भारत हेवी इलेक्ट्रिकल्स लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT HEAVY ELECTRICALS LIMITED
(A Govt. of India Undertaking)

TCN - 04

Ref: PSER:SCT:LPT-A1114:TCN-04 Date: 20-09-2010

Sub	Tender change notice (TCN) 04.	
Job	Civil, structural, architectural work including piling work of main plant, BOP etc; erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSH, associated piping, associated electrical, associated C&I etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam.	
Ref	1.0	Tender no PSER:SCT:LPT-A1114:10.
	2.0	BHEL's NIT, vide reference no PSER:SCT:LPT-A1114:2310, dated 23-07-10.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT:LPT-A1114:TCN-01, dated 16-08-10.
	4.0	BHEL's TCN-02, vide reference no PSER:SCT:LPT-A1114:TCN-02, dated 30-08-10.
	5.0	BHEL's TCN-03, vide reference no PSER:SCT:LPT-A1114:TCN-03, dated 08-09-10.
	6.0	All other pertinent issues till date.

With reference to above, following points/ documents, relevant to tender, may please be noted and complied with while submitting offer.

1.0 The scope also includes enabling work, part balance of plants (BOP). In view of this broad scope/ name of work shall stand revised as `Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam.'

2.0 Notwithstanding quantities specified anywhere in the tender volumes, it is clarified that the scope includes 2 nos utility boilers, 2 nos HRSGs, 2 nos GTGs, 1 no STG, electrical, C&I, AC, elevator, enabling, construction power network etc.

3.0 Revised Price Schedule, Volume-IIIA-R-1 enclosed, superseding previous version. Bidder shall submit offer as per the revised price schedule.

4.0 Revised Volume-ID&II-P-1-C+S-R-1, Volume-ID&II-P-2-UB-HRSG-R-1 and Volume-ID&II-P-3-GTG+STG+E+C&I-R-1 enclosed, superseding previous versions.

5.0 Inclusion of specification for enabling works, vide Volume-ID&II-P-4-EW-R-0.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)
POWER SECTOR EASTERN REGION, DJ-9/1, SECTOR-II, SALT LAKE CITY, KOLKATA - 700 091
फैक्स/Fax : (033) 23211960 फोन/Phone : बोर्ड/EPABX : 23211691, 23211798, 23211796

6.0 Inclusion of specifications for AC System, vide Volume-ID&II-P5-AC-R-0. Bidder to note that though complete specification for the said system is included, the scope of supply & execution shall be as per the items referred in price schedule, Volume-IIIA-R-1.

7.0 Inclusion of specification of elevator system, vide Volume-ID&II-P6-E-R-0.

8.0 Bidder to note that the scope of civil & structural work includes piling & associated items. In view of this, pre-qualifying criteria under Annexure-1A (With piling) issued vide TCN-03 shall only hold good and Annexure-1B (Without piling) issued vide TCN-03 shall be treated as cancelled. Moreover, since the scope is made for driven pile, Annexure-IA stands modified as per enclosed Annexure-IA-R-1 suiting to type of pile covered under the scope of this tender.

9.0 Revised `No deviation certificate' as per enclosed Annexure-2. Bidder shall submit no deviation certificate as per enclosed format only.

10.0 All other terms & conditions shall remain unchanged.

Thanking you,

Yours faithfully,
for BHARAT HYEAVY ELECTRICALS LTD

SDGM (SCT)

Encl

1.0 As above.

ANNEXURE-1A, REV-1 (WITH PILING)

JOB	CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP ETC AND ERECTION, TESTING, COMMISSIONING ETC OF 2x80 TPH UTILITY BOILER & AUX, 2x80 TPH HRSG & AUX, 2xFR5 GTG & AUX, 1x13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I ETC FOR 53 MW COMBINED CYCLE POWER PLANT AT BCPL, LEPETKATA, ASSAM.
TENDER NO	PSER:SCT:LPT-A1114:10.

SL NO	CRITERIA	REFERENCE ANNEXURE NO OF SUPPORTING DOCUMENT
A.0	PRE-QUALIFYING CRITERIA	
1.0	BIDDERS SHOULD HAVE AVERAGE ANNUAL TURNOVER OF MINIMUM Rs 15.06 CRORE IN LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 31-03-2010 AND MUST HAVE EARNED PROFIT IN ANY ONE OF LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 31-03-2010 & SHOULD HAVE POSITIVE NET WORTH AS ON 31-03-2010. AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT OF THE COMPANY NEED BE SUBMITTED FOR LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 31-03-2010 IN SUPPORT OF THIS REQUIREMENT. IN CASE AUDITED BALANCE SHEET FOR THE FINANCIAL YEAR, ENDING ON 31-03-2010 IS NOT AVAILABLE, BIDDERS SHALL FURNISH AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT FOR LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 31-03-2009. IN SUCH CASE, ABOVE CRIETERIA SHALL BE READ AS FOLLOWS. BIDDERS SHOULD HAVE AVERAGE ANNUAL TURNOVER OF MINIMUM Rs 15.06 CRORE IN LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 31-03-2009 AND MUST HAVE EARNED PROFIT IN ANY ONE OF LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 31-03-2009 AND SHOULD HAVE POSITIVE NET WORTH AS ON 31-03-2009. AUDITED BALANCE SHEET AND PROFIT & LOSS ACCOUNT OF THE COMPANY NEED BE SUBMITTED FOR LAST 3 (THREE) FINANCIAL YEARS, ENDING ON 31-03-2009 IN SUPPORT OF THIS REQUIREMENT.	
2.0	BIDDER SHOULD HAVE EXECUTED CIVIL & STRUCTURAL OR CIVIL WORK IN ANY INDUSTRIAL/ INFRASTRUCTURAL PROJECT DURING LAST 7 (SEVEN) YEARS, ENDING ON LAST DUE DATE OF SUBMISSION OF OFFER, VALUE OF WHICH SHOULD BE ONE OF THE FOLLOWING. IN CASE OF EXECUTION, THE VALUE OF EXECUTED PORTION OF THE JOB SHALL AT LEAST CORRESPOND TO THE RESPECTIVE VALUES SPECIFIED BELOW. RELEVANT DOCUMENT IN SUPPORT OF ABOVE SHALL BE SUBMITTED.	
2.1	3 (THREE) WORKS COSTING NOT LESS THAN Rs 12.11 CRORE EACH.	
OR		
2.2	2 (TWO) WORKS COSTING NOT LESS THAN Rs 15.14 CRORE EACH.	
OR		
2.3	1 (SINGLE) WORK COSTING NOT LESS THAN Rs 24.23 CRORE.	
3.0	ERECTION, COMMISSIONING ETC OF ANY HRSG OR WHRB OR UTILITY BOILER OF 40 TPH OR ABOVE RATING IN ANY INDUSTRIAL/ INFRASTRUCTURAL PROJECT AND STG OR GTG OF 10 MW OR ABOVE RATING IN ANY INDUSTRIAL/ INFRASTRUCTURAL PROJECT DURING LAST 7 (SEVEN) YEARS, ENDING ON LAST DUE DATE OF SUBMISSION OF OFFER.	

4.0	BIDDER SHOULD HAVE EXECUTED ELECTRICAL & C&I OR ELECTRICAL OR C&I WORK IN ANY INDUSTRIAL/ INFRASTRUCTURAL PROJECT DURING LAST 7 (SEVEN) YEARS, ENDING ON LAST DUE DATE OF SUBMISSION OF OFFER, VALUE OF WHICH SHOULD BE ONE OF THE FOLLOWING. IN CASE OF EXECUTION, THE VALUE OF EXECUTED PORTION OF THE JOB SHALL AT LAEST CORRESPOND TO THE RESPECTIVE VALUES SPECIFIED BELOW. RELEVANT DOCUMENT IN SUPPORT OF ABOVE SHALL BE SUBMITTED.	
4.1	3 (THREE) WORKS COSTING NOT LESS THAN Rs 0.82 CRORE EACH.	
OR		
4.2	2 (TWO) WORKS COSTING NOT LESS THAN Rs 1.03 CRORE EACH.	
OR		
4.3	1 (SINGLE) WORK COSTING NOT LESS THAN Rs 1.65 CRORE.	
5.0	BIDDER SHOULD HAVE EXECUTED/ EXECUTING FOLLOWING JOBS IN CONSTRUCTION OF ANY INDUSTRIAL/ INFRASTRUCTURAL PROJECT DURING LAST 7 (SEVEN) YEARS, ENDING ON LAST DUE DATE OF SUBMISSION OF OFFER. RELEVANT SUPPORTING DOCUMENT SHALL BE SUBMITTED IN THIS REGARD.	
5.1	CIVIL & STRUCTURAL JOB OF PILING, EQUIPMENT FOUINDATIONS (INCLUDING GTG/ STG FOUNDATION), ETC FOR A UNIT OF RATING 10 MW OR ABOVE IN ANY INDUSTRIAL/ INFRASTRUCTURAL PROJECT. IN CASE OF EXECUTION, JOB SHALL BE COMPLETED AT LEAST TO THE EXTENT OF 700 NO OF DRIVEN CAST-IN-SITU RCC PILES, COMPLETION OF FOUNDATION OF GTG/ STG AND 800 MT FABRICATION & ERECTION OF STRUCTURAL STEEL.	
5.2	7.5 MVA TRANSFORMER.	
5.3	3.3/ 6.6 KV BUSDUCT.	
5.4	3.3/ 6.6 KV SWITCHGEAR.	
5.5	DCS BASED C&I WORK.	
6.0	BIDDER SHOULD HAVE VALID PAN. RELEVANT DOCUMENT IN SUPPORT OF ABOVE SHALL BE SUBMITTED.	
7.0	IN CASE OF CONSORTIUM BIDDING, FOLLOWING POINTS SHALL BE COMPLIED. RELEVANT SUPPORTING DOCUMENT SHALL BE SUBMITTED.	
7.1	NO OF CONSORTIUM PARTNER(S) INCLUDING PRIME BIDDER SHALL NOT BE MORE THAN 3.	
7.2	PRIME BIDDER SHALL COMPLY WITH CRITERIA UNDER SL NO 1.0.	
7.3	PRIME BIDDER SHALL COMPLY WITH ANY ONE CRITERION OUT OF 2.0 & 3.0 ABOVE AND CONSORTIUM PARTNER SHALL COMPLY WITH BALANCE CRITERION OUT OF 2.0 & 3.0 ABOVE.	
7.4	PRIME BIDDER SHALL COMPLY WITH AT LEAST ONE OF THE CRITERIAS UNDER SL NO 4.0, 5.1, 5.2, 5.3, 5.4 & 5.5 AND CONSORTIUM PARTNER(S) SHALL COMPLY WITH THE BALANCE CRITERIA(S).	
7.5	PRIME BIDDER AND CONSORTIUM PARTNER EACH SHALL COMPLY WITH CRITERIA UNDER SL NO 6.0.	
7.6	PRIME BIDDER SHALL ENTER INTO CONSORTIUM AGREEMENT ALONG WITH CONSORTIUM PARTNER(S).	
B	GENRAL REQUIREMENT	
1.0	AFTER SATISFACTORY FULFILLMENT OF ALL THE ABOVE CRITERIA, OFFER(EITHER SOLE BID OR CONSORTIUM BID) SHALL BE CONSIDERED FOR FURTHER EVALUATION AS PER NIT AND ALL OTHER TERMS OF THE TENDER.	
2.0	CONSIDERATION OF OFFER WILL BE SUBJECT TO CUSTOMER'S APPROVAL OF PRIME BIDDER AS WELL AS CONSORTIUM PARTNER(S) (IN CASE OF CONSORTIUM BIDDING).	

NOTE

1.0 BHEL RESERVE THE RIGHT TO INCLUDE OR EXCLUDE THE SCOPE OF PILING AND ASSOCIATED ITEMS IN OR FROM THE SCOPE OF THE TENDER. BIDDER TO QUOTE THEIR RATES IN CONSIDERATION TO THIS IN THE COMMON PRICE SCHEDULE. IN VIEW OF ABOVE, ANNEXURE-1 (QUALIFYING CRITERIA) HAS BEEN MODIFIED IN TWO PARTS (I) ANNEXURE-1A (WITH PILING) AND ANNEXURE-1B (WITHOUT PILING).

2.0 DEPENDING ON BIDDER'S CREDENTIAL TO COMPLY WITH EITHER OF 2 CRITERIA (ANNEXURE-1A OR ANNEXURE-1B), INTENDED BIDDERS MAY SUBMIT THEIR OFFER EITHER FOR INCLUSIVE OF PILING COMPLYING IN SEALED ENVELOPES.

3.0 BIDDER SHALL SUBMIT ABOVE PRE-QUALIFICATION CRITERIA FORMAT, DULY FILLED-IN, SPECIFYING RESPECTIVE ANNEXURE NUMBER AGAINST EACH CRITERIA AND FURRNISH RELEVANT DOCUMENT IN THE RESPECTIVE ANNEXURES IN THEIR OFFER.

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These special conditions, applicable for civil/ struictural portion of work, shall be construed as part of tender document and shall be read along with general conditions of contract (GCC), Volume-II and other volumes of tender. In case of any conflict or inconsistency between GCC, Volume-II, other volumes and these special conditions contract (SCC), the same shall be brought out by the bidder in writing to BHEL for clarification, failing which most stringent interpretation/ clause in favour of BHEL shall be adopted and the same shall be binding to the bidder.

CLAUSE NO	DESCRIPTION
1.0	**PROJECT SYNOPSIS AND GENERAL INFORMATION**
1.1	Details of proposed stage/ units
	The proposed 53 MW Combined Cycle Power Project at Lepetkata being set up by Brahmaputra Cracker and Polymer Ltd (BCPL), Assam. The site is approachable by road. The information given hereunder is for general guidance and shall not be contractually binding on BHEL.
1.2	APPROACH TO SITE
	The proposed project site is located at Lepetkata, Assam. Nearest important town: Dibrugarh (15 km). Nearest railway station: Dibrugarh (15 km). Proposed railway approach: Proposed Dibrugarh-Moran Rail link. Nearest airport: Dibrugarh (25 km). Nearest highway milestone: Tinsukia-Dibrugarh-Sibsagar (NH-37), 500 M.
1.3	Owner: Brahmaputra Cracker and Polymer Ltd (BCPL).
2.0	**SITE VISIT**
	Contractor should visit project site and acquire full knowledge and information about site conditions. The bidder must visit site, to acquaint himself with the conditions prevailing at site and in and around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.
3.0	**NAME OF WORK**
3.1	Civil, structural, architectural work including piling, foundation, superstructure of various various plant equipments, systems, facilities, non-plant buildings, misc civil/ structural work etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam.
3.2	Civil, structural, architectural work including foundations/ superstructure of various plant equipments/ systems/ facilities, non-plant buildings/ facilities, misc civil work, switch yard etc.
3.3	The work to be performed under the scope of this tender mainly consists of but not limited to complete civil, structural and architectural work and their maintenance for specified period of the following plant buildings, structural equipment foundations and other miscellaneous structures.
3.3.1	Buildings.
3.3.1.1	GTG hall.
3.3.1.2	STG hall cum switchgear cum control building.
3.3.1.3	DG room.
3.3.1.4	Analyzer rooms
3.3.1.5	SWAS rooms
3.3.1.6	CCTV guard room.
3.3.1.7	Deaerator and BFP structure.
3.3.1.8	Transformer yard.
3.3.2	Foundations for the following equipment.
3.3.2.1	Main equipment
3.3.2.1.1	STG.
3.3.2.1.2	GTG – 2 nos.
3.3.2.1.3	HRSG - 2 nos.
3.3.2.1.4	Utility boiler - 2 nos.
3.3.2.1.5	DG foundation.

3.3.2.1.6	Water cooled condenser.
3.3.2.1.7	Main stack and bypass stack foundations.
3.3.2.1.8	GT, ST, station power and LT aux transformer.
3.3.2.1.9	FD fans by pass stacks foundations for GTG & HRSG.
3.3.2.1.10	Inlet air filter & duct supports for GT & gen.
3.3.2.1.11	GTG & bypass stack auxiliaries.
3.3.2.1.12	HRSG aux.
3.3.2.1.13	STG aux.
3.3.2.2	Fuel gas system for GT.
3.3.2.2.1	Gas conditioning skid.
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3.3.2.5.7	Feed water pumps for boiler.
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3.3.2.6.2	Chilled water pumps.
3.3.2.6.3	CW pumps.
3.3.2.6.4	Condensate tank.
3.3.2.6.5	Transfer pumps.
3.3.2.6.6	AHU.
3.3.2.6.7	Over head make up water tank.
3.3.3	Foundation & super structure for the following.
3.3.3.1	Pipe rack cum cable rack.
3.3.3.2	Deaerator.
3.3.4	Construction of following services.
3.3.4.1	Approach road & road work within the power plant area.
3.3.4.2	Storm Water drains.
3.3.4.3	Oily sewer system.
3.3.4.4	Contaminated rain water system.
3.3.4.5	Sanitary sewer system.
3.3.4.6	Service water lines.
3.3.4.7	RCC cable & pipe trenches including inserts & pre-casts cover slabs.
3.3.4.8	Pipe sleepers.
3.3.4.9	Concrete paving.
3.3.4.10	Civil works related to fire fighting, A/C, ventilation etc.
3.3.5	Structural platforms, monorail beams, walkways, crossovers, handrails etc for miscellaneous equipments, piping etc.
3.3.6	Landscaping including sprinkler type irrigation using treated effluent from sewage

	disposal system in areas under this specification.
3.3.7	Switchyard civil work including its associated enabling works.
3.3.8	Any other buildings/ structures required from system considerations.
3.4	Detail of of the scope may also be referred in Volume-II.
3.5	Any buried pipe/ cable coming in the working fronts are to be removed safely by the contractor at no extra cost to BHEL.
3.6	EXCLUSION
3.6.1	Civil works of boundary wall along the plant boundary.
3.6.2	Civil works of complete river water Intake system.
3.6.3	Civil works of gas receiving & metering station.
3.6.4	Civil works of fuel supply lines upto battery limit inside plant.
4.0	**BROAD SCOPE OF WORK**
4.1	The scope shall include other related works although they may not be specifically mentioned in the subsequent clauses and all such incidental items not mentioned, but are necessary for completion of the work as a whole. The scope also includes supply of all labour, technical personnel, materials and equipment for execution of work and getting all materials tested at site laboratory or approved laboratory outside, submitting test reports, arranging supervision etc and execution of the contract with following major areas of work. The work also involves grit blasting of fabricated structures along with painting prior to ereftion. The paint shall be supplied by vendors free of cost. Bidder's quoted rate should be inclusive for these works also.
4.2	The work to be performed under this specification consists of providing all labour, materials, consumables, equipment, temporary works, temporary storage sheds, temporary colony for labour and staff, temporary site offices, constructional 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.
4.3	The scope shall also include setting up by the bidder a testing laboratory in the field to carry out all relevant tests.
4.4	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.
5.0	**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.
6.0	**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.
7.0	**LAND**
7.1	Availability of land within plant boundary is very limited and the contractor has to plan and use the existing land considering the use of land by other mechanical/ electrical 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/ customer and allotted to the extent available/ considered necessary, depending upon the area availability. Contractor shall develop these areas for their site office, covered storage shed, various open yard, fabrication yard, batching plant yard etc including grass/ tree cutting, leveling, grading etc as applicable. Bidder must visit site to assess site condition, prior to quoting.
7.2	Land (around 15000 sqm) for labour colony will be provided inside project boundary wall (in the 'Spare area'), free of cost, depending on availability. The contractor to construct labour colony/ hutment as per their requirements at their own cost. The contractor is to fulfill norms of cleanliness, sanitation, sewerage etc for labour colony, as per site requirement. However, bidder shall also note the following.
7.2.1	A 'kaccha road' passes through the unoccupied area which is used by villagers. Bidder shall ensure that this is not encroached upon while constructing temporary shelters.
7.2.2	These temporary shelters shall be separated from construction/ storage area by providing suitable boundary wall/ fencing and suitable watch & ward shall be provided for security.
7.2.3	Proper sanitation, cleanliness etc shall be maintained at site.
7.2.4	In case required by customer to meet any statutory requirement or otherwise, the land will be vacated without any cost & time implication within a suitable mutually agreed time.
7.2.5	On completion of work & before demobilizing, labour colony shall have to be dismantled, the whole area cleaned and the debris etc removed from the land.
7.2.6	All statutory, legal and contractual requirements shall be complied with while constructing temporary shelters.
7.3	Land for contractor's site office, store, fabrication yard, batching plant, plant material storage will be provided free of cost as per availability within the project premises. The contractor to construct site office, store, fabrication yard as per requirement at their own cost.
7.4	The contractor will be responsible for handing back all lands, as handed over to the by BHEL/ customer.
8.0	**WATER**
8.1	BHEL will provide water connection at one point (about 300 mtr away from work place) free of cost for construction as well as drinking water. Further distribution of pipeline net work is to be arranged by the bidder at his own cost. Contractor will submit work plan showing batching plant, temporary covered cement store 500MT capacity, civil construction office of contractor alongwith toilet, septic tank, soak pits etc, fabrication yard, within twenty days. Contractor will construct civil laboratories, their own offices, strores, erection approaches near each work spot, at their own cost.
8.2	Contractor will arrange for drinking water in their labour colony at his own cost.
8.3	BHEL shall not be responsible for any inconvenience or delay caused due to any interruption of water supply and the contractor shall claim no compensation for delay in work for such interruption. Contractor may make standby arrangement for water for which no separate payment shall be made by BHEL.
8.4	Contractor will have to arrange at his own cost for storage of water near batching plant (minimum 100 cum) to meet day-to-day requirement. Contractor will ensure adequate storage of construction water to meet the requirement of water during major concreting.
8.5	Availability of water (construction as well as drinking) in project is limited. Contractor shall ensure that no water is wasted. In this regard the contractor shall take all necessary measure towards preservation of water.

9.0	**ELECTRICITY**
9.1	Construction power & general illumination network BHEL shall provide construction power at 3 or 4 points free of charge at 415V level (approximately 150 mtr or more away from workplace) within the project premisis. Contractor shall make their own distribution arrangement to draw electricity. The bidder to arrange DG back-up for initial period of three to four months at their own cost. General If any other voltage level (other than normally available) is required, the same shall be arranged by contractor from power supply as above. Contractor will have to provide at his own cost necessary calibrated energy meters (tamper proof, suitably housed in a weather proof box with lock & key arrangement) at point of power supply along with calibration certificate from authorized/ accredited agency for working out the power consumption. In case of recalibration required for any reason, 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.
9.2	The bidder shall have to provide earth leakage circuit breaker at each point wherever human operated electrical drives/ T&Ps are deployed.
9.3	The power supply will be from the available grid. BHEL shall not be responsible for any inconvenience or delay caused due to any interruption of power supply/ variation in voltage level and no compensation for delay in work can be claimed by the contractor due to such non-supply on the grounds of idle labour, machinery or any other grounds.
9.4	Bidder shall arrange sufficient illumination at their own cost in the working areas.
9.5	The contractor should ensure that the work in critical areas is not held up in the event of power breakdown. In the event of breakdown in the electric supply, if the progress of work is hampered, it will be the responsibility of the contractor to step up the progress of work after restoration of electric supply so that overall progress of work is not affected.
9.6	Contractor will arrange power including area illumination inside labour colony at his own cost.
10.0	**CONSUMABLE**
10.1	All consumables, like gas, electrodes, chemicals, lubricants etc required for work, shall be arranged by the contractor at their cost unless otherwise specifically mentioned in the contract.
10.2	All consumables to be used for the job shall have to be approved by BHEL/ customer prior to use.
10.3	In the event of failure of contractor to bring necessary and sufficient consumables, BHEL may arrange for the same at the risk & 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.
11.0	**TEST CERTIFICATES**
	Necessary test certificates of all materials supplied by contractor are to be produced to BHEL prior to use of those materials.
12.0	**MMD**
	The contractor shall provide all (excepting those in BHEL scope) required monitoring and measuring devices (MMD) and handling & transportation equipments for the scope of work covered under these specifications. The MMD shall have test calibration certificate from authorized/ Govt approved agencies. The contractor shall also keep provision of alternate engagement for such MMD so that the work does not suffer when a particular MMD 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.

13.0	**QUALITY CONTROL & QUALITY ASSURANCE**
	Contractor's engineers & supervisors shall be adequately qualified and also inclined to do a quality job. The quality assurance engineer shall co-ordinate all aspects of quality control, inspection, implementation of quality assurance procedures laid down in Quality Plan and technical specification by BHEL. He shall fill up quality assurance log sheets/ formats and submit to BHEL for joint inspection and acceptance. The contractor shall fill up, maintain & preserve the quality records in computerized media. BHEL's authorized representative shall be given free access at all time to such quality related records etc for inspection, review etc.
14.0	**QUALITY ASSURANCE PROGRAMME**
14.1	The contractor shall arrange for suitable quality assurance programme to control all activities pertaining to the scope of work, as necessary. Such programs shall be outlined by the contractor & shall be finally accepted by BHEL. A quality assurance programme of the contractor shall generally cover the following
14.2	Organization structure and qualification data for key personnel of the contractor for the management and implementation of proposed quality assurance programme.
14.3	The procedure for source inspection, incoming raw material inspection, verification of material purchased etc.
14.4	System for maintenance of records.
14.5	General requirements – quality assurance
	All materials, components and equipments covered under the specification shall be procured, manufactured, erected, commissioned and tested, as applicable, at all stages as per comprehensive quality assurance programme. An indicative programme for inspection/ test, to be carried out by the contractor, for some of the major items is given in the respective technical specification.
14.6	Field quality plan will detail out the quality practices and procedures etc to be followed by the contractor's site quality control organization, during various stages of site activities from receipt of material /equipment at site.
14.7	Casting and forgings used for construction shall be of tested quality. Details of results of chemical analysis, mechanical properties test result, as necessary, shall be furnished.
14.8	All welding shall be carried out as per procedure drawn and qualified in accordance with the requirements of ASME Section- 1X/BS4870 or other international equivalent standard acceptable to BHEL
14.9	All welders etc employed on any part of the contract at contractors' work or at site shall be qualified as per ASME Section–IX or BS:4871 or equivalent international standard approved by BHEL/ customer. Such qualification test shall be conducted in presence of BHEL.
14.10	All non-destructive examinations (NDT) shall be carried out in accordance with approved international standard. NDT operators shall be qualified as per SNT-TC-IA (of American society of non-destructive examination) Results of NDT shall be properly recorded and submitted for approval.
14.11	All the purchase specifications for the major bought out items list of which shall be drawn up by the contractor and finalized with BHEL shall be furnished to BHEL for comments and approval before placement of orders.
14.12	BHEL reserves the right to carry out quality audit 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.
14.13	Quality audit/ 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.
14.14	Repair/rectification procedure to be adopted to make any job acceptable shall be subject to the approval of BHEL.
14.15	All the latest relevant IS codes as per technical specification should be available with the contractor at site with in 45 days from the date of placement of LOI.
15.0	**PROJECT MANAGEMENT/ CONSTRUCTION MANAGEMENT**

	To meet the need of construction management at site, contractor shall provide the following services within quoted/ accepted rates.	
15.1	PLANNING & MONITORING	
15.1.1	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 subsystems/ components 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. The network must conform to following overall project schedule. However, further micro break-up of project schedule based on major schedule shall be drawn at site prior to start of work. Bidder should also ensure monitoring of these activities at least weekly basis to start with and on daily basis whenever required by BHEL/ customer.	
	Civil Milestones for 1st unit/ block/ module (Milestones of 2nd unit/ block/ module will be 2 months after 1st unit/ block/ module)	Completion schedule from date of start of work
15.1.1.1	Completion of leveling and grading.	8 months.
15.1.1.2	Readiness of foundation for boiler erection (HRSG-I/II).	6/ 8 months.
15.1.1.3	Readiness of foundation for boiler erection (UT-I/II).	8/10 months.
15.1.1.4	Readiness of foundation for GT (I/ II) erection.	9/10 months.
15.1.1.5	Readiness of GT hall for erection.	12 months.
15.1.1.6	Readiness of STG hall for erection.	15 months.
15.1.1.7	Completion of all civil/structural works for commissioning of STG.	14 months.
15.1.1.8	Completion of contract, ie reconciliation, completion of formalities, for contract closing, winding up of site set up, handing over demobilization etc.	20 months.
15.1.2	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.	
15.1.3	The bidder will have to install three nos PCs (multimedia PC work station Pentium-Duo, 1 GHZ or above, 120 GB HDD, 1GB RAM, 100 MBPS LAN card of HCL/ Compaq/ Zenith or equivalent make with window XP (professional) O/S and required software like MS Office 2007 Professional, AutoCAD 2008, PageMaker (7.0 etc), Adobe PDF Creator with one no laser jet printer compatible for A3 size printing (ink/ cartridge for which to be supplied as and when required, for estimation of the bidder, the consumption may be assumed as 1 cartridge per 2 month), one no laser jet printer compatible for A4 size printing (ink/ cartridge for which to be supplied as and when required, for estimation of the bidder, the consumption may be assumed as 1 cartridge per 3 month) and one A0 plotter with power backup for minimum two computer set at places, as per instruction of BHEL for exclusive use of BHEL. These computers/ printers shall remain contractor's property and they will be allowed to take out the same after completion of the site works. 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. The contractor shall also provide 2 (two) nos computer operators and 4 (four) numbers service staff for miscellaneous service for BHEL's use at site/ Kolkata for reconciliation, progress review & day-to-day planning purpose, documentation etc. This facility to be provided from 1st month from LOI date till original completion period, stipulated in the tender. If contractor fails to provide computer/ printer or 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 prorate basis, from contractor's RA bill or any other dues.	
15.1.3.1	@ Rs 12,000.00 (twelve thousand)/ month for each computer operator.	
15.1.3.2	@ Rs 8,000.00 (eight thousand)/ month for each computer with printer.	

15.1.3.3	@ Rs 6,000.00 (eight thousand)/ month for each service staff.	
15.1.3.4	In the event of the contract period getting extended beyond the stipulated time for reasons not attributable to the bidder. The bidder will be reimbursed at Rs 9,230.00 per month for each computer operator, Rs 6,153.00 per month for each computer with printer and Rs 4,615 per month for each service staff, if the services of computer/ operator/ staff are being used by BHEL.	
15.1.4	The contractor's site office must have facilities of communications like Fax, E-mail, and telephone with STD facility within a month from LOI.	
15.2	PROGRESS REPORTING	
15.2.1	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.	
15.2.2	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.	
15.2.3	The daily work force reports shall clearly indicate the work force deployed, category-wise specifying also the activities in which they are engaged.	
15.2.4	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.	
15.2.5	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 site/ any other location. 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 shall be further responsible for ensuring that suitable steps are taken to meet various targets decided upon such meetings.	
15.2.6	During construction contractor shall take an average thirty colour digital photograph/ slides per month (not less than seven per week) of the works during progress and fifty colour digital photograph/slides of completed facilities.	
15.2.7	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 CD (as per requirement) and handed over to BHEL as per requirement.	
15.3	SITE ORGANIZATION	
15.3.1	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 for supervision 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.	
15.3.2	Following engineering manpower with power plant construction background to be deployed at site by the successful vendor for their day to day supervision etc..	
15.3.2.1	Qualified safety officers with assistants (exclusive for safety supervision for project jobs).	Officer – Two nos.
15.3.2.2	Site supervising engineer and supervisors for leveling grading, piling, civil works.	One no enigineer One nos supervisor
15.3.2.3	Engineer & supervisors for quality inspection	Two nos engineer (civil+strl)

	(civil+strl).	Two supervisors (civil+strl)
15.3.2.4	Site supervising engineer and supervisors for civil works in power block area.	Two nos enigineers Three nos supervisors
15.3.2.5	Site supervising engineer and supervisors for structural job (fabrication & erection).	Two nos enigineers (fab+ern) Two nos supervisors (fab+ern)
15.3.2.6	Planning engineer (power plant erection background)	One
15.3.3	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.	
15.3.4	In the event of non deputation of engineer/ supervisor/ draftsman by the bidder BHEL shall reserve the right to deduct Rs 45,000 per man-month for engineer and Rs 35,000 per man-month for the supervisor from the date of deputation as indicated as above from RA bills. Further induction of manpower regarding site supervisor & site engineer will be decided at site as per requirement. Further induction of manpower regarding site supervisor & site engineer will be decided at site as per requirement.	
15.3.5	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.	
15.3.6	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.	
15.3.7	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.	
15.3.8	The contractor should also submit network programs for the erection of various items. These networks shall show the BHEL hold points (CHP), which have to be cleared by BHEL, or their authorized representatives before further erection can take place. These programs for the erection would clearly identify responsibilities of the contractor and 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.	
15.4	CONSTRUCTION MANAGEMENT	
15.4.1	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 BHEL to tie up detailed resources mobilization plan over the period of the contract matching with the performance targets.	
15.4.2	The program would be jointly finalized by the site in-charge of the contractor with BHEL project coordinator as well as the site-planning representative. The erection program will also identify sequential events matching financial turnover.	
15.4.3	The contractor is liable to furnish all documentary evidences towards payment of Works Contract Tax as and when required by BHEL.	
15.5	WORK & SAFETY REGULATIONS	
15.5.1	The contractor shall ensure the safety of all workmen, materials and equipment either belonging to him or to others working at site. He shall observe safety rules and codes applied by the BHEL at site without exception.	
15.5.2	Passenger lift should have safety cage with multiple rope, ie with safety rope & limit switch.	

15.5.3	Safety nets with hand railings must be provided on all both inside & outside hanging platform of slip-form equipment & hanging platform from brickwork.	
15.5.4	Emergency vehicle must be provided & kept separately as stand-by.	
15.5.5	Non-conformity of safety rules and safety appliances will be viewed seriously and BHEL has right to impose fines on the contractor on each incident/each non-conformity as per details given below:	
	Safety measure	Fine (Rs)
15.5.5.1	Not wearing safety helmet at site.	Rs 50/-
15.5.5.2	Not wearing safety shoes at site.	Rs 50/-
15.5.5.3	Not wearing safety belt while working at higher elevation	Rs 100/-
15.5.5.3	Not providing lifeline of safety belt	Rs 100/-
15.5.5.4	Not using grinding goggles while doing grinding operations	Rs 50/-
15.5.5.5	Not using 24V supply for lighting in confined spaces.	Rs 500/-
15.5.5.6	Improper earthing of welding & other electrical machines.	Rs 500/-
15.5.5.7	Electrical plug not used for hand machines	Rs 100/-
15.5.5.8	Not slinging properly	Rs 200/-
15.5.5.9	Using damaged slings	Rs 200/-
15.5.5.10	Using frayed / broken welding cables	Rs 200/-
15.5.5.11	Non removal of scarp from platforms	Rs 200/-
15.5.5.12	Lifting cylinders without cage	Rs 500/-
15.5.5.13	Gas cutting without taking proper precautions or not using sheet below	Rs 200/-
15.5.5.14	Not maintaing electrical winches properly	Rs 500/-
15.5.5.15	Shorting of fuse links by thick wire	Rs 500/-
15.5.5.16	Over speeding of vehicles within in site premise	Rs 200/-
15.5.5.17	Not having valid driving license for type of vehicle being driven	Rs 500/-
15.5.5.18	Not having valid registration for the vehicle	Rs 500/-
15.5.5.19	Not providing proper barricades/ caution boards	Rs 200/-
15.5.5.20	Not displaying SWL on the lifting equipment	Rs 200/-
15.5.5.21	Sub-contractor not attending safety meeting	Rs 1000/-
15.5.5.22	Improper ladder for climbing up	Rs 500/-
15.5.5.23	Improper scaffolding arrangement	Rs 500/-
15.5.5.24	Engaging child labour for construction work	Rs 1000/-
15.5.5.25	Using domestic LPG cylinder for gas cutting /welding operations	Rs 500/-
15.5.5.26	Not maintaining First Aid Box	Rs 500/-
15.5.6	Any other nonconformity noticed not listed above will also be fined. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the contractor. The amount collected on the above will be ecogniz for giving award to the employee who could avoid accidents by following safety rules. Also, the amount will be spent for improving the safety at site.	
15.5.7	The contractor shall also be responsible for provision of all safety notices and safety equipment required both by the relevant legislation and BHEL, as he may deem necessary.	
15.5.8	The contractor will notify well in advance to BHEL of his intention to bring to the site any container filled with liquid or gaseous fuel or explosive or petroleum substance or such chemicals, which may involve hazards. BHEL shall have the right to prescribe the conditions, under which such container is to be stored, handled and used during the performance of the works and the contractor shall strictly adhere to and comply with such instructions. BHEL shall have the right at his sole discretion to inspect any such container or such construction plant/equipment for which material in the container is required to be used and if in his opinion, its use is not safe, he may forbid its use. BHEL shall entertain no claim due to such prohibition and BHEL shall not entertain any claim of the contractor towards additional safety provisions/conditions to be provided for/constructed as per the BHEL's instructions.	
15.5.9	Further, any such decision of the BHEL shall not, in any way, absolve the contractor of his responsibilities and in case, use of such a container or entry thereof into the site area is forbidden by the BHEL, the contractor shall use	

	alternative methods with the approval of the BHEL without any cost implication to BHEL or extension of work schedule.
15.5.10	Where it is necessary to provide and/or store petroleum products or petroleum mixtures and explosives, the Contractor shall be responsible for carrying-out such provision and/or storage in accordance with the rules and regulations laid down in Petroleum Act 1934, Explosives Act, 1948, and Petroleum and Carbide of Calcium Manual published by the Chief Inspector of Explosives of India. All such storage shall have prior approval of the BHEL. In case, any approvals are necessary from the Chief Inspector (Explosives) or any statutory authorities, the Contractor shall be responsible for obtaining the same.
15.5.11	All equipment used in construction and erection by contractor shall meet Indian/ International Standards and where such standards do not exist, the Contractor shall ensure these to be absolutely safe. All equipments shall be strictly operated and maintained by the Contractor in accordance with manufacturer's operation Manual and safety instructions and as per Guidelines/ rules of BHEL in this regard.
15.5.12	Periodical examinations and all tests for all lifting/ hoisting equipment & tackles shall be carried-out in accordance with relevant provisions of Factories Act 1948, Indian Electricity Act 1910 and associated laws/ rules in force from time to time. A register of such examinations & tests shall be properly maintained by contractor and will be promptly produced as & when desired by BHEL or by the person authorized.
15.5.13	The contactor shall be fully responsible for the safe storage of his and his sub-contractor's radioactive sources in accordance with BARC/ DAE (Bhabha Atomic Research Center/ Department of Atomic Energy, Govt of India) rules and other applicable provisions. All precautionary measures stipulated by BARC/ DAE in connection with use, contractor would take storage and handling of such material.
15.5.14	The contractor shall provide suitable safety equipment of prescribed standard to all employees and workmen according to the need, as may be directed by BHEL who will also have right to examine these safety equipments to determine their suitability, reliability, acceptability and adaptability.
15.5.15	Where explosives are to be used, the same shall be used under the direct control and supervision of an expert, experienced, qualified and competent person strictly in accordance with the Code of Practices/ Rules framed under Indian Explosives Act pertaining to handling, storage and use of explosives.
15.5.16	The contractor shall provide safe working conditions to all workmen and employees at the Site including safe means of access, railings, stairs, ladders, scaffoldings etc. The scaffoldings shall be erected under the control and supervision of an experienced and competent person. For erection, the contractor only shall use good and standard quality of material.
15.5.17	The contractor shall not interfere or disturb electric fuses, wiring and other electrical equipment belonging to BHEL or other contractors under any circumstances, whatsoever, unless expressly permitted in writing by BHEL to handle such fuses, wiring or electrical equipment.
15.5.18	Before the contractor connects any electrical appliances to any plug or socket belonging to the other contactor or BHEL, he shall fulfill following.
15.5.18.1	Satisfy BHEL that the appliance is in good working condition.
15.5.18.2	Inform BHEL of the maximum current rating, voltage and phases of the appliances.
15.5.18.3	Obtain permission of BHEL detailing the sockets to which the appliances may be connected.
15.5.19	The BHEL will not grant permission to connect until he is satisfied that:
15.5.19.1	The appliance is in good condition and is fitted with suitable plug;
15.5.19.2	The appliance is fitted with a suitable cable having two earth conductors, one of which shall be an earthed metal sheath surrounding the cores.
15.5.20	No electric cable in use by contractor/ BHEL will be disturbed without prior permission. No weight of any description will be imposed on any cable and no ladder or similar equipment will rest against or attached to it.
15.5.21	No repair work shall be carried out on any live equipment. BHEL must declare the

	equipment safe and a permit to work shall be issued by BHEL before the contractor carries out any repair work. While working on electric lines/equipments whether live or dead, suitable type and sufficient quantity of tools will have to be provided by contractor to electricians/ workmen/ officers.
15.5.22	The contractors shall employ necessary number of qualified, full time electricians/ electrical supervisors to maintain his temporary electrical installations.
15.5.23	The contractor shall employ trained safety officer to supervise day to day safety aspects of the equipments and workmen, who will co-ordinate with BHEL safety officer. In case of work being carried out through sub-contractors, sub-contractor's workmen/ employees will also be considered as the contractor's employees/ workmen for the above purpose.
15.5.24	The name and address of such safety officer of contractor will be promptly informed in writing to BHEL with a copy to safety officer-In charge before he starts work or immediately after any change of the incumbent is made during currency of contract.
15.5.25	In case any accident occurs during the construction/ erection or other associated activities undertaken by the contractor thereby causing any minor or major or fatal injury to his employees due to any reason, whatsoever, it shall be the responsibility of the contractor to promptly inform the same to BHEL in prescribed form and also to all the authorities envisaged under the applicable laws.
15.5.26	BHEL shall have the right at his sole discretion to stop the work, if in his opinion the work is being carried out in such a way that it may cause accidents and endanger the safety of the persons and/ or property, and/ or equipments. In such cases, the contractor shall be informed in writing about the nature of hazards and possible injury/ accident and he shall comply to remove shortcomings promptly.
15.5.27	The contractor shall not be entitled for any damages/ compensation for stoppage of work due to safety reasons above and the period of such stoppage of work will not be taken as an extension of time for completion of the facilities and will not be the ground for waiver of levy of penalty.
15.5.28	The contractor shall follow and comply with all safety rules of BHEL, relevant provisions of applicable laws pertaining to the safety of workmen, employees plant and equipment as may be prescribed from time to time without any demur, protest or contest or reservation. In case of any inconformity between statutory requirement and Safety Rules of BHEL referred above, the later shall be binding on contractor unless the statutory provisions are more stringent.
15.5.29	In case BHEL is made to pay such compensation then the contractor is liable to reimburse BHEL such amount in addition to compensation indicated above.
15.5.30	These insurance covers have to be taken prior to start of his work at subject project and he shall make available the Policy to Construction Manager, BHEL for necessary verification before commencement of work. However, irrespective of such verification/ acceptance, sole responsibility to maintain adequate insurance cover for his workmen, T&P, assets etc at all times during the period of contract shall lie with the contractor. Regarding the aforesaid insurance cover, the contractor shall directly deal with Insurance Company for all matters regarding the insurance in his scope.
15.6	HEALTH SAFETY & ENVIRONMENT
15.6.1	It is imperative on the part of the contractor to join and effectively contribute in joint measures such as tree plantation, environment protection, contributing towards social up-liftment, conversion of packing woods to school furniture, keeping good relation with local populace etc.
15.6.2	Round the clock experienced paramedical personnel with first aid facility & one ambulance at site to be arranged by the bidder at his own cost. No medical facility within/ near the site shall be provided by BHEL. However, BHEL shall provide one room (without furniture) for use as first aid.
15.6.3	No staff quarter shall be provided by BHEL.
15.6.4	No borrow area for earth shall be arranged/ provided by BHEL.
15.6.5	All individual site erection, temporary approaches required for movement of cranes, trailers, trucks, transit mixers, dumpers, etc shall be arranged by the contractor at his own cost.

15.6.6	The contractor shall solely be responsible for safety, quality, & quantity of material after it is handed over and issued to contractor by the BHEL.
16.0	**TEST CERTIFICATE FOR T&P**
	All T&P, lifting tackles & pulling devices to be deployed by the contractor must bear valid/ latest test certificates for their suitability, and documents shall be preserved at site.
17.0	**ISSUE OF T&P**
17.1	BHEL will provide one no 75 T & 1 no 100T class or above capacity crawler crane for all works under the scope of this tender. Bidder has to indicate his requirement for deployment of this crane at least 3 months in advance. The crane will be provided free of cost during the normal woring hours as stipulated in the crane service contract. The crane may be allowed for use beyond the normal working hours, free of cost, depending on specific approval of Construction Manager, BHEL.
17.2	Crane returned in defective/ damaged condition (defect/ damage occurred during use due to negligence of contractor) shall be rectified promptly to the full satisfaction of BHEL engineer failing which suitable recovery along with BHEL overheads will be made from contractor's bills/ dues.
17.3	BHEL shall provide fuel, lubricants, mobil, cardium compound, hydraulic oil, air and fuel filter etc. on free of cost basis for this crane. Regular maintenance and Break down maintenance (not attributable to the contractor) of the BHEL crane is excluded from the scope of the contractor. However, necessary services as required for shortening/ extending of crane boom are included in the scope of contractor.
17.4	BHEL shall provide crane free of cost. However; if BHEL bears any extra expenditure toword deployment of the crane beyond prescribed hours of operation, the same will be borne by the contractor.
17.5	In case of non-availability of crane to be provided by BHEL due to break down, major overhauls distribution pattern or any other reason, the contractor shall plan/ augment/ alter his activities to meet erection/ commissioning targets in consultation with BHEL and no compensation will be admissible on above ground.
17.6	Consolidation of ground and arrangement of sleepers/ sand bag filling etc for safe operation/ movement of equipment including cranes/ trailers etc shall be the responsibility of the contractor at his cost.
17.7	In the event of BHEL issued T&P, measuring instruments etc. the contractor and BHEL shall maintain joint protocol about the condition of all T&P, instruments etc taken from BHEL's custody and return to BHEL after use. The contractor shall not use this equipment for purposes other than the scope of work given in this tender document. It is the responsibility of contractor to keep these equipments always in working condition and ensure their safe return in working condition to BHEL's store subject to normal wear & tear.
17.8	After use of T&P items issued by BHEL the same shall be returned to BHEL in good working condition subject to normal wear & tear failing which recoveries at the book value of the item or the market rate prevailing at the time of returning the items, whichever is higher shall be made from the payments due to the contractor from BHEL from this contract or from any other contract.
18.0	**INSURANCE**
18.1	BHEL shall arrange comprehensive MCE (marine cum erection) Insurance Policy for 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 each unit including theft, sabotage, fire, lightning and other natural calamities.
18.2	Bidder shall timely intimate despatches to the underwriter. The name of the underwriter and Policy No shall be intimated in due course of time.
18.3	Bidder shall be responsible for timely submission of loss/ damage/ theft to the underwriter, assistance in lodging & settlement of claim for losses/ damages/ theft/ lodging of FIR with police. Any consequential loss arising out of non-compliance of this stipulation will be borne by bidder.

18.4	It is bidderr entire responsibility to insure bidderr workmen against accident and injury while at work as required by the relevant rules and to pay compensation, if any, to bidder workmen as per workmen's compensation act. Bidder has also to insure his staff against accident/ injury. Bidder have to take insurance cover for his tools & plants, assets etc.
18.5	These insurance covers have to be taken prior to start of work at project and bidder shall make available the policy to Construction Manager, BHEL site for necessary verification before commencement of work. However, irrespective of such verification/ acceptance, the sole responsibility to maintain adequate insurance cover for his workmen, T&P, assets etc at all times during the period of contract shall lie with bidder. Regarding the aforesaid insurance cover, bidder shall directly deal with the Insurance Company for all matters regarding the insurance in his scope.
18.6	Bidder 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, bidder will submit necessary documents. BHEL will reserve the right to recover the loss from bidder as detailed below in case the damage/ loss is due to negligence/ carelessness on his part. In case of theft of material under his custody, the same shall be reported to police by bidder 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 bidder of his contractual obligation for the materials in his custody.
18.7	It will be his responsibility to replenish the items lost/ damaged in time without hampering the schedule of work and without waiting for settlement of insurance claim. Amount received from the underwriters on settlement of insurance claim shall be passed on to bidder as and when available.
18.8	In case the claim is summarily rejected by the underwriters due to his WILFUL NEGLIGENCE and bidder fail to replenish the items lost/ damaged, the entire cost of repair/ replacement will be recovered from bidder.
18.9	Other conditions of Insurance shall be as per relevant clause of GCC.
19.0	**MATERIAL HANDLING (BHEL ISSUED MATERIAL)**
19.1	Cement, reinforcement (TMT bar) and structural steel (plate/ ISMB/ channel/ angle) only will be issued free of cost by BHEL for use in the work covered in this contract. All other materials required for proper completion of job shall be provided by contractor and quoted rates shall be inclusive of this.
19.2	Consignment of cement & steel will be directly issued to the contractor as received by BHEL, on weighment basis from its supplier, as per delivery challan of supplier.
19.3	Due to urgency, it may be required that an approximately quantity of 2000 MT of steel might have been unloaded & handled by BHEL through other agency. This amount of steel will be handed over to the successful bidder of this tender by BHEL through the respective unloading agency.
19.4	It would be the responsibility of the contractor to keep in constant contact with BHEL/ site to find out the delivery status, arrival of the consignments and arrange for escort to accompany the truck/ trailor for transportation of above materials by BHEL'S supplier, as necessary. The lorry, truck way bill for the consignment as shall be received by BHEL would be handed over to the contractor immediately for unloading of materials including all arrangement for necessary gate passes etc. All arrangement for necessary gate passes etc shall be the responsibility of contractor.
19.5	Payment of all demurrages that may result due to contractor's fault/ delay would be the responsibility of the contractor. If BHEL have to make payment of demurrage together with freight, the amount so paid as demurrages for the reasons stated above, shall be recovered from the bills of the contractor. The decision of BHEL's engineer in this regard will be final and binding on the contractor. However the contractor has to clear all such charges, if any in this regard and complete the job without waiting for BHEL's decision.
19.6	It would be the responsibility of the contractor to sign on the delivery book acknowledgement slip of supplier/ transport authorities etc.

19.7	Consignments coming on Sundays and holidays are also required to be handled/ unloaded by the contractor. Since the offices and stores will probably remain closed on such days, it will be the responsibility of the contractor to contact BHEL engineers at their residence and obtain instructions.
19.8	Since the consignments are expected to arrive during any time of the day or night, contractor shall have, his workmen round the clock at site as well as other places as required to unload the materials immediately on arrival.
19.9	Unloading of materials at the storage yard or at places designated by BHEL, stacking & restacking, shifting & resifting, using contractor's own cranes, trailers and other equipments with the valid road permit for their operation, unloading and stacking etc shall be responsibility of the contractor under this contract. All materials/equipments 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/ wooden sleepers required for stacking the materials shall be arranged by contractor (successful bidder of this package) at his own cost. All other material handling equipments like winches, d-shackles, slings of various sizes, max puller, pulley blocks, jacks, trucks, tailors etc required for such material handling of steel, cements etc shall be arranged by contractor within quoted/accepted rates.
19.10	It will be the responsibility of the contractor to submit computerized account of all such consignments of materials received by them, daily to BHEL.
19.11	BHEL reserve the right to recover from the contractor any loss arising out of damage/ theft or any other causes of the materials issued to him at any point.
19.12	Open land (very limited space) for storage shall be provided by BHEL on free of cost basis. Temporary barbed wire fencing of the steel storage yard, batching plant area, reinforcement bending yard area etc are 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-keepment 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, to safeguard all free issue materials in his custody. Materials issued will be used only for construction of permanent work. The contractor shall take care of material issued by BHEL and shall protect the same from theft, damage and weathering.
19.13	The contractor shall construct waterproof cement store (capacity minimum 500 MT or 500 sqm area) as indicated above for storing and stacking of cement, CGI/ asbestos roofing (slope) with brick masonry wall, PCC flooring. Materials required for the same shall be provided by contractor at his own cost. Cement has to be kept over wooden raised platform. Stacking of cement is to be done as per IS codes with proper illumination and locking arrangements.
19.14	The contractor shall in no case be entitled for any compensation or damages on account of any delay in supply or non-supply thereof for all or any such material.
19.15	Clotting of cement and excessive rusting of steel must be avoided. In case, due to any cause attributable to the contractor, such clotting of and/ or rusting of steel occur rendering the same unusable, then such quantity of cement/ steel shall be recovered from the interim payment at the penal rate specified in the tender.
19.16	No material shall be issued to the contractor except as those indicated above, ie cement and steel unless otherwise expressly provided for in the contract. Contractor will have to make his own arrangement at his own cost for procurement of any other material as required for the works and of such quality as acceptable to BHEL.
19.17	The contractor shall maintain proper store account for all the BHEL issued materials and shall give three copies of monthly computerised reconciliation statement of such account to the BHEL.
19.18	Contractor shall carry out in complete association with BHEL, material management functions and execution like day to day update of materials, issued to contractor, accounting for surplus/ scrap material returned etc. These functions shall also be carried out through computerised system utilizing suitable software. Contractor

	shall provide experienced software personnel to associate on dedicated basis for efficient discharge of the same.
19.19	The contractor shall solely be responsible for the safety & quality of material after it is handed over and issued to contractor by BHEL.
19.20	BHEL issued materials shall not under any circumstances taken out of the project site unless otherwise permitted by BHEL.
19.21	All the necessary lifting tackles, cranes, hydra, tools & plants including tractors, trailers, trucks, pulley blocks, jacks, winches, wire ropes etc, of suitable capacities and other equipments incidental to carry out this work shall have to be arranged by the contractor at his cost. BHEL engineer reserves the right to inspect lifting tackles and equipment before allowing their use. Such approval however shall not relieve the responsibility of the contractor to ensure safe handling of equipment taking the precautions to avoid any accident and damage to other equipment and personnel.
19.22	No separate rate will be applicable for the above job. The contractor will quote the rate for the items inclusive of all charges for the above job. The contractor shall organise despatch & transport steel materials through supplier and unload & receive the materials as above as per requirement decided by BHEL and in this case the decision of BHEL will be final.
20.0	**ISSUE OF MATERIALS**
20.1	ISSUE OF CEMENT
20.1.1	Cement as received from the manufacturer/ stockiest will be issued free of cost to the contractor. The theoretical weight or each bag of cement for issued purposes will be considered as 50 kg, the contractor shall be accountable for the cement issued to him on this notional weight only. No claim whatsoever will be entertained because of difference between theoretical and actual weight of the bags of cement.
20.1.2	The empty cement bags duly accounted for against issue shall be the property of the bidder and the same shall be disposed by the bidder as per statutory regulation prevailing in the project.
20.2	ISSUE OF STEEL
20.2.1	The steel shall be issued to the contractor free of cost on the following basis.
20.2.1.1	MS structural steel (plates, angle, channel, ISMB) materials – Weighment basis (unit – MT).
20.2.1.2	Reinforcement steel and earthing rod (MS round) – Weighment basis (unit – MT).
20.2.2	All the steel (structural steel, reinforcement, earthing & MS rod) issued by the 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 and lugs. The measurement for payment as well as for accounting shall be based on the sectional weights as indicated in the following IS specifications. IS: 808-1964 - Beams, channels and angles IS: 1730-1961 - Plates Reinforcements - Fe-500 confirming to IS: 1786. or grade-1 of IS:432 (part-I)
20.2.3	In case any such sectional weights are not available in the above documents, the manufacturer recommendation shall be binding.
20.2.4	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.
20.2.5	In case MS flats as required in the fabrication of structures are not available, the contractor shall cut such width out of the available MS plates to make flats at no extra cost till such material is available and procured by BHEL.
20.3	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.
20.4	The contractor shall submit to the engineer, a statement indicating estimated quantity of cement and steel required at least two months in advance. 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.		
20.5	Bidders to ensure that no lamination materials are taken over by them from BHEL. Fabrication wastage, if any due to above, shall not be compensated by BHEL		
20.6	Bidder to note that all fasteners like MS/ HT/ HSFG bolts/ nuts, lock nuts, washers etc shall be supplied by the bidder as per applicable item of Price Schedule.		
20.7	Bidder to note that cement and steel required for his enabling job like store/ site office etc shall be arranged at his own cost. All TG staging material shall be arranged by contractor at his own cost. Bidder shall do the design for its structure just immediately after receipt of TG deck drawing and obtain approval from BHEL.		
21.0	**RETURN OF MATERIALS**		
21.1	RETURN OF CEMENT		
21.1.1	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 weighment basis.		
21.2	RETURN OF STEEL INCLUDING SCRAP		
21.2.1	All surplus steel and all wastage materials will be taken back on weighment basis.		
21.2.2	Surplus, unused and un-tampered steel shall be sorted section-wise and returned separately for a place directed by BHEL/ engineer within the project area. Return of such materials will not be entitled to any handling and incidental charges.		
21.2.3	All wastage/ scrap (including wastage, unusable scrap) shall be returned to the stores on weighment basis and a receipt obtained for material accounting purposes. Return of such material will not be entitled to any additional cost due handling and transportation and incidental charge.		
21.2.4	Scrap for reinforcement steel and structural steel shall be returned separately		
22.0	**CEMENT AND STEEL CONSUMPTION AND WASTAGE**		
22.1	CEMENT CONSUMPTION		
22.1.1	The theoretical consumption of cement shall be based on the following.		
22.1.1.1	For design mix concrete as per approved design mix.		
22.1.1.2	For nominal mix concrete work, as per minimum cement as specified or as approved by Engineer-in-charge.		
22.1.2	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 Delhi schedule of Rates of CPWD-DSR-2002 unless otherwise specified in the specifications or the drawing of contract of contract or mutually agreed by Engineer-in-charge and contractor.		
22.1.3	Actual consumption = Issue – Surplus/ unused quantity of cement returned in good condition by contractor to store. (No sweep cement will be taken back by BHEL).		
22.2	CEMENT WASTAGE		
22.2.1	Allowable wastage – Two percent (+2%) of theoretical consumption of cement unless specified otherwise in the technical specification.		
22.2.2	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 effected at penal rates.		
22.2.3	Sl no	Cement consumption	Basis of issue & penal recovery
	C-1	Theoretical consumption (without considering any wastage or loss).	Free
	C-2	Actual consumption being Limited to plus two percent (+2%) of aforesaid theoretical consumption towards allowable wastage.	Free
	C-3	Actual consumption beyond two percent (+2%) of above	Penal rate

		(C-1).	
22.3	REINFORCEMENT STEEL & EARTHING MS ROUND CONSUMPTION		
22.3.1	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.		
22.3.2	Actual consumption = Issue – Surplus.		
22.3.3	Surplus = Un-tampered and unused quantity of steel returned by the contractor to BHEL store along-with relevant documents.		
22.3.4	Wastage = Actual consumption – Theoretical consumption.		
22.4	REINFORCEMENT STEEL & EARTHING MS ROUND WASTAGE		
22.4.1	Allowable wastage – (+5%) of the theoretical consumption shall be considered as allowable wastage.		
22.4.2	Wastage and scrap shall be as per actual weighment basis.		
22.4.3	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)	Free
	R-2	Wastage limited to plus five percent (+5%) of aforesaid theoretical consumption (R-1) towards allowable wastage.	Free
	R-3	Wastage beyond five percent (+5%) of the theoretical consumption above (R-1).	Penal rate
22.5	STRUCTURAL STEEL CONSUMPTION		
22.5.1	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.		
22.5.2	Actual consumption = Issue – Surplus.		
22.5.3	Surplus = Untempered, unused, uncut quantity of steel returned by the contractor to BHEL store.		
22.5.4	Wastage = Actual consumption – Theoretical consumption.		
22.6	STRUCTURAL STEEL WASTAGE		
22.6.1	Allowable wastage – 5 % (five 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 theoretical consumption and shall be considered for reconciliation purposes only. But this invisible wastage shall be considered to be included in allowable wastage (i.e. five percent).		
22.6.2	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-2	Wastage limited to plus five percent (+5%) of the aforesaid theoretical consumption (S-1) towards allowable wastage.	Free
	S-3	Wastage beyond five percent (5%) of the aforesaid theoretical consumption (S-1).	Penal rate
22.7	All wastage reinforcement, MS round (for earthing), structural steel shall be returned to BHEL.		
23.0	**RECONCILIATION OF BHEL ISSUED MATERIALS**		
23.1	The contractor shall submit a reconciliation statement of cement and steel issued to him with each RA bill.		

23.2	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 with contractor's custody at site.	
23.3	At the time of submission of bills by the contractor, if it is noticed by BHEL that the wastage is high and calls recovery at the penal rate, then BHEL will proceed for recovery for the excess wastage as per penal recovery rates as specified.	
23.4	The approved drawings/ bar bending schedules are to be considered for the purpose of reconciliation of materials.	
24.0	**RECOVERY OF MATERIAL**	
24.1	If wastage exceeds the specified limit, the recovery of excess wastage shall be made from monthly RA bill at the penal rate stipulated below.	
24.2	PENAL RATE OF MATERIALS	
	Item	Penal rate (Rs)
24.2.1	Cement (OPC/ PPC/ PSC).	7,000/- per MT.
24.2.2	Reinforcement steel and earthing rod etc.	55,000/- per MT.
24.2.3	Structural steel.	65,000/- per MT.
25.0	**CONSTRUCTION OF TEMPORARY OFFICE, STORES ETC**	
25.1	The contractor shall arrange at his own cost cleaning and grass removing of area allotted, construction of his temporary office/ stores, cement godown, fabrication yards 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.	
25.2	BHEL contemplates to provide fabrication yard more that one places within plant premises. However; during execution, based on actual site conditions, requirement and layout and approaches, the above may change suitably.	
26.0	**TOOLS & PLANTS (TO BE PROVIDED BY CONTRACTOR)**	
26.1	Tentative list of T&P to be deployed by contractor for successful completion of work is detailed below. This supersedes corresponding Annexure of Volume-1E	
26.2	It may be noted that the list is not exhaustive and is only for general guidance. The contractor is required to provide all necessary T&P (other than those specified to be provided by BHEL) measuring (calibrated) instruments & handing equipments 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 may have to deploy additional T&P. Quoted rate shall be inclusive of such requirements. However, contractor shall submit deployment plan of all T&P along with tender bid.	
26.3	In the event of any failure of the part of the contractor and as a result progress of work suffered, 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. BHEL will be at liberty to arrange the same at the risk & cost of contractor including transportation cost of same from any of BHEL site/ other agency & charges as applicable shall be deducted from contractor's RA bill. Decision of BHEL in this regard will be final & binding on contractor.	
26.4	Following major T&Ps to be arranged by contractor within the time as indicated against each T&P.	
	Major T&P items	Mobilisation time (from date of intimation for starting the work)
26.4.1	One no crawler cranes 40/45 T capacity	Within 90 days,
26.4.2	One no hydraulic excavator/ Poclain	Within 45 days
26.4.3	One no 20/25 T capacity crawler crane	1st Within 45 days.
26.4.5	4 nos drill machine (all cut)	Within 120 days.
26.4.6	1 nos submerged arch welding machine	Within 60 to 100 days.
26.4.7	4 nos MIG machine	Within 60 to 100 days.
26.4.8	20 nos welding rectifier	Within 60 to 120 days.
26.4.9	20 nos welding rectifier	Within 180 days.
26.4.10	1 no trailor – 15T	Within 100 days.
26.4.11	2 no power driven HSFG bolt tightening m/c	Within 160 to 180 days.

26.4.12	1 no portable automatic concrete batching plant (Output 15 cum/ hr)	To be commissioned within 40 days.
26.4.13	1 no automatic concrete batching plant with printing facility (25 cum/ hr) – to be commissioned at site.	Within 60 days.
26.4.14	3 nos transit mixer (4.5/5/6 M3 capacity)	1st within 40 days, balance within 75 days.
26.4.15	2 nos concrete pump (20 cum/ hr min capacity & lift 70M)	Within 60 to 75 days.
26.4.16	1 no air compressor	Within 45 to 75 days.
26.4.17	2 nos self priming dewatering pump 5 HP (diesel/ electric)	Within 20 days.
26.4.18	One no 10 HP submersible mono-block electric pump (KOS-1040+ of Kirloskar or equivalent),	Within 60 days.
26.4.19	2 nos self priming dewatering pump 2 HP (diesel/ electric)	Within 30 days.
26.4.20	2 nos curing pump – 1.5 /2 HP (pump for curing)	Within 60 days.
26.4.21	1 no dozer.	Within 25 days.
26.4.22	1 no pneumatic hammer.	As per site requirement
26.4.23	Ply shuttering board (3500 sqm) including propping with steel tubular sections/ ACROW pipes	Within 90 days.
26.4.24	5 nos dumper	3 nos within 20 days, balance within 30 days
26.4.25	2 nos reinforcement bending machine	Within 30 days.
26.4.26	2 nos reinforcement cutting machine	Within 30 days.
26.4.29	20,000 RM MS scaffolding pipe	As per site requirement
26.4.30	04 nos power driven earth rammer	Within 60 days.
26.4.31	1 no vibromax (earth compacter)	Within 45 days.
26.4.32	1 no compression testing machine (200 T cap)	Within 45 days.
26.4.33	Civil laboratory equipments as per list attached in ANNEX `A`with temporary building (20 M x 8 M).	Within 55 days.
26.4.34	2 nos electric winch with building hoist	Within 200 days.
26.4.35	Power winch – 3T - 2 nos for structural erection	Within 150 days
26.4.36	Power winch – 5T - 1 nos for structural erection	Within 150 days
26.4.37	1 no total station with adequate arrangement for operators.	Within 15 days.
26.4.38	1 no theodolite 1 second accuracy	Within 15 days.
26.4.39	2 nos auto level & staff	Within 15 days.
26.4.40	125 nos concrete cube moulds	Within 15 days.
26.4.41	1 no 75 T capacity crawler crane for fabrication and other works under the scope of this tender	Within 90 days.
26.4.42	One nos drinking water tank – 5000 lit.	Within 30 days.
26.4.43	1 nos truck mounted water tank (minimum 5000 lit) capacity with sprinkler arrangement.	Within 30 days.
26.4.44	4-5 nos piling rigs, full set, along with casing tube to achieve 18-20 nos piles per day.	Within 30-45 days progressively.
26.4.45	Portable fire extinguishers as below: Soda acid – 20 sets. Dry chemical powder – 20 sets CO2 – 15 sets. Water & sand bucket (4 buckets in one stand) – 10 sets. Fire hose with nozzle (50 M length) – 12 sets.	Within 90 days
26.5	T&P shown in the above mentioned list are minimum requirement. Mobilisation period shown above for major T&Ps have to be adhered and no change will be permitted without written approval of Construction Manger/ BHEL. Further requirement will be reviewed time to time at site and vendors will provide additional T&P/ equipments to ensure completion of entire work within schedule time without any financial implication to BHEL.Vendor will give advance intimation & certification regarding capacity etc prior to dispatch of heavy equipments.	

26.6	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.
26.7	Non-mobilisation of 75T capacity crawler crane by the contractor will attract a deduction of Rs 4.00 lac (Rupees four lacs only) per month from the date of start of structural work till the date of completion of structural work from their RA bill.
27.0	**CIVIL LABORATORY AT SITE**
27.1	Contractor's scope for testing shall be broadly as per following and contractor shall establish & maintain civil laboratory at site with equipments as listed attached in Annexure-A.
27.1.1	Compressive strength of cement, concrete cubes, bricks etc.
27.1.2	Water absorption test of bricks.
27.1.3	Earth compaction test (proctor density/ dry density and optimum moisture content, etc).
27.1.4	Conducting of test for setting time and compressive strength of cement.
27.1.5	Sieve analysis of fine aggregates and coarse aggregates.
27.1.6	Bulking test of fine aggregates.
27.1.7	Sieve analysis, moisture content, specific gravity and crushing strength of course aggregates.
27.1.8	Rapid moisture meter
27.2	Other than above mentioned test, any testing required to be carried out at site as per Quality Plan and technical specification have to be arranged by contractor for all the works at his own cost.
28.0	**CONSTRUCTION SCHEDULE**
28.1	Entire work shall be carried out in accordance with the broad project milestone schedule as given in tender. The contractor shall ensure compliance with detailed project milestone schedule (approved by customer), which is integral part of the tender. Within 30 days of LOI, the contractor shall discuss with BHEL site engineer & furnish the (L-3) construction schedule indicating all detailed milestones on the basis of major activities and get it approved from BHEL engineer.
28.2	Contractor shall submit daily work program based on above construction schedule.
28.3	The contractor has to work round the clock in two shifts of 12 hrs each.
29.0	**COMPLETION PERIOD**
29.1	Entire work for civil & structural including reconciliation, completion of formalities for contract closing, winding up of site set-up, handing over, demobilization etc (common for both the units/ module/ block) shall be completed by 20 (Twenty) months from date of start of work.
29.2	The contractor shall mobilize to start the work within 15 days from the date of written confirmation from BHEL.
29.3	However, actual date of start of work will be certified by Construction Manager, BHEL site.
30.0	**LIQUIDATED DAMAGE**
	Subject to force majure, if contractor fails to complete the job as per aforesaid completion period, BHEL shall have the right to recover as liquidated damages/ penalty a sum equivalent to 0.5 % (half percent) of price for including taxes, duties for delay of each week or part thereof. The liability for delay shall not in any case exceed 5 % (five percent) of total executed contract price of total package, including taxes, duties of total contract. For deduction of the said penalty BHEL needn't justify the quantum of damages suffered by BHEL on account of such delay.
31.0	**CERTIFICATE TOWARDS COMPLETION**
	The work under the scope of contractor shall be deemed to have been completed in all respects only when so certified by BHEL. Decision of BHEL in this regard shall be final and binding on the contractor.
32.0	**GUARANTEE**
32.1	Even though the work will be carried out under supervision of BHEL, the contractor will be responsible for the quality of workmanship, quality of materials/ items and

	design for which the contractor is responsible.
32.2	The contractor shall guarantee the work executed under the scope of the contract for a period of 12 (twelve) months from the date of start of guarantee period as certified by the engineer (ie on completion of total work under scope and/ or taking over by BHEL) and shall rectify free of cost all defects due to faulty supply or work done. In case the contractor fails to repair/ replace the defective works within the time specified by the engineer, BHEL may proceed to undertake the repairs/ replace such defective works at contractor's risk and cost without prejudice to any other rights and recover the same from security deposit/ other dues.
33.0	**MOBILIZATION ADVANCE**
	Not applicable for this tender.
34.0	**OVER RUN CHARGES**
	No over run charges shall be paid to the contractor in the event the completion period is extended for any reason whatsoever.
35.0	**REVISION ON ACCEPTED CONTRACT RATE**
	No revision of rates shall be applicable in the event completion period is extended for any reason whatsoever.
36.0	**PRICE VARIATION CLAUSE**
36.1	After the `Base Date', and/ or during the progress of work, the monthly price adjustment amount of the contract price will be computed as per the formula given below. The base date shall be reckoned as latest due date of submission of offer as per NIT & subsequent TCNs, if any.
36.1.1	ACV = $ACV_1 – CV_0$, where ACV = Adjustment to contract price payable/recoverable to the contractor for each billing. CV_1 = Adjusted amount payable to the contractor of contract price for each billing. CV_0 = Value of work done in the billing period.
36.1.2	ACV_1 will be computed as follows. $ACV_1 = CV_0 (0.30 + 0.38 \times \frac{M_1}{M_0} + 0.05 \times \frac{D_1}{D_0} + 0.27 \times \frac{L_1}{L_0})$, Where

Factor (description)	Reference Index/ Price.
M_0/ M_1 (material other than steel & cement).	Wholesale Price Index of all commodities as published by RBI, as on base date & as on month of work done respectively.
D_0/ D_1 (high speed diesel oil).	Price of HSD oil at pump of IOCL/ BPCL/ HPCL nearest to project site, as on base date & as on month of work done respectively.
L_0/ L_1 (Labour).	All India Consumer Price Index for Industrial Workers (All India Average) as published by Labour Bureau, Simla, Government of India, as on base date & as on month of work done respectively.

