10 days' notice shall be given for Inspection / Testing.

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6. Before sending written notice to the Inspection Agency, the Vendor's own inspection staff should have fully inspected / tested the item. If the visit of the Inspection Agency proves to be futile on account of the item not being ready for inspection / Testing or the same being rejected to reasons which could otherwise, have been detected during Vendor's own Inspection / Test, the cost incurred by Inspection Agency on such visits shall be borne by the vendor.
7. Approval or passing of Inspection / Test and thereby issue of the acceptance Certificates or waive of Inspection by the Inspection Agency shall not relieve the vendor of his responsibilities and obligations under the contract and also shall not bind BHEL to accept the item should it, on further tests after receipt at destination, erection / commissioning be found not complying with the Contract.
8. All necessary documents such as test reports, test certificates, test curves, stress relieving charts, radio graphic films and other non-destructive tests, copies of the welding procedure, welder qualification certificates and other documents in support of adherence to Quality plan shall be furnished to the Inspection agency. The Quality Assurance document consisting of certified copies of all of the above complied sequentially by the vendor shall be sent to BHEL prior to dispatch.
9. The Vendor shall submit the inspection schedule after receipt of LOI/Purchase order.
10. The vendor shall provide test pieces as required by Inspection agency to enable him to determine the Quality of Material supplied under the contract. If any test piece fails to comply with the requirements the inspection agency may reject the whole material represented by the test piece.
11. In the event of inspection revealing poor quality of goods, BHEL shall be at liberty to specify additional Inspection / Test, required ascertaining Vendor's compliance with the equipment specification.
12. All welding shall be carried out in accordance with applicable codes or approved equal. Welding procedure and Welder's qualification shall be got approved. Welding consumables used shall be approved by the inspection agency.
13. Approved methods of radiographic, ultrasonic or other non-destructive testing as applicable shall be used for the welding of critical components / assembly.
14. If considered necessary by Inspection Agency, multiple assemblies shall be fully erected and tested at Vendor's work prior to packing and dispatch to site.

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15. None of the item shall be dispatched without the receipt of "Quality Surveillance Note" from the Inspection Agency as well as the written approval in the form of Material Dispatch Clearance Certificate (MDCC) unless specifically agreed.
16. The affixing of Inspection Stamp on the item by the Inspection Agency is for the purpose of identification only and shall not be considered as a token of acceptance.
17. The above conditions are equally applicable to the agency on which the vendor has sub ordered as it shall be construed as if the works are manufactured or assembled at Vendor's own premises of works.

2.1 QUALITY PLAN:

1. The Quality Plan is a document, which presents in a tabular form the Quality control checks exercised by the vendor during the various stages of manufacture and dispatch in order to meet the requirements of this specification. This plan details, step by step, the operations, components and characteristics being controlled, method of exercising such controls, the importance (criticality) of the control (critical major or minor) with respect to the functioning of the item the extent to which the controls are exercised (100% samples, one per heat, etc.). Acceptance norms for the characteristics, method of maintaining records thereof as a proof of having exercised the control successfully, the agency responsible for performing and witnessing the checks and for verifying the records thereof.
2. The bidders shall furnish the Quality Plan for approval from BHEL / PVUNL. In case the Standard Quality plans are included in tender specification, the bidder shall furnish his Quality Plan strictly in line with the same. Instructions for filling the Quality Plan format are given on the back of the format.
3. Copies of Bidder's/Bidder's Collaborators catalogues/drawings/standards/specifications/ procedures etc. as mentioned in reference document of the Quality Plan shall be furnished for approval.
4. In the Quality Plan, the bidder shall give in detail, the quality control checks exercised by him during the various stages of fabrication / manufacture such as:
 - a) All bought out items and incoming material checks carried out at sources and on receipt.
 - b) Process of manufacture i.e. welding, heat treatment etc.
 - c) Manufacture of various components, sub-assemblies and assembly.
 - d) Final Inspection and Testing including Performance Test at shop.
 - e) Surface preparation and painting.
 - f) Packing, Marking and Dispatch.

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2.2 Inspection Agency:

Inspection of packages shall be carried out by agency as per below Inspection category of packages:

1. **Cat I:** - Inspection shall be done jointly by PVUNL, BHEL & Successful bidder.
2. **Cat-II:** - Inspection shall be done by BHEL & Successful bidder.
3. **Cat-III:** - Certificate of Compliance shall be furnished by Successful bidder.

Please note, for Cat I & II items BHEL reserve the right to carry inspection by themselves or through nominated third party. For Inspection agency for various items, vendor may refer to Quality Plan.

2.3 Material Dispatch Clearance Certificate (MDCC)

1. When the tests have been satisfactorily completed at the Contractor's works, the Inspection Agency shall issue a certificate to that effect within fifteen (15) days after completion of tests, but if the tests were not witnessed by the Inspection Agency or his representative, the certificate would be issued within fifteen (15) days of the receipt of the test certificates by the Inspection Agency.
2. BHEL / PVUNL will issue MDCC to the Contractor based on the QS Note/Report from the Inspection Agency.
3. Contractor will not dispatch any material before issue of MDCC by BHEL / PVUNL.
4. The satisfactory completion of these tests or the issue of MDCC, shall not bind BHEL / PVUNL to accept the supply/equipment, should it, on further tests after erection, be found not to comply with the contract provisions.

For Cat-I item, MDCC shall be issued by PVUNL and it's the responsibility of vendor to arrange MDCC from them, and original MDCC shall be attached with Invoice by Vendor for claiming payment from BHEL.

For Cat-II & Cat-III items, MDCC shall be issued by PVUNL/BHEL, which shall be valid for vendor payment.

2.4 GENERAL INSTRUCTION FOR DISPATCH:

1. No equipment / material shall be dispatched without prior consent of BHEL / PVUNL. Vendor shall dispatch the equipment / material only after receipt of "Quality Surveillance Note" and Material Dispatch Clearance Certificate (MDCC) issued by BHEL / PVUNL.
2. Vendor shall notify in writing to site at least within 15 days in advance of shipment, the probable date, when the equipment / material shall be ready for dispatch.

