T E N D E R S P E C I F I C A T I O N

No. BHE/PW/PUR/MONTI-TGE/447

Receipt, Unloading at Site / Stores / Storage Yard, Handling at Site / Storage Yard / Stores, Verification, Stacking, Preservation of STG Equipments/Components/ Materials including Electrical and Control & Instrumentation Equipments/ Components/ Materials, Materials Management Services, Watch & Ward at Stores and BHEL Office, Collection of materials from BHEL Stores/storage yard, Loading and Transportation to Site of Work, Unloading, Erection, Assembly/Alignment, Fit-up/Welding/Radiography & NDT etc., Testing, Assistance for Commissioning etc. of Surface Condenser, Steam Turbine, Generator, Piping with supports, LP Dosing system, De-aerator with FST & approach platform, LP Heater, Gland Steam Condenser, Drain Cooler, Condensate Extraction Pumps, Boiler Feed Pumps and other related Pumps with auxiliaries, Equipments/Tanks & Vessels, Auxiliaries, Application of Thermal Insulation, CO_2 system, Final Painting, Assistance for PG test and Handing Over of 2x45 MW STG set of

Captive Power Plant

at

Monnet Ispat Limited

Raigarh (Chhattisgarh)

PART-I
(TECHNICAL BID SPECIFICATION, NOTICE INVITING TENDER and GCC)

Bharat Heavy Electricals Limited

Power Sector - Western Region, Nagpur

345-Kingsway, Nagpur-440 001

CONTENTS

CONTENTS

LEGEND:

$: PLACED BEFORE 'GENERAL CONDITIONS OF CONTRACT' IN BOTH HARD AND SOFT COPY DOCUMENTS.

#: ATTACHED AT THE END OF HARD COPY OF TENDER SPECS. PART-I (TECHNICAL BID) AND AS A SEPARATE FILE TITLED '**WEB_NIT_GCC**' AS SOFT COPY HOSTED IN WEB PAGE.

@: ISSUED AS SEPARATE BOOKLET IN HARD COPY AS **PRICE BID (PART-II)** AND AS SEPARATE FILE TITLED 'PRICE_BID' AS SOFT COPY HOSTED IN WEB PAGE.

Bharat Heavy Electricals Limited
Power Sector - Western Region
345-Kingsway, Nagpur-440 001

Tender Specification No. BHE/PW/PUR/MONTI-TGE/447

Name of the Work:

Receipt, Unloading at Site / Stores / Storage Yard, Handling at Site / Storage Yard / Stores, Verification, Stacking, Preservation of STG Equipments/Components/ Materials including Electrical and Control & Instrumentation Equipments/ Components/ Materials, Materials Management Services, Watch & Ward at Stores and BHEL Office, Collection of materials from BHEL Stores/storage yard, Loading and Transportation to Site of Work, Unloading, Erection, Assembly/Alignment, Fit-up/Welding/Radiography & NDT etc., Testing, Assistance for Commissioning etc. of Surface Condenser, Steam Turbine, Generator, Piping with supports, LP Dosing system, De-aerator with FST & approach platform, LP Heater, Gland Steam Condenser, Drain Cooler, Condensate Extraction Pumps, Boiler Feed Pumps and other related Pumps with auxiliaries, Equipments/Tanks & Vessels, Auxiliaries, Application of Thermal Insulation, CO_2 system, Final Painting, Assistance for PG test and Handing Over of 2x45 MW STG set of

Captive Power Plant
at
Monnet Ispat Limited
Raigarh (Chhattisgarh)

EARNEST MONEY DEPOSIT: Please see Special Conditions of Contract

LAST DATE FOR TENDER SUBMISSION: Please obtain updated information from web page **www.bhel.com** ® **Tender Notifications** ® **View Corrigendums.**

THESE TENDER SPECIFICATION DOCUMENTS CONTAINING **PART-I** TECHNICAL BID SPECIFICATION AND **PART- II** PRICE BID, ARE ISSUED TO:

M/s. ……

……

PLEASE NOTE:

1) **THESE TENDER SPECS DOCUMENTS ARE NOT TRANSFERABLE.**
2) **BIDDER SHALL NOTE THAT THEIR OFFER WILL BE CONSIDERED SUBJECT TO THE APPROVAL OF BHEL'S CUSTOMER.**

For Bharat Heavy Electricals Limited

DGM (Purchase)

Place: Nagpur
Date:

Bharat Heavy Electricals Limited
(A Government of India Undertaking)
Power Sector - Western Region
345-Kingsway, Nagpur-440 001

Procedure for Submission of Sealed Tenders

The bidders must submit their tenders as required in two parts in separate sealed covers prominently super-scribed as part-I technical bid and part-II price bid and also indicating on each of the covers the tender specification number and due date and time as mentioned in the tender notice.

Part-I (Technical bid) cover-I

Except the rate schedule, all other schedules, data sheets and details called for in the specification shall be enclosed in Part-I "Technical Bid" only.

Part-II (Price bid) cover-II

All indications of price shall be given in this Part-II "price bid".

These two separate covers-I and II (part-I and part-II) shall together be enclosed in a third envelope (cover-III) along with requisite EMD as indicated earlier and this sealed cover shall be super-scribed and submitted to Dy. General Manager (Purchase) at the above mentioned address before the due date as indicated.
The qualified bidder will be intimated separately about the status of their offer.

Bidders shall fulfil the following conditions.

