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These Technical conditions shall be construed as part of tender document and shall be read along with General Conditions of Contract. In case of any conflict or inconsistency between the general and these technical conditions, the same shall be brought out by the bidder in writing to BHEL for clarification during pre-bid discussions; failing which most stringent interpretation / clause in favour of BHEL shall be adopted and the same shall be binding to the contractor.

CLAUSE NO	DESCRIPTION
1.1	<p>PROJECT SYNOPSIS AND GENERAL INFORMATION</p> <p>Kahalgaon Super Thermal Power Plant has been set up by NTPC, is located near Kahalgaon town in Bhagalpur district of Bihar State. The Stage-I & Stage -II of the Project were comprised of four (4) units of 210 MW, three (3) units of 500 MW respectively. The ultimate capacity of the project is 2340 MW (4 X 210 MW, Stage-I + 3 X 500 MW, Stage-II). As per Govt. of India norms, Flue Gas Desulphurization (FGD) system is being set up by NTPC for all units.</p> <p>1. Owner : NTPC Ltd.</p> <p>2. Project title : Flue Gas Desulphurisation (FGD) system Package for 2x210 MW Stage-I & 3X500 MW Stage-II at NTPC Kahalgaon,Bihar</p> <p>4. Location : Kahalgaon town in Bhagalpur district, Bihar</p> <p>5. Nearest Rly Stn : Colgong (Kahalgaon) 2.0 km away from project site</p> <p>6. Nearest Port : Paradip</p> <p>7. Nearest Airport : Patna (250 KM FROM PROJECT LOCATION)</p> <p>8. Road Approach : Bhagalpur - Sahibganj State Highway</p> <p>9. Lattitude : 25 o 15 N</p> <p>10. Longitude : 87 o 15 E</p> <p>11. Average Elavation : 16 MTR.</p> <p>12. Average Temp : 35-40°C During summer</p> <p>13. Average Rainfall : 50-75 CM</p>
2.0	<p>SITE VISIT</p> <p>The contractor should visit project site and acquire full knowledge and information about conditions prevailing at site and in & around the plant premises, together with all the statutory, obligatory, mandatory requirements of various authorities necessary for preparing the bid and entering into the contract. All costs for and associated with site visits shall be borne by the bidder.</p>
3.0	<p>SCOPE OF WORK</p>
3.1	<p>The work to be done under this specification comprises of construction of 02 nos. 180 M height & 03 nos 150M height RCC Single Flue Chimney complete in all respect excluding pile but including pile breaking, pilecap works, Chimney RCC wind shield, fabrication & erection of steel flue cans, installation of Borosilicate Glass Block Lining on Inner Surface of Steel Flue Can, erection of shop fabricated structural platforms, installation of electrical items in conformity with the approved layout etc to complete the chimney in all respect for Unit#1&2, Unit#3&4, Unit#5, Unit#6 & Unit#7 FGD system at 4 X 210 MW, Stage-I & 3 X 500 MW, Stage-II NTPC Kahalgaon, Bihar.</p>
3.2	<p>The subject tender consists of 2 packages – Package 1 & 2 as per the following: Package 1: Chimney Unit-5, Chimney Unit-6 & Chimney Unit-3&4(Common) Package 2: Chimney Unit-7 & Chimney Unit-1&2(Common)</p>
3.3	<p>The scope of work is as follows:</p> <p>A.Construction of 02 numbers 180-meter(01 no each in Package-1 & Package-2) & 03 numbers 150-meter -high (02 nos namely Unit-5 & Unit-6 in Package-1 & 01 no i.e U#7 in Package-2)reinforced concrete single flue steel lined chimney and other</p>

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	<p>incidentals as detailed in the specification in the tender document including providing all labour, materials (except those which are specifically mentioned to be issued by BHEL as Free of Cost (FOC) Items), consumables, equipment, temporary works, temporary storage sheds, temporary colony for labour and staff, temporary site offices, construction plants, transportation/handling and all incidental items not shown or specified but reasonably implied or necessary for the completion of subject scope, all in strict accordance with the specifications including revisions and amendments thereto as may be required during the execution of work.</p> <p>B. Supply including design, receipt, unloading, erection, testing and commissioning of stack elevator and electrical equipments; allied items, cabling, earthing, spares etc. are also under the scope of this work. The complete works have to be carried out by providing all labour, supervision, materials, scaffolding, power, fuel, construction equipments, tools & plants, inspection, measuring, testing instruments, supplies, transportation, storage, and all incidental items not herein specifically mentioned but reasonably or found required for the successful completion of work including contractor's and where necessary manufacturer's expert supervision in strict compliance with the requirement of this specification and approved construction drawing.</p> <p>C. Installation of Borosilicate Glass Lining inside MS Flue Cans, including surface preparation, application of primer, adhesive etc. as per the technical specifications and approved erection procedure under the expert supervision of Borosilicate Glass Lining manufacturer /supplier. The complete works have to be carried out by providing all labour, supervision, materials, scaffolding, power, fuel, construction equipment, tools & plants, inspection, measuring, testing instruments, supplies, transportation, storage, and all incidental items not herein specifically mentioned but reasonably or found required for the successful completion of work. Borosilicate Glass Lining Materials, Primer, Adhesive (suitable fixing materials) and Expert Supervision of Manufacturer shall be provided by BHEL as Free of Cost (FOC) Items.</p>
3.4	<p>The bidder's scope shall include excavation in soil and rock (if any with/without blasting as per the site conditions), dewatering, dressing to required profile, sheet piling or shoring/strutting, backfilling around completed structures and plinth filling, plinth protection, disposal of surplus earth and rock, concreting including Reinforcement and Formwork, Masonry work, Plastering, Painting, Flooring, Installation of borosilicate lining, Doors/Windows, Ventilators, Fire Proof Doors, Insulation, Roof Water Proofing, Dismantling of existing structures (below ground and above ground- RCC, Brick Works, Sheet piling, Structural steel and Other facilities), RCC and Brick/ Block masonry and Steel Structures, fabrication and erection of all structural steel and miscellaneous steel (i.e. steel stair case, cable/duct/pipe supports, ladders, walkways, railing, Chequered plate/grating floor, inserts, anchor bolts, etc.), paving, Embedment, Earthing, Gravel filling, Precast covers, Expansion joints, Rain water pipe, Insulation, Gates/Valves, Water proofing of underground structures, Trenches, Final grading and site clearance before handing over to Owner and other auxiliary items of work, etc. all complete including supply of all materials (except those which are specifically mentioned to be issued by BHEL as Free of Cost (FOC) Items), consumables, labor, Tools and plants, transportation and storage, Sample Testing etc. all complete as per BOQ, specifications and drawings for proper and successful execution of the job for FGD at 4 X 210 MW, Stage-I & 3 X 500 MW, Stage-II NTPC Kahalgaon, Bihar.</p>
3.5	<p>The complete works have to be carried out by providing all labour, supervision, materials, scaffolding, power, fuel, construction equipment, tools & plants, inspection, measuring, testing instruments, supplies, transportation, storage, and all incidental items not herein specifically mentioned but reasonably or found required for the successful completion of work.</p>
3.5.1	<p>Cement, Structural Steel & Reinforcement Steel (TMT) for the item of work wherever specifically mentioned in BHEL's scope, shall be supplied by BHEL free of cost.</p>
3.5.2	<p>Borosilicate Glass Lining Materials, Adhesive (suitable fixing materials) and Expert</p>

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	Supervision of Manufacturer shall be provided by BHEL as Free of Cost Items.
3.6	<p>Reinforcement Steel required for the items of works wherever specifically mentioned in Price Schedule in BHEL's scope, shall be procured by BHEL and issued to contractor as free of cost (FOC) Item.</p> <p>However, unloading, handling / storage of Reinforcement steel procured by BHEL for this tender scope, at site, inside BHEL Stores / Contractor's Stores and further transportation from Stores to work area will be in the scope of contractor. No Extra payment shall be made for this work.</p>
3.7	<p>Fabricated Structure Steel Supply: Structural Steel required for the items of works wherever specifically mentioned in Price Schedule in BHEL's scope, shall be procured by BHEL and issued to contractor as free of cost (FOC) Item.</p> <p>All steel structures (vendor's scope supply) shall be fabricated in factory, transported and erected at site. All factory fabricated structures shall have bolted field connections. Chimney flue liners can either be fabricated at factory in segments, transported and welded at site before erection or fabricated at site. However, BHEL will issue required material at site only. For Chimney flue liners, to prevent flue gas leakages, the applicable field joints shall necessarily be welded. Structural Steel shall be fabricated at a suitable fabrication shop, outside the plant premises.</p> <p>BHEL will visit the fabrication shop of Contractor to examine its suitability for the scope of work involved. However, contractor's fabrication shop shall be adequately equipped to handle the scope of work involved within the given time schedule. Any modifications / alterations as required to carry out the works shall be done by contractor at his own cost. No claim / compensation for delay in works on this account will be admitted.</p> <p>Contractor shall designate separate areas inside its fabrication shop for storage of Raw Materials as well as fabricated materials for this tender's scope and materials supplied for this work shall solely be utilized for this tender's purpose only. Safety, Watch and Ward, Insurance of the materials procured, fabricated and stored inside fabrication shop and transit insurance shall be the responsibility of the contractor. No claims / compensation on account of damage / theft of materials which is in the custody of contractor shall be permitted.</p> <p>Contractor shall give due notice in advance to BHEL for Stage Inspection of the works being carried out at its fabrication shop as per the approved FQP. However, BHEL Engineer shall be entitled to visit the Contractor's Fabrication shop at any feasible time during the period of execution to examine the progress and quality of work. Contractor shall always maintain all such records and provide facilities / equipment / MMEs as required by BHEL's Engineer for inspection of works within the quoted rates. Fabricated Structural Steel shall be dispatched from the shop only after getting the due clearance from BHEL /Customer.</p> <p>Transportation of fabricated structure steel / Raw Structure Steel from shop to site, Unloading, Handling / storage, at site, inside BHEL Yard / Contractor's store, will be in the scope of contractor. No extra payment for unloading / handling / transportation shall be paid to contractor.</p>
3.8	The scope shall also include setting up by the bidder a testing room with compressive strength testing machine and other site test instruments for conducting day to day testing of concrete cubes, compaction of earth & road work, brick & other material testing. One qualified quality engineer to be deployed as necessary.
3.9	The scope of work also includes setting up batching plant with capacity of minimum 30 Cum. All machineries, equipments, tools tackles including transit mixer, vibrating needle, dewatering pump, roller, compactor, admixture etc. to be made available prior to concreting activity. All test samples to be taken in presence of BHEL/NTPC

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	Engineer and joint protocol to be maintained by contractor
3.10	Mix design (M25, M30 and M35 or above) for all concreting shall be carried out either at site or from a reputed institute as per instruction of BHEL and should get the mix design approved by BHEL/ NTPC prior to start of work. Contractor has to ensure adding of admixture and minimizing of cement content in line with latest revisions of IS 456, IS 10262 and other relevant codes as advised by BHEL time to time without any additional cost.
3.11	The working area shall be separated from the existing plant area by cordoning off the area by providing MS / GI sheets of suitable heights with appropriate frame work as approved by BHEL/ Customer. No extra payment shall be paid to contractor for this work.
3.12	The Customer National Thermal Power Corporation (NTPC) may depute their representative for checking and supervision of important stages of work. The contractor shall be required to provide all facilities for inspection of works at no extra cost to BHEL. Any defect in quality of work or deviations from drawings / specifications pointed out during such inspection shall be made good by the contractor in the same way as if pointed out by the BHEL Engineer, without any cost implication to BHEL.
3.13	The work under this contract shall be carried out as per BOQ Cum Rate Schedule. In case the description / specifications as per BOQ are found to be incomplete, Indian standard specifications shall be followed. Quantities mentioned in the BOQ cum Rate schedules are approximate only and liable for variation due to change of scope of work / variation in schedule of quantities, changes in design etc. The tenderers shall undertake to execute actual quantities as per advice of BHEL Engineer and accordingly the final contract price shall be worked out on the basis of quantities actually executed at site and payments will also be regulated for the same. The quantities indicated against each item may vary to any extent and no compensation will be payable in variation of Individual quantity.
3.14	The complete works shall be carried out as per BOQ cum Rate schedule. If any work covered in the scope of contract cannot be executed using items available in BOQ, additional / extra items shall be made and rates for such items shall be worked out as per tender. However contractor shall be bound to execute all the works under the scope of the contract and decision whether an extra item is applicable or not, shall be taken by BHEL Engineer which will be binding on the contractor.
3.15	Any activity which is necessarily required for satisfactory execution of any item of BOQ in line with technical specifications shall be deemed to be included in BOQ item even if it is not described in the item description and no extra payment shall be made against such activity.
3.16	The technical requirements for work to be executed under this specification shall be as per Specifications enclosed with this tender document.
3.17	All quality standards, tolerances, welding standards & other technical requirements shall be strictly adhered to. The Bidder shall fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon pattern, soil conditions, local conditions and site-specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may not have been specifically brought out in the specifications.
3.18	Contractor's scope also includes following:
3.18.1	Furnishing all labor, materials (except those specified in BHEL scope), supervision, construction plans, equipment, supplies, transport to and from the site, materials handling, fuel, electricity, compressed air, water, transit and storage insurance and all other incidental items and temporary works not shown or specified but reasonably implied or necessary for the proper completion, maintenance and handing over the works, in accordance with the stipulations laid down in the contract documents and additional stipulations as may be provided by BHEL Engineer during the course of works.
3.18.2	Furnishing samples of all materials required by the engineers for testing / inspection and approval for use in the works. The samples may be retained by the engineer for final incorporation in the works. Furnishing test reports for the products used or intended to be used, if called for the