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3. Immediately after the shipment is made, necessary shipping / transport documents shall be sent by the vendor in accordance with the instructions of BHEL. The shipping documents / transport documents shall comprise of the following:
- Bill of lading/ Railway Receipt / Lorry Receipt as applicable
 - Freight invoice
 - FOB/FOR Invoice
 - Packing List (No of copies as required)
 - Certificate of origin
 - Letter to Insurers
 - Quality Surveillance Note
4. The distribution procedure for the above documents shall be as per the “dispatch instructions”.

A. Consignee Address:

Construction Manager / BHEL Site office,
3x800 MW PVUNL STPP, Patratu
Distt – Ramgarh (Jharkhand) Pin- 829119

Note:

- Consignee address in LR should be strictly as per above.
- Seller / contractor to note that to effect “Sale in Transit”, BHEL shall issue “Delivery Note” to the Transporter for transferring the ownership from BHEL to customer (PVUNL).
- Delivery note shall be carried by transporter along with other dispatch documents.

B. Road Permit Requirement: As per requirement.

C. Mode of Dispatch: By Road

Note: It is Seller / contractor responsibility to ensure availability of trucks well in advance for dispatch of material to meet contractual delivery requirement and as per instruction of BHEL engineer.

D. Transit Insurance: In BHEL Scope

Prior dispatch intimation shall be issued to Insurance agency about the value of consignment, dispatch details, along with one set of documents consisting of LR/RR copy, packing list / Challan indicating the items dispatched

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(with their weights.) A copy of above should be sent to BHEL Patratu site office (address same as consignee address).

E. Packing:

1. The packing shall be in conformity with specification and shall be such as to ensure prevention of damages, corrosion, deterioration, shortages, pilferage and loss in transit or storage.
2. Packing list shall be submitted as per standard format along with advance set of documents for claiming payment which shall also indicate: -
 - a) Packing size.
 - b) Gross weight and net weight of each package.
 - c) Contents of the package with quantity of each item separately.

F. Transportation & Freight Charges:

1. All road dispatches shall be only through the carriers approved by the BHEL.
2. Owing to any reason, in case the seller / contractor has to resort to a mode of transport other than what was contemplated, to keep up the delivery / completion schedule incurring extra expenditure, such extra expenditure shall be borne by the seller / contractor.
3. Freight charges shall be borne by the seller / contractor.

2.5 MATERIAL RECEIPT CERTIFICATE:

The Seller/Contractor shall arrange Material Receipt Certificate (MRC) at project site, duly signed by the BHEL/PVUNL/NTPC Site Engineer, after receipt of the material at site and its physical verification.

2.6 SHORTAGES/DAMAGES:

Any shortages or damages during transit, transportation or handling at site, including at the time of erection and commissioning, shall be made good by the Seller/Contractor at his risk and costs, to meet the project schedule. In case of faults/discrepancies in any material, component, sub-assembly, assembly, etc., the same shall be supplied/replenished free of cost to enable the equipment to be put in service. Shortages in some cases shall also be replenished free of cost.

2.7 Dispatch Documents required (to be furnished by vendor):

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A. For customer billing by PSWR, supplier shall provide the following documents to BHEL-PSWR in 4 sets:

1. Copy of vendor Invoice
2. Copy of Packing List Indicating Quantity / Gross weight/Net Weight and NTPC approved BBU item no. wherever applicable against each item dispatched.
3. MDCC (Original NTPC MDCC, if applicable).
4. CHP issued by NTPC – Original (if applicable).
5. Insurance intimation copy
6. Test certificate / Inspection Reports- Original (For Cat II & III packages).

B. For vendor payments by PSWR, the following documents are required in 4 sets:

1. Original vendor Invoice
2. LR copy (Consignee address shall be BHEL Patratu site).
3. Packing list.
4. Copy of insurance intimation letter / e-mail. (Intimation to Insurance agency to be sent on the same day of dispatch.)
5. Guarantee certificates in line with PO terms- Original.
6. MDCC – Copy.
7. In addition to the above, vendor may furnish mfg. clearance/drg/docs approval date for the purpose of determining contractual delivery for expeditious processing of Invoices.

C. Checklist for submission of Bills:

Fabricator should ensure that the following documents are submitted for bill processing to avoid any delay in processing of payment:

1. Invoice – duly signed by Fabricator with seal. Fabricator shall submit 100% Invoice.
2. Invoice Annexures - duly signed by Fabricator with seal.
3. GST Invoice – Original for buyer and Duplicate for transporter copies
4. Original Inspection Reports (IRs) – with relevant painting/SB remarks and ODC details (if applicable) - duly signed by BHEL QC inspector and Fabricator with seal.

2.8 Raw Material issue and Accountal:

The fabricator shall ensure Material Accounting within 365 days from date of issue of materials. This is a statutory requirement and must be strictly complied with. In case Material Accounting within 365 days from the date of first issue of raw material due to subcontractor's default, the amount payable by BHEL to Government (i.e. GST @ 18%

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of input material value + applicable interest for 365 days) will be recovered from the fabricator as penalty. The recovery/ penalty will be calculated separately for each material gate pass wherever the period crosses 365 days under a purchase order/ contract.