- Contractor shall deploy adequate resources for this job.
- Contractor should have sound financial stability.
- Bidder should meet quality requirement regarding workmanship, deployment of personnel, erection tools and necessary inspection, measurement & testing instruments.
- All information as called for in various appendices and clauses of tender specification should be furnished. Please refer the checklist. The details so furnished by bidder should be complete in all respects and as per formats specified in tender specification.
- Clarification on tender if any, may be obtained by the bidder before
- Offers must be submitted without any deviation, after seeking clarification, if any.
- Offers received with any deviation or without relevant information as described above are liable to be rejected. Price bids received in the form other than specified in part-II (price bid) are liable to be rejected.
- **Bidder shall note that their offer will be considered subject to the approval of BHEL's customer.**

PROJECT INFORMATION				
1.00	**General**			
1.01	Project Authority		:	**Monnet Ispat Ltd.**
1.02	Name of Project		:	**Monnet Ispat Limited** (Raigarh Sponge Iron Project) Village: Naharpalli Tehsil: Kharsia Dist.: Raigarh-496 001 Chhattisgarh
1.03	Location		:	The Plant site is about 22 km from Raigarh on National Highway No.200 towards Bilaspur
1.04	Nearest Railway Station		:	The nearest railway station is Bhopdeopur on the South Eastern Railway main line.
1.05	Geographical Location		:	$21^0$55'36" N Latitude
				$83^0$20'32" E Longitude
2.00	**Site Conditions**			
2.01	Climate		:	Tropical, region with very hot summer and cool winters. Average annual rain fall 1650.0 mm
2.02	Altitude		:	255 m (average) above Mean Sea Level (MSL)
2.03	Ambient Temperature (dry blb)		:	
	a.	Daily minimum (mean)	:	21.5^0C
	b.	Daily maximum (mean)	:	33.5^0C
	c.	Design ambient temp. for Electrical Equipment	:	50^0C
2.04	Relative Humidity		:	
	a.	High	:	88
	b.	Low	:	19
2.05	Rainfall			
	a.	Average per annum	:	1650.0 mm
	b.	Tropical monsoon	:	June to September
2.06	Heaviest rain fall in 24 hours		:	507.7 mm
2.07	Wind Velocity			1. 10 – 15 km/hr 45 days/year 2. 15 – 22 km/hr 135 days/year 3. 22 – 29 km/hr 180 days/year

PROJECT INFORMATION			
2.08	Maximum Wind Velocity		63 km/hr
2.09	Water Source	:	The make-up water requirement shall be met from River Mahanadi.
2.09	Water table		• Water table during summer is around 30 to 35m below NGL. • Water table during rains is around 10 to 15m below NGL.
2.10	Seismic	:	The area for the proposed power plant lies in Zone III of Seismic Zoning Map of Indian Standard ISS: 1893-1984 and the importance factor is 1.50.
2.11	Bearing Capacity		Net Safe bearing capacity as 25 t/m^2 at 3 meters below ground level.

Bidders are advised to personally visit the project site and acquaint themselves with site location and working conditions prior to submission of their offer. No claim for compensation will be entertained on the grounds of non-familiarity with the site condition & working conditions etc. No claim for compensation will be entertained on the grounds of non-familiarity with the site condition & working conditions etc.

Check List (Vide Para 1.3 of Section-I of General Conditions of Contract)				
1	Name of the Bidder with Postal Address for Correspondence			
2	Name of Contact Person with Telephone & Fax No.	Mr./Ms Tel No. Fax No.		
3	Nature of the firm	PROPRIETARY / PARTNERSHIP / LIMITED CO.		
4	Details of EMD Please Indicate whether 1) One Time EMD or, 2) Only for this Tender	DD No. …… DD Date…… Name of Bank…….. Amount: Rs……		
5	Validity of Offer (BHEL's Requirement: 180 days from Last Date for Offer Submission)	Validity _____ days		
6	Mobilization Time (Please refer Section-11 of SCC)	Mobilization Time _____		
7	Whether any conditions stipulated or any Deviations taken?	**Yes** (vide Document reference:	**No**	
		Bidder to note that tender with conditions unacceptable to BHEL shall be rejected.		
8	Bidder has visited the project site and acquainted with the site conditions		Yes	No
9	Details of concurrent jobs are furnished (**Appendix-VI**)		Yes	No
10	Headquarters organization is furnished		Yes	No
11	Proposed site organization is furnished		Yes	No
12	Names and particulars of directors/partners are furnished		Yes	No
13	Financia l status of the firm (**Annexure 'A' of GCC**) is furnished		Yes	No
14	Profit & Loss Account for preceding three years is furnished		Yes	No

	Check List (Vide Para 1.3 of Section-I of General Conditions of Contract)		
15	Latest *Solvency Certificate* from *Govt. Authority* or **Certificate by Bidder's Banker for Overdraft & BG Limits** is Furnished (Certificate **shall not be older than six months** from the Last Date for offer submission)	Yes	No
16	Copy of the latest *Income Tax Clearance Certificate* or c**opy of IT Return along with copy of PAN Card** is Furnished	Yes	No
17	Month-wise manpower deployment plan (**Appendix–III**) is furnished	Yes	No
18	Analysis of unit rates quoted (**Appendix-VII**) is furnished	Yes	No
19	Month wise deployment plan by Contractor for major T&P (**Appendix-IV**) is furnished	Yes	No
20	Whether all the pages of the Tender Specification documents are read, understood and signed	Yes	No
21	Power of Attorney Enclosed in favour of Person Making Offer	Yes	No
22	Bidder has familiarized himself with all Relevant Local Laws & Local Conditions	Yes	No
23	Safety Requirement of this work in a Running plant Premises has been understood.	Yes	No
24	Erection and Commissioning programme furnished	Yes	No
25	Details of Similar Work carried out in last seven years furnished in **Appendix-VIII**		
26	Whether copies of detailed Work Orders (with BOQ) and Completion Certificates in support of above furnished	Yes	No
27	Whether contractor has left any job unfinished? If so, give reasons.	Yes	No
28	Whether any client has terminated the contractor's work before completion? If so, furnish reasons for the same	Yes	No