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	specifications or if so desired by the engineer.
3.18.3	Giving all notices, paying all fees, taxes etc., in accordance with the general conditions of contract, that are required for all works including temporary works.
3.18.4	Arranging manufacturer's supervision for items of work done as per manufacturer's specifications when so specified.
3.18.5	The scope of work will also include such other related works although they may not be specifically mentioned in the above paragraph and all such incidental items not specified but reasonably implied and necessary for completion of the job as a whole all as desired and as directed by the engineer.
3.18.6	The scope of work covered above is not a comprehensive list of items of work involved. The detail scope of work may vary considerably depending on the actual construction requirements.
3.19	APPROVED MANUFACTURER / SUB VENDOR
3.19.1	As instructed by BHEL and as per approved FQP, Materials to be procured by the bidder must be approved by BHEL / NTPC. A tentative list of suppliers of some of the items is provided herewith this document. For suppliers other than those mentioned in the list, specific approval of BHEL / NTPC will be required.
3.19.2	STACK ELEVATOR Stack elevator to be supplied through BHEL / NTPC approved stack elevator manufacturer as furnished below: Alikraft Engineers Pvt Ltd- Savli, Vadodara Universal Construction Machinery- Pune Sucessful bidder can propose name of vendors other than above mentined vendors but acceptance shall be subject to approval by NTPC.Deceision of NTPC in this regard shall be final and binding to BHEL/Sucessful bidder.
3.20	INSPECTION & JOINT VERIFICATION (AT CONTRACTOR'S WORKS) Prior to dispatch, the materials would be offered by the contractor for joint inspection at the contractor's works as detailed in this tender specifications for which the contractor would serve the advance notice of 15 days for inspection call to BHEL.
3.21	INSPECTION & JOINT VERIFICATION (AT SITE) The contractor shall be intimated within 7 days from the date of receipt of each consignment at site to depute their representative for joint inspection and verification of the equipment / materials received at site. The contractor shall depute their representative within 7 days from receipt of such intimation failing which BHEL shall proceed with the inspection and verification of equipment / materials and BHEL's decision in this regard shall be final and binding to the contractor.
3.22	QUALITY PLAN The bidder shall furnish the quality assurance plan along with the offer which would be approved by BHEL / Owner.
3.23	MATERIAL DESPATCH CLEARANCE CERTIFICATE (MDCC): MDCC shall be issued by BHEL / Owner or their authorized representative prior to dispatch. In case the tests are not witnessed by BHEL / Owner / Owner's representative, the test certificates shall be submitted and MDCC will be issued thereafter. MRC shall be issued by BHEL / Owner or their authorized representative after the material is received at site in good condition.
3.24	MODE OF EVALUATION & Methodology for award of Packages:-
3.24.1	The entire scope of tendered work is being split into two separate packages i.e. Package-1 (consisting of 3 nos chimney for Unit-5, Unit-6 & Unit-3&4(Common) and Package-2 (consisting of 2 nos Chimney for Unit-7 & Unit-1&2(Common). BHEL intends to engage 2 (two) agencies for execution of the subject job. <ul style="list-style-type: none"> - Evaluation shall be done on lowest total quoted price for 5 nos of chimney as per SCH-1 of the price schedule (Latest revision). - Based on final quoted total price at Sch-1 of Price schedule, total price for Package-1 & Package-2 shall be arrived as per Schedule-2 of the price schedule (Latest revision).

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	<ul style="list-style-type: none"> - Package-1 – Package-1 shall be awarded to L1 Bidder, as per Sch-2 of the Price Schedule (Latest revision). - Package-2 - BHEL at its discretion, may award the contract for package-2 to the next lowest bidder in the order of competitiveness to qualified bidders i.e. L2, L3 ... so on ...but except H1 (except in the case of two qualified bidders) subject to bidder's acceptance of the counter offered L1-Package-2 derived price. If none of the bidder matches L1 price for Package-2 then BHEL reserves the right to award the Package-2 job to L1 bidder. - Sequence of counter offer shall be as per their respective ranking. - Note: BHEL reserves the right to not offer Package-2 in above manner at its sole discretion without assigning any reason to bidders.
3.24.2	Separate order shall be placed for package-1 & Package-2 and will be treated as separate contracts.
4.0	DEVIATIONS / CLARIFICATIONS The bidder is required to submit with his offer in the relevant schedule / format without any ambiguity. Any assumptions, presumptions, deviations etc. indicated or implied anywhere by the bidder except those indicated in the deviation schedule / format will not be recognized and will not form a part of consideration / offer. In the absence of such filled-up schedule / format it will be understood and agreed that the bidder's offer is based on strict conformance to the specification and no negotiation would be allowed in this regard. BHEL reserve the right not to recognize any / all deviations submitted after opening of the bid.
5.0	DEWATERING Contractor shall ensure at all times that his work area & approach / access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL. No separate payments for dewatering of subsoil, surface water or catchments water, if required, at any time during execution of the work including monsoon period shall be considered by BHEL.
6.0	LAND
6.1	Availability of land within plant boundary is very limited and the contractor has to plan & use the existing land considering the use of land by other contractors and the storage of plant machineries and materials. The existing land shall be shared by all erections agencies. The same will be reviewed by BHEL and allotted to the extent available/ considered necessary free of cost. Contractor shall develop these areas for their site office, their own stores etc. Bidder must visit site to assess site condition, prior to quoting.
6.2	Levelled area for storage area for BHEL's material shall be provided as per availability free of cost.
6.3	Land for labour colony shall be arranged by successful bidder at their own. The contractor shall construct labour colony / hutment as per his requirements after obtaining approval of formalities from statutory body. Further, contractor must ensure minimum HSE norms and hygienic sanitary conditions in his labour colony.
6.4	The contractor will be responsible for handing back all lands, as handed over to him by BHEL/NTPC.
7.0	WATER
7.1	Contractor shall make all arrangements himself for the supply if construction water as well as potable water for labour and other personnel at the work site/ colony. However, drawl of construction/ potable water from the bore-well shall be permitted if

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	found suitable. Any statutory clearance required shall be obtained by the contractor. Assistance, if required shall be provided by the BHEL/NTPC.
8.0	ELECTRICITY
8.1	BHEL shall provide construction power on chargeable basis at 415V level at one point. The charges only for the actual energy consumed by the Contractor shall be recovered by the Employer based on prevalent rate of DISCOM for type of connection(HT/LT). Contractor has to make their own distribution arrangement to draw electricity. Overall area illumination will be provided by BHEL. However, for night working contractor should arrange illumination as and when required by them. Contractor shall be responsible for fulfillment of all requirements including statutory requirements in this regard. Contractor shall deploy and install required energy meter, cables, fuses, LT distribution boards, switchboards, bus bars, earthing arrangements, protection devices i.e, required capacity ELCB/RCCB in outgoing feeders 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.
8.2	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.
8.3	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.
8.4	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.
8.5	Contractor shall be well equipped with back-up power supply arrangement like DG set and diesel operated welding machine etc to tackle situations arising due to failure of supplied power, so as to ensure continuity and completion of critical processes that are underway at the time of power failure or important activities planned in immediate future.
8.6	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.
8.7	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. In case there is any difference between the sum of the LT side meter readings of all sub-contractors and the HT side meter reading of M/s NTPC, same shall be distributed proportionately among all sub-contractors working during the respective calendar month.
8.8	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.
8.9	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

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	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.
8.10	Contractor shall make arrangement of electricity of their own for labour colony.
9.0	CONSUMABLE
9.1	All consumables, like gas, electrodes, chemicals, lubricants etc. required for the scope of work, shall be arranged by the contractor at his cost from approved brand / make unless otherwise specifically mentioned in the contract.
9.2	All consumables to be used for the job shall have to be approved by NTPC / BHEL prior to use.
9.3	In the event of failure of contractor to bring necessary and sufficient consumables, BHEL may arrange for the same at the risk and cost of the contractor. The entire cost towards this along-with overhead shall be paid by the contractor or deducted from the contractor's bills.
10.0	TEST CERTIFICATES
	Necessary test certificates of all materials supplied by contractor are to be produced to BHEL prior to use of those materials.
11.0	IMTE
	The contractor shall ensure deployment of reliable and calibrated instrument, measuring, and test Equipment (IMTE). The IMTE shall have test calibration certificate from authorized / Govt approved agencies. The contractor shall also keep provision of alternate engagement for such IMTE so that the work does not suffer when a particular IMTE is sent for calibration. Re-testing/ re-calibration shall also be arranged by the contractor at their own cost at regular interval during the period of use as advised by BHEL.
12.0	QUALITY CONTROL & QUALITY ASSURANCE
12.1	INSPECTION & FIELD QUALITY ASSURANCE
12.1.1	Contractor shall carry out all activities conforming to the approved Field Quality Plan (FQP) & technical instructions as revised from time to time. 'Total Quality' shall be the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and quality standards. Contractor shall provide the services of quality assurance engineer as per the relevant clauses.
12.1.2	Preparation of quality assurance log sheets and protocols with customer / consultants / statutory authority, welding logs, NDE records, testing & calibration records and other quality control and quality assurance documentation as per BHEL engineer's instructions, is within the scope of work / specification. These records shall be submitted to BHEL / customer for approval from time to time.
12.1.3	The protocols between contractor and customer / BHEL shall be made for correctness of foundations, materials, procedures, at each stage of installation, generally as per the requirement of customer / BHEL. This is necessary to ensure elimination of errors and to avoid accumulation and multiplication of errors.
12.1.4	A daily log book (with proper indexing) should be maintained by every supervisor / engineer of contractor, for respective area of work, on the job for detailing and incorporating alignment/ clearance / centering / levelling readings and inspection details of various equipment, etc. This log book shall be always accessible to BHEL engineers. High pressure welding (as applicable under the scope of this contract) details like serial number of weld joints, welders name, date of welding, details of repair, heat treatment etc. will be documented in welding log as per BHEL Engineer's instructions. Record of radiography (as applicable under the scope of this contract) containing details like serial number of weld joints, date of radiography, repairs, if any, re-shots etc shall also be maintained as per BHEL Engineer's instructions. Record of heat treatments (as applicable under the scope of this contract) performed