2.9 Reconciliation of steel issued by BHEL (free of cost):

General Notes:

- a. All steel like structural steel as specified in relevant BOQ and shall be issued free of cost by BHEL unless specified otherwise in BOQ for use in the work covered in this contract from BHEL stores/storage yard/BHEL direct issue upto fabricator shop. The fabricator shall collect these materials from BHEL at vendors work at his own cost and store the same at the work site or in his stores as per standard norms.
- b. BHEL reserves the right to recover from the fabricator 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.
- c. The fabricator shall in no case be entitled for any compensation 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 and shall be considered for time extension of contract.
- d. Fabricator will have to make his own arrangement at his own cost for procurement of any other materials except as mentioned above, as required for the works and of such quality as acceptable to BHEL.
- e. The fabricator shall maintain proper store account for all the BHEL issued materials and shall give Three (03) copies of monthly-computerized reconciliation statement of such account showing total receipt, consumption and balance at Vendor works to the BHEL. BHEL Engineer's certification for the reconciliation of steel shall be final. The detailed reconciliation (dia. Wise or as required) shall be done at least once in three months (03) or before submission of final bill which comes earlier.
- f. Fabricator 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. Fabricator shall engage experienced software personnel to associate on dedicated basis for efficient discharge of the same in time.
- g. The fabricator shall solely be responsible for the safety & security of material after it is handed over and issued to fabricator by the BHEL.

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2.10 HANDLING OF MATERIALS ISSUED BY BHEL:

- a. Materials shall be issued by BHEL based on the **weightment basis/linear measurements & sectional weight**. Direct issues shall be as per the Challan/dispatch document/LR received with the consignment. In such cases, Fabricator shall do unloading of materials from trucks/lorry at their own cost.
- b. All materials issued by BHEL shall be stacked, stored 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 fabricator (successful bidder of this package) at his own cost within the quoted rates.
- c. Materials issued will be used only for construction of permanent works. The fabricator shall take care of material issued by BHEL and shall protect the same from theft, damage and weathering. Excessive rusting of steel in custody of agency/fabricator must be avoided. **In case, due to any cause attributable to the contractor, such rusting of steel occurs rendering the same unusable, then such quantity of steel shall be recovered from the interim payment at the penal rate specified in the tender.**

2.11 ISSUE OF STEEL

The steel shall be issued to the fabricator on the following basis:

Structural Steel: Weightment basis (Unit – MT)

All the steel (structural) issued by BHEL shall be properly accounted. The total quantity of steel required for the work will be calculated from the approved, fabrication drawings, lugs etc. The measurement for payment as well as for accounting shall be based on the sectional weights as indicated in the following IS/BS/EN specifications.

S. No.	Name of Standard	Name of Section
1.	IS: 808-1964	Beams, Channels and Angles
2.	IS: 1730-1961	Plates, Sheets and Strips/Flats
3.	BS4-1: 1993	UB/UC sections
4.	IS: 12778/equivalence with EN-19-57	For NPB sections
5.	IS: 12778/equivalence with EN-53-62	For HE/WPB sections
6.	IS: 1786 or grade -1 of IS432 (Part-I)	Rounds including deformed high yield strength bars

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In case any such sectional weights are not available in the above documents, the manufacturer recommendation shall be binding.

- a) The steel issued to the fabricator shall be mainly in standard length and sections as received from the supplier. However, the fabricator shall be bound to accept the steel in length as available in the project stores, no claims for extra payment because of issue of non-standard length will be entertained.
- b) The fabricator shall satisfy himself of the quality and quantity of the materials at the time of taking delivery from BHEL deployed trucks. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by the fabricator from BHEL deployed trucks.
- c) The fabricator shall submit to BHEL, a statement indicating estimated quantity of steel required during a quarter. In addition, the fabricators Shall also furnish the estimated requirement of steel during a month by the third week of the previous month indicating his requirement. Fabricator during his indenting should specify the required dimension in order to minimize the scrap generation and utilizing the standard available lengths.

2.12 RETURN OF MATERIALS

Return Structural Steel including Scrap: All surplus steel will be taken back on weight basis. Surplus, unused and untampered steel shall be sorted section-wise and returned separately which will be transported by Fabricated to Project Premise. As regard to the scrap generated will be the property of fabricator & the amount for same will be recovered from the fabricator at the rate as per BHEL scrap policy mentioned below: -

2.13 SCRAP RECOVERY RATES:

For all the categories of scrap recovery, quarterly floating rate shall be followed based on the latest disposal rate of BHEL/JPC. Wherever the latest scrap rates are not available the existing rates available as on date of recovery shall prevail. Recovery shall be based on Scrap Rate as on the quarterly available JPC rate. Subsequent revision of scrap rates shall be updated every financial quarter. The revised scrap rates will be updated during first week of every financial quarter (i.e.) in the month of Apr, Jul, Oct & Jan.

2.14 Scrap and Serviceable Materials:

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

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Plates having both side greater than 1 Meter OR if any side is less than 1 M but greater than 0.5 M and the total area is equal or greater than 2 sq. Meter shall be considered as **serviceable material**.

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

2.15 Steel Consumption and wastage:

i. Structural Steel (Rolled Sections and Plates etc.) Consumption

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

- a) Actual consumption = Issue – Surplus.
- b) Surplus = un-tampered, unused, uncut quantity of steel **including serviceable material** returned by the fabricator to BHEL.
- c) Wastage = Actual consumption – Theoretical consumption.

ii. Structural Steel Wastage for Plates.

- a) **Allowable wastage:** 4% (FOUR percent) of the theoretical consumption shall be considered. Wastage shall be considered as cut pieces and scrap material, measured as per actual weight basis. Invisible wastage, if any, shall be considered to be included in the specified 4 % allowable wastage.

S. No.	Structural steel	Basis of issue & penal recovery
S-1	Theoretical consumption (without considering any wastage, scrap or loss) as per specification & drg.	Free
S-2	Wastage limited to plus four percent (+4%) of the aforesaid theoretical consumption (S-1) towards allowable wastage.	Free
S-3	Wastage beyond four percent (4%) of the aforesaid theoretical consumption (S-1).	Penal rate
	SS plate	

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S4	Wastage limited to 26 percent (26%) of the aforesaid theoretical consumption (S-1).	Free
S5	Wastage beyond 26 percent (26%) of the aforesaid theoretical consumption (S-1).	Penal rate

Note :SS Scrap shall be return to BHEL as per BHEL recommended cut sizes.

iii. Structural Steel Wastage for Beam, channel, angle, UC, UB, rods, pipes etc.