Note: strike off 'yes' or 'no', as applicable

Date: Signature of Bidder

DECLARATION BY BIDDER'S AUTHORIZED SIGNATORY

I, …… HEREBY CERTIFY THAT ALL THE INFORMATION AND DATA FURNISHED BY ME WITH REGARD TO THE TENDER SPECIFICATION No. **BHE/PW/PUR/MONTI-TGE/447** ARE TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE. I HAVE GONE THROUGH THE SPECIFICATIONS, CONDITIONS AND STIPULATIONS IN DETAIL AND AGREE TO COMPLY WITH THE REQUIREMENTS AND INTENT OF THE SPECIFICATION. I FURTHER CERTIFY THAT I AM DULY AUTHORIZED REPRESENTATIVE OF THE UNDER-MENTIONED TENDERER AND A VALID POWER OF ATTORNEY TO THIS EFFECT IS ALSO ENCLOSED.

AUTHORISED REPRESENTATIVE'S SIGNATURE WITH
NAME AND ADDRESS

DATE:

BIDDER'S NAME AND ADDRESS

CERTIFICATE OF NO-DEVIATION

TENDER SPECIFICATION No. BHE/PW/PUR/MONTI-TGE/447

I/WE, M/s .....

HEREBY CERTIFY THAT NOTWITHSTANDING ANY CONTRARY INDICATIONS / CONDITIONS ELSEWHERE IN OUR OFFER DOCUMENTS, I/WE HAVE NEITHER SET ANY TERMS AND CONDITIONS NOR THERE IS ANY DEVIATION TAKEN FROM THE CONDITIONS OF BHEL'S TENDER SPECIFICATIONS, EITHER TECHNICAL OR COMMERCIAL, AND I/WE AGREE TO ALL THE TERMS AND CONDITIONS MENTIONED IN BHEL'S TENDER SPECIFICATION WITH ASSOCIATED AMENDMENTS, CLARIFICATIONS etc.

SIGNATURE OF THE BIDDER

DATE:

SECTION-3

OFFER OF THE BIDDER

To
The DGM (Purchase)
BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR - WESTERN REGION
SHREEMOHINI COMPLEX
345-KINGSWAY
NAGPUR-440 001

DEAR SIR,

I/WE HEREBY OFFER TO CARRY OUT THE WORK DETAILED IN TENDER SPECIFICATION NO. **BHE/PW/PUR/MONTI-TGE/447** ISSUED BY BHARAT HEAVY ELECTRICALS LIMITED, POWER SECTOR-WESTERN REGION, NAGPUR, IN ACCORDANCE WITH THE TERMS AND CONDITIONS THEREOF.

I/WE HAVE CAREFULLY PERUSED THE FOLLOWING DOCUMENTS CONNECTED WITH THE ABOVE WORK AND AGREE TO ABIDE BY THE SAME.

1. INSTRUCTIONS TO TENDERERS
2. GENERAL CONDITIONS OF CONTRACT
3. SPECIAL CONDITIONS OF CONTRACT
4. OTHER SECTIONS, APPENDICES, SCHEDULES AND DRA WINGS.

I/WE HAVE DEPOSITED / FORWARDED HEREWITH THE EARNEST MONEY DEPOSIT DETAILS OF EMD PAYMENT ARE FURNISHED IN THE CHECK LIST.

EMD SHALL BE REFUNDED SHOULD OUR OFFER NOT BE ACCEPTED /EMD **NEED NOT BE REFUNDED AND THE AMOUNT MAY BE TREATED AS "ONE TIME EMD" FOR ERECTION AND COMMISSIONING TENDERS OF BHEL –PSWR NAGPUR** SHOULD OUR OFFER BE ACCEPTED, I/WE FURNTHER AGREE TO DEPOSIT SECURITY DEPOSIT FOR THE WORK AS PROVIDED FOR IN THE TENDER SPECIFICATION WITHIN THE STIPULATED TIME AS MAY BE INDICATED BY BHEL, POWER SECTOR –WESTERN REGION, NAGPUR.

I/WE FURTHER AGREE TO EXECUTE ALL THE WORKS REFERRED TO IN THE SAID DOCUMENTS UPON THE TERMS AND CONDITIONS CONTAINED OR REFERRED TO THEREIN AND AS DETAILED IN THE APPENDICES ANNEXED THERETO.

PLACE: SIGNATURE OF BIDDER:
DATE: ADDRESS:

WITNESSES WITH THEIR ADDRESS

	SIGNATURE	NAME	ADDRESS
1.			
2.			

Section- 4

Special Conditions of Contract

4.0 Scope of Work

Scope of work for the Contractor shall broadly as under.

Receipt, Unloading at Site / Stores / Storage Yard, Handling at Site / Storage Yard / Stores, Verification, Stacking, Preservation of STG Equipments/Components/ Materials including Electrical and Control & Instrumentation Equipments/ Components/ Materials, Materials Management Services, Watch & Ward at Stores and BHEL Office, Collection of materials from BHEL Stores/storage yard, Loading and Transportation to Site of Work, Unloading, Erection, Assembly/Alignment, Fit-up/Welding/Radiography & NDT etc., Testing, Assistance for Commissioning etc. of Surface Condenser, Steam Turbine, Generator, Piping with supports, LP Dosing system, De-aerator with FST & approach platform, LP Heater, Gland Steam Condenser, Drain Cooler, Condensate Extraction Pumps, Boiler Feed Pumps and other related Pumps with auxiliaries, Equipments/Tanks & Vessels, Auxiliaries, Application of Thermal Insulation, CO_2 system, Final Painting, Assistance for PG test and Handing Over of 2x45 MW STG set of Captive Power Plant.

