TENDER SPECIFICATION

Sl No	E-Tender Specification Number	Description of Work
1	BHE:PW:NGP:PUR:BRM-BFG:3229	RENOVATION & MODERNIZATION OF RE-INTRODUCTION OF BLAST FURNACE GAS FIRING SYSTEM IN ALL 3 UNITS (2X30MW +1X14MW) AT PP-II, NSPCL BHILAI

VOLUME – I

FOR

VOLUME I – TECHNICAL BID

THIS TENDER SPECIFICATION CONSISTS OF:

Notice Inviting Tender	
Volume-IA	**Technical Conditions of Contract**
Volume-IB	**Special conditions of Contract**
Volume-IC	**General conditions of Contract**
Volume-ID	**Forms & Procedures**
Volume-IE	**Technical Specifications**
Volume II	**Price Bid**

Bharat Heavy Electricals Limited

(*A Government of India Undertaking*)
Power Sector - Western Region
345-Kingsway, Nagpur-440001

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NIL	Notice Inviting Tender	(Part of **Vol-IA-3229**)
I-A	Technical Conditions of Contract	Vol-I-A-3229
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3229

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter - I: PROJECT INFORMATION

Sl No	DESCRIPTION	Chapter
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20	Erection Condition of Contract & NSPCL safety Rules/Norms	Annexure-III

1.0 Project Information:

NSPCL a joint venture between NTPC Ltd and SAIL supplies power and process steam to Bhilai Steel Plant of Steel Authority of India Ltd. (SAIL) from its coal based Power Plant II at Bhilai (2x30 MW + 1x14 MW) on captive basis.

NSPCL, BHILAI PP – 2 captive power plant comprises of three pulverized coal-fired boilers, each with a capacity of 150 TPH, originally supplied by M/s BHEL. These units, commissioned in during the period 1982-85, are outdoor-type, tangentially fired, balanced draft, natural circulation boilers with a radiant dry-bottom furnace. The boilers utilize bowl mills for coal pulverization and were designed to use fuel oil for start-up, blast furnace gas (BFG) for stabilization and partial load support, and coal for the primary load-carrying operation. Following a significant operational upset incident (explosion) in 1992, the BFG system was decommissioned and replaced with coke oven gas (COG) firing. Since the retrofit, COG has served as the primary start-up and load-carrying fuel.

NSPCL proposes to carry out the renovation and modernization works for Re-introduction of Blast Furnace Gas Firing System in all 3 units of Bhilai PP-II units.

Sl. No.	Description	Details
1.1	Location	Bhilai Steel Plant Complex
1.2	Nearest Highway	NH 53
1.3	Nearest Commercial Airport	Raipur (35 km)
1.4	Nearest Railway Station	Bhilai (4 kms)
1.5	Indicative Coordinate	21011'25” (N), 81026' 05" (E)
1.6	Site Elevation	305 Meters above Sea level
1.7	**Maximum Temperature**	43 degree Centigrade
1.8	**Minimum Temperature**	14 degree Centigrade

In addition to the above, for any further information, to assess the existing plant/equipment conditions, the bidder is advised to visit the plant/site and collect the information as required, before quoting against this specification. The employer will provide all cooperation to the representative of the bidder in obtaining the required information during their visit to site. Condition of the plant, equipment and system shall be carefully assessed by the bidder for assessing the scope of work. Information on the plant and system given in this specification shall not be construed in any manner whatsoever, as to limit the scope of work by the bidder.

JOB: RENOVATION & MODERNIZATION OF RE-INTRODUCTION OF BLAST FURNACE GAS FIRING SYSTEM IN ALL 3 UNITS (2X30MW +1X14MW) AT PP-II, NSPCL BHILAI.

The complete scope of the work shall be divided in two sections in the following manner:

- **Section-A:** -The work of receipt, unloading, verifying, shifting, stacking, preservation, handling of material at BHEL/clients stores/storage yard including transportation and handing over of components for renovation & modification of re-introduction of blast furnace gas firing system, BHEL T&P & other materials, components & equipment and providing services for materials management at PP-II, NSPCL Bhilai for all Three Unit.

- **Section-B:** - Renovation & modernization of re-introduction of blast furnace gas firing system in all 3 UNITS (2X30MW +1X14MW) power plant which includes dismantling of existing facilities & erection and commissioning of CO gas & Blast furnace gas line, wind box, u-seal, igniter, scanner, hangers, blast furnace gas pipe, valves, C&I and Electricals, super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.

- **Section-A:** -The work of receipt, unloading, verifying, shifting, stacking, preservation, handling of material at BHEL/clients stores/storage yard including transportation and handing over of components for renovation & modification of re-introduction of blast furnace gas firing system, BHEL T&P & other materials, components & equipment and providing services for materials management at PP-II, NSPCL Bhilai.

SCOPE OF WORK IS FURTHER DETAILED IN VARIOUS HEADS HEREAFTER: -

Part (A): MATERIAL MANAGEMENT OF STORES

Part (B): REDEVELOPMENT WORK OF OPEN YARDS

PART (A) MATERIAL MANAGEMENT OF STORES

1. Work of this tender specification of "The work of receipt, unloading, verifying, shifting, stacking, preservation, handling of material at BHEL/clients stores/storage yard including transportation and handing over of components for renovation & modification of re-introduction of blast furnace gas firing system, BHEL T&P & other materials, components & equipment and providing services for materials management at PP-II, NSPCL Bhilai (2X30MW +1X14MW) Power Plant".
2. Scope of work includes Material Handling and Management (Incl. Issue, verification, stacking, shifting and record keeping etc.) of materials receipt at BHEL Site/ store from various units of BHEL or from any other source of BHEL. Tentative quantities of all such materials expected to be received at site are given in the tender Document.
3. Unloading of all types of heavy consignments and/or over-dimensional consignments directly from trailers by suitable crane/s or by jack & sleeper method as per instruction of BHEL Engineer.
4. The required jack & sleeper are to be arranged by the contractor.
5. Receipt of materials dispatched by road transport on door delivery basis at the BHEL stores and unloading thereof.
6. Collection of materials dispatched by road transport on godown delivery basis from transporters' godown, loading at transporters godown, local transport up to BHEL stores / storage yard and unloading thereof.

- **Preliminary verification** of all materials at the time of unloading from transport vehicle or while receiving consignments from transporters' Godown, as the case may be, reporting immediately the discrepancies like damages and shortages noticed.
- **Detailed verification** of materials with reference to packing list and loading advice slip after unpacking of boxes & crates; repacking, where called for, after detailed verification; preparation of receipt inspection reports.
- **Stacking and storing** at BHEL open storage yard / covered stores / closed & semi-closed sheds, and submission of stacking / storing records.

- **Preservation of the materials** in accordance with BHEL preservation manual and as per BHEL instructions.
- General cleaning, grass cutting and upkeep of storage yard, covered and semi-closed stores sheds within the quoted rates for unloading, verification and stacking.
- Providing Materials Management Services.
- Re-handling and restacking of materials as and when called for by BHEL. This also includes excess / redundant / scrap materials returned to stores by BHEL erection contractors.
- Handling and loading of outgoing materials those are to be sent to other destinations.

1.1 MAJOR PACKAGES TO BE HANDLED ARE AS UNDER:

Components of the following major systems are to be handled under this contract:

1. Burner Wind box
2. Wind Box Connecting Duct
3. Super heater coils
4. Structural Items (supplied in loose condition)
5. BFG (Blast Furnace Gas) piping -
6. COG (Coke Oven Gas) piping
7. Scanner air piping
8. Steam purging piping
9. Following brought Out components: -
    - Goggle Valve
    - Flow Element
    - Scanner Air fan
    - Ignitors (12 nos)
    - Flame scanners (16nos)
    - Insulation components
    - Refractory –
10. Control & Instrumentations Items
11. Cable & cable trays etc.
12. Fabricated Structure
13. Electricals items.
14. BOP Package items.
15. Chemicals, Paints etc.
16. Construction equipment's of BHEL sent in assembled / dismantled condition and other items received from other sites/locations.
17. Materials and consumables required for erection & commissioning of plant.

The above list is not exhaustive; it only includes most common major packages. It should in no way a basis for any claim/dispute on account of any variation. The intent of specification is to provide the complete material handling and material management services. All the work

shall be carried out as per the instructions of BHEL engineer which shall be final and binding on the contractor.

1.2 BILL OF QUANTITY

Summary of Weight of BOQ under the Scope.

1.2.1 GENERAL IDEA OF WEIGHTS TO BE HANDLED FOR MM WORKS

Total approx. weight to be unloaded of –

- R&M associated systems equipment's & Pre-fabricated structure for three the units:

640 MT (Approx.)

BOQ- **Refer Annexure-I for details.**

1.2.2 Some of the Major Heavy Single Consignments are as furnished below:

S.N.	Item Description	Qty for (Each Unit)	Dimensions (m) (L x W x H)	Unit Weight (Approx.) (MT)	Total Weight (Approx.) (MT) for Three Unit
1	Goggle Valve	1	6 M x 5 M x 2 M	20 MT	60 MT

The unit weight indicated above (1.2.2) is for EACH UNITS & are only the tentative indication and should in no way become a basis for any claim on account of any variation in actual weight. Work shall be carried out for all the Equipment's received from various manufacturing units and their vendors for the project under this specifications and drawings.

1.3 The intent of specification is to provide Material Handling and Materials Management services according to the most modern and proven Techniques and codes. The omission of specific reference to any method, equipment or materials necessary for proper and efficient unloading, transportation, verification, stacking & preservation etc. shall not relieve the contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

1.4 All the work shall be carried out as per the instructions of BHEL engineer. BHEL engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor.

1.5 The contractor shall perform all required services which may not be specified herein but nevertheless required for the completion of work within quoted rates.

1.6 All necessary certificates and licenses required to carry out this work are to be arranged by the contractor expeditiously.

1.7 All cranes, transport equipment's, handling equipment, tools, tackles, fixtures, equipment, manpower, supervisors/engineers, consumables (excluding those indicated as BHEL scope), etc. required for this scope of work shall be provided by the contractor.

1.8 All expenditure including taxes and incidentals in this connection will have to be borne by the contractor unless otherwise specified in the relevant clauses elsewhere here. The contractor's quoted rates shall include of all such contingencies. In this connection refer relevant clause of general conditions of contract.

PART (B) - REDEVELOPMENT WORK OF OPEN YARDS.

2.1. Development work of Open Yards

The scope of work comprises of but not limited to the following: -

01 Redevelopment of Open storage yard – 1 Nos. (40X50M)

02 Illumination of open storage yard.

03 Internal electrification & Illumination of PEB closed store sheds.

All the above jobs shall be as per BHEL Engineer's instructions & drawings.

(a) Redevelopment Work of open Yard (40M X 50M) – 01 Yard: -

(i) Clearing & leveling of open Yard.

(iii) Supply & erection of Chain Link wire fencing with supports.

(vi) Supply & erection of Gate with locking facility.

(vi) Electrification including lighting arrangement in side as well as outside of open Yard. Fixing of JBs, cables & fixtures is in the scope of bidder.

(b) Internal electrification of closed store sheds/area.

NOTE: Fabrication & Erection or arrangement of Close Shed area Qty – 01 **shall be in the scope of BHEL.**

Bidders Scope of work for Close shed/area if required.

(i) Only Electrification including lighting arrangement in side as well as outside of Close shed/area including Fixing of JBs, switches, cables, lighting arrangement & fixtures is in the scope of bidder. (Minor civil work included in the bidder scope)

3.1 General

All works at Contractor place shall be carried out in proper workmanship. Items of works covered by the following specification shall be carried out as per approved MQP by BHEL. Unless otherwise specified in this section or in the description of item, the cost of stage of works including all materials mentioned hereunder shall be deemed to have been included in the rates of items provided in the schedule.

Bidders may take note of the following points while sending their offers:

a) The quoted prices also include the cost of receipt, unloading, stacking and handling of materials supplied by vendor from its work to NSPCL site, assembly and erection with associated works including Civil Foundation Work.
b) Bidders are requested to gather all relevant information & prevailing local laws etc. in the specified regions. No claim shall be entertained on account of lack of knowledge of site condition.
c) The above technical specification is a minimum requirement and idea for the bidders only.
d) The materials and workmanship must be of good quality and accepted standards and specifications. BHEL reserves the right to reject any material not up to the specification. After completion of work, the building and areas around them should be cleared of all rubbish, debris etc. and handed over in fit condition for occupation.

~~3.2 Inspection & acceptance of goods: It is subject to BHEL inspection at supplier's works before dispatch or on receipt of materials at destinations as the case may be, as per the agreed/approved MQP. Final/ stage inspection will be carried out at the destination/ supplier's works by the authorized inspection officials in line with agreed MQP. Wherever preliminary or stage inspection is to be carried out at supplier's work, the same is subject to final acceptance after receipt of material at destination and the decision of purchaser shall be final.~~

~~3.3 Quality Plan: Vendor to submit quality plan after receipt of work order. The quality plan is expected to cover generally specification of item, the stage inspection to be carried out, Guarantee/ Warrantee/Test certificate/Inspection report, sampling plan as per relevant IS specification. The bidder/vendor shall furnish the details of the inspection facilities available with him in the quality plan, as applicable. The vendor is requested to ensure work completion as per approved QP in all aspect before start of work. The vendor should provide calibrated instrument etc. for carrying out the inspection as per the quality plan.~~

~~3.4 Rejection: The seller shall intimate the purchaser in writing within 15 days after receipt of rejection advice regarding the disposal of rejected material and action plan for replacement. If no information is received within this time, the purchaser shall be at liberty to return the material at the risk and cost of the seller after recovering the cost if any, including inward freight and other incidental~~

charges incurred. The purchaser will not be responsible for the rejected material thereafter and no claim will rest on them.

3.5 Packing, Marking and Forwarding

Packing: The supplier shall arrange for secure protecting packing of the goods suitable for tropical condition to avoid loss, damage or atmosphere action during transit by road. The packing standard shall comply with relevant National standards wherever available, carrier's conditions of packing or established trade practice. The seller shall be liable to replace the material or reimburse the value of the loss not withstanding whether insurance is arranged by him or not. The packing materials and cases and packing charges are included in the quoted price unless otherwise agreed.

Marking: The following marking shall be made on each package in black bold capital letter.

A) Name of CONSIGNOR – ("Supplier's name)

B) Name of CONSIGNEE – Bharat Heavy Electricals Limited - PSWR

C) WEIGHT: Gross & Net

The above marking should be stenciled or written in bold letter on the package. Should the packages too small, suitable cards/metal tags giving these details may be tagged or nailed. Copy of the packing slip should be kept in each package without failed.

Dispatch Intimation: Immediately after dispatch, the seller shall intimate BHEL PSWR NSPCL site. The details of the items dispatched Quantity, Order Reference and LR/RR no and date by Fax/e-mail.

Name of the officials
Construction Manager,
PP-II , NSPCL BHILAI (2X30MW +1X14MW) POWER PLANT AT NSPCL Bhilai .

3.6 Other Related Activities: -

The contractor shall take adequate precautions to ensure complete safety and prevention of accidents at site. The safety precautions shall conform to IS codes wherever aapplicable.

All the above jobs shall be as per BHEL Engineer's instructions, drawings, and detailed specification.

3.7 Field Quality Assurance:

The contractor shall be responsible for day-to-day quality checks of fabrication, erection and welding works during the progress of work. All quality records and log sheets shall be maintained as per the requirement of BHEL/BHEL'S customer and as per Field Quality Plan approved by BHEL. Cutting plans, Fabrication protocols, erection protocols, welding protocols, DP test protocols etc shall be made on regular basis as per approved formats. During erection, alignment of various members shall be checked as per approved erection tolerances with the help of laser alignment tools (HILTI make or equivalent) to the extent possible. The Contractor shall establish their own field quality lab or have tie-up with approved lab by BHEL of the plant if so required by BHEL.

3.8 In case of non-finalization of delay analysis, BHEL at its discretion may provide provisional time extension with withholding 10% of running bills.

Note:

Bidders are requested to specifically note the following:

*Bidders are requested to have **pre-bid visit/ inspection of site** to make them fully acquainted with the site situation & nature of job. No claim shall be entertained at later date on account of non-familiarization of site conditions. Bidders may fix up their site visit in consultation with BHEL Officials.*

3.9 Bidder manpower accommodation: Bidder shall arrange accommodation for their manpower.

- The Bidder would be provided with free 415 Volts, 3-phase & Neutral supply of electricity only for the purpose of execution of the contract at one point only at work site. For further distribution, bidder shall make his own arrangements. **Electricity for all other facilities if required by the Bidder shall be on chargeable basis as per NSPCL norms**

1. Construction power (three phase, 415 V/ 440 V) will be provided free of cost at one point near the site. Further distribution shall be arranged by the contractor at his own cost and services. Contractor shall be responsible for fulfilment of all requirements including statutory requirements in this regard. Contractor shall deploy and install required energy meter, cables, fuses, distribution boards, switchboards, bus bars, earthing arrangements, protection devices and any other installation as specified by statutory authority/act. Contractor shall also obtain approvals of appropriate authority and pay necessary fees, levies etc towards the clearance of such installations, prior to use. Sufficient power factor compensation equipments 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.
2. 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. 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.
4. 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 labor, extension of time etc. The Contractor shall adjust his working shift accordingly and deploy additional manpower, if necessary, so as to achieve the target.
5. Contractor to note that till construction power is made available by BHEL/NSPCL, contractor shall make his own arrangement like DG set etc. The contractor shall also take the approval/ permission of statutory authorities for his DG set installation. The Contractor has to make his own arrangement for the same as required to carry out the job under the scope of work within the quoted rate. Nothing extra shall be paid on this account of DG set up and running for construction and office maintenance etc.
6. 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 like Operation of Batching Plant, Concreting, etc. that are underway at the time of power failure or important activities planned in immediate future.

7. 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.
8. Contractor is advised to maintain the calibrated energy measuring instruments and use their system as efficiently as possible to maintain the HT side input energy meter reading and LT side outgoing energy meter reading to sub-contractors as equal.
9. The bidder will have to Procure & install General mobile illumination system during construction right from start of his work. This system will include temporary pole lighting, portable lighting towers with DG back-up, within the quoted price. The illumination should be such that minimum illumination requirement as specified by Indian standards for general illumination is maintained.
10. Contractor to arrange energy meter for office.

General:

If any other voltage level (other than normally available) is required, the same shall be arranged by the contractor from power supply as above. Contractor will have to 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. 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.

Contractor to arrange calibrated energy meter (tamper proof, suitably housed in a weather proof box with lock & key arrangement) for office and this construction power at office is chargeable as per applicable tariff rates.

2.15 Construction water (Provided by NSPCL free of cost):

Free supply of water will be made available for construction and drinking purposes at a single point at works site to be decided by NSPCL.

Sl. No	Description	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.1	**ESTABLISHMENT**			
3.1.1	**FOR CONSTRUCTION PURPOSE**:			
A	Open space for office (as per availability)	Yes		Bidder shall arrange Porta cabin/other facility for their office use & location will be jointly decided.
B	Open space for storage (as per availability)	Yes		**Note:** There are following locations identified: - (1) Close Sheds – 01 (2) Open yard/Sheds – 01 Bidder shall make his establishment accordingly for material handling and MM services.
C	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
D	Bidder's all office equipments, office / store / canteen consumables		Yes	
E	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
F	Fire fighting equipments like buckets, extinguishers etc		Yes	
G	Fencing of storage area, office, canteen etc of the bidder		Yes	
3.1.2	**FOR LIVING PURPOSES OF THE BIDDER**			
A	Open space for labour colony (as per availability)		Yes	Bidder shall arrange accommodation for their manpower.
B	Labour Colony with internal roads, sanitation, complying with statutory requirements			N/A
3.2.0	**ELECTRICITY**			
3.2.1	**Electricity For construction purposes**			

Sl. No	Description	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
A	Single point source (415 V**,** A.C., 3 Phase , 50 Hz)	Yes		415 Volts, 3-phase & Neutral supply of electricity only for the purpose of execution of the contract at one point only at work site. For further distribution, bidder shall make his own arrangements. Electricity for all other facilities if required by the Bidder shall be on chargeable basis as per NSPCL norms.
B	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
C	Duties and deposits including statutory clearances if applicable		Yes	
3.2.2	**Electricity for the office, stores etc of the bidder**			
A	Single point source	Yes		Chargeable. The charges for the actual energy consumed by the Contractor shall be Recovered by bidder based on the prevalent rate of NSPCL + Applicable Taxes / Duties, if any. (Further distribution will be in bidder scoep.)
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 etc**		Yes	
A	Single point source		Yes	
B	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
C	Duties and deposits including statutory clearances if applicable		Yes	
3.3.0	**WATER SUPPLY**			

Sl. No	Description	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.3.1	**For construction purposes:**			
A	Making the water available at single point		**Yes**	Free supply of water will be made available for construction purposes at a single points at site to be decided by NSPCL , Further distribution will be in bidder scope.
B	Further distribution as per the requirement of work including supply of materials and execution		N/A	
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**			
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	
3.4.0	**LIGHTING**			**Note:** The area lightning of BHEL's Material store/ yard / Store Office and premises shall be in the scope of Bidder. BHEL will provide the detail of lighting required at different places.
a.	For construction work (supply of all the necessary materials) At office/storage area.		Yes	
B	For construction work (execution of the lighting work/ arrangements) At office/storage area.		Yes	
C	Providing the necessary consumables like bulbs, switches, etc during the course of project work		Yes	
D	Lighting & Fan for the living purposes of the bidder at the colony / quarters (as applicable)		Yes	

Sl. No	Description	Scope / to be taken care by		*Remarks*
		BHEL	**Bidder**	
3.5.0	**COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER**			
a	Internet, wi-fi, e-mail services etc		Yes	02 Nos of Modem for office/store work
3.6.0	**COMPRESSED AIR wherever required for the work**		Yes	
3.7.0	**Demobilization of all the above facilities**		YES	
3.8.0	**TRANSPORTATION**			
a	For site personnel of the bidder		Yes	
B	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

Note: There are following locations identified for storage purpose: -
(1) Close Sheds – 01 (Around 02 Km form Erection Site)
(2) Open yard/ Sheds – 01 (Around 02 Km from Erection Site)

Bidder shall make his establishment accordingly for material handling and MM services.

LIST OF TOOL & PLANTS TO BE DEPLOYED BY THE CONTRACTOR –

SN	DESCRIPTION OF EQUIPMENTS	CAPACITY (MINIMUM)	MINIMUM QUANTITY	REMARKS
1	New generation Pick & carry type tyre mounted mobile crane.	12/14 MT or above	01	To be deployed before arrival of First Consignment as per instruction of BHEL Engineer.
2	New generation Pick & carry type tyre mounted mobile crane.	20/22 MT or above	01	To be deployed before arrival of First Consignment as per instruction of BHEL Engineer.
3	Tractor trailer	15/20MT	As Required	To be deployed as per instruction of BHEL Engineer.
4	Concrete sleepers	Sizes (6' Ft X 6'' X 6'')	500 Nos	50% before arrival of First Consignment & balance within as & when required
5	Slings, 'd'-shackles, max puller.	01 MT To 20 MT	As Required	To be deployed as per instruction of BHEL Engineer.
6	Slings, 'd'-shackles, max puller, pulley blocks, hydraulic jacks, etc above 10 MT for unloading of HP Heaters.	As Required	As Required	To be deployed as per instruction of BHEL Engineer, WITH TEST REPORTS.
7	Spanner sets ring/d	Up To 56 mm	As Required	To be deployed as per instruction of BHEL Engineer.
8	Tarpaulin (**)	Assorted Size	As required for complete coverage.	Size to be decided at Site in consultation with BHEL Engineer. To be deployed before arrival of First Consignment or as per instruction of BHEL Engineer. As required for Open Shed area (40X50) Mtrs.

NOTE: NO SEPARATE PAYMENT WILL BE MADE FOR SUPPLY OF TARPAULINS, CONCRETE SLEEPERS, FIRE EXTINGUISHERS. CONTRACTOR HAS TO PROVIDE REQUIRED NUMBER OF TARPAULINS, CONCRETE SLEEPERS, FIRE EXTINGUISHERS WITHIN QUOTED RATES.

MEASURING AND MONITORING DEVISES (MMD):

AS PER REQUIREMENT TO BE FINALISED AT SITE, SHALL MEET THE REQUIREMENTS AS PER FIELD QUALITY PLAN AND OTHER ERECTION, TESTING RELATED ACTIVITIES.

SPECIAL NOTE:

2) The age of the contractor deployed cranes up to SN No 1, 2 above should be within 15 years as on date of deployment. Contractor has to provide documentary evidence/ proof for age of the crane at the time of deployment to BHEL Engineer and bidder to also fulfil the NSPCL standard requirement before deployment of cranes.

3) THIS ABOVE LIST IS ONLY INDICATIVE AND NEITHER EXHAUSTIVE NOR LIMITING. CONTRACTOR SHALL DEPLOY ALL NECESSARY T&P (CALIBRATED) TO MEET THE SCHEDULES & AS PRESCRIBED BY BHEL ENGINEER AND REQUIRED FOR COMPLETION OF WORK. QUANTITIES (AS REQUIRED) MAY BE MUTUALLY AGREED UPON AND MINUTES OF MEETING DULY SIGNED FOR DEPLOYMENT.

4) Regular maintenance period of one day per month shall be permitted and Preventive maintenance period of six days per year with each spell not exceeding three days shall be permitted for the T&Ps.

5) Mostly all consignments planned for this project will be within the capacity of cranes or combination of cranes mentioned in above table in contractor's scope.

6) If work gets delayed due to non-availability of Crane, BHEL reserves the right to get the work done at the risk and cost of contractor without prejudice to rights of BHEL as in general conditions of contract. Overheads will be charged on differential amount.

   Case-I: If risk and Cost is invoked

   In addition to risk and cost, BHEL reserves the right to levy penalty at the rate of 50% X daily rate for delay in deployment of T&P calculated as below

   Number of days eligible for penalty = (Date when notice is served to deploy T&P at Risk and Cost of Contractor) – (minus) (Date when T&P was required to be deployed)

   Daily Rate= Monthly hire Charge/30.

   Please Note: It is desired that contract shall maintain their T&P in good condition. However, considering the criticality of work, the notice period for the deployment/repair of Crane shall be 2 (Two) Days.

   Case-II: If risk and Cost is not invoked

   Penalty shall be levied at the rate of 50% X daily rate

   Number of days eligible for Penalty = Actual Deployment Date - (Minus) Date when T&P was required to be deployed

Daily Rate= Monthly hire Charge/30.

7) IN CASE OF NON COMPLIANCE IF ANY AS LISTED BELOW IN SL. NO. 9.1, THE CHARGES AS MENTIONED BELOW SHALL BE DEDUCTED IN THE RUNNING BILLS OF THE RESPECTIVE MONTHS.

9.1. LIST OF NON COMPLIANCE:

- NOT WORKING CONDITION OF THE PARTICULAR CRANE CUMULATIVELY FOR MORE THAN THREE DAYS IN THE CALENDAR MONTH DURING THE PERIOD MENTIONED IN THE DEPLOYMENT PLAN.
- NOT WORKING CONDITION OF THE PARTICULAR CRANE FOR MORE THAN THREE CONSECUTIVE WORKING DAYS IN THE MONTH DURING THE PERIOD MENTIONED IN THE DEPLOYMENT PLAN.

THE DEDUCTION SHALL BE AS GIVEN BELOW:

DEDUCTION FOR THE MONTH = OUTAGE BEYOND THREE DAYS X (MONTHLY CRANE CHARGES/30)

NOTE: I) FOR CALCULATION NO. OF DAYS IN A CALENDAR MONTH IS TAKEN AS 30.

*II) MONTHLY CRANE CHARGES AS DERIVED IN THE "*Table for Weightages/ Factors and BOQ of Chapter XI SCHEDULE OF RATES & QUANTITIES*".*

10. ALL THE T&PS DEPLOYED BY THE BIDDERS SHALL HAVE VALID TEST CERTIFICATES, FITNESS CERTIFICATES, REGISTRATION CERTIFICATE, INSURANCE ETC. THE DOCUMENTARY PROOF SHALL BE SUBMITTED TO BHEL ENGINEER ALONG WITH APPLICABLE VALID CERTIFICATES.

11. CRANE LOG SHEET FOR EACH OF THE CRANE ON DAILY BASIS IS TO BE CERTIFIED BY THE BHEL ENGINEER. CONTRACTOR SHALL SUBMIT THE MONTHLY RUNNING ACCOUNT BILLS ALONG WITH DULY CERTIFIED LOG SHEETS.

12. ANY OR PART OR ALL OF THE T & Ps OF THE CONTRACTOR IDENTIFIED FOR THE TENDERED PACKAGE SHALL NOT BE ENGAGED FOR ANY WORKS OTHER THAN THAT OF THE WORKS INTENDED IN THIS TENDER. HOWEVER, BHEL RESERVES THE RIGHTS TO ENGANGE THOSE T&Ps FOR WHICH SEPARATE MONTHLY RATES ARE BEING PAID AS PER "Table for Weightages/ Factors and BOQ of Chapter XI SCHEDULE OF RATES & QUANTITIES" FOR ITS OWN WORKS OTHER THAN THAT OF THE WORKS INTENDED IN THIS TENDER DURING THE PERIOD OF CONTRACT. IN SUCH CASES FUEL WILL BE PROVIDED BY BHEL. HOWEVER, OPERATOR FOR THE SAME SHALL BE PROVIDED BY CONTRACTOR.

13. DURING THE EXTENDED PERIOD OF CONTRACT, SERVICES OF T&PS SHALL BE PROVIDED BY THE CONTRACTOR AS PER THE INSTRUCTION OF BHEL ENGINEER. THE MONTHLY CHARGES TOWARDS DEPLOYMENT OF THE PARTICULAR CRANE SHALL BE PAID AT THE RATE OF 90 % OF MONTHLY AWARDED RATES FOR A PERIOD BEYOND AFTER COMPLETION OF CONTRACT PERIOD.

14. THE CONCRETE SLEEPERS SHALL BE TAKEN BACK BY THE CONTRACTOR ON AS IT IS BASIS. NO CLAIM ON ACCOUNT OF DAMAGE /LOSS SHALL BE PAYABLE BY BHEL.

15. 50% SLIPPERS SHALL BE MOBILIZED BY THE CONTRACTOR BEFORE ARRIVAL OF FIRST CONSIGNMENT AND BALANCE AS & WHEN REQUIRED. IN CASE OF NON-MOBILIZATION, 20% AMOUNT OF EACH RA BILL (MONTHLY) SHALL BE WITHHOLD TILL MOBILIZATION OF THE SAME.

16. DURATION FOR DEPLOYMENT OF MAJOR T & P FOR WHICH SEPARATE MONTLHY HIRING RATES ARE BEING PAID (Sr. no A2.1 and A2.2) AS PER "**Table for Weightages/ Factors and BOQ of Chapter XI SCHEDULE OF RATES & QUANTITIES**" IS TENTATIVE AND MAY CHANGE AS PER REQUIREMENT.

17. MOBILISATION AND DEMOBILISATION OF ALL T&Ps SHALL STRICTLY BE DONE AS PER THE INSTRUCTIONS FROM BHEL. BHEL ALSO RESERVES THE RIGHT TO DIRECT THE CONTRACTOR TO DIS-CONTINUE/ DE-MOBILISE ANY/ALL OF THESE CRANES WITHIN THE CONTRACT PERIOD/EXTENDED CONTRACT PERIOD WITH 30 DAYS ADVANCE WRITTEN NOTICE WITHOUT ASSIGNING ANY REASON. NO PAYMENT WILL BE MADE FOR THE PERIOD AFTER THE DATE OF DEMOBILIZATION/DISCONTINUANCE NOTIFIED BY BHEL.

18. THE COMMENCEMENT DATE OF DEPLOYMENT PERIOD FOR EACH CRANE MAY BE MUTUALLY AGREED UPON AND DULY SIGNED MINUTES OF MEETING. HOWEVER TOTAL DURATION OF DEPLOYMENT SHALL BE ACCOMMODATED WITHIN ORIGINAL CONTRACT PERIOD.

19. **Fire Extinguishers**

Bidder to provide suitable type of adequate number **(Approx. – 20)** of fire extinguishers at close & open sheds (Under Material Management) in consultation with BHEL Engineer. Details are as follows: -

1. CLASS 'A'

Fires involving ordinary combustible materials like wood, paper, textiles, rubber etc. (Ordinary hazard or low fire load)
WATER Soda acid type, water type (gas pressure) and water type (constant air pressure) IS: 934 -1976; IS: 940 -1976; IS: 6234 -1971
For every 600 square meter floor area or part, one 9-litre capacity. Minimum 4 numbers per floor or room; should not be required to travel more than 15 meter to reach any extinguisher.

2. CLASS 'B'

Fires in flammable liquids like oils, solvents, petroleum, products, varnishes, paints, etc. where blanketing effect is essential (Storage and handling in small quantities)
FOAM / CARBON DIOXIDE / DRY CHEMICAL POWDER IS: 933 -1976; IS: 2878 1976; IS: 2171 1976; IS: 4308 -1982
For every 50 square meter floor area or part, 2 numbers 9 -liters foam or 5 kg dry powder; should not be required to travel more than 10 m in the area of storage to reach any extinguisher.

3. CLASS 'C'

Fires involving gaseous substances under pressure where it is necessary to dilute the burning gas at a very fast rate with an inert gas or powder (storage and handling of gas cylinders)
CARBON DIOXIDE / DRY CHEM. POWDER. The best way to extinguish such fire is by stopping the flow of fuel gas to the fire. Container is kept cool with water spray. IS: 2878 1976; IS: 2171 -1976; IS: 4308 -1982
For every 100 square meter floor area or part; 2 numbers, 10 kg powder extinguisher or 6 kg C02; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher.

4. CLASS 'D'

Fires involving metals like magnesium, aluminum, zinc, potassium etc. where the burning metal is reactive to water and which require special extinguishing media or technique
SPECIAL DAY POWDER IS: 2171 -1976 IS: 4861 -1968

For every 50 square meter floor area or part, 2 nos. 5 kg special dry powder; minimum 3 nos. per room; should not be required to travel more than 10 meter to reach any extinguisher.

5. MIXED OCCUPANCY

Fires involving (electrical fire); Generators; Transformers; etc.
CARBON DIOXIDE DRY POWDER, IS: 2878 1976; IS: 2171 -1976
For every 100 square meter floor area or part one 10 kg C02. Minimum 2 numbers for every location should not be required to travel more than 10 meter to reach an extinguisher.

Note:

a. All Open / closed stores shall be equipped with appropriate Fire Extinguisher (Approx. – 20 Nos)
b. Appropriate Fire Extinguishers shall be made within easy reach.
c. Fire extinguishers shall be regularly tested and last checked date to be indicated on each. Master list shall be prepared with location and details.
d. Providing appropriate fire-fighting equipment at designated work place.
e. Subcontractor shall provide enough fire protecting equipment of the types and numbers at his office, stores, temporary structure in labour colony etc. Such fire protection equipment shall be easy and kept open at all times.
f. The fire extinguishers shall be properly refilled and kept ready which should be certified at periodic intervals. The date of changing should be marked on the Cylinders.
g. All other fire safety measures as laid down in the “Codes for fire safety at construction / store site” issued by safety coordinator of BHEL shall be followed.
h. Emergency contacts nos. must be displayed at prominent locations.

i. All safety norms and regulations of NSPCL shall be strictly complied with by the Bidder.

PART (A): MATERIAL MANAGEMENT OF STORES

A.1 INITIAL MOBILIZATION

AFTER RECEIPT OF FAX/MAIL LOI, CONTRACTOR SHALL DISCUSS WITH PROJECT MANAGER / CONSTRUCTION MANAGER REGARDING INITIAL MOBILISATION. CONTRACTOR SHALL MOBILIZE NECESSARY RESOURCES **WITHIN 07 DAYS.**

A.2 CONTRACT PERIOD

THE CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK UNDER SCOPE SHALL BE **17 MONTHS (TWENTY MONTHS)** FROM THE "START OF CONTRACT PERIOD".

PART (B): REDEVELOPMENT WORK OF OPEN YARDS

B.1 INITIAL MOBILIZATION

AFTER RECEIPT OF FAX/MAIL LOI, CONTRACTOR SHALL DISCUSS WITH PROJECT MANAGER / CONSTRUCTION MANAGER REGARDING INITIAL MOBILISATION. CONTRACTOR SHALL MOBILIZE NECESSARY RESOURCES **WITHIN 07 DAYS.**

B.2 COMPLETION PERIOD

THE COMPLETION PERIOD FOR REDEVELOPMENT WORK OF OPEN YARD UNDER SCOPE SHALL BE 20 DAYS FROM THE DATE OF START OF WORK TO COMPLETION OF REDOVELOPMENT WORK.

NOTE :

1. ALL THE ABOVE WORKS (A & B) SHALL BE CARRIED OUT BY VENDOR. THUS THE TOTAL CONTRACT PERIOD SHALL BE 17 MONTHS FROM THE DATE OF START OF REDEVELOPMENT WORK OF OPEN YARDS.
2. VENDOR HAS TO MOBILIZE THE SITE WITHIN 03 DAYS AFTER RECEIPT OF FAX/MAIL LOI / LOA, FOR REDEVELOPMENT WORK OF OPEN YARDS.

(A) Material Handling & Material Management Received by Road

(A).1. MAJORITY OF CONSIGNMENTS SHALL REACH SITE DIRECTLY FOR DELIVERY THROUGH ROAD. HOWEVER, A GOOD NUMBER OF CONSIGNMENTS SHALL BE BOOKED ON GODOWN DELIVERY BASIS OR DOOR DELIVERY AGAINST CONSIGNEE COPY BASIS, THE PROCEDURE OF MATERIAL COLLECTION SHALL BE ADOPTED AS DETAILED IN RELAVENT CHAPTER

(A).2. IT WILL BE RESPONSIBILITY OF THE CONTRACTOR TO KEEP IN TOUCH WITH OFFICIALS OF BHEL REGARDING ADVANCE INFORMATION ABOUT ARRIVAL OF CONSIGNMENTS. THE CONTRACTOR SHALL COLLECT LORRY WAY BILLS OR OTHER SUCH DESPATCH DOCUMENTS.

(A).3. THE CONTRACTOR SHALL REMAIN IN REGULAR CONTACT WITH THE CONCERNED TRANSPORTERS OR BASED ON THE DESPATCH DETAILS OBTAINED AS STATED ABOVE AND MAKE ALL NECESSARY ARRANGEMENTS FOR COLLECTION / RECEIPT OF THE CONSIGNMENT AS APPLICABLE. CONTRACTOR SHALL TAKE ADVANCE ACTION TO DEPLOY ALL NECESSARY RESOURCES FOR LOCAL TRANSPORTATION, HANDLING AND UNLOADING OF THE ANTICIPATED CONSIGNMENTS SO AS TO ENSURE NO LOSS OF TIME UPON ARRIVAL OF THE CONSIGNMENTS.

(A).4. PAYMENT OF DEMURRAGE/ WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE THE RESPONSIBILITY OF CONTRACTOR AND TO HIS ACCOUNT. IF BHEL HAS TO MAKE PAYMENT OF SUCH DEMURRAGE/ WHARFAGE TOGETHER WITH FREIGHT (PAYMENT OF FREIGHT ALONE IS IN BHEL SCOPE), THE AMOUNTS SO PAID AS DEMURRAGE/WHARFAGE FOR THE REASONS STATED ABOVE SHALL BE PAID TO BHEL BY THE CONTRACTOR FORTHWITH OR SHALL BE RECOVERED FROM THE BILL PAYMENTS DUE TO THE CONTRACTOR.