- a. **Allowable wastage:** 1% (One percent) of the theoretical consumption shall be considered. Wastage shall be considered as cut pieces and scrap material, measured as per actual weighment basis. Invisible wastage, if any, shall be considered to be included in the specified 1 % allowable wastage.

S. No.	Beam, channel, angle, UC, UB, rods, pipes etc.	Basis of issue & penal recovery
S-1	Theoretical consumption (without considering any wastage, scrap or loss) as per specification & drg.	Free
S-2	Wastage limited to plus One percent (+1%) of the aforesaid theoretical consumption (S-1) towards allowable wastage.	Free
S-3	Wastage beyond One percent (1%) of the aforesaid theoretical consumption (S-1).	Penal rate

2.16 Reconciliation of Materials:

- The fabricator shall submit a reconciliation statement of steel issued to the fabricator with each RA Bill
- At the time of submission of bills, the fabricator shall properly account for the material issued to him as specified herein to the satisfaction of BHEL certifying that the balance material are available in the fabricator custody at site.
- 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.
- The reference drawings for actual material consumption to be used for the purpose of reconciliation shall be drawings prepared by the BHEL and drawings approved by BHEL for fabrication works and such other drawings approved by BHEL.

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2.17 Recovery of Materials (Penal Rates):

If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly RA Bills as per following penal rates if material Supply is in BHEL SCOPE:

S. No.	Item	Penal rate (Rs)
P-3	Plates (if supplied by BHEL) and MS/chquered plates	120% of Current SAIL Price (At the time of effective recovery)
P-4	MS Flats, beams, channel, angels etc. (Rolled Sections)	120% of Current SAIL Price (At the time of effective recovery)
P-5	SS Plate	120% of Current SAIL Price (At the time of effective recovery)

- a) The weights of P.O. items as per Specification/Drawing shall be the basis for accounting of the raw materials issued. The raw materials shall be issued with a process allowance of 3% for Sheets and 4% for Plates. This includes an invisible wastage of 2% for Sheets and Plates.

For rolled section (Beam, Channel, Angle UC, UB, Rods, Pipe etc.) invisible wastage shall be 0%.

- b) All balance materials (off cut) /serviceable are to be returned to designated Stores by BHEL, at Subcontractor's cost.
- c) All scraps under BHEL supplied materials including that of Stainless Steel shall not be returned to BHEL. In case, scrap generated beyond permissible limit shall be charged as per penal rate as well as recover scrap value as per recovery rate.
- d) Recovery of the cost of the scrap along with GST and other statutory levies, if any, shall be made from the fabricator.
- e) Wherever attested materials are issued, the balance materials are to be returned in the attested condition only.
- f) The material rejected as PDO (Part Disposition Order) due to faulty workmanship of Fabricator shall entail recovery of the cost of prime material as per relevant penal clause. In addition, conversion and service charges shall also be recovered in case of part-processed item.
- g) The material rejected as PDO (Part Disposition Order) due to reasons other than faulty workmanship of Fabricator shall be returned to BHEL Stores, failing which recovery shall be made as per relevant penal clause.

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- h) The Fabricator should properly utilize materials issued by BHEL/PSWR as per the drawings/QWIs (Quality Work Instructions) in order to meet design and quality requirements of the product.
- i) After material issue, the Fabricator should submit cutting plan within 15 days from the date of material issue. Fabricator should submit cutting plan along with layout and joint details (if applicable) before GR (Good Receipt) for all the materials issued.
- j) However, in working out such economic cutting plans, it is to be ensured that the details as prescribed in each QWIs are adhered to. After the approval of the cutting plans, any balance material available from the issues made either in original or in supplementary shall be returned to our Stores at Subcontractor's cost. The cutting plans as approved by BHEL shall be kept at Subcontractor's premises for a minimum period of 3 years from date of cutting plan approval. They should be made available whenever required by BHEL officials or representatives of BHEL. It should be ensured that the jobs are fabricated and welds are made as per the layout of approved cutting plans.
- k) Whenever fabrication is done without proper cutting plans, the excess issue over and above the net weight shall attract recovery as prime material as per relevant penal clause.
- l) In case joint is specified in the cutting plan by BHEL, necessary quality requirements such as WPS should be adhered to by the Subcontractor
- m) Failure to return the prime / offcut material shall entail recovery of the value of material as fixed by BHEL from time to time which is inclusive of departmental/financing charges, etc. In addition, statutory taxes, duties and levies as applicable shall also be recovered.
- n) Normally, all the indirect materials falling within the scope of the fabricator for doing the job is to be taken care of by the fabricator themselves.
- o) For the purpose of material accountability, Vendor shall submit a provisional material reconciliation statement on Quarterly basis, considering the Scrap percentage as applicable (Including Invisible scrap) and Serviceable offcut material (Certified by engineer).

2.18 Provisional Material Accounting Method:

- i) Actual consumption = Issue – Surplus.
Surplus = un-tampered, unused, uncut quantity of steel **including serviceable material** returned by the fabricator to BHEL.
Wastage = Actual consumption – Theoretical consumption.

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- ii) Agency shall submit with the Provisional monthly reconciliation statement along with applicable MDCC, MRC Detailed BOM for receipt of material at vendor works, detail of finished goods supply and resident engineer certified material under work in progress and serviceable off cut material. In case of deviation from the reconciliation statement, amount Any discrepancy such as weight mismatches etc. shall be settled in before final bill.
- iii) Recovery towards unreturned balance material as per FMAS (Final Material Accounting Statement) shall be done as per BHEL norms along with applicable statutory levies from the Subcontractor. Hence, any correction after the generation of the FMAS shall not be entertained. After the issue of FMAS, the purchase order shall be treated as closed in all respects; therefore, requests toward refund of recovery shall not be entertained.
- iv) The Fabricator shall be responsible for prompt material accounting. Repeated occurrence of inordinate delay in returning and settling the material accounts shall entitle BHEL the right to terminate the contract forthwith or to impose a temporary suspension on further loading at the discretion of BHEL.