The scope of work under this Tender Specification is further detailed as follows.

4.1 For Material Handling, Materials Management, Preservation of Materials, Watch & Ward

4.1.1 Receipt of materials at storage yard and stores, unloading from transport vehicles, collection of certain small consignments from transporters' Go-down outside the project premises to the stores/site of work including handling and local transport, verification, stacking, storing & preservation including direct unloading of certain heavier consignments at the site of work with attendant work as above by using contractor's own lifting tools / tackles, Cranes and transport arrangements.

4.1.2 Checking & Verification of consignments so received as above, preparation & submission of regular receipt inspection reports including shortages / damages reports. Contractor shall inspect the incoming consignments very carefully at the time of arrival of vehicles. In case any loss / damage is noticed the same shall be recorded suitably on the back of the LWB/LR with counter-signature of the vehicle driver while acknowledging receipt of the consignment. Such incidents of loss/damages shall also be brought to the notice of BHEL for the purpose of lodging Marine Insurance claim on BHEL's underwriters.

4.1.3 The materials will be unloaded, stacked at stores, storage yard as identified by Customer. Contractor shall arrange the further transportation including providing transport arrangements to take the equipments to erection site.

4.1.4 It will be responsibility of the contractor to keep in touch with officials of Client and BHEL regarding arrival of consignments and other formalities. The contractor shall collect all the Lorry Way Bills or any other such documents from BHEL site office. The contractor shall arrange for regular collection of dispatch documents etc.

4.1.5 Payment of all demurrages etc, which resulted due to the contractor's fault, shall be the responsibility of contractor and to his account. If BHEL have to make payment of demurrage etc, the amounts so paid, as demurrages for the reasons stated above shall be recovered from the bills of the contractor with BHEL's overhead charges as applicable from time to time.

4.1.6 It would be responsibility of the contractor to examine the packages, consignments etc on arrival and bring to the notice of BHEL regarding loss / damage / shortage or any discrepancy observed in the consignments before taking delivery of the same. The contractor in this regard shall make necessary records.

4.1.7 In case of consignments in smalls, the weight of package shall be checked with the invoiced weight of the packages and any discrepancies shall be reported immediately to BHEL / transporters. For all such consignments, observations regarding loss / damage / discrepancy are to be recorded in appropriate document and informed to BHEL promptly. In case it becomes necessary to take open delivery from the authorities, contractor should make all arrangements for taking open deliveries with requisite documentation. All expenses connected therewith shall be to the account of contractor. Any loss that accrues to BHEL on account of such failures shall be recovered from contractor's bill with overhead charges as stated earlier.

4.1.8 Any discrepancy/shortage/damage found in the consignment after taking delivery from the carriers after giving clear receipt but was possible to be detected at the time of taking delivery, would be the responsibility of contractor and the amount liable to be loss by BHEL on such accounts is recoverable from the contractor.

4.1.9 Since the consignments are expected to arrive during any time of the day, contractor shall have his workmen round the clock at site as well as other places as required to unload the materials. Also, consignment coming on weekly off days as also on holidays is required to be handled by the contractor. Contractor shall make all arrangements and obtain all approvals as may be applicable.

4.1.10 Unloading at storage area/work site of heavy/sophisticated equipment shall be done in the presence of and as per directions of BHEL representative including stacking and restacking if necessity arises.

4.1.11 The contractor shall verify the materials on receipt as per instructions.

4.1.12 Contractor shall provide facilities to open packages, where required in the presence of BHEL engineer, verify the contents, repack wherever and whenever called for and properly stack them as per storage manual or/and as may be directed by BHEL.

4.1.13 The contractor shall provide wooden / concrete sleepers, tarpaulins etc. required for stacking/covering of materials. Contractor shall handle the sleepers and tarpaulins and cover the items as part of work.

4.1.14 The material shall be so stacked that it should facilitate easy retrieval and handling for issue. Where indicated improper stacking shall be corrected.

4.1.15 The contractor shall execute the work in the most substantial and workmanlike manner. The stores shall be handled with care and diligence. Any loss to BHEL/Client due to contractor's lapse shall have to be made good by the contractor.

4.1.16 If the contractor or his workmen or employees shall break, de-face, injure or destroy any part of a building, road, kerbs, fence, enclosures, water pipes, cables, drains, electric or telephone posts or wires, trees or any other property or to any part of erected equipments, stored components etc The contractor shall make the same good at his own expenses.

4.1.17 Contractor shall arrange for cutting and removal of vegetation growth/grass etc in the storage yard as and when called for by BHEL as incidental to work. BHEL will take appropriate action at the risk & cost of the contractor in case of failure in this regard.

4.1.18 All arrangements for making and display of location placards, repainting of material identification codes etc is incidental to work.

4.1.19 Certain materials/ equipments/items (Like Deareating heater assy 2 Nos, LP Heater -2 Nos, Dome assy – 1 no,Hotwell-2 Nos, Gland steam condenser –2 Nos,Drain cooler-2 Nos, SS Welded Condenser tubes, Generator air cooler-12 Nos, Main oil tank – 1 no, Gear box – 1no,Surface condenser -1 no, centrifugal pumps-6 nos,CEP-2 Nos, LP Dosing system 2 nos, and other loose items which are smaller in size and weight - like valves, gauges, transmitters, aluminium sheet etc) total weight about 150 MT have been received and kept in store/ storage yard by customer so far. Contractor shall carry out verification and preservation, cleaning of these materials. Payment for these will be made as per item rate and percentage Break-up specified under Section–12.