(A).5. IT WOULD BE RESPONSIBILITY OF THE CONTRACTOR TO EXAMINE THE PACKAGES, CONSIGNMENTS ETC. IMMEDIATELY ON ARRIVAL AND BRING TO THE NOTICE OF BHEL AUTHORITIES REGARDING LOSS/DAMAGE/SHORTAGE/DISCREPANCY, IF ANY, OBSERVED IN THE CONSIGNMENTS BEFORE TAKING DELIVERY OF THE SAME.

(A).6. ANY DISCREPANCY/SHORTAGE/DAMAGE FOUND IN THE CONSIGNMENT AFTER TAKING CLEAN DELIVERY FROM THE CARRIERS SHALL BE THE RESPONSIBILITY OF CONTRACTOR AND THE RESULTANT LOSS TO BHEL ON SUCH ACCOUNT SHALL BE RECOVERABLE FROM THE CONTRACTOR.

(A).7. CONSIGNMENTS ARE EXPECTED TO ARRIVE DURING ANY TIME OF THE DAY, AND COUNT DOWN FOR DETENTION/DEMMURAGE/WHARFAGE CHARGES IS LIABLE TO START IMMEDIATELY. UNLOADING OF SUCH CONSIGNMENTS MAY BE NECESSITATED EVEN IN THE NIGHT OR ROUND THE CLOCK. CONTRACTOR SHALL ARRANGE TO DEPLOY HIS RESOURCES IMMEDIATELY AND CONTINUE ROUND THE CLOCK ON SUCH OCCASIONS WITHOUT ANY ADDITIONAL COST TO BHEL. CONTRACTOR SHALL ARRANGE ALL NECESSARY RESOURCES INCLUDING SPOT LIGHTING FOR WORKING AT NIGHT. THE CONTRACTOR SHALL SIMILARLY UNLOAD CONSIGNMENTS ARRIVING ON WEEKLY OFF DAYS AND HOLIDAYS.

(A).8. UNLOADING AT STORAGE AREA/WORK SITE, STACKING AND RESTACKING IF NECESSITY ARISES, OF ALL MATERIALS INCLUDING HEAVY/SOPHISTICATED EQUIPMENTS ETC. SHALL BE DONE AS PER STORAGE AND PRESERVATION MANUAL OF RELEVANT EQUIPMENT/COMPONENTS OF BHEL AND/OR AS PER DIRECTIONS OF BHEL ENGINEER.

(A).9. THE CONTRACTOR SHALL VERIFY THE CONSIGNMENTS IN DETAIL WITHIN 12 DAYS OF RECEIPT AND REPORT THE DISCREPANCIES IN PRESCRIBED FORMATS NOT LATER THAN 14TH DAY. ANY LOSS ON ACCOUNT OF DELAYED REPORTING SHALL BE RECOVERABLE FROM CONTRACTORS BILL/ANY

PAYMENT DUE. CONTRACTOR SHALL ARRANGE ALL FACILITIES TO OPEN PACKAGES - WHERE REQUIRED IN THE PRESENCE OF BHEL ENGINEER, VERIFY THE CONTENTS, REPACK WHEREVER AND WHENEVER CALLED FOR AND PROPERLY STACK THEM AS PER STORAGE MANUAL OR/AND AS MAY BE DIRECTED BY BHEL.

(A).10. THE MATERIAL SHALL BE SO STACKED THAT IT SHOULD FACILITATE EASY IDENTIFICATION, RETRIEVAL AND HANDLING FOR ISSUE AS AND WHEN NEED ARISES.

(A).11. PRE-DEFINED IDENTIFICATION SYSTEM OF THE LOCATIONS OF OPEN STORAGE YARD, SEMI-CLOSED SHED, COVERED STORES AS WELL AS STORAGE RACKS HAS TO BE DESIGNED BY THE CONTRACTOR WITH THE APPROVAL OF BHEL. CONTRACTOR SHALL PUT UP PROMINENT IDENTIFICATION BOARDS OF SEGMENTAL LOCATIONS (FOR OPEN AND CLOSED STORES) OR INSCRIPTION (ON THE STORAGE RACKS) WITH CLEAR VISIBILITY FROM A DISTANCE. CONTRACTOR SHALL ALSO ARRANGE TO DISPLAY PLOT PLAN AT REGULAR INTERVALS IN THE COVERED/SEMI-CLOSED/OPEN STORAGE. THE CONTRACTOR SHALL ARRANGE PROPER DISPLAYS/SIGNS FOR VARIOUS REQUIREMENTS AS PER INSTRUCTIONS OF BHEL.

(A).12. THE DISPLAY BOARDS SHALL BE MADE WITH STRUCTURAL STEEL & M.S. PLATES AND SHALL BE PAINTED WITH SYNTHETIC ENAMEL PAINT. CONTRACTOR SHALL HAVE TO PERIODICALLY REPEAT SUCH EXERCISE AS THE ORIGINAL DISPLAYS MAY GET LOST / DAMAGED / DETERIORATE WITH TIME. ALL MATERIALS AND CONSUMABLES FOR THIS PURPOSE SHALL BE ARRANGED BY THE CONTRACTOR. CONTRACTOR SHALL HAVE TO MAKE HIS OWN ARRANGEMENTS INCLUDING SUPPLY OF MATERIALS FOR DISPLAYING THE PROPER IDENTIFICATION TAGS, BOARDS, MARKING, INSCRIPTION ETC. AS SCOPE OF WORK.

(A).13. THE CONTRACTOR SHALL EXECUTE THE WORK IN A PROFESSIONAL MANNER. THE STORES SHALL BE HANDLED WITH DUE CARE AND DILIGENCE. THE CONTRACTOR AT HIS RISK AND COST SHALL MAKE GOOD ANY LOSS TO BHEL DUE TO CONTRACTOR'S LAPSE.

(A).14. FOR ALL CONSIGNMENTS, OBSERVATIONS REGARDING LOSS/DAMAGE/SHORTAGE/ DISCREPANCY IS TO BE RECORDED IN APPROPRIATE DOCUMENT AND INFORMED TO BHEL. IN CASE IT BECOMES NECESSARY TO TAKE 'OPEN DELIVERY' FROM THE AUTHORITIES, CONTRACTOR SHALL MAKE ALL ARRANGEMENTS FOR TAKING OPEN DELIVERIES. ALL EXPENSES CONNECTED THEREWITH SHALL BE TO THE ACCOUNT OF CONTRACTOR. ANY LOSS THAT ACCRUES TO BHEL ON ACCOUNT OF SUCH FAILURES SHALL BE DEBITED TO THE CONTRACTOR AND RECOVERY EFFECTED FROM HIS RUNNING BILLS.

(A).15 HANDLING HEAVIER CONSIGNMENTS:

(A).15.1
CONTRACTOR SHALL SUBMIT PROCEDURE WITH SKETCHES OF HANDLING OF ALL HEAVY COMPONENTS TO BHEL WELL IN ADVANCE AND OBTAIN PRIOR APPROVAL BEFORE UNLOADING AND STACKING.

(A).16 SINCE THIS CONTRACT IS INTENDED TO BE A COMPLETE PACKAGE FROM MATERIAL RECEIPT THROUGH ISSUE/TRANSACTIONS RIGHT UPTO MATERIAL RECONCILIATION, FULL RESPONSIBILITY W.R.T THE PROPER UPKEEP OF FACILITIES E.G. COMPUTERS, STATIONARY ITEMS; ENSURING BEFITTING DISCIPLINE AMONG THE STORE ASSISTANTS/STAFF UNDER ITS CONTROL AND ACCOUNTING OF MATERIALS ON STOCK SHALL REST WITH THE CONTRACTOR AT ALL TIMES.

IN THE REMOTE POSSIBILITY OF ANY UNTRACEABLE MATERIAL, CUSTOMARILY BHEL HAS TO PROCESS THE INSURANCE CLAIM. TO KICK OFF SUCH CLAIM, THE CONTRACTOR SHALL RENDER ALL NECESSARY ASSISTANCE INCLUDING AUGMENTATION OF DOCUMENTS (FIR ETC) WITHIN THE QUOTED PRICE AS MAY BE REQUIRED FOR REALIZATION OF THE INSURANCE CLAIM.

(A).17 THE CONTRACTOR UNDER THIS CONTRACT SHALL COMPLETE INDUCTION OF FOLLOWING CATEGORIES OF RESOURCES WITHIN THE QUOTED ITEM RATES, TO ENSURE ESTABLISHMENT OF PROPER MATERIALS MANAGEMENT AT THE PROJECT SITE.

COMPUTERS AND PRINTERS WITH LATEST UP-GRADATION, MEMORY AND COMPATIBLE WITH BHEL COMPUTERS/LAN EQUIPMENT TO BE INSTALLED/USED WITHIN BHEL SITE OFFICE – COMPUTER - 01 SETS AND PRINTER (CUM SCANNER & PHOTOCOPY M/C) – 01 SETS. COMPUTERS AND PRINTERS ARE ENVISAGED FOR VARIOUS MATERIAL MANAGEMENT ACTIVITIES SUCH AS RECORD KEEPING/DATA ENTRY DONE BY BIDDER'S STAFF.

FOR THE CONSIGNMENTS RECEIVED BY ROAD THE PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE ACCEPTED UNIT RATES AS PER SL NO A.1.1 OF "Table for Weightages/ Factors and BOQ of Chapter X SCHEDULE OF RATES & QUANTITIES". THE ABOVE ALSO INCLUDES ALL COSTS TOWARDS UNLOADING FROM THE TRUCK / TRAILER AT THE UNLOADING SIDING IN THE PLANT AND LOADING ON THE TRANSPROT AND THE COST TOWARDS INTERNAL TRANSPORTATION TO STORAGE YARD/ STORES SHED OF BHEL/ CLIENT.

(A).18 RESPONSIBILITIES OF THE CONTRACTOR -

(1) RECEIPT & ISSUE

SCOPE INCLUDES EXECUTION OF VARIOUS ACTIVITIES AS FOLLOWS:

(I) RECEIPT, UNLOADING, CARRYING OUT RECEIPT INSPECTION, DETAILED VERIFICATION, STACKING AND REGULAR STOCK VERIFICATION OF PROJECT MATERIALS AT SITE.

(II) PREPARING VARIOUS REPORTS AT APPROPRIATE STAGES AND REPORTING DAMAGE/LOSS DURING RECEIPT AS WELL AS STORAGE AND ANY OTHER ASSOCIATED RESPONSIBILITY AS ASSIGNED BY BHEL FROM TIME TO TIME. RESPONSIBILITY SHALL INCLUDE THE FOLLOWING ACTIVITIES:
a. EXAMINATION OF INCOMING CONSIGNMENTS TO DETECT ANY LOSS OR SHORTAGE OR OUTWARD DAMAGE AND RECORDING IT ON THE LR/LWB BEFORE MAKING ACKNOWLEDGEMENT OF IT'S RECEIPT FROM THE TRANSPORTER AND SIMULTANEOUSLY OBTAINING ENDORSEMENT OF THE VEHICLE DRIVER ON THE SAME.
b. REPORTING SUCH DISCREPANCY TO BHEL IMMEDIATELY ON RECEIPT OF CONSIGNMENT.
c. ASSISTING BHEL IN LODGING INSURANCE CLAIMS IN RESPECT OF LOSS/DAMAGE AS STATED ABOVE.

(III) ISSUE OF MATERIALS TO BHEL'S ERECTION CONTRACTORS, PRESERVATION OF STACKED MATERIALS, RE-STACKING/RE-HANDLING AS NECESSARY, PROGRESSIVE AND FINAL RECONCILIATION WITH BHEL'S ERECTION AGENCIES AND PREPARATION OF NECESSARY DOCUMENT/ RECORD IN RESPECT OF THESE ACTIVITIES.

(IV) RETURN OF EXCESS/DEFECTIVE MATERIALS BY VARIOUS ERECTION CONTRACTORS OF BHEL.

(V) LOADING AND DISPATCH OF OUTGOING MATERIALS.

EXPECTED MINIMUM QUALITY OF SERVICE

CONTRACTOR SHALL RENDER THE SERVICES BY ENSURING DEPLOYMENT OF REQUISITE PERSONNEL WITH ADEQUATE EDUCATIONAL QUALIFICATION HAVING THOROUGH EXPERIENCE IN RELATED FIELD TO ENABLE UNDERSTANDING THE INTRICACIES OF AND SPECIAL REQUIREMENTS INVOLVED IN HANDLING OF PROJECT MATERIALS, INCONSISTENCIES AND UNCERTAINTIES ASSOCIATED WITH IN/OUT FLOW OF MATERIALS, PROJECT ACTIVITIES AT ODD HOURS & HOLIDAYS AND IRREGULAR WORKING HOURS. CONTRACTOR SHALL ENSURE PROMPT AND TIMELY AVAILABILITY OF SUCH SERVICES.

(2) PRESERVATION OF COMPONENTS -

CONTRACTOR SHALL ARRANGE FOR PRESERVATION OF COMPONENTS AS PER BHEL'S STORAGE AND PRESERVATION MANUAL AND/OR AS PER INSTRUCTIONS OF BHEL ENGINEERS.

ONE OR MORE OF FOLLOWING METHODS SHALL BE ADOPTED FOR PRESERVATION.

COATING WITH PRESERVATIVE PAINTS/LUBRICANT/INHIBITORS

CAPPING/WRAPPING/COVERING

FILLING/IMMERSION IN OIL/CHEMICALS ETC

PERIODIC CHECKS/MAINTAINING REQUIRED NITROGEN PRESSURE IN TANKS OF TRANSFORMERS; BHEL WILL PROVIDE THE NITROGEN GAS FOR THE SAME. HOWEVER CONTRACTOR SHALL HANDLE THE CYLINDERS AT STORES, TRANSPORT TO POINT OF USE, FIT-UP REFILLS AND RETURN EMPTY CYLINDERS TO BHEL STORES.

HT MOTORS

FOR PRESERVATION OF HT MOTORS, SPACE HEATERS HAVE TO BE KEPT ENERGIZED TO AVOID INGRESS OF MOISTURE. INSULATION RESISTANCE HAS TO BE MEASURED AND RECORDED AT SPECIFIED INTERVALS TILL THESE ARE ISSUED FOR ERECTION. BHEL WILL PROVIDE NECESSARY CABLES, SWITCHES ETC. FOR THIS, HOWEVER CONTRACTOR SHALL INSTALL, OPERATE AND MAINTAIN THE SAME.

BHEL WILL PROVIDE FREE OF COST PRESERVATIVES LIKE PRESERVATIVE OIL, LUBRICANTS, CHEMICALS, INHIBITORS, CAPS ETC EXCEPT PRIMERS & PAINTS. CONTRACTOR SHALL PROVIDE RED OXIDE ZINC CHROMATE (ROZC) PRIMER CONFORMING TO IS: 2074 OF REPUTED MANUFACTURES (E.G. ASIAN PAINTS, BERGER, JENSON & NICHOLSON, BOMBAY PAINTS, SHALIMAR OR ANY OTHER BHEL APPROVED MANUFACTURER) REQUIRED FOR PRESERVATION SHALL BE PROVIDED BY THE CONTRACTOR AND USED FOR THIS PURPOSE.

IN THE PROCESS THE IDENTIFICATION MARKS, COMPONENT/MATERIAL CODES, MATCH MARKS MAY HAVE TO BE REPAINTED. THIS WORK AFTER PRESERVATION COMPONENTS ARE TO BE STACKED PROPERLY, PERIODICAL REPORTS ON THE PRESERVATION CARRIED OUT SHOULD BE SUBMITTED TO BHEL IN THE PRESCRIBED FORMATS.

(3) RECORD KEEPING –

CONTRACTOR SHALL PREPARE, MAINTAIN AND UPDATE VARIOUS MM RECORDS, ASSOCIATED WITH MATERIALS MANAGEMENT OPERATION OF BHEL AT PROJECT SITE. TWO SYSTEMS OF RECORD KEEPING/CAPTURING INFORMATION & DATA AT VARIOUS STAGES ARE IN VOGUE VIZ.

MANUAL LEDGERS & RECORDS.
COMPUTERIZED DATABASE APPLICATION: BHEL HAS DEVELOPED A SOFTWARE APPLICATION NAMED E-STORE (OR ANY NEW) THAT CAPTURES ALL THE DATA IN THE ENTIRE CHAIN OF TRANSACTIONS STARTING WITH MASTER LIST OF PROJECT MATERIALS, RECORDS OF DISPATCH, RECEIPT, INSPECTION, ISSUE, RETURN, CONSUMPTION ETC.

SOME OF THESE RECORDS ARE MASTER SHIPPING/PACKING LIST, LR/RR REGISTER, DAYBOOK REGISTER, STOCK REGISTER, RECORDS OF ISSUES TO & RETURN OF MATERIALS IN RESPECT OF VARIOUS ERECTION SUBCONTRACTORS, INSURANCE CLAIM RECORDS, PERIODICAL STATUS REPORTS IN VARIOUS FORMATS COVERING DESIRED ASPECTS AND OUTPUT INFORMATION AS PER BHEL/CLIENT'S REQUIREMENT.

CONTRACTOR WILL PROVIDE NECESSARY HARDWARE, SOFTWARE & STATIONARY ETC. AND SHALL TAKE UTMOST CARE TO ENSURE THAT THESE PROPERTIES AND RECORDS ARE PROTECTED FROM ANY DAMAGE OR LOSS. BHEL WILL RECOVER THE COST OF SUCH PROPERTY / EXPENSES OF RESTORATION FROM THE CONTRACTOR WITH OVERHEAD CHARGES IN CASE OF ANY LOSS/DAMAGE ATTRIBUTABLE TO NEGLIGENCE/FAILURE ON CONTRACTOR'S PART.

SL NO	ACTIVITY/DESCRIPTION	MINIMUM NO. OF PERSONS	REMARKS
1	MATERIAL RECEIPT/UNLOADING, COLLECTION/BOOKINGS/PRESERVATION	4 nos. *	To be deployed as per instruction of BHEL Engineer
2	DETAILED VERIFICATION		
3	MATERIAL ISSUE		
4	RECORD KEEPING		

(* Further as required for execution of work. Area/Activity wise manpower deployment shall be finalized jointly with BHEL engineer in-charge)

NOTE: THE CONTRACTOR SHALL DEPLOY SKILLED PEOPLE (PREFERABLY DIPLOMA HOLDERS) FOR CARRYING OUT FUNCTIONS/OPERATIONS STATED ABOVE. NO. OF PERSONS INDICATED ABOVE IS TENTATIVE AND ACTUAL DEPLOYMENT MAY VARY BASED ON WORK LOAD AND SITE REQUIREMENT. THE MANPOWER REQUIREMENT SHALL BE FINALISED IN THE BEGINNING OF THE CONTRACT PERIOD WITH ENGINEER INCHARGE. THIS DOES NOT ABSOLVE THE CONTRACTOR FROM HIS RESPONSIBILITY TOWARDS THE SATISFACTORY EXECUTION OF THE JOB.

IN CASE THE CONTRACTOR DOES NOT DEPLOY OR DELAYS DEPLOYMENT OF ABOVE SAID MANPOWER WITH REFERENCE TO SPECIFIC INSTRUCTIONS FROM BHEL, BHEL WILL RECOVER NON-REFUNDABLE PENALTY PER MAN- DAY @ Rs 500/-

(B) Material Handling & Material Management Received by Rail

(B).1 ALL THE CONSIGNMENTS REACHING THE PROJECT SITE BY RAIL SHALL BE UNLOADED AT THE RAILWAY SIDING, FOLLOWED BY LOADING ON TRUCK/TRAILER, LOCAL TRANSPORTATION FROM RAILWAY SIDING TO THE STORAGE YARD/STORES, UNLOADING, VERIFICATION AND STACKING AND PRESERVATION AS APPLICABLE TO THE CONSIGNMENTS ARRIVING BY ROAD. THE APPROXIMATE DISTANCE FORM MAIN STORAGE YARD TO RAILWAY SIDING WILL BE 4-5 KM.
6(B).2 IT WILL BE RESPONSIBILITY OF THE CONTRACTOR TO KEEP IN TOUCH WITH OFFICIALS OF BHEL AND RAILWAYS REGARDING ADVANCE INFORMATION ABOUT ARRIVAL OF CONSIGNMENTS. THE CONTRACTOR SHALL COLLECT RAILWAY RECEIPTS OR OTHER SUCH DESPATCH DOCUMENTS.

(B).3 CONTRACTOR SHALL DEPLOY HIS CRANE, TRAILERS/TRUCKS AND ALL OTHER T & P INCLUDING ADDITIONAL T & P AND MANPOWER ETC FOR HANDLING OF MATERIALS AT SUCH UNLOADING BAY/ LOCATION AND TRANSPORT TO STORES/ STORAGE YARD.

(B).4 CONTRACTOR SHALL IN HIS OWN INTEREST ARRANGE TO RELEASE THE RAILWAY WAGONS/RACKS WITH UTMOST ALACRITY TO AVOID ANY DEMURRAGE CHARGES. DEMURRAGE/ WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE RECOVERED FROM THE BILL PAYMENT DUE TO THE CONTRACTOR.

(B).5 CONTRACTOR SHALL PROVIDE AREA LIGHTING AT RAILWAY SIDING FOR HANDLING OF MATERIALS DURING EVENING/ NIGHT.

(B).6 ALL THE RESPONSIBILITIES SPECIFIED IN THE CONTRACTOR'S SCOPE FOR THE MATERIALS RECEIVED BY ROAD SHALL ALSO BE APPLICABLE MUTATIS-MUTANDIS FOR ALL THE CONSIGNMENTS RECEIVED BY RAIL AT RAILWAY SIDING.

(B).7 FOR THE CONSIGNMENTS RECEIVED BY RAIL THE PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE ACCEPTED UNIT RATES AS PER SL NO A.1.2 OF "Table for Weightages/ Factors and BOQ of Chapter X SCHEDULE OF RATES & QUANTITIES". THE ABOVE ALSO INCLUDES ALL COSTS TOWARDS UNLOADING FROM THE WAGON AT THE UNLOADING SIDING IN THE PLANT AND LOADING ON THE TRANSPROT AND THE COST TOWARDS INTERNAL TRANSPORTATION TO STORAGE YARD/ STORES SHED OF BHEL/ CLIENT.

(B).8 QUANTUM OF WORK: 100 MTS (APPORX.).

(B).9 ADEQUATE NUMBER OF VEHICLES / HANDLING EQUIPMENT: IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DEPLOY ADEQUATE NUMBER OF 40 FEET TRAILERS ALONG WITH SUITABLE NUMBER OF CREW MEMBERS TO CATER TO THE TONNAGE RECEIVED. FOR THIS PURPOSE, THE CONTRACTOR HAS TO WORK CONTINUOUSLY AFTER RECEIPT OF WAGONS AT THE SIDING WITHOUT ANY BREAK, SO AS TO COMPLETE THE WORK WITHIN THE FREE TIME ALLOWED BY RAILWAY WITHOUT DEMURRAGE AND WHARFAGE. THE CONTRACTOR HAS TO DEPLOY ADEQUATE NUMBER OF CRANES AND TRAILERS. ANY DEMURRAGE AND WHARFAGE LEVIED BY RAILWAYS WILL BE TO CONTRACTOR'S ACCOUNT.

(B).10 VOID

(B).11 PRIOR NOTICE TIME: SHIPPING DEPT OF BHEL UNITS WILL INTIMATE THE CONTRACTOR WELL IN ADVANCE (ATLEAST4 DAYS IN ADVANCE) REGARDING THE ARRIVAL OF CONSIGNMENT AT THE RAILWAY SIDING TO ENABLE THE CONTRACTOR FOR MOBILIZING THE CRANES & VEHICLES AND WORKING CREW. IT IS SUGGESTED THAT THE CONTRACTOR HAS TO TRACE THE ACTUAL LOCATION OF RAKE THROUGH ONLINE SERVICES TO AVOID LAST MINUTE RUSH.

(B).12 RAILWAY RECEIPT AND PREPARATION LR/GC WHILE INTERCARTING

(B).12.1 BHEL PERSONNEL WILL BE DEPUTED TO WITNESS/ASSIST FOR THE RECEIPT OF MATERIALS REFERRED IN RR AND MAKING APPROPRIATE DISPATCH DOCUMENTS LIKE LR / GC NOTE OF THE CONTRACTORS TO ACCOMPANY CONSIGNMENTS UPTO NSPCL STORAGE YARD. THE DOCUMENT PRESCRIBED BY BHEL HAS TO BE MAINTAINED BY THE CONTRACTOR FOR VERIFICATION AT ANY POINT OF TIME FOR RECEIPT, STORAGE AND INTER-CARTED CONSIGNMENTS.

(B).12.2 AT ANY COST, THE CONTRACTOR WILL NOT BE ALLOWED TO UNLOAD THE MATERIAL AT SITE AT THEIR OWN. DUE TO ANY REASON, IF BHEL SITE UNLOADING CONTRACTOR IS NOT ABLE TO UNLOAD THE MATERIAL, THE INTERCARTING CONTRACTOR CAN UNLOAD AND GET CERTIFIED FROM BHEL SITE OFFICIALS AND PAYMENT WILL BE MADE AS PER SITE UNLOADING RATE.

(C) Material Handling & Material Management Received at Trasporter Godown

(C).1 INCOMING MATERIALS (SMALLS ETC)

(C).1.1 EVEN THOUGH MAJORITY OF CONSIGNMENTS SHALL REACH SITE DIRECTLY FOR DELIVERY. A GOOD NUMBER OF CONSIGNMENTS SHALL BE BOOKED ON GOWDOWNS DELIVERY/ DOOR DELIVERY BASIS AGAINST ORIGINAL CONSIGNEE COPY BASIS, THE PROCEDURE OF MATERIAL COLLECTION SHALL BE ADOPTED AS DETAILED HERE BELOW:

(C).1.2 CONTRACTOR SHALL KEEP IN TOUCH WITH OFFICIALS OF BHEL REGARDING ADVANCE INFORMATION ABOUT ARRIVAL OF CONSIGNMENTS. THE CONTRACTOR SHALL COLLECT ORIGINAL LRs/RRs/LORRY WAY BILLS OR OTHER SUCH DISPATCH DOCUMENTS

(C).1.3 THE CONTRACTOR SHALL REMAIN IN REGULAR CONTACT WITH THE CONCERNED TRANSPORTERS OR RAILWAYS BASED ON THE DISPATCH DOCUMENTS OBTAINED AS STATED ABOVE AND MAKE ALL NECESSARY ARRANGEMENTS FOR COLLECTION / RECEIPT OF THE CONSIGNMENT AS APPLICABLE. CONTRACTOR SHALL TAKE ADVANCE ACTION TO DEPLOY ALL NECESSARY RESOURCES FOR LOCAL TRANSPORTATION, HANDLING AND UNLOADING OF THE ANTICIPATED CONSIGNMENTS SO AS TO ENSURE NO LOSS OF TIME UPON ARRIVAL OF THE CONSIGNMENTS. LOADING AT TRANSPORTERS GODOWN, LOCAL TRANSPORT UP TO BHEL/ CLIENT'S STORES/ SITE AND UNLOADING AT STORES/STORAGE YARD/SITE, VERIFICATION AND STACKING SHALL ALSO BE IN THE SCOPE OF CONTRACT.

(C).1.4 DETENTION CHARGES/ DEMURRAGE/ WHARFAGE ETC., WHICH RESULT DUE TO CONTRACTOR'S FAULT, SHALL BE RECOVERED FROM THE BILL PAYMENT DUE TO THE CONTRACTOR.

(C).1.5 PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE ACCEPTED UNIT RATE AS PER SL NO A1.3 "Table for Weightages/ Factors and BOQ of Chapter X SCHEDULE OF RATES & QUANTITIES". NO OTHER PAYMENT SUCH AS MINIMUM CHARGES FOR CARRIER ETC WILL BE MADE. ALL ARRANGEMENTS INCLUDING TRANSPORT, LABOUR AND OTHER T&P ETC IS IN CONTRACTOR'S SCOPE. THESE GODOWNS ARE EXPECTED TO BE LOCATED WITHIN A RADIUS OF 50 KM APPROX FROM THE PROJECT SITE.

6(C).1.6 ALL THE RESPONSIBILITIES SPECIFIED IN THE CONTRACTOR'S SCOPE FOR THE MATERIALS RECEIVED BY ROAD SHALL ALSO BE APPLICABLE MUTATIS-MUTANDIS FOR ALL THE CONSIGNMENTS (INCOMING SMALLS) RECEIVED FROM TRANSPORTERS GODOWN/S.

(D) RE-SHIFTING AND RE-STACKING

(D).1 RE-SHIFTING AND RE-STACKING

OWING TO SEVERAL PROJECT REQUIREMENTS, MANY COMPONENETS MAY HAVE TO BE SHIFTED FROM ORIGINALLY STACKED LOCATIONS TO ELSEWHERE WITHIN THE PROJECT PREMISES FOR THE LEAD DISTANCE NOT EXCEEDING 2.5 KMS. THIS MAY INVOLVE LOADING OF SUCH MATERIAL ONTO A VEHICLE MOVING TO A NEW LOCATION AND UNLOADING/STACKING INCLUDING PROPER INSCRIPTION OF IDENTIFICATION MARKS IF NEEDED. LIST OF ITEMS DULY CERTIFIED BY BHEL OFFICIAL, SHIFTED, UPDATED STOCK RECORDS ABOUT CHANGE IN LOCATION ETC SHALL BE PREPARED/SUBMITTED ALONG WITH THE MONTHLY BILLS.

SEPARATE ITEM RATE IS THERE FOR RESHIFTING AND RE-STACKING OF STACKED MATERIALS AND THE PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE ACCEPTED UNIT RATE AS PER SL NO A1.4 of “Table for Weightages/ Factors and BOQ of Chapter X SCHEDULE OF RATES & QUANTITIES”

(D).2 RE-STACKING/RE-ARRANGING

OVER A PERIOD OF TIME, RESTACKING/REARRANGING OF THE MATERIALS STACKED EARLIER MAY ARISES DUE TO VARIOUS REASONS. THE HANDLING OF SUCH ITEMS WILL ALSO BE IN THE SCOPE OF THIS CONTRACT. THE RESTACKING/ RE-HANDLING MAY BE NECESSITATED FOR ANY EQUIPMENT/ MATERIALS COVERED WITHIN THIS WORK SPECIFICATION. CONTRACTOR SHALL DEPLOY NECESSARY RESOURCES LIKE MANPOWER, T&P, EQUIPMENTS ETC TO CARRY OUT THIS EXERCISE INCLUDING PROPER INSCRIPTION OF IDENTIFICATION MARKS IF NEEDED. LIST OF ITEMS DULY CERTIFIED BY BHEL OFFICIAL, RESTACKED, UPDATED STOCK RECORDS ABOUT CHANGE IN LOCATION ETC SHALL BE PREPARED/SUBMITTED ALONG WITH THE MONTHLY BILLS

RESTACKING AND REARRANGING SHALL BE APPLICABLE FOR MATERIALS RETURNED BY BHEL’S ERECTION CONTRACTORS ALSO.

BIDDER SHALL NOT QUOTE ANY SEPARATE RATE FOR RE-STACKING/RE-ARRANGING OF MATERIAL. THE RATE SHALL BE DERIVED AS PER UNIT RATE CALCULATED FOR ITEM NO A1.4 OF “Table for Weightages/ Factors and BOQ of Chapter X SCHEDULE OF RATES & QUANTITIES”.

(E) Material Handling & Material Management of Material Despatches/Outgoing

(E).1 OUTGOING MATERIALS/DISPATCHES

(E).1.1 FOR VARYING REASONS MANY A TIMES, PROJECT MATERIALS/BHEL ASSETS/SCRAPS MATERIALS ARE TO BE DISPATCHED TO OTHER BHEL SITES/MFG. UNITS/OTHER LOCATIONS.

(E).1.2 CONTRACTOR SHALL IDENTIFY, TAG, PACK AND PREPARE GATE PASSES FOR THE MATERIALS TO BE DISPATCHED. MATERIALS SHALL BE LOADED ONTO THE OUTGOING VEHICLES WITH DUE CARE AND HANDED OVER TO THE TRANSPORTER WITH CLEAR GOODS RECEIPT WHICH SHALL BE SUBMITTED WITH BHEL PROMPTLY. BHEL SHALL MAKE ARRANGEMENT FOR THE TRANSPORT VEHICLES AT ITS OWN COST.

PAYMENT WILL BE REGULATED ON PRO-RATA BASIS ON THE ACCEPTED UNIT RATE AS PER SECTION A1.5 of “Table for Weightages/ Factors and BOQ of Chapter XI SCHEDULE OF RATES & QUANTITIES”.

(E).1.3 SUCH MATERIALS WHICH NEED TO BE BROUGHT TO TRANSPORTER’S/RAILWAY GODOWN FOR BOOKING, ARRANGEMENTS SHALL BE ADOPTED AS MENTIONED BELOW:

CONTRACTOR SHALL ARRANGE SUITABLE VEHICLE FOR TRANSPORTATION OF MATERIALS /SMALLS FROM STORES/STORAGE YARD/SITE TO TRANSPORTERS GODOWNS, IDENTIFY, TAG, PACK AND PREPARE GATE PASSES FOR THE MATERIALS TO BE DISPATCHED. MATERIALS SHALL BE LOADED ONTO THE OUTGOING VEHICLE WITH DUE CARE AND HANDED OVER TO THE TRANSPORTER WITH CLEAR GOODS RECEIPT WHICH SHALL BE SUBMITTED WITH BHEL PROMPTLY WITHIN THE QUOTED

PART (B) : SCOPE OF WORK : REDEVELOPMENT WORK OF OPEN YARDS

The scope of work comprises of but not limited to the following: -

04 Redevelopment of Open storage yard – 1 **Nos.** (40X50M)

05 Illumination of open storage yard.

06 Internal electrification & Illumination of PEB closed store sheds.

All the above jobs shall be as per BHEL Engineer's instructions & drawings.

(a) Redevelopment Work of open Yard (40M X 50M) – 01 Yard :-

(i) Clearing & leveling of open Yard.

(iii) Supply & erection of Chain Link wire fencing with supports.

(vi) Supply & erection of Gate with locking facility.

(vi) Electrification including lighting arrangement inside as well as outside of open Yard. Fixing of JBs, cables & fixtures is in the scope of bidder.

(b) Internal electrification of closed store sheds/area.

NOTE: Closed shed (Qty-01) shall be arranged by **BHEL.**

Bidders Scope of work for Close shed/area if required.

(ii) Only Electrification including lighting arrangement inside as well as outside of Close shed/area including Fixing of JBs, switches, cables, lighting arrangement & fixtures is in the scope of bidder. (Minor civil work will be in bidder scope)

1.1 Responsibility of the Contractor

The contractor shall engage all the unskilled, skilled and especially skilled labour including fabricators, welders and fitters etc. and supervisory staff. Only trained and competent personnel with previous experience in the job shall be employed. However, BHEL reserves the right to decide on the suitability of the workers and other personnel who will be employed by the contractor. BHEL reserves the right to insist on removal of any employee of the contractor at any time, if they found him unsuitable. The contractor shall be bound to follow the instruction of BHEL.

All the materials like wire fencing, Gate painting materials and necessary electric goods etc. shall be supplied by the contractor as per the specification mentioned in the tender/Indian standard specification. The contractor is required to quote their rates inclusive of cost of all materials, labour, etc. BHEL reserves the right to inspect and reject any material not found satisfactory.

1.2 General Instructions

1. Contractor shall procure erection material from reputed manufacturer & approval for the same shall be obtained from BHEL well in advance before ordering for the materials.
2. The contractor shall take adequate precautions to ensure complete safety and prevention of accidents at site. The safety precautions shall conform to IS codes wherever applicable.

3. The work though not specifically mentioned either in the drawings or in the tender specification but are needed to complete the work as per site requirement & instruction of Engineer are also in the scope of this contract & to be erected to the entire satisfaction.
4. The contractor shall provide and maintain at his own cost all T & P for carry out the work.
5. BHEL reserves the right to modify/alter the tender drawings, if necessary during the actual execution at site.

1.3 Specification for Civil Works for Open Storage Yard

Standard specifications for various items of work for building as per the relevant IS-codes (latest edition) shall be applicable for this work. The work has to be executed as per standard specification and drawings to the satisfaction of BHEL. Drawing for Chain Linked Fencing & MS Gate is attached.

If any changes in the layout, plan, section, partition etc. is felt necessary by BHEL Engineer to suit site requirement, the same shall be done by contractor as per revised sketches/drawings given by BHEL engineer. Contractor shall ensure/ascertain the stability, safety of the said work. Any modification/variation from the said drawings, if necessary as suggested by the contractor will have to be approved by BHEL in writing.

1.4 Fencing work

Chain Linked Fencing

Supplying and erecting in position 2.4 m high PVC coated gavanised chain linked fencing of minimum 8 gauge (including PVC coating) of mesh size 75mm x 75mm. The diameter of the hot dip galvanised steel wire for chain link fencing excluding PVC coating shall not be less than 12 gauge. GI barbed wire fencing of height of 600 mm confirming to IS 298 at top of chain link fencing shall be provided with 4 strands of barbed wire hot dip galvanised wire of 12G comprising of 2 ply of wires with barbs of 16G spaced at 100mm. Cost to include for GI hook bolts, rings & washers, hot dip galvanised tension wires, 25X6 mm GI flat stretcher bar at end posts, accessories etc. all complete.

MS Posts

Supply, fabrication and fixing of mild steel posts for fencing including painting etc all complete.

MS Gate

Supply, fabrication and installing in position and testing MS Gates out of channels, joints, angles, flats, plates, pipes, welded steel wire mesh & sheets including stiffners, bracings, fabricated hinges, MS Aldrops with locking arrangement, tempered steel pivot, guide track of MS Tee, bronze aluminium ball bearing arrangements, castor wheels, paintings etc. all complete.

1.5 Electrical Installations

The electrical installation shall generally be carried out in conformity with the requirements of the Indian electricity act, 1910 as amended up to date and the Indian electricity rules, 1956 framed there under and also the relevant regulations of the electric supply authority concerned as well as IS: 732-1963 (revised).

Good workmanship is an essential requirement for compliance with the rules in the code. The work shall be carried out under the direct supervision of a person holding a valid certificate of competency issued by the state government concerned for the type of work involved.

All out door/external lamps shall have weatherproof fittings of design approved by BHEL Engineer so as to effectively prevent the admission of moisture.

The distribution fuse boards shall be located as near as possible to the center of the load they are intended to control.

All main switches shall be of metal clad enclosed pattern, which shall be fixed at close proximity to the point of entry of supply.

Main and branch distribution boards shall be in accordance with Indian standard 732-1963 "code of practice for electrical wiring installation".

PVC conduit wiring system should be adopted through out and all conduit pipes/channel shall be conforming to latest IS. Wiring shall be concealed type for CM's room, Conference hall & computer room.

Approved and good quality copper wire with adequate current carrying capacity/voltage rating with proper insulation as per IS should be used for the entire electrical wiring/installation.

The service connection from outside mains to the switchboard inside the building shall also be carried out by the contractor.

Specifications: Suppling, Installation & commissioning of 50 LED Street Light fitting 150 watt of Crompton / Philips or similar make, complete with one piece of appropriate driver & suitable for directly slipping over light mounting bracket.

1.6 Earthing

All earthing system shall be in accordance with IS: 3043-1966 "code of practice for earthing".

The installation and earthing shall generally be carried out in accordance with the Indian electricity rules 1956 as amended from time to time and the relevant regulations of the electricity supply authority concerned.

All plugs and sockets shall be of three-pin type, one of the pins being connected to earth.