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	shall be maintained as prescribed by BHEL.
12.1.5	<p>The contractor has to take prior permission / approval before deployment of NDE & Heat Treatment agencies at site as per BHEL document no. PP-QLY-AA-DC-106/01-20.</p> <p>The contractor's employees involved in NDE & Heat treatment job must be qualified & experienced as per the requirement of the above document.</p>
12.1.6	<p>The performance of welders (as applicable under the scope of this contract) will be reviewed from time to time as per the BHEL standards. Welders' performance record shall be furnished periodically for scrutiny of BHEL's Engineer. Currently, BHEL follows online Welder Performance Monitoring System. Contractor shall extend necessary support, as deemed fit by BHEL site-in-charge, regarding data entry into the system. Corrective action as informed by BHEL shall be taken in respect of those welders not conforming to these standards. This may include removal/ discontinuance of concerned welder(s). Contractor shall arrange for the alternate welders immediately.</p>
12.1.7	<p>Only welders duly authorized by BHEL / customer / consultant after welder qualification test as per ASME Sec-IX / AWS D1.1 (as applicable) shall be engaged on the work. All the welders shall carry identity cards as per the proforma prescribed by BHEL / Customer / Consultant.</p> <p>High Pressure welders and welders of special materail viz. C276, Ti, etc., must be trained & tested by experts from BHEL-WRI/ other units. Necessary infrastructure for welder traning & testing, as per BHEL's instruction, to be arranged by the contractor without any extra cost to BHEL.</p>
12.1.8	<p>Any re-laying or re-termination of cables / re-erection of instruments / recalibration of instruments etc. required due to contractor's mistake and found at any stage inspection, shall be carried out by the contractor at no extra cost. Repair / rectification procedure to be adopted to make any job acceptable shall be subject to the approval of BHEL. Weekly Quality Review Meeting at site shall be organised by BHEL to discuss quality issues and next weeks inspection plans. Site in-charge of the contractor along with QAEs of the contractor must be present in the meeting with closure report of the issues raised by BHEL in the previous meetings.</p>
12.1.9	<p>Weekly Quality Review Meeting at site shall be organised by BHEL to discuss quality issues and next weeks inspection plans. Site incharge of the contractor along with QAEs of the contractor must be present in the meeting with closure report of the issues raised by BHEL in the previous meetings.</p>
12.2	REQUIREMENT OF ISO 9001
12.2.1	<p>BHEL: PSER is accredited with ISO 9001 certification and as such this work is subject to various audits to meet ISO 9001 requirements.</p>
12.2.2	<p>The basic philosophy of the Quality Management System under ISO 9001 is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product / procedure and take corrective action for removal of non-conformance specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers / vendors of various products / services contributing in the work are also considered as part of the quality management system.</p> <p>As such the contractor is expected not only to conform to the quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard.</p>
12.2.3	<p>BHEL reserves the right to carry out quarterly quality audits and quality surveillance of the systems and procedures of contractor's quality management. Contractor shall provide all necessary assistance to enable BHEL to carry out such audit & surveillance.</p>
12.2.4	<p>Quality audits / approval of the results of test & inspection will not prejudice the right of BHEL to reject an equipment service not giving desired performance and shall not in no way limit the liabilities and responsibilities of the contractor in earning satisfactory performances of equipment / service as per specification.</p>

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12.3	MMEs / MMRs
12.3.1	Contractor shall ensure deployment of reliable and calibrated MMEs (Measuring and Monitoring Equipment). The MMEs shall have test / calibration certificates from authorised / Government approved / Accredited agencies traceable to National / International Standards. Retesting / re-calibration shall also be arranged at regular intervals during the period of use as advised by BHEL Engineer within the contract price. The contractor will also have alternate arrangements for such MMEs so that work does not suffer when the particular equipment / instrument is sent for calibration. Also if any MMEs not found fit for use, BHEL shall have the right to stop the use of such item and instruct the contractor to deploy proper item and recall i.e. repeat the readings taken by that instrument, failing which BHEL may deploy MME and retake the readings at Contractor's cost.
12.3.2	Contractor shall provide all the Measuring Monitoring Equipment (MMEs) required for completion of the work satisfactorily. These MMEs shall be of brand, quality and accuracy specified by BHEL Engineer and should have necessary calibration and other certificates as per the requirement of BHEL Engineer. Decision of BHEL Engineer regarding acceptance or otherwise of the measuring instruments / gauges / tools for the work under this specification, is final and binding on the contractor. BHEL shall give an indicative list of MMEs required for this work else where in this contract and to be made available by the contractor. The list will be reviewed by BHEL site as per the requirement of approved FQPs and the contractor shall meet any augmentation needed wherever required.
12.3.3	It is the responsibility of the contractor to prove the accuracy of the testing / measuring / calibrating equipment brought by him based on the periodicity of calibration as called for in the BHEL's quality assurance standards/BHEL Engineer's instructions.
12.3.4	Re-work necessitated on account of use of invalid MMEs shall be entirely to the contractor's account. He shall be responsible to take all corrective actions, including resource augmentation if any, as specified by BHEL to make-up for the loss of time.
12.3.5	In the courses of erection, it may become necessary to carry repeated checks of the work with instruments recently calibrated, re-calibrated. BHEL may counter / finally check the measurements with their own MMEs. Contractor shall render all assistance in conduct of such counter/ final measurements.
12.4	INSPECTION BY TS / FES / QA ENGINEERS OF BHEL UNITS / ENGINEERING CENTRES
12.4.1	Apart from day-to-day inspection by BHEL Engineers stationed at Site and Customer's Engineers, stage inspection of equipment under erection and commissioning at various stages may also be conducted by teams of Engineers from Field Engineering Services of BHEL's Manufacturing Units, Quality Assurance teams from Field Quality Assurance, Unit/Factory Quality Assurance and Commissioning Engineers from Technical Services etc. Contractor shall arrange all labour, tools and tackles etc along with proper access for such stage inspections free of cost.
12.4.2	Any modifications suggested by BHEL FES and QA Engineers' team shall be carried out. Claims of contractor, if any, shall be dealt as per applicable clause of the contract, and provided such modifications have not arisen for reasons attributable to the contractor.
12.5	CONFORMANCE TO THE STATUTORY REQUIREMENTS (AS APPLICABLE UNDER THE SCOPE OF THE CONTRACT)
12.5.1	<p>The work to be executed under these specifications has to be offered for inspection, at appropriate stages of work completion, to various statutory authorities for compliance with applicable regulations. The work related statutory inspections, though not limited to, are as under:</p> <ol style="list-style-type: none"> 1) Inspectorate of Steam Boilers and Smoke Nuisance 2) Electrical Inspector 3) Factory Inspector, Labour Commissioner, PF Commissioner and other authorities connected to this project work. <p>The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per BHEL Engineer's instructions, arranging materials for ground inspection, taking rub outs for stamping of the pressure parts / pipes to be offered for inspection, submitting co-related inspection</p>

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	reports, documents, radiographs etc and following up the matter with them. Contractor shall also make all arrangements for offering the Products / Systems for inspection at location, as applicable, to the concerned authority			
12.5.2	Contractor should be qualified to execute pressure parts & piping work coming under the purview of IBR or Competant Inspecting Authority, for which he should register himself with CIB of state concerned / Competant Inspector. Contractor also should be aware of the latest Boiler regulations and Electricity Act, including the amendments thereof, as applicable under the scope of this contract.			
12.5.3	Contractor shall comply with 'Qualification Tests for welders engaged in welding of Boilers and Steam Pipes under Construction, Erection and Fabrication at Site in India and in repairing Boilers and steam pipes by welding' in line with Chapter XIII of Indian Boiler Regulations- 1950, for testing his welders / men / workers, including all associated fees, procedures, required instruments and equipment and their calibration there of. It shall be contractor's responsibility to obtain approval of Statutory Authorities, wherever applicable, for the conducting of any work which comes under the purview of these authorities, at his cost.			
12.5.4	The following fees shall be excluded from scope of Contractor: 1. Registration Fee as per Regulation 385 of Chapter IX of Indian Boiler Regulations-1950 or Registration Fee as per prevailing statutory boiler regulations. 2. Fees for inspection of Boiler at the site of Construction as per Regulation 395 A, sl no 4 of Chapter IX of Indian Boiler Regulations- 1950. However all other fees like visit fees charged by the Boiler Inspector and other arrangements for his visit or visits till satisfactory completion of work, shall be included in scope of Contractor.			
12.6	STORAGE & PRESERVATION OF WELDING ELECTRODES & OTHER BHEL-ISSUED MATERIAL			
12.6.1	The contractor shall be responsible for storage & preservation of welding electrodes & other BHEL-issued materials as per BHEL Storage & Preservation Guidelines / Instructions.			
12.7	PENALTIES ON VENDORS / SUB-CONTRACTORS AGAINST NON-COMPLIANCE OF QUALITY NORMS			
Sl. No.	Nature of Non-compliance	Penalty for Domestic Project	Penalty for Export Project	Remarks
GENERAL				
12.7.1	Unavailability of QAE deployment schedule (duly approved by BHEL Site) matching with manpower requirement of approved L2 schedule	0.10%	0.10%	Against each RA bill
12.7.2	Unavailability of required number of QAE with proper experience & NDT certification as per the requirement of the Contract	Rs. 1,000.00	\$16.00	Per person per day
12.7.3	Not attending quality meeting of BHEL by nominated member of vendor / sub-contractor	Rs. 2,000.00	\$32.00	Per meeting
CALIBRATION				
12.7.4	Use of MMEs without valid calibration certificate	Rs. 1,000.00	\$16.00	Per equipment per instance
12.7.5	Use of NDT equipment, welding equipment without having valid calibration certificate / condition not as per requirement	Rs. 1,000.00	\$16.00	Per equipment per instance
WELDING & NDT				

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12.7.6	Unqualified welders carrying out welding / tack welding	Rs. 1,000.00	\$16.00	Per welder per instance. (Gatepass of the person shall be withheld)
12.7.7	Not using portable oven for welding consumables	Rs. 500.00	\$8.00	Per welder per instance. (The consumables in the oven shall be confiscated)
12.7.8	Not using electrodes pre-baked in baking oven	Rs. 500.00	\$8.00	Per instance. (The subject consumables shall be confiscated)
12.7.9	Not using welding consumables of approved make & not using correct type of electrode as per approved EWS / Drawing / WPS	Rs. 1,000.00	\$16.00	Per instance. (The subject consumables shall be confiscated)
12.7.10	Non-removal of welding slag and spatters after welding	Rs. 500.00	\$8.00	Per joint
12.7.11	Not using NDT equipment as prescribed in the manual / FQP / guidelines / Contract	Rs. 1,000.00	\$16.00	Per equipment per instance
12.7.12	Welder doing welding without valid job card	Rs. 500.00	\$8.00	Per instance
12.7.13	Discrepancy observed in the weld joints identified by BHEL / Customer for RT vs RT film offered	Rs. 2,000.00	\$32.00	per joint
MATERIAL MANAGEMENT				
12.7.14	Non-maintenance of grid pillar marking	Rs. 200.00	\$3.00	Per location week
12.7.15	Mismatch of location of material in store area w.r.t. location mentioned in stock register	Rs. 500.00	\$8.00	Per instance
12.7.16	Non-compliance of Preservation of material as per storage & preservation manuals	Rs. 1,000.00	\$16.00	Per equipment
12.7.17	Not offering received material for verification within stipulated time as per contract	Rs. 500.00	\$8.00	Per instance
PAINTING & ALLIED WORKS				
12.7.18	Not using primer / paints of approved make and as per Specifications	Rs. 1,000.00	\$16.00	Per instance
12.7.19	Painting without proper surface preparation as per approved schedule / drawing / FQP	Rs. 500.00	\$8.00	Per instance
PROTOCOLS & LOG SHEETS				
12.7.20	Delay in preparation of Protocols / Logsheets as per approved FQP within 3 days of completion of checks	Rs. 200.00	\$3.00	Per protocol per day delay

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INSPECTION OF BOUGHT-OUT ITEMS / CONSUMABLES				
12.7.21	Delay in offering inspection of Bought-out Items / Consumables / Aggregates (for items which need site inspection as per approved QP) within 3 days of receipt of material at site	1% of the item value of the LOT	1% of the item value of the LOT	per item per day delay after receipt of material
12.7.22	Delay in submission of required documents (viz. Invoice, Inspection Release Note, COC, MDCC, MTC as the case may be) of Bought-out Items (shop inspection items / consumables) with in 3 days of receipt of material at site.	1% of the item value of the LOT	1% of the item value of the LOT	per item per day delay after receipt of material
NOTE: Any non-conformity requiring dismantling / rework, attributable to vendor / sub-contractor, shall be penalised at a rate mentioned above or cost to BHEL, which ever is higher.				
13.0	OCCUPATIONAL HEALTH, SAFETY & ENVIRONMENT MANAGEMENT			
	Applicable HSE norms shall be as per HSE Doc. No.: HSEP:14-ER, Rev-01 Dated 08/05/2020, OPERATIONAL CONTROL PROCEDURE , Doc. No.: HSEOCP: 61A , Rev. No.: 00 dated 27.04.2020 & OPERATIONAL CONTROL PROCEDURE , Doc. No.: HSEOCP: 61 , Rev. No.: 01 dated 01.06.2020 of Tender.			
14.0	PROJECT MANAGEMENT/ CONSTRUCTION MANAGEMENT			
	To meet the need of construction management at site, contractor shall provide the following services within quoted/ accepted rates.			
14.1	PLANNING & MONITORING			
14.1.1	The bidder shall prepare detail construction schedule (L-3) as per completion dates given in this document. This schedule must include all milestone and key activities for each sub-system / component in the areas of engineering (wherever applicable), procurement, manufacture (wherever applicable), excavation/ construction/ erection. This network must conform to the overall project schedule. The bidder should also ensure monitoring of these activities at least weekly basis to start with and on daily basis whenever required by BHEL.			
14.1.2	The bidder shall also prepare progress report indicating progress on key activities, management summary for critical activities, list of actions requiring attention of BHEL. This schedule is to be preferably made in PRIMAVERA/MS PROJECTS, so that the same is compatible with BHEL's project management software.			
14.1.3	<p>The bidder will have to install 2 no PC (multimedia PC work station Pentium- core-i5-650, 3.2 GHZ or above, 500 GB HDD, 6 GB RAM, 100/1000 MBPS LAN card) of HP/ DELL / HCL /LENEVO or equivalent make with window 10 (professional) 64 bit (with roll back to 32 bit O/S and required software like MS Office 2010 Professional or higher, AutoCAD 2014 or higher, PageMaker (7.0 etc), ADOBE PDF CREATOR with one no laser jet printer compatible for A4/A3 size printing (ink/ cartridge for which to be supplied as and when required) with power backup at places, as per instruction of BHEL for exclusive use of BHEL.</p> <p>These computers / printers shall remain contractor's property and they will be allowed to take out the same after completion of contract period. The contractor shall provide data / information etc in prescribed formats for periodical updating of the progress reports, material management reports, updating of network pertaining to the contractor's scope of work etc.</p> <p>The contractor shall also provide 1 (one) no computer operator and 1 (one) number service staff for miscellaneous service for BHEL's use at site / Kolkata for</p>			