4.1.20 Preservation of components

Contractor shall arrange for preservation of components as per the instructions of BHEL engineer.

One or more of following method will have to be adopted for preservation:

1) Coating with preservative paints/lubricant/inhibitors
2) Capping/wrapping/covering
3) Filling/immersion in oil/chemicals etc.

4.1.21 Restacking / Re-Handling

Over a period of time, restacking the materials may arise due to various reasons. The handling of such items will also be in the scope of this contract. The restacking/re-handling may be necessitated for any equipment/materials covered within this work specification.

4.1.22 Record Keeping and Report Generation

a) Properly recording the material dispatches, receipt, stacking, preservation, issuing etc. in the prescribed formats, registers etc. manually and on computer and making available for verification by BHEL.

b) Generation of exhaustive reports covering all the details like stock at site, pending materials to be received, materials in transit, components issued to the contractor, location plans of items stacked and other material status documents.

c) Deployment of Secretarial Assistance having necessary proficiency in computer operation. They should be capable of data entry in computers,

report generation as prescribed including conversant with BHEL Site Operation Management System (SOMS) for material management at site, contractor billing etc., regular updating of records as and when necessary and information management. These personnel shall take printouts of required information in the prescribed manner. Secretarial assistance shall be provided in office and stores of respective STG area. Such manpower shall be experienced in office secretarial works including stenography and shall be proficient in computer operations. Contractor has to arrange computer with printer in their site office for SOMS follow-up.

d) To provide services for upkeep of BHEL office and BHEL stores. The persons shall be deployed should have sufficient experience with BHEL material handling system and record keeping which is at the disposal BHEL personnel at office and stores for miscellaneous activities associated with an office establishment.

4.1.23 Other Points

a) BHEL engineer's decision shall be final regarding the type and nature of painting to be done on the components as also for arranging the components sequentially to suit erection requirements.

b) It will be responsibility of the contractor to ensure safe lifting of equipments, taking due precaution to avoid any accidents and damage to other equipments and personnel.

c) **Contractor shall provide exclusive watch & ward (security) services at two locations (i) BHEL Stores (open as well as closed) and (ii) BHEL Office within the quoted rates.** Contractor shall make separate arrangements for security and safety of the components/equipments issued to them by BHEL including such arrangement at the site of work. No separate payments shall be made for any of these watch and ward services under the scope of this tender specification.

d) Contractor shall arrange wooden and concrete sleepers necessary during handling and stacking of materials.

4.2 SCOPE OF WORK FOR ERECTION, TESTING AND ASSISTANCE FOR COMMISSIONING OF STG AND AUXILIARIES:

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

1) Collection & Loading of materials from BHEL / Customer Stores / Storage Yard.

2) Transportation to pre-assembly area and up to & including site of work.

3) Pre-assembly/assembly, pre-erection checks as per requirement.

4) Erection, Alignment, Testing, Commissioning of equipments / systems with associated auxiliaries and stage inspection by statutory authorities like Boiler Inspector, Factory Inspector, Labour Inspector / Labour Officer, Electrical Inspector etc. covered under this tender specification. All the necessary tests including supply of testing / measuring equipments &

instruments shall be carried out as per requirement under this scope of tender specification.

5) Chipping/Blue-Matching of civil foundation, grouting of equipments/ auxiliaries/panels with Portland and Non-shrink ready-mix grouting cement as per normal engineering practice for similar equipments. Contractor shall arrange all the grout materials of BHEL-approved brand within the quoted price.

6) Pre-assembly, Stage inspection as per requirement of BHEL/Customer/ IBR and other Statutory Authorities, Erection, Alignment, Heat treatment, Stress relieving, welding, Radiography & other NDT tests, Flushing/ Chemical cleaning, Hydraulic testing, Steam blowing of piping including impulse piping.

7) Erection, cold setting and hot setting of piping supports & hangers.

8) Application of thermal insulation & cladding of applicable piping, vessels & equipments as applicable.

9) Fabrication & Erection of approach platform of valves and equipments access/approaches.

10) Erection of Electrical motorised/Pneumatic Control valves etc.

11) Erection, Pre-commissioning & commissioning checks/tests and commissioning including trial run operation of applicable equipments and auxiliaries.

12) Trial operation of TG set, Final painting, providing assistance during PG test of the equipments and handing over of unit.

The work shall conform to dimensions and tolerances specified in the various drawings/documents of BHEL which will be provided during various stage of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings/documents or other stipulations due to contractor's fault, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by engaging other agencies and recoveries will be effected from the contractor's bills towards expenditure incurred including departmental overheads of BHEL.

The scope of work is further detailed in the specifications hereinafter.

4.2.1 The intent of specification is to provide erection services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient erection and commissioning of the plant shall not relieve the contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

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

4.2.3 The work shall be executed under the conditions, where customer is already having their existing plant in operation. The contractor and his personnel shall co-operate with personnel of customer's & other contractor's, co-ordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

4.2.4 Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by BHEL. This will be decided by the BHEL engineer depending upon the technical requirements, availability of materials and fronts. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods adopted in erection of similar sets elsewhere.

4.2.5 The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, engineering and construction management. The contractor should ensure successful and timely completion of the work. The contractor must deploy adequate quantity of tools, construction aids, equipment etc. He must also deploy adequate number of trained, qualified and experienced supervisory staff and skilled personnel.

4.2.6 All necessary certificates and licenses, permits & clearances required to carry out this work are to be arranged by the contractor expeditiously at his cost..