Bodies of all electrical appliances shall be earthed by the use of three pin plugs. The covers of the regulators if or metallic construction, shall be earthed by means of a separate earth wire. A separate earth wire shall be used for earthing these appliances.

All earth wires and earth continuity conductors shall be of copper/-galvanized iron. They shall be either stranded or solid bars of flat rectangular strips and may be bard, provided, due care is taken to avoid corrosion and mechanical damage to it. Inter connections of earth continuity conductors and main and branch earth wires shall be made in such a way that reliable and good electrical connections are permanently ensured.

The neutral conductor shall not be used as earth wire.

Welded, bolted and clamped joints only are permissible. For stranded conductor, sleeve connectors are permissible. Bolted connectors and their screws shall be protected against any possible corrosion.

The path of the earth wire shall, as far as possible, be out of reach of any person and shall be visible for inspection.

The galvanized iron pipe electrodes shall not be smaller than 38mm internal diameter and shall not be less than 3.5M. In length and shall, as far as possible, be embedded below permanent moisture level and shall be one piece only without any joints.

1.7 PAINTING

All the steel items MS Angles & Gate etc. shall be supplied with one coat of red oxide primer; two coats of synthetic enamel paint of approved color and quality shall be applied after fixing in position to achieve uniform finishing. Rates shall be quoted taking into account cost of painting for steel work etc.
Three coats of white washing shall be provided uniformly on all wall surfaces as per IS specification.

Comprehensive list of National Standards for reference and use wherever applicable in the execution of Civil, Erection and Commissioning Contracts

IS No	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWARAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)

IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS-DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 2171	1985		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CARTRIDGE)
IS 2309	1989		PRACTICE FOR THE PROTECTION OF BUILDINGS AND ALLIED BUILDINGS AGAINST LIGHTENING
IS 2312	1967		EXHAUST FANS
IS 2361	1994		SPECIFICATION FOR BUILDING GRIPS – FIRST REVISION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS
IS 2762	1964		SAFE WORKING LOADS IN KGS FOR WIRE ROPE SLINGS
IS 2878	1986		FIRE EXTINGUISHERS CARBON DIOXIDE TYPE (PORTABLE AND TROLLEY MOUNTED)
IS 2925	1984		SPECIFICATION FOR INDUSTRIAL SAFETY HELMETS
IS 3016	1982		CODE OF PRACTICE FOR FIRE PRECAUTIONS IN WELDING AND CUTTING OPERATIONS- FIRST REVISION
IS 3315	1974		DESERT COOLERS
IS 3521	1989		INDUSTRIAL SAFETY BELTS AND HARNESS
IS 368	1983		IMMERSION WATER HEATERS

IS 3696	1991		SAFETY CODE OF SCAFFOLDS AND LADDERS PART 1 TO 2
IS 3737	1996		LEATHER SAFETY BOOTS FOR WORKERS IN HEAVY METAL INDUSTRIES
IS 374	1979		CEILING FANS INCLUDING REGULATORS
IS 3764	1992		EXCAVATION WORK – CODE OF SAFETY
IS 3786	1983		METHOD FOR COMPUTATION OF FREQUENCY AND SEVERITY RATES FOR INDUSTRIAL INJURIES AND CLASSIFICATION OF INDUSTRIAL ACCIDENTS
IS 3935	1966		CODE OF PRACTICE FOR COMPOSITE CONSTRUCTION
IS 4014	1967		CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING
IS 4081	1986		SAFETY CODE FOR BLASTING AND RELATED DRILLING OPERATIONS
IS 4082	1977	1996	STACKING AND STORAGE OF CONSTRUCTION MATERIALS AND COMPONENTS AT SITE
IS 4130	1991		DEMOLITION OF BUILDINGS – CODE OF SAFETY PART 1 TO 2
IS 4138	1977		SAFETY CODE FOR WORKING IN COMPRESSED AIR (FIRST REVISION)
IS 4155	1966		GLOSSARY OF TERMS RELATING TO CHEMICAL AND RADIATION HAZARDS AND HAZARDOUS CHEMICALS
IS 4209	1967		CODE OF SAFETY FOR CHEMICAL LABORATORY
IS 4250	1980		FOOD MIXERS
IS 4262	1967		CODE OF SAFETY FOR SULFURIC ACID
IS 4756	1978		SAFETY CODE FOR TUNNELING WORK
IS 4912	1978		SAFETY REQUIREMENTS FOR FLOOR AND WALL OPENINGS, RAILINGS AND TOE BOARDS
IS 5121	1969		SAFETY CODE FOR PILING AND OTHER DEEP FOUNDATIONS
IS 5182	1969	1982	METHODS FOR MEASUREMENT OF AIR POLLUTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROCEDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS – FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)
IS 692	1994		CRITERIA FOR SAFETY AND DESIGN OF STRUCTURES SUBJECTED TO UNDERGROUND BLASTS
IS 6994	1973		SPECIFICATION FOR SAFETY GLOVES

IS 7155	1986		CODE OF RECOMMENDED PRACTICE FOR CONVEYOR SAFETY (PART 1 TO 8)
IS 7205	1974		SAFETY CODE FOR ERECTION OF STRUCTURAL STEEL WORK
IS 7293	1974		SAFETY CODE FOR WORKING WITH CONSTRUCTION MACHINERY
IS 7323	1994		GUIDELINES FOR OPERATIONS OF RESERVOIRS
IS 7812	1975		CODE OF SAFETY FOR MERCURY
IS 7969	1975		SAFETY CODE FOR HANDLING AND STORAGE OF BUILDING MATERIALS
IS 8089	1976		CODE OF SAFE PRACTICE FOR LAYOUT OF OUTSIDE FACILITIES IN AN INDUSTRIAL PLANT
IS 8091	1976		CODE OF PRACTICE FOR INDUSTRIAL PLANT LAYOUT
IS 8095	1976		ACCIDENTS PREVENTION TAGS
IS 818	1968	1997	CODE OF PRACTICE FOR SAFETY AND HEALTH REQUIREMENTS IN ELECTRIC AND GAS WELDING, AND CUTTING OPERATIONS
IS 8448	1989		AUTOMATIC LINE VOLTAGE CORRECTOR (STABILISER)
IS 8519	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR BODY PROTECTION
IS 8520	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR EYE, FACE AND EAR PROTECTION
IS 875	1987		STRUCTURAL SAFETY OF BUILDING: LOADING STANDARD PART 1 TO 5
IS 8807	1978		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF ARMS AND HANDS
IS 8978	1985		INSTANTANEOUS WATER HEATERS
IS 8989	1978		SAFETY CODE FOR ERECTION OF CONCRETE FRAMED STRUCTURES
IS 940	1989		PORTABLE FIRE EXTINGUISHERS WATER TYPE (GAS CARTRIDGE)
IS 9457	1980		SAFETY COLOURS AND SIGNS
IS 9679	1980		CODE OF SAFETY FOR WORK ENVIRONMENTAL MONITORING
IS 9706	1997		CODE OF PRACTICE FOR THE CONSTRUCTION OF AERIAL RPEWAYS FOR THE TRANSPORTATION OF MATERIAL
IS 9759	1981		GUIDELINES FOR DEWATERING DURING CONSTRUCTION
IS 9815	1989		SERVO MOTOR OPERATED LINE VOLTAGE CORRECTOR (SERVO STABILISER)
IS 9944	1992		RECOMMENDATIONS ON SAFE WORKING LOAD FOR NATURAL AND MAN-MADE FIBRE ROPE SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

1.8 NON PERFORMANCE OF BIDDER:

IF WORK GETS DELAYED DUE TO NON-AVAILABILITY OF CONSTRUCTION MATERIALS, LABOURS, ELECTRICIANS & OTHER INPUTS REQUIRED TO COMPLETE THE WORK, BHEL RESERVES THE RIGHT TO GET THE WORK DONE AT THE RISK AND COST OF CONTRACTOR WITHOUT PREJUDICE TO RIGHTS OF BHEL AS IN GENERAL CONDITIONS OF CONTRACT. OVERHEADS WILL BE CHARGED ON DIFFERENTIAL AMOUNT AS PER GCC.

1.9 MOBILIZATION OF SITE

AFTER RECEIPT OF FAX/MAIL LOI, CONTRACTOR SHALL DISCUSS WITH PROJECT MANAGER / CONSTRUCTION MANAGER REGARDING INITIAL MOBILISATION. CONTRACTOR SHALL MOBILIZE NECESSARY RESOURCES WITHIN 03 DAYS AFTER ISSUE OF FAX / MAIL / LETTER OF INTENT OR AS PER THE DIRECTIVE OF PROJECT MANAGER / CONSTRUCTION MANAGER. SUCH RESOURCES SHALL BE PROGRESSIVELY AUGMENTED TO MATCH THE SCHEDULE OF MILESTONES ACTIVITIES AS INTIMATED BY PROJECT MANAGER/SITE ENGINEER. THE START DATE OF WORK FOR REDEVELOPMENT OF OPEN YARDS BY THE CONTRACTOR AS DEFINED IN SCOPE OF THIS CONTRACT & AS CERTIFIED BY BHEL ENGINEER, SHALL BE RECKONED AS THE START OF THE CONTRACT PERIOD. IN CASE OF DISCREPANCY, THE DECISION OF BHEL ENGINEER IS FINAL.

1.10 AUGMENTATION OF MOBILISATION

CONTRACTOR SHALL SUBSEQUENTLY AUGMENT HIS RESOURCES IN SUCH A MANNER THAT DAILY ERRANDS/ACTIVITIES SHALL BE COMPLETED ON DAILY BASIS AND THE ENTIRE WORK IS COMPLETED WITHIN THE TIME SCHEDULE/CONTRACT PERIOD. MOBILIZATION OF CONTRACTOR'S RESOURCES SHALL BE MADE AND AUGMENTED FROM TIME TO TIME IN SUCH A MANNER THAT THE WORK IN SCOPE IS CARRIED OUT IN AN UNINTERRUPTED MANNER.

1.11 TOOLS & PLANTS

BIDDER TO DEPLOY ALL REQUIRED T&P TO COMPLETE THE WORK WITHIN SCHEDULE IN CONSULTATION WITH BHEL ENGINEER.

1.12 MEASURING AND MONITORING DEVISES (MMD)

BIDDER TO DEPLOY ALL REQUIRED MMDs TO COMPLETE THE WORK WITHIN SCHEDULE IN CONSULTATION WITH BHEL ENGINEER.

1.13 COMPLETION PERIOD

THE COMPLETION PERIOD FOR REDEVELOPMENT WORK OF OPEN YARD UNDER SCOPE SHALL **BE 20 DAYS FROM THE DATE OF START OF WORK TO COMPLETION OF REDOVELOPMENT WORK.**

SECTION: A

Price Break-up & Terms of Payment for Section A			
ITEM NO	DESCRIPTION OF ACTIVITY	UNIT	% BREAK UP
PART (A)			
Section – A.1			
A.1.1	**Material Handling and Material Management for Materials received through Trucks/Trailers at Project Site**		**100%**
1	Unloading, Shifting to Open/Covered Stores	MT	30%
2	Updating of Receipt details, in store Material Registers/computer/BHEL MM Package system	MT	15%
3	Stacking and Verification	MT	15%
4	Updation of Verification details in Material stock registers, Submission of reports as per specified formats for shortage/open delivery, loading of police reports if required, documents for insurance claims Etc, and preparation of material receipt certificates in prescribed formats where ever applicable	MT	25%
5	Identification of material in ready to lift position for issue to BHEL/ Erection agency, and updating of issue details in stores Records	MT	12%
6	Completion of contractual obligations as Serial No. 6.5 (6.5.1, 6.5.2, 6.5.3, 6.5.4 and 6.5.5)		3%
A.1.2	**Material Handling and Material Management for Materials received through Railway Wagons at Railway Siding/Station/Godown**		**100%**
1	Unloading from Railway wagons or collection from godowns, Re-loading, transportation to site and unloading	MT	30%
2	Updation of Receipt details, in store Material Registers/Computer/BHEL MM Package system	MT	15%
3	Stacking and Verification	MT	15%
4	Updation of Verification details in Material stock registers, Submission of reports as per specified formats for shortage/open delivery, loading of police reports if required, documents for insurane claims Etc, and preparation of material receipt certificates in prescribed formats where ever applicable	MT	25%
5	Identification of material in ready to lift position for issue to BHEL/ Erection agency, and updation of issue details in stores Records	MT	12%
6	Completion of contractual obligations as Serial No. 6.5 (6.5.1, 6.5.2, 6.5.3, 6.5.4 and 6.5.5)		3%

A.1.3	**Material Handling and Material Management for Materials received at Transporters Godowns within a radius of 50 KM from Project Site**		**100%**
1	Unloading from Railway wagons or collection from godowns, Re-loading, transportation to site and unloading	MT	30%
2	Updation of Receipt details, in store Material Registers/Computer/BHEL MM Package system	MT	15%
3	Stacking and Verification	MT	15%
4	Updation of Verification details in Material stock registers, Submission of reports as per specified formats for shortage/open delivery, loading of police reports if required, documents for insurane claims Etc, and preparation of material receipt certificates in prescribed formats where ever applicable	MT	25%
5	Identification of material in ready to lift position for issue to BHEL/ Erection agency, and updation of issue details in stores Records	MT	12%
6	Completion of contractual obligations as Serial No. 6.5 (6.5.1, 6.5.2, 6.5.3, 6.5.4 and 6.5.5)		3%
A.1.4	**Material re-shifting and re-stacking within project premises**		**100%**
1	Material Re-shifting Stacking	MT	85%
2	Updation of store material register / Computer/BHEL MM package system	MT	12%
3	Completion of contractual obligations as Serial No. 6.5 (6.5.1, 6.5.2, 6.5.3, 6.5.4 and 6.5.5)	MT	3%
A.1.5	**Despatch/Outgoing materials**		**100%**
1	Identification of Material, Tagging, Packing if required, Preparation of Gate passes etc.	MT	40%
2	Loading of materials, including T&P of BHEL, into trucks/Carriers at site stores/ erection site for onwrd transportation to other destinations (Transportation by other agencies)	MT	45%
3	Updation of store material register /Computer/ BHEL MM package system	MT	12%
4	Completion of contractual obligations as Serial No. 6.5 (6.5.1, 6.5.2, 6.5.3, 6.5.4 and 6.5.5)	MT	3%
Section – A.2			
SN	Crane description	Qty	Total crane months
A2.1	New generation Pick & carry type tyre mounted mobile crane. - 12/14 MT or above	1	17 Months
A2.2	New generation Pick & carry type tyre mounted mobile crane. - 20/22 MT or above	1	17 Months
Section – A.3			

SN	Description	Qty (Man months)	Total Man months
A3.1	Menial Services (Un-skilled)	34	51
A3.2	Secretarial Services (Skilled)	17	
Note: The quantities mentioned above are tentative in nature and may vary to any extent.			

OTHER PAYMENT TERMS & CONDITION

6.5	OTHER payment terms & condition	
	% from every RA Bill to be paid only after satisfactory completion otherwise forfeited	
6.5.1	REMOVAL OF GRASS/WEEDS AND OTHER PLANT GROWTH IN THE STORE AREA	0.5%
6.5.2	HOUSEKEEPING & CLEANING OF ALL CLOSED SHEDS	0.5%
6.5.3	PRESERVATION planned for the month	0.5%
6.5.4	Safe working & availability of adequate illumination at the place of work	0.5%
6.5.5	Implementation of E-stores for records/data	1%

- Cranes (For Section A.2)

Payment for Cranes shall be made on monthly basis as per the awarded monthly rate against each crane. No other payment shall be paid for the other / additional T & Ps deployed for carrying out the work as per the scope of this tender.

- Menial and Secretarial Services: (For Section A3)

Payment for Menial and Secretarial Services shall be made on monthly basis as per the awarded monthly rate against each head.

SN	Description of Work/Item	BOQ (Man Months)	Minimum Wages as per latest Circular Dtd. 27.03.2025	1.41 X Minimum Wages	Total
C.1	Menial Services (Unskilled)	34	₹ 11,176	₹ 15,802	₹ 5,37,268
C.2	Secretarial Services (Skilled)	17	₹ 12,606	₹ 17,799	₹ 3,02,583
	Sub Total (C)				**₹ 8,39,851**

Payment for the same shall be made as per the service-month rate fixed in item no A3.1 & A3.2 of rate schedule Section –A.3 Terms of Payment, on pro-rata basis as at actuals.

The actual requirement of manpower shall be discussed and finalized with engineer in charge before start of the works.

However, rates fixed are on the basis of total minimum wages for NSPCL Bhilai plant- CG circular at the time of NIT and the same shall be revised at times when it is changed by the NSPCL/Government.

Therefore, price variation compensation and overrun compensation will not be applicable for items in Sec-A.3.

Payment against items in Section A3 of Chapter-X Schedule of Rates and Quantities shall be calculated & paid in following manner;

Per service month rate= 1.41 x minimum wages per month (rounded to next higher fifty value)

Minimum wages per month
Minimum wages per month = Daily Rate Minimum Wage per day (rounded value) x 26 Days.

During the extended period of contract, supervision and secretarial services, menial services for BHEL office and stores, site offices, etc. Shall be provided by the contractor as per the instruction of BHEL site-in-charge. Rates during extended period shall be followed as above.

Note: BHEL at its sole discretion reserves the right to re-shuffle the work allocation of the personnel deployed.

In case the contractor does not deploy or delays deployment of above said manpower with reference to specific instructions from BHEL, BHEL will levy penalty for delay in the following manner:

A. Supervision/secretarial services @ Rs500 per service-day

B. Menial services for BHEL office and stores etc. @ Rs 300 per service-day

1.14 TERMS OF PAYMENT OF PART(B) - REDEVELOPMENT WORK OF OPEN YARDS

PAYMENT SHALL BE MADE IN THREE PARTS AS FOLLOWS: -

(1) 50% PAYMENT AGAINST REDEVELOPMENT WORK OF OPEN YARD SHALL BE PAID AFTER MOBILIZATION, PREPARATION & SUPPLY OF REQUIRED MATERIAL (ELECTRIFICATION MATERIAL, FENCING MATERIAL ETC) INCLUDING T&P AT SITE.
(2) 40% PAYMENT AGAINST REDEVELOPMENT WORK OF OPEN YARD SHALL BE PAID AFTER COMPLETION OF ALL REDEVELOPMENT WORK AS PER SCOPE.
(3) FINAL 10% PAYMENT AGAINST REDEVELOPMENT WORK OF OPEN YARD SHALL BE PAID AFTER INSPECTION & CERTIFICATION BY BHEL ENGINEER & CLEARING OF ALL PUNCH POINTS.

MOBILIZATION OF SITE

AFTER RECEIPT OF FAX/MAIL LOI, CONTRACTOR SHALL DISCUSS WITH PROJECT MANAGER / CONSTRUCTION MANAGER REGARDING INITIAL MOBILISATION. CONTRACTOR SHALL MOBILIZE NECESSARY RESOURCES FOR MATERIAL MANAGEMENT WITHIN ONE WEEK OF ISSUE OF FAX / MAIL / LETTER OF INTENT OR AS PER THE DIRECTIVE OF PROJECT MANAGER / CONSTRUCTION MANAGER. SUCH RESOURCES SHALL BE PROGRESSIVELY AUGMENTED TO MATCH THE SCHEDULE OF MILESTONES ACTIVITIES AS INTIMATED BY PROJECT MANAGER/SITE ENGINEER.

AUGMENTATION OF MOBILISATION

CONTRACTOR SHALL SUBSEQUENTLY AUGMENT HIS RESOURCES IN SUCH A MANNER THAT DAILY ERRANDS/ACTIVITIES SHALL BE COMPLETED ON DAILY BASIS AND THE ENTIRE WORK IS COMPLETED WITHIN THE TIME SCHEDULE/CONTRACT PERIOD. MOBILIZATION OF CONTRACTOR'S RESOURCES

SHALL BE MADE AND AUGMENTED FROM TIME TO TIME IN SUCH A MANNER THAT THE WORK IN SCOPE IS CARRIED OUT IN AN UNINTERRUPTED MANNER.

CONTRACT PERIOD

THE CONTRACT PERIOD FOR COMPLETION OF ENTIRE WORK UNDER SCOPE SHALL BE 17 MONTHS (SEVENTY MONTHS) FROM THE "START OF CONTRACT PERIOD".

2.1. The payments for works under the scope of this contract shall be as per clause no 2.6; 2.22; 2.23 of General Conditions of Contract and Volume-IB, Chapter-X of SCC. However, Clause No. 10.5 on RA Bill Payments, in Volume-IB, Chapter-X of SCC, is revised as under:

The payment for running bills will normally be released within 30 days of 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 payment (if any) made beyond 30 days.

All documents like HR Clearance, Quality and Safety Compliances, etc. required for processing the RA Bills should be submitted along with RA Bills.

Few points of consideration are as below:

1.1. 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.

1.2. The RA bill payments are interim payments and bills shall be submitted in prescribed formats.

1.3. BHEL will release payment through Electronic Fund Transfer (EFT)/RTGS.

1.4. Final bill shall be submitted after completion of works and upon material reconciliation along with all prescribed formats.

1.5. The Bill will be paid at BHEL's Site office, PP-II , NSPCL BHILAI (2X30MW +1X14MW) POWER PLANT AT NSPCL Bhilai where the PEB shed will be erected.

Extra/Additional Items of Work: - The works shall be regulated as per clause no 2.15 and clause no 2.16 of General Conditions of Contract

GENERAL NOTE:

1. THE INTENT OF SPECIFICATION IS TO PROVIDE MATERIAL HANDLING AND MATERIALS MANAGEMENT SERVICES ACCORDING TO THE MOST MODERN AND PROVEN TECHNIQUES AND CODES. THE OMISSION OF SPECIFIC REFERENCE TO ANY METHOD, EQUIPMENT OR MATERIALS NECESSARY FOR PROPER AND EFFICIENT UNLOADING, TRANSPORTATION, VERIFICATION, STACKING

& PRESERVATION ETC SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY OF PROVIDING SUCH FACILITIES TO COMPLETE THE WORK WITHOUT ANY EXTRA COMPENSATION.

2. THE WORK SHALL BE EXECUTED UNDER USUAL CONDITIONS AFFECTING MAJOR THERMAL POWER PROJECTS IN AN EXISTING POWER PLANT AND IN CONJUNCTION WITH NUMEROUS OTHER OPERATIONS AT SITE. THE CONTRACTOR AND HIS PERSONNEL SHALL COOPERATE WITH PERSONNEL OF CUSTOMER'S CONTRACTORS, COORDINATING HIS WORK WITH OTHERS AND PROCEED IN A MANNER THAT SHALL NOT DELAY OR HINDER THE PROGRESS OF WORK AS A WHOLE.

3. ALL THE WORK SHALL BE CARRIED OUT AS PER THE INSTRUCTIONS OF BHEL ENGINEER. BHEL ENGINEER'S DECISION REGARDING CORRECTNESS OF THE WORK AND METHOD OF WORKING SHALL BE FINAL AND BINDING ON THE CONTRACTOR.

4. THE CONTRACTOR SHALL PERFORM ALL REQUIRED SERVICES WHICH MAY NOT BE SPECIFIED HEREIN BUT NEVERTHELESS REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

5. ALL NECESSARY CERTIFICATES AND LICENSES REQUIRED TO CARRY OUT THIS WORK ARE TO BE ARRANGED BY THE CONTRACTOR EXPEDITIOUSLY.

6. ALL CRANES, TRANSPORT EQUIPMENTS, HANDLING EQUIPMENT, TOOLS, TACKLES, FIXTURES, EQUIPMENT, MANPOWER, SUPERVISORS/ENGINEERS, CONSUMABLES ETC REQUIRED FOR THIS SCOPE OF WORK SHALL BE PROVIDED BY THE CONTRACTOR.

7. ALL EXPENDITURE INCLUDING TAXES AND INCIDENTALS IN THIS CONNECTION WILL HAVE TO BE BORNE BY THE CONTRACTOR UNLESS OTHERWISE SPECIFIED IN THE RELEVANT CLAUSES ELSEWHERE IN THESE SPECIFICATIONS. THE CONTRACTOR'S QUOTED RATES SHALL INCLUDE ALL SUCH CONTINGENCIES. IN THIS CONNECTION REFER RELEVANT CLAUSE OF GENERAL CONDITIONS OF CONTRACT.

8. THE CONTRACTOR SHALL PERFORM ALL REQUIRED SERVICES WHICH MAY NOT BE SPECIFIED HEREIN BUT NEVERTHELESS REQUIRED FOR THE COMPLETION OF WORK WITHIN QUOTED RATES.

9. THE TENDERERS SHOULD ASSESS THE VARIOUS DISTANCES AND SITE CONDITIONS BY VISITING SITE BEFORE SUBMITTING THEIR OFFER. NO ADDITIONAL/EXTRA CLAIMS FOR ANY VARIATION IN THIS REGARD WILL BE ENTERTAINED.

10. CONTRACTOR SHALL ARRANGE FOR CUTTING AND REMOVAL OF VEGETATION GROWTH/GRASS ETC IN THE STORAGE YARD AS AND WHEN CALLED FOR BY BHEL AS INCIDENTAL TO WORK. BHEL WILL TAKE APPROPRIATE ACTION AT THE RISK & COST OF THE CONTRACTOR IN CASE OF FAILURE IN THIS REGARD. CONTRACTOR SHALL USE LATEST AVAILBLE METHODOLOGY TO ENSURE REMOVAL OF VEGETATION.

11. VOID

12. CONCRETE SLEEPERS WILL BE TAKEN BACK BY CONTRACTOR AFTER THE COMPLETION OF CONTRACT PERIOD ON AS IS WHERE IS BASIS.

13. HOUSEKEEPING OF CLOSED & OPEN SHEDS ARE ALSO INCLUDED IN THE SCOPE OF WORK. CONTRACTOR SHALL CARRY OUT THE HOUSEKEEPING WORKS ON REGULAR INTERVALS (ONCE A WEEK).

14. VOID

15. THE TOOLS AND TACKES RECEIVED FROM VARIOUS BHEL UNITS ARE TO BE HANDED OVER TO CUSTOMER AFTER COMPLETION OF WORK AT SITE. IT SHALL BE THE RESPONSIBILITY OF CONTRACTOR TO HANDOVER TOOLS AND TACKES TO CUSTOMER NSPCL THROUGH BHEL AND MAKE NECESSARY HANDING OVER PROTOCOLS.

16. IF THE CONTRACTOR OR HIS WORKMEN BREAK, DEFACE, INJURES OR DESTROY ANY PART OF BUILDING, ROAD, KERBS, FENCE ENCLOSURES, WATER PIPES, DRAINS, ELECTRIC/ TELEPHONE POLES OR WIRES, TREES OR ANY OTHER PROPERTY OR DAMAGE ANY PART OF ERECTED STORES, STORED COMPONENTS ETC. THE CONTRACTOR SHALL MAKE THE SAME GOOD AT HIS OWN EXPENSES (OF WHICH BHEL SITE ENGINEER'S DECISION SHALL BE FINAL) FAILING WHICH THE SITE ENGINEER SHALL GET THE SAME RECTIFIED BY OTHER AGENCIES AT THE RISK AND COST OF THE CONTRACTOR AND THE SAME SHALL BE DEDUCTED FROM THE SUMS THAT MAY BE DUE THEN OR AT ANY TIME THEREAFTER BECOME DUE TO THE CONTRACTOR OR EVEN FROM HIS SECURITY DEPOSIT.

Special Note: -

1. **If any material would have been received at the NSPCL site by BHEL prior to the finalization of this contract, the bidder shall maintain proper records of all such materials already available at the site including stacking & preservation as per scope of this tender, in consultation with the Site In-Charge, without any additional cost**.
2. **Bidder has to follow all the safety related requirement of NSPCL/BHEL safety norms during material handling work and other related work and if required bidder has to arrange safety supervisor for material handling work**.

- **Section-B: -** Renovation & modernization of re-introduction of blast furnace gas firing system in all 3 UNITS (2X30MW +1X14MW) power plant which includes dismantling of existing facilities & erection and commissioning of CO gas & Blast furnace gas line, wind box, u-seal, igniter, scanner, hangers, blast furnace gas pipe, valves, C&I and Electricals, super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.

1. The work under the scope of these specifications is broadly as follows.

DISMANTLING WEIGHT: DISMANTLING AS PER THE SCOPE, HOWEVER TENTATIVE DISMANTLING TONNAGE APPROXIMATLY – 500 MT FOR THREE UNIT.

ERECTION WEIGHT:

Sl.No.	Items	Weight In MT(approx.) all three units
1	Pressure Parts	57
2	Wind box connecting Ducts	54
3	Non-Pressure Parts (Wind box & other associated items)	52
4	Piping (CO, Scanner air pipe, Steam purging Piping)	78
5	Structure	78
6	Refractory & Insulation	45
7	BFG Piping's	226
8	Bought Out Items (Goggle Valve, Flow Element, Scanner Air fan, Ignitors, Flame Scanner other associated items)	115
	Total	**705**
	Note: - Miscellaneous item which will dismantled & re-erect to facilitate the E&C of new items/materials	
8	C&I and Electrical Work	**As per the scope of work and quantity mentioned in the tender.**

- **This weight is indicative only and may differ as per actual shipping list. Any Quantity Variation shall be considered as per GCC.**
- **Bidders are requested to have pre-bid visit/ inspection of site to make them fully acquainted with the site situation & nature of job. No claim shall be entertained at later date on account of non-familiarization of site condition.**
- **The job is Re-introduction of Blast Furnace Gas Firing System in all 3 units of Bhilai PP-II units by replacing the windbox with a new redesigned windbox having two elevations of blast furnace gas, one elevation of coke oven gas and retaining top elevation coal fired one along with necessary air dampers.**
- ***Contact Details of persons for Site Visit:***

Sh. PRASHANT KUMAR GUPTA (MANAGER)
BHEL Site Office, NSPCL BHILAI PP – 2
Email: pk.gupta@bhel.in, Ph no: +91- 8889922884

1.1. Erection of main Equipment: -

1. Complete wind box assembly.
2. Pilot ignitors.
3. Flame Scanner
4. Scanner Air Fans- 2 Nos. X 100% (AC) including piping and associated valves, auto transfer damper and instrumentation.
5. Common BFG line.
6. New BFG pipe.
7. Control System for protection and control of COG and BFG system comprises of control panels, work station and associated accessories.
8. Modification in COG piping.
9. Modification in coal piping, bends and expansion joints.
10. Support Hangers for Coal and Gas piping.
11. Valves & instrumentation in BFG & COG line.
    a. U-Seal (For BFG Common line Only) with blinding flange in both end.
    b. Electro Hydraulic Google Valves for BFG main line to each boiler – 1,2 &3
    c. Flow element (Venturi Type)
        I. For BFG (2 nos. for each boiler)
        II. For COG (1 nos. for each boiler)
    d. Remote operated DBB type Butterfly Trip Valve (for each fuel and for each corner)
    e. Common line trip valve with remote operation pneumatically operated
        I. For BF Gas- Butterfly trip valve
        II. For BF Gas- Control valve
        III. For BF Gas- Vent trip valve
        IV. For CO Gas- Butterfly trip valve
        V. For CO Gas- Control valve
        VI. For CO Gas- Vent trip valve

    f. Trip valves for COG pilot.
    g. Purging system butterfly Valve
    h. Misc. Drains & vent Valves.
    i. Pressure Transmitters
    j. Pressure gauges.
    k. DP flow transmitter
    l. Temperature Element
    m. Temperature transmitter
12. Platen SH Assembly
13. Steam Purging system.
14. Necessary Handling/Lifting arrangement
15. Insulation & cladding.
16. Process Connection & piping.
17. Instrumentation, Power & Control cables
18. Platform, handrails and supports.
19. Dismantling as per the scope
20. Modification of water wall tubes for wind box , SH Assembly.

2. SCOPE OF WORK (IN BRIEF): -

All services whether explicitly stated or otherwise and that are necessary for the satisfactory work of Re-introduction of Blast Furnace Gas Firing System in all 3 units of Bhilai PP-II described in the specification shall be deemed to be included in the scope of work of the Bidder and shall not be limited to the following:

1. Compliance with statutory requirements and obtaining clearances from statutory authorities, by bidder wherever required. However, NSPCL/BHEL will extend support like issuing letter to Statutory Authorities if required.
2. Receipt of material from BHEL/NSPCL store yard and material to be transported at the site for fabrication & E&C.
3. Dismantling / removal/ modification of existing equipment like wind box, burner, damper, piping, duct, structure etc as required and Supply & Erection of redesigned wind box, super-heater assembly/coils and associated auxiliaries and systems duct along with related Electrical/ C&I equipment. Scrap Removal & stacking at a place designated by EIC in plant premises is in Bidder scope.
4. Fabrication, Pre-assembly (if any), erection, commissioning & completion of the proposed works including putting the unit under satisfactory operation.
5. Manpower assistance along with general T&P during Reliability tests and guarantee tests after successful completion of the proposed works.
6. Fabrication and erection of structural works like trestle, truss etc., as required,
7. Erection of trestles on the foundation will be in the scope of bidder.
8. Painting and supply of required paints
9. All Architectural works including construction facilities and construction power distribution (as applicable).
10. Electricals and C&I
11. Satisfactory completion of the contract.

2.1. PRE SHUTDOWN WORK: -

1. **Mobilization of site 45-60 days before the shutdown of the unit** with adequate manpower and T&P for Erection of temporary structures/platforms, arrangement of electric winches, Hydra, cranes, lifting & transporting equipment as required for dismantling & erection activities and fabrication of ducts/other items before the start of shutdown.
2. **Arrangement of 100-150 MT capacity tire mounted telescopic Crane with adequate boom length or Jib arrangement for BFG (Blast furnace Gas) pipe, Burner, coils & other associated pipes/structure/other items for dismantling and erection purpose and other erection purposes. However, if higher capacity crane shall be required to complete the work, same shall be arranged by bidder at no extra cost. Bidder may visit the site for assessment of capacity & positioning of crane.**
3. Identification/Verification of materials to be erected & also as per shipping list (CO gas & Blast furnace gas line, wind box, U-seal, Igniter, scanner, hangers, Blast furnace gas pipe, Valves, C&I and Electricals, super heaters coils, insulations and other)

4. Arrangement of consumables like approved welding electrodes, filler wire, Argon, Oxy-acetylene gases, any other special electrode if required etc.
5. Arranging Gate pass, Insurance, medical fitness certificate, police verification & Accommodations to the contract personnel.
6. Shifting of material to store and T&Ps. Temporary store shall be made/fabricate by contractor as space provided by NSPCL.
7. Receipt of material from BHEL/NSPCL store yard and material to be transported at the site for Fabrication and E&C.
8. To obtain all required statutory approvals like labour license, safety training & insurance, etc.
9. To obtain IBR approvals for work execution & open/ground inspection of materials and work and endorsement of HP welders certificates.
10. Making arrangements for the stay of staff and workers at site.
11. Shifting of special T&Ps to Site.
12. Making arrangements for transportation of staff and workers at site.
13. Transportation Erection Material from BHEL/NSPGCL/Open Yard Store to Site.
14. Arrangement of hydra, crane, truck, trailer, trolley as required for work.
15. Heat treatment & radiography Facility shall be arranged by contractor in advance.
16. Sky climber/cup lock, if required, for the removal and installation of burner assembly and alignment of the burners, will be in vendor's scope.
17. Cup locks to be installed inside the furnace for the coil erection works and scaffolding pipes for balance erection works.
18. **Removal and re-installation of structure or any other equipment for erection of new component is in bidder's scope.**
19. **Laying of Cables, Cable Trays, Junction Boxes (JB's), Instrument Calibration, Ferrule Printing, Cable Tag preparation, etc.**
20. All kind of Electrodes shall be procured by bidder as required as per BHEL standard EWS (Erection Welding Schedule)
21. Any work pertaining to this contract that the Customer (Plant Owner) provides the permit for may be carried out during pre-shutdown.

Note: ***Bidders are advised to make a site visit to have on hand information about the prevailing site conditions and also accommodation arrangements for his manpower, may meet concerned NSPCL officials at site in this regard.***

2.2. **Major Pre-shutdown work (Which are to be carried within pre-shutdown period – 45-60 Days along with Sl. no. 2.1): -**

1. Dismantling / removal/ modification of existing equipment like Blast Furnace Gas (BFG) line (Common Headers) , old valves & its supporting structure of boiler#1,2 &3.
2. Dismantling of existing google valve and erection of newly designed google valve.
3. Erection/modification of newly designed equipment like BFG line (Common Headers) & its supporting structure of boiler#1,2 &3.
4. Dismantling of existing column and supporting structures & Erection of newly supplied column beam and supporting structure for BFG line from start point to entry of boilers including minor civil work with arrangement of GP-1 & GP-2. (**Other Civil work excluded from bidder scope**).

5. Bidder shall complete all feasible dismantling work of existing equipment which will not hamper the unit operation, all fabrication work, Erection of C&I and Electricals related work and erection of mechanical items.

Note: Bidders are advised to make a site visit to have on hand information about the prevailing site conditions for the above major pre-shutdown activities and assessment of dismantling quantity and erection activities.

2.3. DETAILED SCOPE OF WORK: -

Erection & commissioning for each Boiler unit shall include all items indicated but will not be limited to following and is broadly categorized below: -

❖ Mechanical Work

A. Wind Box & duct: -

1. Dismantling of existing wind box assembly, ducts, insulation & associated items and same to be shifted to designated place as decided by customer.
2. Installation of New Re-designed Wind box assembly, ducts including new coal, blast furnace gas, coke oven gas air nozzle tips for all four corners
3. Installation of New Re-designed Tilting Tangential Burner Assembly for coal elevation.
4. Installation of Burner Tilt Power cylinders.
5. Modification in existing coal piping, coupling & its supports.
6. Strengthening/ modification of structure as required for carrying out the proposed works (if required). Any minor work required to complete the scope of work indicated in this contract shall be in the scope of bidder.

B. Dismantling of existing superheated coils and Installation of a complete new platen superheated assembly and associated items as per instruction of BHEL.

1. Removal of any platform, water wall, insulation and structural item etc. for dismantling of existing super heater coils, headers and erection of new platen superheated assembly and headers. Dismantled item shall be disposed from site and shifted to designated place as decided by customer.
2. Cup locks to be installed inside the furnace for the coil erection works and scaffolding pipes for balance erection works.
3. Cutting & welding of HP joint with IBR approved welder.
4. IBR approval from statutory body is in bidder scope.
5. Erection of platen super heater headers.
6. Erection of complete platen super heater assembly.
7. Re-assembly of all removed items which is dismantled to facilitate the E&C work.

C. Piping, Bends, Hangers, and Supports:

1. Dismantling of existing facilities such as piping & bends, hangers, supports and other miscellaneous items for installation of new piping, bends, hangers and support. Dismantled item shall be disposed from site and shifted to designated place as decided by customer.
2. Installation of pipes, bends, and associated hangers and supports along with necessary valves for Coal, BF gas and CO gas of various sizes as per the actual site layout requirements.
3. Scope of work include installation of a common BF gas pipeline with a diameter of 2200 mm for all three boilers, designed to handle a gas flow of 210,000 Nm^3/hr. From this main pipeline, tap-offs shall be provided for each boiler through a 1500 mm diameter branch, each carrying 70,000 Nm^3/hr of BF gas. These branches shall further reduce to 1200 mm in diameter to accommodate 35,000 Nm^3/hr of BF gas for each of the two BF gas firing elevations.

4. Each boiler shall be equipped with a 400 mm diameter CO gas pipeline, designed to handle a capacity of 4000 Nm^3/hr & same to be installed by bidder.
5. Bidder shall install miscellaneous drain and vent valves for both BF gas and CO gas pipelines as per actual site requirements.