2.19 Custody of materials issued by BHEL to Subcontractor:

- a) The raw material issued to the Fabricator in connection with the fabrication contract shall remain the property of BHEL PSWR, Nagpur. The Fabricator shall use the above materials only for the execution of BHEL's POs for which the materials have been issued, and for no other purpose whatsoever. The Fabricator shall be responsible for the full value thereof to be assessed by BHEL PSWR, Nagpur, whose decision shall be binding on the Subcontractor.
- b) The Fabricator shall be liable for the loss or damage to such property from whatever the cause may be while such property is in the possession or under the control of the Subcontractor, their employees, workmen or agents or any other person connected with the Subcontractor. **All the materials of BHEL, PSWR shall under no circumstance be sold/hypothecated to any bank or to any lending institution or to any party whomsoever.** Such materials should not be shown as the Subcontractor's assets in any of the statements of the Fabricator to any party.
- c) The Fabricator shall produce the materials supplied by BHEL, PSWR in the form of raw material, semi-finished structure to BHEL officials visiting the Subcontractor's unit for verification purposes.
- d) Inventory statement has to be submitted every month by the Fabricator for the materials issued. If the Fabricator fails to produce or properly account the materials so issued, BHEL, PSWR shall have the right to take further action as deemed fit including recovery of the value of the materials along with the respective

TECHNICAL CONDITIONS OF CONTRACT (TCC)

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administrative charges and statutory levies from the running bills of the Fabricator and/or temporary suspension of load and/or termination of contract and/or de-listing.

- e) Any act of Fabricator resulting in dishonest misappropriation or conversion of the materials so issued for his own use shall constitute the offence of Civil / Criminal Breach of Trust under Indian Penal Code and/or such other offences under any other provisions of law and the Contractee (BHEL) shall have every right to proceed against the Fabricator under Civil/Criminal Law in order to ensure proper punishment to such perpetrator(s) for the said offence(s). In such cases, BHEL shall take all necessary steps to recover the material available with those firms.
- f) Wherever availability of material becomes critical for certain work orders, BHEL, PSWR shall transfer the balance material available with the Fabricator including the scrap sizes from one Fabricator to the other. For this, necessary credit shall be given during material accounting. The material transfer emanating from BHEL, PSWR is to be honored immediately or otherwise, recovery shall be made at the prime material cost. Any difficulty for affecting such transfer shall be brought to the knowledge of BHEL officials immediately.

2.20 Material Procurement by Fabricator

Based on prior approval of BHEL, fabricator shall make their own arrangement for raw material to value limited to **Rs. 10,00,000/-** for each package in case the same is not available for Free issue material from BHEL depending on the dispatch criticality. **BHEL / QC shall clear the use of such materials. This clause is pertaining to BHEL free issue material. Further, BHEL committee shall approve such proposal and it is the sole responsibility of the fabricator to obtain confirmation from BHEL prior to commencement of Procurement of such items.**

2.21 GUARANTEE FOR THE FINISHED GOODS

The Subcontractor shall warrant that the fabrications comply fully with the drawings and other technical conditions specified by BHEL. If the fabrications are found defective owing to faulty workmanship/incomplete work **within a period of eighteen (18) months from the date of receipt of respective consignment at site**, the Subcontractor shall do the necessary repair/rework or replace the defective items free of cost. Alternatively, the rework/replacement charges shall be recovered.

For Supply Contract

Bidder must be possessing established fabrication **work shop / factory** equipped with all kinds of T & P's and other necessary requirement for supply of finished material as per specification at their own cost Tentative requirement of Factory is stipulated in **Annexure - A**. All other equipments and T&Ps (if required) for supply of finished material, shall be arranged by Fabricator.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter - II: Scope of Works

Important Notes:

- The scope of Permanent / Erection bolts, it is not in Vendor scope.
- Supply and fixing of Electro forged gratings is not in bidder scope.
- Painting specifications as per technical specification
- All structural steel works including tubular sections shall be painted as per specification.
- All factory fabricated structures shall have bolted field connections.
- Splice is permitted only for longer length of members and at selected and approved location finalized during detailed engineering.

2.22: ODC Consignment

- ODC **dimension considerations:** Job dimensions of length above 12.5 m (Meter) or width or height above 2.5 m (Meter) are considered as ODC. The job dimensions in case of ODC consignment are to be indicated by the Fabricator.
- ODC Freight Charges, (wherever becomes necessary) will be in addition to the finalized fabrication rate including transport i.e. it is an additional/ incremental charges for ODC consignments over the rates finalized for fabrication.
- An additional charge shall be paid for ODC consignments as per following: -

Sl no	ODC Schedule	ODC Description	Rate Payable (Excluding GST)
1	ODRS1	Single ODC Freight Rate, if Length is more than 12.5 m upto 15 m or width ODC (more than 2.5 m) or height ODC (more than 2.5 m)	Rs 650 / MT
2	ODRS2	Combination ODC Freight Rate, i.e combination of any 2 or 3 dimensions falling under ODC's Length above 12.5M up to 15M/ Width ODC /Height ODC	Rs 900 / MT
3	ODRS3	Length ODC Freight Rate / MT over & above ODRS1 or ODRS2 for each meter increment and part thereof in the length above 15 M till 24 M	Rs 200 / MT

Note: -

1. Per MT ODC rates shall be payable only for the Fabricated items which are ODC, not for Full consignment.
2. Decision of BHEL will be final in case of any disputes on ODC dimensions.

Chapter-III, IV & V - Not Applicable for this contract.