36.2	Total PVC payable/ recoverable against the contract shall have an overall ceiling of 12 % of the contract price.
36.3	The quantum of such price variation amount per month shall be restricted to the ceilinging percentage for each RA bill amount. The final adjusted amount of PVC will be paid along with the final bill.
36.4	The contractor shall produce necessary Government Notifications/ RBI Bulletins of above component for receiving payment from BHEL/ refund to be made to BHEL, as required, in the formula mentioned above.
36.5	The contractor will be required to raise bills for PVC payment on monthly basis along with RA Bill irrespective of the fact whether, any increase/ decrease in price/ index has taken place or not.
36.6	PVC shall be admissible upto original completion period of tender and extension

	period for which delay is not attributable to the contractor.
37.0	**SECURITY DEPOSIT & PERFORMANCE BOND**
37.1	Security deposit shall be as per relevant clause of GCC.
37.2	Performance bond is not applicable for this tender.
38.0	**TAXES AND DUTIES**
38.1	TDS under Income Tax, VAT etc, shall be deducted at prevailing rates on gross invoice value from RA bills unless exemption certificate from appropriate authority/ authorities is furnished.
38.2	All taxes (except Service Tax including Educational Cess and other cess, if any), Works Contract Tax under VAT Act, charges royalties, duties, Octroi, any state or central levy & other taxes for materials obtained for work and for execution of contract shall be borne by you and shall not be payable extra. Any Increase of the same at any stage during execution of the contract shall have to be borne by you. Accepted rates are inclusive of all such requirements after taking the input credit, if any, as per provisions of the state VAT Act. You are responsible to furnish all documentary evidences towards payment of Works Contract Tax as and when required by BHEL. Submission of tax invoice is a must after grossing up the bills as the price is inclusive of VAT.
38.3	Service Tax: Finance Act, 2007 introduced a new sub-clause (zzzza) to Section 65 (105) which provided for levying Service Tax on execution of works contract with effect from 01-06-07. Notification no 32/2007-Service Tax provides an option (of composition) to the person liable to pay service tax in relation to works contract service to pay an amount equal to 4.12% (at present) of the gross amount charged for the works contract instead of normal rate provided in the Sec 66 of the Act. However, this option of paying service tax @4.12 % (at present) on gross value can be exercised prior to payment of Service Tax in respect of said works contract and the option so exercised shall be applicable for the entire works contract and shall not be withdrawn until the completion of said works contract. In view of notification no 23/2009 of Service Tax, dated 07-07-09, value of free issue of materials (steel & cement) by BHEL based on monthly consumption by you may be included to determine `Gross amount charged' for this works contract.
38.4	As such, Service Tax as legally leviable & payable by you under the above provisions of applicable law/ Act, shall be paid by BHEL, PSER on your gross bill. However, you shall have to submit proof of Service Tax deposited by you immediately after the deposit but not later than the next bill submitted after the due date of deposit. You shall furnish proof of Service Tax registration with Central Excise Division covering the Services as well as exercising the aforesaid option, ie the composition scheme under Notification 32/2007 under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by you on BHEL, PSER for this project. BHEL, PSER will not be held to be responsible for non-compliance of various Service Tax rules, being framed from time to time.
38.5	You have to make your own arrangement at your cost for completing the formalities, if required, with state VAT Act Authorities, for bringing your materials, plants and machinery at site for the execution of the works under this contract, road permit/ way bill, if required, shall be arranged by you and BHEL/ PSER will not supply any road permit/ way bill for this purpose. You must be a registered dealer with the state VAT Act, if not registered yet and a copy of the said registration certificate along with TIN number must be provided to site RAO.
38.6	New tax & duties, if imposed subsequently by statutory authority during contract period (including extension, if the same is not attributable to you), shall be reimbursed by BHEL, PSER on production of relevant supporting document to the satisfaction of BHEL, PSER. However, you shall obtain prior approval from BHEL, PSER before depositing new taxes & duties.
39.0	**INTERIM PAYMENT**
39.1	For all items of work as per Volume-IIIA, Price Schedule, interim payment shall be limited to 95 % of the gross value of interim bill on item rate basis. All admissible

	recovered/ adjustments etc shall be made from the interim payable amount. The balance 5 % shall be payable along with final bill. However, this 5 %, retained from each RA bill, may be released against submission of performance bank guarantee, to be kept valid till final bill & guarantee period in prescribed proforma, 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 and (iv) handing over to BHEL/ customer. Submission of bank guarantee towards performance guarantee is separate and the bank guarantee towards security deposit cannot be utilized for this purpose. The security deposit will be refunded as per GCC.
39.2	Out of this 95 %, 0.5 % 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.
39.2.1	0.2 % shall be paid on compliance of house keeping of vendor's working area and store/ office areas.
39.2.2	0.1 % shall be paid on compliance of general illumination of vendor's working area and stores, office area.
39.2.3	0.1 % shall be paid on compliance of applicable OHSAS requirement as per guidelines of BHEL/ PSER and as specified in the tender.
39.2.4	0.1 % shall be paid on compliance of applicable safety requirement as per guidelines of BHEL/ PSER and as specified in the tender.
39.3	Contractor's RA bill, complete & correct in all respects, certified by BHEL engineer, shall be paid in the following manner.
39.3.1	Minimum 60 % (sixty percent) of payable amount of RA bill shall be made within 15 days of date receipt of bill certified by the BHEL engineer.
39.3.2	Balance payment within 30 days of receipt of bill.
39.4	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.
39.5	Such payment as above shall be effected only on certification by BHEL against completion of each stage.
39.6	No bills including RA bills will be paid to individual consortium partners in case of consortium arrangement.
40.0	**METHOD OF MEASUREMENT**
	IS:1200 in conjunction of IS:3385 shall be adopted. In case the item of measurement is not available in the IS:1200, 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, interpretation of BHEL will be final and binding to the contractor.
41.0	**EXTRA/ ADDITIONAL ITEMS OF WORK**
	If any extra or additional items, which are not incorporated in main schedule or non-schedule items of price schedule, the same has to be executed by you, the rate of such extra or additional work shall be derived as per following.
41.1	The rate of such items shall be derived based on rates of non-schedule items of price schedule, as quoted by bidder & agreed by BHEL.
41.2	If the rate cannot be derived on above basis, the rate will be derived by a duly constituted committee, if possible, from the available rates of the rate schedule of this contract.
41.3	If it is not possible to derive rate in above 2 ways, the rates have to be mutually agreed upon between the contractor and a duly constituted committee of BHEL on the basis of prevailing market rates for which all documentary evidences, as required by BHEL, shall have to be produced by subcontractor. Decision of BHEL in such cases shall be final & binding on you
42.0	**CONTRACT PRICE**
42.1	The bidder shall quote their rates strictly in accordance with prescribed rate

	schedule of Volume-IIIA (latest revision).
42.2	The quantities of various items mentioned in the Price Schedule, Volume-IIIA (latest revision) are approximate, based on very preliminary information and may vary to any extent or 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 the this contract including extra items, if any, remains within +/- 30 % (plus/ minus thirty percent) of the awarded price as per LOI/ WO.
43.0	**DESIGN OFFICE AND FABRICATION DRAWING**
43.1	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 reserve 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.
43.2	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 establishement/ liason office at Delhi/ Noida with a co-ordinator for better co-ordination with BHEL/ PEM.
43.3	Contractor shall submit progress report pertaining to fabrication drawing, by 7th 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.
44.0	**FABRICATION/ GALVANISING**
44.1	All the fabrication of structural steel items (except nuts/ bolts) shall be done in fabrication yard inside project premises. 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 and BOQ items. Payment shall be made as per price schedule & SCC.
44.2	Bidder, at his own cost, shall supply electrodes required for fabrication, erection of structural steel as per specification and approval of BHEL.
44.3	However, in case of exigency as considered fit by BHEL, BHEL may permit the contractor to get some specific portion of fabrication/ galvanizing work done at qualified shop (s) outside project premises. For steel to be issued to the contractor for such purpose, 50% of the value of such steel as worked out as per BHEL's procurement rates shall be furnished by the contractor in the form of BG. Such BG shall be returned depending on receipt of fabricated/ galvanized steel back to site.
45.0	**OTHER TERMS**
45.1	Contractor shall submit work plan showing batching plant deployment, construction of temporary covered cement store of 500 MT capacity, construction of office of contractor alongwith toilet, septic tank, soak pits etc, construction of fabrication yard within twenty days of date of LOI.
45.2	Contractor will construct civil laboratories, their own offices, strores, erection approaches near each work spot, at their own cost.
45.3	Cement & steel consumption shall be governed by tender provision.
45.4	Drawings for piiling work, containing information regarding 'Cut-off' level, shall be issued during construction.
45.5	Unless otherwise specifically mentioned against items of Price Schedule, for all works covered in this tender, cement & steel shall be issued free of cost by BHEL as per SCC.
45.6	During execution, BHEL reserves the right to include in the scope of work any civil, structural and architectural works of any other area under this project, depending on final layout, approach, execution convenience etc and to minimise execution interface problem. The work shall be executed as per applicable relevant item of Volume-IIIA of this tender.
45.7	All other term & conditions of this specification, not mentioned above shall be governed by the pertinent provisions of GCC.

ANNEXURE-A
LIST OF EQUIPMENTS FOR CIVIL SITE LABORATORY

A. CONCRETE TESTING EQUIPMENT				
SL NO	**NAME OF TEST**	**NAME OF EQUIPMENT**	**SIZE OF EQIPMENT**	**IS REF**
1	Initial & final setting time, consistency of cement	Vicat Apparatus with desk pot	Standard	IS 5513
2	Shrinkage of cement, auto clave Test	Le Chatelier's appratus Auto Clave Equipment	Standard	IS 5514
3	Abrasion value test	Los Angles Abrasion testing machine	Standard	IS 2386
4	Aggregate Impact value test	Aggregate Impact value testing machine with blow counter	Standard	IS 9377
5	Aggregate crushing value test	Crushing value apparatus	Standard	IS 2386
6	Flakiness index	Thickness gauge for measuring flakiness index	Standard	IS 2386
7	Elongation Index	Elongation guage	Standard	IS 2386
8	Bulk density, voids and bulking apparatus	Measuring cylinders	3, 5,10 & 15 liters cylinders	
9	Concrete Compressive test	Digital Compressive Testing Machine with 2000 KN capacity.	2000KN capacity	IS 2505
10	Cement motor cube casting	Mortor Cube mould	70.6 x 70.6 x 70.6 mm, minimum 06 sets desired.	IS 10086
11	Concrete cube casting	Concrete Cube Mould	150x150x150mm, minimum 20 sets desired considering TG Raft major concereting activity.	IS 10086
12	Workability of concrete	Slump cone	Standard, atleast 04 nos	IS 456
13	Specific gravity of aggregates	Pycnometer	Standard, atleast 02 nos	IS 383
14	Cement mortor cube vibrating	Motorised vibration machine for cement testing	Standard	IS 4031
15	Course agregate sieve analysis (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	IS 383
16	Fine agregate 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	IS 383
17	Seive shaker	Motorised Sieve	Mfg catalogue	

		shaker		
18	Silt content check	Sand silt content beaker	Standard	
19	Ultrasonic pulse velocity test	UPV appratus for concrete	Standard	
B.	**SOIL TESTING EQUIPMENT (LEVELLING & GRADING)**			
1	Liquid limit test	Liquid limit apparatus	Standard	IS 2720
2	Core cutter test	core cutter appratus	Rammer, 6 nos of std 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
C.	**PROCESS CONTROL ACCESSORIES**			
1	Hot air oven	Temperature range 50° C to 300° C	600x600x600mm (min size)	
2	Electronic balance	3 nos	600gx0.01g, 10g and 50 kg	
3	Physical balance	5 kg capacity	Weights upto 5 kg	
4	Thermometer	Temperature range 0° C to 150° C	Digital	
5	Poker thermometer (Concrete road)	Temperature range 0° C to 50° C & 150° C	02 nos each required	
6	Measuring jars	2 nos set of each size	100ml, 200ml, 500ml & 1000 ml	
7	Gauging trowlers	4 nos	100mm & 200 mm with wooden handle	
8	Sptula	2 nos each size	100mm & 200 mm with long blade wooden handle	
9	Stainless steel scoop	2 nos each	2 kg and 5 kg	
10	Vernier calipers	2 nos each	12" and 6" sizes	
11	Digital pH meter	01 nos	0.01 mm least count	
12	Digital micrometer	01 nos	0.01 mm least count	
13	Digital paint thickness meter for steel	02 nos	500 micron Range	
14	GI tray	02 nos each	600x450x50mm, 450x300x40mm, 300x250x40mm	
15	Electric morter mixer	01 nos	0.25 cum capacity	
16	Rebound hammer test	01 nos	Digital rebound hammer	IS 13311
17	Screw gauge	02 nos	0.1 mm-10mm, Least Count 0.05	
18	Digital paint thickness meter for masanory/ concrete painting measurement	02 nos	150 micron range	

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These special conditions, applicable for civil/ struictural portion of work, shall be construed as part of tender document and shall be read along with general conditions of contract (GCC), Volume-II and other volumes of tender. In case of any conflict or inconsistency between GCC, Volume-II, other volumes and these special conditions contract (SCC), the same shall be brought out by the bidder in writing to BHEL for clarification, failing which most stringent interpretation/ clause in favour of BHEL shall be adopted and the same shall be binding to the bidder.

CLAUSE NO	DESCRIPTION
1.0	**PROJECT SYNOPSIS AND GENERAL INFORMATION**
1.1	Details of proposed stage/ units
	The proposed 53 MW Combined Cycle Power Project at Lepetkata being set up by Brahmaputra Cracker and Polymer Ltd (BCPL), Assam. The site is approachable by road. The information given hereunder is for general guidance and shall not be contractually binding on BHEL.
1.2	APPROACH TO SITE
	The proposed project site is located at Lepetkata, Assam. Nearest important town: Dibrugarh (15 km). Nearest railway station: Dibrugarh (15 km). Proposed railway approach: Proposed Dibrugarh-Moran Rail link. Nearest airport: Dibrugarh (25 km). Nearest highway milestone: Tinsukia-Dibrugarh-Sibsagar (NH-37), 500 M.
1.3	Owner: Brahmaputra Cracker and Polymer Ltd (BCPL).
2.0	**SITE VISIT**
	Contractor should visit project site and acquire full knowledge and information about site conditions. The bidder must visit site, to acquaint himself with the conditions prevailing at site and in and around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.
3.0	**NAME OF WORK**
	Receipt from store/ storage yard, unloading at the place of erection/ fabrication/ work, erection, testing, commissioning, trial run, handing over of 2x80 ton/ hr HRSG and 2x80 ton/ hr utility boiler with all auxiliaries, piping for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam.
4.0	**SCOPE OF WORK**
4.1	Scope of these specifications cover complete work of handling, shifting of materials from Project store/storage yard to erection site, preservation including touch up painting, watch & ward, checking, chipping and levelling of foundations if necessary, pre-assembly, erection, alignment, grouting, welding, radiography, LPI/MPI testing wherever required, heat treatment, application of thermal insulation, finish painting etc., interconnection with GT exhaust alongwith Diverter damper/Guillotine/Seal Air fan/Bypass stack(Height of approx 30 M) etc(including E&C of Electrical,C&I system required for Diverter damper based By-pass stack & HRSG operation, both from local & remote, as required), Hydraulic test, Air leak test, Alkali boil out, Chemical cleaning, Steam blowing ,Safety valve floating and including erection & dismantling of all temporary piping, valves pumps, tanks etc., required for above operations & all commissioning activities including post commissioning, trial operations & handing over of 2X80 Ton/Hr HRSG and 2x80 Ton/hr Utility Boiler Waste with all auxiliaries and piping at BCPL-Lepetkata site. These WASTE HEAT RECOVERY BOILER(WHRB)s and UTILIYU BOILERS will generate the rated steam parameter by recovering the energy available from GT exhaust, fuel firing for Utility Boilers. Unfired, Natural circulation, Dual pressure, Single-pass, Horizontal Flue-gas path type Heat Recovery Steam Generator(HRSG)s required for process system of Refinery. Utility Boilers will be oil fired type and used for 13.5 MW Steam Turbine Generator at LEPETKATA. For the purpose of this tender spec “WHRB” & “HRSG” will carry same meaning.
4.2	Approximate weight to be erected under the subject specification shall be around

	900 MT for each WHRB and UB , as per Annexure-I.
4.3	All works such as cleaning, checking, leveling, blue matching, aligning, assembling, temporary erection for alignment dismantling of certain equipment for checking, cleaning, surface preparation, fabrication at site, cutting, grinding, shaping, fitting up, tube expansion etc. as may be applicable in such erection works are to be treated as incidental to erection and necessary to complete the work satisfactorily & shall be carried out by the contractor as part of the work.
4.4	The contractor shall clean the surfaces of the material / equipment before erection and any preservative coating which has peeled off shall be painted by the contractor. The paints required for such touch-up painting shall be supplied by the contractor free of cost.
4.5	Any fixtures, scaffolding materials, approach ladder, concrete block supports, steel structures required for temporary supporting pre-assembly or checking, welding, lifting and handling during pre-assembly and erection shall be arranged by contractor at his cost.
4.6	No members of the ladder/ structure/ platform should be cut without specific approval of BHEL. In case it is necessary to cut the contractor shall rectify/ repair in a manner acceptable to BHEL/ customer without any additional cost.
4.7	It shall be the responsibility of the contractor to provide pre fabricated ladders including materials at his cost on columns for initial work till such time stairways are completed.
4.8	The contractor shall arrange/ organise for stage inspection of boiler components by statutory authority/ Boiler Directorate. All co-ordination in this respect towards obtaining clearance, has be done by the contractor. However, the inspection fees only will be paid by BHEL/ owner.
4.9	The contractor is strictly prohibited in using the boiler components like angles, channels, hand rails etc for any temporary supporting or scaffolding works. In case of such misuse a sum as determined by BHEL Engineer will be recovered from contractor's bills.
4.10	1Certain adjustment in length may be necessary while erecting pipe lines/ ducts/ casings/ claddings etc and the contractor should remove the extra lengths/ add extra lengths to suit the final layout after preparing edges afresh by adopting specified heat treatment procedures at no extra cost.
4.11	Adjustment like removal of ovalities in pipes and opening or closing the fabricated bends of piping to suit the layout shall be considered part of the work and the contractor is required to carry out such work within finally accepted price/ rate as per instructions of Engineer.
4.12	The contractor shall completely erect & test all the piping systems, covered in the specification including sampling lines up to and including sample coolers, hangers & supports, valves & accessories in accordance with the drawings furnished. This includes all necessary bolting, welding, pre-heating, stress relieving, testing, cleaning & painting. System shall be demonstrated in condition to operate continuously in a manner acceptable to the Engineer. Welding shall be used throughout for joining pipes except where flanged screwed or other type joints are specified or shown on the drawings. All piping shall be erected true to the lines & elevation as indicated in the drawings.
4.13	Most of the pipes shall be supplied un-fabricated in running lengths without bevelling. It shall be responsibility of contractor to carryout fabrication by cutting to size, bevel/ prepare edges, fabricate support pads, drill holes for drain, vent and other stub, welds, carryout NDT & SR, as applicable.
4.14	The contractor shall ensure lowering of pipes in position with adequate precautions as to avoid any damage to either material or men. Only the anchoring points earmarked for the purpose of lowering the pipes are to be used.
4.15	For site routed pipings based on schematic drgs, no layout drgs will be supplied. Contractor to deploy specially skilled manpower for these type of pipings for drawing optimum advantage in laying with minimum flexibility. Bends/reducers/tees etc. fittings as required at site, will have to be fabricated at site without any extra cost. On completion of such pipings, contractor should submit the “AS BUILT” drg

	for record purpose.
4.16	All vents and drains for piping equipment covered in the scope whether shown in the drawings or not shall terminate at suitable points unless otherwise specified. The contractor shall carry out the same at no additional cost.
4.17	Wherever piping erected by the contractor is connected to equipment/ piping erected by the other agencies, the joint at the connecting point shall be the responsibility of the contractor of this specification.
4.18	The contractor shall be responsible for correct orientation of all valves so that seats, stems & hand wheels will be in desired location. It is the responsibility of the contractor to obtain the information regarding orientation of valves not fully located on drawings before the same is installed. All the valves, including motorised valves, flap valves, dampers, actuators, etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre-commissioning/commng also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates. The contractor shall dismantle the valves & actuator for overhauling servicing & lubrication wherever required as advised by the BHEL Engineer. The contractor shall also lap or grind the valve seat for ensuring the satisfactory performance of valves at no extra cost. All parts such as gaskets, gland packing which form the permanent part of equipment shall be supplied by BHEL free of cost.
4.19	No temporary supports should be welded on the piping. In case of absolute necessity they should take prior approval from BHEL engineer.
4.20	All hangers, supports and anchors shall be installed as per drawing to obtain safe, reliable and complete pipe installation as per instructions of engineer. Any additional support as called for by engineer shall have to be fabricated by the contractor and provided at no additional cost. However the raw materials required for fabricating such supports shall be supplied by BHEL free of cost. Spring suspensions/ constant load hangers have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Any adjustments, removal of temporary arrestors/ locks etc, have to be carried out as and when required.
4.21	The hangers assembly shall not be used for attachment of rigging to hoist the pipes into position. Other means shall be used to securely hold the pipe in position till pipe supports are completely assembled and attached to the pipe & building structure. Suspension for piping, pressure parts and ducting etc will be supplied in running lengths, which shall be cut to suitable sizes and adjusted as required.
4.22	Fittings and welding of necessary instrumentation tapping points thermocouples pads, valves, root valves, condensing vessels, flow nozzles, orifice plate and control valves etc. will also be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer within quoted rates. The welding of all the above items will be contractor's responsibility even if the :
4.22.1	Product groups under which these items are released, are not covered in the scope of this tender.
4.22.2	Items are supplied by any agency other than BHEL.
4.23	Ducts/ expansion bellows are despatched to site in loose walls/ plates/ pieces and these are to be assembled and welded at site alongwith stiffeners etc before erection within the quoted rates.
4.24	Additional platforms and ladders of permanent nature for approaching different equipment as well as canopy for motors and pumps as per site requirement which may not be indicated in drawings shall be fabricated and installed by the contractor. However, the contractor will be paid for this work on accepted tonnage rate. The materials required for platforms excluding consumables and T&P will be supplied by BHEL.
4.25	Erection testing and commissioning of power cylinders, actuators, valve actuators etc. coming under various groups is covered under the scope of this specification.
4.26	The boiler supporting structure includes ACC-sheets, monitor roofs of drum and burner operating level including drains to canal. Contractor has to install

	these roofs as per drawings. The cement required for jointing of the ACC materials will be arranged by the contractor at his cost.
4.27	Erection, testing and commissioning including grouting, if required, of the auxiliaries/ equipment consisting of pumps, tanks, filters, valves, piping, fittings, electrical-panels wiring and C&I etc, will also be in the scope of work of this contract and will be carried out within the quoted rates.
4.28	The Boiler drum is to be lifted with crane after the Pressure Part modules are positioned and secured. Being self supporting the drum will not have any suspension arrangement. Fabrication and installation of the temporary structure for supporting and final alignment is in the scope of contractor. The structural materials will be supplied by BHEL free of cost. This temporary structure is to be removed after the completion of welding of connecting piping.
4.29	For chimney lightning arrestors , twin air terminal type to be erected. Down conductors are to be laid and welded upto ground level before application of insulation on chimney.
4.30	The tank required for pouring and mixing the chemicals need to be fabricated by the vendor within his quoted rate.
5.0	**DEVIATIONS**
	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. Offers with deviations are liable for rejection.
6.0	**TENDER DRAWINGS**
	The drawings enclosed with this tender are intended to give the tenderer a general idea of the type & extent of work involved.The drgs as such are only indicative & not to be considered as the construction drgs.
7.0	**6DEWATERING**
	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. Grading in the vicinity of excavations shall be controlled to prevent surface water running into excavated areas.The Contractor shall remove by pumping or any other means approved by BHEL,any water inclusive of rain water and subsoil water accumulated in the area without any extra cost.
8.0	**LAND**
8.1	The contractor shall make his own construction site office/ store, any other temporary facility / enabling works/ fencing, as required, at his own cost, for execution of his work. The estimated area showing layout plan/sketch required for as described above, are to be given separately, alongwith offer. Contractor shall develop, if required, above areas including grass/tree cutting, earth cutting/filling, leveling, grading etc at no extra cost to BHEL for his own enabling works. If any Forest clearance is required, BCPL shall arrange the same, on intimation from BHEL/Contractor.
8.2	As required, the contractor shall ,after obtaining clearance from BHEL, arrange at his cost :
8.2.1	Construction of temporary residential accommodation on land,(to be given free of cost by BCPL) for his workmen, including labours and ensure their transportation to and from site. All site clearance /Grass cutting/tree cutting and other civil, sanitary,plumbing & electrical works have to be carried out by the contractor for this

	purpose, at no extra cost to BHEL.
8.2.2	Proper sanitary & sewerage system (septic tank , covered TOILET etc.) within his such temporary colony.
8.2.3	Distribution of Electricity for domestic purpose and for area illumination within his temporary colony by tapping from a nearby Power supply point – 230 V, Single phase (to be provided by BCPL) on chargeable basis. Tariff to be intimated later.
8.3	The contractor will be responsible for handing back all lands, as handed over to him, (for his temporary use) to BHEL/BCPL, after completion of work.
9.0	**WATER & ELECTRICITY**
9.1	BCPL/BHEL will provide area location where contractor will have to make bore wells for arranging water and Electricity will be provided at one single point from 11KV power source on chargeable basis as per rates to be decided by customer, BCPL. However, backup DG set capacity of 2000KVA to be arranged by you to take care of smooth progress of erection work during power failure. Contractor shall be responsible for arranging all necessary facilities like Site office, stores and residential accommodation, transport, electricity, water, medical facilities ,etc., at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.
9.2	The contractor shall submit to the BHEL engineer his electrical power requirements. Construction power shall be provided at a single point within erection site at a distance of 250 mtrs (approx) on chargeable basis. Further distribution shall be done by the contractor at his cost . All wiring must comply with local regulation and will be subject to the BHEL Engineer's inspection and approval before connecting supply.
9.3	Provision of distribution of both electrical power from the central; point to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution boards, switch boards, TPN, CBS, ELCBS/ MCCBs/ Copper/ Brass clamps, copper conductor, change over switches pipes etc at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working sheets/ hours accordingly and deploy additional manpower if necessary so as to achieve the targets within his quoted rate/ price. No idle labour payment is admissible for power supply failure.
9.4	Following points should be strictly adhered to by the contractor while drawing construction power supply from distribution board.
9.4.1	All electrical installations should be as per Indian Electricity Rules.
9.4.2	All distribution Boards installed by the contractor should be constructed with fire proof materials viz. Steel frames, bakelite sheets etc.
9.4.3	Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral.
9.4.4	All electrical connection should be made through connectors , nuts and bolts, switches ,plug and sockets. Loose connections or hooking up of wires shall not be permitted.
9.4.5	Contractor have to make their own earthing arrangement for their equipment/ DB earthng. The earthing connections have to be done with copper conductor and copper/ brass clamps with BHEL's prior permission.
9.4.6	All electrical equipment/ tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
9.4.7	Contractor should use MCCB and ELCBs either on incoming or outgoing connections to the DBs.
9.4.8	Contractor should ensure that all the CBs/ TPNs/ Fuses/ MCCBs/ ELCBs cables etc should be of adequate rating/ capacity.
9.4.9	For permission of supply connections, contractor has to submit a test report of their installation with a single line diagram of connected / proposed loads.
9.4.10	Contractor will submit a report on all electrical connected loads 7th of every month.
9.4.11	ELCB will be tested once in a week by actually simulating the earth leakage for all

	installations and the same shall be recorded by BHEL Engineer in the log book to be maintained by the contractor.
9.4.12	Adequate lighting facilities such as flood lights, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractors material, storage area etc., within the finally accepted rates/ price.
9.4.13	On completion of works or as and when required by BHEL all the temporary buildings, structures, pipelines, cables, etc, shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, same will be got done by the BHEL Engineer and the expenses incurred shall be recovered form the contractor along with the prevailing overhead. Decision of BHEL engineer in this regard shall be final**.**
10.0	**WELDING,HEAT TREATMENT, RADIOGRAPHY AND NON-DESTRUCTIVE TESTING**
10.1	The pressure parts and IBR pipe lines shall be erected in conformity with the provision of Indian Boiler Regulations and as per any other standards/ specification in practice/ directed by BHEL. The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings/ schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.
10.2	Welding of pressure parts/ IBR piping/ high tensile structural steel shall be done by certified high pressure welders who possesses valid certificate of CIB of the state in which the equipment is erected as per provision of IBR. The HP welder who possesses necessary certificate shall appear well in advance before the expiry of the validity of his certificate for requalification test as per relevant provision of IBR and keep the certificate valid till the completion of work. The services of such welders, the validity of whose certificates have expired, shall have to be terminated forthwith.
10.3	All welders including tack welder, structural and high pressure welder shall be tested as per ASME section IX/ BHEL's welding manual as decided by BHEL engineer before they are actually engaged on work though they may possess the IBR certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The records of qualification of welders shall be maintained by the contractor in proforma given by BHEL engineer. All the welders qualified for the work will be issued an identity care by BHEL engineer and welder will keep the same with him at work place.
10.4	Engineer may stop any welder from the work if his performance is unsatisfactory for any technical reason or if there is a high percentage of rejection of joints welded by a particular welder which in the opinion of the engineer will adversely affect the quality of the welding though the welder has earlier passed the tests prescribed by engineer. The welders having passed qualification tests does not absolve the contractor of contractual obligation to continuously check the welder's performance.
10.5	Faulty welds caused by the poor workmanship or lack of supervision on the part of the contractor shall be cut and re-welded at the contractors expenses. The procedure for the repair of defective welds shall be approved by the engineer prior to any repair being made.
10.6	The contractor shall carry out the root run welding of all butt welds, HP or LP by TIG welding method only. The contractor shall have to carry out full TIG welding of butt weld joints of tubes/ pipes of lesser thickness if required. During the root runs of stainless steel joints, the contractor shall before and during welding have to purge the pipes with inert gas. All arrangements required for the above shall be the responsibility of the contractor at no additional cost.
10.7	All charges for testing of contractor's welders including destructive and non destructive tests conducted by BHEL at site or at laboratory shall have to be borne by the contractor only. The test coupons raw material will be supplied by BHEL free of cost. The regulators used on welding machines shall be calibrated before putting these into use for work. Periodic calibration for the same shall also be arranged by the contractor at his cost.
10.8	Only BHEL approved electrodes and filler wire will be used. All electrodes shall be baked and dried in the electric electrode drying oven to the required temperature for

	the period specified by the engineer before these are used in erection work. All welders shall have electrodes drying portable oven at the work spot. The electrodes brought to the site will have valid manufacturing test certificate. The electrodes brought to the site will have valid manufacturing test certificate.
10.9	The test certificate will have corelation with the lot no/ batch no given on electrode packets. No electrodes will be allowed to be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will be also calibrated and test certificate from Govt. approved/ accredited test house traceable to National/ International standards will be submitted to BHEL before putting the oven in use. Periodical calibration for the same shall also be arranged by the contractor within the quoted rates.
10.10	All welds shall be painted with anticorrosive red oxide paint. Necessary consumables and scaffolding etc. including paints shall be provided by contractor at his own cost.
10.11	Preheating, radiography and other NDT tests, post heating and stress relieving after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of the engineer. All equipment and consumables essential for carrying out the above process have to be arranged by the contractor at his cost.
10.12	All stress relieving (SR) equipment will be used after due calibration and submission of test certificate to BHEL. Periodic calibration from Govt approved/ accredited Test Houses traceable to National/ International standards will also be arranged by the contractor for such equipment at his cost.
10.13	The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL. Iridium - 192 shall be used by contractor for radiography work. The geometric un-sharpness shall not exceed 1.5 mm. Taking adequate safety precautions shall be the responsibility of the contractor while carrying out radiography. Necessary safe guards required for radiography (including personnel from BARC) shall be arranged by contractor at his cost.
10.14	Low speed high contrast, fine grain films (D-7 or equivalent) in 10 cm width only be used for weld joint radiography. Film density shall be between 1.5 to 2.0.
10.14.1	All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.
10.14.2	Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs. Contract no, joint identification, source used, welder's indentification and SFD are to be noted down on paper cover of radiograph. Lead intensifying screens for front and back of the film should be used as per the above referred ASME specification.
10.14.3	The joint is to be marked with permanent mark A, B, C, etc to identify the segments. For this a low stress stamp shall be used to stamp the pipe on the downstream side of the weld. For multiple exposure on pipes, an overlap of about 25 mm of film should be provided.
10.14.4	Radiography personnel with sufficient experience and certified by BARC as Radiographer for conducting radiographic tests in accordance with safety rules laid down by division of radiological protection only have to be deployed. These personnel should also be registered with DRP/ BARC for film badge service.
10.14.5	All arrangements for carrying out radiography work including dark room and air conditioner and other accessories shall be provided by contractor within the space allotted for office at his cost. As an alternative the contractor may deploy an agency having all above facilities and who are duly approved/ accredited by BARC and/ or other Regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL engineer before the actual deployment of agency for radiography work.
10.14.6	Contractor shall note that 100% radiography will be done at the initial stages on all the HP welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be

	radiographed shall not be less than the requirement of IBR/ BHEL welding schedule. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL.		
10.14.7	All the Radiographs shall be properly preserved and shall become the property of BHEL. Since radio-isotopes are being used, all precautions and safety rules as prescribed by BHEL/ BARC/ customer shall be strictly followed BARC/ DRP Certificate to be provided before taking up the work.		
10.14.8	Radiography of joints shall be so planned after welding that the same Is done either on the same day or next day of the welding to assess the performance of HP welders. If the performance of welder is unsatisfactory, he shall be replaced immediately.		
10.14.9	Wherever radiographs are not accepted, on account of bad shot, joints shall be re-radiographed and re-shots submitted for evaluation. Radiographs shall be taken on joints after carrying out repairs. However, if the defect persists after first repair, as per radiograph, carrying out radiography shall be repeated till the joint is made acceptable. In case the joint is not repairable, the same shall be cut, re-welded and re-radiographed at contractor's cost.		
10.14.10	Heat treatment and radiography may be required to be carried out at any time (day and night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, supervisors/ engineer required for the work as per directions of BHEL.		
10.14.11	The contractor shall also be equipped for carrying out other NDT like LPI/ MPI/ Steeloscopy/ hardness etc as required as per welding schedule/ drawings within the finally accepted price/ rates. Ultrasonic testing, wherever required will be arranged by BHEL. Necessary help in conducting the UT shall however be rendered by contractor.		
10.15	On completion of welding of each shell/ component of chimney, inspection vis-a-vis quality conformance will be carried out and joint protocol to be signed and submitted before proceeding for subsequent erection activity. Welding inspection plan is as follows.		
	Area	Type of check	Extent of check
10.15.1	Shell to Shell	LPI	10 %
10.15.2	Shell to foundation	LPI	10 %
10.15.3	Shell to Ladder	Visual	100 %
10.15.4	Shell to painter's trolley	Visual	100 %
10.15.5	Shell to lightning arrestor	Visual	100 %
10.16	Fluorescent dye, developer cleaner etc are to be supplied by the vendor and after acceptance on inspection, each weld area is to be cleaned of slag etc and painted within his quoted rate.		
10.17	It is the responsibility of the contractor to arrange the visit of IBR Inspector, getting approval of drawings and works being carried out under IBR scope. Necessary statutory fees as applicable will be paid by BHEL/ customer.		
11.0	**CIVIL WORKS, FOUNDATIONS AND GROUTING**		
11.1	Column foundations and foundations for all equipment and necessary civil works shall be provided by BHEL or its client. The dimensions & locations of the foundations, pockets, anchor bolt pitch shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark etc. All minor adjustments of foundation level, dressing and chipping of foundation surfaces upto 50mm, enlarging the pockets in foundations etc, as may be required for the erection of equipment/ plants shall be carried out by the contractor. While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided it is allowed by BHEL engineer. When required by manufacturers the embedded subsole plates shall be scraped and checked with prussian blue to get the required contact with frames.		
11.2	The contractor shall ensure perfect matching of packer plates including machining,		

	scrapping and blue matching with foundation by dressing the foundation, as well as perfect matching between the packer plates and the base plate of structural column and equipment to the satisfaction of BHEL engineer.
11.3	The grouting of all equipment shall be carried out as per drawings, specifications or as advised by BHEL engineer. The equipment bases, bolt holes and structural steel base plates etc, shall be grouted with grouting mixture of portland cement, sand, gravel & antishrinkage compound/ plasticiser as per the specification/ requirement. If recommended, rotating machines may required to be grouted with non-shrink special cement. All the arrangement required for grouting including supply of cement, anti-shrinkage compound, sand gravel and any other material required for grouting, mechanical mixer, vibrators, shuttering, nails, wires etc., shall be arranged by the contractor at their cost and test certificates (from authorised/ Govt. approved/ accredited test laboratories traceable to National/ International standards) for the construction material so used, should be obtained by contractor before use at his cost.
11.4	The contractor shall prepare the required test pieces/ cubes to ensure the strength of the grout and get the same tested in laboratory at his cost as directed by BHEL before grouting. Test cubes shall also be taken during grouting for testing in the laboratory and shall be tested at his cost.
11.5	Besides grouting as above, any civil works, required for safe efficient operation of tools and tackles, like grouting/ excavation/ casting of foundation/ anchor points for derricks, winches, guy ropes fastening, etc/ foundations required for chemical cleaning pumps, tanks and any other temporary supports shall also be the contractor's responsibility. For these civil works all materials including cement and required facilities will have to be arranged by contractor at his own cost.
12.0	**APPLICATION OF INSULATION**
	The application of insulation materials and sheet casing work include but not limited to the following.
12.1	All attachment welding including welding of hooks/ supports as per pitch both on equipment and piping shall have to be done by the contractor as per drawings/ as directed by engineer. Attachment welding shall have to be done by certified welders. If necessary contractor may have to cut the hooks to required size without any extra cost. The boiler ducting shall be internally insulated with ceramic wool and cladded with stainless steel sheet on stainless steel hooks and retainers. Plasma cutting machine required for cutting stainless steel sheets is to be arranged by the contractor.
12.2	All mating joints, including those of top and bottom casings, are to be packed with ceramic wool and cladded with stainless steel strips which are to be fabricated by contractor. Before packing of insulation, the corner angles/ cladding sheets are to be removed with plasma cutting machine.
12.3	The ceramic wool, LRB mineral wool mattresses (bonded/ unbonded)/ are received at site in standard sizes. These are to be dressed/ cut to suit site requirements by the contractor as directed by BHEL.
12.4	The number of layers/ thickness of ceramic wool/ mineral wool/ LBM mattresses for equipment and piping shall be as per various drawings/ as directed by engineer. For applying the mineral wool mattress, the required holding materials, if necessary by fabrication of spacer rings, supporting rings and hooks shall be fixed as directed and as per drawings and specifications. Required materials for fabrication of rings/ hooks shall be supplied by BHEL free of cost.
12.5	The contractor should ensure that the finished surface of the insulation works conform to the dimensions and tolerances given in the drawings. Accuracy and aesthetic finish is the essence of work.
12.6	It is the responsibility of the contractor to ensure that the insulation materials and sheet metal covering issued to him for application are well protected against loss or damage from weather conditions tending to affect its quality by the provision of closed/ semi closed sheds at his cost. If any damage occur to the material due to improper storage or due to any causes attributable to the contractor except for normal wastage or damages allowed in such cases, the cost of such damaged

	material shall be to the account of the contractor.
12.7	Aluminum/ stainless steel sheet cladding over insulation consist of plain/ ribbed/ corrugated sheets. Their application shall be by fabrication to the sizes and shapes specified in drawings, beading, swaging, bevelling of sheets, crowning the sheets if necessary, application of two coats of anticorrosive black bituminous paint on inner surfaces, fixing the same to supports over wool insulation with screws as specified in BHEL drawings or as instructed by BHEL engineer. Bitumen sealing compound on cladding joints if necessary is included in the scope of this work & will be carried out within the quoted rates. Contractor may note that BHEL approved anti-corrosive black bituminous paint & bituminous sealing compound required for above works will also be supplied by him at his cost.
12.8	Only 2% wastage allowance for the wool mattresses, LBM mattresses and cladding sheets is allowed.
12.9	The contractor shall leave certain gaps and opening while doing the work as per instructions of BHEL engineer to facilitate inspection during commissioning and to fix gauges, fittings and instruments. The gaps will have to be finished as per drawings at a later date by the contractor at his cost.
12.10	If during erection and commissioning any of the parts are to be temporarily fixed and then replaced by permanent ones at a later date or if some parts are to be opened for inspection and checking and for measurement of metal surface temperature, the same may necessitate removal and re-application of insulation and sheet metal cladding, which shall be done by the contractor and the quoted rate shall be inclusive of such contingencies.
12.11	Removable type of insulation shall be provided for valves, fittings, expansion joints etc as per the drawings or as directed by BHEL engineer.
13.0	**HYDRO TEST AND OTHER TESTS**
	The contractor shall carry out the required tests upto the specified terminal points of the boiler and the pipelines such as hydro test of boiler pressure parts / pipings etc. All the tests shall be repeated till the successful completion test is certified by BHEL engineer. The contractor shall lay all required temporary pipeline with valves, pressure gauges, blank plates etc. and install the pump required for the test. Pump required for the testing has to be organised by the contractor. On completion of the test all temporary installations will be removed at no extra cost.
14.0	**PRE-COMMISSIONING, COMMISSIONING & POST-COMMISSIONING.**
14.1	All works mentioned hereunder shall be carried out within the quoted price/ rates.
14.2	Contractor shall lay out all necessary temporary piping, install the pumps, tanks etc with access platforms valves, pressure gauges, electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the valves etc, required for various activities like hydro test, alkali boil out, chemical cleaning , steam blow off or any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off-site disposal of effluents, site clean-up and removal of temporary piping, pumps etc and returning same to stores. Charges for dismantling of temporary lines etc, should be included in the quoted rates.
14.3	It shall be responsibility of the contractor to preserve the boiler as per BHEL requirement.
14.4	In case any defect is noticed during tests, trial runs and commissioning such as loose components, undue noise or vibration, strain on connected equipment etc, the contractor shall immediately attend to these defects and take necessary corrective measures. If any readjustment and realignment are necessary, the same shall be done as per engineer's instructions including repair, rectification and replacement work by the contractor at his cost. The parts to be replaced shall be provided by BHEL.
14.5	It shall be the responsibility of the contractor to provide various category of workers in sufficient numbers along with supervisors and erection & commissioning engineers, including necessary consumables, T&P, IMTEs etc, and any other assistance required during pre-commissioning, commissioning, post commissioning, trial run, of equipment and attending any problem in the equipment

	erected by the contractor till handing over and PG test. Association of BHEL's/ client's staff during above period will not absolve contractor from above responsibilities.
14.6	It shall be specifically noted that the above employees of the contractor may have to work round the clock along with BHEL Engineers and hence overtime payment by the contractor to his employees may be involved. The contractor's quoted rates/ price shall be inclusive of all these factors also.
14.7	In case, any rework is required because of contractor's faulty erection which is noticed anytime till Handing Over, the same has to be rectified by the contractor at his cost. If any equipment/ part is required to be inspected during any stage of Erection/commissioning, the contractor will dismantle/ open up the equipment/ part and re-assemble/ redo the work without any extra claim.
14.8	During commissioning, opening/ closing of valves, changing of gaskets, realignment of rotating and other equipment, attending to leakage, minor adjustments of erected equipment may arise. The price/ rates shall include all such works.
14.9	The contractor shall carry out cleaning and servicing of valves and actuators, valve actuators prior to pre-commissioning tests and/ or trial operations and/or PG test of the plant. A system for recording of such servicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer and to ensure that no valves and valve actuators are left un-serviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap/ grind valve seats or any other associated works, as required for system completion.
14.10	The contractor shall carry out any other test as desired by BHEL Engineer/ Manufacturer on erected equipment covered under scope of this contract during testing and commissioning to demonstrate the physical completion of any part or parts of the work performed by the contractor.
15.0	**PROGRESS REPORTING & PLANNING**
15.1	Contractor is required to draw mutually agreed monthly erection program in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed programme and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.
15.2	Weekly progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. The program for subsequent week shall also be presented by contractor for discussions. The contractor shall constantly update/ revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of non-conformities.
15.3	The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables (gases/ electrodes) report and other reports as per proforma considered necessary by the engineer.
16.0	**FINISH PAINTING**
16.1	Painting of all exposed metal parts of the equipment, structure, auxiliaries, piping, electrical and C&I items (covered within the scope of this contract and received painted from manufacturing units), after thoroughly cleaning all such parts of all dirt, rust, scales, grease, oils and other foreign materials by wire brushing scrapping, any other method as specified by supplier/ as per requirement of BHEL is included under the scope of the contractor. Before application the surface being painted need to be inspected and approved by the engineer. Bare/ unpainted surfaces and un-insulated piping surfaces shall be provided with two coats of primer of red-oxide zinc chromate (IS-2074). The gas cut stubs would require to be ground and rounded before painting.
16.2	While structural members and casings will be supplied with some intermediate coat of painting from the shop, some members will be supplied with primer coat applied on the same. All structural members and casings

	shall be finish painted with two coats of ALIPHATIC ACRYLIC POLYURETHANE PAINT with a film thickness of not less than 30 micron. Other surfaces need to be painted with Synthetic enamel paints with a film thickness of not less than 40 micron. Silencer and un-insulated steam lines are to be painted with heat resistance aluminium paint. Total dry film thickness of primer and finish coats shall not be less than 70 microns for Aluminium paint.
16.3	Required quantities of paints to be provided by Contractor free of any charges within the quoted price / rate. Before application, the paints and primers need to be inspected and cleared by BHEL engineer. Other tools and consumables including scaffolding materials required for finish painting also shall be supplied by contractor at no extra cost to BHEL.
16.4	Certain equipment like control panels etc shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting of such equipment at his own cost. Spray painting at the job site shall be permitted only at times and locations approved by the owner/ engineer.
16.5	The insulated pipe lines though not to be painted but to be provided with colour bands as specified for each system in the colour code scheme. The contractor shall provide legends with direction of flow on equipment and piping in size specified by Engineer. Letter writing shall be done in Hindi/ English or in both language.
17.0	**INSURANCE**
17.1	BHEL shall arrange comprehensive MCE (marine cum erection) Insurance Policy for 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 each unit including theft, sabotage, fire, lightning and other natural calamities.
17.2	Bidder shall timely intimate despatches to the underwriter. The name of the underwriter and Policy No shall be intimated in due course of time.
17.3	Bidder shall be responsible for timely submission of loss/ damage/ theft to the underwriter, assistance in lodging & settlement of claim for losses/ damages/ theft/ lodging of FIR with police. Any consequential loss arising out of non-compliance of this stipulation will be borne by bidder.
17.4	It is bidderr entire responsibility to insure bidderr workmen against accident and injury while at work as required by the relevant rules and to pay compensation, if any, to bidder workmen as per workmen's compensation act. Bidder has also to insure his staff against accident/ injury. Bidder have to take insurance cover for his tools & plants, assets etc.
17.5	These insurance covers have to be taken prior to start of work at project and bidder shall make available the policy to Construction Manager, BHEL site for necessary verification before commencement of work. However, irrespective of such verification/ acceptance, the sole responsibility to maintain adequate insurance cover for his workmen, T&P, assets etc at all times during the period of contract shall lie with bidder. Regarding the aforesaid insurance cover, bidder shall directly deal with the Insurance Company for all matters regarding the insurance in his scope.
17.6	Bidder 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, bidder will submit necessary documents. BHEL will reserve the right to recover the loss from bidder as detailed below in case the damage/ loss is due to negligence/ carelessness on his part. In case of theft of material under his custody, the same shall be reported to police by bidder 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 bidder of his contractual obligation for the materials in his custody.
17.7	It will be his responsibility to replenish the items lost/ damaged in time without hampering the schedule of work and without waiting for settlement of insurance claim. Amount received from the underwriters on settlement of insurance claim

	shall be passed on to bidder as and when available.
17.8	In case the claim is summarily rejected by the underwriters due to his WILFUL NEGLIGENCE and bidder fail to replenish the items lost/ damaged, the entire cost of repair/ replacement will be recovered from bidder.
17.9	Other conditions of Insurance shall be as per relevant clause of GCC.
18.0	**FACILITIES TO BE PROVIDED BY BHEL/CONTRACTOR**
18.1	BHEL shall provide limited open space for site office and store in project complex. It is the responsibility of the contractor to construct sheds, provide all utilities like electricity, drinking water etc. and dismantle and clear the site after completion of work or as and when required as a part of his scope of work.
18.2	Contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical facilities etc. to the personnel employed by him, at his own cost as required under various labour laws and statutory rules/ regulations.
18.3	The contractor shall submit to the Engineer his electrical power requirements. Construction power shall be provided at point near erection site on chargeable basis, Calibrated (by statutory authority) meter for power consumption to be installed by contractor. Further distribution shall be done by contractor at his cost. All wiring must comply with statutory regulations and will be subject to Engineer's inspection and approval before connecting supply.
18.4	Water for construction purposes shall be provided on free of any charge at point within erection site. Further distribution shall be arranged by the contractor at his cost.
18.5	Following points should be strictly adhered to by the contractor while drawing construction power supply from Distribution Board.
18.5.1	All electrical installations should be as per Indian Electricity rules.
18.5.2	All distribution Boards installed by the contractor should be constructed with fire proof materials viz steel frames, bakelite sheets etc.
18.5.3	Connection for single phase should be taken from phase and neutral. No where the connection should be taken with earth as neutral.
18.5.4	All electrical connections should be made through connectors, nuts and bolts, switches, plug and sockets. Loose connections or hooking up of wires shall not be permitted.
18.5.5	Contractor have to make their own earthing arrangement for their equipment/ DB earthing. The earthing connections have to be done with copper conductor and copper/ brass clamps with BHEL's prior permission.
18.5.6	All electrical equipment/ tools and plants should be properly earthed. DBs to be dearthed diagonally opposite at two points.
18.5.7	Contractor should use "MCCB" and "ELCB" either on incoming or outgoing connections to the DBs.
18.5.8	Contractor should ensure that all the CBs/ TPNs/ Fuses/ MCCB ELCB cables etc. should be of adequate rating/ capacity.
18.5.9	For permission of supply connections contractor has to submit a test report of their installations with a single line diagram of connected/ proposed loads.
18.5.10	ELCB will be tested once in a week by actually simulating the earth leakage for all installations and the same shall be recorded by BHEL Engineer in the log book to be maintained by the contractor.
18.6	In case of power cuts/ load shedding no compensation for idle labour or extension of time for completion of work will be given to contractor.
18.7	Adequate lighting facilities such as flood lights, hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractor's material storage area etc. within the quoted rates.
18.8	On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and levelled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, same will be got done by the Engineer and expanses incurred shall be recovered from the contractor along with prevailing overhead. The decision of

	BHEL Engineer in this regard shall be final.
18.9	BHEL, as per site requirement will provide(preferably 120T/150T crawler crane with telescopic boom, alongwith operator) for a limited period / few days for erecting the last few Shells of Chimney (height 70 M) weighing around 2 MT each ,75 Mt capacity crane for normal erection free of charge.For keeping the above cranes in operating condition ,The contractor has to arranged regular maintenance at his own cost.
19.0	**CONSUMABLES**
19.1	The contractor shall provide at his cost all consumables including special electrodes (Alloy steel stainless steel etc.), TIG filler wires, gases (oxygen, acetylene, Argon etc.),consumables for electrical/C&I works(as per scope of work) like cable lugs/ glands/ferrules/tags/sleeves etc. required for the work except those which have been specifically indicated as BHEL Supply. The consumables supplied by contractor shall be subject to approval of BHEL engineer prior to use.
19.2	All the shims gaskets which form finally a part of equipment shall be supplied by BHEL free of cost.
19.3	It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.
19.4	It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes etc. before procurement of welding electrodes/ TIG wires. On receipt of electrodes at site these shall be subjected to inspection and approval by BHEL. The contractor shall inform BHEL details regarding type of electrodes, batch No. date of expiry etc. and produce test certificate for each lot/ batch with correlation of batch/ lot no. with respective test certificate. No electrode will be allowed without valid test certificate.
19.5	In the event of failure of contractor to bring / procure necessary consumable, BHEL reserves the right to procure the same from any source and recover the cost from the Contractor's first subsequent bill at market value plus the departmental charges/overhead of BHEL from time to time (30% at present). Postponement of such recovery is normally not permitted. The decision of Engineer in this regard shall be final and binding on the Contractor.
19.6	All lubricant and chemicals required for cleaning, pre-commissioning, commissioning, testing, preservation and lubricants required for commissioning, trial run etc of the equipment shall be supplied by BHEL/ BHEL's client.
19.7	All services including labour and T&P will be provided by the contractor for handling, filling, emptying, refilling, etc. The consumption of lubricants/ chemicals shall be properly accounted for. Surplus material if any shall be properly stacked and returned to stores. Transportation of oil drums, from stores, filling of oil and filling of oil for flushing, first filling of oil and subsequent changeover or topping/ making up till the unit is fully commissioned and handed over to customer is included in scope of this contract. The contractor shall have to return all the empty drums to BHEL/ BHEL's client store at no extra cost. Any loss/ damage to above drums shall be to contractor's account.
20.0	**INSPECTION, MEASURING & TESTING EQUIPMENTS**
	The contractor shall ensure deployment of reliable and calibrated inspection, measuring and testing equipments. The IMTE shall have test / calibration certificate from authorised / Govt. approved agencies. The contractor shall also keep alternate provision for such IMTEs so that work does not suffer when a particular instrument is sent for calibration.
21.0	**ISSUE OF T&P**
21.1	T&Ps to be provided by BHEL to sub-contractor free of hire charges, if any, shall be shared by other sub contractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding. Fuel will be given by BHEL free of cost, for all such T&Ps, which are issued free of cost by BHEL, on sharing basis. Although, normal maintenance of these BHEL issued T&Ps will also be done by BHEL, if the breakdown of T&P is due to reasons attributable to the contractor, then

	contractor has to bear the expenditure of such repair/maintenance.
21.2	In case of non-availability of the T&Ps to be provided by BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan/ amend/ alter his activities to meet erection/ commissioning targets in consultation with BHEL. Depending on availability of T&Ps, BHEL may provide alternate T&P, free of charges, as substitute of contractual provision of BHEL T&P(Capacity of the alternate T&P, if provided by BHEL, may be more or less than contractual provision of BHEL T&P), based on particular requirement of job.
21.3	Regular utilisation report of the BHEL T&Ps as per requirement of BHEL shall be furnished by the contractor. Any loss/ damage to any part of BHEL T&Ps and IMTEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.
21.4	In the event of contractor not using and maintaining BHEL T&Ps according to BHEL's instructions. BHEL will have the right to withdraw such item without any notice and no claim in this regard shall be entertained and contractor shall be responsible for delay in execution on this account.
21.5	Besides the T&Ps being made available to contractor free of hire charges by BHEL, all other T&Ps 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. In the event of the failure of contractor to bring necessary and sufficient T&Ps, BHEL will be at liberty to arrange the same at the risk and cost of contractor including transportation cost of same from any of BHEL site/ place and hire charges as applicable shall be deducted from contractor's bill. Decision of BHEL in this regard shall be final and binding on contractor.
21.6	The day to day and routine maintenance of BHEL's T&Ps should be carried out by contractor as per manufacturer's/ BHELs' maintenance schedule at his cost. These shall be maintained in good working condition during the entire period of use. T&Ps in defective/ damaged condition shall be rectified promptly to the full satisfaction of BHEL engineer. Contractor shall maintain records for maintenance of major T&Ps which shall be made available for Inspection whenever required. In case of any lapses on the part of the contractor, BHEL at its own discretion will get the servicing/ repair of equipment done at the risk and cost of the contractor with BHEL overheads.
21.7	For BHEL provided cranes, repair/ replacement of filter, batteries, self, dynamo, gaskets, hoses, oil seals and rubber parts shall be the responsibility of BHEL, provided the damage is not due to the negligence of the contractor. However, if there are breakdowns/ damages due to negligence of the contractor, the complete service/ repair charges and cost of all the spares damaged, with BHEL overheads shall be to the account of contractor and shall be recovered from his RA bills.
21.8	The contractor shall return BHEL T&Ps issued to him in good working condition as and when desired by BHEL (on completion or reduction of work load). If return of T&P is delayed by contractor, hire charges as applicable shall be levied by BHEL from time, it was requisitioned till the time of actual return
21.10	Contractor shall ensure deployment of serviced and healthy T&Ps including cranes, lifting tackles, wire ropes, Manila ropes, winches and slings etc. History card and maintenance records for major T&Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Identification for such T&Ps will be done as per BHEL Engineer's advice. All T&Ps should carry valid test certificate and periodical test report to be furnished. The T&Ps shall have test / calibration certificate from authorised / Govt. approved agencies. The contractor shall also keep alternate provision for such T&Ps so that work does not suffer in any means.
22.0	**PRESERVATION OF COMPONENTS & RETURN OF SURPLUS MATERIAL**
22.1	The contractor shall ensure that all surplus/ damaged/ scrap/ unused material, packing wood/ containers/ special transporting frames etc are returned to BHEL at

	a place in project area identified by the Engineer. An account will be maintained by the contractor for all such items received and returned to BHEL. Any shortage in returning such items shall be chargeable to the contractor excepting an amount of 5 % allowable against wastage for packing wood only. The contractor shall return all surplus materials with proper identification tags to the concerned BHEL engineer.
22.2	After taking delivery from BHEL/ customer's stores, plant materials storage shall be subjected to the following protection besides other provisions indicated in these specifications elsewhere.
22.2.1	Items stored outdoors shall be blocked up at lease six inches (5") off the ground
22.2.2	Motors, valves, electrical equipment, control equipment and instruments etc shall be stored indoors in warehouse provided by contractor. Motor windings shall be kept dry by use of external heat or space heaters.
22.2.3	Bearings and other wearing surfaces of plant materials shall be protected against corrosion and kept clean.
22.2.4	Insulation materials shall be stored indoors or otherwise protected against getting wet.
23.0	**COMPLETION PERIOD**
23.1	Entire work of erection, testing, commissioning, trial run, handing over etc of 2 no HRSGs & 2 no UBs along with all 2 sets of diverter damper/ guillotine/ bypass stack shall be completed by 16 (Sixteen) months from date of start of work.
23.2	The contractor shall mobilize to start the work within 20 days from the date of written confirmation from BHEL.
23.3	However, actual date of start of work will be certified by Construction Manager, BHEL site on successful erection of first component of by-pass stack/ first column of HRSG or specified otherwise by BHEL after award of work.
24.0	**CONSTRUCTION SCHEDULE**
24.1	Bidder shall plan activities accordingly to match the milestone schedule enumerated below. However, the stated schedule is indicative and actual milestones shall be finalized during execution at site depending on project's requirement.
24.2	A bar chart showing of various milestones to be submitted by the bidder within one month from date of LOI to Construction Manager, BHEL site for approval.
24.3	Generally, out of 2 nos HRSG and 2 nos Utility Boiler (UB), the erection priority will be decided by BHEL, as per site condition. For guidance purpose, the HRSG, whose work will be started first will be designated as 1st HRSG and the system of diverter damper/ guillotine/ bypass stack, whose work will be started first will be designated as 1st set of diverter damper/ guillotine/ bypass stack. Similar nomenclature will be followed for 2nd HRSG and 2nd of diverter damper/ guillotine/ bypass stack (As per nomenclature of customer, HRSG unit nos will be assigned to the above mentioned set nos of HRSGs). Similar way, UBs will be designated.
24.4	The various milestones to be achieved for each HRSG and each UB , are as under:

Milestone		Milestone dates			
		1ST HRSG	2ND HRSG	1st UB	2ND UB
24.4.1	Erection start	08-07-11	29-10-11	29-06-11	31-12-11
24.4.2	Completion date	31-03-12	29-06-12	31-05-12	02-07-12

24.5	In addition to above, milestones for following completion schedule is also to be maintained by the contractor.
24.5.1	Diverter damper/ guillotine/ bypass stack, 1st set - By 31-03-12.
24.5.2	Diverter damper/ guillotine/ bypass stack, 2nd set - By 29-06-12.
24.6	Based on requirement of the project commissioning target, the milestone schedule and /or completion schedule may be required to be squeezed by the contractor for which additional resource mobilization will be required. The contractor has to augment all necessary resources to complete the balance works for achieving such targets of preponement of the completion schedule or the intermediate milestone schedules by 20 % and no extra payment shall be made for this.
24.7	If the schedule compression required is more than 20 % and the requirement arises due to reasons not attributable to the contractor, BHEL will provide additional T&Ps

	required without any charge to the contractor and the contractor has to provide/ augment matching resources like manpower, consumables etc. at his cost. The extent of resource augmentation required will be reviewed by Construction Manager, BHEL site with the contractor before finalizing deployment and subject to deployment of the T&Ps by the contractor commensurate with the contractual completion schedule. The terms and conditions for these additional T&Ps shall be governed by the contract condition for similar BHEL T&Ps provided free of hire charges to the contractor.
24.8	The work under the scope of this contract is completed in all respect, only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on actual completion date achieved, shall be final & binding on the contractor. However, the contractor has to be also responsible for successful completion of PG test, which will be conducted within 2 months of completion of trial operation & handing over. For conductance of PG test, BHEL will intimate the contractor with an advance notice of approx 15 days. The contractor has to acknowledge & accept BHEL's above notice within 5 days of receipt of notice and make proper mobilisation at site for PG test with all necessary tool & plants, instruments, manpower etc, within above notice period. In case of delay in accepting BHEL's notice for PG test beyond stipulated period or failure on the part of the contractor to mobilize for PG test by stipulated period, BHEL reserves the right to get the job done suitably at the risk & cost of the contractor without any prejudice and without any further notice to the contractor.
25.0	**TAXES AND DUTIES**
25.1	All taxes (except Service Tax including Educational Cess), WCT under state VAT act, duties, charges etc for execution of the contract shall be borne by the contractor and shall not be payable extra. Any increase of the same at any stage during execution of the contract shall have to be borne by the contractor. Quoted price of the bidder shall be inclusive of all such requirements.
25.2	Service Tax (including Educational Cess) as legally leviable & payable by the contractor under the provisions of applicable law/ act shall be paid by BHEL as per contractor's bill. However, contractor shall have to submit proof of Service Tax deposited by them immediately after the deposit but not later than the next bill submitted after the due date of deposit. The contractor shall furnish proof of Service Tax registration with Central Excise Division covering the services covered under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by contractor on BHEL for this project. The contractor shall obtain prior approval of BHEL before billing the Service Tax amount.
25.3	With introduction of CENVAT credit rules 2004 which came into force wef 10-09-04, Excise Duty paid on input goods including capital goods used for providing the output service and service tax paid on input service can be taken credit of against the Service Tax payable on output service. As such, while offering the rates, the contractors may take into account the benefit of above provisions as the cost of input to contractors will be the cost net of Excise Duty and Service Tax and adjust their offer price accordingly to make it more competitive.
25.4	As such, bidder's quoted price shall be exclusive of Service Tax (including Educational Cess). Any changes in Service Tax rules (by Govt) shall be complied with.
25.5	Vendor shall have to opt for composition scheme applicable for execution of the contract vide notification no 32/2007, dated 22-06-07.
25.6	Contractor should be registered under state VAT Act. They should produce their Registration No and copy of Registration Certificate as proof of registration and contractor shall produce proof of payment of VAT so that BHEL as main contractor can get the benefit of deduction of input credit from the contractual transfer price under state VAT Act. Contractors should produce Tax Invoice, copy of tax paid challan, copy of returns of the bidder showing BHEL portion of job value separately and other necessary documents to BHEL as required under state VAT Act/ Rules so that BHEL can avail input credit under VAT Act.

25.7	The contractor has to make his own aqrrangement at his cost for completing the formalities, if required, with state VAT authorities, for bringing their materials, plants & materials at site for the execution of the works under this contract, road permit/ way bill, if required, shall be arranged by the contractor and BHEL/ PSER will not supply any road permit/ way bill for this purpose. The contactor must be a registered dealer with the state VAT Acvt, if anot registerd yet, and a copy of the said registration certificate along with TIN No must be provided to site RAO.
25.8	New tax & duties, if imposed subsequent to latest due date of offer submission, by statutory authority during contract period (including extension, if the same is not attributable to the contractor), shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, the vendor shall obtain prior approval from BHEL before depositing new taxes and duties.
26.0	**TERMS OF PAYMENT**
	Subject to any deduction which BHEL may be authorised to make under the contract, the contractor on the certificate of the engineer at site, be entitled for payment as explained hereunder.
26.1	PROGRESSIVE PAYMENT (ON PRORATA BASIS FOR EACH UNIT - 80 % OF UNIT RATE)
	There are 2 types of products eg, (A-I) All products (other than insulation, ie other than PGs 32, 33 & 37) & (A-II) Insulation (Products under PG 32, 33 & 37), against which the progressive payment has been shown under options A-I & A-II respectively.
26.1.1	A-I (APPLICABLE FOR ALL PGS EXCEPT 32,33 & 37)
26.1.1.1	20% of unit rate on prorata basis on pre-assembly wherever applicable and 20% of the contract rate on prorata basis on placement in position and rough alignment for the items where pre-assembly is involved.
	OR
	40% of unit rate on prorata basis on placement in position and rough alignment for the items where pre-assembly is not involved.
26.1.1.2	35% of the contract rate on prorata basis on final alignment/ fastening/ leveling/ welding/ grouting along with proper supports including radiography/ NDT/ stress relieving etc wherever involved.
26.1.1.3	5 % of unit rate on prorata basis on completion of total work pertaining to the applicable product as may be decided by Engineer.
26.1.2	A-II (APPLICABLE FOR 32, 33 & 37)
26.1.2.1	20 % of unit rate on readiness for Application (application of red-oxide painting, if applicable, hook/ retainer/ insulation strip/ support etc welding & arrangement of scaffolding etc).
26.1.2.2	30 % of unit rate on application of wool mattress.
26.1.2.3	30 % of unit rate on complete work completion including aluminum sheeting, sealing etc as may be decide by engineer.
26.2	MILESTONE PAYMENT (PRO-RATA PAYMENT FOR EACH UNIT – 11 % OF UNIT RATE)
26.2.1	3.0 % of unit rate on completion of diverter damper/ guillotine/ bypass-stack system.
26.2.2	2.0 % of unit rate on successful completion of boiler hydraulic test.
26.2.3	2.0 % of unit rate on completion of alkali boil out.
26.2.4	2.0 % of unit rate on completion of steam blowing.
26.2.5	2.0 % of unit rate on completion of safety valve floating.
26.3	FINISH PAINTING (PRO-RATA PAYMENT FOR EACH UNIT) - 2 % OF UNIT RATE.
26.4	COMPLETION OF TRIAL OPERATION/ UNIT HANDING OVER (PRO-RATA PAYMENT FOR EACH UNIT - 2 % OF UNIT RATE.
26.5	MATERIAL RECONCILIATION (PRO-RATA PAYMENT FOR EACH UNIT) - 2% OF UNIT RATE.
26.6	PG TEST (PRO-RATA PAYMENT FOR EACH UNIT) - 3% OF UNIT RATE.
26.7	TOTAL - 100 %.

26,8	Out of above break-up, 1.5 % shall be released for payment against each RA bill 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 you in each month, no payment shall be made by BHEL against corresponding activity and no claim of you at a later date, whatsoever, in this regard shall be entertained by BHEL.
26.8.1	0.7 % shall be paid on compliance of house-keeping of your working area and store/ office areas.
26.8.2	0.3 % shall be paid on compliance of general illumination of your working area and stores, office area.
26.8.3	0.2 % shall be paid on compliance of applicable OHSAS requirement as per guidelines of BHEL/ PSER and as specified in the contract.
26.8.4	0.3 % shall be paid on compliance of applicable safety requirement as per guidelines of BHEL/ PSER and as specified in the contract.
26.9	Moreover, out of above break-up of payment, 5% will be retained from all RA bills which will be released on completion of guarantee period of 12 months. The guarantee period shall commence from the date of successful completion of Trial operation of the unit. However, this 5% payment can be released against submission of performance bank guarantee valid for the guarantee period in prescribed proforma subject to receipt of certificate that all the works are completed in all respect.
26.10	The submission of bank guarantee towards performance guarantee is separate and the bank guarantee towards security deposit cannot be utilised for this purpose. The security deposit shall be refunded as per GCC.
26.11	The contractor shall extend all required support for successful conductance of PG test and also support required during the Guarantee period, including attending & resolving any fault/maloperation/non-achievement of desired parameters etc of any equipment/system, as reported by BHEL. For the purpose of this contract, 'Trial operation' and 'Trial run' of the unit , will mean the same.
26.12	BHEL at its discretion may further split up the percentage breakup given in billing schedule and effect payment to suit site conditions cash flow requirement etc. according to progress of work.
26.13	The engineer (which will mean 'BHEL Engineer', for the purpose of this tender), will verify, certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement book.
26.14	Contractor shall submit bills for the work completed under the specification, once in a month detailing work done during the month. The format for billing shall be approved by BHEL before raising invoices.
26.15	Subject to any deduction which BHEL may be authorised to make under the contract, the contractor on the certificate of the engineer at site be entitled for payment as explained above.
26.16	BHEL at its discretion may further split up the percentage breakup given in billing schedule and effect payment to suit site conditions cash flow requirement etc. according to progress of work.
26.17	Pro-rata payment will be made against each RA bill approx within 30 days of submission of invoice based on site engineers verification regarding the completion of the work subject to the correctness & completeness of the invoice.
26.18	Contractor is required to submit provident fund contribution and state insurance premium (ESI) prior to RA bill payment to their employees. Above documentary proof to be submitted within 21 days to release next payment. All other term & conditions of this specification, not mentioned above shall be governed by the pertinent provisions of GCC, Volume-IB. As per norms of the customer, the contractor shall comply with the special safety rules of customer, as existing and as imposed from time to time.
27.0	**MOBILISATION ADVANCE**
	Not applicable for this tender.
28.0	**ESCALLATION/ PRICE VARIATION CLAUSE (PVC)**

28.1	After the `Base Date', and/ or during the progress of work, the monthly price adjustment amount of the contract price will be computed as per the formula given below. The base date shall be reckoned as 09-03-10.
28.2	$ER = ER_1 – ER_0$.
28.3	ER_1 will be computed as follows. $ER_1 = ER_0 (0.15 + 0.85 \frac{L_1}{L_0})$, where ER = Adjustment to contract price payable to you for each billing. ER_1 = Adjusted amount payable to you of contract price for each billing. ER_0 = Value of the work done in the billing period.
28.4	The payment of price adjustment amount so computed shall be made against a separate invoice linking the corresponding invoice (gross RA bill amount) after retaining the prorate amount due on completion of guarantee/ final bill (as per payment terms of contract). The amount so retained shall be paid on successful completion of guarantee/ final bill (as per payment terms of contract). L_0 = All India Consumer Price Index for Industrial Workers (All India Average) as published by Labour Bureau, Simla, Government of India as on base date. L_1 = All India Consumer Price Index for Industrial Workers (All India Average) as published by Labour Bureau, Simla, Government of India for the month of work done.
28.5	Total PVC payable/ recoverable against the contract shall have an overall ceiling of 12 % of contract price.
28.6	The quantum of such price variation amount per month shall be restricted to the ceiling percentage for each RA Bill amount. The final adjusted amount of PVC will be paid along with the final bill.
28.7	You shall produce necessary Government Notifications/ RBI Bulletins of above component for receiving payment from BHEL/ refund to be made to BHEL, as required, in the formula mentioned above.
28.8	You will be required to raise bills for PVC payment on monthly basis along with RA Bill irrespective of the fact whether, any increase/ decrease in price/ index has taken place or not.
28.9	PVC shall be admissible up to the original completion period, as stated above.
29.0	**OVER RUN COMPENSATION (ORC)**
29.1	In case, due to reasons not attributable to you, the work gets extended beyond original completion period, stated above, you shall be entitled for over run compensation (ORC).
29.2	The total ORC amount shall be limited to 10% of the contract value.
29.3	ORC shall be applicable as per following.
29.3.1	The rate/ price of balance part of job beyond normal completion period shall be revised by 10 % from 1st month of extended period. This revised rate shall remain valid for one year.
29.3.2	The above revised rate shall be further revised by 10 % per year in the subsequent years and this re-revised rate shall remain valid for one year and so on till completion of contract.
29.4	During the extended period, you shall maintain your resources as per mutually agreed program. However, you have to deploy additional resources, if required, to complete the job within the re-scheduled completion period.
29.5	Payment of ORC shall be subject to compliance to following condition.
29.5.1	You shall maintain minimum resources as per agreed program and certified by BHEL.
29.5.2	You shall achieve the target as per agreed program.
29.5.3	The example is indicated below. Rate/ price of balance job on contractual completion date. = A, say

	Revised rate during the 1st year after contractual completion date. = 1.1A Revised rate during second year after contractual completion date plus one year. = 1.21A <u>Note</u> (a) Enhanced rate shall not be applicable during the period in extension where reasons for delay are attributable to you as explained below: Contract period extended = 8 months, say Out of 8 months delay, supposing you are responsible for 3 months delay and BHEL is responsible for 5 months delay. Revised rate 1.1 A shall come into effect on expiry of contract period plus 3 months. Revised rate 1.1A shall be in force for one year thereafter. (b) For further extension if any, for application of ORC, above logic shall be applicable after evaluating the reasons of delay. That is, the revised rate for 2nd year shall come into effect on expiry of delay period attributable to you during first year, ie, extended period. Contract period + your delay (3 month in above case) + one year + your delay during one year extended period. This revised rate 1.21A shall remain in forces for one year thereafter. And so on.
30.0	**EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION WORK**
30.1	BHEL may consider payment for extra work on man-hour basis for such of those works which require major rectification/ revamping/ re-work which is totally unusual to the normal erection commissioning work which are not due to contractors faulty erection which contribute more than twenty man-hours for each case. The following all inclusive man-hour rates will be applicable for extra works as defined above.
30.1.1	Average single man-hour rates including overtime, if any, supervision, use of T&Ps, equipment and other site expenses and incidentals including consumables as per the scope of this tender specification for carrying out rework / revamping as certified by site, as may arise in the course of erection, testing and commissioning for all types of jobs. - Rs 40.00 per man-hour (Rupees forty per man-hour).
30.1.2	Average single man-hour rates including overtime, if any, supervision, use of T&Ps, equipment as per the scope of this tender specification and other site expenses and incidentals but excluding consumables for carrying out rework/ revamping as certified by site, as may arise in the course of erection, testing and commissioning for all types of jobs. - Rs 25.00 per man-hour (Rupees twenty five per man-hour).
30.2	All the extra work, if any, carried out should be done by a separate gang which should be identified prior to start of work for certification of man-hours. Daily labour sheets should be maintained and should be signed by the contractor's representative and BHEL's engineer. Signing of labour sheet does not necessarily mean acceptance of extra work.
30.3	The extra work rates for above shall be firm and not subject to any escalation till the completion work.