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	<p>reconciliation, progress review & day-to-day planning purpose, documentation etc.</p> <p>The above services/ facilities are to be provided within 30 days from the date of Start of Work till the completion of original contract period for respective packages.</p> <p>Persons so deployed shall have to work in extended hours whenever required. Workmen provided as per the above provisions shall be fully trained and experienced in the nature of work for which they are deployed.</p> <p>However, if BHEL does not utilize the man months as per above provision, fully or partly; recovery at the rate of the prevailing minimum wages at Kahalgaon along with statutory expenses i.e. PF, ESI, bonus etc. (as applicable) for the categories given plus 10% will be made from the final bill of the contractor.</p> <p>If contractor fails to provide computer / printer / personnel as per requirement, for a continuous period of fifteen days or more, BHEL shall have the right to deduct the amount as per following rates on prorata basis, from contractor's RA bill or any other dues.</p>
14.1.3.1	@ Rs 20,000/- (Twenty thousand)/ month for each computer operator. Or at actuals (rate +30%) if BHEL arranges this facility, whichever is lower.
14.1.3.2	@ Rs 15,000/- (Fifteen thousand) / month for each service staff. Or at actuals (rate +30%) if BHEL arranges this facility, whichever is lower.
14.1.3.3	@ Rs 15,000/- (Fifteen thousand)/ month for each set of computer & printer. Or at actuals (rate +30%) if BHEL arranges this facility, whichever is lower.
14.1.3.4	In the event of the contract period getting extended beyond the stipulated time for reasons not attributable to the bidder and if the services services of computer operator(Skilled) & Service staff(unskilled) are being used by BHEL then successful bidder shall be reimbursed by minimum wages with statutory benefits +15% minimum.
14.1.3.5	The contractor's site office must have facilities of communications like Computer with all facilities, E-mail, and telephone with STD facility within a month from LOI.
14.1.4	A list contain supply of computers & printers with their workability status and details of supply of computer operators & service staff with their payment details will be quarterly submitted by the successful bidder to BHEL.
14.1.5	A list contain supply of computers & printers with their workability status and details of supply of computer operators & service staff with their payment details will be quarterly submitted by the successful bidder to BHEL.
14.2	PROGRESS REPORTING
14.2.1	The bidder shall submit daily, weekly and monthly progress reports for work force, materials reports, consumables (gases / electrodes) report and other reports as per pro-forma considered necessary by the BHEL. In case of any failure on contractor's part to comply with this, BHEL may at its discretion, consider to withhold part payment against their RA bills.
14.2.2	The progress report shall indicate the progress achieved against planned with reasons indicating delays, if any, and shall give the remedial actions which the contractor intends to take to make good the slippage or lost time, so that further works again proceed as per the original program and the slippages do not accumulate and effect the overall program.
14.2.3	The daily work force reports shall clearly indicate the work force deployed, category-wise specifying also the activities in which they are engaged.
14.2.4	Weekly progress review meetings will be held at site during which actual progress during the week vis-à-vis scheduled program shall be discussed or actions to be taken for achieving targets. For discussions, the contractor shall present program of subsequent week. The contractor shall constantly update/revise his work program to meet the overall requirement.
14.2.5	Periodic progress reviews on the entire activities of execution in respect of supply and works in scope of bidder will be held once in a month at Kolkata /site. These meetings will be attended by reasonably higher officials of the contractor and will be used as a forum for discussing all areas where progress needs to be speeded up. The contractor

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	shall be further responsible for ensuring that suitable steps are taken to meet various targets decided upon such meetings.	
14.2.6	During construction contractor shall take an average Twenty colour digital photograph / slides each month (not less than four per week) of the works during progress through email only. However, if required, bidder to submit hard copies of photographs as and when required in line with instruction by BHEL site. In case of failure in providing such soft and/or hard copies photographs, an amount of Rs. 1,000/- per instance shall be deducted from contractor's RA bill.	
14.2.7	Successful bidder has to provide for electronic / computerized storing and re-production/ printing/ plotting of various data, log sheets, protocols, measurements etc. These may be stored in pen drive (as per requirement) and handed over to BHEL as per requirement.	
14.3	SITE ORGANIZATION	
14.3.1	The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all time for smooth execution of the contract headed by a competent construction manager for site operations with sufficient level of authority to take site decisions. The vendor will submit organization chart (showing the name of SITE-IN-CHARGE) with individual bio-data indicating various levels of experts to be posted in the fields of supervision and execution, quality, material management, planning, safety, etc. The organization shall be reinforced from time to time, as required to make up slippage (if any) from the schedule without any commercial implication to BHEL. The organization chart is to be submitted within 10 days from the date of LOI.	
14.3.2	Following Tentative Manpower with power plant construction background to be deployed at site by the successful vendor for their day to day supervision etc.as directed.	
14.3.2.1	Qualified safety officer (exclusive for safety supervision)	One no. officer (from start of work) One no. assistant (from start of work)
14.3.2.2	Site supervising staff for Civil work	1 engineer and 2 nos. supervisors. However, during shell construction work, minimum 2 no. engineers and 4 nos. supervisors to be deployed for working in day and night shift in each chimney
14.3.2.3	Site supervising staff for Structural work	One no. engineer and Minimum 1 nos. supervisors
14.3.2.4	Engineer for quality inspection.	Minimum Two nos. (one no. from start of work, 2 nd as per site requirement)
14.3.2.5	Material management, site enabling	One no.
14.3.2.6	Engineer for Civil Laboratory	One no.
14.3.3	Deputation of above man-power shall be jointly decided and agreed at site in line with construction schedule.	
14.3.4	Engineer / supervisor for other functions like store & purchase, material management, planning, fin, admn etc are to be provided as per site requirement and not considered above.	
14.3.5	Induction of further manpower regarding site supervisor & site engineer will be decided by BHEL at site as per requirement without any financial implication.	
14.3.6	BHEL reserves the right to reject or approve the list of personnel proposed by the contractor. The persons whose bio-data have been approved by BHEL will have to be posted at site and deviation in this regard will not be permitted unless specific & reasonable justification is made.	
14.3.7	In addition to above, a well experienced qualified engineer to be designated, as 'Project Co-coordinator', shall be deployed by the contractor. Such engineer shall have adequate exposure on the job and shall remain fully involved in all planning activities, guidance etc to contractor's own team during the complete execution period of contract.	
14.3.8	The contractor should also submit to BHEL for approval a list of T&Ps along with their fitness certificates. The tools & tackles shall not be removed from site without written permission of BHEL.	

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14.3.9	The contractor should also submit network programs for the erection of various items. These networks shall show the NTPC / BHEL hold points, which have to be cleared by NTPC / BHEL, or their authorized representatives before further erection can take place. These programs for the erection would clearly identify responsibilities of the contractor and NTPC / BHEL. It is the responsibility of the contractor to get the Networks approved by BHEL within four weeks of the date of finalization of award of work/ placement of LOI.
14.4	CONSTRUCTION MANAGEMENT
14.4.1	Based on the approved program, the contractor shall submit a program of construction / erection / commissioning for the implementation. These programs would be amplified showing start of erection and subsequent activities and shall form the basis for site execution and detail monitoring. The three-monthly rolling program with the first month's program being tentative based on the site condition would be prepared based on these programs. The contractor shall also be involved along with NTPC / BHEL to tie up detailed resources mobilization plan over the period of the contract matching with the performance targets.
14.4.2	The program would be jointly finalized by the site in-charge of the contractor with BHEL / NTPC's project coordinator as well as the site-planning representative. The erection program will also identify sequential events matching financial turnover.
14.4.3	Theses network / Program must confirm to the overall requirement of the project schedule. The bidder should also ensure monitoring of these activities at least on weekly basis to start with and on daily basis whenever required by BHEL.
14.4.4	The contractor is liable to furnish all documentary evidences towards payment of Works Contract Tax as and when required by BHEL.
15.0	TEST CERTIFICATE FOR T&P All T&P, lifting tackles and pulling devices to be deployed by the contractor must bear valid / latest test certificates for their suitability, and the documents shall be preserved at site.
16.0	T&P TO BE PROVIDED BY BHEL No T&P shall be provided by BHEL.
17.0	MATERIAL HANDLING (BHEL ISSUED MATERIAL)
17.1	Materials shall be issued by BHEL based on the weighment basis/linear measurements & sectional weight and list of shop fabricated structures as per MDCC/LR/drawings. However, on specific request of the contractor "as a special case to expedite the job" the consignment received at BHEL stores can directly be diverted to the work site following issuance procedure of BHEL. Such direct issues shall be as per the Challan/dispatch document/LR received with the consignment. In such cases, Contractor shall do unloading of materials from trucks/lorry at their own cost.
17.2	All materials issued by BHEL shall be stacked, stored above ground level by use of concrete or wooden sleepers. No materials shall remain on ground at any time. All concrete or wooden sleepers required for stacking the materials shall be arranged by contractor (successful bidder of this package) at his own cost within the quoted rates. All other equipments like winches, D-Shackles, slings of various sizes, max puller, pulley blocks, jacks, trucks, trailers etc. Required for such handling of steel from BHEL stores/storage yard etc. Shall be arranged by contractor within quoted/accepted rates.
17.3	The contractor shall take delivery of the materials from the designated place within the project premises at his own cost and store the same at his stores as on free of cost basis. Temporary barbed wire fencing of the open storage yard is to be done by the contractor and is included under the scope of his work. Contractor shall also remove grass, bushes, trees etc wherever required off the land provided to him and shall make proper continuous up keeping of the open yard /land by removing grass, bushes trees etc and same is included under the scope of his work & No extra payment shall be made to the contractor in this regard. The bidder shall make complete arrangement of necessary security personnel's to safeguard all such materials in his custody. Materials issued will be used only for construction of permanent works. The contractor shall take care of material issued by BHEL and shall protect the same from theft,