4.2.7 During the course of erection, testing and commissioning certain rework/ modification/ rectification/ repair/ fabrication etc, will be necessary on account of feedback from various power station units already commissioned and/ or units under erection and commissioning and also on account of design discrepancies or manufacturing defects and site operation/ maintenance requirements. This will also include modifications/ re-works suggested by FES/ other inspection group(s). Contractor shall carry out such rework/ modification/ rectification/ fabrication/repair etc, promptly and expeditiously. Daily log sheets signed by BHEL engineer and indicating the details of work carried out, man-hours etc shall be maintained by the contractor. Claim of contractor if any, for such works will be governed by clauses 13.1 to 13.8.

4.2.8 All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments/ components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL engineer's instructions at site, cutting, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc, as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work.

4.2.9 As this plant is an extension of the existing plant, any interconnection, hook-up, required with existing system shall form part of work. Such interconnections, hook-ups may require shut down of running plant and the relevant work have to be completed within such planned shutdowns. This may call for working with enhanced resources and on extended hours. Contractor's offer shall cover all such contingencies.

4.2.10 Excepting those specifically shown as BHEL scope, the contractor shall provide all fixtures, concrete block supports, wooden sleepers, steel structures required for jigs & fixtures, temporary supports, anchors for load and guide pulleys etc, required for the work.

4.2.11 The contractor shall take delivery of the components, equipments, chemicals, lubricants, gases etc from the BHEL's/client's stores/ storage area after getting the approval of BHEL engineer on standard indent forms to be specified by BHEL. Complete and detailed account of the equipments erected as well as the progress shall be submitted to the BHEL engineer as directed.

4.2.12 Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by contractor most expeditiously. No claim for extra payment for such work will be entertained.

4.2.13. **Preparation of Foundations and Grouting of Equipments**

4.2.13.1 Building foundations and other necessary civil works for supporting structures, equipments etc will be provided by BHEL's client. The dimensional accuracy, axes, elevation, levels etc, with reference to benchmarks of foundations and anchor bolt pits have to be checked and logged. Adjustments of foundation level, dressing and chipping of foundation surfaces of all equipments as per BHEL engineer's instructions, should be done by the contractor as part of the work. Dressing and chipping of foundations to the extent of 25mm for achieving proper levels is within the scope of work.

4.2.13.2 All minor foundations and anchor points/arrangements required for installing erection equipments and winches etc are in the scope of contractor.

4.2.13.3 Contractor shall carry out scrapping and blue matching of embedded plates/ packers of rotating equipments. Chipping and the bedding of concrete surfaces, fine dressing up to the extent required to obtain contact between packer and concrete, is also covered in the scope of this work. Scrapping, chipping and matching shall be done so as to achieve prescribed percentage of contact.

4.2.13.4 BHEL will provide free of cost only the shims and packer plates (either machined or plain) which go as permanent part of the equipment. Certain packer plates and shims over and above the quantity received as a part of supplies from manufacturing units of BHEL will have to be cut out from steel plates/steel sheets at site to meet site requirement. Contractor shall cut and prepare and finish the packers and shims by suitably. However, machining of the packers wherever necessary will be arranged by BHEL.

4.2.13.5 Complete grouting of equipments, including anchor/foundation bolts, beneath base, base hollows etc, as may be applicable, is included in the scope of contractor. Arranging all labour, building materials including cement, ordinary Portland as well as quick setting – free flow - non-shrink grouts (e.g. Conbextra GP2 Or any other make/grade as decided by BHEL Site In-charge), form work, shuttering, and any other requirements is in the contractor's scope. Contractor shall obtain approval of BHEL for cement (ordinary as-well-as quick setting) prior to use. Cleaning of foundation surfaces, pocket holes and anchor bolt pits and de-watering and making them free of oil, grease, sand and other foreign materials by soda washing, water washing, compressed air and other approved methods, are within the scope of this specification/work.

4.2.13.6 The Quick-setting-Non-shrink-Free-flow special grout mix shall be purchased only from the latest BHEL approved vendors. Following is the list of approved vendors as on date.

1. M/s Fosroc Chemicals (India) Pvt Ltd;
2. M/s Sika India Pvt Ltd;
3. M/s Pagel Concrete Technologies Pvt Ltd;
4. M/s Pidilite Industries Ltd.

The list of approved vendors is subject to updation / addition / deletion from time to time by BHEL. In order to ensure the quality, the major grouting of equipments using any of above grout mixes shall essential be done as per the recommendations of supplier with regard to grout preparation and use of machinery etc under the supervision of the respective supplier. BHEL has arrangement with above suppliers for supervision services and the supervision charges for the same will be borne by BHEL. However, the contractor shall ensure readiness of equipment for grouting in all respect before such a service is requisitioned and the duration is not prolonged unduly. Any overstay required due to contractor shall be charged to the contractor with BHEL's departmental charges. Contractor shall consult BHEL engineer before deciding upon the vendor for the above.

4.2.14 Welding, Heat-Treatment, Radiography and Other Non-Destructive Testing

A) Installation of equipment involves good quality welding, NDE checks, post weld heat treatment etc Contractor's personnel engaged should have adequate qualification on the above works.

B) The method of welding (viz) arc, TIG or other method will be indicated in the detailed drawing/documents. BHEL engineer will have the option of changing the method of welding as per site requirement.

C) 1) Welding of high pressure joints shall be done by IBR certified high pressure welders who have been permitted by CIB of state concerned for deployment at the site of work.

2) Welding of all attachments to pressure parts, piping shall be done only by the qualified and approved welders.

D) All the welders (structural and high pressure) shall be tested and approved by BHEL engineer before they are actually engaged on work though they may possess the IBR/other certificate. BHEL reserves the right to reject any welder without assigning any reason.

E) Unsatisfactory and continuous poor performance may result in discontinuation of concerned welder.