30.4	In the event of any dispute regarding acceptance of any work as " Extra" , the work has to be carried by keeping man-hour and consumable record jointly signed with remark " For HQ Decision ". Under no circumstances the contractor can refuse to carry out such work with any pre condition, save and except of keeping the daily record of category of man-hour and consumables spent for the particular job for further consideration by HQ at Kolkata.	
31.0	**EXTRA WORK RATE FOR HIGH PRESSURE JOINTS**	
31.1	The following are all inclusive rates will be applicable for rectification / modification / rework involving welding of high pressure joints.	
31.2	Unit rate per equivalent water wall joint of size OD 63.5 mm x 6.3 mm thick.	
	Type of material	Average rate per joint
31.2.1	Carbon steel	Rs.200.00
31.2.2	Alloy steel & S.S	Rs.250.00
31.3	The rate indicated above are firm and are not subject to any escalation during the contractor period till the completion of work unit rates for welding are all inclusive including joint preparation, cutting, edge preparation, welding and stress relieving, radiography with all consumables and tools and plants.	
31.4	For additional radiography, if so desired by BHEL, payment @ Rs.5.00 per cm length of film (100 mm wide) exposed and accepted by site engineer and further certified by site Engineer that the length of film exposed is minimum required for carrying out the radiography shall be paid.	
31.5	All the extra work, if any, carried out should be done by a separate gang which should be identified prior to start of work for certification of man hours. Daily labour sheets should be maintained and should be signed by contractors representative and BHEL's engineer. Signing of labour sheets does not necessarily mean acceptance of extra works.	
31.6	The above man-hour rates towards extra works shall be firm and not subject to any escalation.	
31.7	In the event of any dispute regarding acceptance of any work as "EXTRA", the work has to be carried out by keeping man-hour and consumables record jointly signed with remark "For HQ decision". Under no circumstances, contractor can refuse to carry out such work with any pre-condition, save and except of keeping the daily record of category of man-hours and consumables spent for the particular job for further consideration by HQ at Kolkata.	
32.0	**CONTRACT PRICE**	
32.1	Bidder shall quote rates against each item of every schedule of Volume-IIIA (Latest revision).	
32.2	Total price will be considered for evaluation and awarding.	
32.3	The quantities of the various items mentioned in pertinent schedules of Volume-IIIA are approximate, based on very preliminary information and may vary to any extent or 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 work executed under the tender including extra items, if any, but excluding any price variation, remains within ± 20 % (Plus/ minus twenty percent) of total contract price of LOI/ WO.	
33.0	**LIQUIDATED DAMAGE/ PENALTY FOR DELAY**	
33.1	Subject to force majure, if contractor fails to complete the job as per aforesaid completion period, BHEL shall have the right to recover as liquidated damages/ penalty a sum equivalent to 0.5 % (half percent) of the price under SCH-3 & SCH-4, of Volume-IIIA, including taxes, duties for delay of each week or part thereof. The liability for delay shall not in any case exceed 5 % (five percent) of total executed contract price under the tender, including taxes, duties. For deduction of the said penalty BHEL needn't justify the quantum of damages suffered by BHEL on account of such delay.	
33.2	Other terms & conditions shall be as per the provision of GCC of this tender.	
34.0	**GUARANTEE**	
34.1	Even though the work will be carried out under supervision of BHEL, the contractor	

	will be responsible for the quality of workmanship, quality of materials/ items and design for which the contractor is responsible.
34.2	The contractor shall guarantee the work executed under the scope of the contract for a period of 12 (twelve) months from the date of start of guarantee period as certified by the engineer (ie on completion of total work under scope and/ or taking over by BHEL) and shall rectify free of cost all defects due to faulty supply or work done. In case the contractor fails to repair/ replace the defective works within the time specified by the engineer, BHEL may proceed to undertake the repairs/ replace such defective works at contractor's risk and cost without prejudice to any other rights and recover the same from security deposit/ other dues.
35.0	**OTHER TERMS**
	All other term & conditions of this specification shall be governed by the pertinent provisions of GCC, Volume-IB as applicable.

ANNEXURE-I

A. WEIGHT SCHEDULE FOR UTILITY BOILER (TOTAL)

SL NO	DESCRIPTION	WEIGHT (MT)
1	Pressure parts.	632
2	Non-pressure parts.	848
3	Chimney.	350
4	Piping.	200
5	Fuel firing syste.	65
6	Lining & insulation.	140
TOTAL		**2235**

B. WEIGHT SCHEDULE FOR HRSG (TOTAL)

SL NO	DESCRIPTION	WEIGHT (MT)
1	Pressure parts.	584
2	Non-pressure parts.	854
3	Chimney.	340
4	Piping.	60
5	Lining and insulation.	140
TOTAL		**1978**

ANNEXURE - II
ERECTION WELDING SCHEDULE

MATERIAL	SIZE OF THE ITEM	THICKNESS	NO OF WELDS/ TOTAL LENGTH
PG NO 07			
SA106 GR-B	D48.3	5.08	90 nos
SA106 GR-B	D73	7.01	122 nos
SA106 GR-B	D108	8	18 nos
SA106 GR-B	D219.1	14.2	6 nos
SA106 GR-B	D33.4	4.55	4 nos
SA106 GR-B	D88.9	6.3	40 nos
SA106 GR-C	D88.9	5.49	68 nos
SA106 GR-C	D127	10	20 nos
SA106 GR-C	D159	16	8 nos
SA106 GR-C	D127	12.5	2 nos
SA312 TP316	D219.1	12.7	2 nos
SA312 TP316	D88.9	5.49	48 nos
SA312 TP316	D33.4	4.55	50 nos
PG NO 12-992			
SA106 GR-B + SA106 GR-C	D88.9	6.3	28 nos
SA240 TP304 + SA335 P22	D48.3	5.08	0.7M (Flange welding - 5 nos)
SA240 TP304 + SA182 F304	D48.3	5.08	0.4M (Flange welding - 3 nos)
SA335 P22 + SA335 P22	D219.1	20.62	10 nos
SA240 TP304 + SA335 P22	D48.3	5.08	1.5M (Flange welding - 11 nos)
SA182 F304 + SA240T P304	D48.3	5.08	1M (Flange welding - 7 nos)
SA335 P22 + A217 WC9	D219.1	20.62	3 nos
SA335 P22 + SA335 P22	D88.9	11.13	48 nos
SA403 WPS316 +SA182 F316	D88.9	11.13	40 nos
SA240 TP304 +SA335 P22	D48.3	5.08	0.5M (Flange welding - 4 nos)
SA240 TP304 + SA182 F304	D48.3	5.08	0.8M (Flange welding - 6 nos)
SA403 WPS316 + SA335 P22	D88.9	11.13	8 nos
SA335 P22 + SA234 WP22 CL	D88.9	11.13	16 nos
SA335 P22 + SA182 F316	D88.9	11.13	24 nos
SA106 GR-B + SA182 F12 CL2	D88.9	6.33	8 nos
SA355 P22 + SA335 P22	D33.4	4.55	32 nos
SA355 P22 + SA182 F22CL3	D33.4	4.55	11M (Flange welding - 77 nos)
SA335 P22 + SA335 P22	D88.9	11.13	16 nos
PG NO 19-992			
SA106 GR-B + SA106 GR.B	D88.9	6.3	100 nos
SA240 TP304 + SA335 P22	D48.3	5.08	1M (Flange welding - 7 nos)
SA240 TP304 + SA182 F304	D48.3	5.08	1M (Flange welding – 7 nos)
SA106 GR-B + SA216 WCB	D114.3	8.56	3 nos
SA106 GR-B + SA106 GR.B	D159	16	3 nos
SA335 P22 + SA240 TP304	D48.3	5.08	0.25M (Flange welding - 2 nos)
SA240 TP304 + SA182 F304	D48.3	5.08	0.5M (Flange

			welding - 4 nos)
SA106 GR-B + SA106 GR.B	D33.4	4.55	10 nos
SA106 GR-B + SA105	D33.4	3.38	5M (Flange welding - 20 nos)
SA106 GR-B + SA105	D33.4	3.38	14M (Flange welding - 56 nos)
SA234 WPB + SA106 GR.B	D33.4	3.38	12 nos
SA106 GR-B + SA106 GR.B	D33.4	3.38	48 nos
PG NO 21-992			
SA106 GR-B + SA105/SA182F22CL3	D 60.3	5.54	5.5M (Flange welding – 75 nos)
SA106 GR-B + SA106GR.B	D 60.3	5.54	8 NO'S
SA106 GR-B + SA105/SA182F22CL3	D 60.3	3.91	0.5M (Flange welding – 4 nos)
SA106 GR-B + SA106GR.B	D 60.3	3.91	6 NO'S
SA106 GR-B + SA105	D 33.4	3.38	1.5M (Flange welding – 6 nos)
SA106 GR-B + SA106GR.B	D 33.4	3.38	5 nos
SA106 GR-B +SA234 WPB /SA106GR.B	D21.3	2.77	2 nos
SA106 GR-B + SA105	D21.3	2.77	0.5M (Flange welding – 2 nos)
SA105 + SA105	D63.7	12	1 nos
SA355 P22 + SA182F22CL3	D 33.4	4.55	0.25M (Flange welding – 3 nos)
SA106 GR-B + SA182F22CL3	D 33.4	3.91	0.25M (Flange welding – 2 nos)
SA106 GR-B + SA106GR.B/SA234WPB	D 60.3	3.91	95 nos
SA106 GR-B + SA105	D 60.3	3.91	18.0M (Flange welding – 126 nos)
SA106 GR-B + SA105	D 33.4	3.38	1.0M (Flange welding – 4 nos)
SA106 GR-B + SA106GR.B	D 33.4	3.38	8 nos
PG NO 80-992			
SA106 GR-B + SA105	D21.3	2.77	0.5M (Flange welding – 2 nos)
SA106 GR-B + SA106 GR.B/SA234WPB	D21.3	2.77	10 nos
SA106 GR-B + SA106 GR.B/SA234WPB	D33.4	3.38	10 nos
SA106 GR-B + SA105	D33.4	3.38	3.0M (Flange welding – 12 nos)
SA106 GR-B + SA105	D60.3	3.91	1.5M (Flange welding – 11 nos)
SA106 GR-B + SA106GR.B	D60.3	3.91	6 nos
SA106 GR-B + SA106GR.B	D73	7.01	36 nos
SA106 GR-B + SA106GR.B	D108	8	10 nos
PG NO 24-992			
SA213 TP347H + SA182 F316 (OR) SA182 F304H	D14	2.9	8.0M (Flange welding – 32 nos)
SA106 GR-B + SA105	D33.4	3.38	16.0M (Flange welding – 112 nos)
SA106 GR-B + SA234 WPB	D33.4	3.38	260 nos
SA335 GR-P22 + SA335 GR.P22(OR)SA234 WP22	D33.4	4.55	30 nos
SA335 P22 + SA182 F22	D33.4	4.55	2.5M (Flange

			welding – 28 nos)
SA335 GR P22 + SA335 GR.P22	D108	8	12 nos
SA106 GR-B + SA106 GR.B(OR)SA234 WPB	D21.3	3.73	132 nos
SA335 GR P22 + SA234 WP22	D21.3	3.73	50 nos
SA213 TP347H + SA182 F12	D14	2.9	0.1M (Flange welding – 1 nos)
SA106 GR-P + SA105	D21.3	3.73	0.1M (Flange welding – 1 no)
SA213 TP316 + SA182 TP316	D33.4	4.55	4.0M (Flange welding – 28 nos)
SA213 TR316 + SA213 TP316	D33.4	4.55	75NO'S
SA106 GR-B + SA105	D33.4	3.38	40NO'S
SA106 GR-B + SA106 GR.B(OR)SA234 WPB	D33.4	3.38	60NO'S
SA335 P22 + SA335 P22	D33.4	4.55	260NO'S
SA335 P22 + SA182 F22	D33.4	4.55	8.0M(Flange welding-88NO'S)
SA106 GR-B + SA105	D60.3	3.91	22.0M(Flage welding-154NO'S)
SA106 GR-B + SA106 GR.B	D60.3	3.91	150NO'S
SA106 GR-B SA216/SA234 WPB	D73	7.01	30NO'S
SA213 TP316 + SA213 TP316	D33.4	4.55	45NO'S
SA213 TP316 + SA182 F316	D33.4	4.55	3.0M(Flange welding-33NO'S)
SA106 GR-B + SA182 F12CL2	D33.4	3.38	0.4M(Flange welding-2NO'S)
SA106 GR-B + SA105	D21.3	3.73	1.2M(Flange welding-9NO'S)
SA106 GR-B + SA106 GR.B(OR)SA234 WPB	D21.3	3.73	14NO'S
SA106 GR-B + SA105	D33.4	4.55	0.5M(Flange welding-6NO'S)
SA106 GR-B + SA106 GR.B	D33.4	4.55	6NO'S
SA106 GR-B + SA105	D33.4	3.38	0.4M(Flange welding-2NO's)
SA106 GR-B + SA106 GR.B	D33.4	3.38	14NO'S
SA106 GR-B + SA105	D48.3	5.08	10.0M(Flange welding-110NO'S)
SA106 GR-B + SA106 GR.B	D48.3	5.08	20NO'S
SA106 GR-B + SA182 F12 CL3	D48.3	5.08	2NO'S
SA335 GR P 22 + SA182 F12 CL3	D48.3	5.08	3NO'S
SA335 GR P22 + SA182 F22	D48.3	5.08	1.0M(Flange welding-11no's)
SA335 GR P22 + SA335 GR.P22	D48.3	5.08	5NO'S

ANNEXURE-III
LIST OF MAJOR T&P/ INSTRUMENTS TO BE PROVIDED BY CONTRACTOR AT THEIR OWN COST

SL NO	DESCRIPTION	QUANTITY
1.0	Crawler crane (100/ 150 MT) (As per requirement) for works in other areas also under the scope of this tender	1 no
2.0	Low-bed tractor trailor (As per requirement)	1 no
3.0	Plasma cutting machine (As per requirement)	1 no
4.0	Hydraulic pipe bending machine	1 no
5.0	Welding generator K-320	6 no
6.0	Welding rectiformer	8 no
7.0	Tig welding set	4 no
8.0	Hydraulic Test Pump (0-150 kg/sqcm)	1 no
9.0	Chemical cleaning pump with motor and starter distribution board, cables	1 set
10.0	Winches	As required
11.0	D-shackles	As required
12.0	Slings	As required
13.0	Max puller	As required
14.0	Chain pulley blocks/multi-sleeved pulley blocks	As required
15.0	Sleepers	As required
16.0	Jacks	As required
17.0	Grinding & cutting machines	As required
18.0	Truck	1 no
19.0	Trailor	1 no
20.0	Megger 500 V upto 200 M ohms + 5 % at center scale +10% at end of scale.	1 no
21.0	Tong tester 10,200 or 50 amp AC/ DC +3 %.	1 no
22.0	Digital multimeter, Voltage 200 mV-1000 V +1% + 1 digit, Ccurrent 200 mA - 10A DC +0.8% +1 digit, Current 20 mA - 20 A AC +0.8%+1 digit, Resistance 200ohms - 20Mohms +0.5%+1 digit.	1 no
23.0	Multimeter analogue - 3 1/2 digit 1 no.	1 no
24.0	Temperature recorder, 0 to 1000 deg C, 6/ 12 points for stress relieving with thermocouples & compensating cable.	1 set
25.0	U tube manometer, 0-2000 mm water cohtmn with steel (Water) scale.	2 nos
26.0	Inclined manometer, 0-50 mm set (water)	1 set

NOTE

1.0 Top shells of chimney is to be erected by the contractor either by derrick system or alternatively by arranging the required capacity crane, for a limited duration of such erection, as per cl no 18.09. For either of these options, the contractor has to bear the cost. But in any case, non-availability of such crane will not be accepted as reason for delay in erection or excuse for any financial implication/compensation.

2.0 The above list specifics only major T&P/ instruments and may not be the complete requirement to be deployed by the contractor. All additional/ other tools & plants including trucks, lorries, devices, tackles, machines, etc and instruments in good & safe working conditions which are required for satisfactory & timely completion of work shall also be deployed by the contractor within quoted rate/ price.

3.0 Contractor must ascertain/ recheck range and accuracy of each IMTE from BHEL engineer well in advance before arranging calibration/ deployment.

ANNEXURE-IV
LIST OF CONSUMABLES TO BE PROVIDED BY CONTRACTOR AT NO ADDITIONAL COST

SL NO	DESCRIPTION	QUANTITY
1.0	PVC	As required
2.0	Kerosene	- Do -
3.0	Jute	- Do -
4.0	Tape	- Do -
5.0	Brush	- Do -
6.0	Emery paper	- Do -
7.0	White finishing enamel	- Do -
8.0	Wire brush	- Do -
9.0	Weatherproof and fireproof covering material	- Do -
10.0	Concrete or wooden sleeper	- Do -
11.0	Grease	- Do -
12.0	Varnish	- Do -
13.0	Silica gel	- Do -
14.0	White spirit	- Do -
15.0	Tarpaulins	- Do -
16.0	Zinc primer Redoxide Paints	- Do -
17.0	Thinners For Paints	- Do -
18.0	Paraffin paper	- Do -
19.0	End caps	- Do -
20.0	All SMAW / TIG welding electrodes, filler wires etc.	- Do -
21.0	All gases including Oxygen, DA & Argon etc.	- Do -
22.0	All paints required for painting.	- Do -
23.0	All grinding/ cutting etc wheels.	- Do -
24.0	All winch wire ropes/ lifting slings/ other steel & manila ropes.	- Do -
25.0	All scaffolding material & temporary supports.	- Do -
26.0	Computer floppies and CD-s, ribbons & cartridges (B&W, Color) for printers, printing papers (A4/A3 sizes as required).	- Do -

NOTE

1.0 The above list specifics only major consumables and may not be the complete requirement to be deployed by the contractor. All additional/ other tools & plants including trucks, lorries, devices, tackles, machines, etc and instruments in good & safe working conditions which are required for satisfactory & timely completion of work shall also be deployed by the contractor within quoted rate/ price.

ANNEXURE-V
LIST OF DRAWINGS/ DOCUMENTS

SL NO	DESCRIPTION	REFERENCE DRG/ DOC NO	NO OF PAGES
1.0	GENERAL ARRANGEMENT OF BOILER	O-00-561-92755	1
2.0	EXHAUST DUCTING ASSEMBLY(BY-PASS STACK)	1-965-94-98074	2
3.0	ERECTION SCOPE DOCUMENT FOR ELECTRICAL, C&I OF DIVERTER DAMPER & GULLOTINE DAMPER SYSTEM	1-965-94-98074	3

CONTENTS

CLAUSE NO	DESCRIPTION
1.0	PROJECT SYNOPSIS AND GENERAL INFORMATION
2.0	SITE VISIT
3.0	GENERAL
4.0	NAME OF WORK
5.0	TECHNICAL SPECIFICATION & SCC FOR ELECTRICAL AND C& I SCOPE OF WORK (SCH-7 OF VOLUME-IIIA)
6.0	DETAILED SCOPE OF WORK FOR ELECTRICAL AND C& I
7.0	GUIDELINES FOR HANDLING OF ELECTRONIC CUBICLES/SUB-ASSEMBLY/ LOOSE ITEMS
8.0	GUIDELINES FOR HANDLING OF SOLID STATE MODULE
9.0	WORK EXCLUDED FROM CONTRACTOR'S SCOPE
10.0	INSPECTION
11.0	TESTING
12.0	MATERIAL RECONCILIATION
13.0	MEASUREMENT & RETURN OF SURPLUS
14.0	AS BUILT DRAWING
15.0	SCOPE OF WORK FOR PANEL/ CUBICLE/ INSTRUMENTS/ EQUIPMENT'S/ ITEMS
16.0	JUNCTION BOX AND TRANSMITTER RACK
17.0	PLANT MONITORING SYSTEM (MMI)
18.0	MOTORSISED VALVE/ PNEUMATIC VALVE
19.0	TRANSFORMER
20.0	AVR/GENERATOR & TRANSFORMER PROTECTION PANELS
21.0	BUS DUCTS
22.0	SCOPE OF ERECTION WORK FOR BUS DUCTS
23.0	SWITCHGEARS
24.0	SCOPE OF WORK FOR HT & LT SWITCH BOARD AND DCDB
25.0	BATTERY AND BATTERY CHARGER
26.0	SCOPE OF WORK FOR BATTERY AND BATTERY CHARGER
27.0	SCOPE OF WORK FOR JUNCTION BOXES
28.0	SCOPE OF WORK FOR CABLES
29.0	TERMINATION OF CABLES
30.0	SCOPE OF WORK FOR CABLE TRAYS/CONDUITS/FLEXIBLE CONDUIT
31.0	SCOPE OF WORK FOR FABRICATION MATERIALS & STRUCTURAL STEEL
32.0	SCOPE OF PAINTING
33.0	MEASUREMENT & WASTAGES & CUTTING ALLOWANCES
34.0	STORAGE
35.0	SCOPE OF WORK – PART – D (E & C OF GTG & STG PACKAGE)
36.0	PRELIMINARY WORKS
37.0	CIVIL WORKS, FOUNDATIONS AND GROUTING
38.0	CONSUMABLES
39.0	TOOLS & PLANTS / IMTEs
40.0	SUPERVISORY STAFF AND WORKMEN
41.0	ERECTION
42.0	WELDING HEAT TREATMENT, RADIOGRAPHY AND NON-DESTRUCTIVE TESTING
43.0	TESTING , PRE-COMMISSIONING, COMMISSIONING AND POST COMMISSIONING
44.0	PLANNING & PROGRESS REPORTING
45.0	DRAWINGS AND DOCUMENTS
46.0	EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION WORK

47.0	**FINISH PAINTING**
48.0	**CONTRACT PRICE**
49.0	**TERMS OF PAYMENT**
50.0	**DETAILS OF MAJOR MECHANICAL EQUIPMENT TO BE HANDLED, ERECTED, TESTED AND COMMISSIONED**
51.0	**COMPLETION PERIOD**
52.0	**CONSTRUCTION SCHEDULE**
53.0	**SAFETY**
54.0	**SOCIAL OBLIGATION**
55.0	**FIRST AID CENTRE**
56.0	**ENVIRONMENT**
57.0	**FACILITIES TO BE PROVIDED BY BHEL TO CONTRACTOR**
58.0	**MOBILISATION ADVANCE**
59.0	**TAXES, DUTIES ETC**
60.0	**LIQUIDATED DAMAGE/ PENALTY FOR DELAY**
61.0	**INSTRUCTIONS TO TENDERER**
62.0	**INSURANCE**
63.0	**GUARANTEE**
64.0	**RATE REVISION**
65.0	**PRICE VARIATION CLAUSE (PVC)**
66.0	**OVER RUN COMPENSATION (ORC)**
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68.0	**QUOTED RATE**
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70.0	**ANNEXURE–I (LIST OF ITEMS)**
71.0	**ANNEXURE–II (LIST OF T & Ps, IMTES TO BE PROVIDED BY TSECL FOR USE OF CONTRCATOR FREE OF HIRE CHARGES ON SHARING BASIS)**
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74.0	**ANNEXURE–IVA (OTHER T&P s TO BE ARRANGED BY CONTRACTOR)**

These special conditions for shall be construed as part of tender document and shall be read along with general conditions of contract (GCC), and other volumes of tender. In case of any conflict or inconsistency between GCC, other volumes and these special conditions contract (SCC), the same shall be brought out by the bidder in writing to BHEL for clarification, failing which most stringent interpretation/ clause in favour of BHEL shall be adopted and the same shall be binding to the bidder.

CLAUSE NO	DESCRIPTION
1.0	**PROJECT SYNOPSIS AND GENERAL INFORMATION**
1.1	Details of proposed stage/ units
	The proposed 53 MW Combined Cycle Power Project at Lepetkata being set up by Brahmaputra Cracker and Polymer Ltd (BCPL), Assam. The site is approachable by road. The information given hereunder is for general guidance and shall not be contractually binding on BHEL.
1.2	APPROACH TO SITE
	The proposed project site is located at Lepetkata, Assam. Nearest important town: Dibrugarh (15 km). Nearest railway station: Dibrugarh (15 km). Proposed railway approach: Proposed Dibrugarh-Moran Rail link. Nearest airport: Dibrugarh (25 km). Nearest highway milestone: Tinsukia-Dibrugarh-Sibsagar (NH-37), 500 M.
1.3	Owner: Brahmaputra Cracker and Polymer Ltd (BCPL).
2.0	**SITE VISIT**
	Contractor should visit project site and acquire full knowledge and information about site conditions. The bidder must visit site, to acquaint himself with the conditions prevailing at site and in and around the plant premises, together with all statutory, obligatory, mandatory requirements of various authorities before submission of bid.
3.0	**GENERAL**
3.1	The intent of this specification is to provide for execution of project according to most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibilities of providing such services / facilities to complete the work or portion of work awarded to him. The quoted / accepted rates / lump sum price shall deem to be inclusive of all such contingencies.
3.2	The contractor shall carry out the work in accordance with standard practices / codes / instructions / drawings / documents / specification supplied by BHEL from time to time.
3.3	The work shall conform to dimensions and tolerances given in various drawings and documents that will be provided during erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations, the contractor shall dismantle and redo the work duly replacing the defective materials at his cost failing which the job will be carried out by BHEL by engaging other agencies / departmentally and recoveries will be effected from contractor's bills towards expenditure incurred including BHEL's usual overhead charges.
3.4	Following shall be the responsibility of contractor and have to be provided within finally accepted rates / prices :
3.4.1	Provision of all types of labour , supervisors, Engineers, watch and ward as required, tools & tackles , calibrated inspection , measuring and test equipment as specified and otherwise required for the work and consumables for erection , testing and commissioning including cabling, instrumentation, mechanical piping, painting, material handling etc.
3.4.2	Proper out turn as per BHEL plan and commitment.
3.4.3	Completion of work as per BHEL schedule.
3.4.4	Good quality and accurate workmanship for proper performances of equipment.

3.4.5	Repair and rectification.
3.4.6	Preservation/ reconservation of all components during storage/ erection till handing over.
3.5	BHEL Power Sector (ER) is an ISO 9001-2000 certified company. Quality of work to customer's satisfaction and system requirements are the essence of ISO 9001-2000 certification. The contractor in all respects will organize his works, systems, environment, process control documentation, T&P, inspection, measuring and testing equipment etc. as per instructions of BHEL engineer.
4.0	**NAME OF WORK**
	Receipt from store/ storage yard, unloading at the place of erection/ laying/ fabrication/ work, erection, testing, commissioning, trial run, handing over of 2xFr5 GTG & aux, 1x13 MWE STG & aux, associated piping, associated electrical system, associated C&I system for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam.
5.0	**TECHNICAL SPECIFICATION & SCC FOR ELECTRICAL AND C& I SCOPE OF WORK (SCH-7 OF VOLUME-IIIA)**
5.1	It is not the intent to specify completely herein all details of equipment and material. The omission of specific reference to any method, or test & equipment or material necessary for the proper and efficient services towards installation of the plant shall not relieve the contractor of the responsibility of providing such facilities / services to complete the project or portion of the project awarded to him. The quoted rate shall deem to be inclusive of all such contingencies. Only exclusions specifically mentioned in this tender shall be entertained in all matters. The major items of works are described hereinafter under the head "Erection". However, the contractor shall perform all the necessary works to complete the installation for satisfactory handing over to the ultimate customer.
5.2	Site testing shall be required for all electrical equipment installed by the contractor to ensure proper installation, setting, connection and functioning in accordance with drawings, specifications and manufacturer's recommendations.
5.3	The Contractor shall take full responsibility for satisfactory testing, pre-commissioning, commissioning and trial run of the connected equipment under overall guidance of BHEL and shall locate any cause of malfunction and shall make the necessary minor wiring changes or cable connection to obtain the intended operation. Testing shall also include ant additional tests which the Engineer feels necessary because of site conditions, customer requirement to determine that equipment, material and system meet requirements of the specification.
5.4	Scope of work covered under this specification is of highly sophisticated nature, requiring the best quality of workmanship, engineering and construction management. The contractor should ensure timely completion of work. The contractor must have adequate quantity of tools, measuring instruments, calibrating equipments etc. in his possession. He must also have on his rolls adequately trained qualified and experienced engineers, supervisory staff, and skilled personnel. The manpower deployment identified by contractor should match the requirement of sophistication involved with equipments to be erected and should possess electrical contractor license to carry out the scope of work mentioned in the BOQ.
5.5	These tender calls for erection, testing and commissioning of all Electrical, C&I items & equipment enumerated in the schedule of quantities and rates (SCH-7, Volume-IIIA) as per instruction of BHEL engineer.
5.6	Contractor shall arrange all necessary clamps, fasteners, required for supports of all impulse lines, GI pipes. The rates for these items are to be accommodated in the respective pipes erection rates. For cable dressing, necessary aluminium strips/flats and fasteners for fixing the above also to be arranged by the contractor. The rates for these items are also to be accommodated in cable laying. For installation of panels, stanchion etc., concrete anchor fasteners is to be arranged by the contractor. The rates for these items are also to be accommodated in Panel

	erection.
6.0	**DETAILED SCOPE OF WORK FOR ELECTRICAL AND C& I**
	The scope of specification covers the installation, testing, and commissioning of the following electrical equipments, hardwares along with associated auxiliaries as detailed in BOQ:
6.1	Installation of HT/LT Switchboards, miscellaneous distribution boards and panels, Power & Auxiliary Transformers, NGRs, HT isolation panels, LT Busducts, UPS system panels, Battery & Battery charger set panels, Control/relay/excitation panels.
6.2	Installation of supporting structures for cable trays, cable racks etc. using standard mild steel sections like channels, angles, flats etc.
6.3	Installation of cabling system.
6.4	Installation of underground electronic earthing and above ground earthing grid, equipment earthing conductors (GI flats) for connection of all equipment with the main under/above ground earthing grid, buried earthing rods for cable racks, earth pits as per IS: 3043.
6.5	Installation of lightening protection conductors (GI flats), spikes, earth electrodes, test links, sothser fittings etc. for the Main power house building area including HT switchgear & LT switchgear/ control building.
6.6	Installation of HT cable termination kits and straight through joints (if applicable).
6.7	Installation of cable termination and straight through joints (if applicable) for LT power cables, control cables.
6.8	Installation of GI materials for clamping the multi-core HT/LT Power & Control cables.
6.9	Installation of trefoil cable clamps (nylon/FRP) for clamping single core HT/LT power & control cables.
6.10	Installation of GI pipe conduits in various sizes, hume pipes (RC), and fittings for cable installation, wherever required.
6.11	Installation of painted steel support structures for mounting push button stations for local starting of all motors.
6.12	Installation of single/double compression cable glands, cable lugs, ferrules, cable identification tags, cable dressing materials etc.
6.13	Supply of complete hardware for installation of electrical equipment like clamps, bolts, nuts, brackets, anchor fasteners etc.
6.14	Supply & Installation of flexible GI conduits.
6.15	Installation of Danger sign boards, first aid box
6.16	Fabrication & Installation of canopy for outdoor push button station/motors/panels.
6.17	Supply of all consumables & hardwares required for installation.
6.18	Supply & Installation of all other items which have not been specifically indicated but may be required for completion of installation.
6.19	Arranging all scaffolding and platforms for erection of cables, panels etc.
7.0	**GUIDELINES FOR HANDLING OF ELECTRONIC CUBICLES/ SUB-ASSEMBLIES/ LOOSE ITEMS**
7.1	After unloading at site, the package of the equipment shall be inspected for external damage. In case the package is damaged, the package number and details of the damage should be noted. The details of the damage should be reported to the engineer during issue.
7.2	After erection of the equipment/instrument, the packing material should be removed and internals should be checked in presence of BHEL engineer. Silica gel (moisture absorber) placed inside the equipment should not be taken out and periodic inspection of silica gel is necessary. It has to be replaced when de-colorisation takes place.
7.3	Verify the availability of modules, plugs, relays etc as per the drawing and shipping list in presence of BHEL engineer.
7.4	The keys of the panels should be handed over to BHEL Engineer carefully with proper identification tags.

8.0	**GUIDELINES FOR HANDLING OF SOLID STATE MODULE**
8.1	Electronic modules should only be touched when it is absolutely essential and it should be handled by a qualified person and also earth shield to be used.
8.2	The PCB should always be held by the front panel or the module frame and the electronic components should never be touched.
8.3	All modules using CMOS components are packed in anti static bags, when transported, to avoid ESD failures.
9.0	**WORK EXCLUDED FROM CONTRACTOR'S SCOPE**
9.1	Supply of cables, Glands, lugs, maxi termi clips, wire-wrapping wire etc.
9.2	Major Civil works like excavation and concreting of concrete trenches, plate embedment on cable trenches, ceiling and floors.
9.3	Civil works for ducting of crossing of road & main track.
9.4	Conduit and pipes embedded in walls, floors etc.
10.0	**INSPECTION**
	The actual inspection shall be carried out as per the approved field quality plan.
11.0	**TESTING**
11.1	Prior to installation, cables shall be tested for following and record to be maintained-
11.1.1	Continuity of conductors.
11.1.2	Insulation resistance between conductors & earth.
11.1.3	Insulation resistance between conductors.
11.2	After installation, cables shall be tested for following and record to be kept.
11.2.1	Insulation resistance between conductors & earth.
11.2.2	Insulation resistance between conductors.
11.2.3	Continuity of conductors.
11.3	BHEL/ owner may ask for additional tests at site as found necessary to determine that the works comply with the specification, and relevant standards. No extra payment will be made for the same.
11.4	The contractor shall have to bring all testing equipment & instrument in sufficient numbers to carry out the job simultaneously in more than one area. All instruments shall be calibrated to the satisfaction of engineer before actual testing and tests shall be conducted by qualified & experienced personnel.
11.5	All documents/records regarding test data and all other measured values shall be submitted to engineer for approval and subsequent record. All cables shall be energized only after certification from BHEL. The results of all tests shall conform to the specification requirements as well as any specific performance data guaranteed during finalization of contract.
12.0	**MATERIAL RECONCILIATION**
	The philosophy is contract closing activities right from the day one'. Material reconciliation statement signed jointly by the contractor and BHEL is to be generated and submitted to BHEL by the contractor once in every three months, so that handing over is not delayed by even a single day on account of material reconciliation. In event of failure to do so, the contractor shall be entirely responsible for the delay.
13.0	**MEASUREMENT & RETURN OF SURPLUS**
13.1	For payment purposes measurement shall be made on the basis of the execution drawing/actual physical measurements. Physical measurement shall be made by the contractor in presence of engineer. The measurement for cable laying shall be made on the basis of length actually laid from lug including that of loops provided and paid accordingly.
13.2	All the surplus, scrap & serviceable cables cut out of the cables quantity issued by BHEL to the contractor etc., shall be returned back in good condition,as directed by Engineer.
13.3	Cables of less than 5M length will be termed as scrap. Cables of length 5M and above shall be termed as serviceable material and shall be returned size wise and category wise to the owner's stores/yard.

13.4	Cable of serviceable length being returned to the stores shall have their free end sealed and the balance length shall be noted and certified by the engineer for the purpose of accounting. The above forms the part of scope of work.
13.5	While carrying out material appropriation with contractor, all the above points will be taken into account. All the serviceable material returned by contractor shall be deducted from the quantities issued for the respective sizes and categories and the balance quantity(ies) will be taken as the net quantity(ies) issued to Contractor. Allowable scrap quantity is calculated as per wastage allowance percentage, as mentioned elsewhere.
13.6	Any scrap / wastage generated by contractor in excess of allowable percentage shall be charged at the rates decided by engineer whose decision shall be final and binding on the contractor.
13.7	For steel material supplied by contractor, all scrap shall be returned to BHEL's stores with due accounting.
14.0	**AS BUILT DRAWING**
14.1	After successful completion, testing & commissioning of installation work BHEL / owner's Drawings and documents shall be updated in line with the actual work carried out at site and two marked up copies of the same having approval of engineer should be submitted to BHEL by contractor within one month of completion of major activities.
14.2	Whether specifically mentioned elsewhere or not, the following will be supplied/ carried out by the contractor at no extra cost:
14.2.1	Supply and installation of nylon ties for cable clamping, other type of clamps, PVC straps, aluminium strap, interlocking type ferrules, aluminium/stainless steel tags etc.
14.2.2	Materials cement/sand/chips etc for minor civil works**.**
14.2.3	Fasteners like nuts, bolts, washer, spring washer, anchoring bolts etc.
14.2.4	Drilling of gland plates of equipment's/junction boxes/terminal boxes etc.
14.2.5	Rotating of terminal box of the motors.
14.2.6	Enlargement of cable entry holes.
14.2.7	Drilling, cutting, reaming, threading and relocating holes at actual point of entry of cable or conduit in equipment etc.
14.2.8	Cutting standard tray sections and inserting additional tray fittings to match with the existing arrangement, if required.
14.2.9	Routine cleaning of the equipment's erected by the contractor at their own cost.
14.3	The unit rate of cabling shall also cover all the above activities for cabling including removal and repositioning of gland plate, drilling of gland plate, cable glanding, making plugs & termination at both ends and supply of all above items.
15.0	**SCOPE OF WORK FOR PANEL/ CUBICLE/ INSTRUMENTS/ EQUIPMENT'S/ ITEMS**
15.1	**CONTROL PANEL**
	These panels shall be of various types like computerized electronic control panel (DDC & PLC), electrical control panel, mechanical instrumentation panel etc located in control room, field etc. the scope of work shall include but not be limited to the following activities:
15.1.1	Checking of foundation and chipping of floor and Fabrication of base frame.
15.1.2	Installation of base frame & fixing anti vibration pad.
15.1.3	Placement of panels on base frame and panels which are supplied with base frame as integral part, directly on floor.
15.1.4	Leveling, alignment of the panel using Packing plate & shims etc, bolting with base frame/welding of integrated base frame with floor inserts. The contractor shall arrange packing plate, shims etc at his own cost. In case of welding, following procedures shall be adopted. Two separate cables from the welding set, one cable from the electrode holder and other for earth point of welding, i.e. the point of welding shall have earth connection directly from the welding set through cable and not through plant machinery, columns etc.

15.1.5	Grouting of the base frame/panel/equipment.
15.1.6	Checking, testing, mounting/fixing in the panel all loose supplied items modules, relays, switches, lamps, push buttons, meters and all other items.
15.1.7	Checking and testing of internal wiring/components
15.1.8	Interconnection among panels, engineering control, diagnostic, plant monitoring system, control desk and field equipment/instruments.
15.1.9	Charging the system, checking and testing functional operation, simulation testing, checking signal flow.
15.1.10	Software/hardware setting of parameters, logic etc.
15.1.11	Software programming, erasing, calibration etc.
15.1.12	Commissioning of all auto control loops.
15.1.13	All the welding joints of the structure shall be applied with anti-corrosive primer and paints immediately after welding. The contractor shall arrange primer and paint at their own cost.
15.1.14	The unit rate shall cover all but not limited to above activities including supply of above items & activities for loose supplied items unless otherwise specified elsewhere.
15.2	**CONTROL DESK**
	The control desk shall be located in the unit control room. The desk will have the control switches, push buttons, receiver/indicators, annunciation windows/facia, CRT monitor, keyboard/mouse, meters, console, lamps, indicators controllers and such other items. The scope of work shall include but not be limited to following activities:
15.2.1	Checking, testing, mounting/fixing in the desk all loose supplied items control switches, push buttons, lamps, indicators, meters, console, CRT monitor, keyboard, controllers, receiver, indicator, recorders, annunciation windows, terminal blocks and such other items. Verify the console that 27 pin connectors and pins are available or not.
15.2.2	Inter desk loop wiring, desk wiring between components and terminal block laying wires, making plugs, lugging & terminating.
15.2.3	Checking & testing of functional operation, simulation, and signal flow.
15.2.4	Commissioning of all control loops, protection, interlock, indication and annunciation etc with respect to discrete signal, subsystem and total system.
15.2.5	Commissioning of all auto control loops under BHEL's scope.
15.2.6	All the welding joints of the structure shall be applied with anti-corrosive primer and paints immediately after welding. The contractor shall arrange primer and paint at their own cost. The unit rate shall cover all but not limited to above activities including supply of above items & activities for loose supplied items unless otherwise specified elsewhere.
15.3	**INSTRUMENT**
	The instrument shall be located in field/unit control desk. The scope of work shall include but not be limited to following activities:
15.3.1	Fabrication of steel frame/pedestal as necessary, cutting and welding of steel channel, angle, flat section. The frame/pedestal shall be erected with permanent steel structure by welding, anchored with concrete/brick wall. Anticorrosive primer and paint shall be applied at the welded joint and the same shall be arranged by the contractor at his own cost. Instrument shall be erected on this frame/pedestal, control panel.
15.3.2	Physical verification, checking/testing of functional operation, calibration /re calibration, setting/ resetting shall be done before erection. Replacement of defective components, rewiring etc should be done.
15.3.3	All accessories like thermowell, isolation valve and other fittings shall be erected by welding/screwing. Welding of thermowell with the tapping point shall be done by the contractor.
15.3.4	For instruments with capillary, capillary shall be properly laid with uniform spacing in a bunch of capillaries, clamped using proper clamp, tagged at both ends and at

	regular interval. Aluminium tag shall be used at the instrument end for identification. Immediately after welding, anticorrosive primer and paint shall be applied at welded joints. The contractor shall arrange above tags and primer & paint at his own cost.
15.3.5	Charging the instrument, after flushing the connected pipe, shall be done with due care as per procedure.
15.3.6	Checking/testing of functional operation locally, adjustment and local commissioning.
15.3.7	Checking/testing and commissioning of operation with interlock protection, indication and loop control.
15.3.8	Commissioning with auto control loop.
15.3.9	Fabrication of canopy by cutting and welding of steel plate/section. Erection of canopy over the instrument frame/pedestal/installation. All necessary hardware & consumables/fasteners as stated elsewhere including bolts, nuts, screws, insulation tape, primer paints shall be supplied by the contractor at their own cost. BHEL will supply GI/Aluminium sheets and structural materials for the same free of cost.
15.3.10	The unit rate shall cover all but not limited to above activities including supply of above items and supply of loose items unless otherwise specified elsewhere.
16.0	**JUNCTION BOX AND TRANSMITTER RACK**
16.1	The scope of work shall include but not be limited to following activities:
16.2	Fabrication of steel frame/pedestal/base frame by cutting and welding of steel channel angle, flat section. The frame/pedestal/base frame shall be erected with permanent steel structure by welding/anchored with concrete/brick wall. Anticorrosive primer and paints shall be applied at the welded joints, and, the same shall be supplied by the contractor at his own cost. Some of the JBs may require canopy.
16.3	Physical verification, checking of terminal block/internal tubing, replacement of terminal block of JB and tubing of TR if required.
16.4	Placement, leveling and alignment of JB and TR.
16.5	Numbering of JB & TR by paints. Paint shall be arranged by the contractor at his own cost.
16.6	Fixing the numbering/tag plate.
16.7	All necessary hardwares & consumables/fasteners, as stated elsewhere, shall be supplied by the contractor at his own cost.
17.0	**PLANT MONITORING SYSTEM (MMI)**
17.1	The scope of work shall include but not be limited to the following activities:
17.2	Checking of foundation and chipping of floor.
17.3	Fabrication and erection of base frame by cutting and welding of steel channel/section,welding and grouting base frame.
17.4	Placement, leveling & alignment of power supply/computer cabinet.
17.5	Placement of desk top peripherals e.g. keyboard, monitors, printers, mouse, modem.
17.6	Fixing and installation of monitors in the unit control desk.
17.8	Installation of Hub power supply unit.
17.9	Laying, termination of interconnecting cables of miscellaneous & special type.
17.10	Installation of inter plant bus access coupler module.
17.11	Checking, testing, pre-commissioning.
17.12	Initialization, programming and commissioning.
17.13	Commissioning of the total system.
17.14	All the necessary hardware & consumables/fasteners as stated elsewhere shall be supplied by the contractor at his own cost. The unit rate shall cover all but not be limited to above activities.
18.0	**MOTORSISED VALVE/ PNEUMATIC VALVE**
18.1	Cable checking. Limit switch settings, minor repair of cu -tube. etc.
18.2	MCC checking.
18.3	Commissioning assistance for all valves.

19.0	**TRANSFORMER**
19.1	Receipt & unloading of all accessories and spares including oil in drums at site stores, inspection, storage, maintaining of N2 gas pressure in transformer tank, handling of accessories between stores & transformer yard/location upto respective plinth, erection of all accessories, cabling from transformer accessories to marshalling Kiosk & OLTC panel, Oil flushing, Oil pressure testing, dry out, pre-commissioning test, commissioning of equipment, final painting and handing over.
19.2	The contractor will load, transport, unload the Transformer on rails from Storage area, turn the wheels/rollers, if necessary, for changing over at right angles on rails, rolling the transformers to their respective locations and put them on the foundation. All necessary arrangements e.g. sleeper, jacks, winches etc. as required for this operation shall be made by the contractor at his own cost. BHEL will provide a 18T crane for the purpose of erection of transformers on sharing basis at free of cost. However, the operator, fuel, and other consumables shall be provided by the contractor.
19.3	Samples from each and every Oil drum will have to be tested for required strength before pouring. If the strength is found to be inadequate, the oil in the drums should be filtered. The entire arrangement of testing oil samples, filtering whenever required to achieve the desired strength and moisture content within shortest time shall be made by the contractor. The job has to be taken up in consultation with BHEL engineers at site at the cost of the contractor.
19.4	Required numbers of high vacuum filtering machines with adequate capacity, vacuum pumps, oil tank, and 5 kV motorized megger will be arranged by the contractor at his own cost. The transformers may have to be suitably lagged / covered during the drying out operation by the contractor at no extra cost.
19.5	The contractor shall engage his men on three shifts operation during drying out the transformers.
19.6	The transformers will be bolted to the adopter panel/bus duct on both the sides and the bus bar will be connected together. Any modification required in the bus connectors for matching the PCC Bus bar with the transformer LT side shall be carried out by the contractor at no extra cost.
19.7	The auxiliary components of the above transformers have to be cleaned and checked before the assembly as instructed by BHEL engineer.
19.8	The contractor shall carry out all the pre-commissioning works for the transformers using his own testing equipments under the supervision of BHEL engineer.
19.9	Di-electric strength/ PPM of the transformer oil shall be improved and brought to BHEL recommended value by the contractor using his own filtering machines and other testing equipments.
19.10	All the transformer protective system such as Buchholz relay explosion vent, oil and winding temperature detectors etc., healthiness are to be checked under the guidance of BHEL engineer.
19.11	Transformer protective relays are to be checked prior to the commissioning of the transformer.
19.12	The scope of the erection work includes final painting, minor civil works such as chipping and grouting of the support structure as well as for the support of the transformer.
19.13	During the oil circulation of the transformer, the contractor has to employ sufficient number of personnel who will take care of the operation of the filter machine as well as safety of the transformer.
19.14	The scope of final painting involves supply of paints, thinner, and other consumables at the cost of the contractor.
20.0	**AVR/GENERATOR & TRANSFORMER PROTECTION PANELS**
20.1	These panels shall be installed in Control rooms. Generator and Transformer protection panels shall be supplied with loose items like instruments, interconnecting cables etc.
20.2	The scope of work shall be in line with relevant Drawings. However any special

	instruments/testing equipments like injection kits, CRO, frequency counter etc. are required for calibration and testing of relays, recorders, indicators etc., same shall be arranged by the contractor.
21.0	**BUS DUCTS**
21.1	NG CUBICLE:
	Each NG cubicle shall be fabricated out of 3 mm thick steel sheet complete with illuminating lamps, space heater, bus bars, mounting insulators, marshalling box etc. Each set shall house the following: • Dry type Epoxy cast NG Transformer • NG Resistor
21.2	SHORTENING BARS:
	One set of shortening bar shall be supplied for Generator dry out.
22.0	**SCOPE OF ERECTION WORK FOR BUS DUCTS**
22.1	The Contractor is responsible for receipt and unloading of all the bus duct materials, accessories, and equipments as indicated in the BOM such as NG cubicle, CTs etc. and drawing, inspection, erection, installation of all the materials, testing, commissioning of equipments/panels painting, and handing over. BHEL will provide suitable capacity crane for erection of bus ducts on free of charge on sharing basis. However, the operator, fuel and other consumables have to be arranged by the contractor at his own cost.
22.2	If any modification required in the supporting structures due to site conditions, the same will be carried out by the contractor without any extra cost. Pockets will be provided during casting in which anchor bolts will be grouted for supporting the structures.
22.3	Make-up pieces will be supplied along with bus ducts. Necessary joining at different sections will have to be carried out at site by the contractor. The scope shall include suitable modifications of make-up pieces, if required, along with NGT, cubicle and 6.9 kV SGR.
22.4	All bolts in the joints and flanges will be tightened by Torque wrench to approved pressure. Anti-oxidation compound will be used for joints.
22.5	The alignment of the bus ducts will start from Generator side. The Generator terminal enclosure shall be placed and aligned first.
22.6	Only a few holes on the Generator terminal box flange will be drilled at works. The balance numbers of bolts shall be drilled at site to facilitate matching of Bus duct cover flange with Generator flange easily at site.
22.7	A ground bus shall be provided running the entire length of the bus duct section and the grouting of all parts of supporting structures and one end of each enclosure is under the scope of work.
22.8	The Contractor has to carry out final painting as per the standard codes recommended by BHEL. The paints, thinner and other consumables required for the job shall be arranged by the contractor at his own cost.
22.9	The following works shall be part of the Bus duct erection:
22.9.1	Transportation of bus duct equipments from BHEL stores to erection site.
22.9.2	Cleaning of enclosure and conductors, insulators and other panels before assembly & erection.
22.9.3	Placement of embedment, erection, and alignment of steel support structures.
22.9.4	Assembly and checking of Bus duct at ground level, is necessary.
22.9.5	Erection and commissioning of NG cubicle with all its accessories.
22.9.6	Fixing of neutral side flexible connectors to Generator and position of neutral CTs after testing.
22.9.7	Assembly, erection with its equipments such as 33 kV breaker control panel.
22.9.8	Fixing of wall bushings.
22.9.9	Fixing of current transformers in bus ducts including wiring from CT terminal to marshalling box taking through conduit piece.

22.9.10	Providing earthing connections as per site conditions.
22.9.11	Minor civil work such as chipping, drilling holes in concrete, if necessary and grouting of bus duct supporting structures.
22.9.12	Carrying out short circuit test before commissioning of the Generator as per the instruction of BHEL engineer.
22.9.13	Carrying out required level of cleaning inside as well as outside of the bus duct for the purpose of conducting high voltage test before commissioning of the unit.
22.9.14	The required earthing as detailed in the relevant drawings for the bus duct is to be carried out by the contractor.
22.9.15	The erected Bus duct before commissioning will be subjected to Air tightness & Water tightness tests and it should satisfy the requirement of BHEL/Customer standards. In case of any leakage, the contractor has to modify and bring to the required level of Air tightness and water tightness without any extra changes.
22.9.16	Erection and commissioning of above bus ducts include extension of embedment and erection of required support structures as detailed in the drawing.
22.9.17	High Voltage test of the bus duct is to be carried out by the contractor as per the instruction of BHEL engineer after making necessary cleaning inside as well as outside of the bus duct.
22.9.18	The contractor has to carry out final painting as per the standard color codes recommended by BHEL. Paints will be supplied by Contractor as part of erection scope which includes thinner and other consumables.
22.9.19	The length of phase indicated is only approximate. The relevant drawings are enclosed for the purpose of tendering. The contractor has to ascertain the quantum of work involved and quote the lump sum value as called for in the rate schedule.
23.0	**SWITCHGEARS**
23.1	415V – POWER MOTOR CONTROL CENTRES (PMCC)/MCC
23.1.1	Motor control centers are Double Front drawout type consisting of circuit breaker unit, contactors/starter fuse switch units, MCB etc. arranged in multi-tier construction. These PCC & MCC are mainly supposed to cater to the requirement of drives, valves etc.
23.2	DC DISTRIBUTION BOARD
23.2.2	DCDB is Single Front non-drawout type consisting of circuit breaker, contactor, starter, fuse switch unit, MCB etc. arranged in multi-tier construction. DCDB shall be located in MCC room to cater to the DC supply requirements.
24.0	**SCOPE OF WORK FOR HT & LT SWITCH BOARD AND DCDB**
24.1	The Scope of work covers receipt of all the materials from stores, transportation to the respective location, erection, testing, commissioning, and handing over.
24.2	The base frames will be supplied normally along with the boards. These will have to be aligned, leveled and grouted in position as per approved drawings. Wherever the base channels are not available, the same will have to be fabricated and painted at site. The material for this will be supplied by BHEL. The opening left on the floor during the time of casting where the base channel will have to be grouted. All necessary concrete chipping and finishing works are deemed to be included in the scope of the job. For fabrication/erection of frame, if required, no separate rate shall be paid. This is applicable for local start/stop push button box also.
24.3	For the panels to be mounted on the trenches, channel supports are to be provided across the cable trenches over which the base frame or the panels shall be mounted. Fabrication & erection of these supports structures shall be carried out by the contractor. Fabrication of supports shall be paid on tonnage basis.
24.4	The contractor shall set each piece of equipment on its foundation or supporting structures. The contractor shall assemble equipment as required. All equipments shall be installed with parallel, horizontal and vertical alignment by skilled craftsmen arranged by the contractor.
24.5	All the boards will be delivered in sections. Necessary interconnection of bush bar, bolting of panels, left out panel/inter panel wiring etc. will have to be done by the

	contractor.
24.6	Normally the panels will be delivered with instrument mounting and wiring. However, if necessary, dismantling of the existing components, making modifications in wiring to suit operating conditions, mounting and re-wiring of new components will be carried out without any extra cost. Mounting and wiring of any instrument will also be included in the scope of work.
24.7	The commissioning of MCCs, PMCCs, Switchgears, DCDB will also involve the trial runs and commissioning of all connected equipment like motors, valves, dampers and finally the cranking of the turbine. The contractor will have to engage his people round the clock, if necessary, during the trial runs and promptly take action for any repairs, checks, and rectifications etc. required in the equipment erected by him (separate rate shall be paid for commissioning of associated electrical drives/actuators as per BOM).
24.8	The contractor has to do touch up painting of switchgear panels wherever necessary. This includes the supply of paint also.
24.9	The work of switchyard is also included in this scope.
25.0	**BATTERY AND BATTERY CHARGER**
25.1	The batteries are make type heavy duty capable of providing normal and emergency DC loads. The coils will be mounted on insulators carried on suitable wooden stands. The chargers are fully thyristorised and shall comprise of Silicon controlled rectifier with transformer, switchgear, and automatic regulation. The float and boost chargers will be housed in separate cubicles and mounted side by side. Tentative details are as mentioned in the BOM.
26.0	**SCOPE OF WORK FOR BATTERY AND BATTERY CHARGER**
26.1	Receipt of batteries and all the accessories from stores, transportation to the erection site,erection, testing, commissioning, and handing over.
26.2	After shipping the cells, the electrolyte for first filling is to be prepared and poured in the individual cells.
26.3	The Contractor will have to arrange for suitable load to discharge the battery during charging & discharging cycles.
26.4	The contractor will arrange the complete manpower requirement in shift for battery charging & discharging cycles which will be carried out round the clock as per the code of practice.
26.5	After the batteries are fully charged, the contractor will keep his man for checking up the level of electrolyte, adding distilled water etc. until the set is taken over by BHEL/Customer.
26.6	The contractor will mount the loose items, if any, supplied with the battery & battery charger and make modifications or changes in wiring, if required, without any extra cost.
26.7	The commissioning of battery and battery charger is to be carried under the supervision of BHEL engineer. The contractor should co-ordinate suitably and should abide by the instructions of supplier's supervising engineer.
26.8	After completing erection of all equipments, the contractor should arrange for systematic routine test as per the IS codes and as per the instructions of site-in-charge and commission them to the satisfaction of BHEL/Customer. NOTE: Necessary tools, T&Ps, testing, calibrating instruments required for erection and commissioning of the above electrical equipment/panel shall be arranged by the contractor.
27.0	**SCOPE OF WORK FOR JUNCTION BOXES**
27.1	The unit rate shall be paid for the erection of junction boxes. The scope also includes providing necessary supports, drilling of bottom gland plates for cable entry, as required. Painting the tag no. of JB or fixing a separate tag plate on all junction boxes shall be in the scope of work and this will be within the quoted rate.
27.2	For fabrication of supports, the rate shall be paid on tonnage basis. If minor chipping is required for mounting the support frames, the same has to be carried

	out within the quoted rate.
27.3	All bolts and nuts (fasteners) required for mounting the junction box shall be arranged by the contractor.
28.0	**SCOPE OF WORK FOR CABLES**
28.1	The scope includes laying of cables, drilling of holes in the panels, gland plates for panels, junction boxes, fixing of glands and terminations on either end as per BHEL specification and as per BHEL engineer's instructions. The scope of work also includes dressing of the cables, fixing of the ferrules, tag plates with necessary numbering.
28.2	Rates quoted for the cabling apart from above work shall also include supply of dressing/clamping materials, ferrules, tag plates, lugs upto 2.5 mm^2. The quality of materials covered in contractor's scope of supply shall be as per BHEL's requirements.
28.3	Unit rates based on the length in meters will be paid for laying of all type of cables. No extra payment other than that provided in rate schedule will be made for jobs incidental to cable laying and termination.
28.4	The unit rates for laying, dressing, clamping and end termination of pre-fabricated cables with necessary supports and the unit rate also applicable for the cables routed through or laid in duct bank, conduits, cable shafts etc. Separate rate shall be paid for all type of cable supports such as trays, angles, conduits etc, if the same are erected for the above cable works.
28.5	No separate rate shall be paid for cable termination except HT cable. Termination of cable shall be part of unit rate quoted. Type of termination shall be maxi-termi, wire wrapping, soldering, screwed connections etc.
28.6	For some of the cables, cable trays will not be provided either by BHEL or by customer and such cables have to be routed on the steel angles as per site condition. Steel angles required for the same will be supplied by BHEL free of cost. Even if the cable support are arranged by the other agency, cable dressing shall be carried out for the cables laid by the contractor.
28.7	If contractor desired to know the approximate number of terminations other than HT cables, they can collect the details from BHEL at the time of quoting.
28.8	Looping of wires at terminals as shown in the inter-connection diagram is to be done by the contractor at no extra cost.
28.9	Termination of cables for interplant bus/data high SG/TG systems to be done with 75 ohms connectors supplied by BHEL free of cost if it is covered in the BOM.
28.10	Spacing and connection of redundant data high way/interplant bus co-axial cable to the panel with N type matching connector on the co-axial cable at suitable locations of the highway cable to be done. The N type connectors and barrel connectors will be supplied by BHEL free of cost.
28.11	For pre-fabricated cables, if the sockets are supplied as loose items, the same shall be soldered at free of cost. The quoted rate shall include soldering also.
28.12	If any loose items such as plug-in connectors, indicators, modules, push buttons etc. are supplied, the same shall be mounted on the console and necessary wiring shall be carried out by the contractor as part of the cabling work.
28.13	The unit rate quoted for cable laying/termination shall also cover the following works:
28.13.1	Modification such as rotating the terminal box through 90^o or 180^o as required.
28.13.2	Enlargement of cable entry holes, if necessary, by chipping and finishing the same properly.
28.13.3	Drilling of gland plates of equipment, if not done already.
28.13.4	Reasonable amount of drilling, cutting, reaming and relocating holes at actual point of entry of cable or conduit in terminal boxes, outlet boxes, and pull boxes etc. cleaning of the debris/trapped material from conduit/ducts.
28.13.5	In case any existing structure is affected/ damaged due to installation work of cables, the contractor shall repair the same to the satisfaction of Site engineer.
28.14	While testing and commissioning if the system to which the cabling is connected is

	observed to be not functioning, it shall be the responsibility of the contractor to check, establish and demonstrate in close co-ordination with the commissioning agencies that there is no defect in the cabling. The contractor shall put his supervisor and workmen along the commissioning agencies to check the interconnecting cables.
28.15	Contractor shall carefully plan the cutting schedule to each cable drum in consultation with Engineer such that wastages are minimized and any resultant short lengths can be used where appropriate route lengths are available.
28.16	Cable installation shall be properly co-ordinated at site with other services and wherever necessary suitable adjustment shall be made in the cable routings with a view to avoid interference with any part of the building structure, equipment, utilities and services. Any such adjustment shall be done with the approval of Engineer.
29.0	**TERMINATION OF CABLES**
29.1	At cable termination points where the conductor and the cable insulation will be terminated, termination shall be made in a neat manner.
29.2	The contractor shall include connections to terminal of vendor's equipment installed by others. The contractor shall work in co-operation with other agencies in obtaining correct direction of routing and commissioning of the equipments.
29.3	Wherever the equipment installed by other are not provided with cable accessories such as cable gland, holes etc., contractor shall co-operate to get the same done.
29.4	The insulating sleeves shall be of fire resistant and be long enough to over pass conductor insulation and shall be properly sized.
29.5	Termination of all the cables installed by the tenderer is included in his scope. The work of testing and reconnecting, changing of connectors, re-arrangement of leads, if required, shall be carried out by the tenderer without additional cost.
29.6	Tools/equipments required for the connections and termination of cable except maxi termi tools shall be provided by the contractor wherever necessary.
30.0	**SCOPE OF WORK FOR CABLE TRAYS/CONDUITS/FLEXIBLE CONDUIT**
30.1	In many cases, trays are supplied with tray covers. These covers have to be erected after completion of bottom cable tray and laying of cables. The covers are to be properly fixed on the bottom trays and no separate payment will be made for putting these covers. If required, GI strip clamps to be used. For erection of cable trays necessary bends, Tees, fixing plates, fasteners etc. shall be supplied as loose items. However, if the above materials are not supplied, the same shall be fabricated for which separate rate shall be paid. The contractor shall quote a uniform rate on running meter basis.
30.2	The unit rate quoted for tray erection on meter basis shall include erection of all accessories such as coupler plates, elbow, cross TEE, reducers, anchor bolts, fastners etc.
30.3	The scope for flexible conduits includes drilling of the holes in the plates, fixing of the end connectors, providing suitable supports and fixing marks wherever specified and required by BHEl. The supply of suitable clamps, fasteners and tag plates are in contractor's scope.
30.4	In the case of flexible conduit laying and fixing end connectors, no separate payment will be made for end connectors.
30.5	If touch up painting is required, the same shall be arranged by the contractor.
30.6	Welded joints of trays shall be painted with red lead and aluminium paint in turn and afterwards, coated with bitumen as per IS 3043. The contractor's quoted rates shall inclusive of paint, thinner, brush etc.
30.7	The unit rate quoted shall also cover the following works:
30.7.1	Changes in line and grade of addition of off-set by means of cutting standard tray sections and inserting additional tray fittings to match with the existing arrangement.
30.7.2	Small modifications in the cable tray routings.
30.7.3	Cleaning and minor chipping work, dewatering of trenches, if necessary, minor civil works and other associated works. Securing the supports on walls, ceilings, floor or trenches by suitable anchoring may also have to be done, if required.

31.0	**SCOPE OF WORK FOR FABRICATION MATERIALS & STRUCTURAL STEEL**
31.1	The scope of fabrication generally includes supports for cable tray, instruments, impulse pipes, GI pipes, and mounting frames for JB, control box/panel, canopy for local instruments wherever required.
31.2	The fabrication steel materials such as angles, channels, plates, flats shall be supplied by BHEL.
31.3	The unit rate shall be paid on tonnage basis and no separate rate shall be paid for the erection of fabricated items i.e. the rate quoted for the steel material includes fabrication & installation. However, for earthing materials the rates shall be paid on running meter basis.
31.4	Fabrication shall be carried out as per schemes in consultation with site engineers.
31.5	For fixing frames or racks if any minor grouting is required, the same shall be carried out at free of cost. After installation of frames, supports the grouting of the same is in the scope of contractor.
31.6	The mounting frames for instruments may be supplied either fabricated or as loose. In the case of fabricated frames, erection has to be carried out at site either by fixing on the ground or on a suitable structure and shall be properly fixed by grouting or by welding. The rate shall be paid on tonnage basis.
31.7	All the T&Ps including welding machining shall be arranged by the contractor.
31.8	All the consumables such as welding electrodes, gas etc. shall be arranged by the contractor.
31.9	If nuts, bolts, anchors, fasteners required for fixing the racks or frames, the same shall be arranged by the contractor.
31.10	All the fabricated steel materials shall be painted as per the details given in the scope of painting and no separate rate shall be paid for painting.
31.11	Supply of all cement, sand etc. required for grouting of supports are in the scope of contractor.
32.0	**SCOPE OF PAINTING**
32.1	The scope of painting generally includes for all the steel works such as supports, racks, frames,canopy, impulse pipes etc. carried out by the contractor.
32.2	The scope also includes supply of paints, primers, consumables like brushes, emery papers, thinner etc.
32.3	The painting shall include 2 (two) coats of Red oxide primer and 2 (two) coats of final painting approved by BHEL.
32.4	Paints shall be arranged from standard suppliers in consultation with BHEL.
32.5	Touch up painting generally requires for trays, control panels, junction boxes and Final painting shall be required only for specific equipments as per the scope of erection.
32.6	No separate rate shall be paid for painting, supply of paints and other consumables. Painting shall be accommodated in the unit rate quoted for items which calls for painting as per the scope of work.
32.7	For any bare copper tube requirement, painting as desired by the site engineer shall be carried out by the contractor at free of cost.
32.8	All damaged painted surfaces shall be cleaned and coated with two (2) coats of primer followed by a finishing coat of appropriate colour of approved paint.
32.9	All damaged galvanized surfaces including cable trays shall be coated with cold galvanizing paint.
32.10	All primers & paints including touch-up paints shall be supplied by the contractor.
33.0	**MEASUREMENT & WASTAGES & CUTTING ALLOWANCES**
33.1	For all payment purposes, measurement shall be made on the basis of the execution of drawings/physical measurements. Physical measurements shall be made by the contractor in the presence of the Engineer.
33.2	The measurement for cables, impulse pipes/tubes, GI pipes, conduits, flexible conduits, trays, copper tubes etc. shall be made on the basis of length actually laid.
33.3	All the surplus scraps and serviceable materials out of the quantity issued to the contractor shall be returned to BHEL in good condition and as directed by the

	engineer.
33.4	All materials returned to stores should carry out an aluminium tag indicating the size and type. More than 5 meters length termed as serviceable material and shall be returned size wise and category wise to the owner's stores/yard. Cable of serviceable length being returned to the stores in drums shall have their free ends sealed and the balance lengths on the drum(s) shall be noted and certified by the Engineer-in-charge. This shall be applicable only for the purpose of accounting the cables issued for installation.
33.5	While carrying out material appropriation with contractor, all the above points will be taken into account. All serviceable material returned by the contractor shall be deducted from the quantities issued for the respective sizes and categories and the balance quantity(ies) will be taken as the net quantity(ies) issued to the contractor. Material appropriation shall then be done and allowable scrap quantity calculated as per wastage allowance percentage specified above. Any scrap/wastages generated by the contractor in excess of the allowable percentage shall be charged at the rates decided by the Engineer whose decision shall be final and binding on the contractor.
33.6	For all site fabricated steel item such as supports, racks, frames, canopy etc.,physical measurement shall be made and then converted to tonnage. For steel material supplied to the contractor, all scrap shall be returned to BHEL stores with due accounting.
33.7	Every month the contractor shall submit an account for all the materials issued to him by BHEL in the standard proforma prescribed for this purpose by the site-in-charge.
33.8	The wastage allowances as permissible for various items are indicated in below clause. Cutting and wastage allowance shall be computed on the lengths and weight of materials actually used, measured and accepted.
33.9	The erection contractor shall make every effort to minimize wastage during erection work. In any case, the wastage shall not exceed the following limits:

Item	% wastage on issued quantity
Each Iron/Steel section	2
Each size of Power cables	1
Each size of Control cables	2

33.10	If however the bidder quotes for more wastage than specified above, the excess portion will be considered for adjustment during the tender evaluation at the quoted supply rate of material.
33.11	If the actual wastage be more than the specified above, then equivalent price of the excess portion will be deducted from the contractor's bid.
33.12	The cable take off from drums shall be planned strategically such that jointing in the run of cables and wastage are avoided. For this purpose the exact route length between various equipment/panels as per the cable schedule shall be measured and the route length recorded before laying of the cables. Depending upon the route length, the type of cable required for various destinations, the cable drums shall be suitably selected for cable laying. Any jointing which may be approved by the engineer, all the cut pieces/bits of cables which are not used/unused shall be returned to the purchaser for accounting towards wastages. The cables damaged by the contractor shall have to be replaced by the contractor at his own cost.
33.13	Salvageable scrap shall mean lengths of tubes, pipes, multi-core cables, other cables etc., that can be used one time or other at later date and normally they are recovered from the cut pieces of tubes, pipes, multi-core cables, and other cables etc.
33.14	Non-salvageable scrap means lengths of tubes, pipes, multi-core cables, other cables etc., and they are from cut pieces of tubes, pipes, multi-core cables, other cables etc. that cannot be used at all one time or other.
34.0	**STORAGE**
34.1	The equipment should be preferably in its original package and should not be

	unpacked until absolutely necessary for its insulation. The equipments should be best protected in its cases. It should be arranged away from walls.
34.2	The wooden pallet provided for packing itself can be retained for raised platform to protect equipment from ground damps, sinking into around and to circulate air under the stored equipment. This will also help in lifting the packing with fork lift truck.
34.3	Periodic inspection of Silica gel placed inside the equipment is necessary. It has to be replaced when decolorisation takes place.
34.4	Due care should be taken to ensure that the equipment is not exposed to fumes, gases etc. which can affect electrical contacts of relays and terminal boards.
34.5	The storage room and the equipment should be checked at regular interval of 3 months to ensure protection from termites, mould growth, condensation of water etc. which can damage the equipment.
34.6	All the equipment, materials and goods kept in the store room should be identified and registered in a book. Inspection report should be recorded. Any discrepancy observed should be communicated to site.
34.7	Packing material shall be retained if the cubicle to be repacked after inspection.
34.8	SUB-ASSEMBLIES:
34.8.1	All sub-assemblies should be kept in a separate place where it is easily accessible.
34.8.2	Sub-assemblies should have a protective cover in case it is stored without wooden packing/case to prevent accumulation of dust. Silica gel packets should also be kept along with it.
34.8.3	Sub-assemblies should not be stacked one above the other.
34.9	LOOSE ITEMS (Wherever applicable):
	The loose items supplied for the main equipment falls into various categories like tools, cables, prefabricated cables, console inserts, recorders, modules and display units, printers, sensors and transducers, cable glands, cable ducts, frames etc. are to be categorized and stored separately.
35.0	**SCOPE OF WORK OF GTG & STG PACKAGE**
35.1	Providing required manpower including supervision, T & Ps and consumables for unloading/ loading, receipt of materials from stores and arranging their issue, transportation to site, temporary storage prior to erection, if required, material handling, storage, preservation including touch up painting, stacking, watch and ward, checking , chipping and leveling of foundation if necessary , pre-assembly, erection, alignment, grouting, welding, radiography, LPI /MPI Testing, wherever required, heat treatment, application of thermal insulation, finish painting, including supply of paints, electrical, C&I etc all complete and commissioning activities including post commissioning, trial operation / full load operation, PG test/Handing over of frame-V GTG , STG and other station auxiliaries complete erection testing and commissioning including final painting of 2 X 20 MW GTG (Gas Turbine & Generator) set and 1X13.3 MW STG with all its accessories at BCPL, Lepetkata, Assam.
35.2	Major equipments to be erected, tested and commissioned under this specification are given in Annexure-I. However change in design may occur as is usual in any such large scale work for which no compensation will be payable and contractor shall complete the entire work as detailed in tender specification within the finally accepted rates / price.
35.3	SCOPE OF ERECTION - STEAM TURBINE
35.3.1	Steam Turbine
35.3.2	Gear Box between Turbine and Pump
35.3.3	Emergency Trip Cum Stop Valve
35.3.4	Blanket Plate for Steam Blowing
35.3.5	Turbine Steam Governing Valves
35.3.6	Steam Strainer Built into Stop Valve
35.3.7	Suitable Coupling for the Train
35.3.8	Suitable Turning Device

35.3.9	Solenoid Valve for Remote Tripping
35.3.10	Turbine sole plates
35.3.11	Foundation Bolts, shims etc.
35.3.12	Mating Flanges for Turbine Inlet and Exhaust Flanges
35.3.13	Special Tools for Maintenance (common for both)
35.3.14	Prime Coat of Paint
35.3.15	Turbine Drain Water Piping within TG Block
35.3.16	Turbine Insulation (Mineral wool mattress with CAT-9 cement layer)
35.3.17	Safety Relief Valve in Exhaust Line
35.4	SCOPE OF ERECTION - OIL SUPPLY SYSTEM (API 614/4TH EDITION)
35.4.1	Main Oil Tank (SS material) Including
35.4.1.1	Drain & Maintenance Openings
35.4.1.2	Level Indicator
35.4.1.3	Level Signalisation High/Low
35.4.1.4	Connection for Purifier
35.4.1.5	Heater
35.4.2	First fill of lubricants.
35.4.3	Over Head Oil Tank with associated Piping(SS)
35.4.4	Main Oil Pump (Centrifugal pump) with Auxiliary Turbine driven
35.4.5	Auxiliary Oil Pump (Centrifugal) with AC Motor
35.4.6	Emergency Oil Pump (Centrifugal) with DC Motor
35.4.7	Duplex Filter for Lube Oil
35.4.8	Trans-flow Valves for Duplex Oil Filters
35.4.9	Oil Cooler 2 No. - (1 Main + 1Standby)
35.4.10	Change Over Device for Oil Coolers
35.4.11	Vent & Drain Valves for Oil Coolers on Water and Oil Sides
35.4.12	Oil Mist Fan with AC Motor 2 x 100%
35.4.13	Pressure Throttles for Bearings
35.4.14	Complete Lube Oil Piping (Stainless Steel Material)
35.4.15	Complete Control Oil Piping (Stainless Steel Material)
35.4.16	Oil Accumulator – Bladder type for Lube oil circuit also
35.4.17	Oil Centrifuge 1000 LPH capacity without heater
35.4.18	Governing Console Consisting of
35.4.18.1	Duplex Filter for Control Oil
35.4.18.2	Main Trip Solenoid Valve
35.4.18.3	Electric-Hydraulic Converters
35.4.18.4	Local Gauge Board
35.4.18.5	Other hydraulic components
35.4.19	Oil Cooler 2 No. - (1 Main + 1Standby)
35.4.20	Change Over Device for Oil Coolers
35.4.21	Vent & Drain Valves for Oil Coolers on Water and Oil Sides
35.4.22	Isolation Valves on CW side with Counter Flanges
35.5	Scope of Erection – Integral (piping)
35.5.1	Thermal insulation for piping in scope.
35.5.2	Integral piping
35.6	SCOPE OF ERECTION – CONTROL & INSTRUMENTATION
	Primary instruments for STG Integral portion.
35.6.1	Local gauges for pressure, differential pressure, temperature, flow and level measurements.
35.6.2	Primary sensors for remote monitoring / modulating controls / Interlocks & Protection
35.6.3	Temperature elements: Bearing RTDs (PT-100), K-type thermocouples on other lines
35.6.4	Local gauge board.
35.6.5	Governing console board.