D. The bidder installs a U-seal in the common BF gas pipeline. The U-seal shall be equipped with blinding flange connections at both ends.
E. Installation of Electro-Hydraulic goggle valve on the BF gas line to each individual boiler. The goggle valve shall be equipped with blinding flange connections at both ends.
F. The existing butterfly valves on the COG main line to Boilers 1, 2, and 3 shall be retained. However, checking the healthiness and servicing of these existing components being reused is included in the bidder's scope. Any required spares for these components to ensure they are operational during contract execution shall be supplied by the owner.
G. Double Block and Bleed (DBB) type Butterfly Trip Valves with remote operation shall be installed for each BF gas and CO gas pipeline at each corner of the boiler. These valves shall be equipped with pneumatic actuators.
H. Each common gas pipeline for BF gas and CO gas shall be equipped with a Butterfly Trip Valve, a butterfly control valve, and a vent trip valve, all with remote operation. These valves shall be equipped with pneumatic actuators and same shall be installed by bidder.
I. Venturi-type flow elements shall be installed for both BF gas (BFG) and CO gas (COG) pipelines.
J. Steam purging system, including piping, valves, and instrumentation, shall be provided for the fuel gas lines (BF and CO gas) to ensure safe and effective purging operations & same shall be installed by bidder.
K. The scope includes modification of coal piping, bends, and expansion joints as per the actual site layout requirements. The necessary modifications shall be carried out to facilitate the installation of BF gas and CO gas pipelines.
L. Installation of Scanner air Fans (2x100% AC) in the available space at ground floor and the corresponding piping, valves, auto transfer damper and instrumentation from scanner air fan to the wind box. (Including GP-2 grouting).
M. Bidder to carry out the Dismantling of existing Wind box assembly & duct, coal burner, Coal nozzle tip, ignitors, coal piping, hangers etc as per bidder's proven practice. Repairing and replacing shall be done on items damaged during dismantling shall be identified by a joint protocol between NSPCL/BHEL Engineer In-charge representative and bidder's representative. Bidder to include the equipment/items which are liable to be damaged during dismantling and items are not found operational or below the expected level of performance as per the joint inspection protocol.
N. The scope also includes the dismantling of existing platforms, handrails, and supporting structures over the existing BF gas line. These dismantled structures shall be replaced with newly supplied platforms, handrails, and supports. Additionally, any modifications or installation of any additional structures required within the boiler area shall also be included in the bidder scope. (Re-usable structural items to be strengthened and re-installed by bidder) .
O. Dismantling/modification of existing Coke Oven Gas (COG) line – common headers and erection of newly designed Coke Oven Gas (COG) line and its supporting structure.
P. Dismantling of equipment, items, removal of any piping, cable tray, and cables.
Q. Necessary access, platforms, walkways, handrails, staircase, ladders and gratings etc. for proper approach shall be installed by bidder for all equipment, instruments (for newly added items as per

scope of supply) including required during commissioning and testing and accessories in the scope. These approach platforms shall be provided to meet all required safety norms and these shall be of permanent nature and also restoration of existing platforms, removed for erection of equipment is in Bidder' scope.

R. Necessary handling/lifting arrangement shall be installed where ever is required.

S. Insulation and cladding for all parts (which require insulation) under scope of this package.

T. Erection of New Re-designed Wind box assembly, ducts, as applicable with Tilting Tangential Burner Assembly, and Wind box connecting duct along with Expansion bellows between wind box connecting duct and wind box. Erection of all items /equipment required to meet the proper functioning of equipment and systems shall be in the scope of bidder.

U. Installation of Pilot ignitors, Flame Scanner.

V. Painting and name stenciling on equipment, including the supply of all required paints and materials, shall be included in the bidder's scope of work.

W. Scope of work also includes the hydro test repair/replacement/ modification of water wall tubes for installation of windbox and superheater assembly, failures during hydro test (Hydro test is in Employer's Scope). **Bidder shall be responsible for obtaining IBR clearances /approval (both ground inspection of supplied material and erection work).** Bidder to note that the Air and gas tightness test of steam generator enclosure and ductwork for the modified portion of their scope shall be in bidder's scope. In addition, the consumables and blowers (if required) for air & gas tightness test is also in bidder's scope for their portion of work covered in the proposed works package.

X. Completion of total proposed R&M work in all aspects for functioning of Boiler as per normal condition. Bidder shall provide necessary manpower and T&P support during commissioning, testing and conductance functional guarantee test of Combustion Modification package.

Y. Paintings as per specification/ instructions of exposed surfaces along with materials.

Z. Bidder to ensure safe operation of unit after the proposed works (All statuary requirements including NFPA requirement and safe operation of unit after modification need to be ensured by bidder) and related documents/precaution shall be submitted to Employer for approval if required.

AA. Any other equipment/system and works (Which is minor in nature) required to make the system complete in all respects for its safe, reliable, efficient and trouble free operation will be in bidder scope.

Note: -

- **Removal and re-installation of any other component in order to the complete the job is in bidder's scope.**
  Note: - In the event that existing items require removal due to fouling during dismantling of existing facilities and/or installation of newly supplied items, such items shall be reinstalled, and all associated testing shall be included in the bidder's scope of work
- **Any minor modification required to complete the job is in bidder's scope.**
- **Quantity of Material for E&C: - Annexure-I (Mechanical).**

- **Google valve G a Drawing (Annexure-II) and Power pack along with erection procedure which is to be carried at site by bidder: -**
  Google Valve – 03 Nos. (One for each boiler)

1.0 APPLICABLE & REFERENCE DOCUMENTS (**Refer Annexure-II)**

The scope of work covered under this document shall be executed in accordance with the latest approved revisions of the following:

- General Arrangement Drawing (GAD) – Enclosed Rotary Goggle Valve ND-1500
- Hydraulic Power Pack – GA & Bill of Materials
- Control Panel – GA, wiring diagrams and terminal drawings
- Approved technical specifications, comments and datasheets
- Relevant statutory codes, safety rules and site practices

2.0 SCOPE OF WORK – BIDDER RESPONSIBILITY

2.1 Structural Works (Civil work excluded from bidder scope)

The bidder shall be fully responsible for the following:

- Construction and readiness of foundations / supporting structures for:
  - Enclosed Rotary Goggle Valve
  - Hydraulic Power Pack (Weatherproof sheltered area)
  - Control Panel
- Ensuring that the valve is freely supported on the platform and shall not be rigidly welded or bolted to the structure, in line with approved GAD notes.
- Providing necessary shims, leveling arrangements, and grouting.
- Provision of approach platforms, ladders, handrails, Staircases, Safety Railings and maintenance clearances.

3.0 Mechanical Erection of Enclosed Rotary Goggle Valve

The bidder scope shall include, but not be limited to:

- Unloading, handling, shifting, and erection of the valve at site.
- Alignment of valve with respect to the process pipeline centerline.
- Installation of companion flanges by welding with spool pieces, gaskets, fasteners, and bolting, avoiding pulling of Valve flanges due to welding/ tightening.
- Tightening of all fasteners using calibrated torque wrenches.
- Installation of vent valve extension pipe, drain valve and associated process piping within customer scope.

3.1 Installation of Hydraulic Power Pack (HPP)

The bidder shall carry out the following activities:

- Transportation, shifting, and placement of the Hydraulic Power Pack at the designated weatherproof room or sheltered location.
- Fixing HPP on prepared foundation using supplied foundation bolts.
- Ensuring adequate access, ventilation, and canopy clearance for operation and maintenance.
- Provision of proper earthing of the HPP.

3.2 Hydraulic Tubing, Hoses & Hook-Up Works

Hydraulic tubing and fittings are supplied in loose condition. The bidder shall be responsible for:

- Routing, cutting, bending, installation and clamping of hydraulic tubing between:
  - Hydraulic Power Pack and valve hydraulic manifold
- Installation of flexible hoses at required locations if applicable.
- Providing adequate pipe support, clamps, and protection.
- Proper identification and tagging of all hydraulic lines.
- Flushing and cleaning of hydraulic pipelines prior to final hook-up.

3.3 Hydraulic Oil Filling & System Preparation

The bidder shall arrange and execute:

- Filling of recommended hydraulic oil (ISO VG-68) in the HPP reservoir. **(Hydraulic Oil shall be arranged by BHEL)**
- Flushing of the complete hydraulic tubing and subsequent cleaning through external flushing and filtration system along with flushing oil
- Bleeding of entrapped air from pumps, cylinders and pipelines.
- Checking and confirmation of oil level, oil temperature switch, level switches, and pressure gauges.

3.4 Electrical Power Supply & Earthing

The biddrer scope shall include:

- Necessary arrangement for **supply** to Control Panel incomer

- Laying, termination, and testing of all power cables.
- Providing proper and effective earthing for:
    - Control Panel
    - Hydraulic Power Pack
    - Junction Boxes and field devices or wherever applicable

3.5 Control, Signal & Instrumentation Cabling

The bidder shall be responsible for:

- Laying and termination of control and signal cables between:
    - Control Panel and Hydraulic Power Pack
    - Control Panel and Valve Junction Box
- Ferruling, tagging, dressing, and securing all cables.
- Carrying out continuity checks, loop checking, and insulation resistance tests.

3.6 Pre-Commissioning Activities

The bidder shall carry out the following prior to commissioning:

- Mechanical inspection for tightness, alignment, and leak-free installation.
- Verification of all hydraulic connections and fittings with pressure testing.
- Electrical continuity and insulation resistance testing.

3.6 Commissioning & Trial Run Support

bidder responsibilities shall include:

- Providing required manpower, utilities, tools & tackles and consumables during commissioning.
- Carrying out no-load and load trial runs of the hydraulic system.
- Functional testing of:
    - Valve Open / Close operation
    - Clamp / De-clamp operation
    - Vent valve operation
- Rectification of defects attributable to site installation, cabling or interconnections.
- Final operational acceptance and handover.

4.0 MANPOWER, TOOLS & TACKLES (INDICATIVE)

4.1 Manpower

- Mechanical erection supervisor
- Mechanical fitters / riggers
- Hydraulic technician
- Electrical supervisor
- Electricians / instrumentation technicians
- Manpower support to Commissioning / operations engineer
- **Commissioning /operations engineer shall be arranged by BHEL.**

4.2 Tools & Tackles

- Crane / hydra / chain pulley block of adequate capacity with lifting tools and tackles.
- Tube cutting, bending and deburring tools.
- Calibrated torque wrenches and alignment tools.
- Electrical testing instruments (IR tester, multimeter) & tools
- Hydraulic oil filling Pressure testing and flushing equipment.

5.0 GENERAL CONDITIONS

- All works shall be executed in compliance with applicable safety rules, statutory regulations and site safety procedures.
- Deviations from approved drawings or documents shall be implemented only after obtaining written approval from the competent authority.

❖ Electrical System and Control & instrumentation system

The scope of work includes dismantling of existing **Electrical System** and **Control & instrumentation system** and its transportation to Employer's workshop/stores as per employer's guidance. Transportation from place of storage to erection site, erection, testing, pre-commissioning and commissioning of Electrical System and Control & Instrumentation system and handing over in fully operable condition satisfactorily to employer.

Cabling package, C&I package, Equipment & Associated Auxiliaries for the following: -

1. Cable tray & Accessories.
2. HT/LT power cables (generally arm/unarmored), LT control cables, instrument cable (generally arm/unarmored, screened or unscreened).
3. Junction boxes for electrical, Control & Instrument system and push button.
4. Structural steel.
5. PLC Panels, DCS Panels, Control & Instrument Panel, HMI, OWS/EWS, ontrol desk etc.
6. Erection and Commissioning of the Instruments is under the scope of Bidder.

7. Plant trial run, resolving any deficiencies observed and handing over the system to customer.
8. Impulse Pipe and SS Tubes.
9. Other equipment.

ELECTRICAL AND CONTROL & INSTRUMENTATION (C&I) SYSTEM:

Complete dismantling, erection and commissioning of the system are in Bidder's scope.

(A) Erection:

Being R&M work, erection consists of two major parts:

1) Proper identification and dismantling of existing equipment, items, cables, cable trays, JBs, instruments, removal of piping etc.

2) Erection/ installation of new system wise panels, equipment, cable, cable trays, JBs, instruments, impulse pipes, SS tubes, etc with proper glanding and termination of old field cables, laying and termination of new cables.

(1) Proper Identification and Dismantling:

(Dismantling of system wise panels, control desks and HMI)

- All existing cables are armored and lifted up through panel bottom gland plate with proper glanding. Because of the weight of the cable, glanding is necessary and to be maintained in new DCS/PLC panels. Proper identification of the cables with core wise usage details to be established before removal of termination/ disconnection.

- Removal of existing panels and re-accommodation of all panels with required base frames and anti-vibration pads with base frame grouting / welding and extending.
- Fabrication of base frames for panels/ cabinets is in Bidder's scope.
- The required civil works for floor cut-outs for additional panels to be located in existing free space in existing relay room/Control room, compressor room.

(2) Erection/ Installation of new system wise panels, electrical panels, switchgear panels, control desks, HMI, marshalling panels, Junction Boxes, Instruments etc.:

a. New power supply cables are to be laid and terminated as per requirement.
b. Existing cut-out size if necessary to be modified.
c. Minor Civil works like modification in cut out for panels, making approach through walls, breaking of concrete floors to suite DCS Panels, Electrical Panels and Switchgear Panels erection etc. wherever required.
d. Base frames with anti-vibration pads to be erected and properly grouted after proper alignment.

e. Panel earthing where ever required to be extended.

f. New panels/ desks are to be installed.

g. Modification/ laying of trays, conduits as per system requirement.

h. Gland plate of required size and number of gland holes to be fixed/ erected.

i. Glanding, lifting, dressing, clamping and termination of identified old and new cables in new panels, marshalling panels, supply distribution systems, power supply units and HMI including all peripherals.

j. Extension of earthing system as per requirement.

Note: -

1. All consumables for above all equipment's shall be included in bidder scope.
2. Supply and Installation of Earth Pits (2no.s per Unit) shall be in bidder scope.
3. Supply of GI Earth Flats and GI wire for earthing of all above Equipment's shall be in bidder scope.

(B) Commissioning:

Systems commissioning is a critical activity and hence following conditions are to be fulfilled:
Bidder has to ensure availability of expert commissioning team to successfully commission new Electrical and DCS/PLC system.
Commissioning of the system will comprise of activities in three parts viz. Pre-commissioning, Trial and Tuning.

1. Pre-commissioning:

I. Pre-commissioning activities starts with the powering of new panels/ HMI system.
II. Analog and Binary field input signal loop tests and correct signal validation.
III. Analog and Binary output signal to field and HMI tests and validation.
IV. Interfacing relay pick up through O/P modules and auxiliary contact changeover.
V. Proper window alarm through binary O/P.
VI. Proper HMI signal/ event validation.
VII. Inter-panel signal validation.
VIII. HT/ LT breakers cold trial in "TEST POSITION"
IX. Motorized valves limit switches, torques switches correct status validation.
X. HT/ LT auxiliaries' permissive, interlock and protection checking with breaker in test position.

Trials:

Trials are to be taken to ensure proper functioning of the following:

i) HT/ LT auxiliaries' actual trial with valid permit.

ii) Motorized valves actual open/ close with designed permissive and interlocks operation.

iii) Solenoid operated valves actual trials.

iv) Function testing of auto control loops in limited final control element action.
v) HT auxiliaries permissive, interlock and protection trials.
vi) System wise interlock and protection trials with correct alarm and event recording.

NOTE: Trials to be hold up in case any concerned parameter is not available because of new system.

MECHANICAL WORKS:

All the mechanical work involved in up-gradation of Electrical and C&I system is in the scope of Bidder.

2.1 GENERAL REQUIREMENTS.

2.1.1
The intent of specification is to procure 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.

2.1.2

The work covered under this specification is of highly sophisticated nature, requiring the best quality of workmanship, engineering and construction management. The contractor should ensure proper planning and successful & timely completion of the work to meet the overall project schedule. The contractor must deploy adequate quantity of tools & plants, measuring instruments, calibrating equipment, modern/ latest construction aids etc. He must also deploy adequately trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor should match requirement of sophistication involved with the items mentioned in the BOQ.

2.1.3

The work shall be executed under the usual conditions without affecting major power plant construction and in conjunction with numerous other operations 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.

2.1.4

Contractor shall erect, align and commission all the equipment and auxiliaries 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/ sequences adopted in erection of similar sets elsewhere.

2.1.5

The services, tests and support to be provided by the agency for the work mentioned in the various sections of this tender are indicative and not exhaustive, but not limited to these for the completion of the work in all respects.

2.1.6

The work to be carried out under the scope of this specification covers the complete work of loading, handling, transporting, unloading, preassembly, dismantling, erection, calibration, testing, pre-commissioning tests, commissioning of systems, trial run of various auxiliaries, achieving various activities till handing over of the unit to BHEL's customer, providing maintenance team to cater to guarantee responsibilities and maintenance thereafter. The work shall conform to dimensions and tolerances specified in various drawings that will be provided during the erection. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done departmentally or by engaging other agencies and recoveries will be affected from contractor's bills towards expenditure incurred including 30% departmental charges.

2.1.7

Contractor shall dismantle, calibrate, erect, commission all the equipment, cabinets/panels, instruments and cabling etc. as per sequence prescribed by BHEL at site. The sequence of dismantling/ erection / commissioning methodology will be decided by the BHEL engineers depending upon the availability of materials/work fronts etc. No claims for extra payment from the contractor will be entertained on the grounds of deviation from the methods of dismantling/ erection / commissioning adopted in erection / commissioning of similar jobs or for any reasons whatsoever.

2.1.8

The services, tests and support to be provided by the agency for the work mentioned in the various sections of this tender are indicative and not exhaustive, but not limited to these for the completion of the work in all respects.

2.1.9

Plant materials should not be used for any temporary supports/ scaffolding/ preparing pre-assembly bed etc.

2.1.10

The contractor shall have total responsibility for all equipment and materials in his custody at contractor’s stores, or any 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 machined surfaces/ finished surfaces should be greased and covered.

2.1.11

At all stages of work, equipment/ materials in the custody of contractor, including those erected, will have to be preserved as per the instructions of BHEL.

2.1.12

The terminal points as decided by BHEL shall be final and binding on the contractor for deciding the scope of work and effecting payment for the work done.

2.1.13

Descriptions of certain packages appearing in the rate schedule are available in this section to give general idea to tenderer about the type of equipment to be erected, calibrated, tested and commissioned.

2.1.14

During the course of dismantling, erection, testing and commissioning of electrical and C&I work, certain rework/ modification/ rectification/ repairs/ fabrication etc., will be necessary on account of feedback from various power stations or units already commissioned and/or units under erection and commissioning and also on account of design discrepancies and manufacturing defects and site operation/ maintenance requirements. Contractor shall carryout such rework / modification / rectification / fabrication repairs etc. promptly and expeditiously. Daily log sheets indicating the details of work carried out, man-hours, consumables used etc., shall be maintained by the contractor and got signed by BHEL engineer every day. Claims of contractor, if any, for such works will be dealt as per clauses 2.15 of GCC

2.1.15

The contractor shall make all fixtures, temporary supports, steel structures required for jigs & fixtures, anchors for load and guide pulleys required for the work (excepting, those specifically included in BHEL scope). However, necessary steel will be provided from the scrap/ surplus materials available at site.

2.1.16

All tools, tackles, fixtures, equipment's, materials, manpower, supervisors/ engineers, consumables, electrodes including oxygen, acetylene argon etc gases, primers, paints etc. 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 him unless otherwise specified in the relevant clause. The contractor's quoted rates should be inclusive of all such contingencies. Electrodes shall be baked / dried in the electrode drying oven (range 375 – 425 deg C) to the temperature and period specified by BHEL Engineer before their use. Necessary drying oven / portable oven shall be provided by the contractor at his cost.

2.1.17

All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipment/components for checking and cleaning, fabrication of tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing of cut outs/openings for mounting of console inserts, modules, indicators, recorders, drilling of holes for gland entries, reaming, scrapping, cable laying, dressing, fitting up etc. as may be applicable in such erection works are treated as incidentals to erection work and are necessary to complete the work satisfactorily shall be carried out by the contractor as part of the work.

2.1.18

The contractor shall make suitable security arrangements including employment of security personnel and ensure protection of all materials/ equipment in their custody and installed equipment from theft/ fire/ pilferage and any other damages and losses.

2.1.19

Equipment's /instruments required to be erected for this work, though not limited to but are generally as per rate schedule. For any items or class of work not specified herein but required for total completion of work, the same shall be carried out as per BHEL requirement. However, the payment of these items/class of work shall be regulated as per the General Condition of the contract. Contractor shall provide necessary resources for completion of such work within the stipulated time schedule. Value of such work shall be included while computing the total value of work finally executed for all contractual purposes, particularly for contract variation purpose.

2.1.20

The surfaces of foundations shall be dressed to bring the top surface of the foundations to the required level, prior to placement of equipment/equipment bases on the foundations. All the equipment/ equipment bases shall be grouted and finished as per these specifications unless otherwise recommended by the equipment manufacturer. The concrete foundation surfaces shall be properly prepared by chipping, grinding as required to bring the top of such foundation to the required level, to provide the necessary roughness for bondage and to assure enough bearing strength.

2.1.21

Contractor shall prepare Marked-Up drawings incorporating modifications and deviations from original drawings or prepare fresh sketch for actual installation / connection details if need be, that can be converted to "As-built" drawing.

2.1.22

Contractor shall abide by the safety/ security rules and regulations as per the requirement of BHEL and BHEL's customer. Contractor shall obtain information about all safety and security norms of BHEL and BHEL's customer well in advance. BHEL will not admit any claims whatsoever on account off Contractor's non-familiarization of site safety and security regulations.

2.1.23

The work under this scope being quite sophisticated and also quite extensive, for proper planning, monitoring, reporting, etc of ongoing works, the contractor shall establish his own computer(s) and printer(s) at his site office, along with suitable operator(s), consumables, etc. *Non-establishment of above equipment will attract penalty @ Rs 10000 (Rupees Ten thousand only) per month.*

BHEL uses its own software SOMS (Site Operation and Management System) for total project execution and billing. The contractor shall also provide adequate and suitable manpower for updating / entries into SOMS in BHEL computers at site.

2.1.24 Electronic Earth Pit

If required, erection of separate electronic earth pit for new system will be in scope of bidder including material.

2.2 Collection, Transportation and Handling of materials

2.2.1

The contractor shall take delivery of equipment, materials from the storage yard/ stores/sheds of BHEL/Customer. He shall also make arrangements for verification of equipment, safe custody, watch and ward of equipment after it has been handed over to bidder till these are fully erected, tested and commissioned and taken over by the customer. The contractor should note that the transport of equipment's to erection site, assembly yards, etc. should be done by the prescribed route in the most professional manner without disturbing other on- going works of various contractors. Special equipment (whichever applicable) such as laboratory equipment's, measuring and control equipment's, gauges, panels, console inserts, switches, transmitters, controllers, power cylinders, cables, conduits etc. shall be stored when taken over by the contractor in appropriate manner as per BHEL's instructions. The contractor should also note that while taking delivery of materials from BHEL stores (open/closed), it may be necessary to handle other items which could be blocking the exit route of the materials. The dismantled material shall also be transported from site to the place designated by the Customer. *This aspect shall be taken care of in the quoted rates and no extra payment shall be done in this regard*. It shall be the contractor's responsibility to arrange necessary cranes/tractors, trailer, trucks, slings, labour, etc., etc., for transport of equipment to and from site to designated location as decided by BHEL/ Customer.

2.2.2 Void

2.2.3

The contractor shall hand over all parts/materials remaining extra over the normal requirement with proper identification tags in a packed condition to BHEL/Customer stores. In case of any misuse or use over actual design requirements, BHEL reserves the right to recover the cost of parts/materials used in excess or misused. Decision of BHEL engineer in this regard will be final and binding on the contractor.

2.2.4

The contractor shall take delivery of the components, equipments and special consumables 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. Complete and detailed account of the materials and equipments after usage shall be submitted to the BHEL and reconciled periodically.

2.2.5

Overhauling, cleaning, revisioning, servicing of equipment / instruments, valves etc. during erection and commissioning stages will be arranged by the contractor. However, gaskets /packing for replacement will be provided by BHEL free of cost. All equipments shall be preserved and protected before and after erection as per the advice of BHEL engineer.

2.2.6

The contractor should take all reasonable care to protect equipment and materials under his custody either in his stores or at site. Copper tubing, brass fittings, brass valves etc. forming an integral part of equipment or system are liable to greater damages / pilferages /theft / losses. It will be responsibility of contractor to arrange for adequate security round the clock for protection from such damages / pilferages / theft / losses.

2.2.7

All equipment shall be handled very carefully to prevent any damage or loss. No bare wire ropes, slings etc. shall be used for unloading and/or handling of the equipment without the specific written permission of the engineer. The equipment from the storage yard shall be moved to the actual site of erection/location at the appropriate time as per the direction of BHEL engineer to avoid damage/loss of such equipment at site.

2.2.8

The contractor shall collect all scrap materials periodically from various levels of power house, working area of the power station, auxiliary and piping around power station and collect the same at one place earmarked for the same. Loads of scraps are 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 contractor's risk and cost if there is any failure on the part of contractor in this respect.

2.2.9

All the surplus, damaged, unused materials, package materials, containers, special transporting frames, gunny bags etc. shall be returned to the BHEL stores/customer's stores by the contractor.

2.2.10

All pipes and tubes, equipment, instruments issued to contractor and kept at site for erection shall be covered with plastic caps/steel caps or shall be closed with suitable plugs by the contractor.

2.2.11

The contractor shall ensure that all the packing materials and protection devices used for the various equipments during transit and storage are removed before these equipments are erected in position.

2.2.12

Contractor shall plan and transport equipment/components from storage yard/sheds to erection site and erect them in such a manner and in a sequence that material accumulation at site should not lead to congestion. Materials shall be stacked neatly, preserved and stored in the contractor's shed and work areas in an orderly manner. It may be specifically noted that the space available in the power plant is limited and accumulation of material may lead to the necessity of shifting and restacking the materials to enable other agencies to carry on with their work or to comply with customer's requirements. If required, the contractor shall arrange shifting of surplus material expeditiously failing which the same will be arranged by BHEL and all charges together with departmental charges at 30% will be recovered from his bills.

2.2.13

House-keeping in the erection and pre-assembly area is as important as the well-planned and orderly work. The access to site for inspection approaches by BHEL and customer engineers and leading of the material shall be made available by the contractor at all times. The shifting and re-shifting of erection materials, tools and plants and clearance of restrictions, filling of ditches, undulation near the preassembly area is the responsibility of the contractor. Contractor should visit the site and acquaint himself with all restrictions and difficulties that he may encounter during erection/commissioning stages.

2.3 TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST COMMISSIONING

The work is also inclusive of various commissioning activities of BHEL scope. The various activities, tests, trial runs may have to be repeated till satisfactory results are obtained and also to satisfy the requirements of customer/ consultant/ statutory authorities like, electrical inspector etc.

2.3.1

The contractor shall perform various activities during pre-commissioning, integrated testing, post-commissioning stages of equipment covered under this tender specification. It is responsibility of contractor to arranged tools & plants, test equipment, experienced engineers and technicians. Contractor shall earmark separate manpower for respective commissioning areas and they shall not be disturbed /diverted for other work. The contractor's commissioning group shall work as per the instruction of BHEL Engineer and they shall coordinate day-to-day activity with other agency and BHEL/ Customer. The testing activity may have to be repeated till satisfactory results are obtained and also to satisfy the requirement of Customer / statutory Authority.

2.3.2

The contractor shall simultaneously start testing & commissioning activities for equipment's to match the mile stone activities of the project.

2.3.3

The mobilization of these commissioning groups shall be such that planned activities are taken up in time and also completed as per schedule and work undertaken round the clock if required. It is responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools & tackles / testing equipment with BHEL Engineers and arrange for the same. If at any time the requisite manpower, consumables, testing equipment etc are not arranged then BHEL shall make alternative arrangements and necessary recoveries with overhead cost will be made from the running bills.

2.3.4

Contractor shall cut/ open work, if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over without any extra payment.

2.3.5

It shall be specifically noted that the contractor may have to work round the clock and in shifts during the pre-commissioning and commissioning period along with or without BHEL engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.

2.3.6

In case any rework/ repair / rectification/ modification / fabrication etc is required because of contractor's faulty workmanship which are noticed during the commissioning of, at any stages, the same shall be rectified by the contractor at his cost. If during the commissioning any improvement / repair / rework / rectification / fabrication / modification due to design improvement is required, the same shall be carried out by the contractor promptly and expeditiously. Claims of contractor, if any, for such works will be dealt as per clauses 2.15 of GCC

2.3.7

During the commissioning activities and carrying out various tests, if any of temporarily work such mounting of test equipment / cabling etc are required, the contractor shall carry out such work without any extra cost. The same shall be removed after completion of the activity.

2.3.8

During this period, though BHEL/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for complete requirement of men and required Tools & Plants, Consumables, Scaffolding and approaches etc., till such time the commissioned unit is taken over for trial operations.

2.3.9

The contractor shall carry out any other tests as desired by BHEL engineer on erected equipment covered under the scope of this contract during testing, pre-commissioning and commissioning, to demonstrate the completion of any part or whole of work performed by the contractor.

2.3.10

The pre-commissioning activities will start in a phased manner to meet the various milestones and shall continue till equipments are commissioned fully with all connected equipment / devices or handed over to customer for regular operation. In this duration other erection activities such as cabling etc., shall be carried out by other agencies even though equipments are partially commissioned / charged. In order to co-ordinate the work such as issue of safety permit, normalization and compliance of other requirement, contractor shall keep team of experienced engineer, supervisor, technician and helper in each shift as decided by BHEL Engineer. The team shall take instruction from BHEL Engineer for day-to-day work and shall not be diverted for other work. No extra payment shall be made for their services.

2.3.11

For electrical works, 415 volts and above, the contractor has to bring qualified electricians.

2.3.12

Certain systems may be supplied with portable programming units, which are to be connected at various locations during pre-commissioning to handing over. Necessary cabling interconnecting the programming units and other connected panels has to be carried out by the contractor and are to be dismantled after work. For the purpose of testing, monitoring, commissioning, etc., these programming units will have to be repeatedly connected and disconnected at various locations. These will be considered as part of commissioning activities and no separate payment will be entertained for the above.

2.3.13

It is the responsibility of contractor to provide for necessary labour, tools and tackles and consumables till the completion of work under these specifications even in case dismantling, erection, testing and commissioning of this work is delayed due to reasons not attributable to the contractor.

2.3.14

Simultaneous commissioning activities will be in progress in various areas. All these works need specialized gangs including electricians/instrument mechanics in each area. Contractor shall earmark separate manpower for various commissioning activities. This manpower shall not be disturbed or diverted.

The mobilization of these commissioning gangs shall be such that planned activities are taken up in time and also completed as per schedule and the work undertaken round the clock if required. It is the responsibility of contractor to discuss on day to day / weekly / monthly basis the requirement of manpower, consumables, tools and tackles with BHEL engineer and arrange for the same. If at any time the requisite manpower, consumables, T&P are not arranged then BHEL shall make alternate arrangements and necessary recoveries with overhead cost will be made from the bills of the contractor.

2.3.15

During commissioning activities and carrying out various tests, minor items like gauges, manometers, etc., have to be temporarily erected and put in service to suit the commissioning activities. BHEL will provide the necessary gauges and equipment. Contractor has to carry out the erection, calibration, dismantling of the same. After completion of activities the temporary systems have to be removed and returned to stores. No extra charges will be payable towards these.

2.3.16 Commissioning

- During pre-commissioning, commissioning, post commissioning and trial operation stages of various systems, certain category of manpower with T&P and consumables will have to be provided to BHEL commissioning engineers exclusively at their disposal. It shall be the responsibility of the contractor to provide Engineers, Electricians, technicians, Helpers, Fitters etc along with necessary consumables, hand tools, calibration equipment etc, for the various commissioning activities in progress. During shutdown period there could be requirements of separate commissioning gangs simultaneously in multiple areas. Contractor has to augment the manpower as and when required as per work demand and necessity at site. The quoted rates shall include this.

- Before the plant is put into initial operation the Contractor shall be required to conduct test to demonstrate to the BHEL/Customer that each item of the plant is capable of correctly performing the functions for which it was specified and its performance, parameters etc. are as per the specified/approved values. These tests may be conducted concurrently with those required under commissioning sequence. Decision of BHEL engineer shall be final and binding on contractor.

2.3.17 Calibration, Testing & Commissioning

Calibration, testing & commissioning activity as specified in this technical specification and rate schedule against various equipment, devices, systems etc. are broadly classified below. However, there may be some overlapping between the activities (dismantling, erection, calibration and testing, commissioning). The classification of activity is only a guideline for understanding the total volume of work in each activity. The contractor shall have no claim for performing or providing manpower for such overlapping work, which is also within the scope of the work.

(A) Calibration

Verification after drawing of material of various types, range of the field devices with respect to instrument schedule, data sheet or system document.

- Codification of instruments as per system tag numbers
- Calibration / adjustment of instrument as per system requirement / set values.
- Providing head correction in case of pressure measurement as per calculated values or actual measured value for the instrument, which are used for interlock protections / monitoring. This is generally applicable for turbine / generator, lube oil systems, lube oil system of fans etc.
- Verification of installation of instruments for range, type, tag number as per physical location of process point as per process, instrumentation diagram.
- Checking and ensuring the proper function of instrument.
- All the recorders shall be made functional with proper chart movement and ink marking (if applicable).
- Preparation of computerized calibration certificates in the formats specified by BHEL Engineers and getting those signed by the customer is in the scope of the contractor.

(B) Erection

- Verification of installation as per drawing and document for the correctness of cabling, JBs, impulse pipe, various field device, panels, instruments etc.
- Continuity check and IR value check of cables.
- Verification of correction of cable termination with respect to instrument, electrical hook-up diagram, panel interconnection diagram, JB schedule.
- Checking earthing of the equipments and cable shield wire continuity.
- Energizing the functional group control panels and field devices.

- All cable glands/piping/tubing to be fixed as per installation requirement before commissioning.

(C) Testing, Commissioning & Trial Operation

- Checking/verification of binary/analogue input and output signal from field and panel and up to recording/indicating instrument/HMI monitors.

- Checking the operating electrical/pneumatic drive through functional group panel, remote control desk, HMI, CRT operation and repeatability and smooth operation to be checked.

- Checking the interlock, protection and alarm for various process by simulation of field devices/process changes.

- Functional check of sub-loop control, sub group control and auto loop and fine tuning.

- Adjustment of limit switches/feedback position transmitter checking the actuator for correct Limit switch operation for correct position indication and repeatability shall be ensured.

- Motor IR value measurement, bearing/winding RTD checking, drying out of motor, providing assistance for trial run of motor which includes monitoring temperature rise winding/bearing during trial run.

- Contractor shall prepare calibration/testing report/protocols.

- During trial run of various systems, if the performance of any instrument is found erratic, un-satisfactory and requires re-adjustment, re-calibration etc., the defect shall be attended by contractor.

- Observing and checking the performance of the various devices on load/process variation. Any deficiencies/defect noticed during the variable load conditions, the same should be attended properly.

- Observe the proper functioning of sub-group/sub-loop control.

- Check the operation of various controls in manual/auto mode for smooth functioning.

- Clearing of all bad / invalid signals noticed during commissioning.

- Providing necessary assistance during restart of the unit is in scope of this specification. Smooth operation and availability of all instrument/controls of the systems installed under the scope herein, shall be ensured by the contractor. Contractor shall provide adequate number of skilled manpower and T&P for this purpose. Interruption during restart till stable operations at full load or any mutually agreeable load for reasons attributable to the Contractor may result in re-start of the unit all over again, consequential extension in Time Schedule / Contract Period shall be to the contractor's account.

- If any small wiring correction or minor modification in control panel wiring is noticed during the commissioning, it shall be carried out as a part of commissioning activity.

(D) Post-commissioning

- Contractor shall rectify the defect observed/informed by customer during the restart of the Unit

- Contractor shall submit the as- built drawing as per guidelines and instruction of BHEL engineer.

- After restart/handing over of the equipment, if due to unforeseen reasons, certain works crop up, the contractor shall provide all the assistance.

2.4 CABLE TRAYS/ CABLE DUCTS WITH SUPPORTS AND ACCESSORIES

2.4.1

Various types of sheet metal, galvanized cable tray, i.e. Perforated, ladder type, seal metal duct, solid bottom tray, shall be provided in standard lengths along with accessories like hardware, bends, reducers, coupler plate, tray covers and tray clamps etc.

2.4.2

Installation of cable tray/cable duct shall include cutting, laying, jointing, supporting, drilling holes in the support, providing tees/reducers/bends/clamps as per tray route layout, fabrication of bends/tees/reducers from straight length, fixing of tray covers, welding of tray on support, cleaning and application of cold galvanizing paint on weld joints (supply of paint is in the scope of contractor). *Installation of tray/duct covers, wherever provided, will be done as a part of tray erection and no extra rates will be payable.*

2.4.3

In case cable trays are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instance.

2.4.4

Before start of work support structure/ cable tray work in cable vault, the existing cables of fire alarm system, power and control cables are to be protected to avoid the damage from fire, cutting welds and etc.

2.4.5

Cable trays/ducts have to be routed underground in cable trench, over head on structure, valves, floors etc. for various applications such as cable laying, copper tubes, conduits, thermocouple, temperature gauge capillary etc.

2.4.6

The cable trays shall be supported in general at a span of 1.5m horizontally and at a distance of 1m vertically. All sharp edges and burr shall be removed.

2.4.7

Cable tray on the top tier shall have cover whenever running below pipes.

2.4.8

Cable trays shall be numbered as per layout drawing before laying of cables.

2.5 CABLE LAYING (POWER/CONTROL/INSTRUMENTATION: SHIELDED/ UNSHIELDED/PLUG-IN/COAXIAL/UTP/STP/DATA HIGHWAY, ARMOURED/ UN-ARMOURED, SINGLE/ MULTI-CORE, PVC/HR PVC/FRLS/ TEFLON/PTFE/ XLPE INSULATION, OPTICAL FIBER, ETC.)

2.5.1

Cable laying includes cutting to the required length, laying in overhead/underground cable trench/through pipes/flexible conduits, dressing/clamping in tray, drilling of holes in gland plates in panels and junction box, glanding, splicing, dressing of spliced wire inside the panel and JBs, providing PVC numerical/alphabetical / printed ferrules, termination by using crimp type copper tinned/aluminium lugs, insulated/un-insulated, termination (crimp, soldering, etc.), plug-in connections with insert type crimping, providing identification PVC/aluminium cable tags (at both the ends and at 15 m intervals throughout the route length and also at each bend), continuity checking, insulation resistance checking, high voltage test on HT cables. Contractor to arrange adequate numbers of his own ferrule printing machines.

2.5.2

All cables shall be provided with minimum of 2mm thick aluminum sheets as cable identification tags indicating cable designation in accordance with the cable schedule. The cable tags shall be provided at the ends as per cable schedule, when the cable changes direction/ elevation. The cable tags shall be of aluminum with the number punched on it and securely attached to the cable by not less than two turns of 20 SWG GI wire conforming to IS:280. Alternatively, cable may also provide cable tags made of nylon, cable marking ties with cable number heat stamped on the cable tags.

2.5.3

For buried cable, the marker shall project at least 150mm above ground and shall be spaced at an internal of 20m and at every change of direction.