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	damage and weathering. Excessive rusting of steel in custody of agency/contractor must be avoided. In case, due to any cause attributable to the contractor, such rusting of steel occur rendering the same unusable, then such quantity of steel shall be recovered from the interim payment at the penal rate specified in the tender.	
18.0	ISSUE OF MATERIALS	
18.1	ISSUE OF CEMENT	
18.1.1	Cement as received from the manufacturer/ stockiest will be issued free of cost to the contractor. In case if cement is issued in bags, theoretical weight of each bag of cement for issued purposes will be considered as 50 kg, the contractor shall be accountable for the cement issued to the contractor on this notional weight only. No claim whatsoever will be entertained because of difference between theoretical and actual weight of the bags of cement.	
18.1.2	In case cement is issued through bulkers being supplied from manufacturer/stockiest; the same shall be emptied in cement silos of batching plant and necessary assistance shall be provided by contractor.	
18.1.3	In case BHEL supplies cement through Bulker, Bidder has to store cement in Silos of Suitable capacities as decided by Engineer in charge. Silos Capacities shall be finalized mutually.	
18.1.4	The empty cement bags duly accounted for against issue shall be the contractor's property and the same shall be disposed as per statutory regulation prevailing in the project.	
18.1.5	No cement will be issued on free basis for making bought out item like Hume pipe, Interlocking Paver block, Fly ash brick or for use in contractor's own enabling work etc. However, cement for mortar for fixing of these items if required will be issued on free basis	
18.2	ISSUE OF STEEL	
18.2.1	The steel shall be issued to the contractor on the following basis: i. Structural Steel: Weighment basis (Unit – MT) ii. Reinforcement Steel and Earthing Rod: Weighment basis (Unit-MT) iii. GI Gratings: Weighment Basis (Unit- MT/As Received from manufacturer) iv. MS Rails: Weighment Basis (Unit-MT) v. Shop fabricated structures (Unit- nos as per list (MDCC/LR/Drawings)	
18.2.2	All the steel (structural, reinforcement, earthing rod/GI flats, GI gratings, foundation bolts, MS Rails) issued by BHEL shall be properly accounted for. The total quantity of steel required for the work will be calculated from the approved Bar Bending schedule, fabrication drawings, approved laps, chairs etc. The measurement for payment as well as for accounting shall be based on the sectional weights as indicated in the following IS/BS/EN specifications	
	Sr No	Name of Standard
	1	IS: 808-1964
	2	IS: 1730-1961
	3	BS4-1: 1993
	4	IS: 12778/equivalence with EN-19-57
	5	IS: 12778/equivalence with EN-53-62
	6	IS: 1786 or grade -1 of IS432 (Part-I)
	Name of Section	
	Beams, Channels and Angles	
	Plates, Sheets and Strips/Flats	
	UB/UC sections	
	For NPB sections	
	For HE/WPB sections	
	Rounds including deformed hig	
	In case any such sectional weights are not available in the above documents, the manufacturer recommendation shall be binding.	
18.2.3	The steel issued to the contractor shall be mainly in standard length and sections as received from the supplier. However, the contractor shall be bound to accept the steel in length as available in the project stores, no claims for extra payment because of issue of non-standard length will be entertained.	
18.2.4	The contractor shall satisfy himself of the quality and quantity of the materials at the	

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	time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by the contractor from BHEL stores.
18.2.5	The contractor shall submit to BHEL, a statement indicating estimated quantity of cement and steel required during a quarter. In addition, the contractor shall also furnish the estimated requirement of cement and steel during a month by the third week of the previous month indicating his requirement.
18.2.6	Bidders shall ensure that no lamination material is taken over by them from BHEL.
18.2.7	The contractor must note that cement and steel required for the contractor's enabling job like store/ site office/batching plant/temporary works etc. shall be arranged by the contractor at his own cost.
18.3	ISSUE OF BOROSILICATE GLASS BLOCK Borosilicate Glass block shall be issued as received vide challan of the transporter in sqm worked out by multiplication of block sizes by no of block.
18.4	ADHESIVES / MEMBRANCE Shall be issued in Kg / Litre as received in drum
18.5	PRIMER PAINT Shall be issued in Litre as received in drum
18.6	The contractor shall satisfy himself of the quality and quantity of the materials at the time of taking delivery from BHEL stores. No claims whatsoever will be entertained by BHEL because of quality or quantity after the materials are taken by contractor from BHEL stores.
18.7	The contractor shall submit to the engineer, a statement indicating estimated quantity of Borosilicate Glass Blocks, required adhesives / membrane and primer required at least two months in advance.
19.0	RETURN OF MATERIALS
19.1	RETURN OF CEMENT
19.1.1	Sealed cement bags remaining unused and in perfectly good condition at the time of completion or termination of the contract shall be returned promptly, (within 15 days from assessment) if BHEL/ engineer is satisfied of the physical condition of the cement. Return of such cement to the project stores / place as identified within the project area by engineer/ BHEL will not be entitled to handling and incidental charges. Surplus sealed and good conditioned cement bags will be taken back on weightment basis.
19.2	RETURN OF STEEL INCLUDING SCRAP
19.2.1	All surplus steel and all wastage materials will be taken back on weightment basis. Surplus, unused and untampered steel shall be sorted section-wise and returned separately at a place directed by BHEL/Engineer within the project area. Return of such materials will not be entitled to any handling and incidental charges. All wastage / scrap (including melting scrap, wastage, and unusable scrap) shall be promptly returned to the stores and a receipt obtained for material accounting purposes. Return of such material will not be entitled to any transportation and incidental charge. Scrap for reinforcement steel and structural steel shall be returned separately.
19.2.2	Scrap and Serviceable Materials:
19.2.2.1	All structural steel rolled sections of length above 2 M except M.S Plate shall be considered as serviceable materials provided the materials is in good and acceptable condition. Structural steel rolled sections in length less than 2 M Shall be treated as scrap.
19.2.2.2	Plates having both side greater than 1 Meter OR if any side is less than 1 M but greater than 0.5 M and the total area is equal or greater than 2 sq. Meter shall be considered as serviceable material .
19.2.2.3	All TMT measuring 3 M and above in length shall be treated as serviceable material provided they are in good acceptable condition. TMT in less than 3 M shall be treated as scrap.
19.3	BOROSILICATE GLASS BLOCK All unused Borosilicate blocks shall be taken back by BHEL
19.4	ADHESIVES / MEMBRANCE All unused untampered adhesive / membrane drum shall be taken back by BHEL in

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	Kg as received during issue. Open drum / partially used drum shall not be taken back	
19.5	PRIMER PAINT	
	All unused untampered drum containing paint shall be taken back by BHEL in litre as received during issue. Open drum / partially used drum shall not be taken back	
20.0	MATERIAL CONSUMPTION AND WASTAGE	
20.1	CEMENT CONSUMPTION	
20.1.1	The theoretical consumption of cement shall be based on the following:	
20.1.1.1	For design mix concrete as per approved design mix.	
20.1.1.2	For nominal mix concrete work, as per minimum cement as specified or as approved by engineer-in-charge.	
20.1.1.3	For item of works, where volume mix is permitted in writing by the BHEL, for masonry works, plaster other miscellaneous items, the cement consumption shall be governed by the "Statement of cement consumption" attached to the DSR-2013 unless otherwise specified in the specifications or the drawing of contract or mutually agreed by engineer-in-charge and the contractor.	
20.1.1.4	Actual consumption = Issue – Surplus/ unused quantity of cement returned in good condition by the contractor to store. (No sweep cement will be taken back by BHEL).	
20.2	CEMENT WASTAGE	
20.2.1	Allowable wastage: One and half percent (+1.5%) of theoretical consumption of cement.	
20.2.2	For any material issued by BHEL to the contractor free of cost, and which is not accounted for by the contractor to BHEL, then recovery for such material shall be affected at penal rates.	
	Sl no.	Cement consumption
		Basis of issue & penal recovery
	C-1	Theoretical consumption (without considering any wastage or loss).
	C-2	Actual consumption being Limited to one and half percent (+1.5%) of aforesaid theoretical consumption towards allowable wastage.
	C-3	Actual consumption beyond one and half percent (+1.5%) of above (C-1).
20.3	REINFORCEMENT STEEL & EARTHING MS ROUND CONSUMPTION	
20.3.1	The theoretical consumption of various diameter of reinforcement and earthing MS round shall be based on approved construction drawing and bar bending schedule. Weight shall be calculated considering the sectional weights as per Indian standards. No extra cost shall be payable to the contractor for any deviation in weights for the different procedures adopted for issue and calculation of the theoretical consumption including rolling tolerances.	
20.3.2	Actual consumption = Issue – Surplus.	
20.3.3	Surplus = Un-tampered and unused quantity of steel returned by the contractor to BHEL store along-with relevant documents.	
20.3.4	Wastage = Actual consumption – Theoretical consumption.	
20.4	REINFORCEMENT STEEL & EARTHING MS ROUND WASTAGE	
20.4.1	Allowable wastage : (+3%) of the theoretical consumption shall be considered as allowable wastage.	
20.4.2	Wastage and scrap shall be as per actual weightment basis.	
20.4.3	Sl no	Reinforcement steel & earthing rod 40 mm ms round
		Basis of issue & penal recovery
	R-1	Theoretical consumption (without considering wastage and scrap or loss)
	R-2a	Wastage limited to plus three percent (+3%) of aforesaid theoretical consumption (R-1) towards allowable wastage and return to BHEL Store.
	R-2b	Wastage limited to plus three percent (+3%) of aforesaid theoretical consumption (R-1) towards allowable wastage but not returned to BHEL Store.

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	R-3	Wastage beyond three percent (+3%) of the theoretical consumption above (R-1).	Penal rate
20.5	STRUCTURAL STEEL CONSUMPTION		
20.5.1	The theoretical consumption of various sections shall be based on approved drawings. Weights shall be calculated considering the sectional weights as per Indian standard as mentioned in relevant clause. No extra shall be payable to the contractor for any deviation in weights for the two different procedures adopted for issue and calculation of the theoretical consumption including rolling tolerances.		
20.5.2	Actual consumption = Issue – Surplus.		
20.5.3	Surplus = Untempered, unused, uncut quantity of steel returned by the contractor to BHEL store.		
20.5.4	Wastage = Actual consumption – Theoretical consumption.		
20.6	STRUCTURAL STEEL WASTAGE		
20.6.1	Allowable wastage – 4 % (four percent) of the theoretical consumption shall be considered. Wastage is further classified as cut pieces and scrap measured as per actual weightment basis. Invisible wastage (loss of materials due to gas cutting, straightening of edges etc) shall be limited to 0.5 % (zero-point five percent) of the theoretical consumption and shall be considered for reconciliation purposes only. But this invisible wastage shall be considered to be included in allowable wastage.		
20.6.2	Sl no	Structural steel materials	Basis of issue & penal recovery
	S-1	Theoretical consumption (without considering any wastage, scrap or loss) as per specification & drg.	Free
	S-2a	Wastage limited to plus three-point five percent (+3.5% excluding invisible wastage) of the aforesaid theoretical consumption (S-1) towards allowable wastage and return to BHEL Store.	Free
	S-2b	Wastage limited to plus three-point five percent (+3.5% excluding invisible wastage) of the aforesaid theoretical consumption (S-1) towards allowable wastage but not returned to BHEL Store.	Penal rate
	S-3	Wastage beyond four percent (4%) of the aforesaid theoretical consumption (S-1).	Penal rate
20.7	All wastage reinforcement, MS round (for earthing), structural steel shall be returned to BHEL.		
20.8	BOROSILICATE GLASS BLOCK		
20.8.1	Wastage shall be controlled by Supplier of Borosilicate Glass Lining materials under the supervision of whom the lining work shall be carried out. Bidder to follow the instruction of Supplier. Wastage, even after compliance to instructions of supplier, if any, will not be considered under successful bidder's account. However, if it is established during the execution that wastage is due to non-compliances by the successful bidder vis-a-vis instruction of supplier and due to the same BHEL has to procure the additional material then the additional cost with applicable overhead including Taxes & duties shall be recovered from the Successful Bidder.		
20.9	ADHESIVES / MEMBRANCE		
20.9.1	Wastage shall be controlled by Supplier of Borosilicate Glass Lining materials under the supervision of whom the lining work shall be carried out. Bidder to follow the instruction of Supplier. Wastage, even after compliance to instructions of supplier, if any, will not be considered under successful bidder's account. However, if it is established during the execution that wastage is due to non-compliances by the successful bidder vis-a-vis instruction of supplier and due to the same BHEL has to procure the additional material then the additional cost with applicable overhead including Taxes & duties shall be recovered from the Successful Bidder.		
20.10	PRIMER PAINT		
20.10.1	Wastage shall be controlled by Supplier of Borosilicate Glass Lining materials under the supervision of whom the lining work shall be carried out. Bidder to follow the instruction of Supplier. Wastage, even after compliance to instructions of supplier, if any, will not be considered under successful bidder's account. However, if it is		