35.6.6	Safety relief valve: Turbine back pressure line pressure safety relief valve.
35.6.7	Turbo supervisory system consisting of TSI probes, Extension cables, monitors.
35.6.8	Electronic governor will be BHEL-EDN Make
35.6.9	Steam Turbine and auxiliaries Interlocks and Protection are realised in Turbine control system of BHEL-EDN make.
35.6.10	Universal type Hand held communicators- 1 no. for all smart transmitters(common for both turbines)
35.6.11	Impulse lines along with fittings, valves etc. (same as that of parent line material) for instruments in pressure parts.
35.7	2 NOS BOILER FEED PUMP DRIVE TURBINE (NG 25/20-3)
35.7.1	Drive Turbine: NG 25/20-3 (API 612/1995 standard)
35.7.2	Couplings: As required
35.7.3	Lube oil system: API 614 standard
35.7.3.1	With Overhead Lube Oil Tank
35.7.3.2	With Auxiliary Turbine Driven MOP
35.7.4	Control Philosophy: Electronic Governor-BHEL EDN
35.7.5	Turbine control System - BHEL EDN
35.7.6	C&I cables including JBs for STG Integral - BHEL-EDN
35.8	SURFACE CONDENSER (ONE NO FOR EACH 15MW STG; TOTAL: 1 NO.):
35.8.1	Two pass divided waterbox circular Condenser
35.8.2	Carbon steel dome, shell, support plates, hotwell, waterbox, tube sheet etc. and Admiralty Brass tubes
35.8.3	Standpipes for mounting instruments
35.8.4	Sacrificial anodes inside waterbox for cathodic protection
35.8.5	SS Expansion bellow
35.8.6	Primer coating on outer surfaces and epoxy coating on waterbox internals.
35.8.7	Accessories like Atmospheric relief valve, water expansion relief valve, vent and drain valves etc.
35.8.8	Tubing of Condenser will be done at site. Dome, hotwell, tubes, shell, waterbox etc. will be dispatched loose from BHEL works. Tube expansion, welding of parts and final assembly of Condenser will be done at site by erection agency
35.9	STEAM JET AIR EJECTOR (ONE NO FOR EACH 15MW STG; TOTAL: 1 NO)
35.9.1	2 x 100% running ejector with inter and after condensers and one starting ejector with silencer
35.9.2	Nozzle and diffusers for ejectors.
35.9.3	Inter and after condensers with carbon steel shell, tubesheet, waterbox & SEAM LESS stainless steel tubes
35.9.4	Condensate from Condenser is considered as cooling medium for Inter and After condensers.
35.9.5	Primer coating on outer surfaces
35.9.6	Steam and Air pipes
35.9.7	Accessories like water expansion relief valve, vent and drain valves etc.
35.10	GLAND STEAM CONDENSER (ONE NO FOR EACH 15MW STG; TOTAL: 1 NO)
35.10.1	GSC with 2 x 100% ejector
35.10.2	Condensate from Condenser is considered as cooling medium for Inter and After condensers.
35.10.3	Carbon steel shell, waterbox , support plate & tube sheet and Seam less stainless steel TP304 tubes
35.10.4	Accessories like tube side relief valves, vent and drain valves etc.
35.10.5	Primer coating on outer surfaces
35.11	DEAERATOR (ONE NO. FOR TOTAL PLANT)
35.11.1	Spray-cum-tray Deaerator with feed storage tank
35.11.2	Standpipes for mounting instruments
35.11.3	Platform for operation & maintenance
35.11.4	Accessories like safety relief valves, vent and drain valves, isolation valves etc.

35.11.5	Primer coating on outer surfaces
35.12	GENERATOR AIR COOLER (ONE SET FOR 15MW STG AND 2 SETS FOR 2 X FR.5 GTG)
35.12.1	Pit mounted STG Air Cooler , Side mounted GTG Air Cooler
35.12.2	High fin Admiralty brass tubes with cu. fins, Carbon steel tube sheet, CS frames.
35.12.3	Accessories like CW inlet/outlet valves, vent and drain valves etc.
35.12.4	Primer coating on outer surfaces
35.13	LUBE OIL COOLER
35.13.1	One set (2 X 100%) for each Fr.5 GTG; Total : 2 sets.
35.13.2	One set (2 X 100%) for 15MW STG; Total : 1 sets.
35.13.3	One set (2 X 100%) for each BFP Drive Turbine; Total : 2 sets.
35.13.4	Horizontal 2 x 100% capacity Oil Cooler
35.13.5	Coolers shall be with carbon steel shell/channel (106 Gr. B or SA 516 Gr 70), water box etc., Naval brass tube sheet (~~Carbon Steel for GT Oil cooler~~) and Admiralty brass tubes.
35.13.6	Manually operated 3-way change over valve. (Except for GT Oil Coolers)
35.13.7	Primer coating on outer surfaces
36.0	**PRELIMINARY WORKS**
36.1	The contractor shall check the turbine, generator and all auxiliaries foundations for the correctness of the same as per the drawings and satisfy himself in all aspects, such as location of foundations, consolidation of foundations, absence of voids, levels , correctness of bolt holes, pockets levels and center lines etc. All measurements should be recorded and submitted to Engineer for approval before erection.
36.2	The contractor shall provide his stores for special tools and instruments at a convenient location near to the place of working in GTG/ STG hall in the open yard.
36.3	All matching surfaces of components shall be well cleaned with cleaning agent and burrs shall be removed by filing and blue matched. Wherever necessary sealing / lubricating / antisieze compounds shall be applied as per recommendation of BHEL Engineer. Machining / grinding required for fitting of keys, pins, packers & dowels etc. shall be carried out by contractor at his cost.
36.4	The accuracy of all equipment / instruments and their functioning shall be established before they are permitted for use on the job. If the BHEL Engineer doubts the accuracy of the precision tools, any time during erection, the contractor shall arrange the checking of tools / equipment / instruments at his cost.
37.0	**CIVIL WORKS, FOUNDATIONS AND GROUTING**
37.1	Foundation for all equipment and necessary civil works shall be provided by BHEL. The dimensions & location of foundation, pockets and anchor bolt pitch shall be checked by the contractor for their correctness as per drawings. Further, top elevation of foundations shall be checked with respect to bench mark. Etc. All minor adjustments of foundation level, dressing and chipping of foundation surfaces up to 50 mm, enlarging of the pockets in foundations etc. as may be required for the erection of equipment / plants shall be carried out by the contractor.
37.2	While on the job, care is essential to avoid too much chipping and resultant lowering of level. In case of excess chipping, contractor has to arrange additional packing plates as per requirements provided it is allowed by BHEL, Engineer. When required by manufacturers the embedded sub sole plates shall be scraped and checked with Prussian blue to get the required contact with the frames.
37.3	The contractor shall ensure perfect matching of the packer plates including machining, scraping, blue matching with foundation by dressing the foundation as well as perfect matching between the packer plates and the base plates of equipment to the satisfaction of the BHEL Engineer.
37.4	The grouting of all the equipment shall be carried out as per the drawings, specifications or as per the advice of BHEL Engineer. The grouting of foundation bolt holes, plates and equipment bases for GTG & other rotating equipment is to be carried out with special grout material (i.e. Conbextra GP – II) All other equipment

	bases , bolt holes and the structural steel base plates etc shall be grouted with grouting mix of Portland cement , sand , gravel and anti shrinkage compound / plasticiser. All the arrangement required for both types of grouting including supply of pebbles, gravel, cement, sand, ant shrinkage compound / plasticiser & any other material required for grouting, mechanical mixer machines, vibrators, shuttering, nails wires etc shall be arranged by the contractor at their cost. Valid test certificates (from authorized/ Govt approved/ accredited test laboratories traceable to the National/ International Standards) for the construction material so used, should be obtained by the contractor before use at his cost.
37.5	Grouting of seating plates, sole plate, and bedding of packers shall be carried in sequence and stages recommended by the manufacturer. All matching joints which are not to be grouted shall be kept free from the grouting mixture by applying tapes or any other alternative method approved by the BHEL Engineer. Contractor shall also take care to get the perfect fit in the keys and the key ways to avoid any scratches and damages to the keys.
37.6	The contractor shall prepare the required test pieces / cubes to ensure the strength of the grout and get the same tested in the laboratory at his own cost as directed by BHEL before grouting. Test cubes shall also be taken during grouting for testing in the laboratory and shall be tested at his cost.
37.7	After the grouting, the grout thus laid on foundations is to be cured by the contractor to the satisfaction of the BHEL Engineer. The contractor shall check and verify the alignment of the equipment, alignment of shafts of rotating machinery, the slopes of all bearing pedestals, centering of rotors with respect to their sealing bores, coupling etc. as applicable and the like items to ensure that no displacement had taken place during grouting. The values recorded prior to grouting shall be used during post grouting check up and verifications. Such pre and post grout records of alignments details shall be maintained by the contractor in a manner acceptable to the BHEL Engineer.
37.8	Besides grouting as above, any civil works required for safe and efficient operation of tools and tackles like grouting / excavation / casting of foundation / anchor points for derricks, winches, guy ropes fastening, etc. / foundations required for chemical cleaning pumps, tanks and any other temporary supports shall also be the contractor's responsibility. For these civil works all materials including cement and required facilities will have to be arranged by the contractor at his own cost.
38.0	**CONSUMABLES**
38.1	The contractor shall provide within the finally accepted price, all consumables like welding electrode (including alloy steel and stainless steel), TIG filler wires, all gases (inert, welding, cutting) soldering material, dye penetrants, radiography films, and other erection consumables such as tapes, jointing compound, grease, mobile oil, M Seal, Araldite, petrol, CTC / other cleaning agents, wooden sleepers, steel required for temporary works , such as supports, packing, H & S, shims etc. hardware items, sealing compounds required for completion of work except those which are specifically supplied by manufacturing unit.
38.2	All shims and gaskets which go finally as part of the equipment shall be supplied by BHEL free of cost.
38.3	It shall be the responsibility of the contractor to plan the activities and store sufficient quantity of consumables. Non availability of any consumable materials or equivalent suggested by BHEL cannot be considered as reason for not attaining the required progress or for additional claim.
38.4	It shall be the responsibility of the contractor to obtain prior approval of BHEL, regarding suppliers, type of electrodes, batch no., date of expiry etc. and produce test certificate for each lot/ batch with correlation of batch / lot no. with test certificate. No electrode will be allowed for use without valid test certificates.
38.5	BHEL reserves the right to reject the use of any consumable including electrodes, gases, lubricants / special consumables if it is not found to be of the required standard / make / purity or when shelf life has expired. Contractor shall ensure

	proper display of shelf life on consumables wherever required & Records are maintained.
38.6	Storage of all consumables of including welding electrodes shall be done as per requirement / instruction of the BHEL Engineer by the contractor at his cost.
38.7	In case of improper arrangement of procurement of consumables, BHEL reserves the right to procure the same from any source and recover the cost from the contractor's first subsequent bill at the purchased value plus the departmental charges of BHEL from time to time (30 % at present). Postponement of such recovery is normally not permitted. The decision of BHEL Engineer in this regard shall be final and binding on the contractor.
38.8	All lubricant, grease and chemicals required for cleaning, pre commissioning, commissioning, testing, preservation and lubricants for trial runs/ running of the equipment shall be supplied by BHEL / BHEL's client. All services including labour and T & P will be provided by the contractor for handling, filling, emptying, refilling etc. The consumption of lubricants / chemicals shall be properly accounted for. Surplus materials if any shall be properly stacked / stored and returned to stores.
38.9	Transportation of oil drums , from stores, filling of oil and filling of oil for flushing, first filling of oil and subsequent changeover or topping / making up till the unit is fully commissioned and handed over to customer is included in the scope of the contract. The contractor shall have to return all the empty drums to BHEL / BHEL's client store at no extra cost. Any loss / damage to above shall be to the contractor's account.
39.0	**TOOLS & PLANTS/ IMTEs**
39.1	T & P being provided by BHEL to sub contractor free of hire charges, if any, shall be shared by other sub contractors working for BHEL at site and the allotment done by BHEL Engineer shall be final and binding.
39.2	Besides the T & Ps and IMTEs being made available to the contractor free of hire charges by BHEL, all other T & Ps and IMTEs which will required for successful and timely completion of the work covered within the scope of this tender shall be arranged and provided by the contractor at his own cost and in working condition. In the event of failure of the contractor to bring sufficient and necessary T & Ps/ and IMTEs , BHEL will be at liberty to arrange the same at the risk and cost of the contractor including transportation cost of the same from any of BHEL site / place and hire charges as applicable shall be deducted from the contractors bill. Decision of BHEL in this regard shall be final and binding on the contractor.
39.3	All distribution boards, connecting cables / welding cables, wire ropes, hoses, etc. including temporary air /water / electrical connections etc. shall have to be arranged by the contractor at his own cost.
39.4	In case of non availability of the T & Ps to be provided BHEL due to breakdown, major overhauls, distribution pattern or any other reason, the contractor shall plan / amend / alter his activities to meet erection / commissioning targets in consultation with BHEL Non availability of BHEL T&Ps for reasons mentioned, shall not be cited as reasons for delay. No compensation in this regard will be entertained by BHEL.
39.5	The contractor will have to provide 01 no. Hydra (11 T cap.) and 01 no. trailor for erection work depending upon site requirement at their cost.
39.6	All labour required by BHEL for maintenance and attending breakdowns of BHEL supplied T & Ps shall be arranged by the contractor at his own cost.
39.7	Increasing or shortening of the crane boom to suit work requirements shall have to be arranged by the indenting contractor at his own cost. All necessary manpower, tools, support, consumables, illumination etc. will have to be arranged by the contractor at his own cost.
39.8	Consolidation of ground and arrangement of sleepers / sand bags fillings etc. required for safe operation / movement of the equipment including cranes / trailers etc. shall be the responsibility of the contractor at his cost.
39.9	In the event when the contractor is not using BHEL T & Ps according to BHEL's instructions, BHEL will have the right to withdraw such item without any notice and

	no claim in this regard shall be entertained and the contractor shall be responsible for the delay in execution on that account.
39.10	Regular utilization report of the BHEL T & Ps as per the requirement of BHEL shall be furnished by the contractor.
39.11	Any loss / damage to any part of BHEL T & Ps and IMTEs shall be to the contractor's account and any expenditure on these accounts by BHEL will be recovered from the contractor's bill in case the contractor fails to make good the loss.
39.12	It shall be the responsibility of the contractor to take delivery of T & Ps and IMTEs from stores or place of use by other contractor at project site, transport the same to site and return the same to BHEL store / place as shall be intimated by BHEL Engineer in the project site in good working conditions after use.
39.13	The contractor shall return BHEL T & Ps issued to him in good working condition as and when desired by BHEL (on completion or reduction of work load). If return of T & P is delayed by the contractor, hire charges as applicable shall be levied by BHEL from the time it was requisitioned till the time of actual return. Hire charges shall also be charged on the T & Ps returned in damaged / un serviced condition to BHEL till its satisfactory repair. T & Ps returned in damaged / un serviced condition shall be got repaired by BHEL at its own discretion and the entire cost of repair with BHEL overheads shall be recovered from the contractor.
39.14	Replacement cost including BHEL overheads in respect of irreparable / completely damaged / non return of T & Ps and IMTEs shall be recovered from the contractor's running bills.
39.15	The contractor shall ensure deployment of serviced and healthy T & Ps including cranes, lifting tackles, wire ropes, Manila ropes, winches and slings etc. History card and maintenance records for major T & Ps will be maintained by the contractor and will be made available to BHEL Engineer for inspection as and when required. Identification for such T & Ps will be done as per BHEL Engineers advice.
39.16	Contractor shall ensure deployment of reliable and calibrated IMTEs (Inspection measuring and test equipment). The IMTEs shall have test / calibration certificates from authorized / Govt. approved / accredited agencies traceable to National / international Standards. Each IMTE shall have a label indicating calibration status i.e. date of calibration, calibration agency and due date for next calibration. A list of such instruments deployed by the contractor at site with its calibration status is to be submitted to BHEL Engineer for control.
39.17	Re testing / re calibration shall also be arranged by the contractor at regular intervals during the period of use as advised by BHEL Engineer within his quoted contract price. The contractor will also have alternate arrangement for such IMTEs so that the work does not suffer when the particular instrument is sent for calibration. Also if any IMTE is found not 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 IMTEs and retake the readings at the contractors cost.
39.18	BHEL shall have lien on all T & Ps, IMTEs & other equipment of the Contractor brought to the site for the purpose of erection, testing and commissioning. BHEL shall continue to hold the lien on all such items throughout the period of contract. No material brought to the site shall be removed from the site by the contractor and / or his sub contractor without the prior written approval of BHEL Engineer.
39.19	The month-wise T & P deployment plan to be submitted as per format (at Annexure– F to general conditions of the contract) is only to assess the capability as well as understanding of the contractor to execute the work. It shall be the contractor's responsibility to deploy the required T & P, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account.
40.0	**SUPERVISORY STAFF AND WORKMEN**

40.1	The contractor shall deploy all skilled workmen like mill Wright fitters, welders.. gas cutters, riggers, sarangs, masons, carpenters, electricians, instrument, technician etc. in addition to other skilled, semi skilled and unskilled workmen required for all the works of handling and transporting from site storage to erection site, erection, testing and commissioning as contemplated under these specification. Only fully trained and competent men with previous experience on the job shall be employed. They shall hold valid certificates wherever necessary. BHEL reserves the right to decide on the suitability of the workers and other personnel who will be deployed by the contractor. BHEL reserves the right to insist on removal of any employee workman of the contractor at any time, if they find him unsuitable and the contractor shall forthwith remove him.
40.2	The supervisory staff including qualified engineers deployed by the contractor shall ensure proper out turn of work and discipline on the part of workmen put on the job by the contractor and in general see that the works are carried out in a safe and proper manner and in coordination with other labour and staff deployed directly by BHEL or others contractor of BHEL or BHEL's client / other agency.
40.3	The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operation at site. The contractor and his personnel shall cooperate with other personnel / contractor, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.
40.4	The contractor's supervisory staff shall execute the work in the most substantial and workman like manner in the stipulated time. Accuracy of the work and aesthetic finish are essential part of this contract. The contractor shall be responsible to ensure that the assemble and workmanship conform to the dimensions and tolerances given in the drawings / documents / instructions given by BHEL engineer from time to time.
40.5	The contractor shall deploy the necessary number of qualified and approved full time electricians at his cost to maintain his temporary electrical installation till the completion of work.
40.6	It is the responsibility of the contractor to engage his workmen in shifts or on overtime basis for achieving the targets set by BHEL and also during the period of commissioning and testing of unit. The contractor's finally accepted rates / prices shall include all these contingencies.
40.7	During the course of erection, if progress is found unsatisfactory, or if targeted date fixed from time to time for every mile stones are to be advanced or in the opinion of BHEL, of it is found that the skilled workmen like fitters, operators, technicians etc. deployed are not sufficient, BHEL after giving reasonable opportunity to the contractor, will induct the required workmen in addition the contractor's workmen to improve the progress and recover from the contractor's bills any charges incurred for engaging the additional workmen with overheads.
40.8	If the contractor or his workmen or employee shall break , deface , injure or destroy any part of a building, road /kerv, fence, enclosure, water-pipes, cables, drains, electric or telephone posts or wire, trees or any other property or to any part of the erected components etc. the contractor shall make the same good at his own expense or by default, BHEL may cause the same to be made good by other agency / workmen or by other means and deduct the expenses (of which BHEL's decision is final) including BHEL's overhead from any money due to the contractor.
40.9	The monthly manpower deployment plan to be submitted as per format (at Annexure E of general conditions of contract) is only to asses the capability as well as understanding of the contractor to execute the work . It shall be the contractor's responsibility to deploy the required manpower, for timely and successful completion of the job, to any extent over and above those indicated in the above deployment plan (including those which are not covered in the plan submitted) without any compensation on this account. Separate persons shall be identified at

	site for quality control and safety by the contractor.
41.0	**ERECTION**
41.1	All works such as cleaning, checking, leveling, blue matching, aligning, assembling, temporary erection for alignment, dismantling of certain equipment for checking, cleaning, surface preparation, fabrication at site, cutting, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scraping, machining, surface grinding, shaping, fitting up, tube expansion etc. as may be applicable in such erection works are to be treated as incidental to erection and necessary to complete the work satisfactorily & shall be carried out by the contractor as part of the work.
41.2	Any fixtures, scaffoldings materials, approach ladder, concrete block supports, steel structures required for the temporary supporting, pre assembly or checking, welding, lifting and handling during pre assembly or checking, welding, lifting and handling during pre- assembly and erection shall be arranged by the contractor at his own cost.
41.3	No members of the ladder structure/ platform should be cut without specific approval of BHEL Engineer. In case it is necessary to cut, the contractor shall rectify / repair on a manner acceptable to BHEL without any additional cost.
41.4	The contractor shall make arrangement to directly transfer the turbine and generator skids from the transport trailers on to / by the side of the foundation. Arrangement of Additional Crane/Hydraulic jacks, steel sections, anchors, winches etc. is to be made by the contractor before arrival of skids in advance at no additional cost.
41.5	All rotating machines and equipment shall be cleaned, lubricated, checked for their smooth rotation, if necessary by dismantling and refitting before erection. If, in the opinion of the BHEL engineer, the equipment is to be checked for clearance, tolerance at any stage of work or during commissioning period all such works are to be carried out by the contractor at his own cost.
41.6	All the shaft of the rotating equipment shall be properly aligned to those of the matching equipment to as perfect and as accurately as practicable. All bearings, shafts and other rotating parts shall be thoroughly cleaned and suitably lubricated before starting.
41.7	All the motors and equipment shall be suitable doweled after alignment of shafts with tapered machined dowels as per the direction of the BHEL Engineer. Dowel pins required for the same shall be arranged by the contractor at his own cost. However the materials for dowel pins shall be issued by BHEL free of cost.
41.8	The bearings shall be blue matched at site and checked for bearing clearances. Scraping of bearing housing, if required to any extent shall be carried out by the contractor. No extra claim for blue matching of any two surfaces will be entertained. The contractor shall also check air gap and adjustment of stator / rotor to magnetic center shall be carried out as part of erection.
41.9	The contractor shall carry out Kerosene Oil Test / Dye Penetration Test of welding as required and install lube oil systems and carry out the chemical cleaning of fabricated piping. The contractor shall also service the lube oil system, carry out the hydraulic test of oil coolers, etc. However, the calibrations of lube oil system instruments shall be arranged by BHEL.
41.10	All electrical control gears, motors and such other devices shall be properly dried by heating to improve IR value, before they are installed and energized. Bearings, slip rings commutators and other exposed parts shall be protected against moisture ingress and corrosion during storage and periodically inspected.
41.11	Layout of small bore piping as required shall be done as per site requirement. Necessary sketch for routing these lines should be got approved from BHEL by the contractor. There is a possibility of slight change in routing the above pipe lines even after completion of erection or from aesthetic point of view. This should be carried by the contractor at no extra cost. Generally Bends up to 80 mm NB will have to be fabricated at site.
41.12	Erection testing and commissioning of power cylinders, valves, actuators etc.

	coming under various groups is covered under the scope of this specification.
41.13	All the valves, including motorized valves, flap valves, dampers, actuators etc. shall be serviced and lubricated to the satisfaction of Engineer before erecting the same and during pre commissioning also. Welding or jointing of extension spindle for valves to suit the site conditions and operational facility shall be part of erection work within the quoted rates.
41.14	The contractor shall dismantle the valves and actuators for overhauling servicing & lubrication wherever required as advised by the engineer. The contractor shall also lap or grind the valve seats for ensuring the satisfactory performances of valves at no extra cost. All parts such as gaskets, gland packing which form the permanent part of equipment shall be supplied by BHEL free of cost.
41.15	Welding of necessary instrumentation tapping points, thermocouple pads, valves, root valves,condensing vessels, flow nozzles and control valves to be provided on GTG / its auxiliaries /pipe lines covered within the scope of this specification, will also be the responsibility of the contractor and will be done as per the instructions of BHEL Engineer. The welding of all the above items will be contractors responsibility even if the : a) Product groups, under which these are released, are not covered in the scope of this tender. b) Items are supplied by any agency other than BHEL.
41.16	Hangers & supports for the pipes shall have to be fabricated and shall be installed as per the drawings to obtain safe and reliable and complete pipe installation as per instructions of BHEL Engineer. Any additional support as called for by the Engineer shall have to be fabricated by the contractor and provided at no additional cost. However the raw materials required for fabricating such supports shall be supplied by BHEL free of cost.
41.17	Erection of CO_2 system complete in all respects, including cylinders stands, connecting piping,valves, distribution header, main control panels etc. shall be in the scope of the contractor.taking delivery from BHEL / its client stores, handling of cylinders and filing of gases in the system as and when required till unit is commissioned and handed over, returning empty cylinders to BHEL / its client stores, shall be the responsibility of the contractor. Cutting of GI Pipes to size, preparation of threads to match the fittings is to be Carried out by the contractor within his quoted contract rate / price.
41.18	Additional platforms and ladders of permanent nature incidental to the job or rectification /modification in the existing ones for approaching different equipment / valves as per site requirement which may not be indicated in the drawings, shall be fabricated and installed by the contractor at no extra cost. The materials required will be supplied by BHEL free of cost.
41.19	Wherever necessary, the miscellaneous equipment / pipes may have to be anchored with Dash Fasteners. While BHEL will provide fasteners, all other arrangements are to be made by the contractor.
42.0	**WELDING HEAT TREATMENT, RADIOGRAPHY AND NON-DESTRUCTIVE TESTING**
42.1	The method of welding (arc, gas, TIG or other method) may be indicated in the detailed drawings/ schedules. BHEL Engineer will have the option of changing the method of welding as per site requirements.
42.2	All welders including tack welder, structural and pipe welder shall be tested as per ASME Section IX and approved by BHEL Engineer before they are actually engaged on the work though they may possess the IBR certificate. BHEL reserves the right to reject any welder if the welder's performance is not found to be satisfactory. The records of qualification of welders shall be maintained by the contractor in proforma given by BHEL Engineer. All the welders qualified for the work will be issued an identity card by BHEL Engineer and welder will keep the same with him at work place.
42.3	The faulty welds caused by the poor workmanship shall be cut and re welded at the

	contractors expenses.
42.4	The contractor shall carry out the root run welding of all butt welds, HP or LP by TIG welding method only. The contractor shall have to carry out full TIG welding of But Welded joints of tubes / pipes of lesser thickness if required. During the root runs of stainless joints, the contractor shall before and during welding have to purge the pipes with inert gas. All arrangements required for the above shall be the responsibility of the contractor at no additional cost to BHEL.
42.5	All charges for testing of contractor's welders including destructive and non destructive tests conducted by BHEL at site or at laboratory shall be borne by the contractor within his quoted rate.
42.6	The regulators used on welding machine shall be calibrated before putting these into use for work. Periodic calibration for the same shall also be arranged by the contractor at his own cost.
42.7	Only BHEL approved electrodes and filler wire will be used. All electrodes shall be baked and dried in the electric electrode drying oven to the required temperature for the period specified by the Engineer before these are used in the erection work. All welders shall be provided with electrode drying portable ovens at the work spot. The electrodes brought to site will have valid manufacturing test certificates. The test certificates will have the co relation with the Lot No / Batch no. indicated on the electrode packets. No electrodes will be allowed to be used in the absence of above requirement. The thermostat and thermometer of electrode drying oven will have to be calibrated and test certificate from Govt. approved / accredited test houses traceable to the National / International Standards will be submitted to BHEL before putting the oven in use. Periodical calibration for the same shall also be arranged by the contractor within the finally accepted rates.
42.8	All welds shall be painted with anticorrosive red-oxide paint. Necessary consumables and scaffoldings etc. including paints shall be provided by the contractor at his own cost.
42.9	Radiography and other NDT tests, after welding of tubes, pipes, including attachment welding wherever necessary, are part of erection work and shall be carried out by the contractor in accordance with the instructions of the Engineer. All equipment and consumables essential for carrying out the above process have to be arranged by the contractor at his cost.
42.10	The technical particulars, specification and other general details for radiography work shall be in accordance with ASME, IBR or ISO as specified by BHEL.
42.11	Iridium – 192 shall be used by the contractor for radiography work. The geometric un - sharpness shall not exceed 1.5 mm. Taking adequate safety precautions shall be the responsibility of the contractor while carrying out radiography. Necessary safe guards required for radiography (including personnel from BARC) shall be arranged by contractor at his cost.
42.12	Low speed high contrast , fine grain films (D – 7 or equivalent) in 10 cm. Width only be used for weld joint radiography. Film density will be between 1.5 to 2.0.
42.13	All radiographs shall be free from mechanical, chemical or process marks, to the extent they should not confuse the radiographic image and defect finding. Penetrameter as per ASME or ISO must be used for each exposure.
42.14	Lead numbers and letters are to be used (generally 6mm size) for identification of radiographs, contract numbers, joint identification, source used, welder's identification and SFD are to be noted down on paper cover of radiograph.
42.15	Lead intensifying screens for front and back of films should be used as per the above referred ASME specifications.
42.16	The joint is to be marked with permanent mark 'A', 'B', 'C' etc to identify the segments. For this a low stress stamp is to be used to stamp the pipe on the down stream side of the weld.
42.17	For multiple exposure on pipe an overlap of about 25mm of film should be provided.
42.18	Radiography personnel with sufficient experience and certified by M/s BARC as Radiographer for conducting radiographic tests in accordance with d-safety rules

	laid down by the Division of Radiological Protection only have to be deployed. These personnel should be registered with DRP / BARC for film badge service.
42.19	All arrangements for carrying out the radiography work including dark room and air conditioner and other accessories shall be provided by the contractor within the space allotted for office at his own cost. As an alternative the contractor may deploy an agency having all the facilities and who are duly approved / accredited by BARC and / or other regulatory authorities. Detailed particulars of such agencies will be submitted and got approved by BHEL Engineer before the actual deployment of agency for the radiography work.
42.20	Contractor shall note that 100 % radiography will be done at the initial stages on all the piping welding joints. Subsequently radiographic inspection will be done on the basis of quality of welding. However minimum percentage of joints to be radiographed shall not be less than the minimum percentage of joints to be radiographed shall not be less than the requirement of BHEL welding schedule. The percentage may be increased depending upon the quality of joints and at the discretion of BHEL.
42.21	All the radiographs shall be properly preserved and shall become the property of BHEL.
42.22	Since radio – isotopes are being used, all pre – cautions and safety rules as prescribed by BHEL / BARC /. Customer shall be strictly followed. BARC / DRP certificate to be provided before talking up the work.
42.23	Radiography of joints shall be so planned after welding that the same is done either on the same day or next day of the welding to assess the performance of the HP Welders. If the performance of welder is unsatisfactory, he shall be replaced immediately.
42.24	Wherever radiographs are not accepted, on account of bad shot, joints shall be re – radio graphed and re- shots submitted for evaluation. Radiographs shall be taken on joints after carrying out repairs. However, if the defect persists after first repair, as per radiograph, carrying out radiography shall be repeated till the joint is made acceptable. In case the joint is mot repairable, the same shall be cut, re-welded and re – radio graphed at contractor's cost.
42.25	Heat treatment and radiography may be required to be carried out at any time (day or night) to ensure the continuity of the progress. The contractor shall make all necessary arrangements including labour, supervisors / Engineer required for the work as per directions of BHEL.
42.26	The contractor shall also be equipped to carry out other NDT like LPI etc. as required as per welding schedule / drawings within the finally accepted price / rates. Ultrasonic testing, wherever required will be arranged by BHEL. Necessary help in conducting the UT shall however be rendered by the contractor.
43.0	**TESTING, PRE-COMMISSIONING, COMMISSIONING AND POST COMMISSIONING**
43.1	The contractor shall carry out all the required test and pre commissioning and commissioning activities on GTG and STG set such as chemical cleaning of piping system, water washing, oil flushing of oil system etc. as instructed by BHEL using contractor's own consumables, labour and scaffoldings etc. However the chemicals, Lube. Oil/ Lubricants required for carrying out commissioning activities will be supplied by BHEL free of Cost. Some of the normal tests are oil system interlocks tests, turbine protection system checks, hydraulic test on piping, over sped test, generator dry out, inspection and re – boxing up of the bearings and stop valves whenever required after on load run of unit.
43.2	All the above tests should be repeated till all the equipment satisfy the requirement / obligation of BHEL at various stages.
43.3	The scope of pre – commissioning activities cover installation of all necessary temporary piping, supports, valves, blanking , pumps, tanks etc. and other accessories with access platforms / approach valves , pressure gauges , electric cables, switches, cutting of some of existing valve, placing of rubber wedges in the

	valve etc. required for hydro test, chemical cleaning or for any other tests as the case may be and will carry out above activities under this scope of work as per instructions of BHEL. The scope also covers the off site disposals of effluents, site clean up and removal of temporary piping, pumps etc. and returning same stores. Charges for dismantling of temporary lines etc. should be included in the finally accepted price
43.4	All items required for conducting chemical cleaning of pipelines, etc, will be supplied by BHEL free of cost. However servicing, erection and dismantling and returning of the same to stores is the responsibility of the contractor. The quoted price shall cover all the above activities.
43.5	It shall be the responsibility of the contractor to preserve the cleaned surface as per BHEL's requirement.
43.6	It shall be the responsibility of the contractor to provide various category of workers in sufficient numbers along with supervisors including necessary consumables, T & Ps, IMTEs etc. and any other assistance required during Pre – Commissioning, commissioning & post commissioning. association of BHEL's / Client's staff during above period will not absolve contractor from above responsibilities.
43.7	It shall be specifically noted that the above employees of the contractor may have to work round the clock with BHEL engineers and hence overtime payment by the contractor to his employees may be involved. The contractor's finally accepted rates / price shall be inclusive of all these factors also.
43.8	In case , any re-work is required because of contractor's faulty erection which is noticed during commissioning, the same has to be rectified by the contractor at his own cost. If any equipment / part is required to be inspected during commissioning, the contractor will dismantle / open up the equipment / part and re – assemble / redo the work without any extra claim.
43.9	During commissioning opening / closing of valves, changing of gaskets, re-alignment of rotating and other equipment , attending to leakage, minor adjustments of erected equipment may arise. The finally accepted price / rates shall include all such works.
43.10	The contractor shall carry out cleaning and servicing of valves and actuators prior to pre –commissioning tests and / or trial operations of the plant. A system for recording of suchservicing operations shall be developed and maintained in a manner acceptable to BHEL Engineer so as to ensure that no valves and valves actuators are left un serviced. Wherever necessary as required by BHEL Engineer, the contractor shall arrange to lap/ grind valve seats.
43.11	All valves coming from in the gas system of the generator shall have to be hydro statically tested and cocks shall have to be checked up for gas tightness before installation in presence of BHEL Engineer.
43.12	The contractor shall carry out, if required purge test of the rotor to the satisfaction of BHEL Engineer. The necessary arrangement for testing with dry – clean air shall be made by the contractor at his cost.
43.13	Contractor shall carry out the entire electrical pre – commissioning tests on the turbo –generator, excitation system, as stipulated by BHEL Engineer.
43.14	Cleaning and servicing of all the filters / strainers, toppings of oils coming in he system shall be done by the contractor within the accepted price.
44.0	**PLANNING & PROGRESS REPORTING**
44.1	Contractor is required to draw mutually agreed monthly erection schedule in consultation with BHEL well in advance. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL.
44.2	Weekly progress review meetings will be held at site during which actual progress during the week vis – a – vis scheduled program shall be discussed for actions to be taken for achieving targets. The program for subsequent week shall also be presented by contractor for discussions. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall

	also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of non – conformities.
44.3	The contractor shall submit daily, weekly and monthly progress reports, manpower reports, material reports, consumables (gases / electrodes) reports and other reports as per proforma considered necessary by the Engineer.
44.4	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 this slippage or lost time, so that further works again proceed as per the original program and the slippage do not accumulate and effect the overall program.
44.5	The daily manpower reports shall clearly indicate the manpower deployed category – wise specifying also the activities in which they are engaged.
45.0	**DRAWINGS AND DOCUMENTS**
45.1	The detailed drawings, specifications available with BHEL Engineers will form part of this tender specification. This document will be made available to the contractor during execution of work at site. The contractor will also ensure availability of all drawings / documents at work place.
45.2	Necessary drawings to carry out the erection work will be furnished to the contractor by BHEL which shall be returned to BHEL Engineer at site after completion of work. Contractor shall ensure safe storage and quick retrieval of these documents.
45.3	The contractor shall maintain a record of all drawings and documents available with him in a register as per the format given by BHEL Engineer. Contractor shall ensure use of pertinent drawings / data / documents and removal of obsolete documents from work place and return to BHEL.
45.4	The data furnished in various annexure enclosed with this tender specification are only approximate and for guidance. However, the change in the design and in the quantity may occur as is usual in any such large scale of work.
45.5	If any error or ambiguity be discovered in the specification or information the contractor shall forthwith bring the same to the notice of BHEL before commencement of work. BHEL's interpretation in such cases shall be final and binding on the contractor.
45.6	Deviation from design dimensions should not exceed permissible limit. The contractor shall not correct or alter any dimension / details without specific approval of BHEL.
46.0	**EXTRA CHARGES FOR MODIFICATION AND RECTIFICATION WORK**
46.1	BHEL may consider payment for extra work on man-hour basis for such of those works which require major rectification / revamping / re-work which is totally unusual to the normal erection or commissioning work which are not due to contractors faulty erection which contribute more than twenty man-hours for each case. The following all inclusive man-hour rates will be applicable for extra works as defined above. a) Average single man-hour rates including overtime, if any, supervision, use of T & Ps, equipment and other site expenses and incidentals including consumables as per the scope of this tender specification for carrying out rework / revamping as certified by site, as may arise in the course of erection, testing and commissioning for all types of jobs @ RS 40 /- per man-hour (Rupees Forty per man-hour). b) Average single man-hour rates including overtime, if any, supervision, use of T & Ps, equipment as per the scope of this tender specification and other site expenses and incidentals but excluding consumables for carrying out rework / revamping as certified by site, as may arise in the course of

	erection, testing and commissioning for all types of jobs @ RS 25 /- per man-hour (Rupees Twenty five per man-hour).
46.2	All the extra work, if any, carried out should be done by a separate gang which should be identified prior to start of work for certification of man-hours. Daily labour sheets should be maintained and should be signed by the contractor's representative and BHEL's Engineer. Signing of labor sheet does not necessarily mean acceptance of extra work.
46.3	The extra work rates for above shall be firm and not subject to any escalation till the completion work.
46.4	In the event of any dispute regarding acceptance of any work as " Extra" , the work has to be carried by keeping man-hour and consumable record jointly signed with remark " For HQ Decision ". Under no circumstances the contractor can refuse to carry out such work with any pre condition, save and except of keeping the daily record of category of man-hour and consumables spent for the particular job for further consideration by HQ at Calcutta.
47.0	**FINISH PAINTING**
47.1	Touch up painting of all exposed metal parts of the equipment, structure, auxiliaries, piping, electrical and C & I items (covered within the scope of this contract and received painted from manufacturing units) with red oxide zinc chromate conforming to IS 2074 or Epoxy based primer , after thoroughly cleaning all such parts of all dirt, rusts, scales, grease, oils and other foreign materials by wire brushing, scraping, any other method as per requirement of BHEL and the same being inspected and approved by the Engineer before painting. Touch – up painting is to be carried out on internal surface of inlet air ducts and plenums. Their surfaces / unpainted surfaces shall be provided with two coats of suitable primer. The gas cut stubs require to be ground and rounded before painting. After applying the primer, paints all the equipment / items shall be finished with two coats of Epoxy paint. Structures and piping are to be painted with synthetic enamel paints as per IS 2922 and 2933, suitable for outdoor installations as specified by BHEL Engineer. By Pass stack and exhaust duct and GT shall be painted with heat resistant aluminum paint. Total dry film thickness of primer and finish coats shall not be less than 100 microns. for epoxy and synthetic painted surfaces and 50 microns for aluminium painted surfaces. Most of the equipment like gas turbine and generator including their enclosures, Inlet air system, control panels; valves etc. shall require spray painting. The contractor shall make arrangements of the required equipment for spray painting of such equipment at his own cost. Spray painting at the job site shall be permitted only at times and locations approved by the owner / engineer. All paints, thinner, tools and other consumables etc including scaffolding materials required for finish painting shall be supplied by Contractor at no extra cost to BHEL. Paint is to be of BHEL approved make only and painting should be as per colour scheme and quantity, approved and specified by the engineer. Valid test certificates for the paint for the paint so applied shall be made available before use of the same on work. The contractor shall provide legends with direction of flow on equipment and piping in size specified by engineer. Letter writing shall be done in Hindi and english. The painters have to under go test and only qualified painters will be allowed to work.
48.0	**CONTRACT PRICE**
48.1	Bidder shall quote rates against each item of every schedule of Volume-IIIA (Latest revision).

48.2	Total price will be considered for evaluation and awarding.	
48.3	The quantities of the various items mentioned in pertinent schedules of Volume-IIIA are approximate, based on very preliminary information and may vary to any extent or 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 work executed under the tender including extra items, if any, but excluding any price variation, remains within ± 20 % (Plus/ minus twenty percent) of total contract price of LOI/ WO.	
49.0	**TERMS OF PAYMENT**	
49.1	The bidder shall quote their rate for GTG (Lumpsum basis), STG (Lumpsum basis) and Electrical/C&I (Item-rate basis), covered under SCH-5, SCH-6 & SCH-7 respectively of Volume-IIIA. Payment to the vendor for these items will be regulated in following manner as per cl no. 49.1.1 and for Part III D, as per cl no. 63.1 B -	
49.1.1	85% of the amount of SCH-7 will be paid on completion of respective itemwise activity. Balance 10 % will be paid on achievement of milestone, as indicated in cl no. 63.3 (II) and balance 5 % will be paid after completion of Final Painting as indicated in cl no.63.3 (III).	
49.1.2	85% of the corresponding amount of SCH-5 & SCH-6 will be paid on completion of respective itemwise activity, as per cl no.63.3 (I). Balance 10 % will be paid on achievement of milestone, as indicated in cl no. 63.3 (II) and balance 5% will be paid after completion of Final Painting as indicated in cl no.63.3 (III).	
49.2	The weights mentioned under annexure–I are approximate only and given to facilitate the contractor to make an assessment of the magnitude of work under this specification. These are liable to vary as per design consideration or manufacturing units. The bidder has to keep his quoted rates firm for variation in weights as indicated. No revision of rates/extra work will be entertained for entries for increase in the above weight.	
49.3	Subject to any deduction which BHEL may be authorised to make under the contract, the contractor on the certificate of the engineer at site be entitled for payment as explained hereunder. The payment shall be made from Kolkata. The Engineer will certify regarding the actual work executed in the measurement books and bills, which shall be accepted by the contractor in measurement books. Contractor shall submit bills for the works completed under the specification once in a month detailing the works done during the months. The running bill, complete in all respect accompanied by BHEL engineer's certificate/ jointly signed measurement sheet will be paid within 30 days of submission of the bill , subject to its completeness and correctness in all respect. The format for billing shall be approved by BHEL for vendor raising Invoices. Subject to any deduction which BHEL may be authorized to make under the contract, the contractor on the certificate of the Engineer at site be entitled for payment as explained hereunder.	
49.4	**PRO RATA DISTRIBUTION OF 100% PAYMENT FOR E&C OF GT PKG (AS PER CL NO. 63.1 B)**	
49.4.1	Receipt/handling/placement of GT	10 %
49.4.2	Assembly and completion of items Supplied loose for GT skid	7 %
49.4.3	Receipt /handling / Placement of Generator	8 %
49.4.4	Setting shims/packers etc. under GT Skid with Washers and Lowering of skids on to foundation.	5 %
49.4.5	Removal of job support payment, attached for transport, Checking alignment of shims, packers under GT Skid, Doweling of GT bottom support plate.	2%
49.4.6	Setting shims/packers under generator skid with Washers and lowering of skids on to foundation	5%
49.4.7	Alignment of starter and gear box , turbine, load gear Box, Gen. Exciter, Aux. Exciter, reaming & coupling, Gen. Air Gap check etc.	8%

49.4.8	Erection of Inlet air filter (Main Filter Housing including Structures) etc.	5%
49.4.9	Erection of Inlet air ducting, expansion joints, straight ducts,Silencer elbows, transition piece, supports structures etc. And connection to GT air inlet	6%
49.4.10	Erection of by pass stack, silencer stack, transition piece Stack support structures, Diverter Damper, Guillotine Damper	10 %
49.4.11	Horizontal Transition Duct, Expansion joints, exhaust ducts Silencer and connection of GT exhaust.	4%
49.4.12	Erection of Unit walkways , platforms , ladders abnd Structure, chequered plate etc.	2%
49.4.13	Ventilation ducting of GT Enclosures etc.	2%
49.4.14	Erection of Air Processing Skids	1%
49.4.15	Erection of off base lube oil skid of fuel pump & its piping.	4%
49.4.16	Erection of seal air system of diverter damper	1%
49.4.17	Erection of fire protection including CO2 cylinders for Turbine and generator	2%
49.4.18	Erection of vapour extraction system	1%
49.4.19	Other misc. auxiliaries for completion of the erection Such as vent fan, abrasive cling hopper, cooling sys., Air cooling fan etc.	3%
49.4.20	Miscellaneous piping works of various sys.	14%
TOTAL		100 %
NOTE: Further brake up of above terms of payment, if required can be carried out at site entirely at the discretion of BHEL Engineer In charge.		
49.5	**MILESTONE PAYMENTS (10 % OF BALANCE VALUE, AS PER CL NO. 63.1 A & B)- PRORATA DISTRIBUTION OF 10% VALUE**	
49.5.1	on successful completion of OIL FLUSHING.	2%
49.5.2	on successful commissioning of INLET AIR SYTEM.	1%
49.5.3	on successful commissioning of COOLER and BASE MOUNTED AUXILIARIES.	1%
49.5.4	on successful commissioning of DIVERTER DAMPER, GUILLOTINE DAMPER and SEAL AIR SYSTEM.	1%
49.5.5	on successful commissioning of FIRE PROTECTION SYSTEM and OTHER AUXILIARIES.	1%
49.5.6	on successful commissioning of START UP CHECKS, PRE CRANK CHECKS	1%
49.5.7	on successful completion of operational checks and SYNCHRONISATION.	1%
49.5.8	on successful completion of TRIAL RUN.	2%
NOTE : If the commissioning activities could not be carried out due to no fault of contractor , BHEL site in-charge at his discretion after recording reasons for exercising such option can split and release payments up to 50 % of milestone payment on completion of work, to the extent possible required for carrying out that particular milestone and commissioning activities.		
49.6	**FINAL PAINTING** : 5 **% OF BALANCE VALUE, AS PER CL NO. 63.1 A & B - To** be paid after completion of Final Painting.	
49.7	Out of the above breakup for progressive payment,as per cl no. 63.1 A & B, 5 % will be retained from each RA bill, out of which 2.5% will be released on completion of Trial Operation/Full loading/Stabilisation and balance on completion of guarantee period of 12 months. The guarantee period shall commence from the date of completion of Trial operation or the date of handing over of the set to BHEL/customer or the date of Full loading or the date of stabilization of the unit after commissioning of all equipment/systems, whichever is earlier, which is to be certified by BHEL Site in Charge. However, this 2.5 % payment retained for Guarantee period, can be released against submission of performance bank guarantee valid for the guarantee period as stated above in the prescribed proforma subject to designated certification that all the works are completed in all respects.	

	The submission of bank guarantee towards performance guarantee is a separate one and the bank guarantee towards security deposit cannot be utilized for this purpose. The security deposit shall be refunded as per GCC. BHEL site at its discretion may further split up the percentage break up given in billing schedule and effect payment to suit site conditions, cash flow requirement etc. according to progress of work.	
50.0	**DETAILS OF MAJOR MECHANICAL EQUIPMENT TO BE HANDLED, ERECTED, TESTED AND COMMISSIONED.**	
	SL NO.	DESCRIPTION
	1.0	Base-mounted, single shaft Frame 5 Gas Turbine and necessary compartment consisting of followings :
	1.1	Multistage, axial flow corrosion protected compressor.
	1.2	Ten chamber combustion system with standard combustion liners.
	1.3	2 Stage Turbine with PALSMAGUARD coated first stage buckets.
	1.4	Heavy duty, multi-shaft accessory coupling.
	1.5	Continuously lubricated accessory coupling.
	1.6	DC Motor driven hydraulic ratchet rotor turning device.
	1.7	Fuel system (on base)
	1.8	Liquid fuel system
	1.9	Diesel engine starting system
	1.10	Multiple ignition system
	1.11	Closed, forced fed lubricating oil system consisting of :
	1.11.1	Duel Lub Oil Coolers.
	1.11.2	Duel Filter with Transfer valve for Lub. And Hydraulic Oil System.
	1.11.3	Duel Filter with Transfer valve for Trip Oil System.
	1.11.4	Shaft driven main oil pump.
	1.12	AC Motor Driven Auxiliary Pump.
	1.13	Inlet and Exhaust Plenums.
	1.14	On base Piping.
	1.15	Gas detection system.
	1.16	Lighting in accessory compartment.
	1.17	Off base lub. Oil skid for fuel pump.
	1.18	Ventilation system including fans & ductiing.
	2.0	Inlet Air System consisting of mainly
	2.1	Filter compartment with
	2.1.1	Support Structure
	2.1.2	Self Cleaning Filter.
	2.1.3	Lighting and instrumentation.
	2.1.4	Inlet Ducting.
	2.2	Inlet Silencer in the ducting.
	2.3	Transition piece inlet ducting to inlet plenum.
	2.4	Structural Supports
	3.0	Exhaust System consisting mainly of
	3.1	Transition piece and straight duct.
	3.2	Expansion Joints.
	3.3	By Pass stack with silencer.
	4.0	Walkways and ladder
	5.0	Abrasive Cleaning Hopper
	6.0	Air processing Skid.
	7.0	GENERATOR for outdoor operation with stator, rotor built – in RTDs, bearings, foundation frame on Generator Skid, walkways and enclosure for Generator and Gear Box.
	8.0	Load Gear Box between Turbine and Generator and couplings.
	9.0	Main Exciter and auxiliary exciter.
	10.0	Fire detection and protection system (CO_2) for Gas Turbine, Generator

		and Generator Auxiliary compartment.
NOTE		
1.0	Approximate dimensions and weights of major of above equipment to be handled, erected and commissioned are indicated under Annexure–I.These details are given only to give a general idea to the contractor to quote the lumpsum price as per rate schedule.	
2.0	Above system of pipings can be regrouped / renamed or any addition or deletion in the system Can be made in order to make system complete as per requirement. No extra claim shall be entertained on this account.	
3.0	The equipment and piping systems indicated above are only major and does not cover all the equipment / piping system to be erected / commissioned. Contractors are however, required to erect / commission within the price quoted by them, all connected equipment / system shown in manufacturer's drawings / other documents which may be necessary for erection completion and overall commissioning of GTG sets.	
51.0	**COMPLETION PERIOD**	
51.1	Entire work of erection, testing, commissioning, trial run, handing over etc of 2 no GTG & aux, 2 no STG & aux, electrical and C&I stack shall be completed by 14 (Fourteen) months from date of start of work.	
51.2	The contractor shall mobilize to start the work within 20 days from the date of written confirmation from BHEL.	
51.3	However, actual date of start of work will be certified by Construction Manager, BHEL site or specified otherwise by BHEL after award of work.	
52.0	**CONSTRUCTION SCHEDULE**	
52.1	Bidder shall plan activities accordingly to match the milestone schedule enumerated below. However, the stated schedule is indicative and actual milestones shall be finalized during execution at site depending on project's requirement.	
52.2	A bar chart showing of various milestones to be submitted by the bidder within one month from date of LOI to Construction Manager, BHEL site for approval.	
52.3	The various milestones to be achieved are as follows:	
	Major milestone	SCHEDULE DATE
52.3.1	Start of Work	15-05-11
52.3.2	Synchronization	
52.3.2.1	GTG-1	16-03-12
52.3.2.2	STG	25-07-12
52.3.2.3	GTG-2	15-06-12
52.3.3	Trial Operation/ Full Loading / Stabilization	30-07-12
52.3.4	PG test (assistance) / Handing over	05-08-12
52.3.5	Completion of Works	14-08-12
52.3.6	Reconcilation/Demobilization/Contract closing	29-09-12
52.4	The work under the scope of this contract is deemed to be completed in all respects only when the contractor has discharged all the responsibilities laid down in the contract. The decision of BHEL on completion shall be final and binding on the contractor.	
53.0	**SAFETY**	
53.1	The contractor shall ensure the safety of all workmen materials and equipment's either belonging to him or to others working at site. He shall observe safety rules and codes applied by the owner / BHEL at site without exception.	
53.2	Non conformity of safety rule and safety appliances will be viewed seriously and BHEL has the right to impose fines on the contractor on each incident / each non conformity as per details given below:	
53.3	SAFETY	Fine (Rs)
53.3.1	Not wearing safety helmet.	50/-
53.3.2	Not wearing safety belt.	50/-

53.3.3	Grinding without goggles.	50/-
53.3.4	Not using 24 V supply for internal work.	500/-
53.3.5	Electrical plugs not used for hand machines.	100/-
53.3.6	Using welding cables/electrical wires having lot of joints and not insulated with proper/ standard cable insulating materials.	100/-
53.3.7	Non removal of scrap / debris from worksite	200/-
53.3.8	Gas cutting without taking proper precaution/not using sheet below gas cutting.	200/-
53.3.9	Electrical Winches - Having no guards Earthed Properly etc.	500/-
53.3.10	Improper Earthling of Electrical Equipment per equipment	500/-
53.4	Any other Non Conformity noticed not listed above shall also be fined. The decision of BHEL Engineer shall be final in such cases.	
54.0	**SOCIAL OBLIGATION**	
	It is imperative on the part of the contractor to effectively take part, contribute in joint measures such as tree plantation, environment protection, contributing towards social upliftment, conversion of packing woods to school furniture, keeping good relation with local populace etc.	
55.0	**FIRST AID CENTRE**	
	BHEL is contemplating a FIRST AID CENTRE in and around site. Such facilities will be extended to the contractors on cost sharing basis.	
56.0	**ENVIRONMENT**	
56.1	The vendor has to provide bins for collection of erection scrap, erection work etc, at suitable place(s) as identified by BHEL. Further more the bins will be cleared periodically and such wastage shall be transported and dumping in the specified place in and around the complex as identified by BHEL / BHEL's customer. All such cost including incidentals etc. complete shall be included in the rate / price quoted by the bidder and no extra will be paid on this ground for any reason whatsoever.	
56.2	Bidders to note that in case of failure on bidder's part for compliance of the above clause BHEL may engage any agency for the same job without reminder to the vendor at their risk and cost.	
57.0	**FACILITIES TO BE PROVIDED BY BHEL TO CONTRACTOR**	
57.1	BCPL/BHEL will provide area location where contractor will have to make bore wells for arranging water and Electricity will be provided at one single point from 11KV power source on chargeable basis as per rates to be decided by customer, BCPL. However, backup DG set of capacity 2000kva to be arranged by you to take care of smooth progress of erection work during power failure. Contractor shall be responsible for arranging all necessary facilities like Site office, stores and residential accommodation, transport, electricity, water, medical facilities ,etc., at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.	
57.2	The contractor shall submit to the BHEL engineer his electrical power requirements. Construction power shall be provided at a single point within erection site at a distance of 250 mtrs. (approx.) on chargeable basis. Further distribution shall be done by the contractor at his cost . All wiring must comply with local regulation and will be subject to the BHEL Engineer's inspection and approval before connecting supply.	
57.3	Provision of distribution of both electrical power from the central; point to the required place with proper distribution boards observing the safety rules laid down by the electrical authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution boards, switch boards, TPN, CBS, ELCBS/MCCBS/ Copper / Brass Clamps, copper conductor, change over switches pipes etc at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost.	

	The contractor shall adjust his working sheets / hours accordingly and deploy additional manpower if necessary so as to achieve the targets within his quoted rate/ price. No idle labour payment is admissible for power supply failure.
57.4	Following points should be strictly adhered to by the contractor while drawing construction power supply from distribution board.
57.4.1	All electrical installations should be as per Indian Electricity Rules.
57.4.2	All distribution Boards installed by the contractor should be constructed with fire proof materials viz. Steel frames, bakelite sheets etc.
57.4.3	Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral
57.4.4	All electrical connection should be made through connectors , nuts and bolts, switches ,plug and sockets. Loose connections or hooking up of wires shall not be permitted.
57.4.5	Contractor have to make their own earthing arrangement for their equipment / DB earthng. The earthing connections have to be done with copper conductor and copper / brass clamps with BHEL's prior permission.
57.4.6	All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
57.4.7	Contractor should use :" the MCCB and ELCBs either on incoming or outgoing connections to the DBs .
57.4.8	Contractor should ensure that all the CBs / TPNs / Fuses / MCCBs/ ELCBs cables etc. should be of adequate rating / capacity.
57.4.9	For permission of supply connections, contractor has to submit a test report of their installation with a single line diagram of connected / proposed loads.
57.4.10	Contractor will submit a report on all electrical connected loads 7th of every month.
57.4.11	ELCB will be tested once in a week by actually simulating the earth leakage for all installations and the same shall be recorded by BHEL Engineer in the log book to be maintained by the contractor.
57.4.12	Adequate lighting facilities such as flood lights , hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractors material, storage area etc., within the finally accepted rates / price.
57.4.13	On completion of works or as and when required by BHEL all the temporary buildings, structures, pipelines, cables, etc., shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, same will be got done by the BHEL Engineer and the expenses incurred shall be recovered form the contractor along with the prevailing overhead. Decision of BHEL Engineer in this regard shall be final.
58.0	**MOBILISATION ADVANCE**
	No mobilisation advance is payable under this contract.
59.0	**TAXES, DUTIES ETC**
59.1	TDS under Income Tax shall be deducted at prevailing rates on Gross Invoice Value from the Running Bills.
59.2	All taxes (except Service Tax including Educational Cess and other Cess , if any) , charges, royalties, duties, Octroi , any State or Central Levy and other Taxes for materials obtained for the work and for the Execution of the Contract shall be borne by the Contractor and shall not be payable extra during the tenure of the Contract
59.3	The Contractor has to make his own arrangement at his cost for completing the formalities , if required , with State V.A.T. Act Authorities , for bringing their materials , plants and machinery at Site . Road Permit / Way Bill , if required, shall be arranged by the Contractor and BHEL-P.S.E.R will not supply any Road Permit/Way Bill for this purpose. The Contractor must be a Registered Dealer with the State VAT Act ,if not Registered yet and a copy of the said Registration Certificate along with TIN Number must be provided to Site R.A.O.
59.4	SERVICE TAX

59.4.1	Service Tax as legally leviable & payable by the Contractor under " Erection, Commissioning and Installation Services " of Service Tax law/Act vide Sec 65 (105)(zzd) , shall be paid by BHEL-P.S.E.R on Contractor's Gross Bill. However, Contractor shall have to submit proof of Service Tax deposited by them immediately after the deposit but not later than the next Bill submitted after the due date of deposit . The Contractor shall furnish proof of Service Tax registration with Central Excise Division covering the Services under this Contract. Registration should also bear endorsement for the premises from where the billing shall be done by the Contractor on B.H.E.L-P.S.E.R for this Project. The Contractor shall obtain prior approval of BHEL-P.S.E.R if there is any change in the above provision . B.H.E.L-P.S.E.R will not be held to be responsible for non-compliance of various Service Tax Rules, being framed from time to time.
59.4.2	With introduction of Cenvat Credit Rules , 2004 which came into force w.e.f 10.09.2004, excise duty paid on Input Goods including Capital Goods used for providing the output service and service tax paid on Input Service can be taken credit of against the service tax payable on output service . As such, while offering the rates , the Contractor may take in to account the benefit of above provisions as the cost of input to Contractor will be net of Excise Duty and service Tax and adjust their offer price accordingly to make it more competitive.
59.4.3	New Taxes & duties , if imposed subsequent to due date of offer submission, by statutory authority during Contract period (including extension, if the same is not attributable to the contractor), shall be reimbursed by BHEL-P.S.E.R on production of relevant supporting document to the satisfaction of BHEL-P.S.E.R. However, the Vendor shall obtain prior approval from BHEL-P.S.E.R before depositing new taxes and duties.
60.0	**LIQUIDATED DAMAGE/ PENALTY FOR DELAY**
60.1	Subject to force majure, if contractor fails to complete the job as per aforesaid completion period, BHEL shall have the right to recover as liquidated damages/ penalty a sum equivalent to 0.5 % (half percent) of the price under SCH-5, SCH-6 & SCH-7, of Volume-IIIA, including taxes, duties for delay of each week or part thereof. The liability for delay shall not in any case exceed 5 % (five percent) of total executed contract price under the tender, including taxes, duties. For deduction of the said penalty BHEL needn't justify the quantum of damages suffered by BHEL on account of such delay.
60.2	Other terms & conditions shall be as per the provision of GCC of this tender.
61.0	**INSTRUCTIONS TO TENDERER**
61.1	Offers received without data / information, relevant and declared necessary by BHEL /PSER are liable to be rejected. All these data/ information should be duly supported by documentary evidences.
61.2	No deviations to the tender conditions will normally be accepted.
61.3	The tenderers are advised to actually visit the site and fully acquaint themselves with siteconditions, location of stores, transportation routes, quantum of work etc. before quoting their rates for this work. BHEL shall not be responsible in any way for non familiarization of site conditions. Once the tenderer has quoted for the work, it is implied that he has ascertained various site condition and NO CLAIM whatsoever will be entertained by BHEL on any such account.
61.4	The contractor in the event of this work awarded to him shall establish a site office at site and keep posted an authorised responsible officer who should hold a valid power of attorney for the purpose of the contract. Any order or instruction of the BHEL Engineer or his duly authorised representative shall be communicated to the contractors representative at site office and the same will be deemed to have been communicated to the contractor at his legal address.
62.0	**INSURANCE**
62.1	BHEL shall arrange comprehensive MCE (marine cum erection) Insurance Policy for 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 each unit including theft, sabotage, fire, lightning and other natural calamities.
62.2	Bidder shall timely intimate despatches to the underwriter. The name of the underwriter and Policy No shall be intimated in due course of time.
62.3	Bidder shall be responsible for timely submission of loss/ damage/ theft to the underwriter, assistance in lodging & settlement of claim for losses/ damages/ theft/ lodging of FIR with police. Any consequential loss arising out of non-compliance of this stipulation will be borne by bidder.
62.4	It is bidderr entire responsibility to insure bidderr workmen against accident and injury while at work as required by the relevant rules and to pay compensation, if any, to bidder workmen as per workmen's compensation act. Bidder has also to insure his staff against accident/ injury. Bidder have to take insurance cover for his tools & plants, assets etc.
62.5	These insurance covers have to be taken prior to start of work at project and bidder shall make available the policy to Construction Manager, BHEL site for necessary verification before commencement of work. However, irrespective of such verification/ acceptance, the sole responsibility to maintain adequate insurance cover for his workmen, T&P, assets etc at all times during the period of contract shall lie with bidder. Regarding the aforesaid insurance cover, bidder shall directly deal with the Insurance Company for all matters regarding the insurance in his scope.
62.6	Bidder 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, bidder will submit necessary documents. BHEL will reserve the right to recover the loss from bidder as detailed below in case the damage/ loss is due to negligence/ carelessness on his part. In case of theft of material under his custody, the same shall be reported to police by bidder 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 bidder of his contractual obligation for the materials in his custody.
62.7	It will be his responsibility to replenish the items lost/ damaged in time without hampering the schedule of work and without waiting for settlement of insurance claim. Amount received from the underwriters on settlement of insurance claim shall be passed on to bidder as and when available.
62.8	In case the claim is summarily rejected by the underwriters due to his WILFUL NEGLIGENCE and bidder fail to replenish the items lost/ damaged, the entire cost of repair/ replacement will be recovered from bidder.
62.9	Other conditions of Insurance shall be as per relevant clause of GCC.
63.0	**GUARANTEE**
63.1	Even though the work will be carried out under supervision of BHEL, the contractor will be responsible for the quality of workmanship, quality of materials/ items and design for which the contractor is responsible.
63.2	The contractor shall guarantee the work executed under the scope of the contract for a period of 12 (twelve) months from the date of start of guarantee period as certified by the engineer (ie on completion of total work under scope and/ or taking over by BHEL) and shall rectify free of cost all defects due to faulty supply or work done. In case the contractor fails to repair/ replace the defective works within the time specified by the engineer, BHEL may proceed to undertake the repairs/ replace such defective works at contractor's risk and cost without prejudice to any other rights and recover the same from security deposit/ other dues.
64.0	**RATE REVISION**
	No revision is admissible.
65.0	**PRICE VARIATION CLAUSE (PVC)**
65.1	After the `Base Date', and/ or during the progress of work, the monthly price adjustment amount of the contract price will be computed as per the formula given

	below. The base date shall be reckoned as 09-03-10.
65.2	$ER = ER_1 – ER_0$.
65.3	ER_1 will be computed as follows. $ER_1 = ER_0 (0.15 + 0.85 \frac{L_1}{L_0})$, where ER = Adjustment to contract price payable to you for each billing. ER_1 = Adjusted amount payable to you of contract price for each billing. ER_0 = Value of the work done in the billing period.
65.4	The payment of price adjustment amount so computed shall be made against a separate invoice linking the corresponding invoice (gross RA bill amount) after retaining the prorate amount due on completion of guarantee/ final bill (as per payment terms of contract). The amount so retained shall be paid on successful completion of guarantee/ final bill (as per payment terms of contract). L_0 = All India Consumer Price Index for Industrial Workers (All India Average) as published by Labour Bureau, Simla, Government of India as on base date. L_1 = All India Consumer Price Index for Industrial Workers (All India Average) as published by Labour Bureau, Simla, Government of India for the month of work done.
65.5	Total PVC payable/ recoverable against the contract shall have an overall ceiling of 12 % of contract price.
65.6	The quantum of such price variation amount per month shall be restricted to the ceiling percentage for each RA Bill amount. The final adjusted amount of PVC will be paid along with the final bill.
65.7	You shall produce necessary Government Notifications/ RBI Bulletins of above component for receiving payment from BHEL/ refund to be made to BHEL, as required, in the formula mentioned above.
65.8	You will be required to raise bills for PVC payment on monthly basis along with RA Bill irrespective of the fact whether, any increase/ decrease in price/ index has taken place or not.
65.9	PVC shall be admissible up to the original completion period, as stated above.
66.0	**OVER RUN COMPENSATION (ORC)**
66.1	In case, due to reasons not attributable to you, the work gets extended beyond original completion period, stated above, you shall be entitled for over run compensation (ORC).
66.2	The total ORC amount shall be limited to 10% of the contract value.
66.3	ORC shall be applicable as per following.
66.3.1	The rate/ price of balance part of job beyond normal completion period shall be revised by 10 % from 1st month of extended period. This revised rate shall remain valid for one year.
66.3.2	The above revised rate shall be further revised by 10 % per year in the subsequent years and this re-revised rate shall remain valid for one year and so on till completion of contract.
66.4	During the extended period, you shall maintain your resources as per mutually agreed program. However, you have to deploy additional resources, if required, to complete the job within the re-scheduled completion period.
66.5	Payment of ORC shall be subject to compliance to following condition.
66.5.1	You shall maintain minimum resources as per agreed program and certified by BHEL.
66.5.2	You shall achieve the target as per agreed program.
66.5.3	The example is indicated below. Rate/ price of balance job on contractual completion date. = A, say Revised rate during the 1st year after contractual completion date. = 1.1A

	Revised rate during second year after contractual completion date plus one year. = 1.21A Note (a) Enhanced rate shall not be applicable during the period in extension where reasons for delay are attributable to you as explained below: Contract period extended = 8 months, say Out of 8 months delay, supposing you are responsible for 3 months delay and BHEL is responsible for 5 months delay. Revised rate 1.1 A shall come into effect on expiry of contract period plus 3 months. Revised rate 1.1A shall be in force for one year thereafter. (b) For further extension if any, for application of ORC, above logic shall be applicable after evaluating the reasons of delay. That is, the revised rate for 2nd year shall come into effect on expiry of delay period attributable to you during first year, ie, extended period. Contract period + your delay (3 month in above case) + one year + your delay during one year extended period. This revised rate 1.21A shall remain in forces for one year thereafter. And so on.
67.0	**PRICE SCHEDULE**
67.1	Contractor shall fully understand equipment description and scope of work before quoting. The scope of work and responsibility of the contractor as mentioned under this specification shall be covered within the quoted rates.
67.2	The tenderer shall quote the rates as per the rate schedule only, in vol-III price bid. Conditional price bids or price bids with any deviation / clarification etc. are liable to be rejected. No cutting / erasing / over writing shall be done.
68.0	**QUOTED RATE**
68.1	The tenderer shall quote separate rates as required therein for each of the categories of work in the rate schedule (Vol –III).
68.2	The contractor shall submit his running bill once in a month at the end of each month. The RA bill complete in all respects accompanied by BHEL engineers certified/measurement sheet,jointly signed will be paid with in 30 days of passing of the bill subject to completeness and correctness. The measurement will be taken as specified in terms and conditions of contract and certified by the BHEL engineer of actual work.
68.3	Subject to any deduction which BHEL may be authorised to make under the contract the contractor shall on the certification of the BHEL engineer at site, be entitled to payment explained hereunder:
68.4	The quantities of various items of BOQ are approximate and may vary to any extent or deleted altogether. The quoted rates of each item will remain firm as long as variation in total value of work executed under any part of the contract including extra items, if any, but excluding PVC, remain within (+/-) 20% of tendered value.
68.5	The quoted rate shall be inclusive of supply of items as detailed in technical specification as well as in other sections of this tender document, required for proper completion of the job.
68.6	The dimensions furnished in the Volume-III (B & C) (schedule of quantities and

	rates) are tentative and no additional payment/recovery on unit rate on account of variation in dimensions shall be considered by BHEL except only for control panel/cubicle.
68.7	In case of control cubicle/panel, additional payment/recovery shall be applicable in case of variation in length (L) only and no other dimensions.
68.8	Contractor's quoted rate for control panel/cubicle shall be inclusive of a variation limit of (+/-) 10% of length (L), as specified in Volume-III. However, if actual length is found beyond (+/-) 10% variation in length as indicated in the schedule, additional payment/recovery in rate will be derived in the following manner. In case, actual length exceeds variation limit, the contractor will be entitled for additional payment for the portion beyond 1.1 times of indicated length and BHEL will be entitled to recover for the portion below 0.9 times of indicated length. • Length of panel/cubicle as indicated in the schedule = A • Rate quoted for panel/cubicle = Rs. B • Rate per unit length (L) to be considered for the purpose of additional payment/ recovery for variation in length = B/A = C • Actual length of the panel/cubicle = D • Compensation entitled by the contractor in case of increase in length beyond 1.1A = (D-1.1A) x C. Reduction in unit rate in case of decrease in length below 0.9A = (0.9A-D) x C.
68.9	The contractor shall ensure that each instrument technician is equipped with necessary T&Ps, like at least one allen key set, one screw driver set (with star head), one slide wrench, one 3.5 digit portable digital multimeter etc. the quoted rates shall be inclusive of such items. In case contractor fails to provide the requisite T&Ps to each technician as per above, BHEL reserves the right to procure balance T&Ps out of those mentioned above and provide the same to each technician. The cost incurred by BHEL in this regard along with BHEL's standard overhead shall be recovered from the next RA bill or any other dues from contractor.
68.10	Contractor's quoted rates shall be inclusive of deployment of minimum manpower for commissioning activities as per following details. However, this does not absolve the contractor of deploying additional manpower required for proper completion of the job as per the direction of BHEL.
68.11	If the contractor fails If to provide manpower as per requirement for a continuous period of 15 days or more, BHEL shall have the right to apply either of the following two alternatives: To engage manpower falling short of above and recover the cost including BHEL's standard overhead thereof from the contractor's next RA bills or any other dues. **or** Deduct the amount as per following from contractor's next RA bill or any other dues: @ Rs. 18,000 per graduate engineer/month @ Rs. 12,000 per diploma engineer/month @ Rs. 7,000 per instrument technician/month
69.0	**OTHER TERMS**
	All other term & conditions of this specification shall be governed by the pertinent provisions of GCC, Volume-IB as applicable.