2.5.4

All the cables shall be clamped to the cable trays/ support structure with the help of clamps. Cables to be strapped to tray at interval not greater than 300mm. All power cables shall be clamped individually and control cables shall be clamped in groups of 3 or 4 cables. Clamps for multicore cables shall be fabricated out of 25x3mm aluminum flats. Single core power cables shall be laid in trefoil formation and suitably clamped with Al cast/ Glass Fiber Clamp. All sharp edges and burr shall be removed. Erection Agency shall carry out the plant cabling works in line with customer/ consultant's Technical Specification.

2.5.5

Cables to be strapped to tray at interval not greater than 300mm.

2.5.6

Laying of Power, Control, DC supply Cable and Signal Cables are to be laid as per identified cable tray. In case of non-availability of cable tray, cable shall be laid with permission of BHEL.

2.5.7

Laying, etc of Optical fibre cables on cable trays /cable trench shall necessarily be done using flexible conduit

2.5.8

Damaged cable drums also to be used within the quoted rates. No extra compensation for difficulty in cable laying due to damaged drums shall be made.

2.5.9

Entry to the panels and JBs may be at top, sides or bottom. All cables are required to be properly supported and clamped near to the JB/panel.

2.5.10

Spare holes in the panels/ Instruments/ Actuators/ Motors/ JBs/ etc. shall be sealed by the contractor using suitable method (The cost of work and Materials such as aluminum sheet or Adhesive tape/ Plugs etc. shall be within the quoted rates for laying of cables).

2.5.11

Wherever cable glanding is not possible, either due to the gland plate size limitations or more number of cable entries, prefab plug-in cables, etc., for such cases cables may have to be lifted inside the panel by either making cut-out in gland plate and providing rubber profile for sharp edge protection or alternatively, providing 4" or 6" PVC pipe coupling gland and these pipe coupling gland shall be supplied by contractor within the quoted rate of cable laying.

2.5.12

Copper tinned lugs of various types (pin, ring, fork, snap-on) upto 4 sq.mm, PVC cable ties, PVC ferrules, PVC button and tapes, cable identification tag of PVC/metallic, clamping and dressing material with hardware, PVC sleeves etc. shall be supplied by the contractor within the quoted rates for cable laying. The quality of material shall be got approved from BHEL engineer prior to their use on job.

2.5.13

All care should be taken to avoid abrasion, tension, twisting, kinking, and stretching of cables during installation.

2.5.14

Cable shielding – all signal cables are supplied with bare shielded copper wire/with braided wire shield. Generally, shield wire is kept isolated at instrument/field device end and continuity is maintained through JBs and grounded at panel end only. While terminating the shield wire either in panel or JBs, PVC sleeves are to be used to avoid two-point earthing.

2.5.15

Wherever cables run through ducts, conduits, valves, etc., they shall be sealed using fire/weather proof compound. In addition to this, cable entry in panels, MCCs, instruments, electrical actuators etc., are also required to be sealed. The required material for doing so shall be included by contractor in the cabling scope.

2.5.16

Many of the cable trays and cables have to be laid in cable trenches. For this purpose, the covers of the trenches have to be opened for working at site and whenever the cables are to be laid in existing cable tray, all safety precautions have to be observed.

After completing the work, the trenches have to be cleaned and covers put back into position. Contractor shall also carry out de-watering from the trenches if required and arrange pumps etc., at his cost.

2.5.17

Looping wire at terminal block of panels and electrical actuator as shown in the inter-connection diagrams or as required is to be done by contractor at no extra cost.

2.5.18

Contractor shall carefully plan the cutting schedule of each cable drum in consultation with site engineer such that wastages are minimized. In any case, the wastage shall not exceed the limits mentioned in this contract. Recovery will be made in case the wastages are exceeding the wastage allowances fixed in this contract.

2.5.19

The erection contractor shall make every effort to minimize wastage during erection work. In any case, **the wastage shall not exceed the following limits;**

Sl. No.	Item	% Wastage on issued Qty
1.	Fabrication steel	2
2.	Each size of power cables	1
3.	Each size of control/Instrument cables	2
4.	Impulse pipe/tubes/GI pipes/copper tube	1

If, however, the bidder quotes for more wastage than specified above, the excess portion will be considered for adjustment during the tender evaluation at the quoted supply rate of material.

If the actual wastage be more than the specified figure, then equivalent price of the excess portion will be deducted from the contractor's bill.

2.5.20

In case of HT cable, cutting schedule is to be followed as provided by BHEL.

2.5.21

The HT/ LT Power and control cabling work shall be carried out in advance so that same can be terminated at panel end as the clearance is ready from the panel E&C side.

2.5.22

The termination and connection of cables shall be carried out strictly in accordance with manufacturer's instruction, drawings, and/ or as directed by the BHEL. The work shall include all clamping, fitting, fixing, soldering, tapping, compound filling, cable jointing, crimping, shorting, and grounding as required for the complete job. Cables shall be checked for insulation resistance before and after jointing. All erection consumables shall be in Erection Agency's scope. Termination and connection shall be carried out in such a manner as to avoid strain on the terminals. Cables shall be marked with cable numbers as per applicable drawing.

2.5.23

Control cable cores entering control panel/ switchgear/ MCC etc. shall be neatly bunched and served with PVC perforated tape to keep it in position at the terminal block.

2.5.24

Termination and connection shall be carried out in such a manner as to avoid strain on the terminals. Cables shall be marked with cable numbers as per applicable drawing.

2.5.25

All cable entry points shall be properly sealed and made vermin proof and dustproof. Unusual opening, if any, shall be effectively closed. Sealing work shall be carried out with approved sealing compound having fire withstand capability for at least 03 hours.

2.5.26

The rate of laying for LT power, control and signal cable is inclusive of glanding and termination at both ends.

2.5.27

The LT Power, Control and Signal Cable straight through Jointing Kits (if required) shall be in Contractor's scope of supply. The rate of supply, and erection of these kits will be part of laying rates. No separate rate is applicable on this account.

2.5.28

The unit rates for the HT cable termination are exclusive of unit rates for laying of HT cables. termination kits for HT cables (3.3kV and above) shall be supplied by BHEL.

2.5.29

Ferrules shall be installed on all control cables cores in all junction boxes and at all terminations. The ferruling shall be cross ferruling. The ferrules shall carry terminal numbers as per drawings. All ferrules shall be colored, plastic & interlocked type. Spare cores shall also be similarly provided with ferrules, crimped with lug and aped on the ends. Spare cores shall be ferruled with individual cable number, crimped with lug and aped on the ends.

2.5.30

Terminal Connections:

The types of cable terminations are generally as detailed below:

1) All field cables in package are crimp type of different sizes.

2) All JBs are both side screw type.

3) All console tiles wiring: screwed or plug-in type to be fabricated at site.

2.5.31

For removal of existing Cables, Cable Induction meter of applicable Voltage is mandatory to confirm that the cable is charged or not.

2.5.32

Existing/old cables are to be disconnected from old Panels and re-connected to the new Electrical/DCS/PLC Panels. If the existing cables are short in length, same has to be joined by straight lugs of various types (pin, ring, fork, snap-on) upto 4 sq.mm and reconnected to the new Panels.

2.5.33

Unit rate quoted for cable lying shall include the activities as defined above.

2.6 JUNCTION BOXES

Different types of junction boxes are to be erected by the contractor like junction boxes below 48 ways and above 48 ways. The junction boxes are to be located at the locations jointly decided at site during erection. The junction boxes are to be erected on the frames fabricated at site. Brief work will include:

a. Checking of installation for correctness.
b. Functional checking/ adjustment of JB/ PB for their system.
c. Hardware for erection (Like Nuts, Bolts and Washers etc.) where ever is required shall be in the scope of the contractor.

2.7 FLAME SCANNER

Existing Flame Scanners to be replaced by New flame scanner system for elevations along with necessary mechanical modifications, flame scanner guide pipe installation/assembly and field cabling.

2.8 STRUCTURAL STEEL FABRICATION AND INSTALLATION (Instrument/ Junction Box Frame/ Panel Base Frame/ Cable Tray & Misc. Structures Fabrication)

2.8.1

Structural steel material like MS angles, channels, beams, flats, plates etc. shall be used for fabrication of panel base frame, cable tray supports, canopies, instrument and junction box frames, impulse pipe/instrument air pipe supports and instruments etc.

2.8.2

This shall include cutting into size, conduiting of end connections, if required, welding, grinding of excess weld deposits, drilling of holes for mounting of device/instrument, installation at location, levelling, alignment, providing bracings, painting etc. No gas cut holes will be permitted. Contractor to follow the BHEL supplied welding schedule and welding procedures.

2.8.3

In case, structural cable trays, bends, tees, reducers etc., are required to be fabricated from structural steel and installed, unit rate applicable for fabrication and installation of structural steel shall be applicable in such instances.

2.8.4

Frame installation/cable tray accessories' installation at site may involve mounting either on concrete floor by grouting/using anchor fasteners or on steel structure by welding etc. *All consumables including anchor fasteners shall be arranged by the contractor*.

2.8.5

All the fabricated supports/frames shall be applied with one coat of primer red oxide paint before installation and two coat of synthetic enamel of prescribed shade of final paint,. If required, BHEL shall prescribe time gap between first and second coat of final paint. Supply of paint, primer etc. are in contractor's scope.

2.8.6

In certain packages, galvanized members of junction box frames and instrument racks shall be supplied in cut to sizes and frame assemblies are required to be done as per drawing by bolting/welding. The installation rate as quoted shall include the assembling of the frames.

2.8.7

Gas cutting of tray/impulse pipe support and gas cut holes in frame shall be avoided. Only drilled hole shall be permitted in frame etc.

2.8.8

All the fabricated supports/ frames for instruments, brackets/ racks, support steel work for tubing impulse lines/ instruments trays, pipes, electrical equipment, etc., shall be epoxy painted after shot blasting (as applicable) and surface preparation as per painting specifications. Paints and other associated items are in the scope of the contractor.

2.8.9

Hardware for erection (Like Nuts, Bolts and Washers, etc.) where ever is required shall be in the scope of the contractor.

2.9 INSTALLATION OF PANELS

2.9.1

Electrical control panels, electronic control panels, etc., are normally supplied in suite of either one/two/three/four/five or loose shipping sections with integral base frame or loose supplied.

These panels may have to be installed as stand alone or in groups consisting of number of panels in each row, depending upon the plant layout and foundation arrangement.

2.9.2

The panels shall be transported from stores to the place of installation in vertical position. Care shall be taken such that the switches, lamps, instruments etc. mounted on the panel do not get damaged during transit.

2.9.3

Installation of panel shall include **construction/ fabrication of base frame**, levelling, alignment, fixing of anti-vibration pads, removal of side covers, fixing of cubicle interconnection hardware, bus bar jointing, wiring interconnection, welding and grouting of panels and base frames, mounting of panel canopy wherever supplied as part of panel, drilling of gland plates and sealing of cable entries. In certain case where canopies are not supplied but have to be fabricated out of MS sheets (to be arranged by the Bidder), payment will be done on square meter basis after all requisite documents

2.9.4

Panels have to be shifted to their locations through floor openings, temporary openings like floor grills, door etc. which shall be part of work and no claim whatsoever will be entertained with regard to non-availability of opening as per shortest route etc. Panel have to be erected at different locations and elevation in TG, GTG hall, LT & HT switchgear room, unit control room, etc.

2.9.5

Panel and instruments once erected in position should be properly protected using necessary care to prevent ingress of dust/moisture. This will have to be periodically cleaned and surroundings have to be kept tidy. Necessary canopies for Instruments and JBs shall be provided.

2.9.6

Wherever the panels to be mounted on cable trenches, channel supports have to be provided across the cable trench over which the base frame of panel shall be mounted. For such work, structural steel fabrication, installation rates shall be applicable.

2.9.7

Normally the panels shall be supplied with instruments, relays, meters, electronic modules etc. mounted and pre-wired. However, if these are supplied loose / separately for safety in transit, contractor shall mount/wire such devices as part of the panel installation work and no separate rates shall be applicable unless otherwise *specially* listed in the rate schedule.

2.9.8

Supplier's instruction manuals, packing slips, door keys etc. received along with the panels will be handed over to BHEL's engineer on opening of the panels and record of receipt of such things shall be maintained by contractor.

2.9.9

Regular cleaning of the panels as per the instruction of BHEL engineer till handing over of the set to customer is to be carried out by the contractor free of cost.

2.9.10

No separate payment shall be made for replacement of any devices like electronic modules, relays, conductors, terminal block, push buttons etc. which are found defective during pre-commissioning / post-commissioning of any equipment / item.

2.9.11

For the panels erected by other agencies, commissioning/calibration work and troubleshooting has to be carried out by the contractor as part of testing and commissioning work as per the quoted rates.

2.9.12

Associated civil works like drilling, chipping, punching holes and opening in concrete floors, slabs and brick walls, grouting, related to Rack, support fabrication and installation, associated civil works required for installation of control panels, Junction boxes etc., shall be included in the erection cost of such items. Also all associated civil works like chipping away and making good as necessary in floor

slab/wall for cabling / earthing etc., as required are included in the scope for which no separate payment is applicable. The scope also includes supply of grouting material, if any. Mechanical works as per BOQ is also in the scope of the contractor.

2.10 CONTROL PANELS/PLC Panels

Control & Instrumentation system panels are DCS/PLC based. This system is having communication through UTP cables amongst themselves. The system consists of computer network with servers and workstations and various peripherals like printers, etc. Optical fibre cables are also used for communication, especially for larger distances. The various components/devices are generally located in control room/computer room/diagnostic and shift in charge room. Some panels (viz. network panels) are also located in outdoor plants and other units.

The entire work of dismantling, erection, testing, commissioning of the connected devices/equipment as listed in rate schedule is to be carried out including laying of peripherals cables (either plug-in or plugs to be fabricated at site), placement of computer furniture in computer room as per lay out. The computer furniture shall be supplied either assembled or in knocked down condition, which have to be assembled at site. The quoted rate shall be inclusive of cable laying, termination and placement of furniture against each device as given in the rate schedule.

2.11 Void

2.12 FIELD INSTRUMENTATION

2.12.1

Various type of primary/secondary indicating/recording instrument for pressure, temperature, flow, level and analytical measurement shall be supplied either loose or mounted along with the equipment.

2.12.2

Scope of work under erection/calibration/testing/commissioning shall include calibration, setting, adjustment, writing instrument tag number with paint, report making, installation, servicing, minor repairs/servicing, putting instrument into service, signal checking from field up to the functional group panels and remote indicating instrument, functional checks, interlock and protection/alarm checks by simulating the field devices, troubleshooting during pre-commissioning/post-commissioning till system is handed over to the customer.

2.12.3

It is the responsibility of contractor to make erection, calibration/testing protocols for various electrical and C&I equipment/devices and they should get duly certified by customer/BHEL engineer and should be submitted to BHEL engineer regularly. However, sample formats will be given by BHEL and have to be printed by contractor in adequate numbers.

2.12.4

Contractor shall establish calibration laboratory with adequate facilities and they should arrange standard test instruments duly calibrated from recognized agencies and calibration report of the same to be submitted prior to start of calibration of the field instruments/devices.

2.12.5 Void

2.12.6

Installation of instrument shall also include drilling of holes and tapping for mounting of instrument and local instrument frames/panels and supply of hardware for mounting of the instrument.

2.12.7

Some devices line solenoid valves, position feedback transmitters, limit switches, air filter regulators, airlock relays, positioners etc., are supplied assembled along with mechanical equipments like pneumatic control valves, power cylinders, trip valves, dampers, motorized actuators, etc. These will need removal, calibration/testing, re-fixing, adjustment, etc., and commissioning. Separate payment shall not be made for this. The rates quoted for the commissioning of these equipments (viz., pneumatic control valves, power cylinders, trip valves, dampers, etc.) should take care of the above. Also, the contractor shall remove such devices prior to erection either at site or at store to avoid damages/pilferages and keeping in safe custody and the same shall be installed prior to commissioning of such equipment.

2.12.8

Transmitter enclosure / open racks for various packages which are to be erected and commissioned at various locations of the turbine and outdoors, shall be supplied with internal tubing, air filter regulators, rotameters, provision of continuous or intermittent purging arrangements wherever required, etc. The quoted rates for these racks / enclosures shall include the erection and commissioning of all such items inside these racks / enclosures.

2.12.9

Sometimes recalibration of equipments may become necessary due to reasons not attributable to the contractor, e.g. Lapse of Time after first calibration, Need for change in range/parameter, etc. If re-calibration is required due to no fault of the contractor, the rates payable for re-calibration shall be as under:

Recalibration Charges = 60% of the Percentage Stage Payment for Calibration as per split-up defined in Terms of Payment

The contractor shall keep record of such instrument with the reason for re-calibration and certified by the BHEL Engineer.

Note: For recalibration of skid mounted items or other systems where lump-sum rates are quoted, the recalibration charges, if admissible, will be calculated from the relevant unit rates quoted for same / similar items elsewhere in the rate schedule. The decision of BHEL Engineer shall be final and binding on the contractor.

2.12.10

For the very few cases where required, the contractor shall carry out re-orientation of bottom/top entry arrangement for process connection if needed due to site condition in existing instrument rack/enclosure/JB and re-location of existing instrument including removing of the existing tubing and

re-installation of the same at appropriate location due to any change in grouping of the instrument and no extra payment shall be applicable.

2.12.11

In certain cases, instruments / devices are supplied on equipment or drawn by other agencies as part of mechanical package. The same are to be received or to be collected from other agencies for keeping in safe custody to avoid damages. The same are to be erected back after calibration for which unit rate shall be applicable for erection and calibration. Contractor shall maintain record of such instrument duly certified by BHEL engineer. However for removal of such instrument, no separate rate/payment shall be applicable.

2.14 MISC. OTHER INSTRUMENT/ EQUIPMENT ERECTION, CALIBRATION AND COMMISSIONING.

2.14.1

Wherever panels & control valves have been erected by the mechanical contractor, calibration/ commissioning has to be carried out by the contractor.

2.14.2

Dimension and weight as mentioned against control panels, MCCs, etc. in rate schedule are only approximate and there may be changes in dimension and weight in actual supply of the equipment and no rate variation shall be applicable on this account.

2.14.3

Wherever brief description of the system is given under various sub-heads, it is only for the understanding system requirements. It does not indicate the total specification of work. For such system, other clauses are also applicable wherein work details are specified.

2.14.4

Normally, cable glands on junction boxes side are received in mounted condition. While terminating the cables as per drawings, the cable glands are to be removed and fixed. Wherever cable glands are not received along with junction boxes, the cable glands as per the requirement will be provided by BHEL and the contractor has to make necessary holes/ adjust the available holes in the JB for fixing these. No separate payment will be made for drilling of holes and fixing the cable glands to the junction boxes. Nameplates for JBs will be supplied separately. These are to be suitably written and fixed onto the JBs. Wherever nameplates for JBs are not supplied, the JB no. are to be written with paint on JBs for identification. Separate payment will not be made for this.

2.14.5

The push buttons and indicators in C&I systems are provided as loose with different type of connectors. The fixing of connectors and their wiring from push buttons to indicators shall be the responsibility of contractor. No separate payment will be made for fixing of connectors. The cable laying and termination charges will be paid as per applicable rate schedule.

2.15 GUIDELINES FOR ERECTION

2.15.1 Air Piping

All instrument air pipelines shall be isolated from the instruments and pressurized pneumatically to maximum work pressure. They shall then be isolated from the source of pressure and fall shall be less than 1 psi in 20 minutes.

2.15.2 Pneumatic Signal Lines

All pneumatic signal lines shall be disconnected and blown through with instrument air. The line shall be blanked off and pressurized pneumatically 20 psi and checked with soap solution for leaks and attended accordingly.

2.15.3 Instruments and Equipment

a. All field mounted instruments are to be located in such a way as not to obstruct walk-ways or plant equipment access but shall be easily accessible for maintenance. Hand rails shall not be used for mounting or supporting instruments.
b. Racks/ stands and supports for instruments and transmitters shall be fixed on RCC column/ floor by chipping and grouting or by welding to steel structure. In no case these shall be welded to floor grills.
c. When installing flow and pressure transmitters/ switches for Liquid/ steam/ condensate vapor services, the instrument is to be mounted below its primary element or tapping point. For gas service applications, the instrument is to be mounted above Primary element tapping point.
d. During erection and commissioning stage, the site mounted instrument shall be protected suitably. Contractor shall provide suitable security arrangement in main control room, and other areas where equipment are positioned, at no extra cost.
e. Contractor shall arrange for own firefighting equipment for the materials stored under contractor's custody.

2.15.4 Sub-assemblies

a. All subassemblies should be kept in a separate place where it is easily accessible.
b. Subassemblies should have a protective cover in case it is stored without wooden packing/ case to prevent accumulation of dust. Silica gel packets should also be kept along with it.
c. Subassemblies should not be stacked one above the other.

2.15.5 Loose items

The loose items supplied for the main equipment falls into various categories like tools, cables, prefabricated cables, console inserts, recorders, VDU/CRT, other display units, printers, sensors and transducers, cable glands, cable ducts, frames, racks, etc. These are to be categorized and stored separately.

2.15.6 Guidelines for handling of electronic modules

a. All the electronic modules shall be handled by qualified persons only.
b. Electronic modules should only be touched when it is absolutely essential to do so.
c. Before touching any electronic module, the operator should discharge the static electricity by earthing himself or better still, ensure constant discharge by wearing an earthed wrist strap.
d. The operator should not wear clothing made entirely from synthetic fibres, but a mixture containing at least 65% cotton.
e. The PCB should always be held by front panel or by module frame and electronic components/ connectors should never be touched.

f. The electronic modules should not be placed close to television sets or CRT units.
g. Soldering irons and any other tools used must be grounded.
h. All modules using CMOS components are packed in antistatic bags when transported loose to avoid ESD failures. The antistatic bags must always be used to transport modules at site from one place to the other.

2.15.7 Welding, Non-destructive testing etc.

a. Installation of equipment involves good quality welding, NDE checks etc.
b. Welder deployed for aluminum welding shall have experienced and approved by BHEL and BHEL's Customer after due qualification process/ testing.
c. Welding of all structural steel & aluminum shall be done only by the qualified and approved welders.
d. All the welders shall be tested and approved by BHEL engineer/ Customer's quality engineer before they are actually engaged on work though they may possess IBR/ other certificate. BHEL reserves the right to reject any welder without assigning any reason.
e. The welded surface shall be cleaned of slag and painted with primer paint to prevent corrosion. For this paint will be supplied by the contractor.
f. Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.
g. Certain types of coated 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 coated welding electrodes have to be carried in portable ovens.

2.16 ELECTRICAL CABLING, EARTHING AND ABOVE GROUND EARTHING

2.16.1 ELECTRICAL CABLING/ WIRING

a. All the cables will be properly laid in cable trays, dressed and clamped with aluminium flats. The cable will be terminated at both ends with suitable lugs and printed ferrules and will be glanded properly. Suitable equipment and consumables for ferrule printing has to be arranged by the contractor at his own cost. For cable identification, the contractor shall provide at his cost aluminium tags at regular intervals (as per cable schedule) through each run of cable.
b. All electrical connections shall be tested for polarity and proper connections.
c. Insulation test of the various circuits shall be done.
d. The checking of operation of individual equipment and instruments to which the cabling/ wiring connected shall also be done by the contractor.
e. Wherever supplied, GI cable trays shall be of bolted construction only with fixing screws and coupler plates.
f. Sharp bends of cable trays shall be avoided in all type of cable trays.
g. Installation of cable racks and supports structure shall be carried out in all the required areas. Steel embedment shall be provided in the cable trenches, ceiling slabs and concrete blocks for installing the cable racks and support structures.
h. Ladder perforated type cable trays shall be used in cable trenches and vertical risers.
i. Cable racks in the trenches and control room are to be shared with other contractors installing cables in different areas wherever required. Contractor shall cooperate with the other contractors in sharing the cable trays and proper dressing and clamping the cables.
j. Where power and control cables are to be laid in the same route, suitable barriers to segregate them physically shall be employed.
k. Space equal to the diameter of cable shall be provided between power cables of six over 50 mm in diameter.

l. When cables pass through floors, walls etc., it shall be passed through a pipe for mechanical protection and the pipe ends sealed suitably.
m. Care shall be taken to avoid short bending and kinking of conductor damaging insulation and stressing the cable beyond pulling force recommended by the manufacturer. Cable shall be protected at all times from mechanical damage.
n. The minimum radius of formed bend of an insulated cable shall be 12d for un-armoured cables and 15d for armoured cables where 'd' is the overall diameter of the cables.
o. No cable shall be laid in ducts or trenches where other services such as oil pipes, steam or water pipes are laid.
p. Where cabling passes through brickwork or concrete work, the contractor shall provide suitable local protection against mechanical damage wherever necessary.
q. The layout of all cables shall be arranged to give adequate clearance from other services and cables shall be routed to avoid hot zones. No extra cost shall be considered for rework.
r. Jointing of cables shall be avoided as far as practicable. However, jointing if at all necessary shall be done by crimping type cable joints after getting approval of BHEL engineer.
s. The cable schedules indicating cable sizes, tentative cables routing information will be furnished by BHEL at site to the contractor. Required steel inserts on cable trenches, will be provided by BHEL. The contractor shall design number of cable/ racks to accommodate the cables on racks/ trays properly.
t. Detailed specification shall be as per instruction of site engineer.

2.16.2 EARTHING INSTALLATIONS

a. All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all equipment supplied by BHEL.
b. The earthing conductors shall be of mild steel/ GI strip/ wires. All connections from equipment to main earthing conductors shall be made as illustrated in earthing drawing/ as per instruction of BHEL engineer. Suitable "Cu" Lugs are to be supplied for earthing with GI wire by the agency where ever is required.
c. A continuous earthing conductor shall be installed in all cable trays and securely clamped to each tray section by suitable connectors to form a continuous earthing system. When two or more trays supporting power cables run in parallel, a continuous earthing conductor shall be provided on trays only with tap offs to the control cable trays. All valve and damper motors and rapping motors will be earthed to this conductor.
d. All joints in the earthing system shall be welded type. Earthing connections to all equipment including motors shall be bolted type.
e. Earthing connections shall be free from tinning scale paint, enamel, grease, rust or dirt at the time of making joint.
f. Metallic sheaths, screens/ shields and armour of all multicore cables shall be bonded and earthed.
g. Earthing conductors along their run on columns, beams, walls etc. shall be supported by suitable cleats at intervals as specified by BHEL site engineer.
h. Welded joints on GI earthing conductors shall be painted as mentioned in the Typical Arrangement drawing.

2.16.3 ABOVE GROUND EARTHING

a. The contractor shall carry out above ground earthing for all Electrical equipment, which may be erected by him, or some other agency. Different type of earthing materials shall be supplied and the contractor shall lay and connect the earthing materials as per site requirement and as detailed in drawings. Unit rate for earthing material shall be paid on running meter basis.

b. All equipment shall be earthed by two separate and distinct connections. Earthing terminals will be available in all the equipment supplied by BHEL.
c. Parts of all electrical equipment and machinery not intended to be live shall have two separate and distinct earth connections each to conform to the stipulation of the Indian Electricity Rules and apparatus rated 240V and below may have single earth connections.
d. Generally, risers are provided near the structure/ equipment foundation, in case risers are not visible and buried below the foundation level, contractor shall carry out necessary earth excavation for connecting the above ground earthing strips. Wherever welding is involved necessary protective coating shall be applied on weld joints.
e. The earthing conductors shall be mild steel/ G.I. strips/ wires. All connections from the equipment to the main earthing conductors shall be made as illustrated in earthing drawings. A copy of earthing drawing shall be provided to the successful bidder.
f. A continuous earthing conductor shall be installed in all cables trays and securely clamped to each tray section by suitable connectors to form a continuous earthing system. When two or more trays supporting power, cables run on parallel a continuous earthing conductor shall be provided on one tray only with tap-offs to the control cable trays. All valve and damper motor and rapping motors will be earthed to this conductor.
g. If the equipment is not available at the time of earthing conductor laying tap connections from the main earthing conductor shall be brought out up to slab equipment foundation level with at least 200mm spare length left for further connections to equipment earthing terminals.
h. Entire system shall be earthed in accordance with the provisions of the relevant IEC recommendations/ IS code of practice IS 3043-1947 and further amendments thereof and Indian Electricity Rules, so that the values of the step and contact potentials in case of faults are kept within safe permissible limits.
i. If any outer shops and buildings as well as the electrical sub-stations and electrical rooms are also in contractor's scope, a ring main earthing system will be provided. Ring main earthing systems shall again be interconnected as a network to power plant main earthing mat. Internal earthing ring in the electrical equipment room shall be provided by the contractor irrespective of whether equipment of the area is in their scope or not.
j. For different floors in a building, localized internal earthing ring shall be formed and connected to the ground earthing through vertical risers. The earthing mat shall be common to both power and lighting installations.
k. A minimum of two spare earth rings will be provided in each floor of the building for earthing future building.
l. Each RCC steel column of the building will be interconnected to the floor-earthing grid in basement/ ground floor.
m. For protective earthing separate conductor shall be used for flow of earth fault current.
n. Contractor shall carry out minor civil i.e. chipping of floor (where earth strip is to be laid on floor), removal of topsoil for laying earth strip in switchyard area, etc.
o. It is the responsibility of contractor to provide skilled manpower for periodic maintenance after the initial commissioning till handing over the system to customer. During this period the activities are to be carried out such as checking the electrolyte & specific gravity of individual battery, topping up of electrolyte, cleaning etc.

2.17 TREFOIL CLAMP

As per requirement suitable trefoil clamps shall be supplied by the BHEL

NOTE: Whatever things required for complete Electrical and C&I up-gradation of the Plant shall be in the scope of work, irrespectively whether it is specifically mentioned in the enquiry specification/ scope of work or not.

3.22 ARRANGEMENT OF ELECTRICAL and C&I EXPERTS: -

One (01) No. Electrical and C&I experienced expert is to be deployed by the contractor for complete duration of R&M works with prior approval of BHEL.

3.24 Bidder is to provide one office boy in each shift for BHEL Office.

- *Quantity of Material Supplied for E&C: - Annexure-I (C&I)*

❖ INSPECTION AND TESTING

General: -

1. All components of the pipework shall be subjected to visual inspection and testing as per the relevant codes specified. Inspection and testing of pipework as per Quality Assurance Plan to be done by bidder.

Test at site: -

a. The pipework as erected shall be tested in sections at site for strength and leakage. For hydraulic tests, the test pressures shall be as given in the relevant standard or 1.5 times the design pressure, whichever is higher.
b. The test pressure for fuel gas lines shall be 1.25 times the design pressure but not less than 0.2 kg/cm2 .
c. Compressed air pipework shall be tested at a pressure 1.25 times the design pressure.
d. Steam pipework shall be tested as per Mandatory Indian Boiler Regulations.
e. Drainage, venting and similar system shall be tested at 3 mmWC.
f. Welded joints shall be subjected to hand hammer test while under test pressure. The tests pressure shall be maintained until the entire section under test has been examined for leakage. Defects revealed by the tests shall be repaired, or defective parts replaced and the system retested.

❖ Commissioning of system/Boiler at NSPCL

It is not intent to list out complete scope of services. However, the broad scope of services shall include but not limited to the following: -

- The cleaning, flushing/purging and commissioning of the pipework shall be carried out after completion of hydraulic and other tests. Cleaning shall be carried out prior to erection as well as after erection as per these specifications.

- The piping elements shall be thoroughly cleaned of all foreign matters such as scales, dirt, oil grease, etc. by wiping and wire brushing before fabrication and erection/assembly. Cleaned components of pipework shall be suitably protected to avoid contamination by foreign matters.

- Flushing/Purging

  1. All pipelines shall be flushed/purged till all dirt, scales and foreign matters are removed immediately prior to commissioning. The minimum duration of purging/flushing shall be 30 minutes. During flushing, valves and pipelines accessories such as filters, cylinders, bearings, etc. shall be isolated and by-passed where required.
  2. Pipework for compressed air and steam shall be flushed with fluids for which the pipework is intended unless otherwise approved by the Employer. Pipework for fuel gases shall be flushed with Nitrogen/steam followed by the fuel gas, slowly replacing the flushing media.
  3. Pipework for water, Condensate, pressure and gravity type industrial sewerage, effluents, etc. shall be flushed with water.
  4. The bidder shall perform as per manual for cleaning, purging, commissioning and maintenance of pipework under his scope. Commissioning of the pipeline shall be done by the bidder and under the supervision of the BHEL engineer.

- Provide manpower assistance along with all T&P and required general consumable. during the commissioning of equipment/ Boiler after the completion of R&M works.

❖ <u>Performance Tests /PG Test Assistance</u>

1) Suitable skilled manpower, along with Tools & Plants (T&P) and Erection & Commissioning (E&C) support, shall be provided to assist during the Performance Guarantee (PG) Test.

2) Upon completion of erection and commissioning of the machine, the bidder shall provide necessary assistance for conducting the Performance Guarantee (PG) Test.

   - Installation and removal of test instrumentation shall be in bidder scope.

3) PG Test shall be completed within 6 months from the date of commissioning.

❖ **Painting Including Finish Painting & Stencilling** (All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1. The scope of work shall also include supply and application of final painting of all the erected equipment's as required and specified as per painting schedules. Before commencement of Final Painting, the contractor has to obtain written clearance from BHEL/Customer for effective completion of surface preparation.
2. All exposed metal parts of the equipment, structure, auxiliaries, piping, and other items (covered within the scope of this contract) after installations are to be painted. Mostly the equipment / components installed are with one coat each of primer paint and synthetic

enamel / heat resistant paint. However, due to aging, the same may have got deteriorated for peeled off. The surfaces are to be thoroughly cleaned of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing, scrapping, any other method as per requirement of BHEL. The same will be inspected and approved by the engineer before painting.

3. Required paints, thinner, and other consumables such as wire brush, brush etc. shall have to be arranged by the contractor at their own cost. The required manpower, other required consumables, T & P etc. shall be provided by the contractor with in the quoted rate. The arrangement of primer/paint for final painting will be in contractor's scope.
4. After applying the primer paints all structure/ equipment/ items, shall be finish painted with two coats of alloyed resin machinery enamel paints as specified by BHEL engineer. In case proper finish is not obtained in two coats, the contractor shall apply additional coat(s) till proper finish is achieved. Before applying the subsequent coats the thickness of each coat shall be measured and recorded with BHEL / Customer. After completion of painting all bright spots shall be cleaned to the satisfaction of Engineer.
5. Certain equipment like control panels, valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting. Spray painting at the job site shall be permitted only at times and locations approved by Engineer.
6. Contractor at no extra cost to BHEL shall supply all paints, primers, tools and other consumables including scaffolding materials required for finish painting. Paint is to be BHEL/Customer approved make only and painting should be as per colour scheme and quality approved / specified by Engineer. Valid Test Certificate for the paint so supplied shall be made available before use of the same on work. No paint whose shelf life has expired should be used for painting .
7. 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 also for touch-up painting on damaged areas).
8. Each coat (Primer, intermediate, finish) shall have a minimum thickness of dry film thickness (DFT) in microns and the DFT of finish paint shall not be less than the specified. Necessary instrument for measuring the thickness of paint applied is to be arranged by the contractor.
9. The contractor may be required to fill up dents / marks by applying putty before final painting of equipment. All materials and arrangements have to be made within quoted lump sum price/rates.
10. The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi / English or in both languages.
11. The painters have to undergo test on a mock plate of size 1m*1m and only qualified painters will be allowed to work.
12. The contractor shall ensure availability of
    - Ford Cup-4 to measure consistency of paint,
    - Automatic magnetic gauge/Elcometer to measure the dry film thickness and
    - SSPC Visual standards to assess degree of cleanliness of surfaces to be painted.
13. All paints should be stored in well-ventilated store. The painters and other personnel deployed should use proper protective equipment to avoid inhalation of fumes.
14. Contractor to deploy dedicated supervision staff for painting work.

OTHER SCOPE OF WORK:

1. Transportation of materials / spares from NSPCL/BHEL stores /yard to work site and removal of ash / debris / scrap materials from work site to ash disposal area / scrap yard / stores engaging contractors own vehicle.
2. Fabrication of site store near work site.
3. Fabrication / repair of spares.
4. Fabrication of fixtures and illumination of work zone.
5. Removal and relaying of insulation wherever applicable.
6. Old equipment/material Scrap & removed insulation disposal shall be in the scope of bidder & to be disposed as directed by BHEL /NSPCL.
7. Cleaning of work area during and after execution of work.
8. Minimum 10 curie (As per requirement) Radiography sources- 2 sources along with qualified personnel are to be arranged.
9. Bidder has to obtain IBR approval for works & HP welders approvals from the Boiler Directorate *I* Chhattisgarh & Co-ordination with boiler inspector is the responsibility of the contractor.
10. Successful bidder has to arrange necessary labour licence, insurance etc. for their workmen at the start of work and other necessary statutory requirements are to be fulfilled.
11. **NDT of pressure parts will be as per Erection welding schedule and FQP. For the joints, not mentioned in EWS, NDT for non-pressure parts will be as per FQP.**

NOTE:

- **Lack of supervision / resource mobilization will be viewed seriously.**
- **Carrying out work by BHEL**
  BHEL reserves the right to withdraw/restrict/alter the quantum of works as per clause No. 2.7 of GCC. BHEL may carry work through any other agency/purchase bought out items as per GCC and would levy and overhead charge of 5% on differential cost. In such cases due notice shall be given for a period of 2 (two) weeks.
- Contractor has to make him well conversant with the Customer specification. In case of ambiguity between BHEL and customer specification, customer specification shall prevail.

TERMINALS POINTS: -

- Blast Furnace Gas (BFG): Bhilai Steel Plant common header tapping point with a pressure of 400–500 mmWC.
- Coke Oven Gas (COG): Firing Floor of each boiler. Common header pressure 400 mmWC.
- Common terminal point of Instrument air & service air near Boiler area.
- Owner's 6.6kv Switch Gear.
- Control Panels at Unit Control Room.

EXCLUSIONS (Sl. No. 1,2 &3): -

1. Civil foundation works
2. AC & Ventilation, Illumination.
3. Power Supply Systems for UPS & 24V DC Charger for PLC and HM

❖ Erection Condition of Contract

Please refer to Annexure-A, which forms part of this tender/contract.