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	established during the execution that wastage is due to non-compliances by the successful bidder vis-a-vis instruction of supplier and due to the same BHEL has to procure the additional material then the additional cost with applicable overhead including Taxes & duties shall be recovered from the Successful Bidder.	
21.0	RECONCILIATION OF BHEL ISSUED MATERIALS	
21.1	The contractor shall submit a reconciliation statement of cement and steel issued to the contractor with each RA Bill.	
21.2	At the time of submission of bills, the contractor shall properly account for the material issued to him as specified herein to the satisfaction of BHEL certifying that the balance material are available in the contractor custody at site.	
21.3	At the time of submission of bills, if it is noticed by BHEL that the wastage is high and calls recovery at the penal rate, then, BHEL will proceed for recovery for the excess wastage as per penal recovery rates as specified.	
21.4	The reference drawings for actual material consumption to be used for the purpose of reconciliation shall be drawings prepared by the BHEL and drawings approved by BHEL for fabrication works and such other drawings approved by BHEL. This shall also include the bar bending schedule prepared by the contractor and approved by BHEL.	
22.0	RECOVERY OF MATERIAL	
22.1	If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly RA bill at the penal rate stipulated below.	
	PENAL RATE OF MATERIALS	
	Item	Penal rate
	Cement (OPC/ PPC/ PSC).	Rs 6,300 per MT
	Reinforcement steel and MS earthing rod/GI flat	Rs 65,300 per MT
	MS Flats, beams, channel, angles etc. (Rolled Sections)	Rs 65,600 per MT
	Chequered Plates and MS plates	Rs 70,000/- per MT.
	Foundation bolts if supplied by BHEL	Rs 90,000/- per MT
23.0	CONSTRUCTION OF TEMPORARY OFFICE, STORES ETC	
23.1	The contractor shall arrange at his own cost cleaning of area allotted, construction of his temporary office, stores, cement godown etc. and also the watch and ward of all the above. Materials required for the same shall be provided by contractor at his own cost.	
23.2	BHEL contemplates to provide fabrication yard with in approx 1000 mtr from chimney. However, during execution, based on actual site conditions, requirement and layout and approaches, the above may change suitably.	
23.3	The contractor shall ensure storage of adhesives & primers required for Borosilicate lining work in controlled atmosphere. For this purpose, contractor has to arrange suitable store at his own cost.	
24.0	TOOLS & PLANTS (TO BE PROVIDED BY CONTRACTOR)	
24.1	Tentative list of T&P to be deployed by contractor for successful completion of work is detailed below.	
24.2	It may be noted that the list is not exhaustive and is only for guidance. The contractor is required to provide all necessary T&P (other than those specified to be provided by BHEL, if any) measuring (calibrated) instruments & handling equipments to maintain work progress for timely completion of total work as per contract. In case of project requirement, some activities may have to pre-pone. In such cases the contractor have to deploy additional T&P. Quoted rate shall be inclusive of such emerging requirements. However, contractor shall submit deployment plan of all T&P after order to BHEL / SITE.	
24.3	In the event of any failure on the part of the contractor to deploy T & P to sustain desired work progress, BHEL may at his discretion also terminate the contract on this ground and take out any or whole amount of the contract from the scope of the contractor. In the event of failure of contractor to deploy necessary and sufficient T&P/ IMTEs to maintain work progress, BHEL will arrange the same including mobilization, demobilization, hiring charge, fuel charge etc of same from any of BHEL site/ other agency & charges as applicable shall be deducted from contractor's RA bill. BHEL also reserve for suitable deduction towards non-	

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	depolyment of T&P as per project requirement in line with BHEL's rate of T&P charges available at BHEL/site through corporate circular time to time. Decision of BHEL in this regard will be final & binding on contractor.	
24.4	Following Major T&Ps to be arranged by contractor within the time as indicated :	
24.4.1	PACKAGE-1	
	Major T&P items	Mobilizing time from Zero Date
B1	2 Nos. Hydraulic Excavator/Poclain	Within 20 days
B2	10 Nos. Dumper	4 nos Within 20 days Balance as per requirement
B3	1 Nos. Vibromax/Earth Compactor	As per site requirement
B4	Air Compressor	As per site requirement
B5	8 / 20 T Crawler/Tyre Mounted Crane	As per site requirement
B6	2 Nos Nextgen Hydra (10 / 12 T Cap)	1 nos within 30 days Balance as per requirement
B7	Welding Machine	As per requirement
B8	Motorized MS plate bending machine along with angle bending device – 1 no.	As per requirement
B9	Transit Mixer (5 / 6 Cum capacity)	As per requirement
B10	Concrete Pump (20 cum/ hr min capacity)	As per requirement
B11	3 Nos Self Priming Dewatering Pump 5 HP (diesel / electric)	Within 20 days
B12	2 Nos Multi stage high lift water Pump (for curing) (lifting height shall be 175 metre).	Within 90 days
B13	4 Nos Reinforcement Bending Machine	3 nos within 30 days Balance as per requirement
B14	4 No Reinforcement Cutting Machine	3 nos within 30 days Balance as per requirement
B15	1 No Compression Testing Machine (200 T Cap)	Within 20 days.
B16	Power Winch – 3 T	As per requirement
B17	Power Winch – 5 T	As per requirement
B18	Power Winch – 10 T	As per requirement
B19	1 No Total Station	Within 20 days.
B20	2 Nos Auto Level & Staff	Within 20 days.
B21	1 nos DG set (suitable capacity as per requirement)	Within 30 days.
B22	Concrete Cube Moulds	As per requirement
B23	Slip / Inter form equipment set including required winches for man & material lifting, hydraulic spare pump, minimum 10% spare jack,jack rods, epoxy painted MS shutter plate, wooden planks, materials and passenger hoist with safety block (safety devices), safety ropes etc complete - 2 sets minimum.	1 sets to be mobilized within 90 days. Balance as per site requirement
B24	Strand Jack / winches with safety device lifting capacity 15 T-02 Nos.	As per requirement
B25	2 Nos Hanging platforms with safety device (two nos.)	As per requirement
B26	1 Nos Trailer – 20T,	Within 20 days.
B27	1 Nos Drinking Water Tank – 1000 Lit.	Within 30 days.
B28	1 Nos Ultra-Sonography Testing Machine for structural work.	As per requirement
B29	1 Nos Radiography Source.	As per requirement
B30	Radioset (VHF/UHF.)	01 Nos Within 120 days.Balance as per requirement.
B31	1 nos - 30 Cum/Hr & 1 nos - 15 Cum/Hr capacity of Automatic Batching Plant with Printing facility with required Silo for storing of Cement to be commissioned	1 st Within 60 Days 2nd Within 90 Days

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	at Site.	
B32	Civil laboratory equipments as per list attached in ANNEX 'A & A1'	Within 30 days.
B33	Portable fire extinguishers as below: Soda acid – 4 sets. Dry chemical powder – 4 sets CO2 – 2 sets. Water & sand bucket (4 buckets in one stand) – 3 sets. Fire hose with nozzle (50 M length) – 2 sets.	Within 45 days.
24.4.2	Package-2	
	Major T&P items	Mobilizing time from Zero Date
B1	2 Nos. Hydraulic Excavator/Poclain	Within 20 days
B2	10 Nos. Dumper	4 nos Within 20 days Balance as per requirement
B3	1 Nos. Vibromax/Earth Compactor	As per site requirement
B4	Air Compressor	As per site requirement
B5	18 / 20 T Crawler/Tyre Mounted Crane	As per site requirement
B6	2 Nos Nextgen Hydra (10 / 12 T Cap)	1 nos within 30 days Balance as per requirement
B7	Welding Machine	As per requirement
B8	Motorized MS plate bending machine along with angle bending device – 1 no.	As per requirement
B9	Transit Mixer (5 / 6 Cum capacity)	As per requirement
B10	Concrete Pump (20 cum/ hr min capaci)	Balance as per requirement
B11	3 Nos Self Priming Dewatering Pump 5 HP (diesel / electric)	3 nos within 20 days
B12	2 Nos Multi stage high lift water Pump (for curing) (lifting height shall be 175 metre).	Within 90 days
B13	3 Nos Reinforcement Bending Machine	Within 30 days
B14	3 Nos Reinforcement Cutting Machine	Within 30 days
B15	1 No Compression Testing Machine (200 T Cap)	Within 20 days.
B16	Power Winch – 3 T	As per requirement
B17	Power Winch – 5 T	As per requirement
B18	Power Winch – 10 T	As per requirement
B19	1 No Total Station	Within 20 days.
B20	2 Nos Auto Level & Staff	Within 20 days.
B21	1 nos DG set (suitable capacity as per requirement)	Within 30 days.
B22	Concrete Cube Moulds	As per requirement
B23	Slip / Inter form equipment set including required winches for man & material lifting, hydraulic spare pump, minimum 10% spare jack,jack rods, epoxy painted MS shutter plate, wooden planks, materials and passenger hoist with safety block (safety devices), safety ropes etc complete - 1 sets minimum.	To be mobilized within 90 days.
B24	Strand Jack / winches with safety device lifting capacity 15 T	As per requirement
B25	Hanging platforms with safety device	As per requirement
B26	1 Nos Trailor – 20T,	1 nos within 20 days.
B27	1 No Drinking Water Tank – 1000 Lit.	Within 30 days.
B28	1 No Ultra-Sonography Testing Machine for structural work.	As per requirement
B29	1 No Radiography Source.	As per requirement
B30	Radioset (VHF/UHF.)	Within 120 days.
B31	1 nos - 30 Cum/Hr & 1 nos - 15 Cum/Hr capacity of	1 st Within 60 Days

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	Automatic Batching Plant with Printing facility with required Silo for storing of Cement to be commissioned at Site.	2nd Within 90 Days
B32	Civil laboratory equipments as per list attached in ANNEX 'A & A1'	Within 30 days.
B33	Portable fire extinguishers as below: Soda acid – 4 sets. Dry chemical powder – 4 sets CO2 – 2 sets. Water & sand bucket (4 buckets in one stand) – 3 sets. Fire hose with nozzle (50 M length) – 2 sets.	Within 45 days.
24.5	T&P shown in the above-mentioned list and the mobilization schedule is tentative requirement considering parallel working. However, mobilization schedule modification as well as no. of T&Ps as mutually agreed at site for major T&Ps, have to be adhered to. Numbers/ time of requirement will be reviewed time to time at site and contractor will provide required T&P/ equipment's to ensure completion of entire work within schedule/target date of completion without any additional financial implication to BHEL. Vendor shall give advance	
24.6	All T&P and all IMTEs, which are required for successful and timely execution of the work covered within the scope of this tender, shall be arranged and provided by the contractor at his own cost in working condition.	
24.7	In the event of contractor failing to arrange the required tools, plants, machineries, equipment, material or non-availability of the same owing to breakdown, BHEL will make alternative arrangement at the risk and cost of the contractor.	
24.7.1	Case 1: BHEL provides its own Capital T&P. In case the BHEL provides any T&P which is owned by BHEL, hire charges (as per BHEL norms) will be recovered from the contractor as per the prevailing BHEL corporate hire charges. In case, the T&P is specifically listed in "T&Ps to be deployed by Contractor", "Hire charges applicable to outside agencies other than contractors working for BHEL" will apply. If not listed, "hire charges applicable to contractor working for BHEL" will apply. The hire charges of Capital tools & plants are exclusive of operating expenses e.g. operator, fuel & consumables and the same shall be arranged by the contractor at his cost.	
24.7.2	Case 2 In all cases other than that specified in case 1 above, actual expenses incurred by BHEL along with applicable overheads will be back-charges to the contractor. In the event of need of change of type of any of major T&Ps, approval shall be taken from BHEL Engineer in-charge prior to mobilization. The decision of Number of T&P required due to replacing the enlisted T&P as per above table, shall be taken after analyzing the production capacity and suitability of both the T&Ps.	
25.0	CIVIL LABORATORY	
	Contractor shall establish and maintain civil laboratory Room with necessary equipment for conducting relevant site tests, as required. Tentative list of Lab equipments to be deployed / arranged by the contractor are given in Annexure-A.	
26.0	CONSTRUCTION SCHEDULE	
26.1	INITIAL MOBILIZATION: On receipt of LOI/written intimation from BHEL Site Construction Manager, Contractor shall discuss with Project Manager / Construction Manager regarding initial mobilization. Contractor shall mobilize necessary resources as per the T&P mobilization schedule mentioned in SL No 24.0 above & directive of Project Manager / Construction Manager.	
26.2	Entire work shall be carried out in accordance with the broad construction / Milestone schedule, within the stipulated completion period. Contractor shall discuss with BHEL site engineer within 30 days of LOI/written intimation from BHEL & furnish detail construction schedule (L-3/ L-4) indicating all milestones on the basis of major activities and get it approved from BHEL engineer. This schedule will undergo review and based on progress vis-à-vis project requirement, contractor shall have to submit	