ANNEXURE-I
(LIST OF ITEMS)

A) FOR GAS TURBINE PACKAGE (ERECTION AND COMMISSIONING)

SL	ITEM DESCRIPTION	LENGTH (MTRS)	WIDTH (MTRS)	HEIGHT (MTRS)	WEIGHT (MT)
	Rotor				
1	Exhaust Plenum	3.000	3.300	2.300	5.500
2	Inlet Plenum	3.000	3.200	1.300	1.500
3	Load Coupling	1.932	Dia 0.300	---	0.350
4	Load Coupling Guard	1.930	Dia 0.850	---	0.300
5	Base frame with piping	11.500	3.200	2.000	28.000
6	GT Walkway and Ladders	12.000	1.140	---	3.000
7	GT CO2 Racks	3.350	1.050	2.000	3.500
8	Main Filter House (Loose Shipped)	7.290	3.5	3.5	23.500
9	Tools & Tackles				1.000
10	Turbine Vent Fans(4 No)	2.700	2.700	2.000	18.000
11	GT Vent Ducting	---	---	---	
12	Air Processing Unit	3.000	1.500	1.800	2.000
13	Compressor Water Wash Skid	6.100	2.600	3.540	8.000
14	Lub Oil Centrifuge	2.315	1.430	1.750	2.500
15	Field Interconnection Piping	6.000	3.500	3.000	60.000
16	Foundation Bolts & Misc.	---	---	---	5.000
17	Generator & Exciter CO2	1.520	1.050	2.000	2.000
18	GT Enclosure	6.800	3.500	3.500	60.000
19	Lube Oil Mist Eliminator	2.000	1.200	2.500	2.000
20	Portable LO Drain Pump				0.200
21	Cooling and Sealing air ppg.	6.000	2.000	1.500	1.500
22	Gas piping	6.000	2.000	1.500	1.000
23	Torque converter	0.600	1.000	0.800	0.500
24	Casing Tube along with	9.000	Dia 3.200		42.000
	SUB TOTAL				271.35 MT

B) INLET DUCTING

1	Inlet Duct Transition Piece	2.000	1.700	3.000	3.000
2	Inlet Duct Expansion Pieces	0.400	3.600	2.750	0.900
3	Inlet Duct Elbow	---	3.600	2.750	3.400
4	Silencer	2.515	3.600	2.750	6.000
5	Straight Duct	3.500	3.600	2.750	6.000
6	Plenum Covers -2 no	2.700	1.200	0.750	1.200
7	Support Structure	6.000	3.000	3.500	2.900
		SUB TOTAL			23.2 T

C) EXHAUST DUCTING

1	Silencer in stack-SL (Bypass stack)	3.000	3.816	3.816	12.000
2	Stack transit D2 (Bypass stack)	1.800	3.800	3.800	2.000
3	Miscellaneous Items (Ladders, platforms, gartings , bolts etc.)	6.000	3.500	2.000	4.000

4	Gullitone damper				5.000
5	DIVERTER DAMPER				5.000
			SUB TOTAL		28 MT

D) GENERATOR SYSTEM

SL NO	DESCRIPTION OF EQUIPMENT	OVERALL DIMENSION IN (MTRS)			WEIGHT IN (M.TONS)
		LENGTH	BREADTH	HEIGHT	
1	GENERATOR PACKAGE	5010	3000	1150	50.600
2	AIR FILTER	4000	4000	1900	6.000
3	GENERATOR ENCLOSURE	AS PANELS			7.100
4	FOUNDATION ITEMS	LOOSE ITEMS			7.000
5	GENERATOR CONTROL PANEL	1200	1000	1355	1.000
6	GENERATOR RELAY PANEL	1200	1000	1355	1.000
7	PHASE SIDE T.B	1750	1200	1800	1.500
8	NATURAL SIDE T.B.	1750	1200	1800	1.500
9	GENERATOR CIRCUIT BREAKER	5000	2500	1600	4.000
10	NGE CUBICLE	2200	1500	1500	2.000
11	LOAD GEAR BOX	-	-	-	-
			SUB TOTAL		81.700

GTG PACKAGE GRAND TOTAL 394.450 MT

E) LIST OF PIPING WORKS OF GT & STG PACKAGES (TOTAL)

THIS QTY MAY VARY +/- 30%
NOTE: THE WORK INVOLVES GRID BLASTING OF PIPING FOLLOWED BY PRIMER PAINTING PRIOR TO ERECTION WHICH IS IN VENDOR'S SCOPE. THE PAINT SHOULD BE SUPPLYED BY VENDORS FREE OF COST. THE QUOTED RATE OF VENDOR SHOULD BE INCLUSIVE OF THESE WORKS ALSO.

Sl. No	Description	IBR Piping weight (in tonnes)	Non IBR piping weight (in tonnes)	Sub total weight (in tonnes)
1	Carbon steel piping including fittings	400	500	900
2	Alloy steel piping including fittings	300	0	300
3	Stainless steel piping including fittings	0	75	75
4	Hangers & supports			50
5	Thermal Insulation			40
6	Vent silencers erection(~30 nos)			40
7	Secondary steel structurals for supports, preparation of shoe supports for various piping etc			20
	Total BOP piping erection weight (in tonnes)			**1425**

F) LIST OF DEVICES TO BE CALIBRATED BY ERECTION AGENCY

All devices of GTG and auxiliaries shall be calibrated as part of erection,precommissioning and commissioning activity and indicative list is given below

(refer Device Summary doc. No. GT15055)

ITEM NO	DESCRIPTION	QTY (nos)
1	Temperature switches	15
2	Pressure switches	40
3	Magnetic pickups	10
4	Hazardous gas detectors	4
5	Pressure & differential pressure transmitter	15
6	Level switches	5

G) DETAILS OF THE CONTROL EQUIPMENT

(Refer switchgear room layout & control room layout for further details)

SL. NO	DESCRIPTION	LOCATION	DIMENSION (L X D X H) in mm	QTY	WEIGHT (IN KG)
1)	Haz. gas monitor (240 vac) to be mounted & wired in CO2 panel	control room	161 X 361 X 178 (APPROX)	2 SET	2.5
2)	Inlet air filter panel	Field	660 X 255 X 1015	1 NO	50
3)	Mark-VI turbine control panel along with <hmi> station & network switch, printer.	control room	2257 X 910 X 2400	1 SET	1023
4)	Microprocessor based co2 fire fighting panel to be mounted in control room panel	control room	600x 500 x 1800	1 NO	200
	GT Motor control centre	switchgear room	14000 X 1254 X 2430	1 NO	5000
6)	GT DCDB (125 v dc) with motor control modules	switchgear room	5000 X 644 X 2430	1NO	2000
7)	GT Battery charger (125v dc)	switchgear room	2500 X1200 X 2500	1 SET	400
8)	GT Battery (125 v dc)	switchgear room	2000 X 2500 X 1900	1 SET	2500
9)	i) <I Station> cpu ii) 19" CRT monitor iii) Printer iv) Line driver	control room	i) 2 NO.'S ii) 2 NO.'S iii) 1 NO. iv) 1 NO.	I) 168 X 456 X 450 ii) 455 X 475 X 470 iii) 605 X 338 X 145 iv) 186 x 45 x 203	I) 16 ii) 20 iii) 8.2 iv) 1
10)	Local push button stations for motors above 5.5.kw	field	150 X 100 X 275	20 NOS	60

H) CABLES & THEIR ACCESSORIES

ERECTION AGENCY TO LAY AND TERMINATE FOLLOWING CABLES (Refer cable schedule doc no. 4-36644-59043 & interconnection chart doc no. 4-36659-59004 for further details)			
SL NO.	DESCRIPTION	LENGTH	DES NO
A	POWER CABLES (HR PVC CONDUCTOR)		
1	3C X 6 mm2 -CU	1500	G0515
2	3 CX 25mm2-AL	2100	G0447
3	3 CX 35mm2-AL	1500	G0474
4	3.5 CX 50mm2-AL	500	G0478
5	3Cx 70mm2- AL	1500	G0479
6	3C X 95 mm2 -AL	500	G0480
7	1 C x 120mm2- AL	600	G0476
B	CONTROL CABLES(PVC FRLS)		
1	3C X 2.5mm2	6000	G0475
2	7C X 2.5mm2	4000	G0482
3	19C X 2.5mm2	1500	G0483
4	24C X 2.5mm2	900	G0484
C	SIGNAL CABLES(PVC FRLS- INDIVIDUAL & OVERALL SHIELDING)		
1	12P X 1.3 SQ.MM(T/C)	900	G0481
2	6P X 1.3SQ.MM(T/C)	900	G0489
3	12P X 0.5SQMM	2500	G0486
4	6P X 0.5 SQMM	3000	G0487
5	1P X 1.5 SQMM	3600	G0488
6	6T X 1.5 SQ.MM	500	G0485
7	12P X 1.5SQMM	600	G0490
8	6P X 1.5 SQMM	600	G0491

ERECTION AGENCY TO INSTALL THE FOLLOWING CABLE HOOKING MATERIAL			
SL NO.	DESCRIPTION	LENGTH	DES NO
A	CABLE LUGS		
1	2.5	1500	G0500
2	6	100	G0501
3	25	100	G0502
4	35	50	G0503
5	50	50	G0504
6	70	75	G0505
7	95	50	G0506
8	120	50	G0507
9	NI plated brass cable glands	1 LOT	G0492 TO G0498

FOLLOWING ITEMS TO BE PROCURED AND ERECTED BY ERECTION AGENCY		
1	Cable Glands & Ferrules	1 LOT
2	Branch trays for the field instruments / JBs (300mm ladder type)	1 LOT
3	ISMC-100 CHANNELS	1 LOT
4	70/50/6 mm ANGLES	1 LOT
5	Cable tags	1 LOT
6	Tray coupler bolts, nuts, washers etc	1 LOT

NOTES:

1) This is typical only and is indicative in nature.

2) Weights and dimensions are approximate.

THE WEIGHTS OF EQUIPMENT GIVEN ABOVE ARE APPROXIMATE ONLY AND ARE GIVEN TO FACILITATE THE CONTRACTOR TO MAKE AN ASSESSMENT OF THE MAGNITUDE OF WORK UNDER THIS SPECIFICATION. THE WEIGHTS OF VARIOUS EQUIPMENT AS SHOWN IN MANUFACTURER'S DRAWINGS OR OTHER RELEVANT DOCUMENTS SHALL BE FINAL. THE CONTRACTOR SHALL CARRY OUT DRAWINGS WITHIN THE LUMPSUM PRICE QUOTED/ACCEPTED FOR THE JOB. NO REVISION OF RATE/EXTRA CLAIM WILL BE ENTERTAINED FOR INCREASE IN THE ABOVE WEIGHTS.

ANNEXURE II.

LIST OF T & Ps, IMTES TO BE PROVIDED BY THE CONTRACTOR FOR THEIR OWN USE OF WORK AT THEIR COST

SL.NO	EQUIPMENT	CAPACITY	QTY
1	Trailor	20 T cap.	01 no.
2	Hydra (11 T cap)	11 T Cap.	1 no.

ANNEXURE IIA

LIST OF T&Ps, IMTES TO BE PROVIDED BY BHEL TO THE CONTRACTOR FREE OF CHARGES DEPENDING UPON AVAILABILITY. FOR KEEPING THE CRANES IN OPERATING CONDITION, CONTRACTOR HAS TO ARRANGE REGULAR MAINTAINENCE AT THEIR OWN COST

SL.NO	EQUIPMENT	CAPACITY	QTY	REMARKS
NIL				

ANNEXURE III
INDICATIVE LIST OF MAJOR T&P TO BE PROVIDED BY CONTRCATOR AT HIS OWN COST

SL.NO	EQUIPMENT	CAPACITY	QTY
01	TIG WELDING SET		2 NOS
02	HYDRAULIC JACKS	50MT	4 NOS
03	SCREW JACKS	5/10/25/50 MT	As per requirement
04	PUMP FOR HYDRO TEST OF PIPELINES	50 KG/SQ.CM	1 NO.
05	PIPE BENDING MACHINE		1 NO
06	CONCRETE DRILLING MACHINE		1 SET
07	VACUUM CLEANER (INDUSTRIAL)		1 NO
08	TORQUE WRENCH OF SUITABLE CAPACITY		1 NO
09	SURFACE PLATE UPTO 1 SQ MTR		1 NO
10	STRAIGHT EDGE UPTO 2 M LENGTH		1 NO
11	INSIDE MICROMETER	50-500MM & 500–1000 MM	1 NO each
12	DIAL GAUGES	STROKES - 5 MM 10 MM 30 MM 50 MM	2 NOS 7 NOS 2 NOS 2 NOS
13	ALLEN KEY SETS	2 – 12 MM	1 SET & ONE INCH SET
14	Suitable arrangement including sleepers, jacks, winches, etc. required for dragging, lifting, shifting & erecting heavy consignments like GT Skid, Generator skid Generator Skid, Panels etc.		

NOTES:

1. The above list specifies only major T & P (may not be complete to be deployed by the contractor. All additional / other tools and plants including trucks, dip lorries, devices, tackles, machines, measuring instruments etc. in good and safe working conditions which are required for satisfactory & timely completion of work shall also be deployed by the contractor within finally accepted rate / price.

ANNEXURE IV

TENTATIVE LIST OF MAJOR TESTING INSTRUMENTS / EQUIPMENT TO BE ARRANGED BY CONTRCATOR AT HIS OWN COST

SL. NO	DESCRIPTION	RANGE	ACCURACY	Qty
1	Megger 500 V	Upto 200 M Ohms	+/- 5 % at center scale (+/-) 10 % at centre scale	01 01
2	Digital Multimeter	Voltage 200 mV to 1000V Current 200 mA to 10 A DC Current 20 mA to 20 A AC Resist.200ohms to 20 M ohms	(+/-) 1 % + 1 Digit (+/-) 0.8 % + 1 Digit (+/-) 0.8 % + 1 Digit (+/-) 0.5 % + 1 Digit	01 01 01 01
3	Analog Multimeter	Voltage 2.5 to 2500 VAC Current 100 mA to 10 A AC Current 250 micro A – 1A DC Resist.upto 1000 ohms Voltage 2.5 to 2500 V DC	(+ / -) 1.0% (+ / -) 2.0% (+ / -) 1.5% (+ / -) 3.0% (+ / -) 1.0%	01 01 01 01 01
4	Micro Ohmmeter	0.05 mill ohm to 200 ohm	(+ / -) 2.0%	01
5	Tachometer(Hand held)	0 – 6000 rpm	(+ / -) 0.25%	01
6	Tachometer (Non contact type)	0 – 6000 rpm	(+ / -) 0.25%	01

NOTES:

1. The above list of testing instruments / equipment required for testing / commissioning is only for guidance to the contractor and not complete. Any other / additional testing instruments / equipment required for timely and satisfactory completion of job will also be arranged by the contractor at his own cost.
2. Contractor must re-ascertain / re- check range and accuracy of each IMTE from BHEL Engineer well in advance before arranging calibration / deployment.
3. Other terms and conditions regarding above items shall be as per clause no. 38 (tools & plants / testing & measuring instruments).

ANNEXURE-IVA
OTHER T&PS TO BE ARRANGED BY THE CONTRACTOR

1.0	Gas cutting set
2.0	Electric blower
3.0	Tong tester with selector switch – 0-1000 V
4.0	Variac 3 Phase 415 V, 5A
5.0	Variac 1 Phase 5A
6.0	Decade resistance box
7.0	DC Calibrator 0-200 mV/0-20 mA
8.0	Comparison tester 0-400 Kg/cm^2
9.0	Master pressure gauge: -1 to 0 kg/cm^2, 0.2-1 kg/cm^2, 0-4 kg/cm^2, 0-16 kg/cm^2, 0-40 kg/cm^2, 0-300 kg/cm^2
10.0	Oil bath with cooler for temperature 0-160 ^{0}C
11.0	Salt bath for temperature upto 1200 ^{0}C
12.0	Mercury in glass thermometer 0-120 ^{0}C, 0-200 ^{0}C
13.0	U-tube Manometer (Mercury & Water)
14.0	Regulated DC power supply 0 to +/-30 V, 5A to 15A
15.0	Function Generator
16.0	Oscilloscope
17.0	Pneumatic maxi-termi tool with accessories
18.0	Manual maxi-termi tool with accessories
19.0	Manual crimping tool with accessories
20.0	Tarpaulin (big and small)
21.0	Watchmaker screw driver set
22.0	Terry spanner set
23.0	Box spanner set
24.0	D-spanner set
25.0	Vacuum puller for solder
26.0	Soldering Iron (temperature controlled)
27.0	Bench vice
28.0	Pistol drilling machine
29.0	Watchmaker vice
30.0	Drill bit set
31.0	Sling & manila rope
32.0	Hand tools, spanners
33.0	Star point screw driver
34.0	Hand lamp with glass cover
35.0	Socket for socket wrench M10, M12
36.0	Reversible ratchet handle
37.0	General tools for electrician
38.0	General tools for fitter
39.0	General tools for rigger
40.0	Copper tube bending machine
41.0	HT Cable Jointing/Termination kit
42.0	Needle file set
43.0	Slide wrench
44.0	Needle puller
45.0	Tray cutting machine
46.0	0.2 to 10 kg/cm^2 penwatt or equivalent pneumatic testing kit
47.0	Portable air compressor and vacuum pump for vacuum gauges
48.0	Earth resistance tester 0 to 1, 10, 100 ohm
49.0	Transformer oil test kit
50.0	High vacuum stream line oil filter of 1000 GPH for transformer dry out
51.0	Primary/Secondary injection kit

52.0	HV test kit
53.0	Wheatstone bridge
54.0	Phase sequence meter
55.0	Frequency meter
56.0	Phase shifter
57.0	Other Monitoring & Measuring Devices
58.0	Transformer Turn Ratio Kit
59.0	Schering Bridge For Tan Delta Measurement
60.0	T & Ps For Oil Treatment
60.1	Transformer Oil Filteration M/C Of Suitable Capacities (AC/DC)
60.2	Oil Hose
60.3	Pre-Treatment Tank (Should Accommodate Transformer Oil)
60.4	Vaccum Pump
60.5	Compound Gauge (Pressure Side 1 & Vaccum Side 760 mm Of Hg)
60.6	Tarpaulin (Both Ordinary & Fire Resistant)
60.7	Trident Hose Adapter
60.8	Vaccum Cleaner
60.9	Vaccum Hose
NOTE	
1.0	Any other item required for smooth completion of the job shall be arranged by the vendor at his own cost.
2.0	Vendor must furnish the deployment plan for the following:
2.1	Oil filtering machine 1000 GPH
2.2	Transformer Oil test kit
2.3	Primary and Secondary injection kit
2.4	HV test kit
2.5	Phase shifter
2.6	Pneumatic/Manual Maxi-termi

VOLUME –II

SECTION –I

SCOPE OF WORK :

1.a.0 FOR CIVIL WORK

1.a.1 The intent of this specification is to provide all materials including supply of cement, reinforcement steel, structural steel, AC sheeting, Windows, doors, MS / Aluminum fittings, sanitary fittings and fixtures, plastering painting, flooring, roofing, False ceiling, rolling shutters, ceramic tiling, electrical wiring / fitting, fencing, area leveling & grading, shifting of materials, road works etc complete as per drawings and specification.

1.a.2 Testing of all materials, cement, steel etc. shall be the responsibility of the contractor including submission of test reports.

1.a.3 Providing of all types of labour, supervisors, Engineers, watch and ward as required,T&P including fuel, operators etc. as the case may be, consumables as required for completing the works.

1.a.4 The work includes construction of foundations for two nos. covered (each of size 60Mx20M-approx), 20000SQM area development of open yard, construction of temporary road 8M wide, 5" thick drain, & 4000M surface, Culverts, Area fencing, 3000nos. of RCC concrete block sleepers (trapezoidal section 200mmx250mm xL-500mm) , temporary Construction water and drinking water net work, security kiosk/barrack etc. and other civil enabling works.

1.a.5 The work also include all types of repairs, renovation and upgradation work as and when required.

1.a.6 The detail construction drawings / sketches shall be issued to the contractor after the award of work. Contractor shall be required to perform the work in accordance with the PWD schedule / Relevant IS Codes as per the instruction of Engineer.

1.a.7 Structural fabrication work for roof truss, fencing post, security posts, gates etc. shall also be the responsibility of the contractor.

1.a.8 Horticulture work in front of covered store and other areas including plantation of trees as and when called for including maintenance of garden and planted trees during the contract period.

1.b.0 FOR CONSTRUCTION POWER

SCOPE OF WORK :

This is divisible contract comprising of supply of equipment/materials, services including operation and maintenance. The intent of the specification is divided in the following parts :

A] Supply of Equipment/Materials/Items (Refer BOQ cum price schedule Section – A of Vol IIIA of tender doc.)

Supply all materials/equipment, consumables, etc for the substation and for construction power network except as specified. Certain high value items shall be supplied by BHEL free of cost for installation-refer relevant annexure for reference/information.

B] Installation, Testing & commissioning (Refer BOQ cum price schedule Section B of Vol IIIA of tender doc.)

Receipt, handle, storage, watch & ward of equipment till handing over, transport to site, install test & commission all equipment including those supplied by BHEL.

C] Operation and Stabilization/Maintenance of Equipments and Accessories (Refer BOQ cum price schedule Section C of Vol IIIA of tender doc.)

Operation & Maintenance of equipment as per instruction of BHEL.

1.b.1. Scope of supply:

The supplies shall be FOR LEPETKATA Project Site inclusive of all excise, packing, forwarding, etc. excluding insurance. All items supplied by contractor shall be brand new The successful bidder shall submit manufacturer's test report / technical specification of items supplied. All items shall confirm to relevant IS Code and shall bear IS mark wherever applicable.

Miscellaneous items and work not specifically described herein but required for transmission line and sub-stations shall be provided as per relevant IS and REC Specification and Construction Standards and shall constitute part scope of contract.

1.b.2. Scope of erection :

It is not the intent to specify herein all details of equipment and materials. Any item of the work not covered by this tender specification, but necessary to complete the system will be deemed to have been included in the scope of the job. The major items of work are described hereunder. However, the contractor shall perform all the necessary work including fulfilling the statutory requirements to the entire satisfaction of BHEL. The contractor, within the quoted price, shall arrange the required manpower, T&Ps and IMTEs with valid certificate of calibration.

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

1.b.3 Receiving (BHEL/Owner supplied and vendor supplied) & storing incl. preservation of materials at site store/ store-yard (Open area will be provided by BHEL free of cost to make store/store yard), handling / transportation to erection site for HT/LT Cables, LT kiosks (incl. Fencing of the S/S), supply of civil materials, pre-assembly of equipment wherever required, erection of all required equipment, aligning, fastening, welding,

supporting, cleaning, laying & termination of HT / LT cables, checking and carrying out statutory tests as required, making protocol / log-sheets for erection, testing and commissioning of the total construction power distribution system, till the same is taken over by BHEL.

1.b.4 All incidental civil works eg grouting, foundations including necessary earthwork, provision of all requisite materials eg cement, sand, grit, reinforcement etc T&P, shuttering etc is within the scope of contract. This will exclude those specified in BOQ.

1.b.5 BHEL will provide the Plot plan of the project to the contractor. Tentative locations of the sub-stations are indicated; contractor shall survey the entire area for locations of lighting mast etc and submit to BHEL for approval, final location & suggest BOQ of the sub-station. The supply of items shall be regulated as per the agreed BOQ, which shall also include provision for future diversions / extensions & maintenance. Materials/items supplied for future maintenance shall be handed over to BHEL after joint verification / inspection. The contractor shall carry out preparation of layout, sub-station drawing, etc taking into account Statutory requirements and clearances, etc as per Indian Electricity Acts 1956 and amendments thereof, if any.

1.b.6 All the work shall be carried out as per instruction of BHEL Engineer. BHEL Engineers' decision shall regarding the correctness of the work, method of working shall be final and binding on the contractor.

1.b.7 The contractor shall ensure timely completion of work. Parallel and simultaneous working in multiple fronts will be required to meet the schedule. The contractor must deploy adequate quantity of tools and testing instruments. He must also have on his rolls adequate qualified, trained and experience engineers, supervisory staff, technicians, skilled personnel. Contractor shall deploy manpower as instructed to match project schedule.

1.b.8 The work shall be executed under the usual condition affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall co-operate with personnel of other agencies, co-ordinate his work others and shall proceed in a manner that would not delay or hinder the progress of project work as a whole.

1.b.9 Contractor shall be holding valid license as electrical contractor, copy of which shall be furnished along with the offer. If the license is of any state other than Tripura, then he will have to obtain electrical license/permission from appropriate authority as may be applicable. The contractor, for the entire job, shall deploy qualified technicians/supervisors with the valid certificates.

1.b.10 The contractor shall ensure proper installation, setting connection and functioning in-situ testing shall required to be carried out for all electrical equipment installed by the contractor in accordance with the drawings, specifications and manufacturer's recommendations. If any portion of the work is found to be defective in workmanship or not conforming to drawings or other specifications, the contractor shall dismantle and re-do the work duly replacing the defective material at his cost.

1.b.11 The contractor, for safety, shall adequately illuminate all the working area during erection period.

1.b.12 Contractor shall obtain approval from appropriate authority for the installation at all stages including renewal, etc as per requirement. Necessary fees to be deposited by the contractor to the statutory authorities for arranging clearance of his installations erected before commissioned by him. The amount shall be reimbursed by BHEL on production of requisite evidence of payment. The successful bidder shall do all necessary co-ordination in this regard.

VOLUME – II

SECTION – II

2.A General & indicative technical features for construction power:

2.A.1. One number 415 Volt feeders shall be provided by Owner BCPL from their existing sub-station. Beyond this point, power shall be drawn through under ground cables / overhead 415 Volt lines. 415 volts substations shall be created with LT Kiosks. Different users will draw power.

2.A.2. ERECTION PROCEDURES:

The contractor shall align the structure & lighting mast, mount the other structures and accessories, insulators, AB switches, fuses, erect lighting arresters, etc as per standard or as directed by engineer.

2.A.3 ERECTION OF LT KIOSKS, JUMPERING, CABLING WORK.

2.A.3.1 The Contractor shall receive AB switches, lighting arrestors, HG fuses, cables, etc at His store. The contractor will preserve these materials till handing over.

2.A.3.2 Contractor shall transport LT KIOSKS from his or BHEL's stores. LT kiosks shall be placed on concrete foundations. Each sub-station area shall be graded and slope shall be maintained to prevent rainwater accumulation. Surface shall be covered with ballast of size 15-20 mm. The contractor shall supply all civil materials, excavate and make the foundations for LT Kiosks, structure for fencing.

2.A.3.3 Sufficient care should be taken in handling the above equipment to avoid the damage to the insulators and other delicate parts. Any damage during handling / erection shall be borne by the contractor. Contractor shall ascertain, the healthiness of the equipment before erection, carry out required tests before the erection. The contractor shall arrange necessary oil test kit. If the test result of oil is below the recommended value, the contractor shall carry out filtration of oil till the Di-electric strength of oil improves. The contractor shall arrange the filter machine for this purpose. Carrying out the entire above job and providing T&P and IMTEs shall be in the scope of contractor within his quoted price.

2.A.3.4 LT Kiosks shall be mounted on plinth keeping sufficient clearance from ground for incoming / outgoing cable lifting and termination.

2.A.3.5 HT & LT Cabling requirement:

The cable installations including necessary joints shall be carried out in accordance with the specification IS 1255 – 1967.

2.A.3.6. CABLE LAYING DIRECT IN GROUND :

The method shall be adopted where the cable route is through open country, along road / lanes, etc and where no frequent excavations are encountered and re-excavation is possible without affecting other work.

Width of trenches : The width of trench for laying single cable shall be 35 cms Where more than one cable are to be laid in the same trench in horizontal formation, width of trench shall be increased such that the inter-axial spacing between the cables for 415 volts shall be 20 cm and for 11 shall be 35 cm.

Depth of trenches : Where cables are laid in single formation, the total depth of trench shall not be less than 75 cm for cable upto 1.1 KV grade and shall not be less than 120 cm for cable above 1.1 KV grade. Wherever more than one tier formation is unavoidable and vertical formation is adopted, the depth of trench shall be increased by 30 cm for each additional tier to be formed.

Protective covering : Cable laid in trenches shall have covering of clean dry sand not less than 170 mm above the base cushion of sand before the protective cover is laid. The cables shall be protected by B class/second class brick of not less than 20 cm x 10 cm x 10 cm or protective cover placed on top of the sand and both sides of cable for full length of the cable to the satisfaction of Engineer-in-charge.

Back filling : The trenches shall be back filled wit excavated earth free from stones or other scrap edged debris and shall be rammed and watered, if necessary, in successive layers not exceeding 300 mm unless otherwise specified.

Route marker : Route marker shall be provided along straight runs of cables and at points of change in direction as approved by Engineer-in-charge and in general at intervals not exceeding 100 metres in straight run. Route marker shall be made out of 100 mm x 100 mm x 5 mm GI/Al plate bolted or welded on 35 mm x 35 mm x 6 mm MS angle iron of 600 mm long. Such route markers shall be mounted and grouted parallel to and 0.5 metre away from the side of trench. The work “cable” with voltage grading and size of cable shall be inscribed on the marker.

2.A.4. SUB-STATION EARTHING SYSTEM :

Earthing of all sub-station equipment shall be carried out as per IS 3043. Earthing system shall consist of number of earth electrodes made of 40 mm dia galvanized steel pipe placed in the ground up to required level. The space around the earth electrodes shall be filled with alternate layer of charcoal and salt. A chamber made of brickwork shall be made around each electrode. The brickwork shall be plastered. A lid made of MS plate of 6mm thickness shall be placed to cover each earth pit. All the electrodes shall be connected with the Earthing strips made of GI. The size of earth electrode and earthing strips for connection to the earth pits shall be selected considering fault level, duration of fault and corrosion rate. Earth resistance of each pit shall be within the specified value as per IS. Each sub-station shall have minimum two earth electrodes for neutral earthing, two for body earthing and two electrodes for LA earthing. Metallic supports, fencing, etc shall be connected to earth system. All the earth connection shall be done with GI strips of adequate cross section.

2.A.5 .HT / LT CABLE LAYING DRESSING AND TERMINATION.

2.A.5.1 All cable laying & termination shall be carried out as per IS specification and by qualified HT jointer with valid certificate.

2.A.5.2 All cables should be suitably supported so that they do not cause any strain to the equipment connected.

2.A.5.3 All LT cables from the transformer secondary terminals to the in-comer of LT kiosks and other cables like control cables etc shall be installed by the contractor. All cable lugs, glands, tapes, tags and any other materials to complete the cabling work shall be supplied by the contractor within the quoted price.

2.A.5.4 All necessary testing of cables including High pot test, insulation test etc. Shall be carried out by the contractor within the quoted price. High voltage test shall be carried out on all HT Cables. IR value of cables before and after the test shall be measured. IR value check and continuity test of all LT cables shall be measured before & after laying and at the time of charging. The continuity of the conductors as well as the armours of cables shall be checked before a & after the cable laying.

2.A.5.5 If damage is noticed after cable laying or if the cable is found defective during testing, contractor shall replace the cable free of cost. All the testing shall be carried out on the new cable so replaced.

2.A.6 .APPLICATION OF PROTECTIVE PAINTING & FINAL PAINTING.

2.A.6.1 All the structures shall be covered by protective paints before erection.

2.A.6.2 After completion of all installations, structures are to be painted with one coat of aluminum paints over two coats of primer.

2.A.6.3 Touch up paints shall be done for the other equipment LT kiosks.

2.A.6.4 All materials like paints, primers, paint brushes thinners etc. required for completing above painting work shall be supplied by contractor. The contractor, within the quoted price, shall do the supply of paints, other consumables and painting work.

2.A.7.PROVISION OF SIGNBOARDS AND SAFETY MEASURES.

2.A.7.1 All required signboards, caution boards and safety boards shall be arranged by the contractor and shall be installed in all the required locations by the contractor. The feeder description and line description shall be displayed at vital location. All equipment shall be marked with paints. The R, Y & B phases shall be marked on the equipment with proper paints. Safety is the foremost important and the contractor has to adhere to safety instructions and ensure use of safety appliances.

2.A.8.TESTING AND COMMISSIONING:

Contractor shall arrange all instruments required for testing and commissioning. The contractor shall carry out all tests required. Any other tests if required by customer and statutory authority shall also be carried out by the contractor.

2.A.8.1 LIGHTNING ARRESTOR :: Insulation resistance of lighting arrestor shall be checked and visual inspection of any cracks shall be done. In case any crack is noticed then it has to be replaced immediately by the contractor free of cost.

2.A.8.2 AB SWITCHES :: IR value of Air Break SWITCHES shall be checked with megger and opening & closing operation shall be checked.

2.A.8.3 LT KIOSKS :: The contractor shall check the operation of all components, meters, calibrate the meters. The bus bar to be checked any looseness. IR of bus bars and wiring are to be measured. After satisfactory completion of the above tests, the kiosks shall be energized.

2.A.8.4 EARTH RESISTANCE :: The contractor shall measure the earth resistance of all pits individually. The measured value should be within permissible limit as per IS. In case any earth pit shows a value that is more than the desired one, then contractor shall redo the earth pit work.

2.A.9 CLEARENCE FROM STATUTORY AUTHORITIES :

The contractor shall arrange clearance for energisation of the system from Statutory Authorities. No separate payment is admissible on this account. However, Statutory Fees paid will be reimbursed on production of evidence.

2.B GENERAL

All works shall be carried out in proper workmen like manner. Items of works covered by the following specification shall be carried as per the best practice according to the direction of the Engineer In-charge / BHEL, Site Engineer and to his satisfaction. Unless otherwise specified in this section or in the description of item, the cost of stage of works mentioned hereunder shall be deemed to have been included in the rates of items provided in the schedule.

2.B.1 EXCAVATION OF FOUNDATION AND FILLING UP OF TRENCHES

2.B.1.1 Foundation when excavated to the level shown in the drawing will be shown to Engineer In-charge and if on account of technical ground or for any reason whatsoever, he decides to go deeper with the foundation, the contractor shall excavate further to the depths required by the Engineer Incharge. In no case shall foundation soling or concrete be laid prior to receiving orders to that affect from the Engineer Incharge or his authorized representative. Any extra depth excavated when instructed shall have to be filled up, rammed, graded with crushed stone or lean concrete as directed by Engineer.

2.B.1.2 Excavation shall include keeping the excavated earth up to 150 mm clear of the edge of plain cement concrete or as directed by Engineer whichever is less.

2.B.1.3 The excavated areas around the foundation of structures are to be filled up properly to the required levels with earth obtained from excavation or other materials as directed well rammed with water and consolidated on layers not exceeding 15 cm at a time. The quantity for this item of work will be measured on the basis of quantity of excavation, less the volume occupied by the structure in foundation. Any water accumulating in trenches from underground water, rain and floods etc. shall be pumped / bailed out by the contractor, without any extra charge.

2. B.2 CLEANING OF WORK SITE

All trees, bushes and other vegetable matters shall be removed. Cleaning shall also include removing of stumps and roads etc. to 1 foot below furnished grades or as directed by Engineer. All debris from the above operation shall be removed from the site at location to be decided by Engineer. The tenderer in their own interest should visit the site and make themselves conversant with the actual conditions of the site so as to include all costs on their tender rates. No additional payment due to non-availability of site information shall be entertained in the future.

2.B.3 EARTHWORK IN GRADING, EXCAVATION AND BACK FILLIING

2.B.3.1 The contractor shall carry out the survey of the site before excavation and set properly all lines and establish levels for various works, such as earthwork in excavation for grading basement, foundation, plinth filling, roads, drains etc.

2.B.3.2 The excavation shall be done to correct lines and levels. This shall also include, where required, proper shoring to maintain excavations and also the furnishing, erecting and maintaining of substantial barricades around excavated areas.

2.B.3.3 Excavation for permanent work shall be taken out to such widths, lengths, depths and profiles as are shown in the drawings / specifications or such other lines and grades as may

in the drawings or such other lines and grades as may be specified by the Engineer. Rough excavation shall be excavated with special care, soft pockets shall be removed even below the final level and extra excavation if instructed by the Engineer, should be carried out by the contractor just prior to laying the mud mat, at is own cost.

2.B.3.4 Should any excavation be taken below the specified elevations the contractor shall fill it up with concrete of the same class as in the foundation resisting thereon, upto the required elevation. No extra shall be claimed by the contractor on this account.

2.B.3.5 All fill materials will be subject to Engineer's approval. If any material is rejected by Engineer, the contractor shall remove the same forthwith from the site at no extra cost to BHEL. Surplus fill material shall be deposited / disposed of as directed by Engineer after the fill work is completed.

2.B.3.6 Wherever block excavation is involved, the contractor shall notify the Engineer about his intention to start the work at 3 days earlier to the actual date of starting of work to enable him to take cross sectional levels for purpose of measurement before ground is disturbed.

2.B.4 CEMENT CONCRETE WORKS (PLAIN OR REINFORCED)

2.B.4.1 Shuttering and staging

2.B.4.2 Wherever necessary, shuttering and staging must be provided. Unless otherwise stated, no payment shall be made for such shuttering or staging and the cost thereof deemed to have been covered by the rate for relevant finished item of work. Where payment for shuttering have been specified, the rate shall be deemed to cover the cost of the necessary staging as well. Payment, if any, for shuttering will be on the basis of surface area of shuttering in actual contact with concrete.

2.B.4.3 Shuttering may be approved dressed true to line not less than 2.0 cm thick. Surface in contact with concrete are to be planned smooth except where otherwise stated. As an alternative, sufficiently rigid steel shuttering may be used for which same rate of timber shuttering will be allowed. In every case the joints shall be such that there is no loss of the liquid from the concrete. In timber shuttering the joints shall therefore, be either tongued or grooved or the joints must be perfectly closed and lined with craft paper of other types of approved materials. In case of steel shuttering also, the joints are to be similarly lined. All shuttering and framing must adequately be stayed and braced to the satisfaction of the Engineer for properly supporting the concrete during the period of hardening. It shall be so constructed that it may be removed without shock or vibration to the concrete.

2.B.4.4 Before the concrete is placed, the shuttering shall, if considered necessary, to be coated with an approved preparation for preventing the adhesion of the concrete to the moulds and it is to be of such a nature and so applied that the surface of the finished concrete is not stained. Before the formwork is stripped, the concrete surface shall be exposed where necessary in order to ascertain that the concrete has hardened sufficiently. In normal weather and with ordinary cement vertical or side shuttering may be removed after three days and the bottom shuttering of the horizontal members after 14 days in case of slabs and 21 days in case of beams and cantilevers etc. from the date of placing of last portion of concrete on the structure. The above period is minimum and may be extended, if found necessary. Before stripping the shuttering of structural members contractor shall take previous permission of Engineer Incharge or his representative.

2.B.4.5 No plugs, bolts, ties, hold post or any other appliances, whatsoever, for the purpose of supporting the shuttering are to be fixed in the structure or placed in such a way that the damage might result to the work in removing the same when the shuttering is struck off.

2.B.5 Mixing, placing and compacting

2.B.5.1 The proportion specified is by volume in dry condition of different constituents.

2.B.5.2 Boxes of suitable size shall be used for measuring sand and aggregate. The unit of measurement for cement shall be a bag of cement weighing 50 kg and shall be taken as 0.335 cub. meter. While measuring the aggregate, shaking, removing and hammering shall not be done. The proportioning of sand shall be on the basis of dry volume and in case of damp sand allowance for bulkage shall be made. The aggregate in each batch of concrete are to be proportioned as to contain full bag of cement.

2.B.5.3Normally, all structural concrete shall be mixed in mixture machine of appropriate capacity and shall be vibrated with suitable vibrator. Mixing shall be continued till there is uniform distribution of materials and mass is uniform in colour and consistency but in no case, shall mixing be done for less than two minutes. The rates appearing in the schedule of rates against such items are inclusive of hire and operational charges of each appliance. For particular job, Engineer in charge may allow hand mixing extra cement upto 10% over the standard requirement of cement for machine mix of particular mix have to be provided by the contractor at his own cost.

As the bulking of material may vary from day to day and at different parts of the day on account of varying moisture content, frequent tests for bulking shall be carried out with sand to be used and the amount of bulking allowed for in the field mix so as to keep the actual proportion constant throughout.

2.B.5.4Only the quantity of mix required is to be mixed and workability shall be measured by the amount of slump. The quantity of water, to be used for each mix of 50 kg of cement, to give required consistency shall be as directed at site. The slumps to be adopted should be as directed by the Engineer in charge at site.

2.B.5.5 Strength requirement of concrete (in kg / sq cm)

Grade of concrete	Compressive strength of 15 cm cube	
	Work test at 7 days minimum	Work test at 28 days minimum
M 10 (1:3:6)	70	100
M 15 (1:2:4)	100	150
M 20 (1:1:5:3)	125	200

2.B.6. **Protection and curing**

2.B.6.1The contractor shall adequately protect freshly laid concerts about 1 to 2 hours after its laying, from too rapid drying due to sunshine, drying winds, etc. and also from running or

surface water and shocks. After 24 hours of laying of concrete, the surface shall be cured by flooding with water of minimum 25 mm depth or by covering with wet absorbent materials. The curing shall be done for a minimum period of 10 days. Over the foundation concrete, the masonry works may be started after 48 hours of its laying, but the curing of cement shall be continued alongwith the masonry work for a minimum period of 10 days.

2.B.6.2 In case of cement concrete used as sub-grade, the flooring should be commenced within 48 hours of laying of sub-grade. In case this is not possible due to exigencies of work, the suitable arrangement as per order of Engineer in charge for roughening with steel wire brushes and subsequently neat cement slurry laying as directed may be done.

2.B.7 **Construction joints**

All joints in slabs & other horizontal members to be formed by inserting vertical boards against which concrete deposited can be properly rammed. The position where such joints may be made will be indicated by Engineer in charge or his representative.

2.B.8 **Test results**

Test cubes moulds of the concrete should be taken and laboratory cube test results should be obtained for every day of concrete possibly. In the case of concrete showing on quantity on cubic meter certified by Engineer in charge, so as deficient may be allowed to remain, subject in such a case to a deduction for such sum as are or may become due under the contract, not exceeding Rs. 24.00 per cum of the quantity so certified in case where the deficiency does not exceeds 5% and Rs. 48.00 per cum where deficiency 5%. The Engineer in charge will have full power in his absolute discretion to fix the actual rate of the deduction subject only to that the rate so fixed shall not exceed the minimum provided above. If the deficiency exceeds 10% the Engineer in charge at his discretion direct the portion of the concrete certified by him as so deficient in strength to be removed from the structure and replaced by concrete of specified strength and the contractor shall in that case have to carry out that direction at his own cost irrespective of the amount of loss, remain liable under the provision of his clause notwithstanding signing by the Engineer in charge of any certificate or the passing of the bills or accounts.

2.B.9 **STORAGE OF MATERIALS**

2.B.9.1 **Cement**

The cement shall be stored above the ground level in perfectly dry watertight sheds. The bags shall be stacked in a manner so as to facilitate easy removal. Any material considered defective by the Engineer shall not be used by the contractor and shall be removed from the work site immediately.

2.B.9.2 **Aggregate**

Aggregate shall be stored on brick soling or an equivalent platform so that they do not come in contact with dirt, clay, grass or any other injurious substance at any stage.

2.B.9.3 **Reinforcement**

Reinforcement bar shall be stored off the ground. If necessary a cost of cement wash shall be given to the bars to guard against rusting.

2.B.10 BRICK / MASONARY/FLY ASH BRICKS

2.B.10.1Cement mortar shall be prepared by mixing sand and cement in specified proportion. Sand shall be measured on the basis of its dry volume. In case of damp sand, its quantity shall be increased suitable to allow for bulkage.

2.B.10.2 Brick work shall be done as instructed at site. A layer of mortar shall be spread on full width for suitable length on top on the lower course. Each brick should be pressed into mortar and shoved into final position so as to embed in the brick and to fill its inside face fully with mortar. Cut bricks shall not be used except where necessary. A set of tools comprising of wooden straight edge, masonry spirit level, square half-meter rule, line and pins, string and plumb shall be kept for every three masons for frequent checking during progress of work. Faces of the walls found not in plumb shall be dismantled.

2.B.10.3 Both the faces of the walls of thickness greater than 25 cm shall be kept in proper plan. All the connected brick work shall be out in more than one scaffolding height of about 1.2 meter to 1.5 meter above adjoining walls. The surface of the wall shall be plastering whilst the mortar is fresh.

2.B.10.4 Brick shall be so laid that all joints are quite full of mortar. The thickness of spirits shall no exceed 10 mm. Bricks shall be laid with frogs upward except in the top coarse where frogs shall be placed downwards. The face joints shall be racked to a minimum depth of 15 mm (3/5 inch) by racking tools daily during the progress of work when the mortar is still green so as to provide proper key for plaster or pointing is not required to be done, the joints shall be struck flush and finished at the line of laying.

2.B.10.5 The face of brick work shall be cleaned the very day that brick work is laid daily and all mortar droppings shall be removed.

2.B.10.6 Green work shall be protected from rain by suitable covering. The brick work shall be kept for a period of at least 7 days.

2.B.10.7 Scaffolding should be sound and strong and holes left in masonry work for supporting and scaffolding shall be filled and made good before plastering.

2.B.10.8 Sand to be used for mortar shall be hard, durable, clean and free from dirt, clay, organic matter or other impurities.

2.B.11 BRICK FLAT SOLING

After the ground is prepared and rammed, brick shall be laid flat in one layer with closed fine joints. After laying the bricks sand shall be spread over the soil and the joints of bricks filled up by sand. Rate tendered shall include all charges for ramming etc.

2.B.12 DAMP PROOF COURSE

This shall be laid to specified thickness of 40 mm or as per drawing over walls for the full thickness of the super-structure walls. The surface shall be leveled and prepared before laying the cement should be doubly chequired, damp proof course shall be covered for at least seven days after which shall be allowed to dry. Water proofing materials of approved

qualities shall be added to the concrete mixture in accordance with the manufacturer's specification.

2.B.13 CEMENT POINTING

2.B.13.1 The joints of masonry shall be raked at least 12 mm deep 3 or 4 days after the course is laid, if not done earlier. The dust shall then be brushed out of the joints and the wall washed with water.

2.B.13.2 Mortar shall be filled into joints and well pressed with special steel trowels. The joints shall be touched again after it has once begun to set. The joints of the pointing work shall be neat. The lines shall be regular and uniform in breadth and the joints shall be raised flat, sunk 'V' as may be directed. No false point shall be allowed.

2.B.13.3 The work shall be kept wet for a week after the pointing with complete. Whenever coloured pointing has to be done, the colouring pigment of the colour required shall be added to cement in such proportions as recommended by the manufacturer and approved by the Engineer.

2.B.14 CEMENT PLASTER

2.B.14.1 All joints in masonry shall be cleaned by using a hooked tool made for the purpose when the mortar is still green and in any case within 48 hours of laying. The surface to be rendered shall be washed with fresh clean water free from all dirt, loose material, grease etc. and thoroughly wetted for 6 hours before plastering work is commenced. Concrete surfaces to be rendered will be, however, kept dry. The wall shall not be too wet but only damp at the time of plastering. The damping shall be uniform to get uniform bond between the plaster and wall.

2.B.14.2 The proportion of the mortar shall be as specified under the respective items of work. Cement shall be mixed thoroughly in dry condition and just enough water added to obtain a workable consistency. The quality of water, sand and cement shall be as per IS standards. The mortar thus made shall be used immediately and in no case shall the mortar be allowed to stand for more than 25 minutes after mixing with water.

2.B.14.3 Curing of plaster shall be started as soon as the applied plaster has hardened enough so as not to be damaged. The decision as to when the plaster has hardened will be given by the Engineer. Curing shall be done by continuous applying water in a fine spray and shall be carried out for at least 7 days.

2.B.14.4 Whenever the specification or the item of work calls for water proofing the contractor shall provide the percentage of water proofing compound as specified in the item of work.

2.B.14.5 Ceiling plaster shall be done before wall plaster and wall plaster shall commence at top and work downwards.

2.B.14.6 The mortar shall be dashed on the prepared surface with a trowel and finished smooth by toweling on the surface with neeru (lime—cem). Neeru shall be properly slaked fat lime. The standard of finish expected is high and shall conform to IS 2394.

2.B.15 **Integral cement finish on concrete floor**

In all cases where integral cement finish on a concrete floor has been specified. The layer of concrete shall be screeded off to proper level and tamped with tamper having conical projections so that the aggregate shall be forced below the surface. The surface shall be finished with a wooden float and a trowel with pressure. The finish shall be continued till the concrete reaches its initial set. No cement or cement mortar finish shall be provided on the surface. Where specified, a floor hardener as approved by the engineer shall be supplied as recommended by the manufacturer.

2.B.16 **WHITE WASHING / COLOUR WASHING**

2.16.1 **Preparation of surface**

All surfaces for white washing, colour washing, painting shall be thoroughly brushed free from mortar dropping and foreign matters and prepared to the satisfaction of Engineer incharge before application of treatment.

Before white washing, all the nails etc. shall have to be removed from the wall as directed. Nail holes or other holes, small depressions or damages in plaster or wall surface shall be filled or repaired to original condition with paste.

Old surfaces spoiled by smoke and grease soot's shall be sprinkled with surki and water and rubbed brick bats still or wire brushes or steel scrappers. The surface shall then be broomed to remove all dust and shall be washed with clean water.

2.B.16.2 **White wash and colour wash**

2.B.16.2.1**Preparation of white wash**

The white washing to be done with five parts of stone lime and part of shell lime with necessary gum (2 kg per cum of lime) using as necessary and to be mixed as per standard practice.

2.B.16.2.2**Preparation of colour wash**

Colour washing shall have a primer of white wash and shall be of shade approved by Engineer incharge.

2.B.16.2.3 Sufficient quantity of colour wash enough for complete job shall be prepared in one operation to avoid any difference in shade. Procedure and preparation of the shall be the same as in white washing. Application of white end colour wash – the operation for each coat shall consist of four consecutive strokes of the brush one horizontally from right to left and the next from left to right and the third stroke bottom upward and the fourth from top downward before the previous strokes dries. Each coat shall be allowed to dry before next coat as applied. No portion of the surface shall be left out initially to be patched up later on. The brush shall be dipped in white wash or colour wash pressed lightly against the wall of container and then applied by lightly pressing against the surface with full swing of hand.

2.B.16.2.4. The white wash on ceiling should be done prior to that on walls.

2.B.16.3 **Cement primer coat**

Cement primer coat is used as base on wall finish of cement, lime or lime cement plaster or on asbestos cement surface before oil bound distemper or oil based paints are applied on them. The cement primer is composed of a medium and pigment which are resistant to the alkalies present on the cement, lime, lime cement in wall finish and provides a barrier for the protection of subsequent coat of oil bound distemper or paints. Priming coat shall preferably be applied by brushing and not be spraying. Hurried priming should be avoided particularly on absorbent surface. New plaster patches in old work, before applying oil bound distemper paints etc. should also be created with cement primer. The surface shall be thoroughly cleaned of dust, all white or colour wash by washing & scrubbing. The surface shall be allowed to dry for at least 48 hours, it shall be sand prepared to give a smooth and even surface. Any unevenness shall be made good by applying putty, made of plaster of Paris mixed with water on the entire surface including filling up the undulation and them preparing the same after it is dry.

The cement primer shall be applied with a brush on the clean dry and smooth surface. Horizontal strokes shall be given first, vertical strokes shall be applied immediately afterwards. The entire operation will constitute one coat. The surface shall be finished as uniformly as possible having no brush marks. It shall be allowed to dry at least 48 hours bound distemper is applied.

2.B.17 PAINTING

2.B.17.1 All surfaces for painting shall be properly sand prepared and cleaned and where necessary good quality putty shall be used to hide all holes, cracks, open joints etc. The rate for painting includes such work.

2.B.17.2 Paint shall be applied with approved brushes and surfaces shall be sand papered after every coat. All work when completed shall present a smooth, clean, solid and uniform surface to the satisfaction of the Engineer incharge.

2.B.17.3 **Synthetic enamel paint**

Synthetic enamel paint of approved brand and manufacture and of the required shade shall be used for the top coat and an under-coat of shade to match the top coat as recommended by manufacturer shall be used. Undercoat of the specified paints of shades suited to the shade of top coat shall be rubbed next day. It shall be rubbed next day with fine grade of wet abbressive paper to ensure a smooth and even surface free from brush mark and all loose particles dusted off. Top coats of specified paint of the desired shade shall be applied after the undercoat is thoroughly dry. Additional finishing coats shall be applied if found necessary to ensure properly uniform glossy surface.

2.B.17.4 **Aluminum paint**

Aluminum paint of approved brand and manufacture shall be used. The paint comes in compact dual containers with paste & medium separately. The two shall be mixed together to proper consistency before use. Each coat shall be allowed to dry for 24 hours and lightly rubbed down with fine grade sand paper and dusted before the next coat is applied. The finished surface shall present an even and uniform appearance. As aluminum paint is likely to settle in the container, care shall be taken to frequently stir the paint during use. Also the paint shall be applied and laid off quickly, as surface is otherwise not easily finished.

2.B.17.5 **Plastic emulsion paint**

Plastic emulsion paints are not suitable for application on external wood and iron surface and are to be used generally on masonry or plastered surfaces. No priming coat is required for the later. Plastic emulsion paint of approved brand and manufacture and of the required shade shall be used. The paint will be applied in the usual manner with brush or roller. The paint dries by evaporation of water content and as soon as the water has evaporated the film gets hard and the next coat can be applied. The time to dry varies from one hour on absorbent surfaces to 2 to 3 hours on non-absorbent surface. The thinning of emulsion is to be done with water will be particularly required for the under coat which is applied on the absorbent surface. The quantity of thinner to be added shall be as per manufacturer's instructions. The surface on finishing shall present flat smooth finish. If necessary, more coats will be applied till the surface presents a uniform appearance.

2.B.17.6 **Precaution**

2.B.17.6.1 Old brushes if they are to be used with emulsion paints should be completely dried of turpentine or oil paints by washing in worm-soap water. Brushes should be quickly washed in water, immediately after use and kept immersed in water during break period to prevent the paint from hardening on the brush.

2.B.17.6.2 In the preparation of walls for plastic emulsion painting, an oil base putty shall be used in filling cracks, holes etc.

2.B.17.6.3 Splashes on floor etc. shall be cleaned without delay, as they will be difficult to remove after hardening.

2.B.17.6.4 Washing of surfaces treated with emulsion paints shall not be done within 3 to 4 weeks of application.

2.B.18 **Protective measure**

Surfaces of rolling shutters, steel ventilators and articles of furniture, flooring etc. and parts of building not to be white or colour washed shall be protected from being splashed down. Such surfaces shall be cleaned of white or colour wash splashes, if any.

2.B.19 **GROUTING**

Grouting of pockets shall be done as per the direction of the Engineer at site and as given in schedule of items.

2.B.20 **STRUCTURAL STEEL WORK**

2.B.20.1 All materials for structural steel works have to supplied by the contractor and necessary test certificate of the materials procured for this work has to be submitted for scrutiny.

2.B.20.2 All fabrications, and erection of structures must be executed according to the specification and drawings and all steel works should be as per IS code No. 800, 806, 875,1161 of latest Editions. Erection of trusses are true to line and level and aligned properly, as per drawing and instruction of Engineer Incharge. Necessary connections of member are to be riveted / bolted/ welded as per design and drawing. All fasteners required for the connections are to be supplied by the Contractor.

2.B.20.3 All fabricated members are to be painted with one coat of shop painting of red oxide / zinc chromites of J&N or equivalent make and final two coats of synthetic enamel paint of approved quality and shade.

2.B.20.4 The contractor has to prepare necessary shop & erection drawings in sufficient numbers at his own cost and submitted for obtaining approval from BHEL, including design of connections etc.

2.B.20.5 All the materials procured for this work should be of approved brand and quality. AC sheet should have protection in both sides width wise 800 mm beyond the brick wall.

2.B.20.6 The contractor has to give his competitive offer taking into consideration of all the above points and based on schedule of items enclosed in this tender document.

2.B.21 **WINDOWS AND VENTILATORS (STEEL)**

2.B.22 **General**

Supply and fixing in position of window / ventilators sashes with glazing bars. These sashes should be provided with 12 mm MS round bars welded in window frame horizontally and approximately not more than 100 mm centre to centre and glazing bars shall be fixed / welded to shutter frame as per standard design and as per instruction of BHEL.

2.B.22.1 Glazing and painting etc. as worded in the respective item.

2.B.23 **STEEL WINDOWS / VENTILATOR SASHES**

2.B.23.1 The steel window / ventilator sashes shall be conform to IS 1038-1968 regarding sizes, material design etc. and only such windows manufactured by reputed manufacturers by continuous electric welding with flash butt welding process shall be accepted.

The windows and ventilator frames shall be manufactured from rolled steel sections conforming to IS 7452-1974 free from rolling defects and suitable for punching and cutting .

2.B.23.2 **Frames**

Both the fixed and opening frames shall be constructed of sections, approved and to be cut to true length. The corners of fixed and opening frames shall be electrically butt welded to form a solid and true right angle and all frames shall be square & flat. Subdividing bars of the unit shall be tanned and riveted into the frame. No face welding at the joint of the subdividing bars and frame is required. Casements shall be fixed to their frames so as to provide continuous contact for weathering on the inside and outside and shall be secured in closed position by the fittings which shall have been properly checked and adjusted.

2.B.23.3 Screws

Slotted steel adjustable lugs with a standard slot steel windows ventilators shall conform to the requirements of IS 1362-1962.

2.B.23.4 **Fixing materials**

Slotted steel adjustable lugs with a standard slot of 8 mm wide for MS screw of 6 mm and 12 mm long with square nuts shall be used as fixed lugs. The other dimension of the lugs shall be as per IS 1081-1960. Lugs shall only be placed in the specified positions and grouted into their holes with cement mortar.

The outer frame shall be provided with fixing holes centrally in the section. Additional holes shall be provided at suitable intervals for inserting special spring glazing clips, glazing beads.

2.B.23.5 **Side hung shutter**

Windows shall be provided with steel hinges inserted inside slot out in the fixed frame and welded to the frame. The hinges shall be normally of the projecting type and not less than 65 mm. Friction hinges need not be provided and for easy operation non-friction type projected hinges with hinge pins may be provided. It shall be fitted with peg stays which shall be of aluminium & should be 300 mm long with steel peg and locking bracket. The peg stay should have three holes to open the side hung casements in three different positions.

The side hung shutter shall be provided with aluminium handle and shall be mounted on steel handle plate which shall be welded or screwed or riveted to the opening frame in such a way that it could be fixed before the shutter is glazed and may not be removed after glazing. The handle shall have a two point nose, which shall engage with a cast steel rust protected striking plate on the fixed frame in a slightly open or fast position.

2.B.23.6 **Top hung ventilators**

The steel butt hinges for top hung ventilators shall be riveted to the fixed frame or welded to it after cutting a slot in it. Hinges to the opening frames should be riveted and welded and cleaned off. Hung casements shall be provided with a aluminium peg stay with three holes which when closed shall be held tightly by the locking bracket. The locking bracket shall either be fitted to the fixed frame or window.

All windows / ventilators shall be designed to open outside.

2.B.23.7 **Glazing**

Glazing shall be provided on the outside of the frames. The glass panels shall be free from flow, specks, bubbles etc. and shall have properly squared corners and straight edges. The glass panels shall be of 4 mm thickness, approved figured glass plain sheet glass and of best quality and fixed with special glazing clip / glazing bids the putty containing a hardening agent like lither-age or a patent mastic. The fixing and glazing work shall conform to the relevant specification, contained in the IS-1001-1960.

No glazing shall be considered as complete until all stains have been removed from the surface of glass and metal forms. The contractor shall make good any glass broken while fixing or cleaning. All windows / glazing repaired and the whole work left perfect on completion.

2.B.23.8 Payment shall be for the finished work of providing installation of windows / ventilator frame, as provided. Overall dimensions of the ventilator / window shall be

measured for payment. The length and breadth shall be measured to nearest to 1 cm and area worked out to two places of decimals of a square meter. No deduction shall be made for the thickness of frame.

2.B.23.9 MS GRILLS / MS ROUND

Where MS grills / doors are to be provided in openings, the same shall be fabricated by welding MS Round bars welded as joints to the approved design and pattern or as directed by Engineer incharge from approved quality of material conforming to IS 226-1958 and IS 800-1956. The outside strip frame of the shall be housed to its full thickness into the surfaces as directed by the Engineer incharge. The grills shall be painted with one coat of red oxide paint and two coats of oil paints of approved make and shade.

2.B.24 FLOORING ANE ALLIFD WORKS

2.B.24.1 Terrazzo finish in site

It shall consists of an under-bed and a topping laid over an already laid and matured concrete base.

2.B.24.2 Thickness

Unless otherwise specified the total thickness of the finish shall be minimum 40mm for horizontal and 25 mm for vertical surface of which the topping shall be not less than 10 mm. While the topping shall be of uniform thickness the under-bed may vary inn thickness to provide necessary slopes. The vertical surface shall project out 6 mm from the adjacent plaster or other finish. Necessary cutting into the surface receiving the finish shall be done to accommodate the specified thickness. All junctions of vertical and horizontal shall be rounded neatly to uniform radius of 25 mm.

2.B.24.3 Under- bed

The under-bed for floors and similar horizontal surfaces shall consists of a mix of 1 part cement, 2 parts sand and 4 parts stone chips by volume. For vertical surfaces the mix shall consist of 1 part cement to 3 parts sand by volume. The sand shall be coarse, the stone chips shall be 10 mm down well graded. Only sufficient water to be added to give a workable consistency.

2.B.24.4 Topping

The mix for the topping shall be composed of cement, colour pigment, marble dust and marble chips. The proportions of the ingredients shall be such as to produce the terrazzo of colour, texture and pattern approved by the Engineer. The cement should be white or grey or a mixture of the two to which pigment shall be added to achieve the desired colour. The 3 parts of this mixture 1 part marble powder by volume shall be added and thoroughly mixed dry. To 1 part of this mix 1 to 1.5 parts of marble chips by volume shall be added and thoroughly mixed dry again.

The pigment must be stable and non-fading. It must be very finely ground. The marble powder shall be from white marble and shall be finer than IS seive no. 30. Size of marble chips by volume shall be between 1 mm to 20 mm.

2.B.24.5 Laying

The under-bed shall be laid in panels. The panels shall not be more than 5 sq. metre in area of which no side shall be more than 2.5 metre long. For exposed locations maximum area of panel shall be 2.0 sq. metre. The panel shall be laid in alternative bays or chess board pattern. No panel shall be cast in contact with another already laid untill the later has contracted to the full extent.
Dividing strips made of aluminium or glass shall be used for forming the panels. The strips shall exactly match the total depth of under-bed plus topping.

After laying the under-bed shall be levelled compacted and brought to proper grade with a screed or float. The topping shall be laid after about 24 hours while the under-bed is still somewhat green but firm enough to receive the topping. A slurry of the mixture of cement and pigment already made shall be spread evenly and brushed in just before laying the topping. The topping shall be rolled for horizontal areas and thrown and spread for vertical areas to extract at superfluous cement and water and to achieve a compact dense mass, fully bonded with the under-bed. The surface of the topping shall be trowel led over, pressed and brought to a smooth dense surface showing a minimum 75% area covered by marble chips in a even pattern of distribution.

2.B.24.6Curing

The surface shall be left for curing for about 12 to 18 hours and they cured by allowing water to stand on surface or by covering with wet sack for four days.

2.B.24.7 Grinding and polishing

When the surface has sufficiently hardened it shall be watered and ground evenly with rapid cutting coarse grade (No 60) grit blocks till the marble chips are exposed and the surface is smooth. Then the surface shall thoroughly be washed and cleaned. A grout with already been prepared mixture of cement and pigment shall be applied to fill up all pinholes. The surface shall be cured for seven days by keeping it moist and then ground with fine grit blocks (No 120). It shall again be cleaned with water. The slurry applied again to fill up any pinholes that might have appeared and allowed to be curred again for 5 days. Finally the surface is ground again for third time with very fine grit blocks (No 320) to set smooth surface without any pinholes. The grinding shall be done with a suitable machine. Where grinding Machine cannot be used hand grinding may be allowed when the first rubbing shall be with carborundun stone of coarse grade (No 60), second rubbing with medium grade (No 80) and final rubbing and polishing with fine rubbing and polishing with fine grade (No 120). The surface shall be cleaned with water, dried and covered with soil free lean sawdust, if directed by Engineer. The final polishing shall be postponed till before handing over, if desired by Engineer. Just before handing over the surface shall be dusted with oxalic acid at the rate of 0.33 gm per sq m water sprinkled on to it and finished by buffing with felt or Hessian bobs. The floor shall be cleaned with soft, moist rag and dried. However, all excess wax polish to be wiped off and surface to be left glossy but not slippery.

2.B.25 **SANITARY AND PLUMBING WORKS**

The detailed specifications for various appliances are given below. In all cases the rate shall include for supply, fitting and fixing including painting where necessary, and making good all-round.

2.B.25.1 **Specification**

2.B.25.1.1 Sanitary appliances supplied by the contractor shall be of vitreous china and shall conform to IS 2556 (Part I) – 1967, neceification for vitreous sanitary appliances (Vitreous china) Part I general requirement .

2.B.25.1.2 Water closet wash down shall conform to IS 2556 (Part II) – 1967.

2.B.25.1.3 Squatting pans and traps shall conform to IS 2556 (Part II) – 1967.

2.B.25.1.4 Flushing cisterns for water closets and urinals (CI) shall conform to IS 774 – 1964.

2.B.25.2 **Indian type water closet**

WC pan shall be a white glazed earthenware pan conforming to IS specification. It shall have standard glazed trap 'P' or 'S' type with effective seal and vent arm as per drawing. A pair of white glazed earthenware foot trade shall be provided set in cement mortar (1:3) flushing, cistern shall be high level mosquitop roof cistern of approved capacity as per schedule of item, made of best cast iron and on the "Pull let go" valves siphon type. Other accessories like cover, lever GI chains, pull handle, ball valve with copper float, inlet and outlet pipes with necessary unions, shall be of standard size and make. The flush pipe shall be of GI pipe and shall be connected to the WC pan by means of cement or putty joint.

2.B.25.3 **European type water closet**

WC pan shall be of white glazed earthenware, white vitreous china or fire clay and shall be fitted with 'S' or 'P' type of trap of standard size and make. The sit with lid shall be of wall plastic, well polished with rubber buffers and shall be fixed in position by using Chromium plated (CP) brass hinges and screws. Flushing cistern shall be a low level, mosquito proof cistern of approved capacity made of best cast iron with valve less siphon provided with accessories such as CP brass unions and couplings, etc. Other specifications shall be same as those for Indian type WC.

2.B.25.4 **Wash basin**

The basin shall be of white glazed earthenware or white vitreous china clay conforming to IS specifications. Each basin shall be provided with correct size of CP pillar taps, CP waste coupling with nut, CP chain rubber plug and lead paste pipe with trap leading to floor trap.

2.B.25.5 **Toilet fixture**

The mirror shall be of best Indian make with beveled edges. The size of the mirror shall be as specified. It shall be mounted on the asbestos sheet base and shall be fixed in position by means of CP brass screws. The glass shall be of best quality with edges rounded off. The

shelves have CP brass guard rail with rubber washers in position resting on glass plate and CP brass bracket which shall be fixed with CP brass screws to wooden plugs, firmly embedded in the wall. The towel rail shall be of CP brass with two CP brass brackets. The brackets shall be fixed by means of CP brass screw to wooden cleats firmly embedded in wall.

2.B.25.6 **Installation**

All cisterns shall be fixed on cantilevers brackets firmly embedded in the wall. The Indian type WC pan and the trap shall be sunk in the floor and jammed around with cement concrete of suitable mixture in such a way that uniform cushion between the concrete base and pan is achieved. The European type WC shall be firmly fixed on the floors with screws or some other arrangement. All joints between the pan and the trap and between pan and flush pipes shall be made leak proof by means of putty and white lead. The urinal basin shall be fixed in position by using wooden plugs embedded in wall and screws of proper size. The hand wash basin shall be supported on a pair of CI cantilever brackets embedded in walls.

The CI brackets, lead connection pipes and waste pipes shall be painted with two coats of approved paint over a coat of primer. The inside and outside of the cistern shall be painted with an approved bitumen paint.

2.B.25.7 **Plumbing**

2.B.25.7.1 **Soil waste, vent pipes and fittings**

These will conform to IS 1729 – 1964 or IS 3909 – 1967. All pipes and fittings shall be made of cast iron of approved manufacture and shall conform to

relevant Indian standard specifications. The pipes shall have spigot and socket ends. The pipes shall be free from cracks and flaws and the inside and outside shall be painted with and anticorrosive paint. The access door of fittings shall be of approved design.

2.B.25.7.2 **Stoneware pipes and fittings**

These will conform to IS 651 – 1965. All stoneware pipes, bends, fully traps shall be of approved manufacture of the best salt glazed variety inside and outside, hard burst dark grey colour, perfectly sound free from fire crack and imperfection of glaze, truly circular in cross section, perfectly straight and of standard nominal length and depth of socket and barrel.

2.B.25.7.3 **GI pipes**

These shall conform to IS 1239 – 1964. All GI pipes shall be of 'B' class quality and shall be of reputed manufacturer and shall have threaded ends with a socket at one end only. All fittings for GI pipes are galvanized rough iron.

All exposed pipes shall be painted with two coats of an approved paint over one coat of approved primer, under ground pipes shall be treated with two coats of an approved bituminous paint.

2.B.26. **Miscellaneous**

All sanitary and plumbing works shall be carried out by skilled plumbers so that best workmanship can be attained. It shall comply with local laws where applicable.

No work shall be covered over or surrounded with concrete until it has been inspected and approved by Engineer.

2.B.26.1 The rates for all piping work shall include for supplying, laying and fixing in position including necessary fixture, jointing, painting, necessary earthwork in excavation in all kinds of soil, refilling in 15 cm layers including watering, consolidation, top dressing, removal of spoils, making holes and is for the completed work.

2.B.27 GENERAL :

If Technical Specification of any item is not available, the same will be governed by relevant IS code or manufacturer's specification. -

VOLUME – II

SECTION –III

SPECIFIC TECHNICAL REQUIREMENT

3.1 APPROACH TO WORK SITE

The contractor shall make his own arrangements at his own cost for the necessary approach roads for transportation of materials to site of work. No extra charge in this regard will be entertained.

3.2 SUPPLY OF MATERIALS

3.2.1 The cement for various plain and reinforcement cement concrete works shall generally conform to relevant IS codes as received from various cement manufacturing companies. Major quantity shall be ordinary Portland cement conforming to IS – 269.

3.2.2 The contractor may carry out the test as regards conformity / suitability of cement with reference to IS code.

3.2.3 The contractor has to supply required steel and cement conforming to IS codes . The contractor has to arrange their material handling and storage at their cost.

3.3 DAMAGE TO OTHER STRUCTURE AND PLANT

The contractor shall be totally held responsible for any loss or damages, caused by any act of the contractor labour or his sub-contractor's labour including but not limited to covered / open blasting any structures and plants that may be under construction / erection by any

other agency at this site during this entire period covered by this contract alongwith extension, if any.