3.1 SPECIAL TERMS AND CONDITION

1. Successful bidder has to follow necessary safety regulations and Safety equipment/ accessories to be used and provided to the workers.
2. Illumination of working area is the responsibility of the contractor.
3. Cleaning, housekeeping and security arrangement for the equipment, T&P and materials/ spares is the responsibility of the contractor.
4. **The contractor has to sign "INDEMNITY BOND" for obtaining Form -V (required for Labour license) from the Principal Employer M/s NSPCL on non-judicial stamp paper as per format provide by BHEL.**
5. **Form VI for interstate migrant workers will be provided. Bidder to obtain interstate migration labor license.**
6. **Police verification of all the persons engaged to be done for gate pass.**
7. Necessary workforce, tools and tackles, welding machines, cutting accessories, grinding machines, argon gas with all accessories/cutting accessories, TIG welding kits, TIG welding wires, etc. required for the job shall be arranged by the contractor at their own cost. Consumable, hacksaw blades, grinding/cutting wheels, emery paper, marking cloth, cotton waste, petrol, kerosene, wire brushes, etc. shall be arranged by Successful bidder.
8. **All consumables required for the job will be in bidder`s scope. (Test certificate to be submitted by bidder if required) .**
9. **All consumables and welding electrodes as per EWS required for the job will be in bidder`s scope. (Test certificate to be submitted by bidder if required)**
10. **All technological wastes/wastes generated during execution works at various places shall be removed by Contractor to a place identified by the Engineer in charge. The scrap disposal area is approx. 3 k.m from the site. The ducts are to cut before disposal. The insulation to be disposed in ash dyke are at a distance of approx. 3 k.m. The insulation is to be buried in ground. Bidder to arrange JCB for digging and filling of the pit.**
11. The work details are brief & for knowledge only and Successful bidder will have to do all the related works as per requirement.
12. Subcontractor should assure that the repair/modification of the equipment covered in the scope worker will be conducted with the best of skills and know how available with Subcontractor and in conformance with the clearances and adjustments set forth in manufacture ‘s drawing instruments and other information ‘s furnished to Subcontractor.
13. The various setting, clearances, adjustments and benchmarks will be restored to the extent possible during rectification to the condition as per the erection and commissioning log sheets available with customer. If however we are not able to produce erection / commissioning log sheets, efforts will be made to attend the best possible parameter or the conditions as observed at the time of dismantling of the equipment in consultation with us.
14. Subcontractor must prepare PERT CHART/BAR CHART. Daily monitoring will be done jointly and log sheets of important activities should be noted down and signed jointly. Daily progress reports shall be submitted to BHEL by contractor and involving in progress review meeting along with BHEL/NSPCL official.
15. All the works shall be carried out as per the instructions and to the satisfaction of the Engineer In-charge.
16. The contractor will attend contributory to faulty and poor workmanship during commissioning and trial run of the equipment.
17. Round the clock working under expert supervision shall be ensured by the contractor deploying two equal parallel strength of group in 12 hrs. Shift with equal T&P for all the jobs so as to complete the work in stipulated period or earlier.
18. Adequate manpower along with T&P should be deployed at site. All the T&P required for the work shall be arranged by the contractor and all T&P should reach the site 30 days before

the shutdown of the unit. All the measuring instruments shall be duly tested / calibrated and valid certificate to that effect should be submitted to our Site In-charge before start of the work.

19. A deployment plan along with experience and name of the Site In-charge, Engineers, Supervisors, Foreman and main technicians to be submitted on per shift basis.
20. LAP-TOP with latest configuration, DVD/CD writer, its peripherals including printer-scanner and one USB Modem for Internet connectivity to be provided for BHEL site office.
21. One office boys in each shift are to be provided for BHEL site office (which is not mentioned in List of Manpower required but for both work Two office boy arranged by contractor)
22. It is the responsibility of contractor to keep the plant, equipment, machinery and surrounding area clean.
23. The names of working persons like Site in-charge, supervisors, foreman, main fitters to be deployed during the job with full details has to be submitted stating their area of work and experience and specialization of the work to site in-charge before the start of work. BHEL may ask to change/delete the person not found suitable for the work at any point of time during execution of job. For any addition and deletion of the working person prior permission from BHEL shall be taken.
24. Subcontractor has to ensure that all the key persons must continue till completion of job i.e. machine comes on load. Subcontractor manpower should remain at site for a period of 10 days after machine comes on full load.
25. Work distribution sheet for all the workers/supervisors deployed shall be submitted to BHEL one day in advance on daily basis.
26. Subcontractor should mobilize additional resources such as plant, equipment 's, material as may be required by site in-charge to improve the progress of the work if the progress of the work is not satisfactory.
27. Subcontractor should get registered under GST, where the jobs are executed.
28. Radiography and stress relieving are in the scope of the contractor.
29. Scrap and insulation etc. is to be shifted to scrap disposal area as indicated by the Engineer-in-charge.
30. One administrative personnel to control the resources and attendance of the workers to be ensured.
31. Contractor shall arrange certified HP welder for welding job whose welding test will be conducted at site.
32. Contractor shall arrange skilled EOT crane operator for round clock job as required.
33. Argon, Oxy- Acetylene gas shall be arranged by the contractor with cutting/welding set / argon welding set and other welding appliances.
34. Scaffolding material, Tarpaulin etc. will be arranged by the subcontractor on his own cost.
35. If the duration of work continues beyond stipulated period due to any reason, no claim for compensation will be entertained.
36. The work details are brief & for Subcontractor knowledge only. Subcontractor will have to do all the related works as per requirement.
37. The contractor will be responsible to pay the damages to the property of Board or individual caused by his worker during the course of contract. If the contractor fails to pay the same it will be recovered from his bill.
38. No compensation claimed for idle labor for any reason will be entertained by BHEL.
39. In normal course, the interpretation of the under signed on any matter or decision given by him on any disputable points will be final and binding on the contractor.
40. Accommodation for the sub-contractor 's manpower will be provided if made available by the customer as per the applicable charges. If not available contractor shall arrange at their own.
41. Contractor is to obtain labor license before the start of the work.
42. Workmen compensation policy to taken before the start of the work

43. Third party liability insurance to taken before the start of the work
44. The copy of registration of GST. If this is not applicable, then contractor shall submit an undertaking.
45. Copy of registration of EPF along with the PF account number of the employees. Challans for EPF for previous month shall be submitted along with subsequent RA bill
46. Partnership deed of firm in case of partnership firm or power of attorney of the representative in case of company to be submitted before the start of the work
47. Bank details, address & RTGS numbers etc. to be submitted
48. Copy of GST registration to be submitted before the start of the work
49. Copy of professional tax registration to be submitted before the start of the work (If required)
50. Copy of PAN card in the name of firm to be submitted before the start of the work
51. Copy of wage register witnessed by NSPCL representative for the bill period & bank transfer details to be submitted
52. The contractor has to take clearance from HR group of BMD/NSPCL before release of final bill.
53. The contractor has taken NO OBJECTION CERTIFICATE (NOC) from Safety section, stores, health physics section, HR/HS section & security section of NSPCL before release of final bill.
54. Calibration certificate with validity for all measuring instruments and T&P should be submitted to NSPCL before start of work.
55. Successful bidder has to extend manpower assistance for minor cleaning/scrapping, etc.
56. Transportation of manpower at Site shall be arranged by contractor.
57. Suitable (sufficient capacity) crane, Hydra, Trailer & lifting arrangement for transportation of material & E&C work shall be arrange by contractor.
58. Repair/replacement of materials/equipment's arising due to damages/pilferages during transit/storage/erection/commissioning shall be arranged by contractor well in time to ensure timely completion of work.
59. Dismantling works include weighing of dismantled materials and transportation of scrap material to scrap yard inside plant premises.
60. Transportation of all fabricated structure, pipes and other materials to erection location, handling, rigging, assembling, bolting, welding and satisfactory installation of new pipe rack and pipes in proper location according to approved layout/ approved erection drawings and/or as directed by Engineer in Charge.
61. Erection works include handling at site stores/storage yard, shifting to erection location, erection, providing temporary supports, alignment, welding and testing as per standard methods and specification/drawings/ FQP. If necessary suitable temporary approach roads or slabs over trenches shall be placed for transportation of fabricated materials to erection location.
62. For steam line /pressure Parts IBR approval is to be taken by Contractors and IBR procedure needs to be followed, including activities for welding etc.
63. The contractor shall be responsible for the necessary periodic testing, inspection during erection & commissioning of the equipment and shall carry out the work meet the specific requirements of relevant statutory regulation as necessary. All Fees, Charges etc payable to statutory authorities for carrying out such test shall be borne by the contractor.
64. Checking center lines, levels etc. including checking line, level position and plumb of all bolts and pockets. Any defect observed shall be brought to the notice of the engineer. The contractor shall fully satisfy himself regarding the correctness of the same before installing the fabricated steel structures.
65. Aligning, plumbing, leveling, bolting, welding and securely fixing the fabricated steel structures and equipment in accordance with the drawings or as directed by the Engineer.
66. Air-in Leakage test by arranging blanking all the leakages and pressurizing using blowers/fan etc. test equipment etc.

67. Removal & relocation of fouling to carry out subject work is in contractor scope.
68. Providing temporary supports for existing outlet ducts, gates etc. when the column are dismantled to facilitate the work. The work involves fabrication of supports, etc. as per the drawing/instruction of engineer in charge.
69. Adequate scaffolding and scaffolding material have to be arranged to complete the job stipulated time of shutdown.
70. The general purpose tools & tackles all testing equipment's, instruments etc. required for testing, erection & commissioning of work will be provided by the contractor at his own cost. Also necessary lifting tackles, tools, Wire rope slings of suitable capacities and other incidental to carry out this work shall have to be arranged by the contractor himself.
71. The contractor shall provide all the consumable during the erection, testing and commissioning of plants / equipment's.
72. The stores shall be handled with care and diligence, any loss to BHEL/NSPCL due to contractor lapse shall have to be made good by contractor.
73. If the contractor or his workmen or employees shall break, deface, injure or destroy any part of the building, roads, fence, enclosures, water pipes, cable, drains, electric or telephone posts or wires, tree or any other property belonging to NSPCL/BHEL or their client or to any part of erected equipment store component etc. the contractor shall make good the same at his own expenses or in default. The site engineer may cause the same to be made good workmen, or by other means and deduct the expense (Of which the site engineer's decision is final) from any sums that may be then or at any time thereafter become due to the contractor or from his security deposit or any other money due.
74. Paintings as per specification/ instructions of exposed surfaces along with materials.
75. Any work permit required for execution of job, same shall be obtained by bidder from customer.

Note:

1. **The specific work which is not mentioned in the scope of work but required to be carried out for completion of subject work i.e. any minor modification is in the bidder's scope.**
2. **Decision of BHEL site in charge regarding interpretation of the scope of work shall be final.**
3. **In case of any work arising during the course of execution, which was not envisaged during the engineering phase and is not in the scope of work, will be treated as extra work /supplementary/additional job and same shall be paid as per GCC/SCC.**

3.2. LAISION WITH ALL STATUTORY AUTHORITIES:

a) Compliance of statutory provisions, whether mentioned in this contract or not shall be binding on the contractor.
b) If there is any change in labour laws after the contract has been awarded, then the new law shall automatically be binding on the contractor.
c) No additional financial compensation shall be paid by BHEL to the contractor on account of increased expenditure caused by a) and b) above.

3.3 PAYMENT TO WORKERS:

1. Payment to workers shall be done in the presence of BHEL representative.
2. The contractor shall intimate the day of payment at least three days in advance in writing along with copy of the pay sheet and attendance cards.
3. All workmen shall be covered by PF Rules irrespective of their period of employment.

4. Payment shall be made inside the plant premises and during office hours.

3.4 SUBMISSION OF DOCUMENTS:

The contractor shall submit following documents at appropriate time either before or during the execution of the work and as directed by Site in-Charge.

1. Test certificates of Pulling and Lifting machines and appliances.
2. Details of workers to be deployed with name, address, category.
3. Details of supervisory staff to be deployed.
4. Authorization for receipt of materials and for signing of Measurement Books etc,
5. Labour license specific to the contract.
6. List of T&P brought into plant premises along with their serial numbers and dates/years of purchase.
7. All the Staff/Workers deputed for the Job should have Insurance Cover and document in this regard should be submitted along with 1st RA Bill.
8. List of consumables brought into plant premises along with their serial numbers and dates/years of purchase, along with test certificates wherever applicable.
9. Insurance policy for the workers to be deployed in this contract.
10. Safety undertaking.
11. Approval from IBR to work in Chhatisgarh.
12. Details of approved HP Welders with certificate copies.
13. Copy of ESI certificate to be furnished.
14. Proof of Payment of GST.
    a. (Sl.No.11 to 12 are required before final bill is processed)

The contractor shall submit following documents in report form within 15 days from commissioning of unit after the overhaul/shut down work is completed:

- Details of work executed.
- Measurements against different schedules in compiled form.
- Material issue details.
- Material consumption details.
- Material returns details.
- Details of settlement of accident benefits if any to workmen
- Copies of pay sheets to workmen.
- Details and proof of remittance of PF to workmen (before final bill).
- No dues clearance from different stores of customer/ NSPCL
- Valid labour license

3.5 Statutory Inspection

Please refer General and Special Conditions of Contract. In addition to it the scope includes getting the approvals from the statutory authorities (like IBR, smoke nuisance inspector, Electrical Inspector, anti-

pollution authorities, labor officials). This includes arranging for inspection visits of such authorities periodically as per requirement, submitting documents etc. and payment of fees connected with it.

1. Approvals from the statutory authorities shall be in the scope of bidder (like IBR, smoke nuisance inspector, Electrical Inspector, anti-pollution authorities, labor officials) and payment of fees connected with it
2. IBR approvals for work execution, hydro test & open inspection of materials (carried out with boiler inspector.) and work and endorsement of HP welder's certificates and payment of fees connected with it
3. Hydraulic Test of boiler in presence of boiler inspector & arrangement Hydraulic Test approval form Boiler inspectorate office and payment of fees connected with it
4. This includes arranging for inspection visits of such authorities periodically as per requirement, submitting documents etc. and payment of fees connected with it.
5. Arrangement of Labour license before start of work.
6. Arrangement of Interstate migrant worker license before start of work.
7. Arrangement of police verification of all the manpower employed for gate pass.
8. Arrangement of Insurance for gate pass and before start of work.

3.6 Safety:

Contractor should engage at least One Qualified Engineer in each shift during the contract period. Strict Safety measures have to be followed at Site. Contractor shall also adhere to all the safety provisions of our customer. In case violation of any provision at site fine of Rs.500/- to Rs.2000/- OR as per NSPCL rules, at the discretion of our site in-charge, shall be imposed for each of such occasion and shall be recoverable from the contractor's bill.

1. The contractor should ensure the use of 24 volt hand lamps and 24 volt transformer by his workers. The all electrical gadgets shall have plug top & proper earthing.
2. All T&P like pulling and lifting machine, chain pulley blocks, slings, D-shackles should be maintained in proper working condition. Necessary test certificate has to be submitted by contractor for lifting tools & tackles.
3. The contractor shall be fully responsible for the safety of his workers.
4. The Use of ISI mark safety helmet, ISI mark safety shoes, Goggles, hand gloves, ear plugs and nose mask is a must. In addition to this, a full body (safety) harness, face shield must be provided to workers carrying out work at height &cutting/ welding/ grinding respectively. Gas cutting set with flash back arrester etc. should be provided by the contractor and should ensure the use of these safety equipment's, all PPE by his worker while working.
5. Scaffolding should be erected properly and strong enough with hand rails and it should not be used before getting it checked by Engineer-in-charge.
6. The contractor shall be solely responsible for the safety of his workers & employees. The contractor must ensure that the persons working in specialized nature jobs/ skilled jobs/ working with the welding machines, grinders, cutting set & other special T&P shall be having experience & expertise to perform that job. Contractor should engage physically and mentally fit manpower. The electrical connection / repair jobs shall be done only by the electricians.
9. The contractor shall ensure that prior to start of work all his workers shall get the safety training.

10. The contractor shall also take care for the safety of the equipment's & persons working in the vicinity.
11. Customer at its own discretion may decide to recheck / retest some or all of the T&P / machines of the contractor inside the plant premises.
12. The helmets, safety shoes and safety belts issued by the contractor shall be conforming to relevant IS standards.
12. The contractor shall maintain the first aid box at site.
13. Work permit if required from NSPCL, then bidder shall keep dedicated manpower for the same sothat work progress may not be hampered.
14. **Safety Violation penalty as per extant NSPCL norms will be applicable. In case of any penalty levied on BHEL by customer due to any safety violation/lapses by sub-contracting agency, the same will be debited to the sub-contracting agency.**
15. **All the dial gauges & flash back arrestors of Gas cylinder should be ISI marked. Test certificates of all the gas cylinders should be available.**
16. **All the scaffolding pipes should be in good condition and all the planks should be metallic with hooks for coupling with tubes or scaffolding coupler pipes.**
17. **All the lifting and shifting equipment's should have valid test certificate by competent authority of Chhattisgarh state.**
18. **All the switch boards being used at individual jobs to have ELCB's for the protection.**
19. **Vendor to arrange 5 numbers of type A safety nets each as per the details below:**

a. Safety Net Type-A - 5 Nos (Double Layer)

- Size: 10Mtr X 5Mtr
- Mesh Size: 25mm
- Mesh Rope: 2mm rope double cord
- Border / Tie Cord. Rope: 12mm dia Polypropylene rope (tested as per IS: 5175) 2 Mtr Length shall be provided at all four corners.
- 1st layer – Hdpe 2mm double cord
- 2nd layer – Hdpe Overlay Containment HDPE Blue Nets 15-22 mm

3.7 PROVISION OF PPEs

- Personnel Protective Equipment (PPEs), in adequate numbers, will be made available at site & their regular use by all concerned will be ensured
- The following matrix recommends usage of minimum PPEs against the respective job.

SI.NO	Type of Work	PPEs
1	Concrete and asphalt mixing	Nose mask ,hand glove ,apron and gum boot
2	Welders/Grinders/Gas cutters	Welding/face screen, apron, hand gloves, nose mask and ear muffs if noise level exceeds 90dB. Helmet fitted with welding shield is preferred for welders
3	Stone /concrete breakers	Ear muffs, safety goggles, hand gloves
4	Electrical Work	Rubber hand glove, Electrical Resistance shoes
5	Insulation Work	Respiratory mask, Hand glove, safety goggles
6	Work at height	Double lanyard full body harness, fall arrestor (specific cases)
7	Grit/Sand blasting	Blast suit, blast helmet, respirator, leather gloves
8	Painting	Plastic glove, Respirators (particularly for spray painting)
9	Radiography	As per BARC guidelines

- The PPEs shall conform to the relevant standards as below and bear ISI mark.

Relevant is-codes for personal protection

IS:2925-1984	Industrial safety Helmets
IS:4770-1968	Rubber gloves for electrical purpose.
IS:6994-1973(Part-I)	Industrial safety Gloves(Leather & Cotton Gloves)
IS:1989-1986	Leather Safety boots and shoes.
IS:5557-1969	Industrial and safety rubber knee boots.
IS:6519-1971	Code of practice for selections care and repair of Safety foot wear.
IS:11226-1985	Leather Safety footwear having direct molding sole.
IS:5983-1978	Eye protectors.
IS:9167-1979	Eye protectors.
IS:1179-1967	Eye & face protection during welding
IS:3521-1983	Industrial Safety Belt and Harness
IS:8519-1977	Guide for selection of industrial Safety equipment for body protection
IS:9473-2002,14166-1994, 14746-1999	Respiratory Protective Devices

The list is not exhaustive. The safety officer may demand additional PPEs based on specific requirement.

NOTE: All employee of vendor should wear company uniform along with company logo at work place.

Minimum PPEs required:

1. Safety Shoes conforming to relevant IS standard.
2. Safety Helmet conforming to relevant IS standard.
3. Full body harness with double lanyard conforming to relevant IS standard.
4. Rope grab fall arrestor with ladder rope conforming to relevant IS standard.
5. Retractable fall arrestor conforming to relevant IS standard.
6. Safety goggles and reflective jacket conforming to relevant IS standard.
7. Rigging Hand gloves (cotton)
8. Safety net as per SCC clause 3.6.18.
9. Nose mask conforming to relevant IS standard.

3.8 OTHER TERMS AND CONDITIONS

1.0 Successful bidder has to extend manpower assistance for minor cleaning/scrapping, etc.

2.0 ~~A copy of tender document with each page duly signed and stamped shall be submitted along with your offer as a token of your unconditional acceptance to this tender condition.~~ Also any deviation to the tender conditions shall be submitted in a separate paper duly signed by the bidder, any overwriting / correction by the bidder on the tender will not be recognized and the offer may be rejected on this ground.

3.0 General and special conditions of contract' enclosed herewith will be fully applicable, except otherwise stated in this enquiry. In case of any conflict, the conditions specified in this enquiry letter will prevail over that of the 'General and special conditions of contract'.

3.7 Security Deposit

Please refer our "General and special conditions of contracts".

3.8 Other terms and conditions

1.0 Successful bidder has to extend manpower assistance for minor cleaning/scrapping, etc.

2.0 A copy of tender document with each page duly signed and stamped shall be submitted along with your offer as a token of your unconditional acceptance to this tender condition. Also any deviation to the tender conditions shall be submitted in a separate paper duly signed by the bidder, any overwriting / correction by the bidder on the tender will not be recognized and the offer may be rejected on this ground.

3.0 General and special conditions of contract' enclosed herewith will be fully applicable, except otherwise stated in this enquiry. In case of any conflict, the conditions specified in this enquiry letter will prevail over that of the 'General and special conditions of contract'.

4. LIST OF MANPOWER REQUIRED

Renovation & modernization of re-introduction of blast furnace gas firing system in all 3 UNITS (2X30MW +1X14MW) power plant which includes dismantling of existing facilities & erection and commissioning of CO gas & Blast furnace gas line, wind box, u-seal, igniter, scanner, hangers, blast furnace gas pipe, valves, C&I and Electricals, super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.

Sl.No.	Manpower	Category	Area		
			Piping's (Blast furnace gas & CO gas)	Pressure parts	Burner , wind box
1	Site-in charge	Site-in charge			1
2	Engineer	Graduate	1	1	
3	Supervisor	Graduate	2	1	1
4	Store Keeper	Non-Graduate			2
5	Time-Keeper	Non-Graduate			1
6	HP Welder	IBR		4	
7	Welder (Non-IBR)	Skilled	8	2	
8	Gas cutter	Skilled			4
9	Scaffolder	Semi-Skilled			15
10	Fitter	Skilled	5	4	1
11	Electrician	Semi-Skilled			2
12	Jr. Filter	Semi-Skilled	4	2	1
13	Insn. Lagger/Carpenter	Semi-Skilled			10
14	Grinder Man	Semi-Skilled	8	4	1
15	Rigger	Semi-Skilled	35	25	8
16	Helper/Cutter	Un-Skilled	10	10	5
17	Office boy	semi - skilled			2
	TOTAL		180		

Apart from the above manpower, the additional manpower required for C&I and Electrical works is as follows: -

1) Electrician- 5 Nos.
2) Cable laying gang- 2 Nos.
3) Helper -5 Nos.
4) Calibration engineer- 1 Nos.
5) Supervisor -2 Nos.
6) C&I and Electrical Incharge-1 Nos.

This is an indicative list; the sub-contractor shall deploy adequate manpower to carry out the work round the clock and as per requirement of the site during execution of the Job.

4.1 Man power & T&P:

a) Adequate manpower, T&P, crane, along with consumables should be deployed at site and should reach the **site 10 days before for preshutdown work so that necessary statutory requirement, gate pass & insurance can be arranged and start of work for dismantling of existing Blast furnace gas pipe, structure, google valve, other valves & associated items and Erection of new BFG line (common headers) and google valve.**
b) **Adequate manpower, T&P, crane, along with consumables should be deployed at site and should reach the site 25 days before for shutdown work so that necessary statutory requirement, gate pass & insurance can be arranged – For each unit.**
c) **The bidder shall demobilize the manpower if the shutdown of a particular unit is not declared by NSPCL. Upon receipt of NSPCL clearance for shutdown work and intimation from BHEL, the bidder shall remobilize the team at site within seven (07) days from the date of BHEL's intimation without any extra cost.**
d) All the lifting tools /measuring instruments shall be duly tested /calibrated and valid certificate to that effect should be submitted to BHEL Site In-charge before start of the work.
b) A deployment plan along with experience and name of the Site In-charge, Engineers, Supervisors, Foreman and main technicians to be submitted on per shift basis.
c) Successful bidder has to arrange a LAPTOP at site with latest configuration, USB Modem for Internet connectivity, DVD/CD writer, multimedia and its peripherals including printer.
d) Two office boy to be provided for BHEL site office.
e) One dedicated manpower for arrangement of gate pass for BHEL official and other miscellaneous work will be arranged by bidder.
f) **Successful bidder has to engage 02 Expert Manpower for full duration of work in consultation with BHEL Engineer. Deployment of Experts shall be as follows:**

   01 well experienced expert Engineer, who has experience in erection of piping's & auxiliaries & 01 well experienced expert Engineers who have experience in erection and overhaul of Boiler pressure parts and burner system as per site requirement in consultation with BHEL. Payment of Expert Engineers shall be done by contractor.

g) **Contractor Should Engage at Least 03 (1-piping + 1-pressure parts & burner system + 1-night shift) Qualified Safety Engineer in Each Shift During the Contract Period in Consultation with BHEL Site-In-Charge. Safety Engineer Should Be Qualified from Approved Institute.**

h) **Contractor Should Engage at Least 02 Qualified Quality Engineer in Each Shift During the Contract Period in Consultation with BHEL Site-In-Charge.**

i) This is an indicative list; the sub-contractor shall deploy adequate manpower to carry out the work round the clock and as per requirement of the site during execution of the Job.

4.2 LIST OF T& P AND MEASURING INSTRUMENTS TO BE DEPLOYED FOR EACH UNIT AS PER REQUIREMENT

Renovation & modernization of re-introduction of blast furnace gas firing system in all 3 UNITS (2X30MW +1X14MW) power plant which includes dismantling of existing facilities & erection and commissioning of CO gas & Blast furnace gas line, wind box, u-seal, igniter, scanner, hangers, blast furnace gas pipe, valves, C&I and Electricals, super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.

MECHANICAL WORK: -

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
1	Tire mounted Telescopic Crane	100-150 MT	01 Nos	As per requirement & to be deployed as per instruction of BHEL Engineer and as per
2	New generation Pick & carry type mounted mobile crane. (Farana). **Hydra is not allowed.**	12/14/18/20/22	As per job requirement	As per requirement & to be deployed as per instruction of BHEL Engineer and as per
3	Mixer for Grouting of equipment foundations			**As per requirement**
4	Plasma Cutting Machine	Suitable to cut plate thickness upto 25mm	02 nos	**As per requirement**
5	Trailer with prime mover	20 MT	As required	As required
6	Trailer with prime mover	40 MT	As required	As required
7	Tractor Trailer	15/20MT	As required	To be deployed as per instruction of BHEL Engineer.
8	Truck	Adequate capacity	As required	To be deployed as per instruction of BHEL Engineer.
9	Slings, 'D'-Shackles, Max Puller.	01 MT TO 10MT	As required	To be deployed as per instruction of BHEL Engineer.

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
10	Slings, 'D'-Shackles, Max Puller, Pulley Blocks, Hydraulic Jacks, Etc Above 10 Mt.	As required	As required	To be deployed as per instruction of BHEL Engineer, WITH TEST REPORTS
11	Spanner Sets Ring/D	Upto 56 MM	As required	To be deployed as per instruction of BHEL Engineer.
12	Tube expander	As required	1 No	**As per requirement**
13	Air compressor (electric/diesel operated)/blower	As required	01 nos.	Instrument and service air shall be provided at one point near boiler area by NSPCL , However if non-availability , bidder shall arrange air compressor and blower as per job requirement
14	TIG welding set	As required	10 nos.	**As per requirement**
15	Submerged ARC Welding M/c		Adequate nos.	
16	Oxy Acetelyne Gas cutting Machine		Adequate nos.	
17	DC arc welding machine		As required.	
18	Electric operated Bolt tightening machines		As required	
19	3-phase distribution board with complete set up for drawl of construction power	As required	As required	
20	Power cable for drawl of construction power	As required	As required	
21	Radiography arrangement with radioactive isotope source	Adequate capacity	As required	As per job requirement
22	Theodolite of required accuracy	To ensure verticality of structural columns.	As required	

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
23	Self-drilling cum tapping machine for screws of roof sheets	As required	As required	
24	Electro-hydraulic pipe bending machine	Up to 2" NB and 12 mm thick pipes	As required	
25	Radiography film viewer	As required	As required	
26	Hydraulic pipe bending machine (manual)	For bending of pipes up to 50 mm nb size	As required	
27	Pipe chamfering machine /Tube Cutting	4-14"	As required	
28	Pipe chamfering machine /Tube Cutting	14-20"	As required	
29	Pipe cutting & beveling machines		Adequate nos.	
30	Chain pulley blocks of various & Suitable capacities	3MT/5MT/10 MT	As Required	As per the instructions of BHEL Engineer
31	Baking oven with thermostat and temperature gauge for welding electrodes	As required	As Required	
32	Baking & Holding oven with thermostat and temperature gauge for welding electrodes	As required	As Required	
33	Portable oven for welding electrodes	As required	As Required	
34	Electric winch	2/3/5/10/15 ton capacity	As Required	
35	Hand winch	0.5 ton capacity	As Required	
36	Scaffolding materials with clamps.	Suitable for working at various heights	As required	For Alignment, welding & Insulation works
37	Profile making M/c	For aluminium sheet cladding work	as required	

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
38	Nibbling M/c	For refractory and other required activities	as required	
39	Shearing M/c		as required	
40	Portable grinding M/c	As required	as required	
41	Portable drilling M/c	As required	as required	
42	Hoisting and pulley devices/pulleys	As required	As required	
43	Fire retardant tarpaulins	As required	As required	
44	Fire extinguisher	As required	as required	
47	Hydraulic Jacks	As required	as required	
48	Lifting tackles including slings of assorted size	As required	as required	
49	Various sizes of clamps/ fixtures for assembling		as required	
50	Magnetic particle testing equipment-Dry & Wet Type		as required	
51	Temperature recorder for 0-1000C 6/12 points with thermo couples / rods and compensating cable		as required	
52	Spectrometer for metal testing		as required	
53	Alco meter for paint thickness checking		as required	
54	U Tube Manometer 0-2000 mm Water Column		as required	
55	Inclined Manometer 0-50 mm Water Column		as required	
56	Calibrated Pneumatic Torque wrench		4 nos.	

Sl no	Description Of Equipments	Capacity (Minimum)	Minimum Quantity	Remarks
57	Bolt Tension Calibrator		as required	
60	Safety Net		As required	**To be deployed from begining**
61	Man lifter for bolted structure bolt tightening		As required	As per the instructions of BHEL Engineer
62	Plate rolling/bending machine		As required	As per the instructions of BHEL Engineer (For fabrication)
63	Vernier calipers 0-150 m 0-300 M 0-600 M	As required	 02 nos. 02 nos. 01 no.	
64	Inside Micrometer up to 600 mm	As required	01 no.	
65	Outside Micrometer up to 600 mm range	As required	01 no.	
66	Measuring Tape up to 15 M length	As required	04 nos.	
67	Dial Gauges	As required	03 nos.	
68	Grinding Machine	As required	As required	

NOTE:

1. This above list of T&Ps is only indicative and neither exhaustive nor limiting. Quantities indicated above are only the minimum required. Contractor shall deploy all necessary T&P to meet the schedules & as prescribed by BHEL engineer and required for completion of work.
2. All the tools and tackles/measuring instruments shall be duly tested/calibrated and valid certificate to that effect should be submitted to our site in-charge before the start of work.
3. Arrangement of 100-150 Ton capacity tire mounted Telescopic Crane with adequate boom length or Jib arrangement for pipe and burner erection work and other erection purposes. However, if higher capacity crane shall be required to complete the work, same shall be arranged by bidder at no extra cost. Bidder may visit the site for assessment of capacity & positioning of crane.
4. Sky climber/cup lock, if required, for the removal and installation of burner assembly and alignment of the burners, will be in vendor's scope.
5. BHEL shall not share any tool & plant for this job.
6. **The age of the contractor deployed cranes mentioned above in SN No 1, & 2 should be within 15 years as on date of deployment. Contractor has to provide**

documentary evidence/ proof for age of the crane at the time of deployment to BHEL Engineer.

7. The contractor to furnish a list of Tools and plants including tractors / trailers/ trucks etc. which contractor proposed to deploy for this work.
8. For testing LP lines necessary Hydraulic Test pumps/ Hand pumps/blower are to be arranged by the contractor.
9. For handling at store and transportation, contractor shall make his own arrangement.
10. For transportation, material handling, loading& unloading of all components / equipment's, the contractor has to make his own arrangements at his own cost. BHEL will not provide any crane / T&Ps for unloading the above components. All necessary T&P such as, Trailers, Cranes Winches, welding generators, Slings, Jacks, Sleepers, Rails etc. are to be arranged by the contractor.
11. All the T & P, lifting tackles including wire ropes, slings, shackles and electrically operated equipment shall be got approved by BHEL Engineer before they are actually put on use. Test certificates obtained from the statutory authority should be submitted before their usage.
12. All the T & P arranged by contractor including electrical connections wherein required shall be reliable / proven / tested with necessary test certificate.
13. All instruments, measuring tools etc. are to be calibrated periodically as per the requirement of BHEL and necessary calibration certificates are to be submitted to BHEL before use.
14. Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.
15. Cranes above 40MT, if required for Fabrication work same shall be arranged by contractor within contract value without any extra charges to BHEL.
16. Other Relevant clauses shall be referred in Special Conditions of Contract (SCC)
17. 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 procure/hire the equipment/ T&P and get the work done and charge the contractor as per current market rate/hiring rate + applicable BHEL overhead.

Measuring and Monitoring Equipments (MMEs): As per requirement to be finalized at site, shall meet the requirements as per field quality plan and other erection, testing related activities

18. Necessary electrical / water / air connection required for operation of any of the tools & tackles shall be to Contractor 's account.
19. Contractor has to submit the Calibration certificates of all the precision Equipement to BHEL. BHEL may ask for recalibration of the MME"s /precision equipments for ensuring quality of work. Contractor must reascertain/ recheck range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration/ deployment.
20. **Considering operational safety, the use of material handling equipment "HYDRA" is not allowed, agencies has to deploy the Pick & Carry cranes (Farana) of required capacity.**

21. Any T&P‟s, Cranes, Slings, D-shackles and other lifting tackles, Trailers required for shifting of material from store to site shall be arranged by contractor.

22. Any or part or all of the T&Ps of the contractor identified for the tendered package shall not be engaged for any works other than that of the works intended in this tender.

4.3 CONSUMABLES TO BE ARRANGED BY CONTRACTOR FOR EACH UNIT AS PER REQUIREMENT

(The list is indicative only and not exhaustive)

01. Kerosene oil.
02. Rustolene.
03. Petrol/white Petrol/Benzene/CRC/CTC/WD-40-% litre.
04. Grease/Graphite Grease.
05. Hacksaw Blades.
06. Waste cloth/Cotton.
07. Marking/lint free cloth/Muslin.
08. Asbestos cloth/Asbestos cord.
09. Prussian blue.
10. Graphite (flaked) powder/Molykote/Mosil.
11. Cardiom compound.
12. Holdtite/shellac/Gasket sealing compound.
13. Lead wire 1.0 m/1.5 mm/0.5 mm.
14. Liquid soap.
15. Carborandum grinding paste coarse/fine/Diamond lapping paste.
16. Emery papers/Rolls.
17. Cutoff wheels.
18. Grinding wheels.
19. Oil stones, Mounted wheels, rotary cutters.
20. D. P. test chemicals.
21. Gas Cylinders for cutting/welding.
22. Chalk pieces, marking pens, t112hermoschalks upto 400c
23. Insulation tape, Johnson Tapes.
24. Sander discs and wheels.
25. Polyethylene sheets.
26. Araldite, M. Seal, Instabond, Dendrite.
27. CRC 2-26, white spirit.
28. Electric fuse wire, cables for the connections
29. 2.5 mm^2 Cu cable (flexible) of 200 mtr. length.
30. Ortho phosphoric acid
31. CRC Lectra-clean.
32. Plastic sheet
33. general purpose electrodes for welding purpose,
34. Industrial oxygen, acetylene,

35. Nitrogen gas cylinder,
36. **Special electrode as per requirement.**

NOTE:

1. The above list is only indicative for work in one unit & not exhaustive. Arrangement for any other consumables required for completion of the job shall be the responsibility of the contractor & shall be arranged by him.
2. The contractor shall provide all consumables required for carrying out the work excepting those which are specifically indicated as BHEL scope.
3. All consumables to be used for the work shall have prior approval of BHEL engineer with regard to brand and quality specifications. Test reports / certificates in respect of these consumables, wherever applicable, shall be submitted to BHEL engineer.
4. **Supply of Paints/Primer/Thinner as per specification, application of paints as per painting scheme/FQP, supply of consumables like brush, cleaning agents etc and all other T&P including scaffolding materials, manpower, and supervision is in contractor's scope.**
5. **BHEL reserves the right to reject the use of paint, if found non-acceptable because of bad quality, deterioration in quality due to improper storage, shelf life expiry, unapproved type / brand etc.**
6. **WELDING ELECTRODES, FILLER WIRES FOR TIG WELDING AND GASES**

6.1. All welding consumables including filler wires are in the contractor's scope.
6.2. All the required welding electrodes as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding manufacturer, type of electrodes etc. on receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL regarding type of electrodes, batch number, date of expiry etc. Batch test certificates shall be made available for verification & record before the actual use of the welding consumables.
6.3. BHEL reserves the right to reject the use of any electrodes, if found non-acceptable because of bad quality, deterioration in quality due to improper storage, shelf life expiry, unapproved type / brand etc.

7. The contractor shall provide all consumables required for carrying out the work covered under this scope of work including TIG wires for welding of piping joints.
8. All the required gases like argon, oxygen, and acetylene etc. including required high purity nitrogen gas (for purging of generator stator water system as applicable) shall be arranged by the contractor at his cost.

❖ <u>Electrical System and Control & instrumentation system FOR EACH UNIT AS PER REQUIREMENT</u>

List of major testing & measuring equipment/ tools and tackles to be arranged/ brought by contractor.