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28.0	CERTIFICATE TOWARDS COMPLETION
	The work under the scope of the contractor shall be deemed to have been completed in all respects only when so certified by CM, BHEL / NTPC. The decision of BHEL in this regard shall be final and binding on the contractor.
29.0	EXTENSION OF TIME FOR COMPLETION
29.1	If the completion of work as detailed in the scope of work gets delayed beyond the contract / completion period, the contractor shall request for an extension of the contract and BHEL at its discretion may extend the contract.
29.2	Based on the reviews jointly signed, the works balance at the end of original contract period less the backlog attributable to the contractor shall be quantified, and the number of months of 'Time extension' required for completion of the same shall be jointly worked out. Within this period of 'Time extension', the contractor is bound to complete the portion of backlog attributable to the contractor. Any further 'Time extension' or 'Time extensions' at the end of the previous extension shall be worked out similarly.
29.3	However, if any 'Time extension' is granted to the contractor to facilitate continuation of work and completion of contract, due to backlog attributable to the contractor alone, then it shall be without prejudice to the rights of BHEL to impose penalty/ LD for the delays attributable to the contractor, in addition to any other actions BHEL may wish to take at the risk and cost of contractor.
29.4	A joint programme shall be drawn for the balance amount of work to be completed during the period of 'Time Extension', along with matching resources to be deployed by the contractor as per specified format. Review of the programme and record of shortfall shall be done.
29.5	During the period of 'Time extension', contractor shall maintain their resources as per mutually agreed program.
29.6	At the end of total work completion as certified by BHEL engineer, and upon analysis of the total delay, the portion of time extensions attributable to (i) Contractor, (ii) Force majeure conditions, and (iii) BHEL, shall be worked out and shall be considered to be exhausted in the same order. The total period of time extensions shall be the sum of (i), (ii) and (iii) above and shall be equal to period between the scheduled date of completion and the actual date of completion of contract. LD shall be imposed/ levied for the portion of time extensions attributable to contractor and recoverable from the dues payable to the contractor.
30.0	MOBILIZATION ADVANCE/ INTEREST BEARING RECOVERABLE ADVANCE
	Not applicable.
31.0	SECURITY DEPOSIT & PERFORMANCE BOND
31.1	Security deposit shall be applicable as per relevant clause of GCC (Volume-IB).
31.2	Performance Bond -Not applicable for this tender.
32.0	REVISION ON ACCEPTED CONTRACT RATE
	Not applicable in this tender.
33.0	LIQUIDATED DAMAGE/ PENALTY
33.1	Penalty for Intermediate Milestones
33.1.1	M1 and M2 shall be intermediate Milestones for this work. Refer Clause No. 26.4 above for M-1 & M-2.
33.1.2	In case of slippage of these identified Intermediate Milestones, Delay Analysis shall be carried out on achievement of each of these two Intermediate Milestones in reference to Form 14.
33.1.3	Incase delay in achieving M1 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to Maximum 2% of executable contract value will be withheld.
33.1.4	Incase delay in achieving M2 milestone is solely attributable to the contractor, 0.5% per week of executable contract value* limited to maximum 3% of executable contract value will be withheld.
33.1.5	Amount already withheld, if any, against slippage of M1 milestone, shall be released only if there is no delay attributable to contractor in achievement of M2 milestone.
33.1.6	Amount required to be withheld on account of slippage of identified intermediate milestone(s) shall be withheld out of respective milestone payment and balance

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	amount (if any) shall be withheld @10% of RA Bill amount from subsequent RA bills.
33.1.7	Final deduction towards LD (if applicable), on account of delay attributable to contractor shall be based on final delay analysis on completion / closure of contract. Withheld amount, if any due to slippage of intermediate milestones shall be adjusted against LD or released as the case may be.
33.1.8	In case of termination of contract due to any reason attributable to contractor before completion of work, the amount already withheld against slippage of intermediate milestones shall not be released and be converted in to recovery.
	Note: *Executable contract value-value of work for which inputs/fronTS were made available to contractor and were scheduled for execution till the date of achievement of that milestone.
33.2	LIQUIDATED DAMAGE/ PENALTY FOR OVERALL DELAY
33.2.1	If the contractor fails to maintain the required progress of work which results in delay in the completion of the work as per the contractual completion period, BHEL shall have the right to impose Liquidated Damage/Penalty at the rate of 0. 5% of the contract value, per week of delay or part thereof subject to a maximum of 10% of the contract value. For this purpose, the period of delay shall be the delay attributable to the Contractor for the completion of work as per contract. Contract Value for this purpose, shall be the final executed value exclusive of ORC, Extra Works executed on Manday rate basis, Supplementary/Additional Items and PVC.
34.0	CONTRACT PRICE
34.1	The bidder shall quote their rates strictly in accordance with prescribed Price schedule of Volume-III (Latest revision).
34.2	The quantities of the various items mentioned in the Price schedules, Volume-III are approximate, based on very preliminary information and may vary to any extent or to be deleted altogether. The quoted rates of each item will remain firm throughout the period of execution including extension, for reasons whatsoever, as long as variation in the total value of the work executed under any part of this contract including extra items, if any, but excluding any price variation, remains within +/- 15 % (plus/minus fifteen percent) of the awarded price (as per LOI / WO).
34.3	The unit rate quoted for various items of BOQ shall include all the stipulation mentioned in the tender documents and nothing extra over BOQ rates shall be payable.
34.4	However, the contractor shall inform BHEL in case quantity variation of any item crosses + 50% (plus fifty percent) limit during execution and obtain approval/consent of CM, BHEL for execution of further quantity for this item.
34.5	Unless otherwise specified in price schedule, contractor shall obtain prior approval from BHEL / owner regarding manufacturer / make of all items under contractor's scope of supply
35.0	TAXES AND DUTIES
35.1	All taxes excluding GST & BOCW Cess (as specified elsewhere in the tender) but including, Charges, Royalties, any State or Central Levy and other taxes for materials if any obtained for the work and for execution of the contract shall be borne by successful bidder and shall not be payable extra by BHEL. Any increase of above at any stage during execution of contract, including extension of the contract, shall have to be borne by successful bidder contractor. Bidder's quoted/ accepted rates/ price shall be inclusive of all such requirements.
35.2	GST along with Cess (as applicable) legally leviable & payable by successful bidder as per GST Law shall be paid by BHEL, extra. Hence, bidder shall not include GST along with Cess (as applicable) in their quoted rates/ price.
35.3	Successful bidder shall furnish proof of GST registration with GSTN Portal covering the services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by successful bidder on BHEL for this project / work.
35.4	Since GST on output will be paid by BHEL separately as enumerated above, bidder's your quoted rates / price should be after considering the Input Credit under GST law at bidder's end.
35.5	TDS under Income Tax shall be deducted at prevailing rates on gross invoice value

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	from the running bills (RA bills) unless exemption certificate from the appropriate authority / authorities is furnished.
35.6.1	You may collect TCS under section 206C(1H) of Income Tax Act, 1961 if applicable.
35.6.2	In case, you collect TCS under section 206C(1H) of Income Tax Act, 1961, following compliance is required. <ul style="list-style-type: none"> a) TAN and PAN of vendor should appear in all invoices/claims. Copy of TAN /TCS registration is to be submitted. b) Amount of TCS and Assessable value on which TCS has been calculated should be specified clearly in the invoice. c) You shall be required to submit certificate of TCS in Form no. 270 within 15 days from the due date for furnishing the statement of tax collected at the source.
35.6.3	In case, you do not collect TCS under section 206C(1H) of Income Tax Act, 1961, following declaration is to be submitted alongwith each invoice:- "I/We hereby declare that I/We are not required to collect TCS" under section 206C(1H) of Income Tax Act, 1961, on this bill.
35.6.4	In event of failure to comply with the provisions of the Act, or proper certificate not issued, or if tax collected but not remitted to the Government, or for any other reason and thereby causing loss to BHEL, the same shall be recoverable from the vendor with applicable interest.
35.6.5	You shall comply with all statutory amendment/notifications in this respect.
35.7	TDS under GST shall be deducted at applicable rates on gross invoice value from the running bills (RA bills).
35.8	Bidder shall note that GST Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred thereunder) wherein the 'Bill To' details shall encompass following. BHEL GSTN – Refer attached GSTN code table of BHEL. Name - BHARAT HEAVY ELECTRICALS LIMITED Address - Shall be intimated later. Specific details of BHEL GSTN, Name and Address as stated above, have been specified elsewhere in the tender.
35.9	Successful bidder to intimate immediately on the day of removal of goods (in case of any supply of goods) to BHEL along with all relevant details and send a scanned copy of Tax Invoice to BHEL through following communication mode for enabling BHEL to meet its GST related compliances. Portal address. and Email address – Shall be intimated later. Specific details of above shall be intimated to successful bidder by BHEL at appropriate juncture.
35.10	In case of delay in submission of above-mentioned documents on the date of despatch, BHEL may incur penalty / interest for not adhering to Invoicing Rules under GST Law. The same will be liable to be recovered from successful bidder, in case such delay is not attributable to BHEL.
35.11	In case of raising any Supplementary Tax Invoice (Debit / Credit Note), successful bidder shall issue the same containing all the details as referred to in Section 34 read with Section 31 of GST Act & Rules referred there under.
35.12	Successful bidder shall comply with the Time Limit prescribed under the GST Law and rules thereof for raising of the Tax Invoice. If any supply of goods is applicable, successful bidder shall also ensure prompt delivery of goods after despatch.
35.13	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 successful bidder along with interest levied/ leviable on BHEL, as the case may be.
35.14	Successful 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 successful bidder along with interest levied / leviable on BHEL.
35.15	Way Bill: Successful bidder to arrange for way bill / e-waybill for any transfer of goods for the execution of the contract. Successful bidder has to make their own

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	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 successful bidder and BHEL will not supply any Road Permit/ Way Bill for this purpose.
35.16	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.
35.17	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.
36.0	INTERIM PAYMENTS
36.1	For all items of works, as per the Price schedule, Vol-III, billing shall be on item rate basis. However, Interim Payment shall be limited to 95% of gross bill amount.
36.2	All admissible recovered/ adjustments etc. shall be made from the interim payable amount.
36.3	The balance 5 % shall be payable on completion of guarantee period subject to confirmation of full GST and confirmation of receipt of all TCS certificates from vendor, if applicable. However, this 5 %, retained from each RA bill, may be released against submission of a separate bank guarantee as per Performance Bank Guarantee format, to be kept valid till final bill & guarantee period, subject to (i) Receipt of certificate that all works are completed in all respects; (ii) Reconciliation of materials / T&P / IMTE; (iii) Completion of final bill formalities (iv) handing over to BHEL / customer and (v) subject to confirmation of full GST and (vi) confirmation of receipt of all TCS certificates if applicable. Any Interest if levied thereon for reasons elaborated in Tax & duties clause of the contract and attributable to you shall be recovered for the Final Payment/ Retention amount. Submission of bank guarantee towards retention is separate and other bank guarantee(s) cannot be utilized for this purpose. This retention bank guarantee will be refunded after guarantee period.
36.4	1.5 % of gross bill amount shall be paid in the following manner on certification by BHEL engineer after compliance of each of following activity in each month. In case of non-fulfilment of respective activity by vendor in each month, no payment shall be made by BHEL against corresponding activity and no claim of bidder at a later date, whatsoever, in this regard shall be entertained by BHEL.
36.4.1	0.7 % shall be paid on compliance of housekeeping of vendor's working area and store/ office areas.
36.4.2	0.3 % shall be paid on compliance of general illumination of vendor's working area and stores, office area.
36.4.3	0.2 % shall be paid on compliance of applicable OHSAS requirement as per guidelines of BHEL/ PSER and as specified in the tender.
36.4.4	0.3 % shall be paid on compliance of applicable safety requirement as per guidelines of BHEL/ PSER and as specified in the tender.
36.5	Contractor's RA bill, complete & correct in all respects, certified by BHEL engineer, shall be paid after 45 days of receipt of bill with all supporting documents.
36.6	BHEL site at its discretion, may further split up the above percentages of break up and effect payment to suit the site condition, cash flow requirement, according to the progress of work.
36.7	Such payment as above shall be affected only on certification by BHEL against completion of each stage.
36.8	Applicable GST, which can be claimed at any point, shall be released to you upon compliance of following:
36.8.1	You declaring such Invoice in his GSTR-1
36.8.2	Receipt of Goods / services and Tax Invoice by BHEL
36.8.3	Confirmation of payment of GST thereon by you on GSTN Portal
36.9	BHEL site, at discretion, may further split up the above percentages and effect payment to suit the site condition, cash flow requirement, according to the progress of