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Chapter – VI: Time Schedule

6.1 Time schedule & mobilization

6.1.1 Mobilization (For Supply)

After receipt of Purchase Order, Fabricator shall discuss with project manager / construction manager regarding initial mobilization. The successful bidder will tie up with approved detailers of BHEL/NTPC for preparation of detailed fabrication drawing, submission of same to BHEL PEM and approval from them. Appointed Detailers by the successful bidder will co-ordinate with BHEL PEM/NTPC for approval of drawing and day to day routine co-ordination with site team (Bidder/BHEL/NTPC) for any clarification during fabrication and erection.

On receipt of structural materials from BHEL and approval of detailed drawings, successful bidder will start fabrication work in their "FABRICATION WORKSHOP / FACTORY". They will prepare cutting plan, get it checked with BHEL/NTPC official and proceed with fabrication.

Contractor shall mobilize further resources as per requirement to commence the work of fabrication, testing, shot blasting, painting etc. to match schedule of the project.

6.1.2 Commencement of contract period and tentative schedule: -

Date of issue of GA drawing shall be reckoned as the start of the contract period of this package and the bidder must start action of drawing approval on receipt of Purchase Order. The work to be completed within 5 months after start of work.

1. Submitted drawings will be approved within 10 days by BHEL (PEM).
2. Material requirement to be given within one months of award of work

The contractor has to subsequently augment his resources in such a manner that the entire work is completed to achieve the following tentative schedule: -

Fabrication of entire structures as per scope including surface preparation and application of primer paint shall be completed within 5 months from the date of start of work.

S. No	Unit#3	Completion from Dos (Date of Start)
1.	Coal Bunker, ring beam ,silos and hoppers	5 months

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter – VI: Time Schedule

L-2 Schedule shall be prepared and submitted by Fabricator for approval of BHEL.

In order to meet 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.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-VII: Payment Terms

7 Term of Payment: -

The progressive payment for supply on accepted price of contract value will be released as per the break up given hereinafter: -

Stages of progressive pro-rata payments

- ❖ 95% payment as per PO, Billing schedule/Price Bid, excluding GST shall be released within Payment Timeline furnished below after receipt & acceptance of material at site and submission of following documents: -
 - a) GST Complaint Invoice (1 Original + 2 copies)
 - b) Copy of Intimation to Insurance Company
 - c) Copy of Material Dispatch Clearance Certificate issued by BHEL site.
 - d) Guarantee Certificate
 - e) Material Receipt certificate by BHEL/site.

- ❖ Applicable GST shall be released upon compliance of following documents:

Vendor has declared such Invoice in their GSTR-1 & has paid the tax to the Government by filing GSTR-3B or any other return/form for payment of tax so that Vendor's invoice details appear in BHEL's GSTR-2A. Payment may not be released if above is not complied & invoice details do not appear in BHEL's GSTR-2A.

- ❖ Balance 5% payment as per PO, Billing schedule/Price Bid, excluding GST shall be released, on pro rata basis within Payment Timeline furnished below from the date of submission of Performance Bank Guarantee (PBG - confirmed by Issuing bank). Bank guarantee from any of the consortium Banks of BHEL for 5% of total order value (Excluding GST) is to be submitted in prescribed format. The PBG shall be valid up to end of the Guarantee period with additional claim period of 3 months after Guarantee.
- ❖ **Note-** In lieu of submission of PBG, bidder may opt that last 5% Payment excluding GST on pro rata basis shall be withheld and same shall be released after completion of Guarantee period.

- ❖ **Payment shall be released as per Time line furnished below for Micro & Small Enterprises, Medium Enterprises & Non MSME bidder: -**

Type of Bidder	Payment Timelines (Number of days)
Micro & Small Enterprises	45 days
Medium Enterprises	60 days
Non MSME	90 days

Paying Authority shall be **General Manager, BHEL 3 X 800 MW, PVUNL Patratu Site, Jharkhand**

Chapter-VIII, IX and X - Not applicable for this tender.

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: WELDING & RADIOGRAPHY

11. WELDING, RADIOGRAPHY AND OTHER NON-DESTRUCTIVE TESTING, POST WELD HEAT TREATMENT

11.1 WELDING

11.1.1 INSTALLATION OF EQUIPMENT INVOLVES GOOD QUALITY WELDING, NDE CHECKS, POST WELD HEAT TREATMENT ETC. CONTRACTOR'S PERSONNEL ENGAGED SHOULD HAVE ADEQUATE QUALIFICATION ON THE ABOVE WORKS.

11.1.2 THE METHOD OF WELDING WILL BE INDICATED IN THE DETAILED DRAWING/DOCUMENTS. BHEL ENGINEER WILL HAVE THE OPTION OF CHANGING THE METHOD OF WELDING AS PER SITE REQUIREMENT.

11.1.3 BEFORE ANY WELDER IS ENGAGED ON WORK, HE SHALL BE TESTED AND QUALIFIED BY BHEL/CUSTOMER, THOUGH THEY MAY POSSESS THE PREVIOUS CERTIFICATE. BHEL RESERVES THE RIGHT TO REJECT ANY WELDER WITHOUT ASSIGNING ANY REASON. ALL THE EXPENDITURE IN TESTING/QUALIFICATION OF THE CONTRACTOR'S WELDER SHALL BE BORNE BY CONTRACTOR.

11.1.4 UNSATISFACTORY AND CONTINUOUS POOR PERFORMANCE MAY RESULT IN DISCONTINUATION OF CONCERNED WELDER.

11.1.5 THE WELDED SURFACE SHALL BE CLEANED OF SLAG AND PAINTED WITH PRIMER PAINT TO PREVENT RUSTING, CORROSION. FOR THESE CONSUMABLES LIKE PAINT /PRIMER ETC WILL BE IN THE CONTRACTOR'S SCOPE.

11.1.6 WELDING ELECTRODES HAVE TO BE STORED IN ENCLOSURES HAVING TEMPERATURE AND HUMIDITY CONTROL ARRANGEMENTS. THIS ENCLOSURE SHALL MEET BHEL SPECIFICATIONS.