3.4 BHEL'S INPUT

BHEL will furnish, within the plant site area, the following services and materials under the conditions described below.

One permanent benchmark in the vicinity of the work site.

All further layout work shall be carried out very accurately by the contractor with his own instruments. The contractor shall have on site a good number of survey instruments such as levels, theodolite, stuffs, measuring devices, survey umbrella etc.

3.5 SPECIFICATION AND CODES

All works shall be carried out strictly in accordance with technical specification unless otherwise approved by Engineer in writing. Where not specified in the technical specifications, the relevant latest Indian standard codes shall be followed.

3.6 TECHNICAL INSTRUCTIONS

3.6.1 The successful tenderor on receipt of letter of intent from BHEL shall prepare a detailed work programme including items of work within the overall time period allowed and shall submit the same to the Engineer for approval.

3.6.2 The work has to be carried out according to priority as may be fixed up by site Engineer of BHEL at site.

3.6.3 The materials and workmanship must be of good quality and accepted standards and specifications.

3.6.4 All material for construction are required to be procured by the contractor and should conform to relevant IS specifications.

3.6.5 The site Engineer reserves the right to reject any material not upto the specification. All taxes, levies and duties on construction materials will be on contractor's account.

3.6.6 After completion of work, the building and areas around them should be cleared of all rubbish, debris etc. and handed over in fit condition for occupation.

3.6.7 Unless otherwise specified , rates quoted under the contract shall apply for works irrespective of lifts and leads. Rates shall also include providing scaffolding and its subsequent removal.

3.6.8 All quantities under schedule of rates and quantities are approximate and are subject to change.

VOLUME – II

SECTION – IV

SPECIAL CONDITION OF CONTRACT

These special condition shall be read and construed along with general condition of contract and in case any conflict or in consistency between the general and this special condition of the contract, the content in this special condition shall prevail.

1. **PROJECT SYNOPSIS AND GENERAL INFORMATION**

A) **INTRODUCTION**

The proposed 53 MW Combined Cycle Power Project at LEPETKATA being set up by M/s BCPL, ASSAM. And the site is approachable by road

It is essential that the bidder visit site and acquaint with the conditions prevailing at site before submission of the bid. The information given hereunder is for general guidance and shall not be contractually binding on the /BHEL.

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B) APPROACH TO SITE.

The proposed project site is located at LEPETKATA, Assam.
Nearest important town: Dibrugarh (15 Km).

Nearest railway station: Dibrugarh (15 Km).
Proposed railway approach: Proposed Dibrugarh-Moran Rail link
Nearest Airport: Dibrugarh (25 Km)
Nearest Highway milestone: Tinsukia-Dibrugarh-Sibsagar (NH-37), 500 M

2. **CONSUMABLES:**

A) All consumables, like gas, electrodes, chemicals, lubricants etc. required for the contractor at his cost shall arrange the job unless otherwise specifically mentioned in the contract.

B) All consumables to be used for the job shall have to be approved by BHEL prior to use.

C) In the event of failure of contractor to bring necessary and sufficient consumables, BHEL shall arrange for the same at the risk and cost of the contractor. The entire cost towards this alongwith overhead shall be paid by the contractor or deducted from the contractor's bills.

3. TEST CERTIFICATES

Necessary test certificates of all the materials supplied by contractor are to be produced to BHEL prior to use of those materials.

4. 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 BHEL/CLIENT. The decision of BHEL in this regard shall be final and binding on the contractor.

5. GUARANTEE

Even though the work will be carried out under supervision of BHEL, the contractor will be responsible for the quality of workmanship, quality of materials / items and design for which the contractor is responsible.

The contractor shall guarantee the work executed under the scope of the contract for a period of 12 (twelve) months from the date of start of guarantee period as certified by the Engineer (i.e. on completion of total work under scope and / or taking over by BHEL) and shall rectify free of cost all defects due to faulty supply or work done. In case the contractor fails to repair / replace the defective works within the time specified by the Engineer, BHEL may proceed to undertake the repairs / replace such defective works at contractor's risk and cost without prejudice to any other rights and recover the same from security deposit / other dues.

6. **REVISION OF RATES / OVER RUN CHARGES:**

No revision of rates / over run charges shall be paid to the contractor in the event of the completion period is extended for any reason whatsoever.the rates shall be firm till completion of the entire work to the satisfaction of BHEL.

7. **DEVIATIONS:**

The bidder is required to submit with his offer in the relevant schedule / format list. Bidder is required to visit site and acquaint himself about the situation of sites, law and order situation etc. and submit their bid accordingly. Any assumptions, presumptions, deviations etc. indicated or implied anywhere by the bidder may lead to cancellation offer.

8. **LAND:**

a) Minimum land will be provided free of cost for construction of stores area etc. within the project premises. Contractor has to make his own arrangement to develop the land by backfilling, cutting of grass, bushes etc. at his own cost.

b) Contractor has to make his own arrangement to for labour colony outside the project premises. No land shall be provided for this purpose by BHEL.

c) The contractor will be responsible for handing back all lands, as handed over to him for his temporary use to BHEL as per the instruction of BHEL Engineer.

d) The areas which will be allocated for construction of equipment sheds. have to cleaned by cutting of grass, bushes etc if any, by the vendor within the quoted price, before start of work..

9. **DELETED**

10. **CONSTRUCTION POWER AND WATER**

BCPL/BHEL will provide area location where contractor will have to make bore wells for arranging water and Electricity will be provided at one single point from 1500KVA (415V) power source on chargeable basis as per rates to be decided by customer, BCPL. However, backup DG set of capacity 2000 KVA to be arranged by you to take care of smooth progress of erection work during power failure. Contractor shall be responsible for arranging all necessary facilities like Site office, stores and residential accommodation, transport, electricity, water, medical facilities ,etc., at his own cost as required under various labour laws and statutory rules and regulations framed there under to the personnel employed by him.

The contractor shall submit to the BHEL engineer his electrical power requirements. Construction power shall be provided at a single point within erection site at a distance of 250 mtrs. (approx.) on chargeable basis. Further distribution shall be done by the contractor at his cost . All wiring must comply with local regulation and will be subject to the BHEL Engineer’s inspection and approval before connecting supply.

Provision of distribution of both electrical power from the central; point to the required place with proper distribution boards observing the safety rules laid down by the electrical

authorities of the state shall be done by the contractor, supplying all the materials like cables, distribution boards, switch boards, TPN, CBS, ELCBS/MCCBS/ Copper / Brass Clamps, copper conductor, change over switches pipes etc at his own cost. If any failure is caused in supply of the power and water, it is the responsibility of the contractor to make alternate arrangements at his cost. The contractor shall adjust his working sheets / hours accordingly and deploy additional manpower if necessary so as to achieve the targets within his quoted rate/ price. No idle labour payment is admissible for power supply failure.

Following points should be strictly adhered to by the contractor while drawing construction power supply from distribution board.

- All electrical installations should be as per Indian Electricity Rules.
- All distribution Boards installed by the contractor should be constructed with fire proof materials viz. Steel frames, bakelite sheets etc.
- Connection for single phase should be taken from phase and neutral. Nowhere the connection should be taken with earth as neutral .
- All electrical connection should be made through connectors , nuts and bolts, switches ,plug and sockets. Loose connections or hooking up of wires shall not be permitted.
- Contractor have to make their own earthing arrangement for their equipment / DB earthng. The earthing connections have to be done with copper conductor and copper / brass clamps with BHEL's prior permission.
- All electrical equipment / tools and plants should be properly earthed. DBs to be earthed diagonally opposite at two points.
- Contractor should use :" the MCCB and ELCBs either on incoming or outgoing connections to the DBs .
- Contractor should ensure that all the CBs / TPNs / Fuses / MCCBs/ ELCBs cables etc. should be of adequate rating / capacity.
- For permission of supply connections, contractor has to submit a test report of their installation with a single line diagram of connected / proposed loads.
- Contractor will submit a report on all electrical connected loads 7^{th} of every month.
- ELCB will be tested once in a week by actually simulating the earth leakage for all installations and the same shall be recorded by BHEL Engineer in the log book to be maintained by the contractor.
- Adequate lighting facilities such as flood lights , hand lamps and area lighting shall be arranged by the contractor at the site of construction, contractors material, storage area etc., within the finally accepted rates / price.
- On completion of works or as and when required by BHEL all the temporary buildings, structures, pipelines, cables, etc., shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, same will be got done by the BHEL Engineer and the expenses incurred shall be recovered form the contractor along with the prevailing overhead. Decision of BHEL Engineer in this regard shall be final.

11. CONSTRUCTION OF TEMPORARY OFFICE ETC

The contractor shall arrange at his own cost the construction office, stores, labour colony etc and also the watch and ward of all the above.

12. TOOLS & PLANT (To be provided by contractor)

All T&P to be provided by the contractor for successful completion of work as mentioned elsewhere in the specification. T&P used by the contractor should be tested quality. Necessary test certificates to be produced by the contractor for all the T&Ps received by him at site if desired by BHEL Engineer.

13 CONSTRUCTION SHEDULE

While submitting the offer, the contractor shall furnish the (L-2 / L-3) construction indicating all milestones on the basis of major activities indicated below :-

13.1 Covered Eqpt Stores (1st) : 4(Four) months from the date of issue of LOI

13.2 Covered Eqpt Stores (2nd) : 6(six) months from the date of issue of LOI

13.3 Area leveling & Grading works including roads & drains :

First 20000 SQM – Within 3 (three) months from the date of issue of LOI
Balance area development works : Within 10 (Ten) months from LOI in phases as directed by Construction Manager BHEL.

14. COMPLETION PERIOD

14.1 The contractor shall mobilize T&P required to start the actual work within 15 days from the date of placement of LOI.

14.2 The entire work shall be successfully completed in all respect within 10(Ten) months from the date of placement of LOI.

15. MOBILIZATION ADVANCE

No mobilization advance will be paid.

16. PRICE VARIATION CLAUSE

The item-wise rates shall remain firm throughout the execution of contract period and extension period, if any, for reasons whatsoever.

17. INTERIM PAYMENT

17.1 For all items of work as per Bill of quantities, the monthly R.A. bill payment shall be limited to 95% of the gross value of R.A. bill on item rate basis. All admissible recovery / adjustment etc. shall be made within 30 days of the receipt of correct and complete invoice by BHEL site office, accompanied by BHEL Engineer's certificate / jointly signed measurement sheet subject to its completeness and correctness in all respect. The measurement will be taken as per relevant clauses of Volume – 1B of tender document and certified by BHEL Engineer for the actual work done.

17.2 Balance 5% of gross value of bill shall be paid along with the final bill after adjusting all recoveries due from the contractor.

18. **SAFETY**

The contractor shall ensure the safety of all workmen, materials and equipment either belonging to him or to others working at site and existing unit of customer. He shall observe safety rules and codes applied by the owner / BHEL at site without exception.

Non-conformity of safety rules and safety appliances will be viewed seriously and BHEL has right to impose fines on the contractor on each incident / each non-conformity as per details given below:

SL. NO.	SAFETY REQUIREMENT	FINE (RS.)
01.	NOT WEARING SAFETY HELMET	50/- PER INCIDENCE
02.	GRINDING WITHOUT GOGGLES	50/- PER INCIDENCE
03.	NOT USING 24 V SUPPLY FOR INTERNAL WORK	500/- PER INCIDENCE
04.	ELECTRICAL PLUGS NOT USED FOR HAND MACHINES	100/- PER INCIDENCE
05.	NOT SLINGING PROPERLY	200/- PER INCIDENCE
06.	USING DAMAGED SLING	200/- PER INCIDENCE
07.	USING WELDING CABLES/ELECTRICAL WIRES HAVING LOT OF JOINTS AND NOT INSULATED WITH PROPER/STANDARD CABLE INSULATING MATERIALS	200/- PER INCIDENCE
08.	NOT WEARING HAND GLOVES	200/- PER INCIDENCE
09.	IMPROPER EARTHING OF ELECTRICAL T&P (NOT PROVIDING EARTH LEAKAGE CIRCUIT BREAKER)	200/- PER EQUIPMENT

Any other non-conformity noticed not listed above will also be fined. The decision of BHEL engineer is final on the above. The amount will be deducted from bills of the contractor. The amount collected on the above will be utilized for giving award to the employees of various contractors working at site who could avoid accidents by following safety rules and for improving the safety at site. Such award will be decided by the committee consisting of employees of contractors working within the project and be awarded in presence of BHEL representative.

19. **CHARGES FOR MISCELLANEOUS ITEMS OF WORK**

If any miscellaneous (new or additional) items of work, which are not incorporated in the BOQ schedule, but incidental to the proper execution of the job, have to be executed by the contractor, the rate of such miscellaneous item of work shall be as per the following: -

a) If the items are covered under PWD schedule, the rate shall be derived from the percentage quoted under item Sl. 102, “MISCELLANEOUS ITEMS” of BOQ

b) If the items are not covered under PWD schedule, the rate of such items shall be derived, if possible, from the available rates, agreed upon in the rate schedule of this contract.

c) If the items are not covered in above schedule [sl. no. (a) & (b)], the rates have to be mutually agreed upon mainly on the basis of prevailing market rates for which all

documentary evidences, as required by BHEL/Site Engineer shall have to be produced by the contractor. Decision of BHEL in such cases shall be final and binding on the contractor.

d) In the event of any dispute regarding acceptance of any work under the above category, the work has to be carried by the contractor and measurement to be signed jointly with remark "FOR HQ DECISION". Under no circumstances, the contractor can refuse to carry out such miscellaneous work with any pre-condition, save and except of keeping the records for the particular job for further consideration by HQ at Kolkata.

20. INSURANCE

BHEL shall arrange insurance coverage for the material and properties of BHEL/Customer covering the risks during transit, storage, erection and commissioning.

It is the entire responsibility of the contractor to insure his workmen against accident and injury while at work as required by the relevant rules and to pay compensation, if any, to their workmen as per workmen's compensation act. The contractor has also to insure his staff against accident/injury. The contractor has to take insurance cover for his tools and plants, assets etc.

These insurance covers have to be taken prior to start of his work at the subject project and he shall make available the Policy to BHEL Site in-charge for necessary verification before commencement of work. However, irrespective of such verification / acceptance, the sole responsibility to maintain adequate insurance cover for his workmen, T&P, assets etc. at all times during the period of contract shall lie with the contractor. Regarding the aforesaid insurance cover, the contractor shall directly deal with the Insurance Company for all matters regarding the insurance in his scope.

Insurance covers to be taken by BHEL is stipulated under relevant clauses of Vol – IB of this specification (G.C.C.)

21. SITE ORGANISATION

21.1 The contractor will depute a competent Engineer/Supervisor for all site operation with sufficient level of authority to take site decision. The organization chart for site should indicate the various levels of experts to be posted for supervision in the various fields as applicable. For proper supervision of the work, the vendor shall ensure providing one qualified supervisor against deployment of 15 workmen.

21.2 The contractor shall maintain a site organization of adequate strength in respect of manpower, construction machinery and other implements at all times for smooth execution of the contract. This organisation shall be reinforced from time to time, as required to make up for slippage from the schedule without any commercial implication to BHEL. The site organisation shall be headed by a competent construction manager having sufficient authority to take decisions at site.

21.3 On award of contract, the contractor shall submit to BHEL site organisation chart indicating the various levels of experts to be deployed on the job. BHEL reserves the right to reject or approve the list of personnel proposed by the Contractor. The persons, whose bio-data have been approved by BHEL, will have to be posted at site and deviations in this regard will not generally be permitted.

22. **PROGRESS REVIEW MEETINGS**

Periodic progress reviews on the entire activities of execution in respect of supply & works in scope of bidder will be held once in a month at site. Actions will be placed on the concerned agencies and decisions will be taken to expedite /speed up the progress.

23. TAXES AND DUTIES

All taxes (except Service tax including educational cess), Works contract tax under VAT act, charges, royalties, duties, octroi etc and other taxes for materials obtained for the work and for the execution of the contract shall be borne by the contractor and shall not be payable extra. Any increase of the same at any stage during execution of the contract shall have to be borne by the contractor. Quoted price of the bidder shall be inclusive of all such requirements. The contractor is liable to furnish all documentary evidences towards payment of Works Contract Tax as and when required by BHEL.

Service, tax and Educational Cess on service tax (as applicable), shall be paid extra on submission of documentary evidences to the satisfaction of BHEL. Contractor shall avail abatement available (wherever applicable) as per prevailing service tax rules. BHEL will reimburse service tax after availing abatement, wherever applicable. As such, bidder's quoted rate shall be exclusive of service tax. Any changes in service tax rules (by Government) shall be complied with.

For reimbursement of service tax following documents are to be submitted :

1. Original invoice indicating service tax separately.
2. Copy of service tax paid challan duly certified by bidders authorised signatory stating that the amount paid in the said challan includes above service tax of BHEL.

Any new tax & duties, if imposed subsequently by statutory authority during contract period (after latest date of offer submission) , shall be reimbursed by BHEL on production of relevant supporting document to the satisfaction of BHEL. However, the contractor shall obtain prior approval of BHEL in writing before depositing the new tax to authorities. No reimbursement shall be made on account of increase in rates of existing taxes, duties etc (as on date of offer submission).

24. METHOD OF MEASUREMENT

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.

25. **GENERAL**

25.1 Contractor shall provide temporary barricade all round the working area to avoid any untoward incident.

25.2 No medical facilities to be provided by BHEL at site. Contractor should arrange first aid facility with compounder at site.

25.3 Any other non-conformity noticed not listed above will also be fined. The decision of BHEL engineer is final on the above. The amount will be deducted from bills of the contractor. The amount collected on the above will be utilized for giving award to the employees of various contractors working at site who could avoid accidents by following safety rules and for improving the safety at site. Such award will be decided by the committee consisting of employees of contractors working within the project and be awarded in presence of BHEL representative.

25.4 The contractor shall be responsible for providing all necessary facilities like residential accommodation, transport, electricity, water, medical, insurance etc to the personnel engaged by the contractor for the work.

25.5 The contractor shall comply with all state and central laws, various labour laws, statutory rules and regulations etc.

25.6 The payment of wages act, minimum wages act, workman compensation act, Employers Liability act, Industrial dispute act, Employees provident fund scheme, Employees state insurance, contract labour (Regulation and abolition) act 1970, *Assam Building & other Construction Workers Act* and other acts, rules and regulation for labour as may be enacted by the Government during the tenure of the contract and having force or jurisdiction at site. The contractor shall give to the local government body police and other relevant authorities all such notices as may be required by Law.

25.7 The contractor shall make arrangement at their own cost for necessary access to the work site.

25.8 The security laws as applicable from time to time shall have to be strictly followed by the contractor.

25.9 Person below 18 years shall not be engaged / employed by the contractor.

25.10 The contractor may have to work round the clock for timely completion of work. The contractor shall not be eligible for any extra charges on this account.

25.11 No secured advance shall be paid for this contract.

SPECIFICATION FOR DUCTING & INSULATION FOR CONTROL ROOM AIR CONDITIONING SYSTEM AND SPLIT AC

PROJECT **:CAPTIVE POWER PLANT,LAPETKATA**

CUSTOMER **:BRAHMAPUTRA CRACKER AND POLYMER LIMITED (BCPL)**

CONSULTANT **:M/S ENGINEERS INDIA LIMITED, NEW DELHI**

1.0.0. INTENT OF SPECIFICATION:

The intent of this document is to establish the minimum requirement of supply, delivery FOR site properly packed for transportation and protected from weather including transit insurance of all equipments, unloading at site, transportation to stores, transportation from stores to site, erection as mentioned hereinafter for the system..

All the equipments shall be sourced from recommended vendors only as specified in the specification elsewhere. Further the supplied model /item shall be under regular manufacturing range and have proven track record.

2.0.0 SCOPE OF SUPPLY AND ERECTION:

As per sl no 18.14 A-G of the schedule of quantities (civil works)

3.0.0 CLARITY OF SCOPE IN OTHER AREAS REGARDING SPLIT ACs:

Following shall be scope demarcation wrt to other minor / major works related with electrical, civil and mechanical areas:

ELECTRICAL				
S No.	Item	By BHEL	By Vendor	Remarks
1	Power sockets for split air conditioners in Analyzer room	No	Yes	Socket to be located within 3 m from the indoor unit. Flexible Power cable from the socket to the indoor unit shall be in bidder's scope.
2.	Voltage stabilizers for split air conditioners	No	Yes	
CIVIL				
3.	Making openings in walls, providing insert angles/plates etc for pipes /cables /equipment etc., and making them good after installation for the purpose of installing vendor's supplied items	No	Yes	
MECHANICAL				
4	Support structure like structural steel, anchor bolts, brackets etc for AC units , AC piping, cabling etc	No	Yes	

4.0.0 DETAIL TECHNICAL REQUIREMENTS FOR THE AIR CONDITIONING DUCTING AND DUCT INSULATION WORK.

The Supply and erection of the entire ducting and insulation work for the Air conditioning of the control room shall be completed by the bidder as per the ducting drawing made available to them during project execution stage.

4.1.0 Applicable standards to be followed:

IS: 277 - Galvanized steel sheet
IS: 655 - Metal air ducts
IS: 8183 – Bonded Mineral wool

4.2.0

a. All ducts shall be made of galvanized steel sheets conforming to IS – 277 Grade-120
b. Ducts shall be designed, fabricated and flanged as per IS-655.
c. Duct shall be preferably machine made to improve the quality of ducts.
d. All flanges joins shall have 6mm thick Neoprene packing as gasket struck to the flanges with adhesive (viz. Resins like araldite or equivalent),
e. All the duct shall be made air tight with the help of sealant (Foster 32:17 or MIRACLE D 617 or equivalent).
f. Duct hanger shall be supported with anchor faster in the roof. All the hangers and anchor fasteners shall be provided by the bidder.
g. The ductwork shall be complete with all the required hangers, supports, flanges , stiffeners, sealant, packing etc
h. Complete insulation work shall be as per annexure -1
i. Addional ducting details

I. Joints

All longitudinal joints for the ducts will be Pittsburgh Lockseam Type.

Transverse joints for the low pressure ducting shall be continuous around the four sides, the corner closures, are required. The type of transverse joints shall be as per Table-1 furnished below.
The low-pressure ducting work shall be provided with intermediate transverse bracings continuous around the four sides between the joints as per Table-1 furnished below

TABLE - I

THICKNESS OF SHEET AND TYPE OF TRANSVERSE JOINT FOR RECTANGULAR DUCT CONSTRUCTION

Max. side Mm	Type of transverse joint connection	Bracing
Upto 300	S-drive, pocket or bar slips, on 2.5 m centres	None
301 to 600 601 to 750	S-drive, pocket or bar slips, on 2.5 m centres	None

	S-drive, 25 mm pocket or 25 mm bar slip on 2.5 m centers	25X25X3 mm angels, 1.2 mm from joint 25X25X3 mm
	Drive, 25 mm pocket or 25 mm bar sliip on 2.5 m centers	Angles, 1.2 m from joint 40 X 40 X 3 mm from joint
751 to 1000 1001 to 1500	40X40 mm angles connection, or 40 mm pocket or 40 mm bar slips, with 35X3 mm bar reinforcing on 2.5 m centers.	
1501 to 2250	40X40 mm angles connection, or 40 mm pocket or 40 mm bar slips, 1m max center with 35 X 3mm bar reinforcing	40X40X3mm diagonal angles or 40X40X3 mm angles, 60 cm from joint
2251 and above	40X40 mm angles connection, or 40 mm pocket or 40 mm bar slips, 1m max center with 35 X 3mm bar reinforcing	40X40X3mm diagonal angles or 40X40X3 mm angles, 60 cm from joint

.

Ducts 2250 mm and larger require special field study for hanging and supporting methods.

II. Riveting and Sealing

All joints, slips and seams shall be made secure by riveting on centres not exceeding 150 mm. All transverse stiffeners and all reinforced bar slip joints shall cross at corners and be riveted.

All construction joints and duct seams shall be reasonably sealed with bitumastic cold emulsion or equivalent vapour seal.

III. Construction of Ducts

Rectangular ducts shall be constructed by breaking the corners and grooving the longitudinal seam.

The type of slips and transverse connections for various sizes of rectangular ducts shall be chosen from those indicated in Col.3 of Table-I.Bracing shall be as indicated in Col.4 of Table - I.

Simple elbows and transformation sections shall be formed with pittsburgh corner seams; complicated fittings such as double compounded elbows shall be constructed with double seam corners.

End slips may be used in place of S-slips if found essential. Where drive slips are used, the end slips may be applied on the narrow side of the duct and the drive slips on only the maximum side.

Ducts of size 600 mm and over shall be reinforced between the joints but not necessarily at the joints. Where drive slips are used the angles shall be riveted to the duct about 50 mm from the slips.

IV. Hangers and Supports

All duct work shall be provided with adequate hangers or supports to ensure rigid support and to prevent vibration. Spacing of duct supports shall not exceed 2 m centres.

Hangers shall be suspended from the building steel with provision for necessary auxiliaries, or special steel members, or by hook fixed to the embedded plates provided in the ceiling. In the absence of embedded plates, anchor fasteners shall be used for supporting the ducts.

Hangers for all ducts shall be trapeze type with the shelf constructed from 35mm x 35mm x 5mm angle iron and hung by two steel rods each of not less than 10mm dia for ducts, with larger side less than 2250 mm while for those greater than 2250 mm shall be with 50 x 50 x 5 angles and rods not less than 15 mm dia.

5.0.0 LIST OF SUB-VENDORS:

A. Applicable makes for the Galvanized Steel sheet
- Jindal
- Tata
- Sail

B. Applicable makes for the thermal insulation
- Llyods
- Metthur Beardsell
- U.P.Twiga

C. Applicable makes for SPLIT AC
- Voltas
- Bluestar
- Fedders Lloyd
- Carrier
- Hitachi

D. DUCTING & INSULATION WORK
- The agency engaged for the ducting and erection work shall be a well qualified one, with relevant experience of carrying out AC ducting and insulation work of similar scale.

E. Bidder to note that only approved makes of items listed at 5.0.0 is to be considered.

6.0.0 Packing and forwarding:

6.0.1 Prior to shipment all items shall be cleaned properly. All surfaces shall be protected by coating with easily removable rust preventive. All the equipments /items shall be properly packed to prevent damage during transit, loading, unloading and storage due to vibration, physical contact, moisture ingress, rainwater and pilferage.

7.0.0 LIST OF ANNEXURE:

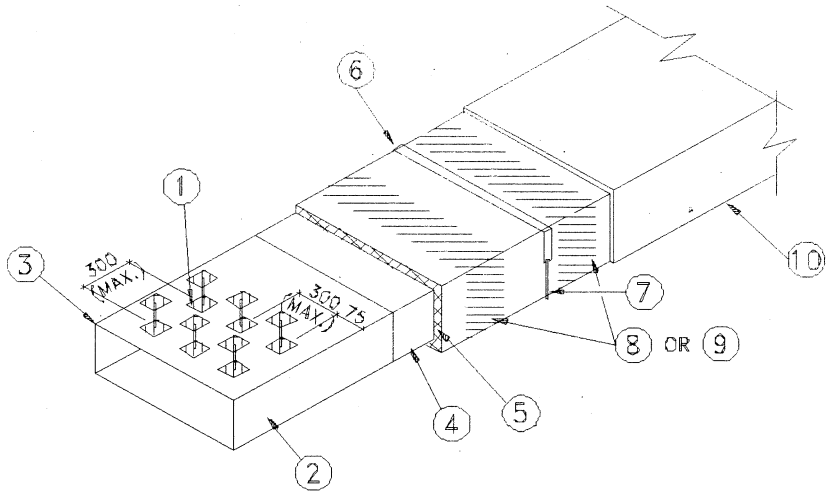
1. Duct Insulation details

RECORD OF REVISIONS

Rev. No.	Date	Revision Details	Revised By	Approved By
00	21.08.10	Original issue	-sd-	-sd-
01	01.09.10	Generally Revised	-sd-	-sd-

Ref

DUCT INSULATION



1) SELF ADHESIVE FIXING PINS WITH SELF-LOCKING WASHER
2) GSS DUCT
3) DUCT SEALENT ON DUCT JOINTS, FOSTER 32:17 OR MIRACLE D617 OR EQUIVALENT
4) ADHESIVE, FOSTER 81:10 EQUIVALENT ON ENTIRE DUCT SURFACE
5) FACTORY LAMINATED ALUMINIUM FOIL FACED FIBRE GLASS INSULATION MATERIAL WITH JOINTS STAGGERED AND TIGHTLY PRESSED TOGETHER WITH ADHESIVE
6) SELF ADHESIVE ALUMINIUM TAPE (75 MM WIDE) FOR SEALING OF INSULATION JOINTS
7) INSULATION JOINT
8) VAPOUR BARRIER TREATMENT FOR INTERNAL DUCTING :
   i) APPLY TACK COAT OF FOSTER 30:80 OR 30:36 OR EQUIVALENT
   ii) EMBED INTO THE WET TACK COAT, OPEN WOVEN GLASS CLOTH AVOIDING WRINKLES
   iii) APPLY FINISH COAT OF FOSTER 30:80 OR 30:36 OR EQUIVALENT WITHIN HALF AN HOUR OF TACK COAT.
9) VAPOUR BARRIER TREATMENT FOR EXTERNAL DUCTING :
   i) APPLY TACK COAT OF FOSTER 60:80 OR EQUIVALENT
   ii) EMBED INTO THE WET TACK COAT, OPEN WOVEN GLASS CLOTH AVOIDING WRINKLES
   iii) APPLY FINISH COAT OF FOSTER 60:96 WITHIN TWO HOURS OF TACK COAT.
10) MECHANICAL PROTECTION FOR INSULATION OF EXTERNAL DUCTING AND INTERNAL DUCTING EXPOSED TO VIEW - 0.63 MM THICK G.S.SHEET CLADDING.

NOTE:-
ALL ADHESIVES AND SEALANTS SHALL BE ASBESTOS - FREE AND NON-INFLAMMABLE.

TECHNICAL SPECIFICATION

FOR

PASSENGER ELEVATOR

PROJECT	**CAPTIVE POWER PLANT,LEPETKATA**
CUSTOMER	**M/S BRAHMAPUTRA CRACKER AND POLYMER LIMITED**
CONSULTANTS	**M/S ENGINEERS INDIA LIMITED, NEW DELHI**

1.0 Intent:

This specification is intended to cover design, manufacture, assembly, inspection, shop testing, delivery, erection , commissioning and testing at site of Freight cum Passenger Elevator complete with all accessories as required and as specified here after.

This specification shall be read in conjunction with its enclosures. In case of any discrepancy arising between this specification & its enclosures, the most stringent of all shall be followed and shall relevantly over-ride others. Further, if a requirement in this specification or its enclosures, calls for decision of owner/BHEL, it shall be bidder's sole responsibility to clearly bring out the same distinctively in his technical tender offer, so as to enable owner/BHEL to furnish their decision. If such a requirement is not duly addressed by bidder during tender stage and same comes out during order execution stage, it shall be binding on the bidder to comply with the decision furnished by owner/BHEL then, without any cost, delivery, or any other commercial implications.

Any additional equipment, material, etc., which are not specifically mentioned here, but are required to make the supplied equipment complete in all respect, in accordance with the intent of this technical specification, contractual agreement, statutory requirements,
relevant/applicable codes/standards, good engineering practices, and for safe and trouble-free operation, shall be deemed to be covered under the scope of this specification.

2.0 Applicable Codes and Standards: -

Latest revision of all standards listed below shall be followed for design, manufacture, testing, erection and commissioning:

IS 2365 : Specification for Steel Wire Suspension Ropes for Lifts, Elevators and Hoists

IS 4666: Electric passenger and goods lifts

IS 3534: Out line dimensions of electric lifts

IS 11706: General requirements for car frame for electric Passenger and good Lifts

IS 11615: Car & Counter weight guide shoes for Electric Passenger and good Lifts

IS 10191: Car and counter weight guide rails, guide rail supports and Fastenings for lifts

IS 7759: Lift door locking devices and contacts

IS 11633: Lift doors

IS 8151: Single speed three phase induction motors for driving lifts

IS 1860: Code of practice for installation, operation and maintenance of electric passenger and good lifts

IS 10913: Brakes for electric passenger and good lifts

IS 9803: Buffers for electric passenger and good lifts

IS 8216: 1976 Guide for inspection of lift wire ropes

IS 6383: Electric service lifts

IS 9878: Safety gears and governors for electric passenger and goods lifts
IS 10448: Retiring cam for electric passenger and goods lifts
IS 4289 (part 1): Flexible cables for lifts and other flexible connections part 1 Elastomer insulated cables

Any other codes / standards / safety procedures not listed above, but required to be followed, for supplying the unit as defined in this specification, shall be complied with by the vendor.

3.0 Scope of work: -

The Vendor's scope of supply of elevator under this specification will include but not limited to the following, so as to make the Elevator package complete in all respects & for its safe, satisfactory & long trouble free performance at site. Suitable chain pulley block to lift the traction motor shall also be part of scope of lift vendor.

All the necessary further civil works required for installation of lift and connecting the elevator entrance to approach, from the corridors shall be part of the lift vendor's scope. The following is the brief scope of civil works to be carried to convert the lift well suitably.

1. Minor building works such as scaffolding, half brick wall construction, plastering, reinforced concrete slabs placing & plastering, wooden template making, cutting of walls/floor and finishing of control board and speed governors, cutting and making pockets on the brick wall and fixing and finishing of angle brackets, fixing of switch box,etc.

2. Transportation of elevator from vendor works to site, unloading, storage at site, erection, commissioning of the complete unit and checking of the various safety aspects. Performance Test of the complete unit as per applicable codes & standards, finish painting & hand over the unit to the customer.

3. Supply of Spares as mentioned in Clause 9.0 of this specification.

4.0 Technical Requirement:

All the technical requirement listed shall be in line with design Codes and standard mentioned above. In case of contradiction between any two standards, the most stringent to be followed.

4.1 Wire Rope

The car and counter weight shall be suspended by steel wire ropes. The number of wire ropes and sire of wire rope shall be so chosen that highest factor of safety Is achieved as per standard. Not less than three independent suspension ropes shall be used. The minimum diameter of rope shall be 12mm and factor of safety 12.

4.2 Car

4.2. 1. Car Frame

1. Every Lift car shall be carried in a complete frame of steel which shall be sufficiently rigid to withstand the operation of the safety gear without permanent deformation to the car frame. The car structure shall be MS finish with power coated finish.
2. At least four renewable guide shoes with renewable linings or set of roller guides shall be provided, two at the top and two at the bottom of the car frame.

4.2. 2. Car enclosure

1. The car shall be enclosed on all sides by means of car body and door. The sides of the car –shall be lined with heavy gauge steel sheet plate properly braced and reinforced.
2. The enclosure shall be flush on the inside and securely fastened to the platform. The car body floor shall be of M.S steel construction.
3. The car shall be equipped with handrails on three sides, fan with grills and suitable lighting with fittings. The light shall be left on during the all time of use.
4. Necessary provisions shall be made for adequate ventilation of the car. Ventilation opening shall be provided in the enclosure roof as per requirement of IS: 14665 (Part *3/Sec* 1 *f* 2)-2000. The controls for light and fan inside the car shall be automatic.
5. The enclosure of the lift car shall withstand a thrust of **35 kgs** applied normally at any point, excepting any vision panel, without permanent deformation,

4.2. 3. Car platform

1. Car platform shall be constructed of structural steel shapes or securely fastened with steel flooring covered with **anti skid PVC tiles** flooring. The platform shall be designed on the basis of rated loads evenly distributed. The car floor shall comprise a smooth non-slip surface.
2. Since the car leveling device will be used, subsequent aprons of sufficient depth shall be fitted to the car floor to ensure that no space is permitted between the threshold and the landing while the car is being leveled to a floor.

4.2. 4. Car roof

1. Car roof shall be covered with sheet metal to prevent dripping of lubricants from ropes-sheave bearings. The top flooring shall be of steel with decorative false ceiling. A three pin plug socket with a switch for head lamp shall be fitted on the top of the car for use during maintenance. The roof shall be strong enough to support at least two persons.
2. Provision for slow speed (1/2 of rated speed) operation from car top in up and down directions in Independent mode shall be made to facilitate maintenance of devices in the hoist way. Necessary fittings shall be provided for this purpose.

3. Difference in levels of the car floor and landing shall not exceed the figures indicated in IS -14665 (Para 3/Sec 1 & 2)-2000 under heading 'Leveling Accuracy ",
4. Suitable lubrication system shall be provided for guide rails as well as for other items.

4.2. 5. Car Door

1. Center opening automatic doors made of mild steel panels with power coated finish at car as well as at landing shall be provided. Necessary fixtures and all associated materials for installation shall be in the scope of vendor..
2. Car door shall have a clear opening of 1200 rnm wide X 2200 rnrn high. The door operation shall be automatic with each door being 600mm(wide) x 2200mm (High).

4.2. 6. Hoist Way Door

1. Automatic type doors having a clear opening of 1200 mm wide x 2200 mm high shall be provided at each of the landing for elevator door .
2. Architrave fixation in each floor shall also be in bidders scope. BHEL to provide only clear opening of 1200mm x 2200mm to each floor.
3. BHEL will provide Pockets for panel fixation along each floor . Panel fixation shall be in bidders scope.

4.2. 7. Door Hangers and Tracks

1. Hangers and tracks for car door and each having a clear hoist way door shall be provided. Suitable material shall be used to minimize the noise. Ball bearing rollers or equivalent arrangement shall be provided to take upward thrust of the doors. Suitable devices shall be provided for transmitting from one door panel to the other.
2. All requires material for landing entrance e.g. extruded aluminum or equipment sills, struct angles, headers etc. shall be provided.

4.2. 8. Door operation for car Door and Hoist way doors

1. The doors operations shall be automatic with Infrared screen protection.

4.2. 9. Car Position Indicator in Car

A signal indication shall be provided by the appropriate numeral (which shall be floor no./ levet of respective floor) being illuminated when the car Is passing the corresponding floor. The Indication shall remain illuminated when the car is stopped at a floor. Up & Down direction jewel lights shall also be provided. The car position indicators are needed to *be* provided at all landings.

4.3 Push Button Station and Call- Registered Tell-tale Lights at Hoist way

A single 'Up" and "Down" push button at terminal landings and 'Up" "Down' each push Intermediate landing including call register light for each push button shall be provided. These shall remain illuminated until the call is answered.

4.4 Emergency exit

The elevator car shall be provided with an emergency exit of adequate dimension**.**

4.5 Terminal Buffers

The terminal buffers shall be provided for stopping the car and the counter weight at the extreme ends of travel. All structural steel members required to install the buffers and minor civil works shall be in the scope of vendor.

4.6 Counter-Weights and Counter-weight Frames

Counter weight sections shall be mounted on structural metal frames so designed to retain the weights securely in its place. Counter -weight frame shall be guided on each guide rail by upper and Lower guiding members attached to the frame. A substantial metal counter- guard of required length shall be provided at the bottom of the hoist way. A compensating chain of adequate strength connecting car bottom and counter weight frame shall be provided for balancing the car and counter- weight while running with minimum load condition.

4.7 Guides for Car and Counter- weight

Car and counter- weight guides shall be of rigid steel and shall be continuous throughout the entire length and shall be provided with adequate steel bracings and stiffeners. Guide for both car and counter weight shall meet the requirement of IS: 4666-1980. The necessary lubrication device for guide rail shall be provided.

4.8 Car Self-Leveling Device

The elevator shall be equipped with automatic self-leveling devices to bring the car to the floor landings. These self leveling shall be correct for over travel or under-travel and rope stretch.

4.9 Control and operation

1. The elevator control i.e. the system governing starting or stopping the elevator machine, determine the direction of the travel, regulating the rate of travel, regulating the rate of acceleration and deceleration and controlling running speed of the moving member shall be through 3 phase speed squirrel cage induction motor. *The* AC drive motor for the elevator shall accelerate or decelerate the elevator according to requirement. Reversal in direction of movement of the elevator shall be achieved by reversing the motor 3phase supply.
2. The operation of the elevator i.e. method of actuating the control shall be “Selective Collective Automatic Operation" as per clause 3.41.3 of IS 14665 (Part2/Sec1) : 2000 with and without attendant. All accessories required for the "collective operation as outlined therein, namely selector and its driving shall be furnished complete**.**

The controller shall be microprocessor based.

4.10 Terminal Limit Switches and Final Limit Switches

Terminal limit switches for normal operation shall be provided to slow –down and stop the car automatically at terminal landings and final limit switches shall be provided to automatically cut off the power and apply the brake, when the car travels beyond the terminal landing.

5.0 Inspection and Testing

The elevator after erection shall be tested as follow:

a) Load test with 100% and 110% of rated load as per IS: 14665 - 2000.

b) A static load test with 125% of rated load as per IS: 14865 - 2000 to check that the brake will sustain the car,

c) All other tests on electrical system as mentioned in IS: 14665 - 2000.

d) Any other test felt necessary by Owner and supplier to ensure proper functioning and installation of the lift.

e) Demonstration of the functioning of all safety provisions made available in the elevator. The vendor shall arrange for weights, slings, wire ropes, stop watches and other necessary equipments instrument to carryout the test.

All Inspection and testing requirements shall be listed in the Quality Assurance plans and all system testing procedures both at shop and at field shall be detailed in "Test Procedure Documents" and submitted to BHEL. These documents shall also referred to appropriately in the Quality Assurance Plans.

6.0 Quality Control

Vendor shall strictly follow the Quality control procedures in all aspects of material selection, design, manufacturing, testing, erection & commissioning, etc. **"Shop quality Assurance"** plan (QAP) & **"Field Quality Assurance Plan"** (FQAP) accordingly to be made. It shall enlist the inspections & tests to be carried out at each stage. These plans are subject to review and approval by BHEL / BHEL's Customer.

7.0 Name plate

The appropriate nameplate shall be put on the Traction Machine and on the car, noting the Technical Parameters / safe loads /safety notices, notices, etc - as applicable. Details of name plate shall be mentioned as a check point in QAP

8.0 Special Tools & Tackles

All special Tools A tackles shall be supplied, if applicable, for maintenance of the system. These items must be enlisted in the BOM and packed separately

9.0 Spares & Consumables

1. Vendor shall supply all the required spares for "Erection & commissioning" of the system. A list shall be furnished in the offer. They are part of the main equipment supply and hence no separate price shall be quoted. In the even of left over of these spares after erection and commissioning, the same shall be handed over to the customer. O&M spares shall be furnished, as required for

two years of trouble free operation and maintenance of the system and shall be quoted with a separate price list

2. Vendor shall supply all the consumables required for site activities and quantity sufficient for six months operation. A list shall be furnished along with the technical offer.

10.0 Packing

All the items shall be properly packed (indicating packing Box no.) after all the inspection and tests are carried out. The packing shall be suitable for standard transport facility and shall be so designed that the items are not damaged and remain safe during their transportation, handling and storing. All the items shall be thoroughly cleaned, appropriately painted (wherever applicable) before packing.

11.0 Services

Vendor shall quote for erection and commissioning of the total system at site.

Separate price to be indicated for this work.

12.0 Vendor Responsibility

Approval / Review of the documents submitted to BHEL shall not relieve the vendor from its responsibilities of supplying the equipment as per applicable standard / specification / codes and regulations in force and the supplied item shall perform satisfactorily as per BHEL's specification and meet their intended use. Vendor has to ensure smooth operational and meet the intended performance of the supplied equipment.

13.0 Documents

13.1. Vendor shall submit the following documents during tendering and for executing the project without which offer will be summarily rejected

13.2. All Drawings and Documents shall be computerised. Catalogues shall be scanned for soft copy. The no of drawing to be submitted is as mentioned in the above table.

13.3. The Vendor has to submit 2 CD's with all drawings and documentation as part of final submission to the purchaser.

Note: Manually prepared drawings are not acceptable.

		With Offer	After Placement of Order		
Sl.No	**Docs/Drawings**	**For Information**	**For Approval**	**For Information**	**As final**
01.	Dimensional G.A Drawing With all technical detail and catalogue	**2**	**3**		
02.	Catalogue of all sub systems with all technical parameters	**2**			
03.	BOM of main and sub systems and various other items of the unit		**2**		**8**
04.	Electrical and control system drawings and circuit diagrams	**2**	**2**		**8**
05	List of consumables			**2**	**8**
06	Data Sheets		**3**		**8**
07	Write up Control System	**2**			**8**
08	QAP and FQAP	**3**	**3**		
09	Site erection, commissioning and testing procedures		**3**		
10	Shop testing procedure	**2**	**3**		
11	O&M Manual	One month before start of site work		**1**	**10**
12	Spares	**2**	**2**		**8**
13	Deviation List	**2**			
14	As Built Drgs				**10**

14.0 Price format:

Sl.No	Item Description	Price in Rs
1.0	Design, manufacture, inspection, supply at site, storage, commissioning spares and handling at site of 1 No passenger Elevator for Switchgear building	
2.0	Assembly, erection, testing and commissioning and performance testing of 1 No passenger Elevator for Switchgear building	
3.0	Optional price for Supply of O&M spares for 1 No passenger Elevator for Switchgear building	

15.0 Description table for Passenger Elevator

Sl no	DESCRIPTION	
1.	Passenger Elevator	One Nos
2.	Capacity	16PERSONS/ 1088Kgs
3.	Lift Well Size	3.0mx2.5m
4.	Pit depth	2.0m
5.	No of Floors	3
6.	Total Travel	17.0m GF(+)100.0m, FF(+)104.5m, SF(+)111.35m, Roof(+)117.0m
7.	Machine room Size	3.5mx3.5mx2.5m, refer Fig-1
8.	Machine Room Location	Roof Top
9.	Location of Passenger Elevator	Refer Annex-9
10.	Area Classification	Non- Hazardous Area, Weather Proof
11.	Make Suggestion	1. Thyssenkrupp Elevators 2. Omega Elevators 3. Johnson Lifts 4. Kone Elevators 5. ECE Elevators 6. OTIS Elevators

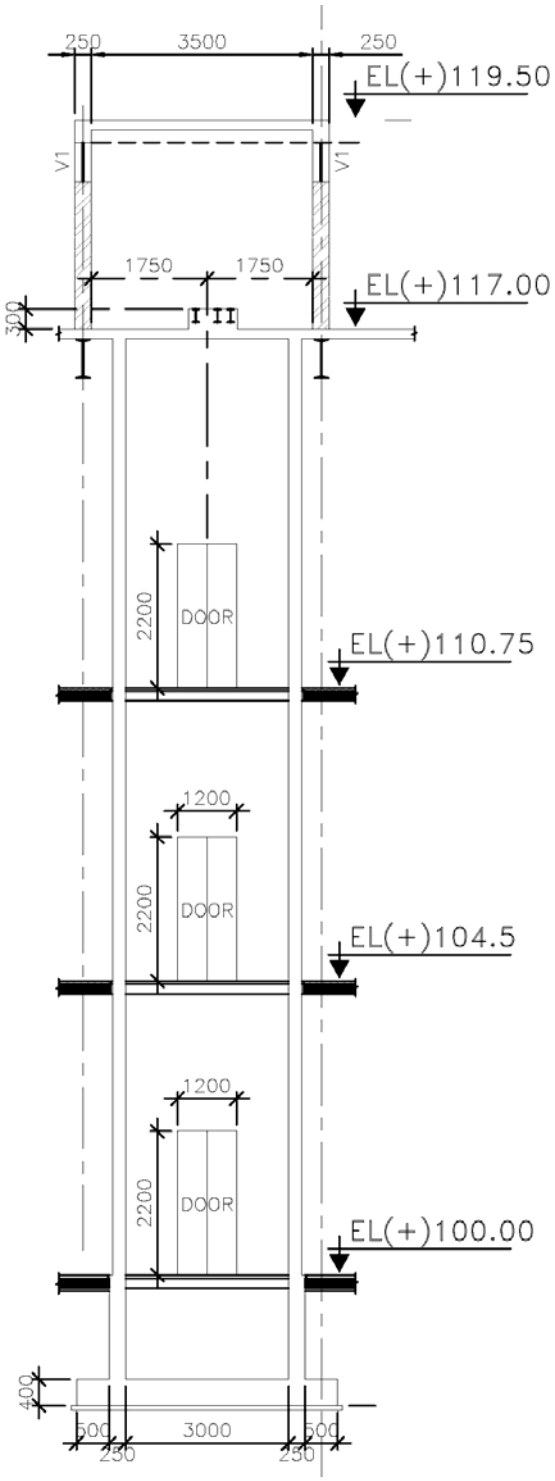


Fig-1

Ref. Doc

(i) RECORD OF REVISIONS

Rev. No.	Date	Revision Details	Revised By	Approved By
00	21.08.10	FIRST ISSUE	Pallabi Bhar	K.Srinivas
01	27.08.10	Generally Revised	Pallabi Bhar	K.Srinivas

Ref. Doc

Interface Document for Elevators (for Information ONLY)			
Project-BCPL			
		CIVIL CONTRACTOR	ELEVATOR BIDDER
General Civil			
1	Elevator Shaft	✓	
2	Scaffoldings in Elevator Shaft		✓
3	Pocket Cutting	✓	Bidder to provide input drawing for the same
4	Grouting and Packing		✓
5	Buffer Block Construction	Pedestals in Civil CONTRACTOR to provide	All other Work to be included in Elevator Bidders
6	Front Wall	✓	
7	Flooring	✓	
8	Architrave		Architrave in Bidders to provide along with Lift panel fixing at each landing.
9	Lockable Covered Storage Space (50m2)	Covered storage Space is limited at site, Vendor to make his own arrangements	
10	All statutory Licenses, fees and approvals required for erection and operation shall be bidders scope		✓
11	Shaft Reduction Channel(if required)		✓
12	Pit flooring	✓	
13	Pit Ladder		✓
Electrical			
14	Machine room Lighting	✓	
15	Shaft Lighting	CONTRACTOR will terminate 3pts at equal distance along the Hoist way	All other Work including lighting of shaft shall be included in Bidders responsibility
16	Power Supply	CONTRACTOR will terminate one 3phase supply and one single phase supply in Machine room terminating with ELCB, and One single phase supply at each landings	
Machine Room			
17	Machine Room Construction	as per IS-14665(Part 2/Sec 1): 2000	
18	Machine room Ventilation	✓	
19	Fire Extinguisher in Machine Room	✓	
20	Trap Doors in Machine Room	✓	
21	" I " Section Beam In Machine Room	✓	
22	Chain Pulley Block in Machine Room		✓
23	Rope Pocket Holes in Machine Room		To be marked by vendor before Flooring

Note:1. This interface document is provided with an intent to help civil contractor

Prepared By- Pallabi Bhar
Date- 09.05.09

Approved By- K. Srinivas
Date-09.05.09

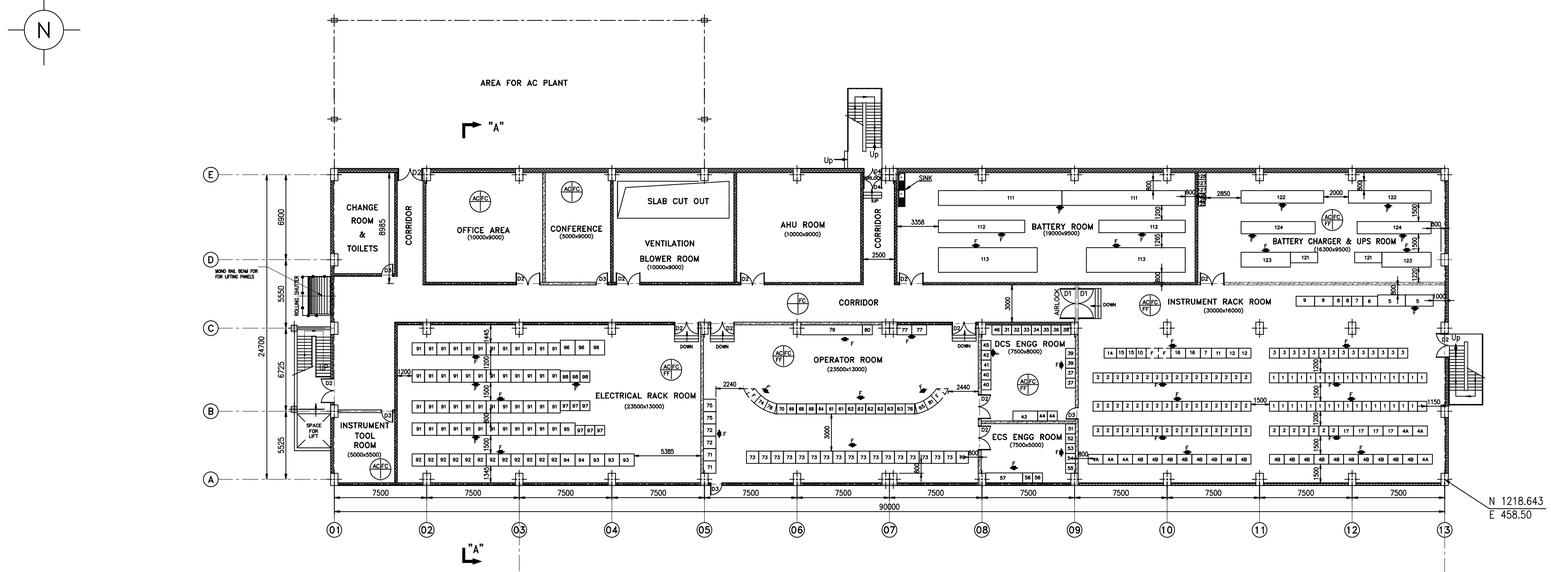
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

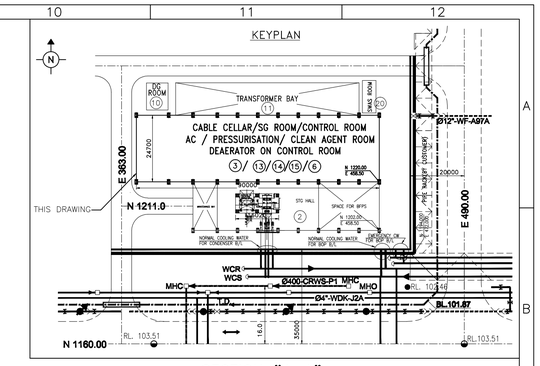
DRG. NO. 1-381-21-02444

SHT. 01 OF 01

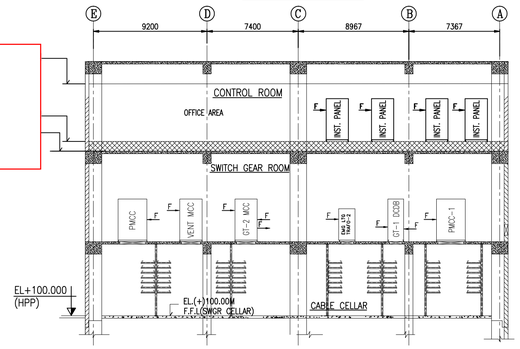
PLANT NORTH



CONTROL ROOM PLAN



SECTION "A-A"



NOTES:-

1. ALL DIMENSIONS ARE IN MM.
2. PANEL DIMENSIONS ARE TENTATIVE ONLY. FINAL DIMENSIONS WILL BE SPECIFIED AFTER ORDERING OF THE PANELS.
3. ALL CONTROL ROOM PANELS OUTSIDE COLOUR: RAL-7032 PANEL INSIDE COLOUR: BRILLIANT WHITE,
4. CLEAR HEIGHT OF THE BUILDING IS 3M.
5. CABLE ENTRY THROUGH WALL CUTOUT SHALL ENTER AT FALSE FLOORING ONLY.
6. CABLE ENTRY FOR ALL PANELS SHALL BE FROM BOTTOM.
7. PLEASE REFER CIVIL DRAWINGS FOR BUILDING ARCHITECTURAL DETAILS AND FLOORING DETAILS.
8. THIS DRAWING IS ONLY SHOWING THE LAYOUT OF VARIOUS CONTROL PANELS.
9. FF - FALSE FLOORING
   FC - FALSE CEILING
   AC - AIR CONDITIONING
10. D1 - DOUBLE DOOR SIZE 2.5 m (width)
    D2 - DOUBLE DOOR SIZE 2 m (width)
    D3 - SINGLE DOOR SIZE 1 m (width)
    D4 - DOUBLE DOOR SIZE 1.5 m (width)
11. F INDICATES PANEL FRONT VIEW.

LEGEND

BRICK WALL

ALUMINIUM GLAZED GLASS PARTITION

REFERENCE DRAWINGS:-

1. 0-381-21-02072 - Switch Gear Room layout
2. 0-381-01-01107-R01 - Plot Plan

INSTRUMENT RACK ROOM

SNo.	DESCRIPTION	QTY	DIMENSIONS (WxDxH) in mm	SCOPE
1	DCS Panels	34	800x800x2415	BHEL-EDN
2	BOP PLC Panels	55	800x800x2100	BHEL-HYD(PEDI)
3	HRSG BMS PLC Panels	12	800x800x2100	BHEL-TRICHY(HRSG)
4A	UB BMS PLC Panels(System Cabinet)	3	1200x800x2100	BHEL-TRY (UB)
4B	UB BMS PLC Panels(Marshalling Cabinet)	9	1200x800x2100	BHEL-TRY (UB)
5	Mark-VI panel	2	2257x910x2400	BHEL-EDN
6	HMS panel	1	1200x800x2415	BHEL-EDN
7	Master clock	1	900x800x2415	BHEL-EDN
8	DCS HMI network panel	2	750x800x2355	BHEL-EDN
9	DCS PDB	2	1500x800x2200	BHEL-EDN
10	CCTV PANEL	1	800x800x2355	BHEL-HYD (PEDI)
11	Plant communication system	1	1200x800x1107	EIL/BCPL
12	BOP VMS panels	2	1000x800x2200	BHEL-HYD (PEDI)
13	future	2	1000x800x2200	
14	Aux. cabinet for GBC	1	1000x800x2200	BHEL-HYD (T&C)
15	VFD panels-1 for Vanadium Inhibition	2	800x800x2100	BHEL-HYD (PEDM)
16	UB Flame Scanner	2	1200x800x2415	BHEL-TRY (UB)
17	UB BMS PLC PDB Cabinet	2	1200x800x2200	BHEL-TRY (UB)

DCS ENGG ROOM

SNo.	DESCRIPTION	QTY	DIMENSIONS (WxDxH) in mm	SCOPE
31	HMS PC	1	800x800x1200	BHEL-EDN
32	DCS Engg station	1	800x800x1200	BHEL-EDN
33	UB BMS PLC Engg station	1	800x800x1200	BHEL-TRY(UB)
34	HRSG BMS PLC Engg station	1	800x800x1200	BHEL-TRY(HRSG)
35	BOP PLC Engg station	1	800x800x1200	BHEL-HYD (PEDI)
36	Historian PC	1	800x800x1200	BHEL-EDN
37	OPC server	2	800x800x1200	BHEL-EDN
38	Max link station	1	800x800x1200	BHEL-EDN
39	GT BNC HMI	2	800x800x1200	BHEL-HYD (GT)
40	Mark-Vie Engg station	2	800x800x1200	BHEL-EDN
41	UB BMS SOE station	1	800x800x1200	BHEL-TRY(UB)
42	UB BMS Engg Server station	1	800x800x1200	BHEL-TRY(UB)
43	Space for Printers	1	2000x800x1200	BHEL-EDN
44	Space for UB Printers	2	800x800x1200	BHEL-TRY(UB)
45	HRSG BMS SOE station	1	800x800x1200	BHEL-TRY(HRSG)
46	BOP SOE station	1	800x800x1200	BHEL-HYD (PEDI)

ECS ENGG ROOM

SNo.	DESCRIPTION	QTY	DIMENSIONS (WxDxH) in mm	SCOPE
51	ECS Engg station	1	800x800x1200	BHEL-HYD (PEDE)
52	Screen Copier	1	800x800x1200	BHEL-HYD (PEDE)
53	Network Disturbance Analyser System	1	800x800x1200	BHEL-HYD (PEDE)
54	ECS OPC Server	1	800x800x1200	BHEL-HYD (PEDE)
55	ECS Data Logger	1	800x800x1200	BHEL-HYD (PEDE)
56	EWS For Data Concentrator	2	800x800x1200	BHEL-HYD (PEDE)
57	Space For Printers	1	3000x800x1200	BHEL-HYD (PEDE)

ELECTRICAL RACK & SCADA ROOM

SNo.	DESCRIPTION	QTY	DIMENSIONS (WxDxH) in mm	SCOPE
91	ECS marshalling panel	48	1000x1000x2200	BHEL-HYD (PEDE)
92	ECS RTU panel	12	1000x1000x2200	BHEL-HYD (PEDE)
93	ECS Auto Synchroniser Panel	3	1200x1000x2000	BHEL-HYD (PEDE)
94	ECS ACDB	2	1200x1000x2200	BHEL-HYD (PEDE)
95	ECS DCDB	1	1200x1000x2200	BHEL-HYD (PEDE)
96	DAVR panels	3	1200x1200x2315	BHEL-EDN
97	Generator relay panel	6	800x800x2400	EM ENGG
98	RTCC panels for OLTC	3	800x915x2324	BHEL-HYD (PEDE)

UPS ROOM

SNo.	DESCRIPTION	QTY	DIMENSIONS (WxDxH) in mm	SCOPE
121	125V DC Battery charger	2	2200x850x2000	BHEL-HYD (GT)
122	UPS Panels	2	7000x1000x2415	BHEL-HYD (PEDI)
123	UPS ACDB	2	4000x1200x2415	BHEL-HYD (PEDE)
124	220V DC Battery charger	2	6000x1000x2000	BHEL-HYD (PEDE)
125	220V DC Battery Fuse Box	2	600x350x800	BHEL-HYD (PEDE)
126	125V DC Battery Fuse Box	1	600x350x800	BHEL-HYD (GT)
127	220V Cell Booster	2	650x550x1000	BHEL-HYD (PEDE)
128	125V Cell Booster	1	650x550x1000	BHEL-HYD (GT)

OPERATING ROOM

SNo.	DESCRIPTION	QTY	DIMENSIONS (WxDxH) in mm	SCOPE
61	DCS OWS for UB-1,2	2	800x825X900	BHEL-EDN
62	DCS OWS for BOP	4	800x825X900	BHEL-EDN
63	DCS OWS for HRSG-1,2	2	800x825X900	BHEL-EDN
64	DCS OWS for STG-1	2	800x825X900	BHEL-EDN
65	UB BMS OWS	1	800x825X900	BHEL-TRY(UB)
66	FUTURE	1	800x825X900	
67	FUTURE	1	800x825X900	
68	Mark-Vie OWS	2	800x825X900	BHEL-EDN
69	6.6KV Data concentrator OWS	1	800x825X900	BHEL-HYD (PEDE)
70	LT Data concentrator OWS	1	800x825X900	BHEL-HYD (PEDE)
71	GT Aux panel	2	1000x1000x2200	BHEL-HYD (GT)
72	CO2 Fire fighting panel(GT-1&2)	2	1000x1000x2200	BHEL-HYD (GT)
73	SCAP	20	1000x1000x2200	BHEL-HYD (PEDE)
74	BOP Hardwired console	1	800x825X900	BHEL-EDN
75	Gas detection panel	1	1000x800x2200	BHEL-HYD (PEDM)
76	Master call station	2	800x825X900	EIL/BCPL
77	SCAP synchronisation trolly	1	1200x800x2000	BHEL-HYD (PEDE)
78	BOP Fire fighting panel	1	1000x1000x2200	BHEL-HYD (PEDM)
79	Space For Printers	1	5000x800x1200	BHEL-EDN
80	Space For UB Printers	1	800x800x1200	BHEL-TRY(UB)
81	HRSG Hardwired console	1	800x825X900	BHEL-TRY(HRSG)

BATTERY ROOM

SNo.	DESCRIPTION	QTY	DIMENSIONS (WxDxH) in mm	SCOPE
111	220V DC Battery	2	10000x1200x1735	BHEL-HYD (PEDE)
112	125V DC Battery	2	7000x1000x1735	BHEL-HYD (PEDE)
113	UPS Battery	2	8000x2000x1735	BHEL-HYD (PEDI)

REV.	DATE	ALTERED	CHD/APPD
01	9.8.10	PANEL DETAILS ARE ADDED.	SUJATHA / PRAKASH

CUSTOMER :
BRAHMAPUTRA CRACKER AND POLYMER LIMITED
BRAHMAPUTRA PETROCHEMICAL COMPLEX PROJECT
UTILITIES SYSTEM LEPETKATA, ASSAM

PROJECT :
CAPTIVE POWER PLANT,LAPETKATA

CONSULTANT :
ENGINEERS INDIA LTD
1, BHIKAIJI CAMA PLACE, NEW DELHI - 110 066

EIL JOB NO.:

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	POORNIMA	SD/-	06.08.10	NA
CHD.	SUJATHA	SD/-	06.08.10	
APPD.	PRAKASH	SD/-	06.08.10	

DEPT.	UNTOL. DIMS.	SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
PED	GR. C/M/F	1:150	NA	NA	NA	NA
CODE. 450						

TITLE
CONTROL ROOM LAYOUT

CARD CODE

DRAWING NO. 1-381-21-02444 REV. 01

SHT. No 01 NO. OF SHT. 01

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GENERAL DIMENSIONAL LIMITS,FITS & TOLERANCES AS PER HY0230261

COMPUTER FILE NAME | REF. DRG. NO. | SIGN. AND DATE | INVENTORY NO

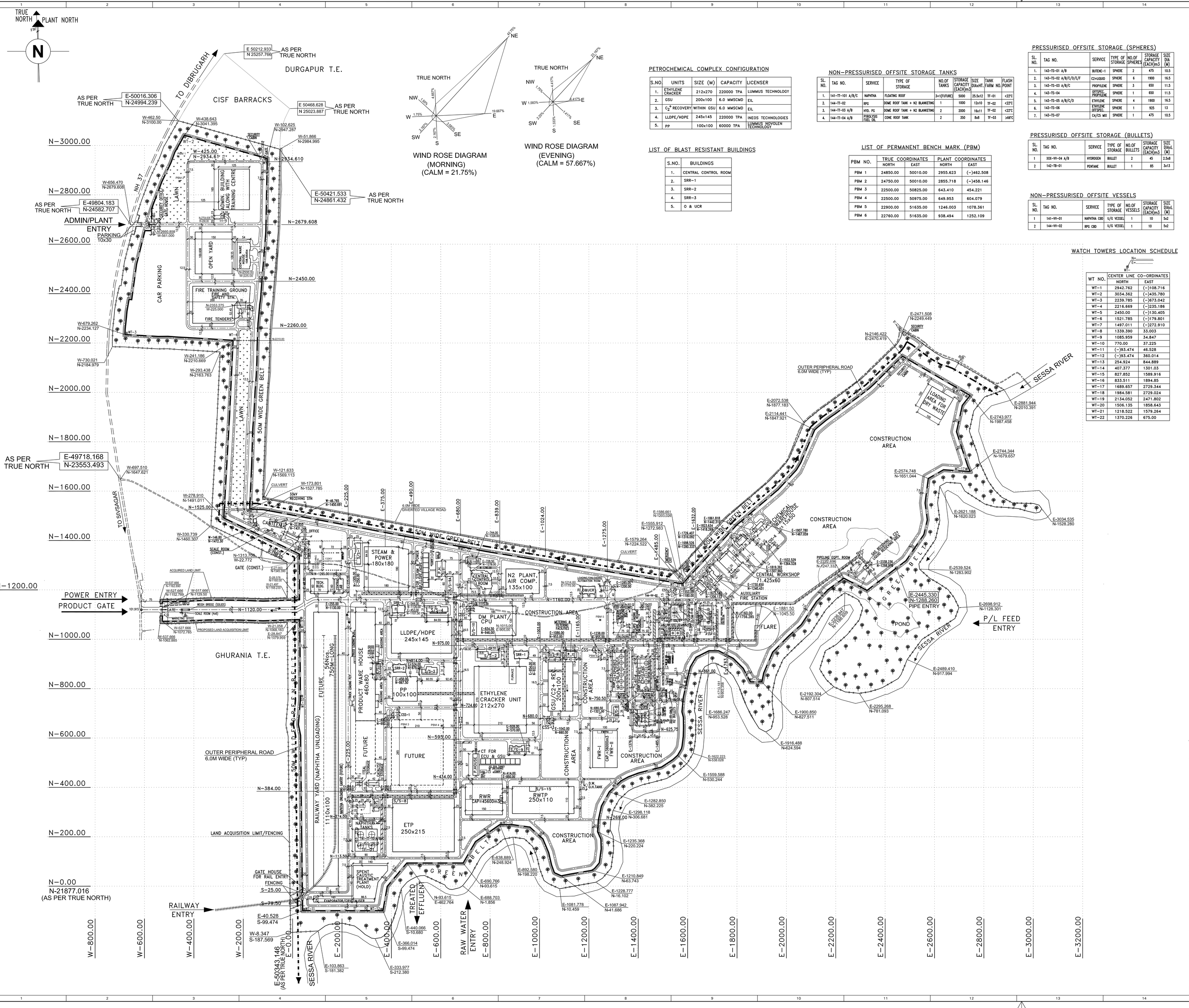
PROJECT SPECIFIC INFORMATION

ANNEXURE-4

Project specific information for electric elevator for M/S BRAHMAPUTRA CRACKER AND POLYMER LIMITED

- Project : **CAPTIVE POWER PLANT,LEPETKATA**

I. Site Data : Elevation above MSL 111 meters
II. Max. ambient temperature 39.8°C
III. Min. ambient temperature 1°C
IV. Relative humidity 88%
V. Site Location : Duliajan , Assam
VI. Nearest Railway Station : Duliajan
VII. Nearest Airport : Dibrugarh : Approx. 48 km
VIII. Nearest State Highway : NH-37



6907-010-16-47-0-001

PETROCHEMICAL COMPLEX CONFIGURATION

S.NO.	UNITS	SIZE (M)	CAPACITY	LICENSER
1.	ETHYLENE CRACKER	212x270	220000 TPA	LUMMUS TECHNOLOGY
2.	GSU	200x100	6.0 MMSCMD	EIL
3.	C_2^+ RECOVERY	WITHIN GSU	6.0 MMSCMD	EIL
4.	LLDPE/HDPE	245x145	220000 TPA	INEOS TECHNOLOGIES
5.	PP	100x100	60000 TPA	LUMMUS NOVOLEN TECHNOLOGY

LIST OF BLAST RESISTANT BUILDINGS

S.NO.	BUILDINGS
1.	CENTRAL CONTROL ROOM
2.	SRR-1
3.	SRR-2
4.	SRR-3
5.	O & UCR

NON-PRESSURISED OFFSITE STORAGE TANKS

SL. NO.	TAG NO.	SERVICE	TYPE OF STORAGE	NO.OF TANKS	STORAGE CAPACITY (EACH)m3	SIZE DIAxHT.	TANK FARM NO.	FLASH POINT
1.	141-TT-101 A/B/C	NAPHTHA	FLOATING ROOF	3+1(FUTURE)	5000	25.5x12	TF-01	<22°C
2.	144-TT-02	RPG	DOME ROOF TANK + N2 BLANKETING	1	1000	12x10	TF-02	<22°C
3.	144-TT-03 A/B	HYD. PG	DOME ROOF TANK + N2 BLANKETING	2	2000	16x11	TF-02	<22°C
4.	144-TT-04 A/B	PYROLYSIS FUEL OIL	CONE ROOF TANK	2	350	8x8	TF-03	>66°C

LIST OF PERMANENT BENCH MARK (PBM)

PBM NO.	TRUE COORDINATES		PLANT COORDINATES	
	NORTH	EAST	NORTH	EAST
PBM 1	24850.00	50010.00	2955.623	(-)462.508
PBM 2	24750.00	50010.00	2855.718	(-)458.146
PBM 3	22500.00	50825.00	643.410	454.221
PBM 4	22500.00	50975.00	649.953	604.079
PBM 5	22900.00	51635.00	1246.003	1078.361
PBM 6	22760.00	51635.00	938.494	1252.109

PRESSURISED OFFSITE STORAGE (SPHERES)

SL. NO.	TAG NO.	SERVICE	TYPE OF STORAGE	NO.OF SPHERES	STORAGE CAPACITY (EACH)m3	SIZE DIA (M)
1.	143-TS-01 A/B	BUTENE-1	SPHERE	2	475	10.5
2.	143-TS-02 A/B/C/D/E/F	C2+LIQUID	SPHERE	6	1900	16.5
3.	143-TS-03 A/B/C	PROPYLENE	SPHERE	3	650	11.5
4.	143-TS-04	OFFSPEC. PROPYLENE	SPHERE	1	650	11.5
5.	143-TS-05 A/B/C/D	ETHYLENE	SPHERE	4	1900	16.5
6.	143-TS-06	ETHYLENE OFFSPEC.	SPHERE	1	925	13
7.	143-TS-07	C4/C5 MIX	SPHERE	1	475	10.5

PRESSURISED OFFSITE STORAGE (BULLETS)

SL. NO.	TAG NO.	SERVICE	TYPE OF STORAGE	NO.OF BULLETS	STORAGE CAPACITY (EACH)m3	SIZE DIAxL (M)
1	XXX-VV-04 A/B	HYDROGEN	BULLET	2	45	2.5x8
2	142-TB-01	PENTANE	BULLET	1	85	3x13

NON-PRESSURISED OFFSITE VESSELS

SL. NO.	TAG NO.	SERVICE	TYPE OF STORAGE	NO.OF VESSELS	STORAGE CAPACITY (EACH)m3	SIZE DIAxL (M)
1	141-VV-01	NAPHTHA CBD	U/G VESSEL	1	10	5x2
2	144-VV-02	RPG CBD	U/G VESSEL	1	10	5x2

WATCH TOWERS LOCATION SCHEDULE

N=..................
E=..................
WT-

WT NO.	CENTER LINE CO-ORDINATES	
	NORTH	EAST
WT-1	2942.762	(-)108.716
WT-2	3034.362	(-)435.780
WT-3	2239.785	(-)673.042
WT-4	2216.669	(-)235.186
WT-5	2450.00	(-)130.405
WT-6	1521.785	(-)179.801
WT-7	1497.011	(-)272.910
WT-8	1339.390	33.003
WT-9	1085.959	34.847
WT-10	770.00	37.225
WT-11	(-)93.474	46.528
WT-12	(-)93.474	360.014
WT-13	254.924	844.889
WT-14	407.377	1301.03
WT-15	827.852	1589.916
WT-16	833.511	1894.85
WT-17	1689.657	2729.344
WT-18	1984.581	2729.024
WT-19	2134.052	2471.802
WT-20	1506.135	1858.643
WT-21	1218.522	1579.264
WT-22	1370.226	675.00

REF. DWG. NO.	REFERENCE DRAWING TITLE
--	LAND USE MAP FOR PROPOSED GAS CRACKER PROJECT AT LEPETKATA
Rites/GT/Contour Plan/Plant Area/1 of 5 to 5 of 5	CONTOUR PLAN

NOTES :-

1. ALL DIMENSIONS & COORDINATES ARE IN METERS.
2. RAW WATER SHALL BE TAPPED FROM RIVER BURHIDIHING, WHICH IS 6 KM (APPROX.) FURTHER SOUTH OF SESSA RIVER.
3. TRUCK PARKING IS ENVISAGED OUTSIDE COMPLEX BATTERY LIMIT (BY BCPL).
4. THE HIGH FLOOD LEVEL (HFL) OF THE AREA IS 101.960M ABOVE MEAN SEA LEVEL (MSL).
5. THE FINISHED GRADE LEVEL (FGL) IS 102.560M.
6. THE FINISHED GRADE LEVEL (FGL) AT OPEN CONSTRUCTION AREA IS 101.660M.
7. RAILWAY SIDING LAYOUT SHOWN IS INDICATIVE AND SHALL BE FINALISED AS APPROVED BY NORTH EAST FRONTIER RAILWAYS DEPARTMENT.
8. TOP OF ETHYLENE OFFSPEC. SPHERE SHOULD BE KEPT SAME AS ADJACENT ETHYLENE SPHERES.
9. ORIENTATION OF WATCH TOWERS SHALL BE SUCH THAT ENTRY OF STAIRCASE IS FROM PERIPHERAL ROAD.