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	work.
37.0	PRICE VARIATION CLAUSE(PVC)
	Applicable as per GCC.
38.0	OVERRUN COMPENSATION (ORC)
	Not applicable for this tender.
39.0	METHOD OF MEASUREMENT
39.1	Mode of measurement shall be as per relevant clauses of technical specification of this tender. In case the same is not available the relevant IS 1200 in conjunction of IS code 3385 shall be adopted. In case the same is also not available, the standard procedure adopted in CPWD shall be adopted. In case the same is also not available in CPWD, the measurement of the work done will be based on the mutual agreement between BHEL and contractor. In all the above cases, the interpretation of BHEL will be final and binding to the contractor.
39.2	Method of measurement for earth work shall be as per following:
39.3	Earthwork in excavation - Measurement shall be as per actual excavated quantity at site and as per clause 5.2.0 of Technical Specification, Section D, Sub-Section D1 of VOL-II B (Standard Technical Specification).
39.4	Earthwork in backfilling – Measurement shall be as per excavation quantity after deduction for concrete etc. Difference in final backfilled level with respect to initial ground level shall also be taken into account for deduction, if any, from excavation quantity.
40.0	EXTRA/ ADDITIONAL ITEMS OF WORK
	It shall be as per relevant clauses of GCC.
41.0	DESIGN OFFICE AND FABRICATION DRAWING
41.1	Based on design drawings of structures, to be issued to the contractor from time to time by BHEL, contractor will prepare & submit within 15 days of receipt, the detail fabrication / shop drawing including tabulated form of bill of materials (BOM), joint calculations, for comments / approval of BHEL at the office of BHEL / PEM, Noida. BHEL reserves the right to assess the capability of the agency to be deployed by contractor for preparation of such fabrication drawing, and prior approval from BHEL Engineering office at Noida, is required for appointment of such agency.
41.2	Since time is the essence of the contract, the contractor must indicate the location of their design office where from such detailed activities will be made operative. It is preferred that the contractor have establishment / liason office at Delhi / Noida with a co-ordinator for better co-ordination with BHEL-PEM.
41.3	Contractor shall submit progress report pertaining to fabrication drawing, by 7 th of each month, drawing-wise, section-wise cumulative bill of materials for which engineering drawing has been issued to them and status of fabrication drawing.
41.4	Based on specification vendor has to design the electrical drawing & aviation lights for chimney within the time schedule mentioned in relevant clause. Based on approval from BHEL / NTPC, vendor has to procure & supply the materials at site.
41.5	As per specification, vendor has to submit the design, MQP & drawing for elevator. On approval of the same, vendor has to take further action for supplying the Elevator to site.
42.0	FABRICATION
42.1	All the fabrication of structural steel items (except work done at qualified shop(s) out side the project premises as per BOQ cum Price schedule) shall be done in fabrication yard inside project premises. Quality plan for structural works will be issued during execution stage upon approval of customer Bidders to note that all fasteners like MS / HT / HSFG bolts, nuts, lock nuts, washers etc shall be supplied by bidder as per technical specification / drawings.
42.2	Bidder, at his own cost, shall supply electrodes required for fabrication, erection of structural steel as per specification and approval of BHEL.
	Above mentioned clauses pertaining to consumption and wastage of structural steel applies to those materials issued by BHEL for site fabrication.
43.0	INSURANCE
43.1	BHEL shall arrange comprehensive MCE (marine cum erection) Insurance Policy for

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	total project supply & services including balance of plant package covering transit risks & loss, destruction or damage during handling at Site, Storage, civil works ,erection, testing and commissioning up to trial operation completion of unit including theft, sabotage, fire, lightning and other natural calamities.
43.2	Contractor shall report to BHEL in writing any damages to equipment/components on receipt, storing, and during withdrawal of the materials from stores, in transit to site and unloading at place of work and during erection and commissioning till trial operation completion including handing over. The above report shall be as prescribed by BHEL site management. Any consequential loss arising out of non-compliance of this stipulation will be borne by contractor.
43.3	The contractor will take necessary precautions/ due care to protect the material at Project site, while in his custody from any damage/ loss till the same is handed over to BHEL / customer at Project site. For lodging/ processing of insurance claim the contractor will submit necessary documents. BHEL will reserve the right to recover the loss from the contractor as detailed below in case the damage/loss is due to negligence/ carelessness on the part of the contractor. In case of theft of material under contractor's custody, the same shall be reported to police by the contractor immediately and copy of FIR and subsequently police investigation report shall be submitted to BHEL / customer for taking up with insurance. However, this will not relieve the contractor of his contractual obligation for the materials in his custody.
43.4	In case the damage/loss/theft of materials are attributable to negligence/failure in discharging the duties and obligations of the contractor, the expenses incurred for repair/replacement of such components in excess of the amount realized from the underwriters, limited to Normal Excess (Deductible Franchise) shall be recovered from the contractor.
43.5	Other conditions of Insurance shall be as per relevant clause of GCC/SCC.
44.0	GUARANTEE
44.1	The works shall be completed to the entire satisfaction of the Engineer and in accordance with the completion schedule as specified in the Contract, and all unused stores and materials, tools, plant, equipment, temporary buildings, site office, labor hutments and other things shall be removed and the site and work cleared of rubbish and all waste materials and delivered up clean and tidy to the satisfaction of then Engineer at the Contractor's expenses.
44.2	The Engineer shall certify to the contractor the date on which the work is completed and the date thereof for commencement of Guarantee Period.
44.3	Guarantee period shall be 12 months from the date of start of guarantee period as per relevant clause of GCC.
45.0	OTHER TERMS
45.1	While bidder's scope include deployment of all resources, like T&P, materials, consumables, manpower including supervision etc for proper completion of the subject job and no sub-contracting for execution of the job is allowed by BHEL, depending on project's requirement and on prior acceptance of BHEL, bidder may associate agencies for deployment of skilled / unskileld manpower only for site execution. Bidder should arrange all resources, like T&P, materials, consumables, supervision etc directly for the subject job.
45.2	Drawing showing enough details for the construction as per the specification shall be furnished to the contractor in a phased manner as far as possible.
45.3	The records / log-books / registers like Site Order Book, Hindrance Register, RMC / Steel Supply and Consumption Register, etc. are to be maintained properly by the vendor duly signed by BHEL representative.
45.4	Customer Specific qualifying requirement for bidder's approval: <i>Bidder should have been in past built at least one (1) reinforced concrete chimney of minimum 100m height.</i> Bidder to consider the above requirement also apart from PQR before submitting the bid.In case of customer's requirement,bidder may have to submit the document in support of the above for submission of the same to customer for approval.
45.5	All other term & conditions of this specification shall be governed by the pertinent provisions of SCC & GCC as applicable.

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ANNEXURE- A
TENTATIVE LIST OF EQUIPMENTS FOR CIVIL SITE LABORATORY

CONCRETE TESTING EQUIPMENT				
SL NO.	NAME OF TEST	NAME OF EQUIPMENT	SIZE OF EQUIPMENT	IS REF.
1	Concrete Compressive test	Digital Compressive Testing Machine with 2000 KN capacity.	2000KN capacity	IS 2505
2	Concrete Cube casting	Concrete Cube Mould	150x150x150mm, minimum 50 sets desired considering Raft/Shell concreting activity. & 70.6 x 70.6 x 70.6 mm, 05 Nos. minimum	IS 10086
3	Workability of concrete	Slump cone	Standard, atleast 04 nos	IS 456
4	Electric mortar mixer	0.25 CUM capacity.	01 no	

Soil Testing Equipment (Levelling & Grading)				
1	Liquid limit test	Liquid limit apparatus	Standard	IS 2720
2	Core Cutter test	core cutter apparatus	Rammer, 4 nos of standard core cutter mould, dolly	IS 2720
3	Proctor density test	Std proctor Compaction apparatus	Standard	IS 2720
4	Moisture Content	Rapid moisture meter	Standard, atleast 04 nos	IS 2720

Process Control Accessories				
1	Hot air oven	Temperature range 50° C to 300° C	600x600x600mm (min. size)	
2	Electronic balance	1 no.	1Kg x 0.001g	
3	Physical balance	5 kg capacity	Weights upto 5 kg	
4	Thermometer	Temperature range 0° C to 150° C	Digital	
5	GI tray	03 nos	600x450x50mm, 450x300x40mm, 300x250x40mm	
6	Measuring jars	2 nos set of each size	100ml, 200ml, 500ml & 1000 ml	
7	Gauging trowlers	2 nos	100mm & 200 mm with wooden handle	
8	Spatula	2 nos each size	100mm & 200 mm with long blade wooden handle	
9	Stainless steel scoop	2 nos each	1 kg and 2 kg	
10	Digital pH meter	01 nos	.01 mm least count	
11	Digital paint thickness meter for steel	02 nos	500-micron Range	
12	Digital paint thickness meter for masanory/concrete painting measurement	02 nos	150-micron range	

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Other lab equipments

SL NO.	NAME OF TEST	NAME OF EQUIPMENT	SIZE OF EQUIPMENT	IS REF.
1	Initial & final setting time, Consistency of cement	Vicat Apparatus with desk pot	Standard	IS 5513
2	Abrasion value test	Los Angeles Abrasion testing machine	Standard	IS 2386
3	Aggregate Impact value test	Aggregate Impact value testing machine.	Standard	IS 9377
4	Aggregate crushing value test	Crushing value apparatus	Standard	IS 2386
5	Flakiness index	Thickness gauge for measuring flakiness index.	Standard	IS 2386
6	Elongation Index	Elongation gauge	Standard	IS 2386
7	Bulk density, voids and bulking apparatus	Measuring cylinders	3, 5, 10 & 15 liters cylinders	
8	Specific gravity of aggregates	Pycnometer	Standard, at least 02 nos	IS 383
9	Cement mortar vibration	Motorised vibration machine for cement cube casting	Standard	IS 4031
10	Course aggregate Sieve analysis (Ready mix concrete & Road Works)	Sieve set	450mm dia GI Frames Size: 125 mm, 90 mm, 75 mm, 63 mm, 53 mm, 40 mm, 20 mm, 16 mm, 12.5 mm, 10 mm, 4.75 mm, Pan and cover (2 Sets)	IS 383
11	Fine aggregate sieve analysis	Sieve set	200 mm dia Brass sieves; Size 4.75 mm, 2.36 mm, 1.18 mm 600 micron, 300 micron, 150 micron, 75 micron, 75 micron, Pan and cover (2 Sets)	IS 383
12	Sieve Shaker	Motorised Sieve shaker	Mfg. Catalogue	
13	Silt content check	Sand silt content beaker	Standard	

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ANNEXURE- B

LIST OF STRUCTURAL DETAILER FOR CHIMNEY

SI No.	Name of the Agency & Address	Previous Work
1	Prabhoo structure Consulting Engineers, Delhi Ph – 011-26186829	Telangana / Rourkela / Unchahar / North Karanpura 2
2	A E Automation, Chennai Ph - 9789859983	Bhadradi, Chimney - 2
3	Bharat Construction Co., Kolkata / Ranchi / New Delhi Ph - 7857800001	Ennore SEZ
4	ADS Engineering Consultant, Kolkata Ph - 8826778359	Bhadradi, Chimney – 1 / Bokaro / North Karanpura 1&3
5	Ennar Structural Design consultant, Chennai	Korba / Marwa
6	Valtrack System Pvt Ltd., Chennai	North Chennai
7	Progressive Drafting Service, Delhi Ph - 8045132348	Barauni
8	Talent Associates, Delhi	Panipat

Note: The above list is indicative and not exhaustive and is for tender purpose only.

The list of vendors mentioned hereunder may preferably be considered for the following items. However, in case the bidder proposes to procure items from other suppliers, specific approval may be required to be taken.

Sl. No.	Item description	Probable vendors
1	CONSTRUCTION CHEMICALS – ADMIXURES, PLASTISIZERSS ETC.	SIKA INDIA LIMITED CICO TECHNOLOGIES LIMITED FOSROC CHEMICALS (I) PVT LTD, BSF
2	PAINT AND PAINTING SYSTEM	BERGER SHALIMAR PAINTS JENSON AND NICHOLSON KANSAI NEROLAC AKZO NOBEL ASIAN PAINTS
3	MINERAL WOOL FOR THERMAL INSULATION	ROCKWOOL INDIA LIMITED, HYDERABAD ROCKWOOL INDUSTRIES, BHILAI LAPINUS, MALANPUR (MP) MINWOOLRAJANANDGAON LLOYD INSULATION, BHILAI U.P. TWIGA, BULEND SHAHAR