S. No.	Description	UoM	Qty
1	DC power supply 0-250 V, 10 A make "Aplab" or equivalent (variable source)	Nos.	2

2	DC shunt 400 A 75 mV	Nos.	As required
3	Decade resistance box	Sets	4
4	Digital Tong tester AC 5/ 10 and 25/ 60/ 300 A of reputed make	Nos. Each	2
5	Digital Tong tester DC 30/ 60/ 300 A	Nos.	1
6	Earth Resistance Tester	Nos.	1
7	Ferrule printing machine	Nos.	2
8	Fire proof tarpaulin		As required
9	Function Generator	Nos.	1
10	Inclined manometer (+/ -) 300 mm water column	Nos.	2
11	Industrial type vacuum cleaner	Nos.	2
12	Insulation Tester Hand Operated 250V/ 500V/ 1000V rated mains/ battery operated	Nos.	2
13	Manometers (+/ -) 500 mm mercury column with hand bulb for lab and small manometer for field purpose.	Nos.	As required
14	Multimeters		
	A) Digital, 3 1/ 2 digit Motwane/ HIL/ Fluke or any reputed make	Nos.	2
	B) Digital, 4 1/ 2 digit Motwane/ HIL/ Fluke or any reputed make	Nos.	4
15	Oil temperature bath suitable to calibrate the instruments range 0 – 200 °C with standard temperature gauges and thermostatic control	Nos.	2
16	Portable air compressor with drier and regulator make “Toshniwal/ Khosla” or any reputed make rated for 7 to 10 kg/ cm^2	Nos.	As required
17	Rheostat	Nos.	2
18	RTD/ Pt 100 source	Nos.	2
19	Single Phase Variac 250 V, 8 A	Nos.	2
20	Soldering iron “Soldron” make 25 W	Nos.	2
21	Standard gauges 12” dial size make “Budenberg” or ”H Guru” or “Odin” or any reputed make		
	A) –1– 0 kg/ cm^2 pressure gauge(vacuum gauge)	Nos.	2
	B) 0 – 5 or 6 kg/ cm^2 pressure gauge	Nos.	2
	C) 0 – 10 kg/ cm^2 pressure gauge	Nos.	2
	D) 0 – 25 kg/ cm^2 pressure gauge	Nos.	2
	E) 0 – 60 kg/ cm^2 pressure gauge	Nos.	2
	F) 0 – 100 kg/ cm^2 pressure gauge	Nos.	2
	G) 0 – 250 kg/ cm^2 pressure gauge	Nos.	2

	H) 0 – 600 kg/ cm^2 pressure gauge	Nos.	2
	I) 0.2 to 1 kg pressure gauge	Nos.	2
22	Standard milliamps/ millivolts source of reputed make. Range 0 to 60 mA and 0 to 100 mV	Nos.	2
23	Temperature Gun Digital Type	Nos.	1
24	Three Phase Variac 05 A	Nos.	2
25	250V/500V/1000/5000V rated Hand operated megger Mains/battery operated		As required
26	Digital Megger		As required
27	HV Test Kit		As required
28	Wheatstone bridge		As required
29	Micro ohmmeter		As required
30	Torque wrench (12-60 Nm,50-225 Nm)		As required
31	Primary current injection kit		As required
32	Secondary current injection kit up to 300 amp		As required
33	Digital Tachometer non-contact type 0 to 4000 rpm		As required
34	Relay testing kit		As required
35	DC Ammeter, DC Voltmeter		As required
36	Voltmeter AC, Ammeter AC		As required
37	Oil specific gravity and PPM measuring equipment		As required
38	Dew point measurement instrument		As required
39	Oscilloscope		As required
40	Electric blower		As required
41	Three phase distribution board with complete setup for drawl & distribution of construction power		As required
42	Electric cables for drawl & distribution of construction power, heating machines		As required

HANDLING EQUIPMENTS

S. No.	Description	UoM	Qty
1	Trailer along with pulling unit		As required
2	Mobile Cranes, trucks etc. for transportation and erection of equipment		As required
3	Hydraulic Lifting Machine /Hydraulic Jacks/ Pallet Truck of 5 Ton Capacity	Nos.	02
4	D-shackles		As required
5	Manila ropes		As required
6	Nylon Slings		As required
7	Steel wire ropes		As required
8	Chain Pulley Blocks 5/ 10 T		As required
9	Turn buckles		As required

10	Oil filtration machine and tank		As required
11	Transformer oil testing kit		As required

MAJOR T&Ps

1	24V AC Transformer & Hand lamps	Nos.	As required
2	Cable Rollers		As required
3	Copper tube bender and cutter sizes 6mm, 8mm, 1/ 2", 1/ 4"	Nos. Each	As required
4	Crimping tool up to all sizes of Cables under scope of work	Nos. Each	5
5	Die sets for threading up to 2" pipe.	Nos.	2
6	Distribution boards with power cable complete as required		As required
7	Drilling machines 1/ 4", 1/ 2", 3/ 4" & 1"	Nos. Each	2
8	Electrician tool kit	Sets	6
9	Electrode drying ovens		As required
10	Ferrule printing machine	Nos.	2
11	Fire extinguishers (Type: as required)	Nos.	5
12	Flood light fittings	Nos.	6
13	Grinding machine	Nos.	5
14	Measuring instruments like Micrometres and Callipers	Sets Each	2
15	Mechanical tool kit for fitters	Sets	4
16	Painting brush		As required
17	Personal computer and accessories, Printer	Sets	1
18	Pipe bending machine – 2" size	Nos.	2
19	Safety belts (Full body Safety Harness) and Safety helmets		As required
20	Spirit level	Nos.	2
21	Tap sets for both BSP and MPT threads up to 1" each	Sets Each	2
22	TIG Welding Set	Nos.	2
23	Welding Generators		As required
24	Welding Transformers		As required

The following materials/ consumables are to be arranged by the contractor as part of the contractual scope.

S. No.	Description
1	Welding electrodes for welding AS/ CS/ SS pipe and other welding from BHEL approved vendors only
2	Filler wire for argon welding
3	Argon, oxygen and acetylene gas
4	Provision for temporary scaffoldings.
5	GI "U" clamps with nuts and washers for impulse and GI pipe clamping.
6	Round aluminium tags (30mm dia. x 3mm thick)

7	Teflon tape and insulation tape.
8	Hold tight/ bitumen tape for GI pipe coupling.
9	Required paints and primer from BHEL approved vendors only.
10	Solder wire (60/ 40)
11	Protocol/ calibration report sheets as per BHEL format.
12	Panel/ JB sealing compound material (for cable entry from bottom/ top of panel).
13	PVC cable tie, aluminium strip and hardware for clamping of cables, copper tube, and temperature gauge capillary.
14	Copper lugs up to 4 sq. mm, PVC sleeve of different size, PVC button & tape
15	Ferrules (PVC) and suitable for ferrule printing.
16	Saddle GI & Saddle Epoxy
17	Nylon Grips
18	Wooden Screw & Machine Screw
19	Reducer, PVC Brush & Sleeves
20	GI Bolts 'U' Clamps fixing
21	Aluminum paint for pole & MS structure painting

NOTE:

a) Instruments shown above are for the regular works only. However, separate sets of tools and instruments are to be arranged and provided to commissioning gang. If contractor fails to arrange the testing instruments as listed above, BHEL site will arrange the instruments at the cost of contractor.

b) The list of instruments/ equipment to be brought by the contractor as shown above is only indicative. Any other instruments/ equipment are required for the execution of the work is to be necessarily arranged by the contractor. The testing/ calibration instruments which are used to be duly calibrated in the interval prescribed by BHEL engineer from the BHEL approved agencies. And test certificate to be furnished.

c) The testing/ calibration instruments which are used to be duly calibrated in the interval prescribed by BHEL Engineers from the reputed agencies decided by BHEL and test certificate to be furnished. Contractor to submit calibration report from recognized agency prior to deployment of same at site and periodical calibration of the same to be arranged by contractor as per procedure of BHEL.

d) Other than the aforesaid, one computer, printer and other necessary peripherals will have to be maintained by the contractor in his site office.

List of T&P/instruments and consumables that will be made available by BHEL free of hire charges (on sharing basis).

1	EOT crane in shall be made available on sharing basis for handling panels	

Note:-

Skilled EOT Crane operators, for round the clock working is in bidder's scope.

Above T&P will be provided on sharing basis only. Contractor has to plan his activities well in advance and inform BHEL Engineer in charge/ Construction Manager the date of actual use. The decision of BHEL Engineer in-charge/ CM on this will be final and binding.

Facilities in the scope of Contractor/BHEL

Sl. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	Bidder	
9.1	ESTABLISHMENT			
9.1.1	FOR CONSTRUCTION PURPOSE:			
a	Open space for office (as per availability)	Yes		BHEL/NSPCL may provide free of charge limited open space for office and store as and Temporary construction and porta cabin shall be arranged by bidder.
b	Open space for storage (as per availability)	Yes		
c	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
d	Bidder's all office equipments, office / store / canteen consumables		Yes	
e	Canteen facilities for the bidder's staff, supervisors and engineers etc		Yes	
f	Firefighting equipments like buckets, extinguishers etc		Yes	
g	Fencing of storage area, office, canteen etc of the bidder		Yes	
9.1.2	FOR LIVING PURPOSES OF THE BIDDER			
	Open space for labour colony (as per availability)		Yes	Space as decided by NSPCL will be allotted to the Bidder for construction of these temporary structures like portable cabins/ offices/ storage sheds technicians and staff colony and other utilities. (if available) or The bidder shall arrange the required resources at their own cost
b	Labour Colony with internal roads, sanitation, complying with statutory requirements		Yes	
9.2.0	ELECTRICITY			

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – VI (B) : Facilities in the scope of Contractor/BHEL
(Scope Matrix)

Sl. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	Bidder	
9.2.1	**Electricity for construction 415 V (To be specified whether chargeable or free)**			
a	Single point source of 415 V	Yes		415 Volts, 3-phase & Neutral supply of electricity only for the purpose of execution of the contract at one point only at work site. For further distribution, bidder shall make his own arrangements. Electricity for all other facilities if required by the Bidder shall be on chargeable basis as per NSPCL norms.
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
9.2.2	**Electricity for the office, stores, canteen etc of the bidder(to be specified whether chargeable or free)**			
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
9.2.3	**Electricity for living accommodation of the bidder's staff, engineers, supervisors etc**		Yes	
a	Single point source		Yes	
b	Further distribution including all materials, Energy Meter, Protection devices and its service		Yes	
c	Duties and deposits including statutory clearances if applicable		Yes	
9.3.0	**WATER SUPPLY**			
9.3.1	**For construction purposes:**			

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – VI (B) : Facilities in the scope of Contractor/BHEL
(Scope Matrix)

Sl. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	Bidder	
a	Making the water available at single point	Yes		Free supply of water will be made available for construction purposes at a single points at site to be decided by NSPCL , Further distribution will be in bidder scope.
b	Further distribution as per the requirement of work including supply of materials and execution		Yes	
9.3.2	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	
9.3.3	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	
9.4.0	LIGHTING			
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	
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	
9.5.0	COMMUNICATION FACILITIES FOR SITE OPERATIONS OF THE BIDDER			
a	Téléphone, fax, internet, intranet, e-mail etc.		Yes	
9.6.0	COMPRESSED AIR wherever required for the work		Yes	

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – VI (B) : Facilities in the scope of Contractor/BHEL
(Scope Matrix)

Sl. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	Bidder	
9.7.0	Demobilization of all the above facilities		YES	
9.8.0	TRANSPORTATION			
a	For site personnel of the bidder		Yes	
b	For bidder's equipments and consumables (T&P, Consumables etc)		Yes	

Sl. No.	Description PART II 3.9.0 ERECTION FACILITIES	Scope / to be taken care by		*Remarks*
		BHEL	Bidder	
9.9.1	Engineering works for construction:			NOT APPLICABLE
a	Providing the erection/constructions drawings for all the equipment covered under this scope	Yes		
b	Drawings for construction methods	Yes	Yes	In consultation with BHEL
c	As-built drawings – where ever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		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			NOT APPLICABLE
e	Preparation of site erection schedules and other input requirements		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	

Sl. No.	Description PART I	Scope / to be taken care by		*Remarks*
		BHEL	Bidder	
j	Preparation of preassembly bay			NOT APPLICABLE
k	Laying of racks for gantry crane if provided by BHEL or brought by the contractor/bidder himself			NOT APPLICABLE
L	Arranging the materials required for preassembly			NOT APPLICABLE

BHEL may provide free of charge limited open space, for office & storage shed, as and where made available by Customer. It is the responsibility of the contractor to construct sheds, 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.

Note: Due to space constraint at site, contractor may have to arrange for disposal of scrap and insulation wast. outside the plant premises. Any cost implication of the same shall be to the account of contractor and no extra payment shall be made for any such arrangements made by contractor (if required).

Facilities to be provided by NSPCL/BHEL

Space: -

The bidder shall advise the owner within 15 days from the date of letter of award about his exact requirement of space for his office, mess rooms, staff colony, Technician colony, toilets etc. The above requirements shall be reviewed by BHEL/NSPCL Engineer and the space as decided by BHEL/NSPCL will be allotted to the Bidder for construction of these temporary structures like portable cabins/ offices/ storage sheds technicians and staff colony and other utilities etc. Such allotment shall be provisional and purely temporary in nature. The bidder shall have to hand over the vacant possession of the aforesaid premises to BHEL/NSPCL after removing cleaning the structures erected within 15 days after completion/termination of contract or on one-month notice by BHEL/NSPCL whichever is earlier.

Electricity: -

The Bidder would be provided with free 415 Volts, 3-phase & Neutral supply of electricity only for the purpose of execution of the contract at one point only at work site. For further distribution, bidder shall make his own arrangements. Electricity for all other facilities if required by the Bidder shall be on chargeable basis as per NSPCL norms.

Water: -

Water Free supply of water will be made available for construction and drinking purposes at a single point at works site to be decided by NSPCL.

Instrument and service air

Instrument and service air shall be provided at one point near boiler area. It is the responsibility of the bidder to check the parameters / suitability of these air supplies.

All tools and tackles including cranes and any other special tools and tackles shall be arranged by the Bidder at his own cost.

Area lighting shall be provided by Owner as per his own scheme. However, the Bidder shall arrange any additional lighting required for the safe execution of the work. Any damage caused due to inadequate lighting shall be made good by the bidder at his own cost.

Contractor responsibility: -

a. Contractor has to be deployed two equal parallel strength of group in 12 hrs. Shift with equal T&P for all the jobs so as to complete the work in stipulated period or earlier.
b. Steam dumping activity if required is in contractor scope.
c. Vendor to take job to facility outside the site for minor machining/modification.
d. Contractor to arrange MCCB/ELCB for the point from where the supply distribution has to be taken.
e. Providing assistance for carrying out testing and commissioning of Air Pre-heaters & Boiler.
f. Bidder to make any temporary arrangement for the flushing of lube oil system of equipment and fuel oil system.
g. Bidder to cut the Main steam line at a location decided as per the procedure to facilitate the steam blowing and again the normalization of the line.
h. Providing assistance for all other testing conducted by BHEL (PET, PG Test, Chemical Cleaning etc.)
i. 100% radiography is done by contractor if repair required after radiography and hydraulic test shall be conducted presence of boiler inspector and during hydro test if found leakage in pressure part shall be repaired by contractor free of cost (contractor own cost) with 100% radiography.
j. Transportation of material from BHEL/NSPCL store to site and back after completion of work contractor scope and Hydra crane, tractor, truck, trailer , trolley shall be arranged by contractor
k. All consumables required for modification work is in the scope of bidder.
l. Safety penalties and inspection of all T & Ps to be as per guidelines of NSPCL. All daily formats and inspection related to safety are to be complied with as per customer safety policy.

4.6 Co-operation with other Contractors: -

Contractor shall agree to co-operate with the other contractor (Boiler, TG , Civil C&I Agencies) for associated Equipment as during their work it may happen that other work contractor is also working nearby or parallel to his work and all the work to be completed in stipulated time only.

6.1 TIME SCHEDULE & MOBILIZATION

6.1.1 INITIAL MOBILIZATION

After receipt of fax/email LOI, contractor shall discuss with project manager/ construction manager regarding initial mobilization. Contractor shall reach site, make his site establishment and be ready to commence the erection work within 10 days from the date of issue of letter of intent or as per the directions of construction manager/ project manager of BHEL. Resources shall be progressively augmented to match the schedule of milestones and commissioning.

THE CONTRACTOR HAS TO SUBSEQUENTLY AUGMENT HIS RESOURCES IN SUCH A MANNER THAT THE ENTIRE WORK IS COMPLETED TO MATCH SCHEDULE OF THE PROJECT.SUCCESSFUL BIDDER HAS TO ATTEND KICK-OFF MEETING AT NSPCL SITE WITHIN 07 DAYS AFTER RECEIPT OF LOI.

6.1.2 MOBILIZATION FOR ERECTION, TESTING, ASSISTANCE FOR COMMISSIONING, OVERHAULING ETC.

The activities for Overhauling/Modification shall be started as per directions of Site In charge of BHEL. Contractor shall mobilize further resources (in addition to those required for activities under clause no. 6.1.1) as per requirement to commence the subject work and progressively augment the resources to match schedule of the project.

Schedule No.	Activity	Completion Period
B.1	Pre-shutdown work - Dismantling & Erection of Blast Furnace Gas piping's, valves, Hangers and other associated items for all 3 Unit	45- 60 Days
	Shutdown Work	
B.1	Shutdown Work for any First Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai. (As per the scope of work) – Erection & Commissioning	90 Days
B.2	Shutdown Work for any Second Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai. (As per the scope of work) – Erection & Commissioning	90 Days
B.3	Shutdown Work for any Third Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai. (As per the scope of work) – Erection & Commissioning.	90 Days

Note: -

1. Start date shall be confirmed & certified by BHEL Site-In charge.
2. Pre-shutdown activities are tentatively scheduled to begin from 01.04.2026 for all three units and the main shutdown work is planned to start from 01.06.2026 for any One Unit (1 or 2 or 3). Subsequent units will be taken up after receiving clearance from the customer.
3. ~~Contract period shall be 17 Month from the date of order issued~~.

4. In the event of limited pre-shutdown time, the contractor shall be responsible for completing all pre-shutdown activities within the shutdown period itself. Accordingly, the contractor must ensure adequate manpower deployment to meet this requirement.
5. If customer given shutdown of one or two or three units together then bidder has to mobilize the sufficient manpower and T&P for completion of the job within schedule period for E&C work.
6. If, at any stage during execution, no work front is available in any area within the defined scope, the Bidder shall demobilize their manpower based on a mutually agreed Minutes of Meeting (MoM). The Bidder must commit to resuming work at the site with full manpower once the front becomes available. Any delay in this regard will not be acceptable under any circumstances. The Bidder shall keep their Tools and Plants (T&P) at the site at their own risk.
7. **In the event of temporary demobilization due non-availability of work front or unit shutdown, the Bidder shall maintain a minimum workforce at the site to ensure the safety and security of dismantled items.**
8. **No additional cost shall be payable to the Bidder for site demobilization due non-availability of work front or unit shutdown. However, the Bidder will be provided with one week's advance notice prior to remobilization.**

6.1.3 DEFINITION OF WORK COMPLETION

The contractor's scope of work under these specifications will be deemed to have been completed in all respect, only when all the activities are completed satisfactorily and so certified by BHEL site in charge. The decision of BHEL in this regard shall be final and binding on the contractor.

6.1.4 MATERIAL RECONCILIATION

The contractor shall do material re-conciliation periodically.

6.1.5 Tentative E&C schedule: -

- **Preshutdown works: - Start date: - 01.04.2026**
- **Shutdown work: -**
- **For Unit#1 :- June-2026**
- **For Unit#2 :- Sep-2026**
- **For Unit#3 :- Dec-2026**

6.1.6 Awarding Philosophy

Scope of Work Consist of Two Sections
Section-A and Section-B:

Section-A	The work of receipt, unloading, verifying, shifting, stacking, preservation, handling of material at BHEL/clients stores/storage yard including transportation and handing over of components for renovation & modification of re-introduction of blast furnace gas firing system, BHEL T&P & other materials, components & equipment and providing services for materials management at PP-II, NSPCL Bhilai.

Section-B	Renovation & modernization of re-introduction of blast furnace gas firing system in all 3 UNITS (2X30MW +1X14MW) power plant which includes dismantling of existing facilities & erection and commissioning of CO gas & Blast furnace gas line, wind box, u-seal, igniter, scanner, hangers, blast furnace gas pipe, valves, C&I and Electricals, super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.

1. This is a combined tender of three Packages (i.e. Section-A and Section-B) as mentioned above.

PACKAGE-A	**Section-A**	The work of receipt, unloading, verifying, shifting, stacking, preservation, handling of material at BHEL/clients stores/storage yard including transportation and handing over of components for renovation & modification of re-introduction of blast furnace gas firing system, BHEL T&P & other materials, components & equipment and providing services for materials management at PP-II, NSPCL Bhilai.
	Section-B.1	Preshutdown work for all three unit and Shutdown work of any First Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.
PACKAGE-B	**Section-B.2**	Shutdown Work for any Second Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.
PACKAGE-C	**Section-B.3**	Shutdown Work for any Third Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.

2. The entire scope of work has been divided in Three packages (i.e. Section-A + B.1 , Section-B.2 and Section-B.3). BOQ/Rate Schedule enclosed in this tender is for Section-A , B.1 , Section-B.2 and Section-B.3 separately as Chapter-XI.
3. Bidder has to submit their Price for Section-A & Section-B (B.1., B.2 & B.3) only as indicated in the "Part-C of 2.
4. Prices for Section-A-3: Menial and Secretarial Services of amount ₹ 8,39,851 are already fixed by BHEL Volume-II-Price Bid" at BHEL e-procurement Portal.
5. Each package will be treated as a separate contract/~~FrameWork Agreement~~
6. The agency shall submit the Security Deposit (SD)/Retention Amount as per the applicable GCC clause for each issued contract, separately, prior to commencement of the work under the respective contract.

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7.1 Payment Terms: - For Section –B (EACH Unit)

Part-A (Mechanical Work)

Section- B.1.: - Pre-shutdown work for all three units and Shutdown work for any One Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II, NSPCL Bhilai.

Sch. No.	Description of Work	Unit	Qty	Percentage of Unit Rates
	Section- B.1			
	Part-A (Mechanical Work)			
	Preshutdown work for all three unit and Shutdown work of any First Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.			
1	Mobilisation of Manpower , T&P and start of work at site	LS	1	100%
2	**Pre-shutdown work - Dismantling & Erection of Blast Furnace Gas piping's, valves, Hangers and other associated items for all 3 Unit**			
2.1	**Dismantling of BFG pipings, structural, goggle valves, other valves, hangers and associated item for all 3 Unit. (As per the scope of work)**			
2.1.1	Dismantling of valve other than google valve, existing hangers and associated structural support at staring point of BFG line	LS	1	10%
2.1.2	Dismantling of BFG pipe , google valve, existing hangers and associated structure up to Boiler-01	LS	1	20%
2.1.3	Dismantling of BFG pipe , google valve, existing hangers and associated structure from Boiler-01 to Boiler-02	LS	1	20%
2.1.4	Dismantling of BFG pipe , google valve, existing hangers and associated structure from Boiler-02 to Boiler-03	LS	1	25%
2.1.5	Scrap shifting at the designated place and site clearing as per the contract	LS	1	10%
2.2	**Erection of Blast Furnace Gas pipings and other associated items for all 3 Unit**			
2.2.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	60	15%

2.2.2	Placement in position	MT	60	25%
2.2.3	Alignment	MT	60	10%
2.2.4	Welding/Bolting/Fixing	MT	60	10%
2.2.5	Completion of Non-Destructive examination (If not applicable, then this portion to be clubbed with activity – 2.2.6)	MT	60	10%
2.2.6	Hangers & supports etc. wherever necessary as per drg. (If not applicable, then this portion to be clubbed with activity – 2.2.4)	MT	60	5%
2.2.7	Hydraulic test/Pneumatic test wherever applicable (If not applicable, then this portion to be clubbed with activity – 2.2.4)	MT	60	5%
2.2.8	Painting (including arrow marking, nomenclature, etc) wherever required. (If not applicable, then this portion to be clubbed with activity – 2.2.4)	LS	00	5%
2.3	**Erection of goggle valve or other valves , Hangers and other associated items for all 3 Unit**			
2.3.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	60	20%
2.3.2	Placement in position	MT	60	30%
2.3.3	Alignment	MT	60	15%
2.3.4	Welding/Bolting/Fixing as applicable	MT	60	10%
2.3.5	Completion of Non-Destructive examination (as applicable). If not applicable, this portion to be paid along with activity - 2.3.4)	MT	60	7%
2.3.6	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -2.3.4)	LS	1	3%
3	**Shutdown Work for any First Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.**			
3.1	**Dismantling of Boiler parts, Pipings,valves, insulation & associated items as per the scope of work.**			
3.1.1	Dismantling of existing part	LS	1	75.00%
3.1.2	Scrap shifting at the designated place and site clearing as per the contract	LS	1	10.00%
3.2	**Erection and commissioning of CO gas & Blast furnace gas line, wind box, duct, U-seal, Igniter, scanner, hangers, Blast furnace gas pipe, Valves, C&I and Electricals, Platen super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.**			
3.2.1	**Erection & Commissioning of Burner Wind box**			

3.2.1.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	15	20%
3.2.1.2	Placement in position	MT	15	30%
3.2.1.3	Alignment	MT	15	17%
3.2.1.4	Welding/Bolting/Fixing as applicable	MT	15	10%
3.2.1.5	Completion of Non-Destructive examination (as applicable)- wherever required. If not applicable, this portion to be paid along with activity -3.2.1.4)	MT	15	5%
3.2.1.6	Painting (including arrow marking, nomenclature, etc). wherever required. If not applicable, this portion to be paid along with activity -3.2.1.4)	LS	1	3%
3.2.2	**Erection & Commissioning of Wind box Connecting duct**			
3.2.2.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	18	30%
3.2.2.2	Placement in position	MT	18	20%
3.2.2.3	Alignment	MT	18	15%
3.2.2.4	Welding/Bolting/Fixing as applicable	MT	18	10%
3.2.2.5	Completion of Non-Destructive examination (as applicable). wherever required. If not applicable, this portion to be paid along with activity -3.2.2.4)	MT	18	7%
3.2.2.6	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.2.2.4)	LS	01	3%
3.2.3	**Erection & Commissioning of Structure & associated items**			
3.2.3.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	26	20%
3.2.3.2	Placement in position	MT	26	30%
3.2.3.3	Alignment	MT	26	15%
3.2.3.4	Welding/Bolting/Fixing	MT	26	10%
3.2.3.5	Completion of Non-Destructive examination as applicable wherever required. If not applicable, this portion to be paid along with activity -3.2.3.4)	MT	26	5%
3.2.3.6	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.2.3.4)	LS	01	5%
3.3	**Dismantling ,Erection & Commissioning of Platen Superheater Coils**			
3.3.1	**Dismantling Existing superheater coils – As per the scope of work**			
3.3.1.1	Dismantling of existing part	LS	01	75%

3.3.1.2	Scrap shifting at the designated place and site clearing as per the contract	LS	01	10%
3.3.2	**Erection & Commissioning of Platen Superheater Coils**			
3.3.2.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	19	25%
3.3.2.2	Placement in position	MT	19	25%
3.3.2.3	Alignment	MT	19	10%
3.3.2.4	Welding/Bolting/Fixing/fin welding	MT	19	15%
3.3.2.5	Completion of Non-Destructive examination & stress Relieving/Heat Treatment wherever required. If not applicable, this portion to be paid along with activity -3.3.2.4)	MT	19	10%
3.4	**Erection & Commissioning of BFG pipes other than common headers, CO Gas Pipings , Scanner air pipings, scanner air fan, Hangers and steam purging piping Structure, valves.**			
3.4.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	100	15%
3.4.2	Placement in position	MT	100	25%
3.4.3	Alignment	MT	100	10%
3.4.4	Welding/Bolting/Fixing	MT	100	10%
3.4.5	Completion of Non-Destructive examination, wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	MT	100	10%
3.4.6	Hangers & supports etc. wherever necessary as per drg. wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	MT	100	5%
3.4.7	Hydraulic test/Pneumatic test wherever applicable, wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	MT	100	5%
3.4.8	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	LS	01	5%
3.5	**Erection & Commissioning of Flow Element , Ignitors , Flame Scanners, coal pipe etc.**			
3.5.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	2	15%
3.5.2	Placement in position	MT	2	30%
3.5.3	Alignment	MT	2	15%
3.5.4	Welding/Bolting/Fixing	MT	2	15%
3.5.5	Completion of Non-Destructive examination wherever required. If not applicable, this portion to be paid along with activity -3.5.4))	MT	2	5%

3.5.6	Hangers & supports etc. wherever necessary as per drg. wherever required. If not applicable, this portion to be paid along with activity -3.5.4)	MT	2	3%
3.5.8	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.5.4)	MT	2	2%
3.6	**Application of Insulation**			
3.6.1	Application of Insulation including Cladding & Refractory.	MT	15	85%

Note:- Above payment terms is for first Unit.

Section- B.2 & B.3.: - Shutdown work for any subsequent Unit – Second and Third (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II, NSPCL Bhilai.

Sch. No.	Description of Work	Unit	Qty	Percentage of Unit Rates
	Section- B.2 & B.3 (Second and Third unit) **Payment terms is for each Unit .**			
	Part-A (Mechanical Work)			
3	**Shutdown Work for any Second & Third Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.**			
3.1	**Dismantling of Boiler parts, Pipings,valves, insulation & associated items as per the scope of work.**			
3.1.1	Dismantling of existing part	LS	1	75.00%
3.1.2	Scrap shifting at the designated place and site clearing as per the contract	LS	1	10.00%
3.2	**Erection and commissioning of CO gas & Blast furnace gas line, wind box, duct, U-seal, Igniter, scanner, hangers, Blast furnace gas pipe, Valves, C&I and Electricals, Platen super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.**			
3.2.1	**Erection & Commissioning of Burner Wind box**			
3.2.1.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	15	20%
3.2.1.2	Placement in position	MT	15	30%
3.2.1.3	Alignment	MT	15	17%

3.2.1.4	Welding/Bolting/Fixing as applicable	MT	15	10%
3.2.1.5	Completion of Non-Destructive examination (as applicable)- wherever required. If not applicable, this portion to be paid along with activity -3.2.1.4)	MT	15	5%
3.2.1.6	Painting (including arrow marking, nomenclature, etc). wherever required. If not applicable, this portion to be paid along with activity -3.2.1.4)	LS	1	3%
3.2.2	**Erection & Commissioning of Wind box Connecting duct**			
3.2.2.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	18	30%
3.2.2.2	Placement in position	MT	18	20%
3.2.2.3	Alignment	MT	18	15%
3.2.2.4	Welding/Bolting/Fixing as applicable	MT	18	10%
3.2.2.5	Completion of Non-Destructive examination (as applicable). wherever required. If not applicable, this portion to be paid along with activity -3.2.2.4)	MT	18	7%
3.2.2.6	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.2.2.4)	LS	01	3%
3.2.3	**Erection & Commissioning of Structure & associated items**			
3.2.3.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	26	20%
3.2.3.2	Placement in position	MT	26	30%
3.2.3.3	Alignment	MT	26	15%
3.2.3.4	Welding/Bolting/Fixing	MT	26	10%
3.2.3.5	Completion of Non-Destructive examination as applicable wherever required. If not applicable, this portion to be paid along with activity -3.2.3.4)	MT	26	5%
3.2.3.6	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.2.3.4)	LS	01	5%
3.3	**Dismantling ,Erection & Commissioning of Platen Superheater Coils**			
3.3.1	**Dismantling Existing superheater coils – As per the scope of work**			
3.3.1.1	Dismantling of existing part	LS	01	75%
3.3.1.2	Scrap shifting at the designated place and site clearing as per the contract	LS	01	10%
3.3.2	**Erection & Commissioning of Platen Superheater Coils**			
3.3.2.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid alongwith placement in position)	MT	19	25%

3.3.2.2	Placement in position	MT	19	25%
3.3.2.3	Alignment	MT	19	10%
3.3.2.4	Welding/Bolting/Fixing/fin welding	MT	19	15%
3.3.2.5	Completion of Non-Destructive examination & stress Relieving/Heat Treatment wherever required. If not applicable, this portion to be paid along with activity -3.3.2.4)	MT	19	10%
3.4	**Erection & Commissioning of BFG pipes other than common headers, CO Gas Pipings , Scanner air pipings, scanner air fan, Hangers and steam purging piping Structure, valves.**			
3.4.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	100	15%
3.4.2	Placement in position	MT	100	25%
3.4.3	Alignment	MT	100	10%
3.4.4	Welding/Bolting/Fixing	MT	100	10%
3.4.5	Completion of Non-Destructive examination, wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	MT	100	10%
3.4.6	Hangers & supports etc. wherever necessary as per drg. wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	MT	100	5%
3.4.7	Hydraulic test/Pneumatic test wherever applicable, wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	MT	100	5%
3.4.8	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.4.4)	LS	01	5%
3.5	**Erection & Commissioning of Flow Element , Ignitors , Flame Scanners, coal pipe etc.**			
3.5.1	On pre-assembly wherever applicable (If not applicable, this portion to be paid along with placement in position)	MT	2	15%
3.5.2	Placement in position	MT	2	30%
3.5.3	Alignment	MT	2	15%
3.5.4	Welding/Bolting/Fixing	MT	2	15%
3.5.5	Completion of Non-Destructive examination wherever required. If not applicable, this portion to be paid along with activity -3.5.4))	MT	2	5%
3.5.6	Hangers & supports etc. wherever necessary as per drg. wherever required. If not applicable, this portion to be paid along with activity -3.5.4)	MT	2	3%
3.5.8	Painting (including arrow marking, nomenclature, etc) wherever required. If not applicable, this portion to be paid along with activity -3.5.4)	MT	2	2%
3.6	**Application of Insulation**			

3.6.1	Application of Insulation including Cladding & Refractory.	MT	15	85%

Part –B (Electrical and C&I Work)

Section- B.1, B.2 and B.3: - The progressive payment for dismantling, erection, testing and commissioning on accepted price of contract value for Electrical and C&I Package rates will be released as per the break up given hereinafter (For each Unit)

Sl. No.	Activity/Work Description	% of unit rate
A	**Main E&C Equipment/Items**	
(I)	**PRO RATA PAYMENTS (85%)**	
1.0	**Cable tray and accessories**	
1.1	Fabrication and fixing/welding/bolting in position	60%
1.2	Earthing of cable trays	15%
1.3	Tagging of cable trays (painting cable tray numbers on sides)	5%
1.4	Covering of trays where ever envisaged	5%
	Total =	**85%**
2.0	**Cable laying (Instrumentation Cables)**	
2.1	Laying of cables	45%
2.2	Glanding, Termination and tagging of cables	15%
2.3	Dressing and clamping of cables	10%
2.4	Shielding of cables	5%
2.5	Testing and charging of cables	10%
	Total =	**85%**
3.0	**Cable laying (Power Cables)**	
3.1	Laying of cables	45%
3.2	Glanding, Termination and tagging of cables	15%
3.3	Dressing and clamping of cables	10%
3.4	Testing and charging of cables	15%
	Total =	**85%**
4.0	**Junction box/Push button station (local)**	
4.1	Erection including fixing of terminal blocks where ever applicable	75%
4.2	Name plate fixing where ever applicable , Labelling (both inside and outside) and Commissioning of connected equipment	10%
	Total =	**85%**
5.0	**Panels/Cubicles/Desks/Racks/Enclosures/Monitors/Computers/Computer peripherals/PLCs/UPS/Batteries**	
5.1	Erection and alignment	50%
5.2	Fixing of loose items/instruments where ever applicable	5%

5.3	Pre-commissioning checks, Charging of panel and Loop testing etc	15%
5.4	System commissioning	15%
		85%
6.0	**Instruments/Devices including Sensors/Cells/Probes etc**	
6.1	Calibration/Local testing/Pre-Checks - commissioning readiness	30%
6.2	Removal & re-fixing/Fixing loose supplied components, Erection including tubing/hose, regulators, etc	30%
6.3	Local Commissioning & Loop Testing as required	10%
6.4	System Commissioning or Remote Commissioning as required	15%
	Total =	**85%**
7.0	**HMI**	
7.1	Erection and alignment	50%
7.2	Fixing of loose items/instruments where ever applicable	5%
7.3	Pre-commissioning checks, Charging and Loop testing etc	15%
7.4	System commissioning	15%
		85%
8.0	**Flame Scanner**	
8.1	Erection and alignment	50%
8.2	Fixing of loose items/instruments where ever applicable	5%
8.3	Pre-commissioning checks, and Loop testing etc	15%
8.4	System commissioning	15%
		85%
9.0	**Conduits/impulse pipe/tubes**	
9.1	Fabrication, Laying and Erection	50%
9.2	Leak Test/Hydraulic Test (where ever applicable, otherwise clubbed with next activity)	20%
9.3	Dressing, clamping, tagging and painting where ever applicable	8%
9.4	Testing & commissioning of associated equipment/system	7%
	Total =	**85%**
10.0	**Commissioning and Testing activities for equipment like Control Valves, On/Off Valves, Electrical/Pneumatic Valves, Actuators, Solenoid Valves, Valves, Limit Switches, ERV Controllers, Power Cylinders, Pressure and Temperature Gauges, Transmitters etc.**	
10.1	Removal & re-fixing/Fixing loose supplied components, including tubing/hose, regulators, etc. (where ever applicable, otherwise clubbed with next activity)	30%
10.2	Calibration/ Local testing - commissioning readiness	30%
10.3	Local Commissioning & Loop Testing as required	15%
10.4	System Commissioning or Remote Commissioning as required	10%
	Total =	**85%**

11.0	**Miscellaneous Structural steel including frames for Panels/Racks/Instruments, supports for cable tray/pipes/tubes, Canopies etc**	
11.1	Fabrication, Erection, Alignment, Welding/bolting and where ever applicable chipping/grouting/painting	65%
11.2	Erection of associated Items/Equipment/Systems as applicable	20%
	Total =	**85%**
12.0	**Above Ground Earthing & Lightning Protection Materials**	
12.1	Fabrication, erection, alignment, welding/ bolting of earthing/ lightning protection strips; earth pits completion	60%
12.2	Testing/commissioning/Connection to equipment	25%
	Total =	**85%**
13.0	**Dismantling**	
13.1	Old cable removal and Dismantling of existing Cable Trays from Site.	40%
13.2	Shifting of existing/old materials (cables, cable trays etc.) from site to Customer's store/designated area.	20%
13.3	Disconnection, Reconnection of existing cables	15%
13.4	Completion	10%
	Total =	**85%**
14.0	**Civil Works**	
14.1	Modification in cut-out, making holes, breaking concrete floors etc	50%
14.2	Finishing	10%
14.3	Clean-up	15%
14.4	Completion	10%
	Total =	**85%**
15.0	**Electronic/Instrumentation Earth Pits.**	
15.1	Erection (Excavation, installation of earth electrode etc.)	50%
15.2	Cabling/Termination/Laying of Earthing Strip etc.	10%
15.3	Pre-commissioning/Testing	15%
15.4	Commissioning/Completion	10%
	Total =	**85%**

NOTE: Further Break-Up of Milestone Activities or Balance 15%(B.1, B.2 & B.3) to complete R&M Work are described below: -

- Payment terms for Section- B.1, B.2 and B.3 against Milestone Activities (15%) – Each Unit.

Sch. No.	Description of Work	Unit	Qty	Percentage

	Milestone Activities to complete R&M Work (15.00000%)			
1	Boiler light-up, BFG Firing , commissioning and trial operation	LS	1	2%
2	Punch List points/pending points liquidation	LS	1	2%
3	On completion of Performance Test	LS	1	1%
4	5% for safety Aspect /compliances to safety Rules.	LS	1	5%
5	1 % for deployment of 3 experts for boiler, piping and Electrical and C&I equipment	Nos	3	1%
6	1 % for deployment of 2 numbers of quality engineers	Nos	2	1%
7	For Material Reconciliation	LS	1	1%
8	Completion of Insulation & scrap disposal at designated place and area cleaning	LS	1	0.5%
9	Completion of Contractual Obligation	LS	1	1.5 %

Above payment terms is for each units

Note for each Unit:

1. While submitting the invoices, Vendor should mention their Bank Account No. on each of their invoices for the purpose of making e-payment. Invoice should be sent in triplicate form.
2. The amount for entire quarter (i.e. RA bills raised during the 3-month period) shall be paid to the bidder at the end of the three-month period with safety compliances duly certified by project manager/site in charge (For Schedule No. 4 of Milestone Activities)
3. **LIQUIDATED DAMAGES/PENALTY: -**
   If the sub-contractor fails to successfully Install & commission the Boiler within the time period of 90 days for each unit from the date of commencement of shutdown and there is need to extend shutdown period due to reasons solely attributable to sub-contractor, then a liquidated damage and not as penalty shall be levied on vendor, at the rate Half per-cent (0.5%) of Total Contract price for each day of delay, subjected to maximum of Ten per-cent (10%) of Total contract price.
4. Payment shall be made on actual executed quantity of each BOQ certified by BHEL Engineer.
5. Actual quantity shall be calculated as per shipping list.
6. Payment against Quantity Variation shall be calculated as per GCC.
7. In case of quantity variation, payment shall be made as per BOQ per unit rate of individual item.
8. **Price Variation Compensation Clause no 2.17 of standard GCC shall be applicable.**
9. **Overrun compensation clause no. 2.12 of standard GCC shall not be applicable.**
10. **Progress Monitoring, Monthly Review and Performance Evaluation of Vol-I BCD is applicable.**

11. Interest bearing recoverable advances- Cl no. 2.13 of GCC, is not applicable.
12. Performance Guarantee/warrantee of Workmanship for the work done / Defect liability period shall be 12 months from successful commissioning of unit.

7.2 Retention money: Retention amount as indicated in Clause 2.22.1 of Vol. I C 'General Conditions of Contract'

The bill due for payment shall be submitted to the Engineer in-charge of BHEL at site for necessary verification and processing through proper channel. It may be noted that payment will be released from the office of the Construction Manager/Site Inchange after minimum 30 days from the date of receipt of the duly verified bill from site.