AREA CHART

PLANT AREA (INCLUDING ADMIN. AREA)	= 259.27 HECT.
ADMINISTRATION AREA	= 11 HECT.
AREA WITHIN DIVERTED VILLAGE ROAD	= 1.08 HECT.
GREEN BELT AREA	= 88.65 HECT.
TOTAL AREA WITHIN LAND ACQUISITION LIMIT	= 349 HECT.
GREEN BELT AREA AS %AGE OF TOTAL AREA	= 25.4%

LEGEND:

—x—x—x—	LAND AQUISITION LIMIT/FENCING
═	ROAD
┼┼┼┼	RAILWAY
	GREEN BELT
▨	PIPE TRACK (ON SLEEPERS)
	PIPE RACK (ON RACK)
—+—+—	FLARE TRESTLE
	COMPOUND WALL
	CHAINLINK FENCING
	DIVERSION DRAIN
	GATE
	LAWN
⊞ WT	WATCH TOWER
	FUTURE FACILITIES
S/S	ELECTRICAL SUB STATION
CSS	CONSTRUCTION SUB STATION
SRR	SATELLITE RACK ROOM
TF	TANK FARM
	CRANE MOVEMENT ROAD
	TRUE CO-ORDINATES
	PLANT CO-ORDINATES
	HPP (HIGHEST POINT OF PAVEMENT)
●	APPROVAL REQUIRED UNDER PETROLEUM RULES, 2002
●	BUILDINGS/UTILITIES

KEY PLAN

APPROVAL UNDER PETROLEUM RULES

REV.	DATE	REVISIONS	BY	CHKD	APPD	PEM/PC
I	26.06.09	ISSUED FOR PESO APPROVAL	Anil			
H	13.04.09	REVISED AS PER PPRC COMMENTS AND ISSUED FOR PPRRC APPROVAL	Anil	RKS/DCB	NK	
G	12.03.09	REVISED AND ISSUED FOR PPRC APPROVAL	Anil	RKS/DCB	NK	
F	09.09.08	UPDATED AND REISSUED FOR COMMENTS	Anil	RC/DCB	NK	
E	25.04.08	UPDATED AS PER TOPO GRAPHICAL SURVEY REPORT AND ISSUED FOR COMMENTS	Anil	RC/DCB	NK	
D	13.03.08	ISSUED FOR PLANT BUILDING TENDER	ANIL	RC/DCB	NK	
C	30.11.07	CLIENT'S/INTERNAL COMMENTS INCORPORATED & ISSUED FOR INFRASTRUCTURE DEVELOPMENT	ANIL	DCB	NK	
B	04.10.07	UPDATED AS PER LAND USE MAP & ISSUED FOR COMMENTS	ANIL	DCB	NK	
A	17.09.07	ISSUED FOR COMMENTS	ANIL	DCB	NK	

इंजीनियर्स इंडिया लिमिटेड (भारत सरकार का उपक्रम)
ENGINEERS INDIA LIMITED
(A Govt. of India Undertaking)

ब्रहमपुत्र कैकर एवं पोलिमर लिमिटेड
BCPL BRAHMAPUTRA CRACKER AND POLYMER LIMITED
(A Joint Venture Company of GAIL (India) Ltd., OIL, NRL & Govt. of Assam)

ब्रहमपुत्र पैट्रोकैमिकल कॉम्पलैक्स
लेपेटकटा, डिब्रूगढ़ असम

BRAHMAPUTRA
PETROCHEMICAL COMPLEX
LEPETKATA, DIBRUGARH ASSAM

सम्पूर्ण क्षेत्र विन्यास

OVERALL PLOT PLAN

SCALE	JOB NO.	UNIT	DIVN.	DEPT.	DWG. NO.	REV.
1:5000	6 9 0 7	0 1 0	1 6	4 7	0 0 0 1	I

3-1641-0500 REV.2 A0-1189 x 841

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

PREAMBLE

1.0	This preamble forms part of tender document and schedule of items. The tenderer should read this preamble carefully in rates for various items. Clauses under this preamble shall be read in conjunction with other volumes of tender as applicable.
2.0	The work shall be carried out strictly as per specifications, description of the items in these schedule and / or engineer's instructions.
3.0	Items of work provided in this schedule but not covered in this specification shall be executed strictly as per instruction of the engineer.
4.0	Unless specifically mentioned otherwise in the tender document, the tenderer shall quote for the finished items and shall provide for the complete cost towards power, fuel, tools, tackles, equipment, constructional plants, temporary works, labour, dismantling of all temporary piping, structures, valves, pumps, tanks & other misc. equipment, strengthening of roads/culverts/bridges etc. including arranging all clearances etc. required for carrying out different activities & tests, materials, levies, taxes, transport, layout, repairs, rectification, maintenance till handing over, supervisions, colonies, shops, establishments, overheads, profits and all incidental items not specifically mentioned but reasonably implied and necessary to complete the work according to the tender document and this schedule.
5.0	Uless specified otherwise & except for lump sum packages, the quantities of the various items mentioned in this schedule of items are approximate, based on very preliminary information and may vary to any extent or 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 work executed under any part of this contract including extra items, if any but excluding any price variation remains within thirty percent (± 30 %) of the contract price.
6.0	The rates quoted shall be inclusive of cleaning of site of any vegetation, dressing and leveling etc including fixing of grid pillars, benchmarks etc required for commencement of site activities. No separate payment will be made towards the same.
7.0	Rates shall be quoted in figures and in words in clear legible writing. No overwriting is allowed. All scoring and cancellations should be countersigned and in case of illegibility the interpretation of engineer shall be final. All entries shall be in English language.
8.0	All works item wise shall be measured upon completion and paid for at the rates quoted and accepted.
9.0	The tender shall be deemed to have studied the specifications, details of work to the done within the time schedule attached and to have acquainted himself of the conditions prevailing at site.
10.0	Engineer's decision shall be final and binding on the contractor regarding clarification of items in the schedule with respect to the other sections/volumes of the contract.

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-2 - TOTAL PRICE

SL NO	DESCRIPTION	AMOUNT (Rs)
1.0	TOTAL PRICE OF CIVIL, STRUCTURAL AND MISC WORK (SCH-2).	
2.0	TOTAL PRICE OF 2 NO UTILITY BOILER (SCH-3).	
3.0	TOTAL PRICE OF 2 NO HRSG (SCH-4).	
4.0	TOTAL PRICE OF 2 NO GTG & AUX (SCH-5).	
5.0	TOTAL PRICE OF 1 NO STG & AUX (SCH-6).	
6.0	TOTAL PRICE OF ELECTRICAL AND C&I WORK (SCH-7).	
7.0	TOTAL PRICE OF BOP (SCH-8).	
8.0	TOTAL PRICE OF CONSTRUCTION POWER (SCH-9).	
GRAND TOTAL PRICE		

NOTE	
1.0	Bidder's quoted grand total price above shall be taken into account for evaluation. However, bidder shall furnish break-up of grand total price for various systems in the respective schedules and shall be complete in all respects as per provision of tender and technical specification.
2.0	Bidder shall furnish item-wise break-up of above grand total price in the respective schedule as per following. Total of prices of various schedules shall match with above total price.
2.1	SCH-2 - CIVIL, STRUCTURAL.
2.2	SCH-3 - UTILITY BOILER (UT).
2.3	SCH-4 - HRSG.
2.4	SCH-5 - GTG & AUX.
2.5	SCH-6 - STG & AUX.
2.6	SCH-7 - ELECTRICAL AND C&I.
2.7	SCH-8 - BOP.
2.8	SCH-9 - CONSTRUCTION POWER.

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-2 - CIVIL, STRUCTURAL, MISC WORKS PRICE

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
1.0	**EXCAVATION**				
1.1	Earthwork in **excavation** in all kinds of ordinary and hard soil (including slushy soil) below ground level and stacking within a lead of 500 m, with necessary shoring, strutting, trimming and dressing of sides etc, including bailing/ pumping out of surface water/ rain water/ sub soil water, cutting minor vegetation, if any, complete as per drawings and specification.				
1.1.1	Up to a depth of 2.0 m.	22990	CUM		
1.1.2	Same as item no 1.1.1 above but from 2.0 m - 4.0 m depth.	10495	CUM		
1.1.3	Same as item no 1.1.2 above but from 4.0 m - 6.0 m depth.	3832	CUM		
1.2	Extra over item no 1.1 for every additional lead of 500 m or part there of (beyond the initial lead of 500 m as per item 1.1 and stacking within the compound wall.	500	CUM		
1.3	Extra over item no 1.2 for every additional lift of 1.0 m or part thereof.	500	CUM		
2.0	**BACKFILLING**				
2.1	Earthwork in backfilling & compacting by manual/ mechanical means (90% maximum laboratory dry density as per IS 2720 Part-VIII) in layers not exceeding 150 mm around foundations & trenches, below grade slabs and all other locations as per specs, drawings and as directed by the engineer.				
2.1.1	With earth obtained from stacks within a lead of 500 m.	14326	CUM		
2.1.2	Extra over 2.1.1 for every additional lead of 500 m or part there of within battery limit.	1000	CUM		
2.1.3	With selected earth (cohesive non-swelling/ murram) obtained from borrow pits outside the battery limit within a lead of 5.0 km inclusive of necessary royalty charges.	500	CUM		
2.1.4	Extra over 2.1.3 for every additional lead of 1 km or part thereof.	500	CUM		
2.2	Earthwork in backfilling & compacting by manual/mechanical means (minimum 95% of standard proctor density as per IS 2720 Part-VIII) in layers not exceeding 150 mm around & below foundations & trenches, below grade slabs and all other locations as per specification, drawings and as directed by the engineer.				
2.2.1	With earth obtained from stacks within a lead of 500 m.	200	CUM		
2.2.2	Extra over 2.2.1 for every additional lead of 500 m or part there of within battery limit.	50	CUM		
2.2.3	With selected earth (cohesive non-swelling/ murram) obtained from borrow pits outside the battery limit within a lead of 5.0 km inclusive of necessary royalty charges.	50	CUM		
2.2.4	Extra over 2.2.3 for every additional lead of 1 km or part thereof.	50	CUM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
2.3	Sand filling.				
2.3.1	Supplying and filling river sand (not below grading zone-III as per IS:383) in layers not exceeding 150 mm including compacting by mechanical means, flooding with water etc all complete as per specification and as directed by the engineer.	700	CUM		
2.3.2	Supplying and filling river sand inside the trenches (not below grading zone-III as per IS:383) in layers not exceeding 150 mm including compacting by mechanical means, flooding with water etc all complete as per specification and as directed by the engineer.	2500	CUM		
2.4	Surplus earth removal.				
2.4.1	Removal of surplus earth & debris beyond battery limit upto 5 Km lead including transportatin, loading and unloading, dumping, stacking, levelling and dressing etc.complete as per specifications and drawings.	21991	CUM		
2.4.2	Extra over 2.4.1 for every additional lead of 1 km or part thereof.	1000	CUM		
2.5.1	Site grading and levelling with filling excavated earth obtained from foundations areas in layers not exceeding 300 mm within the project area with all leads & lifts using mechanical/ manual means breaking clods, cutting heaps, compacting using compaction equipment in non-accessible areas and rolling with road roller in open areas to obtain 95% of proctor density for cohesive soils and 85 % for non-cohesive soils, all complete as drgs and spcifications.	2000	CUM		
2.5.2	Site grading and levelling with filling excavated earth obtained from borrow areas in layers not exceeding 300 mm with all leads & lifts using mechanical/ manual means breaking clods, cutting heaps, compacting using compaction equipment in non-accessible areas and rolling with road roller in open areas to obtain 95% of proctor density for cohesive soils and 85 % for non-cohesive soils, all complete as drgs and spcifications.	500	CUM		
2.6	Consolidating subbase below foundations by manual/ mechanical means including watering, if required, to obtain 90% standard proctor density as per IS 2720 Part-VIII including making good undulation etc all complete as per drawing and specifications.	150	CUM		
2.7	Consolidating subbase below foundations as per IS 2720 Part-VIII by manual/ mechanical means including watering, if required, to obtain 95% standard proctor density including making good undulation etc all complete as per drawing and specifications.	500	CUM		
3.0	**CONCRETE (Providing and placing concrete work including cost of labour, materials and equipment for handling, transportation, batching, mixing, placing, vibrating and curing, (excluding cost of centering, shuttering and reinforcement) with mechanised equipments like batching plant, transit mixer, concrete pump etc complete as per drawing, specifications and as per direction of engineer in charge for the following (Cement will be supplied by BHEL as per SCC free of cost)).**				
3.1	Supplying, laying in position, compacting and curing as per specification plain cement concrete (using OPC/ PPC-calcined based/ PPC-Fly ash based/ SRC) of the following mix with 20mm down size aggregates below GL and upto 1.0 mtr above GL, including consolidation of subgrade wherever required.				
3.1.1	1:5:10.	1500	CUM		
3.1.2	1:3:6,	20	CUM		
3.1.3	M20 (with minimum cement content of 275 kg / m3).	20	CUM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
3.1.4	M15 (with minimum cement content of 275 kg / m3).	120	CUM		
3.2	Supplying, laying in position, curing as per specifications controlled concrete (using OPC/ PPC-calcined based/ PPC-Fly ash based/ SRC) of the following grades (graded coarse aggregates of 40 mm down, 20 mm down & 12 mm down shall be used wherever applicable) including use of corrosion inhibiting admixture as per EIL specification no 6907-121-16-48-SP10 and use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.				
3.2.1	Grade M30 in foundations, floors and pavings etc with 350 kg/m3 cement for all depths below GL and upto 1.0 m above GL.	9445	CUM		
3.2.2	For all elevations 1 mtr above GL.				
3.2.2.1	Grade M30 with minimum cement content of 350 kg/m^3.	5195	CUM		
3.2.2.2	Grade M30 for with minimum cement content of 350 kg/m^3 of concrete for GTG/ STG top deck/ columns above raft at all levels including addition of suitable plastisizers conforming to IS 9103 to achieve required strength in concrete as per manufacturers recommendations, preparation of scheme for concreting, getting it approved by engineer.	1000	CUM		
3.3	Providing and placing in position RCC of grade M30 (using OPC/ PPC-calcined based/ PPC-Fly ash based/ SRC) of 12mm & down graded chips with min cement content of 350 kg/m^3 for encasing of steel structures at all elevations including staging & form works, reinforcement mesh (3mm thick wire, 50x50 size mesh), expanded metal sheets if required, nuts, tie wires, weldings, suface preparation, rendering with cement mortar 1:3 to make the concrete surface smooth after deshuttering, curing etc and use of corrosion inhibiting admixture as per EIL specification no 6907-121-16-48-SP10 all complete as per drawings, specifications, all complete. Wire mech will be paid under item.no 5.2.	10	CUM		
3.4	Paving.				
3.4.1	Providing and placing in position, compating, curing reinforced concrete of M30 grade for paving and grade slab with min cement content of 350 kg/m^3 using (OPC/ PPC-calcined based/ PPC fly ash based/ SRC) including laying in approved size panels, leaving grooves for sealing joints, cost of form work, finishing of top surface as required but excluding cost of reinforcement which will be paid under relevant items, including use of corrosion inhibiting admixture as per EIL specification no 6907-121-16-48-SP10 etc all complete for floors and pavement as per EIL drawing no-6907-010-16-47-3607 and specifications.	1169	CUM		
3.4.2	Providing and placing in position, compating, curing reinforced concrete for paving of M25 grade with min cement content of 350 kg/m^3 (OPC/ PPC-calcined based/ PPC-Fly ash based/ SRC) including laying in approved size panels, leaving grooves for sealing joints, cost of form work, finishing of top surface as required but excluding cost of reinforcement which will be paid under relevant items, including use of corrosion inhibiting admixture as per EIL specification no 6907-121-16-48-SP10 etc all complete for floors and pavement as per EIL drawing 6907-010-16-47-3607 and specifications.	500	CUM		
3.5	Supply and application of epoxy screed lining on RCC surface at all elevations including staging & form works, suface preparation, glass cloth reinforcment etc all complete as per the EIL specification no 6907-0642-PT-B09.	2500	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
3.6	Water proofing compunds.				
3.5.1	Supplying and mixing 'SIKA' or approved equivalent brand of integral water proofing compound in cement concrete/ cement mortar etc all complete as per drawings and specifications, IS:2645.	1000	KG		
3.5.2	roviding and fixing in position 20 mm thick bitumen impregenated Fibre board confirming to IS:1838 in expansion joints etc as per specifications and drawings, all complete.	600	SQM		
3.5.3	Providing and fixing in position 25mm thick bitumen impregenated fibre board confirming to IS:1838 in expansion joints etc as per specifications and drawings, all complete.	200	SQM		
3.7	Sealing compunds.				
3.7.1	Supplying and laying sealing compound with premium grade silicon sealant (SILPRUF of GE silicon or approved equivalent) as per specification.				
3.7.1	25mm wide, 25 mm deep.	2000	RM		
3.7.2	Supplying and laying two part liquid polysulphide based sealing compound as per IS:12118.				
3.7.2.1	20 mm wide, 12 mm deep.	200	RM		
3.7.2.2	25 mm wide, 12 mm deep.	200	RM		
3.7.3	Supplying and laying approved quality joint sealing compound conforming to IS:1834, type-B for joints in concrete etc complete as per specifications.				
3.7.3.1	20 mm wide, 25 mm deep.	8000			
3.8	Fabricating and placing in position precast reinforced concrete trench covers of grade M30 with min cement content of 350 kg/m3 (OPC/ PPC-calcined based/ PPC-fly ash based/ SRC) of varying thickness including reinforcement, shuttering, lifting lugs including use of corrosion inhibiting admixture as per EIL specification no 6907-121-16-48-SP10 etc, all complete including edge angles as per drawing and specifications. Reinforcement will be paid under item 5.1.2 and edge angles will be paid for under item 6.1.4.	385			
3.9	Supplying and installing ribbed water stops in cement concrete including laps by fixing/ valcanizing joints and folds as applicable and approved by the engineer.				
3.9.1	PVC water stops or equivalent - min 5 mm thick and 150 m wide.	1000	CUM		
3.9.2	PVC water stops or equivalent - min 5 mm thick and 230 m wide.	3000	CUM		
3.10	Grouting under equipment bases as required,curing and finishing the exposed surfaces including all materials, form work etc as per drawings and directions of the engineer.				
3.10.1	With 1:2 cement sand and 6 mm down stone chips nominal mix by volume.	10	CUM		
3.10.2	Using free flow non shring grout like conbextra GP1 or approved equivalent including cost of grout mix, form work, finishing, curing etc, all complete as per drawings and manufacturers' specifications. All materials to be supplied by contractor.	100	CUM		
3.10.3	Using free flow non shring grout like conbextra GP2 or approved equivalent including cost of grout mix etc, all complete as per drawings and manufacturers' specifications. All materials to be supplied by contractor.	30	CUM		
3.11	Providing and placing in position fire proofing with vermiculite for encasing of steel structures including cost of expended metal sheet, welded wire mesh, tie wire, nuts, cover plates etc all complete as per EIL specification no 6-68-0033. All materials to be supplied by contractor.				

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
3.11.1	-do- measured in area.	5000	SQM		
3.11.2	-do- measured in volume.	100	CUM		
3.12	Supplying and fixing 3mm thk Aluminium sheet with brass screws in expansion joints including drilling in concrete etc all complete as per EIL specification no 6907-128-16-48-SP-251 to cover expansion and/ or separation joints.	10	SQM		
3.13	Providing and placing in position HDG grating including laying in approved size panels, finishing etc complete as per EIL drawing no 7-65-0272 & specifications.	1000	SQM		
3.14	Providing damp proof course 40 mm thick of PCC of grade M20 (upto 10 mm and down graded aggregate) with 2% of approved admixture of water proofing compound, and applying two layers of hot bitumen coating A90/S90 grade confirming to IS:73 @ 1.7 kg/sqm one before & one after the DPC, including sprinking of dry sharp sand etc all complete as per specifications.	30	SQM		
3.15	Supplying, laying in position, consolidation, finish and curing as per specification cinder concrete of 1:10 mix with 12 mm & down grade cinder at all elevations as per drawing and EIL specification no 6907-128-16-48-SP-251, wherever required.	10	CUM		
4.0	**FORM WORK**				
4.1	Supplying, installing, dismantling and removing the following classes of **formwork** as per drawings and specifications at all levels using steel/ plywood wood shuttering.				
4.1.1	Straight in plan (including raft of STG/GTG).	44000	SQM		
4.1.2	Curved in plan.	1000	SQM		
4.1.3	Fairface formwork for columns and top deck of STG above raft.	7000	SQM		
4.2	Providing p**ockets** in concrete of sectional area less than 0.1 sqm in plan by fixing and removing formwork for anchor bolts, pipe sleeves etc as per drgs including. all materials, labour etc complete as per drawings and specifications.				
4.2.1	Up to 300 mm deep.	800	NO		
4.2.2	301 mm to 600 mm deep.	100	NO		
4.2.3	601 mm to 1000 mm deep.	100	NO		
4.2.4	1001 mm to 1450 mm deep.	100	NO		
5.0	**REINFORCEMENT**				
5.1	Supplying, bending, binding, transporting and placing in position following types of high strength deformed (HSD) TMT bars & MS reinforcements of all diameters and at all elevations using approved quality binding wires as per specifications and drawings.				
5.1.1	MS reinforcement conforming to IS:432. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	10	MT		
5.1.2	Transport, straightening, cutting, bending, placing in position at any level, binding in position of steel reinforcements of TMT steel of grade Fe-500 confirming to IS:1786 including cost of binding wire, labour, scaffolding, transportation to & from stores etc complete all as per specifications, drawings and as directed by engineer (Reinforcement will be supplied by BHEL as per SCC free of cost).	3110	MT		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
5.1.3	TMT reinforcement conforming to IS:1786 of minimum grade Fe 500. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	40	MT		
5.2	Supplying and fixing steel wire mesh (3 mm thick wire, 50x50 size mesh) as reinforcement for encasing steel columns, pipes at all elevations as per drawings and specifications. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	100	SQM		
6.0	**STRUCTURAL STEEL (Structural steel works including all labour, material, equipments, transportation, handling etc at any level as per specification, drawings and as directed by engineer - in - charge).**				
6.1	Transport from store, fabricating using approved quality electrodes of 6013 or low hydrogen 7018 for plate thickness above 20 mm, pre-heating, packing and delivering at the stores or at site of the following categories of structural steelwork including cost of steel, all necessary bolts, nuts & washers etc, painted as per sl no 10.2 of EIL specification no 6907-0642-PT-L07 including surface preparation etc all complete. Contractor to supply all materials. (MS plates, channel, ISMB, angle, chequered plates will be supplied by BHEL free of cost as per SCC).				
6.1.1	Steel work consisting of portal frames, laced & plated columns, beams, roof trusses, purlins, non plated beams, bracings, sag rods, anchor cleats/ end plates and miscellaneous steel work, farbricated with standard folled sections, plates, angles, beams etc.	1960	MT		
6.1.2	Supplying, fabricating using approved quality electrodes of 6013 or low hydrogen 7018 for plate thickness above 20 mm, pre-heating, packing and delivering at the stores or at site of the following categories of structural steelwork consisting of portal frames, laced & plated columns, beams, roof trusses, purlins, non plated beams, bracings, sag rods, anchor cleats, end plates, farbricated with standard folled sections, plates, flats, angles pipes etc including cost of steel, all necessary bolts, nuts & washers etc painted as per sl no 10.2 of EIL specification no 6907-0642-PT-L07 including surface preparation etc all complete. Contractor to supply all materials.	30	MT		
6.2	Erection of structural steel as described in 6.1 including grouting under bases using Convextra GP1, with necessary erection bolts, nuts & washers, welding electrodes of 6013 or low Hydrogen electrodes of 7018 grade, wherever required, etc all complete as drawings and specifications. Grouting willl be paid under item no 3.11.2.	1990	MT		
6.3	Supplying, fabricating and fixing in positions MS inserts like channels, angles, flats, rounds, plates, pipe sleeves and any other structural shape etc including cost of steel, necessary templates/ stagings, cutting to required lengths, bolting revetting welding etc as required all complete as per drawings and specifications. Contractor to supply all materials.	40	MT		
6.4	Supplying, fabricating and fixing in positions rails section Inserts in concrete including cost of rail sections, necessary templates/ stagings, cutting to required lengths, bolting revetting welding etc as required all complete as per drawings and specifications. Contractor to supply all materials.	5	MT		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
6.5	Taking delivery of foundation hardware supplied by BHEL and transporting to site, fixing in position foundation hardware such as anchor bolts, nuts, washers, anchor assembly etc as per drawing including fixing to proper level and alignment using contractor's own templates, protecting till handover of the foundation, all complete as per drawings and specifications.	30	MT		
6.6	Supplying, fabricating and fixing in position foundation hardware such as anchor bolts, nuts, washers, anchor assembly etc as per drawing including fixing to proper level and alignment using contractor's own templates, protecting till handover of the foundation, all complete as per drawings and specifications. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	30	MT		
6.7	Supplying and erecting electro-forged hot dip galvanised MS floor gratings with minimum galvanizing density of 610 gms per sqm, staircase steps as per EIL standard dwg no 7-68-0561 (Type -II and Type-III grating) including all fasteners, painting with two or more coats of aluminium paint at the places of site welding etc all complete as per specifications. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	53	MT		
6.8	Supplying, fabricating, fixing in position by welding 18 gauge MS sheets to steel columns for encasing at various elevations, all complete as per drawings and specifications. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	1	MT		
6.9	Supplying, installing and fixing in position pre-coated profiled galvalume sheeting of minimum 0.5 mm thick for roofing & cladding of buildings with all necessary nuts, bolts, washers, roofing accessories and any other fixing material and means as required as per manufacturer specifications and EIL specification 6907-128-16-48-SP-251.Rev-0 at all elevations as per drawings and specifications. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	7475	SQM		
6.10	Same as above but with transparent fiber glass sheets.	257	SQM		
6.11	Providing & installing the following precoated galvanised steel sheet specials and roofing accessories with standard laps including all drilling, cutting & grouting required to give water tight finish with all bolts, nuts, washers, hangers, spacers, drilled holes to be suitably painted before erecting & fixing etc, complete as per EIL specification 6744-94-16-48-0257. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.				
6.11.1	Ridge with close fitting adjustable ridge pieces including finish.	135	RM		
6.11.2	Eaves gutter E30 or equivalent with accessories.	268	RM		
6.11.3	Half round gutter.	268	RM		
6.11.4	S type louver with fixtures.	100	SQM		
6.11.5	Barge boards with all fixtures.	200	RM		
6.11.6	North light curves.	30	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
6.12	Supplying, fabricating and fixing in positions Seismic Arrestor inserts made up of pipes, channels, angles, flats, rounds, plates of (25mm, 50mm & 100mm thk), pipe sleeves and any other structural shape etc including cost of steel, necessary templates/ stagings, cutting to required lengths, machining of top surfaces, bolting revetting welding etc as required all complete as per and specifications. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	1	MT		
6.13	MS hand rail. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.				
6.13.1	Supplying, fabricating, fixing in position galvanised 32mm dia NB (Medium) MS pipe handrail at various elevation to concrete and steel buildings/ structures as per including cost of materials, cutting concrete, consummables, labour etc all complete as per drawing EIL dwg no 7-68-0501 and specifications. Toe plate will be paid separately under item no 6.1.	1222	RM		
6.13.2	Supplying, fabricating, fixing in position galvanised 32mm dia NB (Medium) MS pipe handrail with square balusters at various elevation to concrete and steel buildings/ structures as per including cost of materials, cutting concrete, consummables, labour, painting with synthetic enamel paint over a coat of approved quality red oxide zinc chromate primer etc all complete as per drawing EIL dwg no 7-75-0036 and specifications. Toe plate will be paid separately under item no 6.1.	250	RM		
7.0	**MASONRY & ALLIED WORKS (Brickwork masonry, plastering including all labour, material, equipment, transportation, handling, scaffolding etc at all levels as per specification, drawings and as directed by engineer-in-charge (Cement will be supplied by BHEL as per SCC free of cost).**				
7.1	Supplying and laying of coarsed rubble stone massonary in cement mortar 1:6 in foundations and basement as per specifications.	10	CUM		
7.2	Supplying and laying in position class 10.0 (as per IS:1077) brick work in foundation and upto plinth in cement sand mortar (1:6) including mixing mortar, laying bricks, raking of joints, curing etc, all complete as per drawings as spefications.	165	CUM		
7.3	Similar to 7.2 in super-structure at all elevations.	2246	CUM		
7.4	Supplying and laying in position class 10.0 (as per IS:1077) brickwork in half brick walls at various elevations in 1:4 cement sand mortar with 2 nos 6mm dia MS bars at every fourth layer properly anchored with pillers or cross walls, including mixing mortars, raking joints, curing etc all complete as per drawings and specifications.	1000	SQM		
7.5	Providing 12mm thick cement-sand plastering in 1:6 cement mortar for all plumb of the internal masonry walls & RCC Columns coming in line (flush) with this side of wall at various elevations including mixing, laying, finishing, curing, rounding corners, cutting grooves, wherever required, etc with all materials complete as per drawings and specifications.	4845	SQM		
7.6	Providing upto 15mm thick cement-sand plastering in 1:6 cement mortar for rough side of internal masonry walls, RCC columns coming in line (flush) with this side of wall at various elevations including mixing, laying, finishing, curing, rounding corners, cutting grooves, wherever required, etc with all materials complete as per drawings and specifications.	3000	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
7.7.1	Providing 18mm thick cement-sand plastering in 1:6 cement mortar (mixed with approved acrylic waterproof compound @ 1 kg per 50 kg of cement) to the exterior faces of the walls & RCC columns coming in line with side of the wall at various elevations including mixing, laying, finishing,curing, rounding corners, cutting grooves, wherever required, etc with all materials complete as per drawings and specifications.	200	SQM		
7.7.2	Same as item no 7.8.1 but 15 mm thk.	180	SQM		
7.7.3	Same as item no 7.8.1 but 12 mm thk.	100	SQM		
7.8	Providing 20 mm thk sand face plaster in two layes, first layer of 13 mm in cement mortar (1:4) & second layer of 7 mm thickness in cement mortar (1:2) using approved quality sand for second layer, on RCC and brickwork including mixing, laying, finishing curing, rounding corners, cutting groves, whereever required, with all materials complete as per drgs and specifications.	6634	SQM		
7.9	Providing minimum 6 mm thick (1:4) cement sand plaster over concrete surfaces of RCC ceiling, beams etc at various elevations including mixing, laying, finishing,curing, rounding corners, cutting grooves, wherever required, etc with all materials complete as per drawings and specifications. However if undulation in ceiling is beyond 6mm thick plaster, extra thickness of plaster shall be applied without any extra cost to give a smooth and fair surface to the satisfaction of engineer-In-charge.	10255	SQM		
7.10	Drip course at various elevations to parapet, chajja, windows, door heads etc with all material complete as per drawings, spcifications and directions of the engineer.	320	RM		
7.11	Providing 20 mm wide x 10 mm deep rectangular grooves in plaster for architectural purposes, including all materials, etc all complete as per drawings.	500	RM		
7.12	Extra over plaster for providing neat cement finish.	1200	SQM		
7.13	Providing 2 mm thick plaster of paris punning to newly plastered surfaces at various elevations with all materials etc, complete as per specifications and directions of engineer.	3450	SQM		
7.14	Supplying and fixing 20 gauge chicken wire mesh stretched tight and fixed with GI type nails at junctions of brick work and concrete work before plastering at various elevations locations as shown in drawings and as directed by the engineer.	600	SQM		
7.15	Providing average 50 mm thick M20 cement screed with 6mm down stone chips, to required slope with all materials, hacking the old concrete, finishing, curing etc, as per drgs & specifications.	10	CUM		
8.0	**FLOORING (Flooring and skirting at any level including base layer, labour, material, equipments, transportation, handling, curing, polishing etc at any level as per specification, drawings and as directed by engineer-in-charge (Under bed concrete will be paid seperately under relevant item). (Cement will be supplied by BHEL as per SCC free of cost)).**				
8.1	Supplying, laying vetrified ceramic acid resistant tiled floor/ DADO as per IS:4457 with 25mm thick tiles from approved manufacturers at various elevations including preparation of base laying underbed of 6 mm thick acid proof mortar over 3 layers of bitumen grade 85/25 (total 3 mm thick) as per IS:702 over 12mm thick CM (1:3), pointing of size 6 mm x 18 mm deep with CSNL mortar or equivalent including curing of the joints with dilute hydrochloric acid (25 %) as per manufacture's specifications, with all materials complete as per drawing and specifications.	50	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
8.2	Supplying and fixing matt finish, non slip type ceramic tiles of approved make of sizes 300 x 300 x 8 mm for flooring laid over a coating of approved neoprene based adhesive including pereparation of base laying underbed, finishing and rounding corners and junctions, curing etc complete as per drawings and EIL specification no 6907-128-16-48-SP-251.	57	SQM		
8.3	Supplying and fixing matt finish, non slip type ceramic tiles of approved make of sizes 100 x 200 x 6 or 300 x 200 x 6 for dado up to 2.1 m height laid over a coating of approved neoprene based adhesive including pereparation of base laying underbed, finishing and rounding corners and junctions, curing etc all complete as per drawings and EIL specification no 6907-128-16-48-SP-251.	95	SQM		
8.4	Laying 125 mm high, 18 mm thick cement plaster skirting (1:3) including preparation of base, laying underbed, finishing with neat cement @2.75 kg per sqm, rounding corners and junctions, cutting grooves, if required, curing etc all complete as per drawings and EIL specification no 6907-128-16-48-SP-251.	143	SQM		
8.5	Supplying laying and fixing vitrified porcelain tile for flooring & skirting laid over a coating of approved neoprene based adhesive including pereparation of base laying underbed, finishing and rounding corners and junctions, curing etc, as per drawings and EIL specification no 6907-128-16-48-SP-251.	400	SQM		
8.6.1	Supplying laying & fixing 40mm thick Kota stone flooring/ steps in staircase in various elevation comprising 25mm thick stone slabs including preparation of base, laying underbed finishing, curing, polishing etc complete as per drawings and EIL specification no 6907-128-16-48-SP-251.	200	SQM		
8.6.2	Supplying laying & fixing 40mm thick Kota stone skirting/ dado/ riser in staircase 18 mm thick stone slabs including preparation of base, laying underbed finishing, curing, polishing etc complete as per drawings and EIL specification no 6907-128-16-48-SP-251.	200	SQM		
8.7	Providing 50 mm thick heavy duty cement flooring comprising of 35 mm cement concrete base laid over sub base in panels (max 1 sqm in area) bound by 3 x 40 mm PVC strips followed by upto 15 mm thick wearing top layer of cement, hardner and stone aggregate, finishing, curing etc all complete as per EIL specification no 6907-128-16-48-SP-251.	3986	SQM		
8.8	Providing 40 mm thick cement concrete granolithic flooring comprising of 25 mm thick base course of M15 grade cement concrete laid on the sub-base in panels (max 1 sqm is area, in desired shape and pattern) bound by 3 x 30 mm PVC strip by upto 15 mm thick wearing top layer of cement mortar 1:3, finishing, curing etc all complete as per EIL specification no 6907-128-16-48-SP-251.	1961	SQM		
8.9	Providing pigmented Epoxy floor coating on flooring, skirting and dado of approved shade, made of a solvent based, two pack system with epoxy resins and amine curing agents, chosen to withstand high degrees of chemical and abrasive action as per approved manufacturer's specification, including screed and finishing coat, curing etc all complete as per EIL specification no 6907-128-16-48-SP-251.	300	SQM		
9.0	**FALSE FLOORING**				

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
9.1	Supplying, erecting, fitting & laying **false flooring** (steel plates with cementitious infill) of approved make with laminated floor panels of size 600 mm x 600 mm and over all thickness of minimum 37 mm including necessary base plates, pedestal studs, top heads, hot dip galvanised stringers, polyurethane coating over floor below flase flooring, nuts, bolts etc all complete as per EIL specification no 6907-128-16-48-SP-251. Contractor to supply all materials. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	1440	SQM		
10.0	**FALSE CEILING**				
10.1	Supplying, erecting, fitting, & fixing **Aluminium plank/ tile flase ceiling** of approved make with all fittings, fixtures etc all complete as per drawings & EIL specification no 6907-128-16-48-SP-251. Payment terms - a) On receipt of material at site - 65%; b) On completion of erection & fixing - 35%.	2390	SQM		
10.2	Providing Phenolic foam **under deck insulation** on the ceiling system (at soffit of the slab and beams) consisting of **40 mm thick** and approx 1000 mm x 450 mm size conforming to IS:13204 prelaminated on both side, including applying bituminous primer or zinc chromate primer on entire soffit of slab and beams, fixing,etc all complete as EIL specification no 6907-128-16-48-SP-251.	2390	SQM		
11.0	**PAINTING**				
11.1	Providing & applying to interior surfaces two or more coats of oil bound distemper of approved shade & make confirming to IS:428 to obtain a even finish and uniform color over a coat of primer at all elevations including cost of paint, surface preparation, scaffolding etc, all complete as per EIL specification no 6907-128-16-48-SP-251 and to the satisfication of engineer incharge.	200	SQM		
11.2	Providing and applying two or more coats of plastic emulsion paint confirming to IS:5411 (Part-1), of approved shade, over a of coat of primer, at all elevations including cost of paint, surface preparation, scaffolding etc, all complete as per EIL specification no 6907-128-16-48-SP-251 and to the satisfication of engineer incharge.	2750	SQM		
11.3	Providing three or more coats of white wash to give a smooth and even shade at all elevations including including cost of paint, surface preparation, scaffolding etc, all complete as per IS:6278 and EIL specification no 6907-128-16-48-SP-251 and to the satisfication of engineer incharge.	13489	SQM		
11.4	Providing and applying waterproof cement paint as per manufacturers instruction over concrete surfaces at all elevations including cost of paint, preparation of surfaces, scaffolding, curing etc, all complete as per EIL specification no 6907-128-16-48-SP-251 and to the satisfication of engineer incharge.	10327	SQM		
11.5	Providing and applying cold applied polymer based water proofing compund in three coats as per manufacturers instruction over a coat of primer at all elevations including cost of paint, preparation of surfaces, scaffolding, curing etc, all complete as per EIL specification no 6907-128-16-48-SOW-251 and to the satisfication of engineer incharge.	300	SQM		
12.0	**ROOF WATER PROOFING (Water proofing works including all labour, material, equipment, transportation, handling, curing, sampling, testing etc at any level as per specification, drawings and as directed by engineer-in-charge. Contractor has to furnish a guarantee for material and workmanship for a minimum period of 10 years. Cement will be supplied by BHEL as per SCC free of cost).**				

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
12.1	Providing and laying Polymer modified bituminous roof water proofing at various elevations including laying underbed, finishing protective layer, fillets at junction of horizontal and vertical surfaces etc with all material complete as per EIL drawing no 7-75-0068 and EIL specification no 6907-128-16-48-SP-251 & 6907-128-16-48-SOW-251. Underbed shall be paid under item 12.2.	3555	SQM		
12.2	Preparation of grading underbed with 1:3:6 mix using 12 mm down graded coarse aggregate at various elevations including mixing, laying, curing etc in varying thickness with all materials complete as per drawings and specifications.	120	CUM		
12.3	Same as Item No-12.2 above but for flashing at junction of slab and parapet wall including preparation of surfaces, cuting grooves, caulking the end of flashing etc. complete as per drawings and specifications.	300	SQM		
12.4	Providing and making 150 x 150 mm size fillets in cement concrete 1:2:4 at junctions of roof slab and parapet wall including cutting groves, rounding corners, finishing etc all complete as per drawings and specifications.	10	CUM		
13.0	**DOORS, WINDOWS & VENTILATORS**				
13.1	Providing and fixing steel windows and ventilators conforming to IS:1038 and IS:7452 including handles, peg stays, stoppers, hinges, and painting with two coats of approved make synthetic enamel paint over a coat of suitable primer etc all complete as per and EIL specifications in doc no 6907-128-16-48-SP-251. Glazing shall be paid seperately. Payment terms - a) On receipt materials at site - 65%; b) On completion of erection & fixing - 35%.				
13.1.1	Fixed type.	200	SQM		
13.1.2	Openable type.	243	SQM		
13.2	Supplying and erecting including assembling, fitting and fixing steel louvers with 18 gauge MS sheet bent to shape at various elevations including frames, shutters, weld mesh with bird screen net etc as required with all materials etc complete as per drawings and EIL specification no 6907-128-16-48-SOW-251 & 6907-128-16-18-SP-251 including painting of steel surfaces with two coats of synthetic enamel paint over a coat of primer paint. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.	1118	SQM		
13.3	Supplying and erecting including assembling fitting and fixing best quality pressed steel doors of 18 gauge MS sheets packed inside with rigid PU foam/ phenolic foam or glass wool insulation, with 16 gauge pressed steel frames at various elevations including frames, shutters, accessories, fittings and fixtures, CP mortice lock cum handle mastic caulking, grouting the frames, painting with 2 coats of approved quality synthetic enamel paint over a coat of approved primer etc complete as per EIL drawing no 7-75-0070, 7-75-0071 and specifications in doc no 6907-128-16-48-SP-251. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
13.3.1	Single shutter.	50	SQM		
13.3.2	Double shutter.	150	SQM		
13.4	Same as item 13.3 but with 150 mm x 300 mm vision panels with 4 mm thk. Plain glass etc complete as per EIL specifications in doc no 6907-128-16-48-SP-251.				
13.4.1	Single shutter.	25	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
13.4.2	Double shutter.	25	SQM		
13.5	Same as item 13.4 but 2 mm sheeting etc all complete as per EIL specifications in doc no 6907-128-16-48-SP-251 & 6907-128-16-48-SOW-251.				
13.5.1	Single shutter.	10	SQM		
13.5.2	Double shutter.	10	SQM		
13.6	Providing and fixing in position composite, insulated type fire check doors of approved make having 2 hrs fire rating conforming to IS :3614 Part I with all necessary fittings and fixtures incuding self closing hinges, locking arrangement and painting with two or more coats of fire proof paint over approved primer etc complete as per EIL specification 6907-128-16-48-SP-251. Contractor to obtain and furnish TAC approval for supplies made. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
13.6.1	Single leaf.	5	SQM		
13.6.2	Double leaf.	5	SQM		
13.7	Laminated wooden flush doors.				
13.7.1	Providing and fixing laminated wooden flush doors with all fittings and fixtures, approved quality heavy duty MS butt hinges, anodised aluminium tower bolts, aldrops, door stoppers, vision panels etc as per EIL specifications in doc no 6907-128-16-48-SP-251. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.	15	SQM		
13.7.2	Same as item 13.6.1 but with 150 mm x 300 mm vision panels with 4 mm thk. Plain glass etc complete as per EIL specifications in doc no 6907-128-16-48-SP-251.	5	SQM		
13.8	Hydraulic door closer.				
13.8.1	Providing and fixing approved quality heavy duty overhead hydraulically operated door closer corforming to IS:3564 as directed by the engineer.	20	NO		
13.8.2	Providing and fixing approved quality heavy duty hydraulically operated double action door closer corforming to IS:6315 as directed by the enginer.	20	NO		
13.9	Providing and fixing 2 mm thk approved quality rubber sealing strip around doors and windows for making them air tight including cost of rubber strip adhesive, clips etc all complete as per specifications in doc no 6907-128-16-48-SP-251.	150	RM		
13.10	Supplying fitting and fixing the following glazing specials at various elevations as per drg no 7-75-0014 including supplying rubber beading, (cost of putty and glazing clips for fixing to steel windows), all materials etc complete as per specifications to alluminium windows, doors & partitions/ steel windows.				
13.10.1	4mm thick plain glass.	243	SQM		
13.10.2	6.3 mm thick laminated safety glass.	300	SQM		
13.11	Supplying, fitting and fixing 12 mm thick twin laminated Gypsum board of "India Gypsum" make conforming to IS:2905, categorised as Class-I for surfaces of very low flame spread as per BS:476, at various elevations to aluminium windows, doors & partitions, including supplying rubber gaskets, cost of all materials etc complete as per drawings and specifications.	600	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
13.12	Supplying and erecting including assembling fitting and fixing electrostatically powder coated aluminum windows and ventilators of Jindal or approved equivalent at various elevations including frames and shutters, transomes, mullions, fittings and fixtures, aluminium beading, but excluding glazing, complete as per EIL drawing no 7-75-0014, 7-75-0015 and EIL specifications no 6907-128-16-48-SP-251. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
13.12.1	Openable type.	50	SQM		
13.12.2	Fixed type.	123	SQM		
13.12.3	Fixed double glass windows at STG operating floor level 2.4 m high.	50	SQM		
13.13	Supplying and erecting including assembling, fitting and fixing aluminium partition frames with matching doors etc as per drawing no 3-38144-00008 with frames, shutters, double acting heavy duty floor springs, fittings and fixtures, mortise lock, aluminium beading to aluminium partitions and doors framework, 6.3 mm thk laminated safety glass and 12 mm thk twin laminated gypsum board/ MDF board etc all complete. Gypsum board/ MDF board and glazing to be paid separately. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.	543	SQM		
13.14	Supplying and erecting including assembling, fitting and fixing aluminium glazed doors including shutters, springs, fittings and fixtures, 6.3 mm thk. laminated safety glass, door closer, tower bolts, beading etc all complete as per EIL drawing no 7-75-0014 & EIL specification no 6907-128-16-48-SP-251. Glazing to be paid separately.	100	SQM		
13.15	Supplying, fitting and fixing 12 mm thick twin laminated medium density fibre (MDF) boards (mannufactured from agrobased lignocellulosic fibres conforming to IS:12406, exterior grade with synthetic resin conforming to IS:848, BWP type), categorised as Class-I for surfaces of very low flame spread as per BS:476 and twin laminated with 1.0 mm thick melamine of approved make and shade at various elevations to Aluminium windows, doors & partitions, including supplying rubber gaskets, cost of all materials etc complete as per drawings and specifications. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.	200	SQM		
14.0	**ROLLING SHUTTERS**				
14.1	Supplying and erecting including assembling, fitting and fixing rolling steel shutters and accessories from approved manufacturers including all fixtures, locking arrangements electric, wiring for motor drive, wiring for drive shutters, including shop coat of approved red oxide zinc chromate primer and two or more coats of synthetic enamel paint of approved brand and shade after erection with all fittings and fixtures etc all complete as per specifications in doc no 6907-128-16-48-SP-251 and drawings. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
14.1.1	Manually operated.	5	SQM		
14.1.2	Mechanically operated, complete with all accessories for mechanical operation as per approved manufacturers design and drawings.	106	SQM		
14.1.3	Electrically operated, complete with all accessories, electrical motor, cabling, etc, as per approved manufacturers design and drawings.	100	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
15.0	**SANITATION/ PLUMBING**				
15.1	Supplying and erecting HDPE cylindrical and vertical water tank with closed top of SINTEX make or approved equivalent of following capacity.				
15.1.1	1450 ltr.	2	NO		
15.1.2	2450 ltr.	2	NO		
15.1.3	4500 ltr.	2	NO		
15.2	Supplying, fitting and fixing PVC drain pipes of approved make at various elevations including shoe bends junctions, sockets, adapters, brackets, hangers, supports etc jointing with appropriate adhesives etc, including all materials complete as per drawings and as per EIL specification no 6907-128-16-48-SP-251.				
15.2.1	110 mm dia pipes.	50	RM		
15.2.2	160 mm dia pipes.	419	RM		
15.3	Same as 15.2 and encasing drain pipes in M15 concrete with wire mesh etc, all complete as per specifications. Wire mesh will be paid under item no 5.2.				
15.3.1	110 mm dia pipes.	50	RM		
15.3.2	160 mm dia pipes.	850	RM		
15.4	Supplying, fitting and fixing PVC roof drain heads with high domed gratings as per drg no 7-75-0068 at various elevations, including connecting to roof drain pipes, caulking with lead supports/ fixing with adhesive for PVC pipes, hangers etc, with all materials as per drawings and specifications.				
15.4.1	110 mm pipe.	15	NO		
15.4.2	160 mm pipe.	55	NO		
15.5	Supplying, fitting fixing the following best quality sanitary fixtures of " Hindustan Sanitaryware" or approved equivalent make at various elevations including all necessary accessories, cutting and making good of concrete/ brickwork for concealing all connecting pipes and bends with all materials etc all complete as per EIL specification no 6907-128-16-48-SP-251 and drawings.				
15.5.1	European type water closet of pattern-1 conforming to IS:2556 part-II with plastic seats & cover and low level earthenware cistern (IS:774) of 10 litre discharge capacity including valveless fittings, flush bends, supply connections, syphon, integral `S' or `P' trap etc all complete as per EIL drg no 7-75-0062 and EIL specification no 6907-128-16-48-SP-251.	6	NO		
15.5.2	Indian pattern water closet (Orissa pan size 550 mm x 440 mm conforming to IS:2556) with integral footrest and 10 litre capacity valve less syphonic type high level glazed earthenware flushing cistern (IS:774) fittings, with all necessary fixtures, integral with 'S' or 'P' trap etc all complete as per EIL drg no 7-75-0060 and EIL specification no 6907-128-16-48-SP-251.	6	NO		
15.5.3	610 x 410 x 380 mm half stall type urinals of single piece construction with integral flushing box rim with concealed hangers and brackets, CP brass spreader for concealed piping work, CP brass waste fittings, 30 mm dia heavy duty bottle trap etc all complete as per EIL drg no 7-75-0063 and EIL specification no 6907-128-16-48-SP-251.	12	NO		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
15.5.4	Automatic high level glazed earthenware cistern with mosquito proof lid, interior painted with 2 coats of anti corrosive paint, with loose key CP brass bibcock etc all complete as per EIL specification no 6907-128-16-48-SP-251.				
15.5.4.1	Cistern capacity 5 ltrs.	12	NO		
15.5.4.2	Cistern capacity 10 ltrs.	6	NO		
15.5.4.3	Cistern capacity 15 ltrs.	6	NO		
15.5.4.4	Marble partitions of minimum 19 mm thick white Makrana marble slabs of size 1000 mm x 600 mm etc all complete as per EIL specification no 6907-128-16-48-SP-251.	12	NO		
15.5.5	550 x 400 mm white glazed stone ware flat back wash basin conforming to IS:2556 part-IV with anti splash rims on three sides and required tap holes, with supporting brackets, CP brass waste fittings, bottle trap, CP brass pillar cock, supply connection brass nuts and CP brass stop cock etc, complete as per drg no 7-75-0064 rev 03 and as per EIL specification no 6907-128-16-48-SP-251.	10	NO		
15.5.6	150 x 150 mm recessed white glazed porcelain soap tray.	10	NO		
15.5.7	Chromium plated shower set with 100/ 150 mm dia brass shower rose with rim arm,wall flange, hot/ cold water mixing valves including handle and concealed supply pipe including 600mm long CP grab bar, bibcock etc, as per specifications all complete.	6	NO		
15.5.8	550 x 400 x 5.5 mm thk round edge mirror of superier glass with 6 mm thick AC sheet backing and necessary fixtures as per specifications.	10	NO		
15.5.9	35 litre capacity hot water geyser of approved make.	6	NO		
15.5.10	600 x 120 x 4 mm thick clear glass shelves with chromium plated brackets, guard rails etc, all complete.	10	NO		
15.5.11	600 mm long, 20 mm dia and 1.25 mm thick chromium plated brass towel rail with brackets fittings, etc, complete.	10	NO		
15.5.12	All Chromium plated standard liquid soap dispenser of approved make with all fittings etc, complete.	10	NO		
15.5.13	12 mm dia CP brass ablution tap with all fittings complete.	10	NO		
15.6	Supplying, fitting and fixing 100 mm dia inlet and 80/ 100 mm dia outlet SS floor drain with trap and with screwed or hinged CP brass gratings.	20	NO		
15.7	Providing gully trap chamber including supplying and fixing square mouth gully trap, gratings, CI frame and cover, cost of materials etc all complete as per EIL drawing no 7-65-0214 & specifications.	5	NO		
15.8	Providing inspection chamber including supplying and fixing manhole cover, grouting of pipes, cost of materials etc all complete as per EIL drawing no 7-65-0215 & specifications.	5	NO		
15.9	Providing neutralisation pit including supplying and fixing chequered plate cover, grouting of pipes, acid proof tile lining, rungs, hooks, cost of materials etc all complete as per EIL drawing no 7-65-0310 & specifications.	2	NO		
15.10	Providing septic tank with capacity for 25 persons including excavation and back filling at all depths, disposal of spoils with a lead of 1 km; including dressing and levelling the same, masonry, concrete, reinforcement, shuttering, plastering, all fittings, heavy duty covers etc with all materials complete as per drawing no 3-38144-00009.	2	NO		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
15.11	Construction of circular soak pit with 450 mm square dry brick honey comb shaft, surrounded by annular shafts of brick bats and brick ballast of 40 mm to 80 mm nominal size including excavations, packing etc.all complete as per drawing no 3-38144-00003.	2	NO		
15.12	Supplying, laying, fitting, fixing, jointing concealed GI pipes "J2A" for water lines at various elevations with all fittings stop cock, valves bends, elbows, tees, reducers etc including excavation, back filling, concrete supports, hangers, straps with all materials etc, complete as per EIL specification no 6907-6-44-0005 and drawings. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
15.12.1	12 mm dia.	100	RM		
15.12.2	19mm dia.	50	RM		
15.12.3	25 mm dia.	100	RM		
15.12.4	32 mm dia.	100	RM		
15.12.5	50 mm dia.	100	RM		
15.13	Same as above but with 25 mm thk miniral wool insulation, laying on piperacks, buildings etc including clamps, screws etc all completeas per EIL specification no 6907-128-16-47-SP-01 and drawings.				
15.13.1	12 mm.	100	RM		
15.13.2	19 mm.	50	RM		
15.13.3	25 mm.	100	RM		
15.13.4	32 mm.	100	RM		
15.13.5	50 mm.	100	RM		
15.14	Suppy and fixing of valves for J2A water lines as per drawings & EIL specification no 6907-6-44-0005.				
15.14.1	12 mm dia.	2	NO		
15.14.2	19 mm dia.	2	NO		
15.14.3	25 mm dia.	2	NO		
15.14.4	32 mm dia.	2	NO		
15.14.5	50 mm dia.	2	NO		
15.14.6	75 mm dia.	2	NO		
15.15	Supplying and fixing 4" dia vent pipes in OWS manholes including fixing the pipe on piperacks at various elevations, necessary clamps, screws etc all complete EIL specification no 7-65-0212 & as per specification.	200	RM		
15.16	Supplying, laying, fitting, fixing and jointing CI soil and drain pipes confirming to IS:3486/1729, underground with all fittings bends, tees, reducers etc including excavation, backfilling, supports, caulking, chases, grooves, hangers, supports, straps etc painting as specified with corrosion resistance protection all complete as per specification and drawings.				
15.16.1	100 mm.	150	RM		
15.16.2	150 mm.	150	RM		
15.17	Same as 15.11 but over ground, including vent pipes and cowls.				
15.17.1	100 mm.	150	RM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
15.17.2	150 mm.	150	RM		
15.18	Supplying fitting and fixing CI heavy duty man hole cover of 82 cm dia of approved brand as per specification.	20	NO		
16.0	**SURFACE AND UNDERGROUND DRAINS**				
16.1	Supplying and installing of PVC pipes of following diameter as per specifications and drawing.				
16.1.1	100 mm dia.	50	RM		
16.1.2	150 mm dia.	50	RM		
16.1.3	200 mm dia.	50	RM		
16.1.4	300 mm dia.	50	RM		
16.2	Supplying and installing of PVC pipes bends of following diameter as per specifications and drawing.				
16.2.1	100 mm dia.	10	NO		
16.2.2	150 mm dia.	10	NO		
16.2.3	200 mm dia.	10	NO		
16.2.4	300 mm dia.	10	NO		
16.3	Providing and installing underground RCC hume pipes of class P-1 as per IS:458 of following diameters with collars, at all depths including bedding, jointing, providing supports etc all complete as per drawing and EIL specification no 6-65-1042 (excavation and backfilling to be measured seperatly under relevant items).				
16.3.1	150 mm.	100	RM		
16.3.2	200 mm.	200	RM		
16.3.3	250 mm.	100	RM		
16.3.4	300 mm.	50	RM		
16.3.5	450 mm.	50	RM		
16.4	Providing and installing RCC hume pipes of class NP-3 of following diameters with collars, at all depths including bedding, following diameters with collars, at all depths including bedding, jointing, providing supports etc all complete as per drawing and EIL specification no 6-65-1042 (excavation and backfilling to be measured seperatly under relevant items).				
16.4.1	400 mm.	50	RM		
16.4.2	450 mm.	50	RM		
16.4.3	600 mm.	50	RM		
16.5	Supplying, laying, jointing, testing and commissioning of carbon steel pipe "A96A" line below GL including coating and wrapping, joint testing, cost of materials etc all complete as per EIL specification no 6907-6-44-0005, 6-79-0011 and drawings (Earthwork excavation and back filling to be measured separately). Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
16.5.1	100 mm dia.	50	RM		
16.5.2	150 mm dia.	100	RM		
16.5.3	200 .mm dia	200	RM		
16.5.4	300 mm dia.	100	RM		
16.6	Suppy and fixing of valves for A96A water lines as per drawings & EIL specification no 6907-6-44-0005.				