F) The welded surface shall be cleaned of slag and painted with primer paint to prevent rusting, corrosion. For this paint will be supplied by the contractor.

G) HP joint fit-ups, should be protected, where required, by use of tapes/protective paint as may be prescribed by BHEL. The contractor shall supply protective paints/tapes etc

H) Preheating, inter-pass heating, post weld heating and stress relieving after welding are part of erection work and shall be performed by the contractor in accordance with BHEL engineer's instructions. Normally the electric resistance heating method will be adopted. Contractor shall arrange to supply heating equipment with automatic recording devices. Also the contractor shall have to arrange for labour, all heating elements, thermocouples and attachment units, graph sheets, thermal chalks, & insulating materials like mineral wool, asbestos cloth, ceramic beads, asbestos ropes etc, required for all heating and stress relieving works.

J) All the recorded graphs for heat treatment works shall be the property of BHEL and shall be handed over to BHEL site in-charge when demanded.

K) The contractor shall maintain welding records in the form as prescribed by BHEL containing all necessary details, and submit the same to the BHEL engineer as required. Interpretation of the BHEL engineer regarding acceptability of the welds shall be final.

L) Heat treatment may be required to be carried out at any time (day and night) to ensure the continuity of the process. The contractor shall make all arrangements including labour required for the work as per direction of BHEL.

M) Radiography work of welds connected with this contract shall be arranged by the contractor including provision of services of technician and

necessary equipment and consumables like isotope camera, x-ray/gamma ray films, chemicals etc, and necessary labour required such as riggers, helpers, etc, to assist the technician for carrying out the radiography work and making other arrangements such as providing scaffolding, approaches, platform lighting arrangements, etc, at their cost and the work has to be arranged as per the instruction of BHEL. It may please be noted that invariably the radiography work will be carried out after the normal working hours and close of other site activities only.

N) Radiography inspection of welds shall be performed in accordance with requirements and recommendation of BHEL engineer. The quantum of radiographic inspection shall be as per provision of IBR/BHEL's erection documents. They may, however be increased depending upon the performance of the individual welder at the discretion of BHEL engineer/boiler inspecting authority.

O) All x-ray/gamma ray films of joints shall be preserved properly and be handed over to BHEL. These shall become the property of BHEL.

P) The field welded joints shall be subject to dye-penetrant / other non-destructive examination as specified in the respective engineering documents/ as instructed by BHEL.

Q) Wherever required, surface preparation, like smooth grinding of welded area, prior to radiography shall be done as specified. It may also become necessary to adopt inter-layer radiography/MPT/UT depending upon the site/technical requirement necessitating interruptions in continuity of the work and making necessary arrangements for carrying out the above work. The contractor shall take all this into account in his offer.

R) **Socket Welding**

In execution of this work, considerable number of socket weld joints is involved. The exact quantity of such socket welds or probable variation in the quantum cannot be furnished. The bidder shall take notice of this while quoting as no extra claim on this account will be entertained at a later date. The socket welding on HP parts/ HP piping shall be done by the IBR qualified welders. In case the contract provides for payment/ recovery on account of variation in the quantity of butt weld joints elsewhere in the specifications, the socket welds will not be taken into account on either side while computing variation in number of butt weld joints. Modification work, involving socket weld joints will be paid on the basis of extra man-day rate only. Contractor has to adhere to the procedures/specification as indicated in the drawing for socket welding.

S) Welding electrodes have to be stored in enclosures having temperature and humidity control arrangement. This enclosure shall meet BHEL specifications.

T) Welding electrodes, prior to their use, call for baking for specified period and will have to be held at specified temperature for specified period. Also,

during execution, the welding electrodes have to be carried in portable ovens.

U) The portion of work coming under IBR purview (e.g. Welding, heat treatment of HP joints) has to be executed as per the latest version of Indian Boiler Regulation and amendments thereof. BHEL will furnish IBR documents for piping & fittings and further approvals of IBR/ Statutory Authorities for pre-assembly & erection and other works shall be taken by contractor.

4.3 Condenser Installation

4.3.1 The Surface Condenser shell weighing about 60 MT will be despatched in tubed condition (i.e. shell with tube plates). However the other parts like, Stainless Steel welded condenser Tubes, hot well, Top Connecting piece, Stainless Steel Bellows, Level instruments, Stand & surge pipes, Collar/sleeve pipe, foundation springs / parts, air extraction pipes, etc will be sent loose. The assembly/insertion and expansion of SS tubes is required to be done at site. Contractor shall have to make his own suitable arrangements to handle at storage yard, transportation to site of work, Erection, Place of condenser in position, Insertion & expansion of tubes and all other related works and Fill test/Hydro test etc. as required.

4.3.2 It will require cleaning of water side surface, opening of manhole/water box covers & re-tighten the same after replacement of packing /gaskets, carry out hydraulic test & water fill test on steam side and water side space. All above shall be carried by contractor including attending the leakages (if any) as part of work under this tender specification

4.3.3 All water side surfaces of water chambers shall be painted only after completion of work and water fill test/ hydro test. Welding & Interfacing of Condenser cooling water connection from customer terminal point will be decided by BHEL Engineer at site and shall be binding on contractor.

4.3.4 For surface preparation, the water boxes etc., may have to be sand/shot blasted to remove all traces of shop coat of primer. The specified primer & protective paint as specified (quality and final dry film thickness) in erection documents shall be applied. Primer and Paint shall be provided by the contractor.

4.4 Generator Installation

Generator stator (weighing about 68 MT) and related items like Rotor, Bearings and Brush-less exciter, foundation parts and auxiliaries like air cooler & duct etc all will be dispatched separately (knocked down condition). Further works of assembly shall be carried out at site. Contractor shall have to make his own arrangements to handle the generator at storage yard & transport to site of work.