QUALITY REQUIREMENT

- Various inspection/ quality control / quality assurance procedure/ methods at various stages will be as per BHEL/ customer quality control procedure/ codes/ IBR and other statutory provisions and as per BHEL Engineer's instructions.
- Preparation of quality assurance log sheets and protocols with customer's engineers, welding logs, other quality control and quality assurance documentation as per BHEL Engineer's instructions, is within the scope of work/ specification.
- A daily log book should be maintained by Area In-charge of contractor on the job incorporating erection / alignment / welding clearance /radiography / progress of work etc. and the same shall be submitted to BHEL. Also, daily reports shall be submitted to BHEL.
- All the important measurements like pre-assembly checking of alignment leveling/ centering work etc. shall be recorded in the daily log book with sketches based on BHEL drawings indicating readings/ measurements actually taken and signed by BHEL/ Customer/ Contractor representatives.
- The inspection/measuring and testing equipments should be of brand, quality and accuracy, as specified by BHEL engineer and should have valid calibration certificates traceable to national/international standards.
- Total quality is the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He will follow the instructions as per BHEL drawings and quality standards.
- The welder's performance will be reviewed from time to time as per the BHEL/ IBR standards and any welder not performing to the standards set by BHEL/ IBR standards will be removed from working, Contractor shall arrange for the alternate welders immediately.
- All the welders including HP welders shall carry identity cards. Only welders duly authorized by BHEL/ Boiler inspector/ customer / consultant shall be engaged on the work.
- STAGE INSPECTION BY BHEL / CUSTOMERS ENGINEERS

  Apart from day-to-day inspection/ stage inspection of equipments by BHEL engineers, the equipments may be checked at various stages by customer's engineers and quality assurance teams. Contractor shall arrange all labour, tools/tackles etc. for such inspections free of cost.

TECHNICAL CONDITIONS OF CONTRACT (TCC)
Chapter – X: TAXES and DUTIES

TAXES, DUTIES, LEVIES (Rev 14 dated 09/10/2020)

1. All taxes excluding GST, GST Cess **& BOCW** Cess **but including, Royalties, fees, license, deposits, commission, any State or Central Levy and other charges whatsoever, if any, shall be borne by you and shall not be payable extra.**

2. Any increase of the taxes excluding GST, GST Cess & BOCW **Cess**, at any stage during execution including extension of the contract shall have to be borne by the contractor. Quoted/ accepted rates/ price shall be inclusive of all such requirements. Please note that since GST on output will be paid by BHEL separately as enumerated below, your quoted rates/ price should be after considering the Input Credit under GST law at your end.

3. **GST :**
   The successful bidder shall furnish proof of GST registration .GST along with Cess (as applicable) legally leviable & payable by the successful bidder as per GST Law, shall be paid by BHEL. Hence Bidder shall not include GST along with Cess (as applicable) in their quoted price.

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

5. E-invoicing under GST has been implemented with effect from 1st October 2020 for all the taxable persons having turnover more than the threshold limit in any preceding financial year from 2017-18 onwards. Therefore, for all the taxable persons falling under the purview of E-invoice, it is mandatory to mention a valid unique Invoice Reference No. (IRN) and QR code as generated from E-Invoicing portal of the Government for the purpose of issuing a valid Tax Invoice. Only an E-invoice issued in the manner prescribed under rule 48(4) of CGST Rules shall be treated as valid invoice for reimbursement of GST amount.
   If the successful Bidder is not falling under the purview of E-Invoicing then he has to submit a declaration in that respect along with relevant financial statements.

6. Bidder shall note that the GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred there under) wherein the 'Bill To' details will as below:
   BHEL GSTN – As per **Annexure -1**
   NAME -- Bharat Heavy Electricals Limited
   ADDRESS – Site address

7. Bidder to immediately intimate on the day of removal of Goods (in case of any supply of goods) to BHEL along with all relevant details and a scanned copy of Tax Invoice to below email ids to enable BHEL to meet its GST related compliances :-
   Email id ---- to be intimated later on.
   In case of delay in submission of the abovementioned documents on the date of dispatch, BHEL may incur penalty /interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from the successful bidder, if such delay is not attributable to BHEL.
8. In case of raising any Supplementary Tax Invoice (Debit / Credit Note) Bidder shall issue the same containing all the details as referred to in Section 34 read with Rule 53.

9. Bidder shall note that in case GST credit is delayed/ denied to BHEL due to delayed / non receipt of goods and /or tax invoice or expiry of the timeline prescribed in GST Law for availing such ITC,

or any other reasons not attributable to BHEL, GST amount shall be recoverable from the vendor along with interest levied / leviable on BHEL, as the case may be.

10. Bidder shall upload the Invoices raised on BHEL in GSTR-1 within the prescribed time as given in the GST Act. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law , GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the bidder along with interest levied / leviable on BHEL.

11. Way Bill: Successful Bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract.

    The Bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, Road Permit/ Way Bill, if required, shall be arranged by the contractor and BHEL will not supply any Road Permit/ Way Bill for this purpose.

12. New taxes and duties:-Any New taxes & duties, if imposed subsequent to due date of offer submission as per NIT & TCN, by statutory authority during contract period including extension, if the same is not attributable to you, shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, you shall obtain prior approval from BHEL before depositing new taxes and duties.
    Benefits and/or abolition of all existing taxes must be passed on to BHEL against new Taxes, if any, proposed to be introduced at a later date.
    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 must convey its impact on his price duly substantiated by documentary evidence in support of the same before opening of the price bids. Claim for any such impact after opening the price bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

13. For transportation work, bidder shall declare in his quotation whether he is registered under GST, if yes, whether he intends to claim GST on forward charge basis. In absence of this declaration, BHEL will proceed further with the assumption that bidder intends not to claim GST on forward charge basis. However, in case of GST registered transporter, the amount to the extent of goods and service tax will be retained till BHEL avails the credit of GST. Further, transporter shall issue tax invoice which inter alia includes gross weight of the consignment, name of the consigner and the consignee, registration number of vehicle in which the goods are transported, details of goods transported, details of place of origin and destination, GSTIN of the person liable for paying tax whether as consigner, consignee or goods transport agency, and also containing other information as mentioned under rule 46.

14. TDS under Income Tax shall be deducted at prevailing rates on gross invoice value from the running bills unless exemption certificate from the appropriate authority/ authorities is furnished.

15. TDS under GST shall be deducted at prevailing rates on applicable value from the running bills.

16. TCS under Income Tax 1961 has been implemented with effect from 1st October 2020 for every seller having turnover more than threshold limit during financial year immediately preceding financial year in which the sale of goods is carried out, who receives any amount as consideration for sale of any goods of the value or aggregate of such value exceeding threshold

limit other than export of goods or who is already covered under other provision of section 206C, collect from the buyer, TCS as per applicable rates of the sale consideration exceeding threshold limit subject to following conditions

i. Buyer shall be as per clause (a) of section 206C- (1H)
ii. Seller shall be as per clause (b) of section 206C- (1H)
iii. No TCS is to be collected, if the seller is liable to collect TCS under other provision of section 206C or the buyer is liable to deduct TDS under any provision of the Act and has deducted such amount.

If Successful Bidder is falling under the purview of TCS then he has to submit a declaration in that respect along with relevant financial statements before the start of work or if bidder is falling under preview of TCS during the work in progress then bidder is compulsorily required to submit relevant financial statement in the beginning of the respective FY.

For TCS claim, vendor has to submit relevant documents required as per Income Tax Act.

17. Refer Annexure – 2 for BOCW Act & Cess Act.

ANNEXURE-1

State wise GSTIN no.s of BHEL

Sl. No	Projects under state	GSTIN
1	Andhra Pradesh	37AAACB4146P7Z8
2	Bihar	10AAACB4146P1ZU
3	Chhattisgarh	22AAACB4146P1ZP
4	Gujarat	24AAACB4146P1ZL
5	Jharkhand	20AAACB4146P5ZP
6	Madhya Pradesh	23AAACB4146P1ZN
7	Maharashtra	27AAACB4146P1ZF
8	Orissa	21AAACB4146P1ZR
9	Telangana	36AAACB4146P1ZG

ANNEXURE-2

BOCW Act & Cess Act

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.

Table for Weightages/ Factors and BOQ

S.no	Description	Unit	**Percentage Factor**
	Section-A		
1	The work of receipt, unloading, verifying, shifting, stacking, preservation, handling of material at BHEL/clients stores/storage yard including transportation and handing over of components for renovation & modification of re-introduction of blast furnace gas firing system, BHEL T&P & other materials, components & equipment and providing services for materials management at PP-II, NSPCL Bhilai.	Lumpsum	4.052311%
	Section-B		
2	Preshutdown work for all three unit and Shutdown work of any First Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.	Lumpsum	41.547689%
3	Shutdown Work for any Second Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.	Lumpsum	27.200000%
4	Shutdown Work for any Third Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.	Lumpsum	27.200000%
			100.000000%

Further %age Breakup of Rates & Quantities related to Section A and Section B is tabulated below

Sl no.	Description of Work	Unit	Qty	Percentage
Section-A	The work of receipt, unloading, verifying, shifting, stacking, preservation, handling of material at BHEL/clients stores/storage yard including transportation and handing over of components for renovation & modification of re-introduction of blast furnace gas firing system, BHEL T&P & other materials, components & equipment and providing services for materials management at PP-II, NSPCL Bhilai.			
	Part-A			
	A1 :- Material Handling & Material Management			
A1.1	Material Handling and Material Management for Materials received through Trucks/Trailers at Project Site	*MT*	*640*	7.62000%

A1.2	Material Handling and Material Management for Materials received through Railway Wagons at Railway Siding/Station/Godown	*MT*	*75*	1.75000%
A1.3	Material Handling and Material Management for Materials received at Transporters Godowns within a radius of 50 KM from Project Site	*MT*	*75*	1.97000%
A1.4	Material resifting and re stacking within project premises	*MT*	*75*	0.74000%
A1.5	Dispatch/Outgoing materials	*MT*	*75*	0.72000%
	A2 :- Pick and Carry Crane Services			0.00000%
A2.1	*New generation Pick & carry type tyre mounted mobile crane 12/14 MT or above (In Months)*	*Month*	*17*	35.10000%
A2.2	*New generation Pick & carry type tyre mounted mobile crane 20/22 MT or above (In Months)*	*Month*	*17*	33.25000%
	Part-B Redevelopment Work of Open Yard			
B	*Redevelopment work of Open Yard As per Scope of Work*	*LS*	*1*	18.85000%
			Total Percentage	100.00000%

Instructions to the bidders regarding Price Bid (Schedule of Rates & Quantities) and its Calculations:

1. Schedule of Rates and Quantities consist of the followings: -

a. Part (A):
- Section-A-1 : Material Handling and Management
- Section-A-2 : Crane and Pick and Carry Crane
- Section-A-3 : Menial and Secretarial Services (Prices Fixed by BHEL)

SN	Description of Work/Item	BOQ (Man Months)	Minimum Wages as per latest Circular Dtd. 27.03.2025	1.41 X Minimum Wages	Total
C.1	Menial Services (Unskilled)	34	₹ 11,176	₹ 15,802	₹ 5,37,268
C.2	Secretarial Services (Skilled)	17	₹ 12,606	₹ 17,799	₹ 3,02,583
	Sub Total (C)				**₹ 8,39,851**

For Section-A-3 – Refer Chapter-VII(A): - Terms of payment

b. Part (B): Redevelopment work of open yard (LS)

2. **Prices for Section-A-3: Menial and Secretarial Services are already fixed by BHEL. (refer Sl. No. a)**
3. BHEL has pre-fixed Weightage Factors for '*Total for Calculation purpose only*' of individual items of/falling under Section A1, Section A2 & Part-B. '*Total for Calculation purpose only*' for each item falling under these sections are derived by Multiplying Weightage Factors and Grand total amount quoted by the bidder for Section-A. Further to calculate Item Rate, '*Total for Calculation purpose only*' shall be divided by respective quantities, rounding down to two decimal places.
4. These item wise Weightage Factors and Quantities allocations are as detailed in above Table.

5. Actual Total amount for individual items shall be obtained by multiplying Unit rate of each item as derived in sl no. 6 above to the respective quantities.
6. Grand Total of Section-A1, A2 & Part B shall be derived by summing up the actual total amount individual items thus derived for (as per Sl No 8 above), i.e. Section-A1 + A2 +B rounding off to zero decimal places.

Section-B	Renovation & modernization of re-introduction of blast furnace gas firing system in all 3 UNITS (2X30MW +1X14MW) power plant which includes dismantling of existing facilities & erection and commissioning of CO gas & Blast furnace gas line, wind box, u-seal, igniter, scanner, hangers, blast furnace gas pipe, valves, C&I and Electricals, super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai.			
B.1	**Preshutdown work for all three unit and Shutdown work of any First Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.**			
1	Mobilisation of Manpower , T&P and start of work at site	LS	1	2.50000%
2	**Pre-shudown work - Dismantling & Erection of Blast Furnace Gas pipings, valves, Hangers and other associated items for all 3 Unit**			
2.1	Dismantling of BFG pipings, structural, goggle valves or other valves, hangers and associated item for all 3 Unit - As per scope of work	LS	1	6.93610%
2.2	Erection of Blast Furnace Gas pipings and other associated items for all 3 Unit	MT	60	11.34696%
2.3	Erection of goggle valve or other valves , Hangers and other associated items for all 3 Unit	MT	60	13.75000%
3	**Shutdown Work for any First Unit (1 or 2 or 3)**			
3.1	Dismantling of Boiler, Pipings,valves, insulation & associated items - As per Scope of work	LS	1	7.85501%
3.2	**Erection and commissioning of CO gas & Blast furnace gas line, wind box, U-seal, Igniter, scanner, hangers, Blast furnace gas pipe, Valves, C&I and Electricals, Platen super heaters coils, insulations and other associated works at PP-II, NSPCL Bhilai**			0.00000%
3.2.1	Erection & Commissioning of Burner Wind box	MT	15	4.90938%
3.2.2	Erection & Commissioning of Wind box Connecting duct	MT	18	5.89126%
3.2.3	Erection & Commissioning of Structure & associated items	MT	26	7.85501%
3.3	**Dismantling ,Erection & Commissioning of Platen Superheater Coils**			0.00000%
3.3.1	Dismantling Existing superheater coils	LS	1	2.45469%

3.3.2	Erection & Commissioning of Platen Superheater Coils	MT	19	4.90938%
3.4	Erection & Commissioning of BFG pipes other than common headers, CO Gas Pipings , Scanner air pipings, scanner air fan, Hangers and steam purging piping Structure, valves.	MT	100	18.91160%
3.5	Erection & Commissioning of Non Pressure Parts (Flow Element , Ignitors , Flame Scanners,coal pipe)	MT	2	4.17298%
3.6	Application of Insulation	MT	15	2.45469%
4	**Electrical and Control & Instrumentation (C&I) Works for any First Unit (1 or 2 or 3)**			
4.1	**Cable Tray and Accessories- Complete with Coupler Plates, Fasteners, Clamps and Fixing Hardwares etc. Erection including Support and Covers**			
4.1.1	Galvanised Ladder Type Cable Tray, W=600mm	Meter	350	0.11114%
4.1.2	Galvanised Ladder Type Cable Tray, W=300mm/150mm	Meter	400	0.10895%
4.1.3	Perforated cable tray and accessories (with or without cover), W=300mm/150mm	Meter	500	0.15409%
4.1.4	Perforated cable tray and accessories (with or without cover) 100mm/50mm	Meter	200	0.03779%
4.2	**Instrumentation Cables**			0.00000%
4.2.1	12P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	8000	0.38730%
4.2.2	12P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Light Blue, Fire Resistant and FRLSZH	Meter	700	0.03145%
4.2.3	6P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	700	0.02086%
4.2.4	2P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	600	0.02008%
4.2.5	2P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Light Blue, Fire Resistant and FRLSZH	Meter	6000	0.20080%

4.2.6	6P X 2.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	400	0.02128%
4.2.7	1P X 2.5 mm2, Armoured, Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	200	0.00600%
4.2.8	2P Kx X 16 AWG, Armoured, Shielded, KX Extension cable with overall sheath colour of As per IEC 60584, Fire Resistant and FRLSZH	Meter	200	0.00469%
4.2.9	Single Triad X 1.5 mm2, Armoured, Shielded, Triad cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	200	0.00600%
4.2.10	Flame Scanner Cable- P/O Shielded	Meter	700	0.02727%
4.2.11	Network UTP Cables in flexible GI pipes(special termination using UTP connectors involved)	Meter	200	0.01326%
4.3	**Power Cables**			0.00000%
4.3.1	3CX 50 SQMM, LT Power Cable	Meter	500	0.03447%
4.3.2	3CX 35 SQMM, LT Power Cable	Meter	300	0.01864%
4.3.3	1CX 25 SQMM, Earthing Cable	Meter	500	0.02566%
4.3.4	12C X 2.5 mm2, Armoured, Unshielded, Power cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	700	0.03724%
4.3.5	3C X 2.5 mm2, Armoured, Unshielded, Power cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	2000	0.06547%
4.3.6	12C X 1.5 mm2, Armoured, Individual & Overall Shielded, Triad cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	100	0.00458%
4.4	**Junction box/Push Button station**			0.00000%
4.4.1	DIE CAST AL. EX JB 48WAY/24WAY	No	52	0.13013%
4.4.2	MTM FRP JUNCTION BOX-24 WAY WITH CANOPY	No	5	0.02994%
4.4.3	Start/Stop Push Button Station	No	5	0.00910%
4.4.4	Local Motor Starter	No	5	0.00944%

4.5	**Panels/Cubicles/Racks/Enclosures/Monitors/Computer/Computer peripheral/PLCs/UPS/Batteries**			0.00000%
4.5.1	PLC PANEL SUIT (Approx. Dimensions - L X B X H: 2800 X 1000 X 2415 mm), Approximate weight = 1800 Kg.	No	1	0.15475%
4.5.2	Computer Furniture (Approximate qty: Computer Table-02 nos, Printer Table-01 nos, Chairs-03 nos)	Set	1	0.04651%
4.6	**Instruments/Devices including sensors/Cells/Probes etc**			0.00000%
4.6.1	DP Transmitters	No	9	0.03626%
4.6.2	Pressure Transmitters	No	13	0.05238%
4.6.3	Pressure Gauge / DP Gauge/DP Indicator	No	33	0.03966%
4.6.4	Thermocouple / RTDs with thermowell (all types) along with converters wherever applicable	No	3	0.00447%
4.6.5	Temperature Transmitters, HART Type	No	8	0.01495%
4.6.6	MTM Thermocouples- 20 Mtrs length	No	6	0.02715%
4.6.7	SADC Power Cylinder	No	32	0.24171%
4.6.8	I/P Converter along with Air Filter Regulator	No	8	0.01458%
4.7	**HMI**			0.00000%
4.7.1	Operator Work Station along with accessories	No	1	0.00958%
4.7.2	Engineering Workstation (EWS)	No	1	0.00958%
4.7.3	A4 Multifunction Printer	No	1	0.00548%
4.8	**Flame Scanner**			0.00000%
4.8.1	UV + IR type or UV + Visible type Flame scanners along with Flame Scanner Guide Pipe	No	16	0.09178%
4.8.2	Miniature Junction Box	No	16	0.03141%
4.9	**Conduits/Impulse pipe/tubes**			0.00000%
4.9.1	PIPE OD 21.3 x 4.78 - SA106GRB/SA106GRB IBR	Meter	900	0.48761%
4.9.2	SS TUBE 1/2"OD X 0.049"THK A269 TP316L	Meter	900	0.39226%
4.9.3	SS TUBE 1/4"OD X 0.049"THK A269 TP316L	Meter	1500	0.65376%
4.10	**Commissioning and Testing activities for equipments like Control Valves, On/Off Valves, Electrical/Pneumatic Valves, Actuators, Solenoid Valves, Valves, Limit Switches, ERV Controllers, Power Cylinders, Pressure and Temperature Gauges, Transmitters etc.**			0.00000%
4.10.1	Electrical Actuators	No	6	0.01823%
4.10.2	Control Valves, Electrically operated valves, Dampers and Gates, Miscelleeous Drives etc. (Regulating & ON/OFF Type)	No	12	0.04250%
4.10.3	Testing and Commisisoning of 415V LT Motors including dryout	No	6	0.02199%

4.10.4	Limit Switches	No	10	0.00606%
4.11	**Miscelleneous Structural Steel including Frames for Panels/Racks/Instruments/Supports for Cable Trays/Pipes/Tubes/Canopies etc.**			0.00000%
4.11.1	Structural Steel for fabrication (MS angle, Channel, Plate etc)/ Cable Tray Structural steel fabrication and installation	MT	20	1.02517%
4.12	**Above Ground Earthing & Lightning Protection Materials (Supply of Material along with Erection will be in Contractor's Scope)**			0.00000%
4.12.1	8 SWG GI Wire	Meter	100	0.01453%
4.12.2	65 X 8 MM GI FLAT	Meter	300	0.28399%
4.12.3	50 X 6 MM GI FLAT	Meter	200	0.11700%
4.12.4	25 X 6 MM GI FLAT	Meter	300	0.14694%
4.13	**Dismantling & Removal of items from site and handover to Customer's store**			0.00000%
4.13.1	Dismantling of existing old / unusable cable trays	Meter	500	0.11916%
4.13.2	Dismantling/Disconnection/Reconnection of Existing Cables	Meter	5000	0.18603%
4.14	**Civil works: Civil works like modification in cut out for panels, making approach through walls, breaking of concrete floors to suite DCS/PLC/MCC/SWGR Panels erection, etc. wherever required. (As per volume of work with cutting of concrete slab).**	Lot	1	0.09302%
4.15	**Electronic/Instrumentation Earth Pits. (Supply of Material, erection and commissioning will be in contractor's scope)**	Set	2	0.14883%
B.2	**Shutdown Work for any Second Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.**			
2	Dismantling of Boiler, Pipings,valves, insulation & associated items- As per the scope of work	LS	1	11.99844%
3	Erection and commissioning of CO gas & Blast furnace gas line, wind box, U-seal, Igniter, scanner, hangers, Blast furnace gas pipe, Valves, C&I and Electricals, Platen super heaters coils, insulations and other associated works at PP-II, NSPCL Bhila			
3.1	Erection & Commissioning of Burner Wind box	MT	15	7.49903%
3.2	Erection & Commissioning of Wind box Connecting duct	MT	18	8.99883%
3.3	Erection & Commissioning of Structure & associated items	MT	26	11.99844%

3.3	**Dismantling ,Erection & Commissioning of Platen Superheater Coils**			
3.3.1	Dismantling Existing superheater coils	LS	1	3.74951%
3.3.2	Erection & Commissioning of Platen Superheater Coils	MT	19	7.49903%
3.4	Erection & Commissioning of BFG pipes other than common headers, CO Gas Pipings , Scanner air pipings, scanner air fan, Hangers and steam purging piping Structure, valves.	MT	100	28.88725%
3.5	Erection & Commissioning of Non Pressure Parts (Flow Element , Ignitors , Flame Scanners, coal pipe)	MT	2	6.37417%
3.6	Application of Insulation	MT	15	3.74951%
4	**Electrical and Control & Instrumentation (C&I) Works for any First Unit (1 or 2 or 3)**			
4.1	**Cable Tray and Accessories- Complete with Coupler Plates, Fasteners, Clamps and Fixing Hardwares etc. Erection including Support and Covers**			
4.1.1	Galvanised Ladder Type Cable Tray, W=600mm	Meter	350	0.16976%
4.1.2	Galvanised Ladder Type Cable Tray, W=300mm/150mm	Meter	400	0.16641%
4.1.3	Perforated cable tray and accessories (with or without cover), W=300mm/150mm	Meter	500	0.23537%
4.1.4	Perforated cable tray and accessories (with or without cover) 100mm/50mm	Meter	200	0.05772%
4.2	**Instrumentation Cables**			
4.2.1	12P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	8000	0.59159%
4.2.2	12P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Light Blue, Fire Resistant and FRLSZH	Meter	700	0.04804%
4.2.3	6P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	700	0.03186%
4.2.4	2P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	600	0.03067%

4.2.5	2P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Light Blue, Fire Resistant and FRLSZH	Meter	6000	0.30673%
4.2.6	6P X 2.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	400	0.03251%
4.2.7	1P X 2.5 mm2, Armoured, Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	200	0.00917%
4.2.8	2P Kx X 16 AWG, Armoured, Shielded, KX Extension cable with overall sheath colour of As per IEC 60584, Fire Resistant and FRLSZH	Meter	200	0.00717%
4.2.9	Single Triad X 1.5 mm2, Armoured, Shielded, Triad cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	200	0.00917%
4.2.10	Flame Scanner Cable- P/O Shielded	Meter	700	0.04165%
4.2.11	Network UTP Cables in flexible GI pipes(special termination using UTP connectors involved)	Meter	200	0.02025%
4.3	**Power Cables**			
4.3.1	3CX 50 SQMM, LT Power Cable	Meter	500	0.05265%
4.3.2	3CX 35 SQMM, LT Power Cable	Meter	300	0.02847%
4.3.3	1CX 25 SQMM, Earthing Cable	Meter	500	0.03919%
4.3.4	12C X 2.5 mm2, Armoured, Unshielded, Power cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	700	0.05689%
4.3.5	3C X 2.5 mm2, Armoured, Unshielded, Power cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	2000	0.10000%
4.3.6	12C X 1.5 mm2, Armoured, Individual & Overall Shielded, Triad cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	100	0.00699%
4.4	**Junction box/Push Button station**			0.00000%
4.4.1	DIE CAST AL. EX JB 48WAY/24WAY	No	52	0.19877%
4.4.2	MTM FRP JUNCTION BOX-24 WAY WITH CANOPY	No	5	0.04573%

4.4.3	Start/Stop Push Button Station	No	5	0.01390%
4.4.4	Local Motor Starter	No	5	0.01443%
4.5	**Panels/Cubicles/Racks/Enclosures/Monitors/Computer/Computer peripheral/PLCs/UPS/Batteries**			
4.5.1	PLC PANEL SUIT (Approx. Dimensions - L X B X H: 2800 X 1000 X 2415 mm), Approximate weight = 1800 Kg.	No	1	0.23638%
4.5.2	Computer Furniture (Approximate qty: Computer Table-02 nos, Printer Table-01 nos, Chairs-03 nos)	Set	1	0.07104%
4.6	**Instruments/Devices including sensors/Cells/Probes etc**			
4.6.1	DP Transmitters	No	9	0.05539%
4.6.2	Pressure Transmitters	No	13	0.08001%
4.6.3	Pressure Gauge / DP Gauge/DP Indicator	No	33	0.06057%
4.6.4	Thermocouple / RTDs with thermowell (all types) along with converters wherever applicable	No	3	0.00683%
4.6.5	Temperature Transmitters, HART Type	No	8	0.02284%
4.6.6	MTM Thermocouples- 20 Mtrs length	No	6	0.04147%
4.6.7	SADC Power Cylinder	No	32	0.36920%
4.6.8	I/P Converter along with Air Filter Regulator	No	8	0.02226%
4.7	**HMI**			0.00000%
4.7.1	Operator Work Station along with accessories	No	1	0.01463%
4.7.2	Engineering Workstation (EWS)	No	1	0.01463%
4.7.3	A4 Multifunction Printer	No	1	0.00836%
4.8	**Flame Scanner**			
4.8.1	UV + IR type or UV + Visible type Flame scanners along with Flame Scanner Guide Pipe	No	16	0.14019%
4.8.2	Miniature Junction Box	No	16	0.04798%
4.9	**Conduits/Impulse pipe/tubes**			
4.9.1	PIPE OD 21.3 x 4.78 - SA106GRB/SA106GRB IBR	Meter	900	0.74481%
4.9.2	SS TUBE 1/2"OD X 0.049"THK A269 TP316L	Meter	900	0.59917%
4.9.3	SS TUBE 1/4"OD X 0.049"THK A269 TP316L	Meter	1500	0.99861%
4.10	**Commissioning and Testing activities for equipments like Control Valves, On/Off Valves, Electrical/Pneumatic Valves, Actuators, Solenoid Valves, Valves, Limit Switches, ERV Controllers, Power Cylinders, Pressure and Temperature Gauges, Transmitters etc.**			
4.10.1	Electrical Actuators	No	6	0.02785%
4.10.2	Control Valves, Electrically operated valves, Dampers and Gates, Miscelleeous Drives etc. (Regulating & ON/OFF Type)	No	12	0.06492%

4.10.3	Testing and Commisisoning of 415V LT Motors including dryout	No	6	0.03359%
4.10.4	Limit Switches	No	10	0.00926%
4.11	**Miscelleneous Structural Steel including Frames for Panels/Racks/Instruments/Supports for Cable Trays/Pipes/Tubes/Canopies etc.**			
4.11.1	Structural Steel for fabrication (MS angle, Channel, Plate etc)/ Cable Tray Structural steel fabrication and installation	MT	20	1.56594%
4.12	**Above Ground Earthing & Lightning Protection Materials (Supply of Material along with Erection will be in Contractor's Scope)**			
4.12.1	8 SWG GI Wire	Meter	100	0.02220%
4.12.2	65 X 8 MM GI FLAT	Meter	300	0.43379%
4.12.3	50 X 6 MM GI FLAT	Meter	200	0.17872%
4.12.4	25 X 6 MM GI FLAT	Meter	300	0.22445%
4.13	**Dismantling & Removal of items from site and handover to Customer's store**			
4.13.1	Dismantling of existing old / unusable cable trays	Meter	500	0.18202%
4.13.2	Dismantling/Disconnection/Reconnection of Existing Cables	Meter	5000	0.28416%
4.14	**Civil works: Civil works like modification in cut out for panels, making approach through walls, breaking of concrete floors to suite DCS/PLC/MCC/SWGR Panels erection, etc. wherever required. (As per volume of work with cutting of concrete slab).**	Lot	1	0.14208%
4.15	**Electronic/Instrumentation Earth Pits. (Supply of Material, erection and commissioning will be in contractor's scope)**	Set	2	0.22733%
B.3	**Shutdown Work for any Third Unit (1 or 2 or 3) under the job of Renovation & Modernization of Re-introduction of Blast Furnace Gas Firing system in all 3 Units (2X30MW +1X14MW) at PP-II , NSPCL Bhilai.**			
2	Dismantling of Boiler, Pipings,valves, insulation & associated items- As per the scope of work	LS	1	11.99844%
3	Erection and commissioning of CO gas & Blast furnace gas line, wind box, U-seal, Igniter, scanner, hangers, Blast furnace gas pipe, Valves, C&I and Electricals, Platen super heaters coils, insulations and other associated works at PP-II, NSPCL Bhila			
3.1	Erection & Commissioning of Burner Wind box	MT	15	7.49903%
3.2	Erection & Commissioning of Wind box Connecting duct	MT	18	8.99883%

3.3	Erection & Commissioning of Structure & associated items	MT	26	11.99844%
3.3	**Dismantling ,Erection & Commissioning of Platen Superheater Coils**			
3.3.1	Dismantling Existing superheater coils	LS	1	3.74951%
3.3.2	Erection & Commissioning of Platen Superheater Coils	MT	19	7.49903%
3.4	Erection & Commissioning of BFG pipes other than common headers, CO Gas Pipings , Scanner air pipings, scanner air fan, Hangers and steam purging piping Structure, valves.	MT	100	28.88725%
3.5	Erection & Commissioning of Non Pressure Parts (Flow Element , Ignitors , Flame Scanners, coal pipe)	MT	2	6.37417%
3.6	Application of Insulation	MT	15	3.74951%
4	**Electrical and Control & Instrumentation (C&I) Works for any First Unit (1 or 2 or 3)**			
4.1	**Cable Tray and Accessories- Complete with Coupler Plates, Fasteners, Clamps and Fixing Hardwares etc. Erection including Support and Covers**			
4.1.1	Galvanised Ladder Type Cable Tray, W=600mm	Meter	350	0.16976%
4.1.2	Galvanised Ladder Type Cable Tray, W=300mm/150mm	Meter	400	0.16641%
4.1.3	Perforated cable tray and accessories (with or without cover), W=300mm/150mm	Meter	500	0.23537%
4.1.4	Perforated cable tray and accessories (with or without cover) 100mm/50mm	Meter	200	0.05772%
4.2	**Instrumentation Cables**			
4.2.1	12P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	8000	0.59159%
4.2.2	12P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Light Blue, Fire Resistant and FRLSZH	Meter	700	0.04804%
4.2.3	6P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	700	0.03186%
4.2.4	2P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	600	0.03067%

4.2.5	2P X 1.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Light Blue, Fire Resistant and FRLSZH	Meter	6000	0.30673%
4.2.6	6P X 2.5 mm2, Armoured, Individual & Overall Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	400	0.03251%
4.2.7	1P X 2.5 mm2, Armoured, Shielded, Signal cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	200	0.00917%
4.2.8	2P Kx X 16 AWG, Armoured, Shielded, KX Extension cable with overall sheath colour of As per IEC 60584, Fire Resistant and FRLSZH	Meter	200	0.00717%
4.2.9	Single Triad X 1.5 mm2, Armoured, Shielded, Triad cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	200	0.00917%
4.2.10	Flame Scanner Cable- P/O Shielded	Meter	700	0.04165%
4.2.11	Network UTP Cables in flexible GI pipes(special termination using UTP connectors involved)	Meter	200	0.02025%
4.3	**Power Cables**			
4.3.1	3CX 50 SQMM, LT Power Cable	Meter	500	0.05265%
4.3.2	3CX 35 SQMM, LT Power Cable	Meter	300	0.02847%
4.3.3	1CX 25 SQMM, Earthing Cable	Meter	500	0.03919%
4.3.4	12C X 2.5 mm2, Armoured, Unshielded, Power cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	700	0.05689%
4.3.5	3C X 2.5 mm2, Armoured, Unshielded, Power cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	2000	0.10000%
4.3.6	12C X 1.5 mm2, Armoured, Individual & Overall Shielded, Triad cable with overall sheath colour of Black, Fire Resistant and FRLSZH	Meter	100	0.00699%
4.4	**Junction box/Push Button station**			0.00000%
4.4.1	DIE CAST AL. EX JB 48WAY/24WAY	No	52	0.19877%
4.4.2	MTM FRP JUNCTION BOX-24 WAY WITH CANOPY	No	5	0.04573%

4.4.3	Start/Stop Push Button Station	No	5	0.01390%
4.4.4	Local Motor Starter	No	5	0.01443%
4.5	**Panels/Cubicles/Racks/Enclosures/Monitors/Computer/Computer peripheral/PLCs/UPS/Batteries**			
4.5.1	PLC PANEL SUIT (Approx. Dimensions - L X B X H: 2800 X 1000 X 2415 mm), Approximate weight = 1800 Kg.	No	1	0.23638%
4.5.2	Computer Furniture (Approximate qty: Computer Table-02 nos, Printer Table-01 nos, Chairs-03 nos)	Set	1	0.07104%
4.6	**Instruments/Devices including sensors/Cells/Probes etc**			
4.6.1	DP Transmitters	No	9	0.05539%
4.6.2	Pressure Transmitters	No	13	0.08001%
4.6.3	Pressure Gauge / DP Gauge/DP Indicator	No	33	0.06057%
4.6.4	Thermocouple / RTDs with thermowell (all types) along with converters wherever applicable	No	3	0.00683%
4.6.5	Temperature Transmitters, HART Type	No	8	0.02284%
4.6.6	MTM Thermocouples- 20 Mtrs length	No	6	0.04147%
4.6.7	SADC Power Cylinder	No	32	0.36920%
4.6.8	I/P Converter along with Air Filter Regulator	No	8	0.02226%
4.7	**HMI**			
4.7.1	Operator Work Station along with accessories	No	1	0.01463%
4.7.2	Engineering Workstation (EWS)	No	1	0.01463%
4.7.3	A4 Multifunction Printer	No	1	0.00836%
4.8	**Flame Scanner**			0.00000%
4.8.1	UV + IR type or UV + Visible type Flame scanners along with Flame Scanner Guide Pipe	No	16	0.14019%
4.8.2	Miniature Junction Box	No	16	0.04798%
4.9	**Conduits/Impulse pipe/tubes**			
4.9.1	PIPE OD 21.3 x 4.78 - SA106GRB/SA106GRB IBR	Meter	900	0.74481%
4.9.2	SS TUBE 1/2"OD X 0.049"THK A269 TP316L	Meter	900	0.59917%
4.9.3	SS TUBE 1/4"OD X 0.049"THK A269 TP316L	Meter	1500	0.99861%
4.10	**Commissioning and Testing activities for equipments like Control Valves, On/Off Valves, Electrical/Pneumatic Valves, Actuators, Solenoid Valves, Valves, Limit Switches, ERV Controllers, Power Cylinders, Pressure and Temperature Gauges, Transmitters etc.**			
4.10.1	Electrical Actuators	No	6	0.02785%
4.10.2	Control Valves, Electrically operated valves, Dampers and Gates, Miscelleeous Drives etc. (Regulating & ON/OFF Type)	No	12	0.06492%

4.10.3	Testing and Commisisoning of 415V LT Motors including dryout	No	6	0.03359%
4.10.4	Limit Switches	No	10	0.00926%
4.11	**Miscelleneous Structural Steel including Frames for Panels/Racks/Instruments/Supports for Cable Trays/Pipes/Tubes/Canopies etc.**			
4.11.1	Structural Steel for fabrication (MS angle, Channel, Plate etc)/ Cable Tray Structural steel fabrication and installation	MT	20	1.56594%
4.12	**Above Ground Earthing & Lightning Protection Materials (Supply of Material along with Erection will be in Contractor's Scope)**			
4.12.1	8 SWG GI Wire	Meter	100	0.02220%
4.12.2	65 X 8 MM GI FLAT	Meter	300	0.43379%
4.12.3	50 X 6 MM GI FLAT	Meter	200	0.17872%
4.12.4	25 X 6 MM GI FLAT	Meter	300	0.22445%
4.13	**Dismantling & Removal of items from site and handover to Customer's store**			0.00000%
4.13.1	Dismantling of existing old / unusable cable trays	Meter	500	0.18202%
4.13.2	Dismantling/Disconnection/Reconnection of Existing Cables	Meter	5000	0.28416%
4.14	**Civil works: Civil works like modification in cut out for panels, making approach through walls, breaking of concrete floors to suite DCS/PLC/MCC/SWGR Panels erection, etc. wherever required. (As per volume of work with cutting of concrete slab).**	Lot	1	0.14208%
4.15	**Electronic/Instrumentation Earth Pits. (Supply of Material, erection and commissioning will be in contractor's scope)**	Set	2	0.22733%
	Total Percentage (B.3)			100.00000%

Note: -

1. Bidder has to quote Total Lump-sum price for **Section-A., B.1, B.2 & B.3 in VOL II PRICE BID at BHEL E-procurement Portal.**
2. **Prices for Section-A-3 : Menial and Secretarial Services are already fixed by BHEL.**
3. Offer evaluation (L-1, L-2 status) of the bidders shall be done based on the Total Lumpsum Price of **Section-A., B.1, B.2 & B.3** as quoted in the Volume II Price Bid.
4. Final awarded price shall be based on Total summation of prices of **Section-A., B.1, B.2 & B.3.**
5. Total Section Section-A and Section B.1, B.2 & B.3shall be considered for award of the work.
6. For the convenience of bidders, BHEL has issued an excel sheet **'Excel sheet for calculation purpose only-'** with all requisite formulae as detailed above. **However, this excel sheet shall not form part of contract document.**

Please refer to Annexure-I, which forms part of this tender/contract.

Please refer to Annexure-II, which forms part of this tender/contract.

Please refer to Annexure-III, which forms part of this tender/contract.