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
16.6.1	100 mm dia.	2	NO		
16.6.2	150 mm dia.	2	NO		
16.6.3	200 mm dia.	2	NO		
16.6.4	300 mm dia.	2	NO		
16.7	Supplying, laying, jointing, testing and commissioning of carbon steel pipe "A92A" line below GL including coating and wrapping, joint testing, cost of materials etc all complete as per EIL specification no 6907-6-44-0005, 6-79-0011 and drawings (Earthwork excavation and back filling to be measured separately). Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
16.7.1	100 mm dia.	50	RM		
16.7.2	150 mm dia.	100	RM		
16.7.3	200 mm dia.	200	RM		
16.7.4	300 mm dia.	100	RM		
16.8	Suppy and fixing of valves for A92A water lines as per drawings & EIL specification no 6907-6-44-0005.				
16.8.1	100 mm dia.	2	NO		
16.8.2	150 mm dia.	2	NO		
16.8.3	200 mm dia.	2	NO		
16.8.4	300 mm dia.	2	NO		
16.9	Supplying and fixing MS drain funnels of following diameter as per EIL drawing no 7-65-0266 and specifications.				
16.9.1	150 mm dia.	10	NO		
16.9.2	200 mm dia.	10	NO		
16.9.3	250 mm dia.	10	NO		
16.10	Providing and fixing weep holes in road/ drains consisting of 100 mm dia LDPE pipe sleeves along with single side covering for the pipe mouth with galvanised welded fabric of 20 mm sq opening along with 300 x 300 mm sq, 300 mm deep, 40 mm aggreate to cover fabric mesh mouth complete as directed by BHEL engineer.	100	NO		
16.11	Supplying and installing of HDPE pipes of following diameter as per specifications and drawing.				
16.11.1	100 mm dia.	10	RM		
16.11.2	150 mm dia.	10	RM		
16.11.3	200 mm dia.	10	RM		
16.11.4	300 mm dia.	10	RM		
17.0	**ROADS/PAVING**				
17.1	Consolidating subbase before providing stone soling/ WBM with road roller including watering, if required to obtain 95% maximum lab dry density as per IS 2720 Part-VIII including making good undulation etc all complete as per drawing and specifications .	16974	SQM		
17.2	Supplying, laying and rolling stone soling of consolidated thickness 200 mm constructed in 2 layers each of 100 mm thick including spreading binding material (sand/ morrum) watering and rolling with road roller etc all complete as per drawings and specifications.	5000	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
17.3	Supplying, spreading & filling of soil (having plasticity index less than 6) in layers not exceeding 150 mm below paving and roads, below grade slabs and all other locations and consolidation & preparation of sub base including watering and rolling & compaction with power roller 10-12 T capacity to the required density (95% of maximum lab dry density as per IS 2720 Part-VIII) as per specifications, drawings and as directed by the engineer.	5000	CUM		
17.4	WBM consolidation.				
17.4.1	Supplying and laying WBM in 100 mm consolidated thickness with grade-I aggregate in one or more layers with dry and wet rolling etc complete as per EIL drawing no 6907-010-16-47-1120 and specification no 6-65-0018.	250	SQM		
17.4.2	Supplying and laying WBM in 75 mm consolidated thickness with grade-II aggregate in one or more layers with dry and wet rolling etc complete as per EIL drawing no 6907-010-16-47-3607 & 6907-010-16-47-1120 and specification no 6-65-0018.	15500	SQM		
17.5	Providing and laying 50 mm compacted thickness of bituminous macadam finish with 20 mm thk premix carpet (using hot mix plant) with premixed seal coat over WBM surface, using bitumen of appropriate grade confirming to IS:73, preparation of surfaces, rolling etc complete as per EIL drawing no 6907-010-16-47-1120 and 6-65-0020 and as per specifications.	2750	SQM		
17.6	Supplying, laying and setting precast concrete edging blocks 300 x 250 mm and a length of 275 mm (except at curves) in 1:2:4 cement concrete including cutting of trench and packing exterior face of blocks with stone chips and murrum including pointing the joints with CM 1:4 etc all complete as per drawings and specifications.	200	RM		
17.7	Providing and placing stone pitching in road embankment slope as per specifications.	150	SQM		
18.0	**MISCELLANEOUS ITEMS**				
18.1	Supplying and spreading 40 mm size stone chips/ gravels in transformer yards.	120	CUM		
18.2	Supply, fabricating and fixing in position transformer gate/ fencing as per drg no:7-75-0051 & 7-75-0052 including painting with aluminium paint two or more coats over suitable primer etc complete, excavation, concreting and post etc to be measured separately. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.	200	SQM		
18.3	Supplying and fixing in positions anchor fasteners of HILTI or approved equivalent of following diameters in concrete, including drilling in concrete, driving the anchor fastner, finishing the conrete etc, all complete as per drawings and specifications.				
18.3.1	8 mm.	50	NO		
18.3.2	10 mm.	50	NO		
18.3.3	12 mm.	50	NO		
18.3.4	14 mm.	50	NO		
18.3.5	16 mm.	50	NO		
18.3.6	20 mm.	50	NO		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
18.4	Supplying and fixing in positions 100 mm wide Aluminium strips of approved make in expansion joints in building/ structures with brass screws including drilling in concrete, all complete as per drawings and specifications.	100	RM		
18.5	Cutting and drilling holes of the following diametes using diamond cutter drilling machine with all material, labour etc, all complete as per drawings and specifications.				
18.5.1	100mm dia x 200 mm deep.	20	NO		
18.5.2	150mmdia x 200 mm deep.	20	NO		
18.5.3	200mm dia x 200 mm deep.	20	NO		
18.5.4	250mm dia x 200 mm deep.	20	NO		
18.6	Providing anti-termite treatment to building columns and floors of Chloropyrifos emulsifiable concentrates (1%) conforming to IS:8944 with cost of material, labour, consumables etc, all complete as per drawings and EIL specifications.	4500	SQM		
18.7	Supplying, fabricating and fixing in position GI MS rungs bent to shape/ size as indicated on drgs and specifications.	100	KG		
18.8	Supplying and fixing lock fix (FOSROC make) for extending new reinforcement from existing structures.	50	NO		
18.9	Chipping of RCC.				
18.9.1	Chipping of RCC structural elements like beams, columns, pedestals, slabs at all elevation upto 5 m height required for facilitating mechanical erection works including scaffolding etc, all complete to the satisfication of BHEL engineer.	1	CUM		
18.9.2	Chipping of RCC structural elements like beams, columns, pedestals, slabs at all elevation from 5 m to 10 height required for facilitating mechanical erection works including scaffolding etc, all complete to the satisfication of BHEL engineer.	1	CUM		
18.9.3	Chipping of RCC structural elements like beams, columns, pedestals, slabs at all elevation from upto 10 m to 15 m height required for facilitating mechanical erection works including scaffolding etc, all complete to the satisfication of BHEL engineer.	1	CUM		
18.9.4	Chipping of RCC structural elements like beams, columns, pedestals, slabs at all elevation from upto 15 m to 20 m ht required for facilitating mechanical erection works including scaffolding etc, all complete to the satisfication of BHEL engineer.	1	CUM		
18.10	Fabrication including modification of already errected steel structures by cutting of members, addding extra members etc to facilitate mechanical erection works.	10	MT		
18.11	Laying buried pipe (approx dia 34 inch supplied by BHEL) including excavation in soil, backfilling etc all complete as per EIL specifications. Payment for excavation and backfilling shall be as per item no 1.0 and 2.0 above, respectively.	50	RM		
18.12	Laying buried pipe (approx dia 20 inch supplied by BHEL) including excavation in soil, backfilling etc all complete as per EIL specifications. Payment for excavation and backfilling shall be as per item no 1.0 and 2.0 above, respectively.	50	RM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
18.13	Providing and laying bitumen sand carpet 50 mm thk in two layers of 30 mm & 20 mm for tank pads including finishing to correct slopes, light rolling etc complete as per EIL specification no 6-65-1022 & directions of the engineer.	137	SQM		
19.0	**FENCING**				
19.1	Supplying and fixing chain link mesh conforming to IS : 2721, both ends bent type, mesh size 50 mm, dia of mesh wire 4 mm , with 2 nos line wire 4 mm dia including tying to RCC/ STEEL posts neatly with GI wires including cost of all materials etc complete. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.	50	SQM		
19.2	Supplying and fixing barbed wire fencing of approved quality, including tying to RCC/ STEEL posts neatly with GI wires including cost of all materials etc.complete. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.	100	RM		
20.0	**DISMANTLING OF STRUCTURE**				
20.1	Dismantling and removal before modification of the following items in the existing structures with all labour, tools, necessary scaffloding, transport etc all complete including delivering as directed by engineer.				
20.1.1	Concrete (plain).	20	CUM		
20.1.2	Concrete (reinforced).	50	CUM		
20.1.3	Brickwork.	50	CUM		
20.1.4	Doors, windows, ventilators.	50	SQM		
20.1.5	75 thick premix carpet.	200	SQM		
20.1.6	Pipe hand rail.	50	RM		
20.1.7	GI sheetings.	50	SQM		
20.1.8	Structural steel.	20	MT		
20.1.9	WBM/ soling for roads or paving.	200	SQM		
20.1.10	Dismantling of false ceiling.	50	SQM		
20.1.11	Making openings in brick work and closing subsequently after installation of ducts etc, including necessary scaffloding for approach to higher elevations.	20	SQM		
21.0	**EARTHING/ GROUNDING**				
21.1	Drawing earthing strips and electrodes from BHEL stores (earthing strips free supply) laying, cutting, jointing, welding, painting the joints with cold galvanising paint after welding and testing ground conductors including cost of excavation up to 1 m, backfilling, galvanising paint, labour, material etc complete as per drawing and specifications. Contractor to supply all materials. Payment terms - a) On receipt of material at site -65%; b) On completion of erection & fixing -35%.				
21.1.1	Earthing strip 75 x 10 mm.	2000	RM		
21.1.2	Earth risers of 75 x 10 mm GI strip.	1000	RM		
21.1.3	Test pit electrode as per drg no GT67997 including construction of masonry chambers with MS covers filling with sand, charcoal and salt etc all complete as per drawings and specifications.	22	NO		
21.1.4	Pipe electrode as per draing no GT57191.	15	NO		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
22.0	**PILING**				
22.1	Mobilization of minimum of rigs to achieveand rigs with ancillary equipment including all equipments, complete to site for instillation of 18-20 nos 450 mm diameter driven cast-in-situ RCC piles per day and demobilization from site after completion of work as per specifications.	1	LS		
22.2	Construction of 450 mm nominal dia driven cast-in-situ piles as per IS 2911 (Part 1, Sec 1) by driving a suitable MS casing pipe (removable) having detachable MS shoe (flat/ conical) at the bottom and driving using atleast 5 MT hammer for the length as specified/for the desired set criteria (to be finalised by contractor & vetted by EIL/ BHEL during contract stage) so as to acheive the safe load carrying capacity as mentioned using using cement concrete (cement not less than 400 kg/ cum) of grade M30 as per specifications including cost of plant and equipment, labour, materials (except reinforcement which will be paid for under relevent item 5.1.2), including use of corrosion inhibiting admixture as per EIL specification no 6907-121-16-48-SP10 and providing plasticizer wherever required etc complete as per the drawing and specifications. Cement will be supplied by BHEL free of cost as per SCC.				
22.2.1	Pile of length 13.5 m below cut off level having a safe load carrying capacity of 70MT in vertical compression.	27108	RM		
22.2.2	Pile of length 10 m below cut off level having a safe load carrying capacity of 40MT in vertical compression.	2670	RM		
22.3.1	Extra over item no 22.2.1 for pile length more than the specified length of 13.5 m below cut off level.	2000	RM		
22.3.2	Extra over item no 22.2.2 for pile length more than the specified length of 10 m below cut off level.	267	RM		
22.4.1	Rebate on item no 22.2.1 for pile length less than the specified length of 13.5 m below cut off level.	1000	RM		
22.4.2	Rebate on item no 22.2.2 for pile length less than the specified length of 10 m below cut off level.	133	RM		
22.5	Conducting load tests on single pile as specified in accordance with IS 2911 (Part-4) including preparation of pile head for testing, necessary excavation, all arrangements of loading, unloading, test equipments/ accessories, jacks, recording of results, labour, submission of test report but excluding the cost of installation of pile (installation of pile shall be paid seperately) etc all complete as per specification, drawing and as directed by engineer-in-charge for the following.				
22.5.1	450 mm dia– initial vertical 70 tones capacity pile.	1	NO		
22.5.2	450 mm dia– initial vertical 40 tones capacity pile.	1	NO		
22.6	Same as item no 22.5 but for routine vertical load test by direct loading.				
22.6.1	450 mm dia – 70 tones capacity pile.	30	NO		
22.6.2	450 mm dia – 40 tones capacity pile.	4	NO		
22.7	Same as item no 22.5 but for initial lateral load test by direct loading.				
22.7.1	450 mm dia – 5 tones capacity pile.	1	NO		
22.7.2	450 mm dia – 4 tones capacity pile.	1	NO		
22.7.3	450 mm dia – 5 tones capacity pile.	1	NO		
22.7.4	450 mm dia – 4 tones capacity pile.	1	NO		
22.8	Same as item no 22.5 but for routine lateral load test by direct loading.				
22.8.1	450 mm dia – 5 tones capacity pile.	15	NO		
22.8.2	450 mm dia – 4 tones capacity pile.	15	NO		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
22.8.3	450 mm dia – 5 tones capacity pile.	2	NO		
22.8.4	450 mm dia – 4 tones capacity pile.	2	NO		
22.9	Same as item no 22.5 but for initial pullout test by direct loading.				
22.9.1	450 mm dia – 20 tones capacity pile.	1	NO		
22.9.2	450 mm dia – 12 tones capacity pile.	1	NO		
22.10	Same as item no 22.5 but for routine pullout test by direct loading.				
22.10.1	450 mm dia – 20 tones capacity pile.	30	NO		
22.10.2	450 mm dia – 12 tones capacity pile.	4	NO		
22.11	Empty boring 450 mm dia in ordinary soil.	3413	RM		
22.12	Carrying out low strain pile integrity test as specified in accordance with IS 14893 on 450 mm diameter pile including all arrangements for test, equipments/ accessories, materials, labour, submission of test report etc but excluding the cost of installation of job pile all complete as per specification and as directed by the engineer-in-charge.	10	NO		
23.0	**BOREWELL**				
23.1	Ground survey & selection of points for bore well to drill by VES (vertacal electrical sounding) method to assess potentiality & quantity/ availability of water etc with all labour material etc. complete. The spread of current shall be such that assessment up to 250 depth can be made. The bidder to suggest location of bore wells accordingly.	3	NO		
23.2	Labour for boring through any type of soil,rock & boulders for sinking tubewell of required dia. With top enlargement by rig boring system (either by DTH method or by rotary method or by combination rig as required) including hire charges and labour for rig machine tools and plants, staging force pumping set, and making arrangement for water required for boring etc complete and lowering of casing pipes, strainers blind pipes etc complete for 150 mm dia upto 50 mtrs, and 100 mm dia from 50 m to 250 m & beyond from GL. Depth of boring to be decided at the time of execution.				
23.2.1	For 150 mm dia bore hole for depth range 0 - 50 mtr from GL.	150	MTR		
23.2.2	For 100 mm dia bore hole for depth range 51- 100 mtr from GL.	150	MTR		
23.2.3	For 100 mm dia for bore hole depth range 101-150 mtr from GL.	150	MTR		
23.2.4	For 100 mm dia bore hole for depth range 151 - 200 mtr from GL.	150	MTR		
23.3	Geophysical investigation of the aquifer by electrologging system with all tools anfd plants, specialist manpower, etc as may be necessary to asses water level for deciding filter position and length of pipes etc including submiossion of reports.	3	NO		
23.4	Supplying, fitting, fixing 'ORIPLAST' make or equivalent PVC casing pipes as per IS 12818-1992/ASTM -D - 1785 and the following details (Dia & length of pipe to be decided at site during execution).				
23.4.1	150 NB having wall thickness of 11 mm (Min).	150	MTR		
23.4.2	100 NB having wall thickness of 8.6 mm (Min).	450	MTR		
23.5	Supplying, fitting, fixing of 'ORIPLAST' make or equivalent PVC ribbed screen (strainer) as per IS 12818-1992. 100 NB (wall thickness 5.0 mm (Min)).	90	MTR		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
23.6	Supplying fitting & fixing reducing socket 100 x 150 mm.	3	NO		
23.7	Providing & fixing bottom plug as required upto 100 mm (internal) dia fixed with PVC pipes with necessary fittings.	3	NO		
23.8	Supplying fiting & fixing 150 mm dia MS housing clamp.	3	SET		
23.9	Providing 150 mm centre Guide for positioning casing pipes.	24	SET		
23.10	Packing the annular space in the blank bore hole at the bottom, between the outside of the tubewell pipe strainers, casing pipes, and the borehole with pea size gravel of sizes varying between 2 mm to 5 mm.	450	MTR		
23.11	Packing the annular space between the outside of the 150 mm dia casing pipe and the bore hole with puddled clay balls.	60	MTR		
23.12	Washing and developing tubewell with air compressor of 150 PSI/ 300 CFM for with necesasary arrangement for testing the yield in gallons per hour with V notch, including bacteria removal treatment as necessary till the water is silt & sand free.	3	NO		
23.13	Collecting sample of water for bacteriological and chemical test from any Govt approved laboratory. Documentary evidence from Govt approved laboratory regarding the water quality certifying that the water coming out of the borewell is safe for human consumption.	3	NO		
23.14	Supplying fitting & fixing MS cap at top 150 mm dia including 150 mm dia MS pipe of 1 mtr or less to be fixed with PVC pipes above ground level.	3	NO		
23.15	Supply & delivery of 2 HP KSB make or equivalent submersible pump motor set having duty point capacity of discharging 2 LPS of clear water at a total head of 40 mtr along with 40 mm dia GI heavy duty best quality column pipes of total length 40 mtr & lockable PVC submersible cable clamps of suitable no and 6 mm dia steel wire rope of suitable length for protecting device with necessary galvanised nuts, bolts, washers for all & control panel, complete and commissioning of pump set as directed by BHEL. Payment terms - a) On receipt of pump set at site - 80% alongwith TC and all purchase documents; b) On installation of pump and commissioning - 20%.	1	NO		
23.16	Supply & delivery of 1 HP KSB make or equivalent submersible pump motor set having duty point capacity of discharging 1 LPS of clear water at a total head of 40 mtr along with 25 mm dia GI heavy duty best quality column pipes of total length 40 mtrs & lockable PVC submersible cable clamps of suitable no and 6 mm dia steel wire rope of suitable length for protecting device with necessary galvanised nuts, bolts, washers for all & control panel, complete and commissioning of pump set as directed by BHEL. Payment terms - a) On receipt of pump set at site - 80% alongwith TC and all purchase documents; b) On installation of pump and commissioning - 20%.	1	NO		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
23.17	Supply & delivery of 4 to 5 HP KSB make or equivalent submersible pump motor set having duty point capacity of discharging 3.5 to 4 LPS of clear water at a total head of 40 mtr along with 40 mm dia GI heavy duty best quality column pipes of total length 40 to 60 mtr & lockable PVC submersible cable clamps of suitable no and 6 mm dia steel wire rope of suitable length for protecting device with necessary galvanised nuts, bolts, washers for all & control panel, complete and commissioning of pump set as directed by BHEL. Payment terms - a) On receipt of pump set at site - 80% alongwith TC and all purchase documents; b) On installation of pump and commissioning - 20%.	1	NO		
23.18	Supplying & delivery of 400 volts, 30 amps, ICTPN switch with MRC fuses of make Havels or equivalent and suitable starter L&T or equivalent, MS angle frame for mounting etc complete.	3	NO		
23.19	Installation of ICTPN switch & starter on MS angle frame on wall.	3	NO		
23.20	Drawing the double run submersible cable from the tubewell to the starter through suitable dia class - B medium GI protection tubes by supplying & laying the same on underground/ under floor/ wall, including laying, termination etc all complete.	3	RM		
23.21	Supplying & laying 10 sqm 1.1 KV grade 3.5 core PVC armoured Aluminium cable on wall by means of saddles from ICTPN switch to busbars to MCCB, NCCB to starter including all end termination and interconnections etc complete.	165	RM		
23.22	Earthing of the whole installation as per IE rule by supplying of earth electronics, SWG, GI wire earth bus and all other materials etc all complete.	3	NO		
23.23	Supplying fitting and fixing GI pipes of TATA medium or equivalent make with all necessary accessories, specials viz socket, bend, tee, union, cross, short piece etc fitted with holder bat clamps, including cutting pipes, making threads, fittings, fixing etc complete in all respects, including cost of all necessary fittings as required, jointing materials in position above ground 40 mm dia medium quality.	45	RM		
23.24	Supplying fitting and fixing GI pipes of TATA medium or equivalent make with all necessary accessories, specials viz socket, bend, tee, union, cross, short piece etc fitted with holder bat clamps, including cutting pipes, making threads, fittings, fixing etc complete in all respects, including cost of all necessary fittings as required, jointing materials in position above ground 25 mm dia medium quality.	50	RM		
23.25	Supplying, fitting, fixing 40 mm dia wheel valve, gun metal of approved brand and make tested to 21 kg/ sqcm as directed by BHEL.	3	NO		
23.26	Providing manpower, consumable, T&P etc for running and maintenance without supply of major equipment for all 3 tube wells with pump set.	3	MAN-MTH		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
23.27	Providing manpower, materials for constrcution of brick masonary pump house (inside area around 5 sqm) with brick foundation of 1 mtr depth from existing GL and plinth level of pump house shall be 600 mm from existing GL with 40 mm thick IPS flooring, 250 thick brick wall 2500 mm height from PL with plaster finish in inside & outsite (12/ 15 mm thick) all brick work & plaster 1 cement:6 sand, with one MS angle (50 x 50 x 6) framed door with MS sheet of 3 mm thick with locking arragement,120 mm thick RCC roof concrete grade M25 with one 150 ISMB fixed on the ceiling of the pump house for maintenance purpose, inside 3 coat of whitewash, out side 3 coats of water proof cement paint finish, the pump house inide to be wired for fixing a CFL lamp of 18W with a switchboard. The necessary supply for this illumination can be tapped from the ICTPN switch supplied for the pump motor set. All cement, steel and other materials, labour etc required are to be supplied by bidder.	3	SET		
23.28	Sprinkling of water by water tanker, fitted with perforated GI pipe (portable tanker of min 3000 ltr cap) for roads, laydown area & misc area within plant boundary for suppression of dust & reduction of suspended particles arising out of day-to-day work under this contract as per instruction of BHEL. Water for this purpose shall be provided by BHEL free of cost & utilisation of tanker will be in terms tank-hr put in actual use for sprinkling.	8000	TANK-HR		
24.0	**ENABLING WORKS**				
24.1	EARTH WORK IN EXCAVATION, BACKFILLING AND DISPOSAL AS PER SPECIFICATION & DRAWINGS.				
24.1.1	Clearing jungle including uprooting of rank vegetation, grass, brushwood, trees and saplings of girth upto 30 cm measured at a height of 1 m above ground level and removal of rubbish upto a distance of 200 m outside the periphery of the area cleared.	10000	SQM		
24.1.2	Excavation with lift up to 2.0 mtr including providing coffer dams, shoring, strutting, sheeting, bracing, draining and pumping out water to maintain reasonably dry working condition for all activities, clearing all grass, vegetation etc including trimming of excavation bottom, staking, levelling, grading etc of excavated materials, loading and unloading etc all complete as per specifications, drawings and instructions of the engineer, including a lead upto 300 mtr.				
24.1.2.1	In all types of soils including expansive soil, ash, morrum, laterite.	2537	CUM		
24.2	Filling using selected excavated materials in trenches, plinths, sides of foundations and other underground structures, pipes, area levelling etc in layers not exceeding 250 mm thickness including lead upto 1.0 km and all lifts and including loading from stock pile, carting, unloading, filling, watering and compacting/ramming each layer, all complete as per specifications, drawings & as directed by engineer to achieve the following densities.				
24.2.1	Ordinary manual compaction.	1510	CUM		
24.3	Sand filling (river sand) in plinth in layers not exceeding 15cm as directed by BHEL and consolidating same by thorough saturation with water and ramming complete including the cost of supply of sand (Payment to be made on measurement of finished qty).	507	CUM		
24.4	Single brick flat soling of picked jhama bricks including ramming and dressing bed to the proper level and filing the joints with powder earth or local sand including all materials, labour etc complete.	1972	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
24.5	Concrete of grade M7.5 as filling course at any level below foundations,drain, mass dumps, floors with 20 mm nominal size graded aggregate, materials, lanbour etc complete (Cement - PPC/ OPC/ PSC to be supplied by the vendor with test certificate from direct manufacturer of ACC/ ULTRATECH/ CETURY/ BIRLA/ LAFARGE/ INDIA CEMENT etc).	122	CUM		
24.6	Reinforced grade 1:1.5:3 with approved stone chips 20 mm down for floor, drain, RCC sleeper, RCC shelf etc excluding cost of shuttering and reinforcement if any but including all materials, labour, curing etc complete all the levels (cement - PPC/ OPC/ PSC to be supplied by the vendor with test certificate from direct manufacturer of ACC/ ULTRATECH/ CETURY/ BIRLA/ LAFARGE/ INDIA CEMENT etc).	306	CUM		
24.7	Reinforced/ plain cement concrete 1:2:4 with approved trap stone chips 20 mm down for floor, drain, septic tank etc excluding cost of shuttering and reinforcement if any but including all materials, labour, curing etc complete all the levels (cement - PPC/ OPC/ PSC to be supplied by the vendor with test certificate from direct manufacturer of ACC/ ULTRATECH/ CETURY/ BIRLA/ LAFARGE/ INDIA CEMENT etc).	60	CUM		
24.8	Damp proof course 40 mm thk 1:1.5:3 concrete (10mm down aggregate) with 2% of approved admixture of water proofing compound. Hot bitumen @ 1.7 kg/ sqm shall be applied before & after the DPC as per specification (cement shall be supplied by BHEL free of cost as per SCC).	81	SQM		
24.9	Hire and labour charges for 25 mm thick shuttering for bldg works for concrete foundations, floor/ roof slabs, beams, lintels, columns, chajja, fins, RCC sleeper (Trapizoidal shape - size 200 x 250 mm,length 500 mm) etc including fitting, fixing and striking out carefully after completion of work for below ground and upto 6m height from finished floor lvl.				
24.9.1	Without vertical props.	2512	SQM		
24.9.2	With vertical props at all levels.	586	SQM		
24.10	Supply, transporting, straightening, cutting, bending, placing at any level, binding in position mild steel reinforcements in concrete including cost of reinforcement and binding wire, labour etc complete all as per specifications & drawings (Contractor will provide MS round from SAIL/ TISCO/ IISCO/ SRMB/ SHRICON/ SHYAM STEEL/ ELEGANT/CONCAST etc).	5	MT		
24.11	Supply, transporting, straightening, cutting, bending, placing at any level, binding in position high yield strength steel reinforcements in concrete including cost of reinforcement and binding wire, labour etc complete all as per specifications & drawings.(Vendor to provide TMT bar Fe-500 quality from SAIL/ TISCO/ IISCO/ SRMB/ SHRICON/ SHYAM STEEL etc).	32	MT		
24.12	Brick work in cement mortar (1 cement :6 sand) including cost of scaffolding and other incidental work etc completed (Cement - PPC/ OPC/ PSC to be supplied by the vendor with test certificate from direct manufacturer of ACC/ ULTRATECH/ CETURY/ BIRLA/ LAFARGE/ INDIA CEMENT etc).				
24.12.1	Below ground level.	106	CUM		
24.12.2	For superstructure upto EL (+) 5 .5 m above PL.	180	CUM		
24.13	Half brick thick wall in cement mortar (1 cement :6 sand) including cost of scaffolding and other incidental work etc completed (Cement - PPC/ OPC/ PSC to be supplied by the vendor with test certificate from direct manufacturer of ACC/ ULTRATECH/ CETURY/ BIRLA/ LAFARGE/ INDIA CEMENT etc).				

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
24.13.1	Ordinary bricks/ fly ash bricks, class designation 50, below GL.	2700	SQM		
24.13.2	Ordinary bricks/ fly ash bricks, class designation 50, for superstructure upto EL(+) 5.5m above PL.	546	SQM		
24.14	Plaster to wall floor, slab soffits, fins, sills,septic tank etc. with sand cement mortar including rounding off or chenfering corners as directed and racking out joints or roughening of concrete surface including chipping & application of cement slury where necessary etc complete as per drawing and direction of engineer (Cement - PPC/ OPC/ PSC to be supplied by the vendor with test certificate from direct manufacturer of ACC/ ULTRATECH/ CETURY/ BIRLA/ LAFARGE/ INDIA CEMENT etc).				
24.14.1	With 1:6 cement mortar average 12.5 mm thick plaster below GL.	1500	SQM		
24.14.2	With 1:6 cement mortar average 12.5 mm thick plaster above GL.	350	SQM		
24.14.3	Outside plaster With 1:4 cement mortar average 15 mm thick above GL.	546	SQM		
24.15	Supply, fabrication, erection and painting of structural steel work in columns, beams, wind ties, RCC sleeper (Trapizoidal shape - size 200 x 250 mm, length 500 mm) etc with simple rolled structural members connected to one with another with brackets gusset cleats, bolts and nuts or welding etc as per design & direction complete including fabrication, hoisting & erection including all materials, labour etc complete with one coat of primer and two coats of synthetic enamel painting (Vendor to provide structural steel from JINDAL/ SAIL/ TISCO/ IISCO/ SRMB/ SHRICON/ SHYAM STEEL/ RINL etc with test certificate).	13	MT		
24.16	Supply, fabrication, erection and painting of steel work with tubular sections as per IS 1161 & 1239 for roof truss, purlin etc including all materials conforming to relevant IS codes, labour etc as per drawing, specification and direction of engineer with one coat of primer and two coats of synthetic enamel painting (Vendor to provide structural steel from JINDAL/ BANSAL /TATA/SHYAM STEEL/ RINL etc).	44	MT		
24.17	Providing & fixing corrugated galvanised iron sheet (CGI) 0.5mm thick for roofing of TATA/ SAIL/ ZINDAL/ BANSAL make including galvanised J or L hook, bolts and nuts 8 mm dia with bitumen washer 25 mm dia x 3 mm thick and 1.6 mm thick limpet washer complete with all labour, tools and plants. Payment terms - a) On receipt of materials at site - 65%; b) On completion of erection & fixing - 35%.	2340	SQM		
24.18	Providing and fixing galvanised iron ridge 0.5 mm thick and 230 mm lappings on both sides of TATA/ SAIL/ ZINDAL/ BANSAL make including fixing necessary screws, washers etc complete with all labour and tools and plants.	250	RM		
24.19	Providing, transporting, fixing of MS foundation/ anchor bolt (Grade-1 of IS:432 & IS:2062) assembly in concrete along with nuts, lock nuts, 25 mm dia, 950 mm long including furnishing of labour, materials, welding, etc all complete as per specification, drawing and instruction of the engineer (Vendor to supply all material).	1075	KG		
24.20	Supply, fitting and fixing of steel windows and ventilators conforming to IS:1038 - 1975 and manufactured from rolled steel heavy type sections conforming to IS:7452 - 1974 with non friction projecting type of hinges fitted with revetts or nut bolt system alongwith providing guard bar of 10 mm dia MS round 100 mm c/c horizontally welded with frame etc complete with one coat of red oxide paint and two coats of sythetic enamel as finished coat for steel windows and guard bar.	54	SQM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
24.21	Supplying, fitting and fixing openable steel windows conforming to us IS:1036-1975 and IS:7452-1974 with non friction projecting type of hinges fitted with revetts or nut bolt system as directed, glazing cleats, lugs, two nos MS anodised peg stays and fastner for each window of size 900 x 1200 mm, 4 mm thick clear glass pane (each glass max size 450 x 450 mm), including fixing in position, fixing lugs in cement concrete 1:2:4 with stone chips 12.5 mm down cutting holes & mending goods damages, 10 mm dia MS round guard bar welded horizontally 125 c/c with each window etc complete with one coat of primer and two coats of water proofing cement paint in all respect.	5	SQM		
24.22	Applying one coat of cement primer of Seacem or equivalent on old or new plastered or concrete surface (old or new) to receive water proofing cement based paint including scraping, cleanning and preparing the surface throughly complete as per direction of the engineer-in-charge. After completion of painting rooms/ areas are to be handed over with neat and clean condition (outside wall).	387	SQM		
24.23	2 coats white washing with line including cleaning and smoothening surface thoroughly to give an even shade (inside wall).	600	SQM		
24.24	Supply and providing of 5 mtr wide x 5 mtr height gate (2 leafs 2.5 mtr each) made of 0.5 mm CGI sheet supportted with 50 x 50 x 6 mm angle with two posts ISMB 150 & all fittings and fixtures like hinges, hatch boalts, locking arrangements etc complete as per drawing, specification and finished with one coats of red oxide primer followed by two coats (Berger) synthetic enamel as directed by site in-charge.	100	SQM		
24.25	Providing attach/ common toilet with following facilities as directed by BHEL: (a) Inside size of toilet 1.35 mtr x 1.35 mtr, (b) 5 mm thick white colour ceramic floor tile & inside walls tile upto 1.2 mtr height from finish floor, (c) one white vitreous wash basin 550 x 400 mm (Hindustan make or equivalent) with CI bracket, 15 mm CP brass pillar taps, 32 mm PVC waste water pipe, 32 mm CP brass waste, one CP towel rail 550 mm long, one best quality 550 x 400 mm mirror etc complete, (d) one European type WC Pan with seat and lid black colour, low level 10 lts capacity white PVC flushing cistern, etc (e) all inside pipe lines shall be 15 mm/ 20 mm PVC & concealed pipes, (f) main external supply water pipe line shall be 25 mm dia PVC of 6 M, complete in all respect including testing (g) Soil pipe shall be min 75 mm dia CI for below floor if any and outside shall be 100 mm PVC of supreme or equivalent. Masonry & plastering will be paid as per respective items. Price to be quoted as lumsum for each set of toilet.	1	SET		
24.26	Consolidation of subgrade/ existing surface with 12 T power roller or vibromax including making good the undulations with earth and rerolling the subgrade for road, hard surfacing of equipment store, assembly yard etc as directed by BHEL.	36000	SQM		
24.27	Providing and laying stone for making road with specified sizes of approved quality hard rock rubble or hand broken hard metal of sizes ranging from 100mm to 225mm, any depths etc in one layers approximately 250mm thickness after compaction, hand packing, filling in interstices with quarry spalls/moorum and providing a layer of 25mm thickness (consolidated) of moorum over layer of soling including watering, thoroughly compacting each layer with 12 tonne power roller or vibromax with minimum 6 passes etc all as per the direction of the Engineer and as per specification.	9000	CUM		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
24.28	Providing and Laying water bound macadam base for hard surfacing of open equipment store, preassembly yard etc in 2 layers of 75 mm. thickness with stone aggregate 90mm to 45mm size stone screening and binding material including screening, sorting, spreading and consolidation with power road roller 12T including carriage spreading and consolidation of blinding material moorum etc Including cost of material,labour,all complete.	5400	CUM		
24.29	Providing PVC pipe and fittings and fixtures of Supreme or equivalent make with all materials, labour etc complete for drinking water .				
24.29.1	For external 32mm dia.	20	MTR		
24.29.2	For external 40mm dia.	20	MTR		
24.29.3	For external 50mm dia.	30	MTR		
24.30	Providing PVC pipe with fittings and fixtures of Supreme or equivalent make with all materials, labour etc complete for external sewer line / waste water line connection upto open drain or manhole to manhole / septic tank / soak pit, as directed by BHEL.				
24.30.1	For external 75mm dia.	25	MTR		
24.30.2	For external 100mm dia.	30	MTR		
24.31	Suppy, Fitting & fixing/laying of GI pipe as per IS 1239/IS 3589 with all necessary accessories i.e socket, bends, tees, unions, cross, elbow, nipple, long screw, reducing sockets, reducing tees, short pieces etc. complete for making common ring header for constrcution/drinking water including cost of all necessry jointing materials labour etc. all complete (payment will be made on the center line meaurement of total pipeline including all specials).				
24.31.1	25 mm meduim quality.	10	RM		
24.31.2	32 mm meduim quality.	10	RM		
24.31.3	50 mm meduim quality.	20	RM		
24.32	Proving best quality locally available stop valve, 40 mm dia.	2	NO		
24.33.1	Providing and fixing NP3 hume pipe for road crossing 300 mm dia with all labour, transport, jointing etc complete.	15	RM		
24.33.2	Providing and fixing NP3 hume pipe for road crossing 400 mm dia with all labour, transport, jointing etc complete.	20	RM		
24.34	Providing and fixing 2000 lts capacity PVC water tank of Syntex or equivalent quality for drinking water sustem with 40mm dia inlet and outlet valve with all labour and materials etc. complete.	1	NO		
24.35	Providing and fixing security kiosk size approx 2Mx2M in plan, front height 3M and back side height 2.9M, made of structural angle frame 65x65x6 all verticals and two horizontals with diagonals, 3 vertical sides and roof shall be covered with CGI sheet 0.5 MM thick with one each side opening 300x300MM for viewing, floor shall be made with 40 MM thick wooden planks (second class treated wood) at an height of 400MM above ground level, one wooden planks 2.0mx450mm size to be provided for sitting arrangement inside kiosk, all angles and planks top side shall be painted with one coat of primer and two coats of synthetic enamel paint finish including all labours and materials etc complete.	3	SET		

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
24.36	1.2M high fencing with MS angle post of size 40X40X5 mm 1.8 M long post placed every 3M centre to centre embeded in concrete blocks(1:2:4), every 15th post, last but one end post corner post shall be strutted on both sides and post on one side only and provided with 8 horizontal lines and two diagonal sinterwoven with horizontal wires, of barbed wire 9.38 kg per 100 metres (min) between two post fitted and fixed with GI staples turn buckles, angle post shall be embeded in plain cement concrete(1:2:4)size 300x300x600mm deep below ground etc complete including excavation, backfilling, concreting, one coat of primer, two coat of synthetic enamel paint finish. Contractor will supply all materials including cement , structural steel, paint, labour etc complete.				
24.36.1	For structural angle post with two coats of bitumen based protective coating etc complete.	544	KG		
24.36.2	Supplying, fitting, fixing galvanised chain link fencing of approved quality 50mmx50mmx8 g, by means of galvanised `C` clips, with fixing of galvinised special clips etc. Contractor to supply all materials. Angle post to be paid separately as per item no 25.1. Payment terms - a) On receipt of materials at site - 70%; b) On completion of erection & fixing - 30%.	467	SQM		
24.36.3	For GI barbed with all fixing etc complete. Contractor to supply all materials.	375	KG		
TOTAL					
25.0	**GENERAL (Quote % below or at par or above the Scheduled of Rates of DSR-2007)**				
25.1	Rate for complete item		%	Below/ At par/ Below	
25.2	Rate for supply of material		%	Below/ At par/ Below	
25.3	Rate for supply of labour		%	Below/ At par/ Below	

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-3 - UTILITY BOILER (2 NOS) PRICE

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
1.0	Erection, testing, commissioning, trial run, handing over etc of 2 nos 80 TPH utility boiler with its associated auxiliaries, piping etc, covering trial run and PG test as detailed in specification.				
1.1	Pressure parts.	632	MT		
1.2	Non-pressure parts.	848	MT		
1.3	Chimney.	350	MT		
1.4	Piping.	200	MT		
1.5	Fuel firing syste.	65	MT		
1.6	Lining & insulation.	140	MT		
TOTAL (UTILITY BOILER)					

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-4 - HRSG (2 NOS) PRICE

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
1.0	Erection, testing and commissioning of 2 x 80 MW utility boiler with its associated auxiliaries, piping etc, covering trial run and PG test as detailed in specification.				
1.1	Pressure parts.	584	MT		
1.2	Non-pressure parts.	854	MT		
1.3	Chimney.	340	MT		
1.4	Piping.	60	MT		
1.5	Lining and insulation.	140	MT		
TOTAL (HRSG)					

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-5 - GTG (2 NOS) PRICE

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
1.0	Erection, testing and commissioning of 2 x 20 MW gas turbine and generator (Frame-V), with its associated auxiliaries, piping etc covering trial run/ reliability run and PG test/ field performance guarantee test as detailed in specification.	2	SET		

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-6 - STG (1 NO) PRICE

SL NO	DESCRIPTION	QUANTITY		RATE (Rs)	AMOUNT (Rs)
1.0	Erection, testing and commissioning of 1x13 MW steam turbine generator set with its associated auxiliaries, piping, etc, covering trial run/ reliability run and PG test/ field performance guarantee test as detailed in specification.	1	SET		

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-7 - ELECTRICAL AND C&I PRICE

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
1.0	HT PANEL, TRANSFORMER, BUS DUCT						
1.1	33 KV Isolating breakers (2 Panels).	1500	1300x4000x 500	2	NO		
1.2	6.6 KV switch board (Total of 35 panels).	1500	820x2650x2700	1	NO		
1.3	11/34.5 KV, 20 MVA, ONAN STG generator transformer.	62000, 18000 ltr	8500x6800x7000	1	NO		
1.4	11/34.5 KV, 31.5/35 MVA, ONAN/ONAF GTG 1 & 2 generator transfomer.	72000, 21000 ltr	11000x6200x6700	1	NO		
1.5	33/6.6 KV, 15/18.55 MVA, ONAN/ONAF power transformer 1 & 2.	56000, 16000 ltr	8500x9000x6500	2	NO		
1.6	6.6/ 0.433 KV, 2.0 MVA, ONAN.	8000, 1400 ltr	3000x3500x3300	4	NO		
1.7	6.6/0.433 KV, 2.5 MVA, ONAN.	8000, 1400 ltr	3000x3500x3300	2			
1.8	6.6 KV NGR for SAT & emergency SAT.	600	1500x1000x1500	2	NO		
1.9	2000A, 6.6 KV, 50 HZ, 40 KA/ 1 SEC, CR enclosure, TP, phase segregated bus duct.	110 kg/mtr	5000x1200x800 (indoor) 5000x1200x800 (outdoor)	2			
1.10	3200 A, 415 V, 50 HZ, CR enclosure, TPN, non-phase segregated bus duct.	100 kg/mtr	5000x1200x800 (indoor), 5000x1200x800 (outdoor)	4	NO		
1.11	4000 A, 415 V, 50 HZ, CR enclosure, TPN, non phase segregated bus duct.	100 kg/mtr	5000x1200x800 (indoor), 5000x1200x800 (outdoor)	2			
1.12	415/415 V, 250 KVA lighting transformers.	800	1100x600x1500	2	BOARD		
1.13	415/415 V, 150 KVA emergency lighting transformer.	500	1000x600x1200	2	BOARD		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
2.0	LT SWITCH GEAR						
2.1	415 V PMCC 1.	12000	14400x1754x2430	1	BOARD		
2.2	415 V PMCC 2.	13000	16000x1754x2430	1	BOARD		
2.3	415V EPMCC.	16000	20000x1754x2430	1	BOARD		
2.4	415 V BOP MCC 1 & 2.	7000	16000x1350x2430	2	BOARD		
2.5	415 V GT MCC 1 & 2.	6000	13000x1350x2430	2	BOARD		
2.6	415 V VENT MCC 1.	7000	15200x1350x2430	1	BOARD		
2.7	415 V ASB.	5500	12000x1350x2430	1	BOARD		
2.8	415 V MLDB.	4000	10000x650x2500	1	BOARD		
2.9	415 V AC ELDB.	4000	9600x650x2430	1	BOARD		
2.10	110 V STATION DCDB.	3500	8000x650x2430	2	BOARD		
2.11	110 V DC ELDB.	4800	4000x650x2430	4			
2.12	125 V GT DCDB 1 & 2.	3000	12000x650x2430	2	SET		
2.13	110 V UPS DB.	4500	7200x650x2430	1	SET		
2.14	STG MCC 1 & 2.	4500	14200x650x2430	2	SET		
2.15	AC SYSTEM MCC.	6000	7200x1350x2430	1	SET		
2.16	415 V BOILER MCC 1 & 2.	5500	7200x1350x2430	2	SET		
2.17	HRSG MCC 1 & 2.	6000	7200x1350x2430	2	SET		
3.0	HT CABLE KITS						
3.1	1C x 630 sqmm, 11 KV copper cable.	5	--	40	SET		
3.2	1C x 630 sqmm, Al cable.	3.5	--	60			
3.3	3C x 185 sqmm, 6.6 KV Al cable.	3	--	50	NO		
3.4	3C x 300 sqmm, Al 6.6 KV cable.	4	--	20	NO		
4.0	220 V station battery chargers (Total 2 panels).	2000	4500x830x2000	2	SET		
5.0	220 V station batteries (1900 AH).	217 kg per cell	11000x1250x2500	2	SET		
6.0	SCAP panels.	9600	14400x1250x2200	1	NO		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
7.0	125 V GT DC system package.	4000kg	2500x830x2000 (Charger) 4370x830x2500 (Batteries)	2	SET		
8.0	Rubber mat 2, 2.5 mm & 3 mm thick.	5	1M x 2M	500	NO		
9.0	HT POWER CABLE						
9.1	1C x 500 sqmm, 33 KV (E) armored, Cu conductor, XLPE insulated FRLS outer-sheathed cable.	--	--	3000	MTR		
9.2	1C x 630 sqmm, 11 KV (UE) armored, Cu conductor, XLPE insulated FRLS outer-sheathed cable.	--	--	2000	MTR		
9.3	3C x 300 sqmm, 6.6 KV (UE) armored, Al conductor, XLPE insulated FRLS outer-sheathed cable.	--	--	1000	MTR		
9.4	3C x 185 sqmm, 6.6 KV (UE) armored, Al conductor, XLPE insulated FRLS outer-sheathed cable.	--	--	2100	MTR		
10.0	LT POWER CABLE						
10.1	3.5C x 300 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	2000	MTR		
10.2	3.5C x 185 sqmm, 1.1 KV armored Al conductor PVC Insulated, FRLS outer sheathed.	--	--	4000	MTR		
10.3	3C x 95 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	5000	MTR		
10.4	3C x 70 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	5000	MTR		
10.5	3C x 50 sqmm, 1.1 KV armored Al conductor PVC Insulated, FRLS outer sheathed.	--	--	4000	MTR		
10.6	3.5C x 95 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	4000	MTR		
10.7	3C x 4 sqmm, 1.1 KV armored Cu conductor PVC insulated, FRLS outer sheathed.	--	--	12000	MTR		
10.8	3C x 16 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	4000	MTR		
10.9	3C x 10 sqmm, 1.1 KV armored Cu conductor PVC Insulated, FRLS outer sheathed.	--	--	10000	MTR		
10.10	1C x 240 sqmm, 1.1 KV armored Cu conductor PVC insulated, FRLS outer sheathed.	--	--	3000	MTR		
10.11	3C x 120 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	3000	MTR		

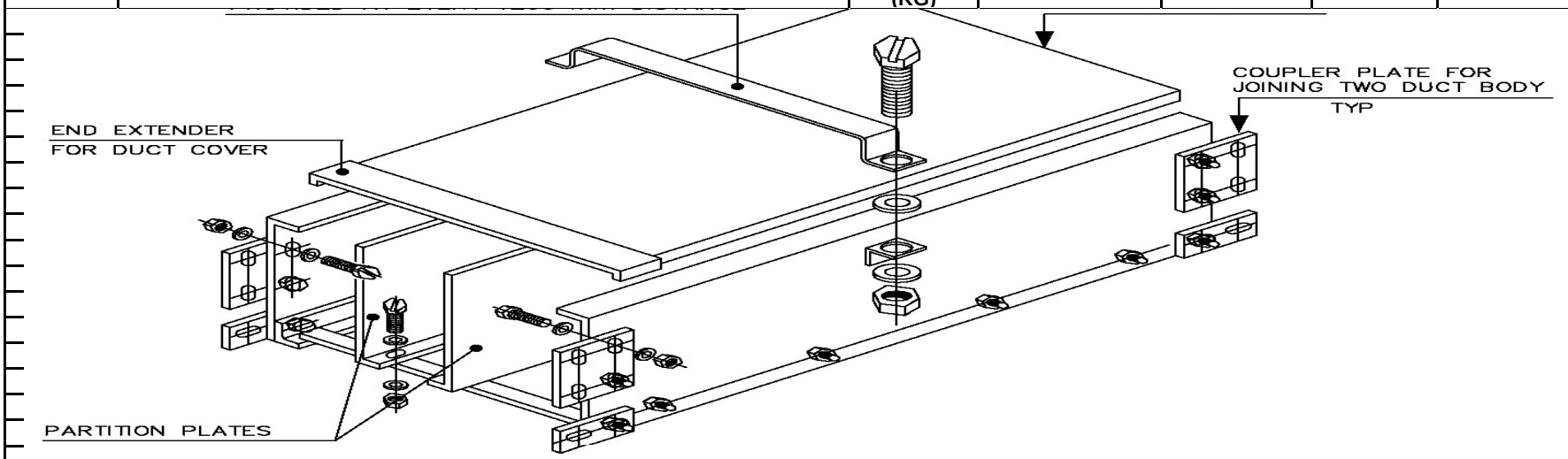
SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
10.12	1C x 10 sqmm, 1.1 KV armored Cu conductor PVC insulated, FRLS outer sheathed.	--	--	3000	MTR		
10.13	3C x 35 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	5000	MTR		
10.14	4C x 16 sqmm, 1.1 KV armored Cu conductor PVC insulated, FRLS outer sheathed.	--	--	10000	MTR		
10.15	1C x 150 sqmm, 1.1 KV armored Cu conductor PVC insulated, FRLS outer sheathed.	--	--	2000	MTR		
10.16	1C x 35 sqmm, 1.1 KV armored Cu conductor PVC insulated, FRLS outer sheathed.	--	--	2000	MTR		
10.17	3C x 185 sqmm, 1.1 KV armored Al conductor PVC insulated, FRLS outer sheathed.	--	--	3000	MTR		
11.0	CONTROL CABLE						
11.1	3C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	30000	MTR		
11.2	5C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	20000	MTR		
11.3	7C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	5000	MTR		
11.4	10C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	45000	MTR		
11.5	12C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	3000	MTR		
11.6	16C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	4000	MTR		
11.7	19C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	16000	MTR		
11.8	24C x 2.5 sqmm, 1.1 KV PVC insulated FRLS outer sheathed.	--	--	2000	MTR		
12.0	CABLE GLANDS AND LUGS (SUPPLY & INSTALLATION)						
12.1	Cable gland: 7-9.5 mm.	--	--	450	NO		
12.2	Cable gland: 13-18 mm.	--	--	220	NO		
12.3	Cable gland: 18.5-20 mm.	--	--	150	NO		
12.4	Cable gland: 20.5-23 mm.	--	--	170	NO		
12.5	Cable gland: 23.5-26 mm.	--	--	90	NO		
12.6	Cable gland: 26.5-30 mm.	--	--	120	NO		
12.7	Cable gland: 30.5-33 mm.	--	--	50	NO		
12.8	Cable gland: 33.5-37 mm.	--	--	70	NO		
12.9	Cable gland: 41.5-46 mm.	--	--	25	NO		
12.10	Cable gland: 46.5-52 mm.	--	--	40	NO		
12.11	Cable gland: 52.5-61 mm.	--	--	20	NO		
12.12	Cable lug: 4 sqmm.	--	--	1	LOT		
12.13	Cable lug: 10 sqmm.	--	--	1	LOT		
12.14	Cable lug: 16 sqmm.	--	--	1	LOT		
12.15	Cable lug: 35 sqmm.	--	--	1	LOT		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
12.16	Cable lug: 50 sqmm.	--	--	1	LOT		
12.17	Cable lug: 70 sqmm.	--	--	1	LOT		
12.18	Cable lug: 95 sqmm.	--	--	1	LOT		
12.19	Cable lug: 120 sqmm.	--	--	1	LOT		
12.20	Cable lug: 150 sqmm.	--	--	1	LOT		
12.21	Cable lug: 185 sqmm.	--	--	1	LOT		
12.22	Cable lug: 240 sqmm.	--	--	1	LOT		
13.0	PRE FABRICATED CABLE TRAYS (GI) AND ACCESSORIES						
13.1	Ladder type cable tray, W=750 mm.	50	--	2000	NO		
13.2	Ladder type cable tray, W=600 mm.	40	--	2500	NO		
13.3	Ladder type cable tray, W=300 mm	30	--	750	NO		
13.4	Cover along with accessories for 300 mm width ladder type cable trays.	10	--	200	NO		
13.5	Cover along with accessories for 600 mm width ladder type cable trays.	13	--	800	NO		
13.6	Vertical down of 600 mm bending radius with coupler plates for ladder type cable tray, w=300 mm.	40	--	150	NO		
13.7	Vertical up of 600 mm bending radius with coupler plates for ladder type cable tray, w=300 mm.	35	--	150	NO		
13.8	Horizontal bend of 600 mm bending radius with coupler plates for ladder type cable tray, w=300 mm.	40	--	160	NO		
13.9	Horizontal tee of 1250 mm bending radius with coupler plates for Ladder Type Cable tray, w=750 mm.	60	--	150	NO		
13.10	Horizontal bend of 1250mm bending radius with coupler plates for Ladder Type Cable tray, w=750mm	50	--	80	NO		
13.11	Vertical up of 1250 mm bending radius with coupler plates for ladder type cable tray, w=750 mm.	60	--	60	NO		
13.12	Vertical down of 1250 mm bending radius with coupler plates for ladder type cable tray, w=750 mm.	--	--	60	NO		
13.13	Horizontal cross of 1250 mm bending radius with coupler plates for ladder type cable tray, w=750 mm.	--	--	60	NO		
13.14	750 mm to 600 mm right hand reducer along with CP for ladder type.	--	--	50	NO		
13.15	750 mm to 600 mm left hand reducer along with CP for ladder type.	20	--	50	NO		
13.16	Cover along with accessories for 750 mm width ladder type cable tray.	15	--	250	NO		
13.17	600 mm to 300 mm left hand reducer & with coupler plates for LDR type (channel) cable trays.	20	--	50	NO		
13.18	600 mm to 300 mm right hand reducer & with coupler plates for LDR type (channel) cable trays.	20	--	50	NO		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
13.19	HOR tee of 900 mm bending rad & coupler plates for 600 mm width LDR type (channel) cable tray.	40	--	100	NO		
13.20	HOR bend of 900 mm bending rad & coupler plate for 600 mm width LDR type (channel) cable tray.	40	--	160	NO		
13.21	VER up of 900 mm bending rad & coupler plates for 600 mm width LDR type (channel) cable tray.	50	--	150	NO		
13.22	VER down of 900 mm bending rad & coupler plates for 600 mm width LDR type (channel) cable tray2.	55	--	150	NO		
13.23	HOR cross of 900 mm bending rad & coupler plate for 600 mm width LDR type (channel) cable tray.	40	--	60	NO		
13.24	600 mm (W) perforated type cable tray.	50	--	1500	NO		
13.25	300 mm(W) perforated type cable tray.	30	--	800	NO		
13.26	150 mm (W) perforated type cable tray.	35	--	1850	NO		
13.27	50 mm(W) perforated type cable tray.	30	--	1500	NO		
13.28	Cover for perforated type cable tray, W=600 mm.	30	--	600	NO		
13.29	Cover for perforated type cable tray, W=300 mm.	25	--	800	NO		
13.30	Cover for perforated type cable tray, W=150 mm.	25	--	1850	NO		
13.31	Cover for perforated type cable tray, W=50 mm.	20	--	1500	NO		
13.32	HOR tee of 900 mm bending rad & coupler plates for 600 mm width perforated type.	40	--	50	NO		
13.33	HOR bend of 900 mm bending rad & coupler plate for 600 mm width perforated type.	35	--	80	NO		
13.34	Vertical up of 900 mm bending radius with coupler plates for perforated type cable tray, w=600 mm.	30	--	50	NO		
13.35	Vertical down of 900 mm bending radius with coupler plates for perforated type cable tray, w=600 mm.	40	--	50	NO		
13.36	600 mm to 300 mm left hand reducer & with coupler plates for perforated type.	25	--	40	NO		
13.37	600 mm to 300 mm right hand reducer & with coupler plates for perforated type.	25	--	40	NO		
13.38	HOR bend of 600 mm bending rad & coupler plate for 300 mm width perforated type.	30	--	50	NO		
13.39	Vertical up of 600 mm bending radius with coupler plates for perforated type cable tray, w=300 mm.	30	--	50	NO		
13.40	Vertical down of 600 mm bending radius with coupler plates for perforated type cable tray, w=300 mm.	40	--	50	NO		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
13.41	300 mm to 150m m right hand reducer & with coupler plates for perforated type.	25	--	50	NO		
13.42	300 mm to 150 mm left hand reducer & with coupler plates for perforated type.	25	--	50	NO		
14.0	CABLE DUCTS AND ACCESSORIES						
14.1	800 mm width, 300 mm height straight run duct with accessories including Joining plate-CAT 1.	--	--	225	NO		
14.2	800 mm width, 300 mm height duct equal tee (Type-A) with accessories including joining plate-CAT 1.	--	--	10	NO		
14.3	800 mm width, 300 mm height duct equal tee (Type-B) with accessories including Joining plate-CAT-1.	--	--	10	NO		
14.4	800 mm width, 300 mm height duct elbow (horizontal plane) - (Type-A) with accessories including Joining plate-CAT 1.	--	--	10	NO		
14.5	800 mm width, 300 mm height duct elbow (horizontal plane) - (Type-B) with accessories including Joining plate-CAT 1.	--	--	10	NO		
14.6	800 mm width, 300 mm height duct elbow (vertical plane) (Type-A) with accessories including Joining plate-CAT-1.	--	--	10	NO		
14.7	800 mm width, 300 mm height duct elbow (vertical plane) (Type-B) with accessories including Joining plate-CAT-1.	--	--	10	NO		
14.8	800 mm width to 400 mm width, 200mm height duct width reducer –'M' path straight (Type-A) with accessories including Joining plate-CAT 1.	--	--	10	NO		
14.9	End cover for 800 mm width, 300mm height cable duct.	--	--	10	NO		
14.10	400 mm width, 200 mm height straight run duct with accessories including Joining plate-CAT 1.	--	--	500	NO		
14.11	400 mm width, 200 mm height duct elbow (horizontal plane) (Type-A) with accessories including joining plate-CAT 1.	--	--	20	NO		
14.12	400 mm width, 200 mm height duct elbow (horizontal plane) (Type-B) with accessories including Joining plate-CAT 2.	--	--	20	NO		
14.13	400 mm width, 200 mm height duct elbow (vertical plane) (Type-A) with accessories including Joining plate-CAT-1.	--	--	20	NO		
14.14	400 mm width, 200 mm height duct elbow (vertical plane) (Type-B) with accessories including Joining plate-CAT-1.	--	--	20	NO		
14.15	End cover for 400 mm width, 200 mm height cable duct.	--	--	20	NO		

TYPICAL CABLE DUCT ASSEMBLY DETAILS

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
							
15.0	STRUCTURAL STEELS						
15.1	ISMC 100 x 50 x 6 mm channels	--	--	70	MT		
15.2	ISA 65 x 65 x 6 mm runner angles.	--	--	50	MT		
15.3	ISA 50 x 50 x 6 mm runner angles.	--	--	20	MT		
16.0	PLANT EARTHING MATERIALS						
16.1	65mm dia pipe electrodes,3 M long GI .	--	--	100	NO		
16.2	75 x 10 mm GI strips.	--	--	9,000	MTR		
16.3	50 x 6 mm GI strip.	--	--	4000	MTR		
16.4	35 x 6 mm GI strips.	--	--	4000	MTR		
16.5	8 SWG GI wire, solid.	--	--	5400	MTR		
16.6	16 SWG GI wire, solid.	--	--	5000	MTR		
16.7	3/8” dia GI fine wire rope.	--	--	4000	MTR		
16.8	5/8” dia GI fine wire rope.	--	--	4000	MTR		
16.9	65 mm dia pipe electrodes,3 M long copper.	--	--	60	NO		
17.0	PLANT LIGHTNING PROTECTION						
17.1	65 mm dia pipe electrodes, 3 M long GI.	--	--	30	NO		
17.2	75 x 10 mm GI strips.	--	--	1000	MTR		
17.3	50 x 6 mm GI strip.	--	--	1000	MTR		
17.4	35 x 6 mm GI strips.	--	--	1000	MTR		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
17.5	Vertical air termination rod.	--	--	20	NO		
18.0	CONVENTIONAL FIRE PROOF SEALING MATERIALS						
18.1	Fire break coatings for HT/LT power cables.	--	--	500	SQM		
18.2	Fire proof materials for sealing of wall / floor openings and panel bottom.	--	--	1500	SQM		
18.3	Fire proof materials required for sealing of cable entry thru conduits/ trenches.	--	--	300	SQM		
19.0	MCT (MULTI CABLE TRANSIT) SYSTEM						
19.1	MCT frame.	--	--	26	NO		
19.2	MCT blocks						
19.2.1	RM 30 (10-25 sqmm outer dia cables).	--	--	6100	NO		
19.2.2	RM 40 (21.5-34.5 sqmm outer dia cables).	--	--	1050	NO		
19.2.3	RM 90 (48-71 sqmm outer dia cables).	--	--	20	NO		
20.0	ECS PACKAGE						
20.1	I/O & RTDs panels.	1000	1000x1000x2500	30	NO		
20.2	Transducer panels	1000	1000x1000x2500	4	NO		
20.3	RTUs, data concentrators, load managers & power distribution boards .	1000	1000x1000x2500	45	NO		
20.4	MMI stations, furnitures.	200	2000x1500x1500	4	NO		
20.5	Printers and furnitures.	50	2000x1500x1500	3	NO		
21.0	C&I PACKAGE						
21.1	Flow nozzles.	--	--	40	NO		
21.2	Orifice plate assemblies.	--	--	30	NO		
21.3	Mass flow meter/ vortex flow meters.	--	--	5	NO		
21.4	Differential pressure transmitters.	--	--	120	NO		
21.5	Control valve with HART positioners.	--	--	60	NO		
21.6	Level gauges.	--	--	10	NO		
21.7	PRDS and control valves.	--	--	5	NO		
21.8	Pressure gauges.	--	--	150	NO		
21.9	Diff pressure gauges.	--	--	15	NO		
21.10	Pressure safety valve & Silencers.	--	--	40	NO		
21.11	Pressure transmitters.	--	--	120	NO		
21.12	Temperature element (Thermo couple).	--	--	45	NO		
21.13	Temperature element (RTD).	--	--	40	NO		
21.14	Temperature gauges.	--	--	140	NO		
21.15	Temperature safety valves.	--	--	10	NO		
21.16	Temperature transmitters.	--	--	35	NO		
21.17	On-off control valves.	--	--	20	NO		
21.18	Hand held communicator.	--	--	5	NO		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
21.19	Thermowells.	--	--	140	NO		
21.20	Radar level instruments/ level transmitters.	--	--	15	NO		
21.21	Annubar.	--	--	5	NO		
21.22	Rotameters.	--	--	4	NO		
21.23	Self actuated valves.	--	--	8	NO		
21.24	Instrumentation items for on skid package and their other auxiliary packages.	--	--	1	LOT		
21.25	On skid instruments for sub packages like instrument air system; gas conditioning system; various storage and drain tanks etc.	--	--	1	LOT		
21.26	Gauge boards on equipment skids.	--	--	1	LOT		
21.27	Needle valve.	--	--	200	NO		
21.28	Gate valves.	--	--	500	NO		
21.29	Globe valves.	--	--	2000	NO		
21.30	Ball valves.	--	--	1200	NO		
21.31	Tube, pipe fittings.	--	--	1	LOT		
21.32	Pipe fittings, nipples of alloy steel, carbon steel, SS.	--	--	1	LOT		
21.33	Condencing chambers and syphons.	--	--	1	LOT		
21.34	Air filter regulators.	--	--	1	LOT		
21.35	Impulse pipes & tubes for impulse connection for instrument hookup.						
21.35.1	SS tube 12.7 X 2.1 mm.	--	--	2200	MTR		
21.35.2	SS pipe 21.3 X 3.7 mm.	--	--	5000	MTR		
21.35.3	SS pipe 33.4 X 3.4 mm.	--	--	2000	MTR		
21.35.4	SS tube 6 mm.	--	--	2000	MTR		
21.35.5	CS pipe 21.3 X 4.74 mm.	--	--	2500	MTR		
21.35.6	As pipe 21.3 X 4.74 mm.	--	--	2500	MTR		
21.35.7	SS pipes 1” for instrument air.	--	--	2000	MTR		
21.36	AC UPS system consisting of battery banks, inverter & charger panels - 3 nos, distribution boards, capacity = 2 x 100 KVA approx.	--	--	1	SET		

SL NO	DESCRIPTION	UNIT WEIGHT (KG)	UNIT DIMENSION (mm)	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
21.37	Charger panel.	--	8000x1200x2200	2	SET		
21.38	Battery.	--	4000x4000x1600	4	SET		
21.39	Vibration monitoring system, located at rack room. Scope includes , E&C of operator consoles printers marshalling panels, I/O & system panels- 1 no networking cables, inter panel cables hardwired consoles etc mounting of probes in filed, furniture, cCabling from field to panel in control room & to other panels.	--	1000x800x2200	2	SET		
21.40	BOP PLC system (located at rack room & operator room). Scope includes E&C of operator consoles printers marshalling panels, I/O & system panels networking cables, inter panel cables hardwired consoles etc furniture - cabling from field to panel in control room & to other panels.	--	1000x800x2200	60	NO		
21.41	CCTV system (located at Rack room & operator room). Scope includes E&C of CCTV cameras - 6 nos CCTV consoles/ monitors printers system panels networking cables, furniture cabling from field to panel in control room & to other panels.	--	800x800x2200	1	SET		
21.42	Cables.						
21.42.1	1P x 1.5 sqmm, (Individual & overall shielded) Intrinsic safe.	--	--	8000	MTR		
21.42.2	1P x 1.5 sqmm, (Individual & overall shielded) non-intrinsic safe.	--	--	25000	MTR		
21.42.3	6P x 1.5 sqmm (Individual & overall shielded) Intrinsic safe.	--	--	10000	MTR		
21.42.4	6P x 1.5 sqmm (Individual & overall shielded) non intrinsic safe.	--	--	40000	MTR		
21.42.5	12P x 1.5 sqmm (Individual & overall shielded) intrinsic safe.	--	--	20000	MTR		
21.42.6	12P x 1.5 sqmm (Individual & overall shielded) non intrinsic safe.	--	--	60000	MTR		
21.42.7	1T x 1.5 sqmm, individual & overall shielded triad cable.	--	--	3500	MTR		
21.42.8	8T x 1.5 sqmm individual & overall shielded triad cable.	--	--	12000	MTR		
21.42.9	1P x 16 AWG Cr-Al extention cable.	--	--	2000	MTR		
21.42.10	12P x 20 AWG Cr-Al extension cable.	--	--	14000	MTR		
21.42.11	Optical fiber cables.	--	--	5000	MTR		
21.42.12	Cables for CCTV system.						
21.42.12.1	3C x 1.5 mm control cable (control & video signal).	--	--	3000	MTR		
21.42.12.2	3 C x 1.5 sqmm power cable.	--	--	4000	MTR		
21.42.12.3	6 P x 1.5 sqmm.	--	--	4000	MTR		
21.42.13	Explosion/ weather proof junction boxes.	--	--	300	NO		
21.42.14	Instruments & Junction box canopies.	--	--	400	NO		
TOTAL							
NOTE							
1.0	Unless specifically mentioned above against any item, scope of bidder is limited to erection/ installation, testing, commissioning etc of items.						

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-8 - BOP PRICE

SL NO	DESCRIPTION	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
1.0	Supply and erection of air conditioning ducts for control room, insulation of AC ducts, split ACs for rooms as per PEMC-02460, Rev-01.				
1.1	18G duct Gr 120 along with all necessary support and bolting structure.	750	SQM		
1.2	20G duct Gr 120 along with all necessary support and bolting structure.	1500	SQM		
1.3	22G duct Gr 120 along with all necessary support and bolting structure.	900	SQM		
1.4	24G duct Gr 120 along with all necessary support and bolting structure.	1450	SQM		
1.5	Supply and erection of the resin bonded fibre glass of density 24 kg/ M3, thickness 50 mm along with all fixing hardwares for the thermal insulation of the AC ducts as above. The thermal insulation shall be supplied in slab/ roll form and shall be as per IS:8183.	4800	SQM		
1.6	Supply and erection of 3 TR air cooled split air conditioners along with suitable voltage stabiliser.	5	NO		
1.7	Supply and erection of 5.5 TR air cooled split air conditioners along with suitable voltage stabiliser.	2	NO		
2.0	Passenger lift for switch gear cum control building as per PEMC 02465, Rev-01.	1	SET		
TOTAL					

NOTE

1.0 Bidder shall associate manufacturer/ agencies for aforesaid BOP systems with BHEL approved list of agencies (specified in the specification).

VOLUME-IIIA
PRICE SCHEDULE, REV-1

Civil, structural, architectural work including piling work of main plant, BOP, enabling work etc; supply, installation, maintenence of construction power and erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSG, associated piping, associated electrical, associated C&I, supply & execution of BOP etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam

TENDER NO - PSER:SCT:LPT-A1114:10

SCH-9 - CONSTRUCTION POWER PRICE

SL NO	DESCRIPTION	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
1.0	**SUPPLY**				
1.1	7/4 mm stay set with turn buckle/ bow tightener/ bow set with turn buckles: Supply of stay set complete galvanised with 19/20 mm dia x 1.8 meter long stay rod, anchor plate size 45 cm x 45 cm x 7.5 mm thick, thimble, staty clamp, turn buckle (20 mm x 60 mm)/ bow tightener, 7/4.00 mm dia GI staty wire and strain insulator, clamps, hardware etc, as required.	10	SET		
1.2	Supplying of 15 mm G.I. Pipe (Gr.B) 3 meter long for protection of earth wire.	100	MTR		
1.3	Supply of GI strip size 50 x 6 mm for earthing.	250	MTR		
1.4	Supply of GI strip size 25 x 3 mm mm for earthing.	250	MTR		
1.5	Supply of earth electrode 40 mm dia. 3 Mtr long GI pipe (grade -B).	25	NO		
1.6	Supply earth wire size 6.09 mm. Dia. GI wire.	250	MTR		
1.7	Supply of GI Earth Spike 1822 x 20 mm.	10	NO		
1.8	Supply of Overhead ACSR conductor 'Rabbit' as per specification [6/3.35 mm Al + 1/3.35 mm Steel].	2250	MTR		
1.9	Supply of CC spun pipe of 300 mm dia.	5	MTR		
1.10	Supply of GI pipe (Gr.B) 50 mm dia.	10	MTR		
1.11	Supply of GI pipe (Gr.B) 75 mm dia.	10	MTR		
1.12	Supply of HT danger notice plate of size 250 mm x 200 mm x 2 mm thk., made of mild steel plate painted with vitreous enamelled white on both side and inscription in Red colour on front side as required.	50	NO		
1.13	Supply of Structural steel [IS] for fabrication.	2.5	MT		
2.0	**SERVICE (ETC)**				
2.1	Erection of stay set complete with turn buckle, stay rod, anchor plate, thimble, staty clamp, bow tightener, staty wire and strain insulator, clamps , hardware etc. as required in cement concrete 1:3:6 (1 cement : 3 Coarse sand ; 6 Graded stone aggregate 40 mm nominal size) in foundation including excavation in all type of soil and back filling etc. as required including supply of cement & all other civil materials.	10	SET		
2.2	Installation of 15 mm G.I. Pipe 3 meter long for protection of earth wire lead to earth electrode with suitable clamping arrangment and hardware.	60	MTR		
2.3	Installation [including welding, etc & supply of matching hardwares like nut, bolts, washers, etc] of GI strip size 50 x 6 mm for interconnecting the earth pits on sub station, transformer netrual earthing etc.	150	MTR		

SL NO	DESCRIPTION	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
2.4	Installation of GI strip size 25 x 3 mm [including welding, etc & supply of matching hardwares like nut, bolts, washers, etc] for earthing AB swtich, DO fuse assembly etc,	150	MTR		
2.5	Supply & making the earth pit as per IS 3043 including earth/ massonary work, (size of electrode 50 mm dia. G.I. Pipe, 3 Meter long, class 'B'). Pit shall be filled with alternative layer of charcoal & salt. GI Pipe shall be with funnel with wire mesh for watering. Mansonry block C.I.cover coplete as per IS. All the earth pits are to be inter connectecd with GI strip of size 50x6 mm including all the material arranged by the contractor.	6	NO		
2.6	Installation of earth electrode 40 mm dia. 3 metre long GI pipe directly driven into earth including earth excavation if required..	6	NO		
2.7	Installation of earthwire 6.09 mm dia including supply of clamps, cleats, etc.	150	MTR		
2.8	Erection of Earth Spike	10	NO		
2.9	Laying of 3 core x 150sqmm 1500 KVA grade XLPE HT cable which includes excavation of trench in all king of soil , laying of cable below ground providing sand layer below/ above the cable, brick lining both side and above the cable and back filling as per specification.	250	MTR		
2.10	1500 KVA Heat shrinkable XLPE cable Joint (Out Door):- Making cable end termination with heat shrinkable jointing	4	SET		
2.11	Laying of 3-1/2 core x 240/300 sqmm 1.1 kv grade PVC LT cable which includes excavation of trench in all king of soil , laying below ground providing sand layer below/ above the cable, brick lining both side and above the cable and back filling as per specification.	4000	MTR		
2.12	Termination of 3-1/2 core x 240/300 sqmm Al armoured cable including glanding, drilling the hole in gland plate & making termination with double compression cable gland and copper lugs for 3-1/2 core x240/300 sqmm aluminium armoured cable (Both the end of cable shall be treated one termination)	40	NO		
2.13	Laying below ground in excavated trench (as per specification) of CC spun pipe of 300 mm dia. Wherever cable laid through pipe for road crossing purpose.	30	MTR		
2.14	Installation of GI pipe 50 mm dia including clamps, hardware etc.	20	MTR		
2.15	Installation of GI pipe 75 mm dia including clamps, hardware etc.	20	MTR		
2.16	Fixing of HT danger notice plate on tubulat pole / DP structure of size 250 mm x 200 mm x 2 mm thk., made of mild steel plate painted with vitreous enamelled white on both side and inscription in Red colour on front side as required.	10	NO		
2.17	Installation, testing and commissioning of LT distribution out door kiosk with all the provision as per specification.				
2.17.1	a] Type - A (Incomer 800 Amps, Outgoing 400 Amps - 2 Nos., Outgoing 200 A - 1 No & Outgoing 100 Amps - 2 Nos.]	3	NO		
2.17.2	b] Type - B (Incomer 400 Amps, Outgoing 250 Amps - 2 Nos., Outgoing 100 A - 1 No & Outgoing 63 Amps - 2 Nos.]	2	NO		

SL NO	DESCRIPTION	QUANTITY		UNIT RATE (Rs)	AMOUNT (Rs)
2.18	Fabrication, installation of various structural members such as cross arms, top adaptors, etc for poles, straight line DP structure/ sub-station DP structure/ DP structure for Line Tap-Offs, bracings member , clamps, bracket for gaurd wire or any other fabrication if required and not specified elsewhere in the tender specification etc; including supply of required matching hardwares and painting of one coat of red oxide & two coats of aluminium paint. This also includes the fabrication of other items as required.	2	MT		
2.19	Installation of MCB distribution board with sheet metal enclosure front cover, indoor type, Incoming 100 Amps TP MCB, outgoing 6 nos. 32 Amps SP MCBs (per phase) complete with internal TPN bus bars.	5	NO		
2.20	Installation of Switchboard wooden 150x100 mm with matching cutouts and interconnections.	10	NO		
2.21	Installation of Switchboard wooden 200x300 mm with matching cutouts and interconnections.	10	NO		
2.22	Installation of Indicator lamp for Switchboard (Anchor / Pritam)	10	NO		
2.23	Installation of local make approved quality Exhaust fan with louvers - 12 " sweep.	6	NO		
2.24	Installation of local make approved quality Pedestal fan - 16" sweep.	4	NO		
2.25	Installation of 30m high lighting mast complete with accessories such as head frame,steel wire,trailing cable,double drum winch galvanized lantern carriage, luminaries and their control gear boxes (16 Nos of 2X400W)	8	NO		
2.26	Fixing from roof truss with suitable clamp arrangement, flexible wire for connection between ceiling rose & fitting and commissioning of type HPSV luminaries medium bay industrial type, model BJMBI-150SV of BAJAJ or equivalent of PHILIPS / CROMPTON.	12	NO		
3.0	**OPERATION**				
3.1	Operation & stabilization/ maintenance of sub-stations & associated equipment as erected and maintenance of electrical installations of BHEL like stores sheds (closed), storage yard, etc as per instruction of BHEL. Start of O&M: Upon successful installation and commissioning of the system (to be certified by Construction Manager, BHEL).	2	MTH		
TOTAL					

FORMAT FOR NO DEVIATION CERTIFICATE
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
Power Sector - Eastern Region,
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	Civil, structural, architectural work including piling work of main plant, BOP etc; erection, testing, commissioning etc of 2x80 TPH utility boiler & aux, 2x80 TPH HRSG & aux, 2xFr5 GTG & aux, 1x13.5 MW STG & aux, 2 nos steel chimney for utility boiler, 2 nos steel chimney for HRSH, associated piping, associated electrical, associated C&I etc for 53 MW Combined Cycle Power Plant at BCPL, Lepetkata, Assam.	
Ref	1.0	Tender no PSER:SCT:LPT-A1114:10.
	2.0	BHEL's NIT, vide reference no PSER:SCT:LPT-A1114:2310, dated 23-07-10.
	3.0	BHEL's TCN-01, vide reference no PSER:SCT:LPT-A1114:TCN-01, dated 16-08-10.
	4.0	BHEL's TCN-02, vide reference no PSER:SCT:LPT-A1114:TCN-02, dated 30-08-10.
	5.0	BHEL's TCN-03, vide reference no PSER:SCT:LPT-A1114:TCN-03, dated 08-09-10.
	6.0	BHEL's TCN-04, vide reference no PSER:SCT:LPT-A1114:TCN-04, dated 20-09-10.
	7.0	All other pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website/ issued by you and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT. We hereby confirm our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification, integrity pact (if applicable) and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer in accordance with tender instructions and as per aforesaid references.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)

TENDER NO	**PSER:SCT:LPT-A1114:10**	
VOLUME	**ID & II, REV-1**	**SPECIAL CONDITIONS OF CONTRACT (SERVICE) AND TECHNICAL SPECIFICATION, SCOPE ETC (P-1 – CIVIL, STRUCTURAL, MISC CIVIL PART)**

JOB	**CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP, ENABLING WORK ETC; SUPPLY, INSTALLATION, MAINTENENCE OF CONSTRUCTION POWER AND ERECTION, TESTING, COMMISSIONING ETC OF 2X80 TPH UTILITY BOILER & AUX, 2X80 TPH HRSG & AUX, 2XFR5 GTG & AUX, 1X13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I, SUPPLY & EXECUTION OF BOP ETC**
CAPACITY	**53 MW**
PROJECT	**COMBINED CYCLE POWER PLANT, BCPL, LEPETKATA, ASSAM**

BHARAT HEAVY ELECTRICALS LIMITED
(A Govt Of India Undertaking)
POWER SECTOR – EASTERN REGION
PLOT – DJ 9/1, SECTOR II, SALT LAKE
KOLKATA – 700 091

TENDER NO	**PSER:SCT:LPT-A1114:10**	
VOLUME	**ID & II, REV-1**	**SPECIAL CONDITIONS OF CONTRACT (SERVICE) AND TECHNICAL SPECIFICATION, SCOPE ETC (P-2 – UTILITY BOILER, HRSG PART)**

JOB	**CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP, ENABLING WORK ETC; SUPPLY, INSTALLATION, MAINTENENCE OF CONSTRUCTION POWER AND ERECTION, TESTING, COMMISSIONING ETC OF 2X80 TPH UTILITY BOILER & AUX, 2X80 TPH HRSG & AUX, 2XFR5 GTG & AUX, 1X13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I, SUPPLY & EXECUTION OF BOP ETC**
CAPACITY	**53 MW**
PROJECT	**COMBINED CYCLE POWER PLANT, BCPL, LEPETKATA, ASSAM**

BHARAT HEAVY ELECTRICALS LIMITED
(A Govt Of India Undertaking)
POWER SECTOR – EASTERN REGION
PLOT – DJ 9/1, SECTOR II, SALT LAKE
KOLKATA – 700 091

TENDER NO	**PSER:SCT:LPT-A1114:10**	
VOLUME	**ID & II, REV-1**	**SPECIAL CONDITIONS OF CONTRACT (SERVICE) AND TECHNICAL SPECIFICATION, SCOPE ETC (P-3 – GTG, STG, ELECTRICAL AND C&I PART)**

JOB	**CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP, ENABLING WORK ETC; SUPPLY, INSTALLATION, MAINTENENCE OF CONSTRUCTION POWER AND ERECTION, TESTING, COMMISSIONING ETC OF 2X80 TPH UTILITY BOILER & AUX, 2X80 TPH HRSG & AUX, 2XFR5 GTG & AUX, 1X13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I, SUPPLY & EXECUTION OF BOP ETC**
CAPACITY	**53 MW**
PROJECT	**COMBINED CYCLE POWER PLANT, BCPL, LEPETKATA, ASSAM**

BHARAT HEAVY ELECTRICALS LIMITED
(A Govt Of India Undertaking)
POWER SECTOR – EASTERN REGION
PLOT – DJ 9/1, SECTOR II, SALT LAKE
KOLKATA – 700 091

TENDER NO	**PSER:SCT:LPT-A1114:10**	
VOLUME	**ID & II, REV-0**	**SPECIAL CONDITIONS OF CONTRACT (SERVICE) AND TECHNICAL SPECIFICATION, SCOPE ETC (P-4 – ENABLING PART)**

JOB	**CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP, ENABLING WORK ETC; SUPPLY, INSTALLATION, MAINTENENCE OF CONSTRUCTION POWER AND ERECTION, TESTING, COMMISSIONING ETC OF 2X80 TPH UTILITY BOILER & AUX, 2X80 TPH HRSG & AUX, 2XFR5 GTG & AUX, 1X13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I, SUPPLY & EXECUTION OF BOP ETC**
CAPACITY	**53 MW**
PROJECT	**COMBINED CYCLE POWER PLANT, BCPL, LEPETKATA, ASSAM**

BHARAT HEAVY ELECTRICALS LIMITED
(A Govt Of India Undertaking)
POWER SECTOR – EASTERN REGION
PLOT – DJ 9/1, SECTOR II, SALT LAKE
KOLKATA – 700 091

TENDER NO	**PSER:SCT:LPT-A1114:10**	
VOLUME	**ID & II, REV-0**	**SPECIAL CONDITIONS OF CONTRACT (SERVICE) AND TECHNICAL SPECIFICATION, SCOPE ETC (P-5 – AIR CONDITIONING SYSTEM PART)**

JOB	**CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP, ENABLING WORK ETC; SUPPLY, INSTALLATION, MAINTENENCE OF CONSTRUCTION POWER AND ERECTION, TESTING, COMMISSIONING ETC OF 2X80 TPH UTILITY BOILER & AUX, 2X80 TPH HRSG & AUX, 2XFR5 GTG & AUX, 1X13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I, SUPPLY & EXECUTION OF BOP ETC**
CAPACITY	**53 MW**
PROJECT	**COMBINED CYCLE POWER PLANT, BCPL, LEPETKATA, ASSAM**

BHARAT HEAVY ELECTRICALS LIMITED
(A Govt Of India Undertaking)
POWER SECTOR – EASTERN REGION
PLOT – DJ 9/1, SECTOR II, SALT LAKE
KOLKATA – 700 091

TENDER NO	**PSER:SCT:LPT-A1114:10**	
VOLUME	**ID & II, REV-0**	**SPECIAL CONDITIONS OF CONTRACT (SERVICE) AND TECHNICAL SPECIFICATION, SCOPE ETC (P-6 – ELEVATOR PART)**

JOB	**CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP, ENABLING WORK ETC; SUPPLY, INSTALLATION, MAINTENENCE OF CONSTRUCTION POWER AND ERECTION, TESTING, COMMISSIONING ETC OF 2X80 TPH UTILITY BOILER & AUX, 2X80 TPH HRSG & AUX, 2XFR5 GTG & AUX, 1X13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I, SUPPLY & EXECUTION OF BOP ETC**
CAPACITY	**53 MW**
PROJECT	**COMBINED CYCLE POWER PLANT, BCPL, LEPETKATA, ASSAM**

BHARAT HEAVY ELECTRICALS LIMITED
(A Govt Of India Undertaking)
POWER SECTOR – EASTERN REGION
PLOT – DJ 9/1, SECTOR II, SALT LAKE
KOLKATA – 700 091

TENDER NO	**PSER:SCT:LPT-A1114:10**	
VOLUME	**IIIA, REV-1**	**PRICE SCHEDULE (ABSOLUTE VALUE)**

JOB	**CIVIL, STRUCTURAL, ARCHITECTURAL WORK INCLUDING PILING WORK OF MAIN PLANT, BOP, ENABLING WORK ETC; SUPPLY, INSTALLATION, MAINTENENCE OF CONSTRUCTION POWER AND ERECTION, TESTING, COMMISSIONING ETC OF 2X80 TPH UTILITY BOILER & AUX, 2X80 TPH HRSG & AUX, 2XFR5 GTG & AUX, 1X13.5 MW STG & AUX, 2 NOS STEEL CHIMNEY FOR UTILITY BOILER, 2 NOS STEEL CHIMNEY FOR HRSG, ASSOCIATED PIPING, ASSOCIATED ELECTRICAL, ASSOCIATED C&I, SUPPLY & EXECUTION OF BOP ETC**
CAPACITY	**53 MW**
PROJECT	**COMBINED CYCLE POWER PLANT, BCPL, LEPETKATA, ASSAM**

BHARAT HEAVY ELECTRICALS LIMITED
(A Govt Of India Undertaking)
POWER SECTOR – EASTERN REGION
PLOT – DJ 9/1, SECTOR II, SALT LAKE
KOLKATA – 700 091