11.1.7 WELDING ELECTRODES, PRIOR TO THEIR USE, CALL FOR BAKING FOR SPECIFIED PERIOD AND WILL HAVE TO BE HELD AT SPECIFIED TEMPERATURE FOR SPECIFIED PERIOD. ALSO, DURING EXECUTION, THE WELDING ELECTRODES HAVE TO BE CARRIED IN PORTABLE OVENS.

11.2 NON DESTRUCTIVE EXAMINATION:

11.2.1 CONTRACTOR SHALL PROVIDE ALL RESOURCES AND MAKE ALL ARRANGEMENTS FOR THE RADIOGRAPHIC EXAMINATION OF WELDS FOR THIS WORK. FOR REASONS OF SAFETY, INVARIABLY THE RADIOGRAPHY WORK WILL BE CARRIED OUT AFTER THE NORMAL WORKING HOURS AND CLOSE OF OTHER SITE ACTIVITIES ONLY. IN THIS REGARD, THE CONTRACTOR HAS TO

TECHNICAL CONDITIONS OF CONTRACT (TCC)

Chapter-XI: WELDING & RADIOGRAPHY

ADHERE TO THE SAFETY RULES / REGULATIONS LAID BY BARC AUTHORITIES FROM TIME TO TIME.

- 11.2.2 RADIOGRAPHY INSPECTION OF WELDS SHALL BE PERFORMED IN ACCORDANCE WITH REQUIREMENTS AND RECOMMENDATION OF BHEL ENGINEER. THE MINIMUM QUANTUM OF RADIOGRAPHIC INSPECTION SHALL BE AS PER PROVISION OF BHEL'S ERECTION DOCUMENTS. THEY MAY, HOWEVER BE INCREASED DEPENDING UPON THE PERFORMANCE OF THE INDIVIDUAL WELDER AT THE DISCRETION OF BHEL ENGINEER/BOILER INSPECTING AUTHORITY. BIDDER SHALL ALSO ARRANGE THE UT EQUIPMENT WITH RECORDING FACILITY AT HIS OWN COST. UT SHALL BE DONE AS PER REQUIREMENT OF BHEL / CLIENT. RECORDS OF UT SHALL BE PRODUCED & SUBMITTED TO AS PER SITE REQUIREMENT.
- 11.2.3 ALL X-RAY / GAMMA RAY FILMS OF WELD JOINTS SHALL BE PRESERVED PROPERLY AND BE HANDED OVER TO BHEL.
- 11.2.4 THE FIELD WELDED JOINTS SHALL BE SUBJECT TO DYE-PENETRANT/MPT/RT/ OTHER NON-DESTRUCTIVE EXAMINATION AS SPECIFIED IN THE RESPECTIVE ENGINEERING DOCUMENTS/ AS INSTRUCTED BY BHEL.
- 11.2.5 WHERE REQUIRED, SURFACE PREPARATION, LIKE SMOOTH GRINDING OF WELDED AREA, PRIOR TO RADIOGRAPHY SHALL BE DONE. IT MAY ALSO BECOME NECESSARY TO ADOPT INTER-LAYER RADIOGRAPHY/MPT/UT DEPENDING UPON THE SITE/ TECHNICAL REQUIREMENT NECESSITATING INTERRUPTIONS IN CONTINUITY OF THE WORK AND MAKING NECESSARY ARRANGEMENTS FOR CARRYING OUT THE ABOVE WORK. THE CONTRACTOR SHALL TAKE ALL THIS INTO ACCOUNT IN HIS OFFER. THE REQUIRED NDT METHOD/PROCEDURE WILL BE DECIDED BY BHEL ENGINEER AT SITE.
- 11.2.6 FOR CARRYING OUT ULTRASONIC TESTING OF WELDING JOINTS OF LARGE SIZE, IT WILL BE NECESSARY TO PREPARE SURFACE BY GRINDING AND BUFFING A SMOOTH FINISH AND CONTOUR AS NECESSARY. THE CONTRACTOR'S SCOPE OF WORK INCLUDES SUCH PREPARATION AS INCIDENTAL TO WORK.
- 11.2.7 NO SEPARATE PAYMENT FOR ANY NDE ACTIVITIES IS ENVISAGED. ACCORDINGLY, THE OFFERED RATE SHALL BE INCLUSIVE OF COST OF ALL NDE.

11.3 HEAT TREATMENT:

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Chapter-XI: WELDING & RADIOGRAPHY

- 11.3.1 FOR THE PURPOSE OF TEMPERATURE RECORDING OF STRESS RELIEVING PROCESS, THERMOCOUPLES HAVE TO BE ATTACHED TO THE WELD JOINT. THE NUMBER OF TEMPERATURE MEASURING POINTS AND LOCATIONS SHALL BE AS PER THE STANDARDS OF BHEL. THERMOCOUPLES HAVE TO BE ATTACHED USING CAPACITOR DISCHARGE TYPE PORTABLE THERMOCOUPLE ATTACHMENT UNIT. CONTRACTOR SHALL ARRANGE SUFFICIENT NUMBER OF THERMOCOUPLE ATTACHMENT UNITS.
- 11.3.2 CONTRACTOR SHOULD PROVIDE TEMPERATURE INDICATOR / TEMPERATURE RECORDER FOR MEASURING TEMPERATURE DURING PRE-HEATING FOR WELDING OR FOR CONTROLLING TEMPERATURE OF METAL FOR HOT CORRECTION ETC. THE TEMPERATURE RECORDERS SHOULD BE PREFERABLY OF SOLID STATE TYPE.
- 11.3.3 HEAT TREATMENT MAY REQUIRE TO BE CARRIED OUT AT ANY TIME (DAY OR NIGHT) TO ENSURE THE CONTINUITY OF THE PROCESS. THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS INCLUDING LABOURER REQUIRED FOR THE SAME AS PER DIRECTIONS OF BHEL.
- 11.3.4 IN CERTAIN CASES ONLY THE PRE-HEATING OF WELD JOINTS MAY BE CALLED FOR.
- 11.3.5 FOR WELD JOINTS OF HEAVY STRUCTURAL SECTIONS, IF HEAT TREATMENT IS REQUIRED, THE SAME SHALL BE CARRIED OUT AS PART OF THE WORK.
- 11.3.6 CHECKING EFFECTIVENESS OF STRESS RELIEVING BY HARDNESS TESTS (BY DIGITAL HARDNESS TESTER OR OTHER APPROVED TEST METHODS AS PER BHEL ENGINEER'S INSTRUCTION) INCLUDING NECESSARY TESTING EQUIPMENTS IS WITHIN THE SCOPE OF THE WORK / SPECIFICATION.
- 11.3.7 PREHEATING, INTER-PASS HEATING, POST WELD HEATING AND STRESS RELIEVING AFTER WELDING ARE PART OF ERECTION WORK AND SHALL BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH BHEL ENGINEER'S INSTRUCTIONS. WHERE THE ELECTRIC RESISTANCE HEATING METHOD IS ADOPTED CONTRACTOR SHALL MAKE ALL ARRANGEMENT INCLUDING HEATING EQUIPMENT WITH AUTOMATIC RECORDING DEVICES, ALL HEATING ELEMENTS, THERMOCOUPLES AND ATTACHMENT UNITS, GRAPH SHEETS, THERMAL CHALKS, & INSULATING MATERIALS LIKE MINERAL WOOL, ASBESTOS CLOTH, CERAMIC BEADS, ASBESTOS ROPES ETC, REQUIRED FOR ALL HEATING AND STRESS RELIEVING WORKS.
- 11.3.8 ALL THE RECORDED GRAPHS FOR HEAT TREATMENT SHALL BE HANDED OVER TO BHEL/ IBR AUTHORITIES AND DUE CLEARANCES OBTAINED.

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11.3.9 RESULTS OF THESE PROCESSES SHALL BE VERIFIED/ VALIDATED AS PER REQUIREMENTS OF BHEL / CLIENT.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter-XII PRESERVATION & PROTECTION OF COMPONENTS

12.0 Preservation & Protection of Components

At all stages of work, equipments / materials in the custody of contractor 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.

12.1

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.

ANNEXURE - A

Tentative requirement for FACTORY for Fabrication of Steel Structures		
S. No	Characteristic	Check List
1.	License	A. Availability of factory registration licence ,GST Registration etc.
2.	Quality management	A. Availability of work instruction/procedures for critical activities & its implementations.
3.	Raw material control	A. Incoming raw material acceptance -MTC review records available B. Availability of material correlation/identification procedures & its implementations by hard punching/by record keeping/painting etc C. Storage/stacking of raw material-in organized manner or elevated platform with proper identification
4.	Material handling	A. Availability of EOT crane/ Gantry Crane of required capacity to handle maximum Load required for movement. B. Availability of gantry cranes/Hydra/other handling equipment's capable to handle proposed heaviest component(if required other than EOT crane)
5.	Handling of weld consumables	A. Availability of calibrated baking oven, holding oven & portable ovens (in sufficient quantities) B. Proper storage of weld consumables or racks & other controlled conditions C. Weld consumables handling: Issue/return of electrodes from store properly documented/recorded.
6.	Welding qualification	A. Availability of qualified WPS & PQR B. Availability of sufficient no of qualified welders C. Availability of welder performance monitoring/defect rate monitoring systems
7.	Machinery	A. Availability of sufficient no of SAW welding machines B. Availability of sufficient number of GTAW welding machines C. Availability of sufficient number of welding machinery-SMAW/GTAW/FCAE etc. D. Availability of CNC plasma/torchy cutting machines/profile cutting machines E. Availability of PUG/Gas cutting machines F. Availability of radial drilling machine-capacity matching to proposed thickness & size of component G. Availability of weld edge preparation/bevel end cutting machines
8.	Spare/Inspection Area	A. Availability of said levelled floor for trail assembly adequate for proposed size of components with required material handling capacity

ANNEXURE - A

Tentative requirement for FACTORY for Fabrication of Steel Structures		
S. No	Characteristic	Check List
9.	NDT/HEAT treatment/hydr/leak test facility	<ul style="list-style-type: none"> A. Availability of sufficient size covered shed with concrete platform for fabrication activities B. Availability of beam straightening machine C. Availability of DPT/MPI facility-in house /outsourced to other agency D. Availability of RT facility-in house/outsourced (as applicable) E. Availability of UT facility-in house/outsourced (however done inside vendors own works) F. Availability of RT film viewer/dark room, densitometer, reference photograph etc. if RT is done
10.	Professional qualification/quality manpower	<ul style="list-style-type: none"> A. Availability of qualified & experience manpower for quality B. availability of qualified welding inspectors C. Availability of DP/MPT Level II qualified personal D. Availability of RT level II qualified personal if applicable E. Availability of UT level II qualified personal if required
11.	Testing facility	<ul style="list-style-type: none"> A. Availability of in house/outsourced testing facilities for chemical testing by spectro/PMI B. Availability of in house/outsourced testing facilities like UTS% elongation/ben/impact testing /hardens etc. C. Availability of calibrated tape/laser beam instruments to measure long column length for proto /assembly/ D. Availability of calibrated weld gauge, vernier, micrometer & measuring instruments
12.	Surface cleaning & painting	<ul style="list-style-type: none"> A. Availability of covered shot/grit blasting facility with air compressor, mechanism to segregate fine shot (sieves) shots/grits re-collection mechanism, surface compactor/surface roughness meter etc. B. Availability of in house painting facility (separate covered area) airless gun for painting etc. C. Availability of in house testing facility, paint thickness & paint adhesion