4.5 De-aerator and Feed Storage Tank:

De-aerator and Feed Storage Tank along with other parts will be dispatched separately in knocked down condition. Handling of Deaerator and FST components including transportation from BHEL stores to site of work and placement on respective foundation/elevation shall be carried by contractor by

making necessary arrangement. Contractor shall carry out erection of approach platform as part of scope of work. No separate payment for Deaerator platform will be made.

4.6 Steam Turbine Installation

Steam Turbine along with Casings, Rotor, Bearings, Guide Blade carriers, Steam Chambers, Exhaust Hood, Support Block, Steam Glands, Emergency Stop Valve & Control Valves, Gear Box, Foundation parts/ base plates and related auxiliaries etc. all will be dispatched in knocked down condition. Further works of assembly, erection and alignment shall be carried out at site.

4.7 Other Rotating Machines Installation

4.7.1 All rotating machinery and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary, by dismantling and re-fitting before erection. If in the opinion of BHEL engineer, the equipment is to be checked for clearances, tolerances at any stage of the work or during testing, pre-commissioning, facilities for dismantling, cleaning, lubricating and re-fitting shall be provided by the contractor. All rotating machines shaft shall be rotated periodically to avoid bowing of shafts.

4.7.2 Trial run of the drive in un-coupled state and then coupled with equipment has to be done after necessary alignment etc

4.7.3 Forced lube oil systems of motors and/or rotating equipments form the part of work under this specification

4.7.4 Performance of hydro test of oil coolers & Air coolers of rotating machines, if any, is included in the scope of work.

4.7.5 Certain rotating machinery after, initial runs and commissioning of the equipment may have to be hot aligned.

4.7.6 Protective lubricant coats/fill provided on the critical area of equipments have to be removed at appropriate stage and regular lubricants, after removal/cleaning of protective coat/fill, as per specifications should be filled/applied.

4.7.7 After initial trial of rotating equipments, control and power cabling for motors and other equipments/instrumentation may have to be disconnected for checking alignment and re-setting / re-alignment / hot-alignment. Contractor will have to arrange labour for disconnecting control and power cabling as per BHEL engineer's instructions and clearance and reconnect the control and power cabling after re-alignment, quoted tonnage rate shall be inclusive of the above.

4.7.8 Even though rotating machines may be grouted to foundation using non-shrink grout mix, blue matching of packer plates /shims with foundation/ between packers/equipment base should be done wherever instructed by BHEL engineer.

4.7.9 Vital clearances of shop assembled rotating machines should be checked at site and adjusted if required.

4.7.10 **Electrical and control & Instrumentation works like cabling, placement of panels, calibration, tray, erection of instruments work, Electrical testing of Motors etc. is excluded from the scope of contractor under this tender specification**. But the motors which are supplied along with mechanical equipments like pumps, Fans etc. will be erected and necessary assistance as required will be provided by contractor to commission these motors as per instruction of BHEL Engineer at site.

4.7.11 The scope of work is further detailed in the specifications hereinafter.

A) Specifications covered under the following para and also other relevant specifications contained in other paras elsewhere in this tender document will be applicable for rotating machines.

B) Lubricants issued by BHEL/Customer shall have to be collected from BHEL/Customer's stores. Contractor shall make all arrangements, manpower and extend the services for collection of materials transporting, handling, filling, emptying, re-filling, accounting and return of surplus lubricants / empty containers / old & used lubricants after draining etc. Contractor should clean the spilled/leaking lubricants thoroughly; consumables for such cleaning will be in contractor's scope.

C) All rotating machinery and equipments shall be cleaned, lubricated, checked for their smooth rotation, if necessary, by dismantling and re-fitting before erection. Also, the equipments may have to be checked for clearances, tolerances at any stage of the work including during testing, commissioning etc. Shaft of the rotating machines shall be rotated periodically to avoid damages. All these shall be part of work.

D) Trial run of the drives in un-coupled state and then coupled with equipment has to be done after necessary alignment.

E) Forced lube oil systems including lube oil piping of drives, rotating equipments etc form part of the work under these specifications. Hydraulic test of oil coolers, oil piping etc are in the scope of work. Where required cooler may have to be dismantled for hydraulic test and re-erected thereafter as part of work.

F) Certain rotating machinery, after testing, pre-commissioning may have to be re-aligned/hot aligned and vital clearances re-set. This may necessitate disconnection of cabling, removal of certain instruments etc and restoration thereafter.

G) Protective lubricant coats / fill provided on / in the critical area of equipments have to be removed at appropriate stage and regular lubricants, after removal / cleaning of protective coat / fill, as per specifications should be filled / applied.

H) Cleaning and air drying of the connecting pipes for the lube oil system has to be carried out wherever required as per instruction manuals / drawings.

I) Even though rotating machines may be grouted to foundation using Non-shrink grout mix (As specified by BHEL Site In-charge at site), blue matching of packer plates / shims with foundation / between packers / equipment base should be done as incidental to work wherever instructed by BHEL Engineer.

J) Skid mounted equipments may need checking, re-setting due to various reasons as incidental to work.

4.8 Testing, Pre-Commissioning, Assistance for Commissioning and Assistance for PG Test

4.8.1 Testing, pre-commissioning, & assistance for commissioning will involve, though not limited to these, various testing, trial runs of various equipments erected and systems installed, flushing of the lines by air, oil or steam as the case may be, chemical cleaning of various systems & piping, oil-flushing, steam blowing of the pipe lines, steam rolling, synchronization, trial operation etc, are some of these activities. All the activities for commissioning of the set, as informed by BHEL from time to time shall be completed.

4.8.2 All the above tests may have to be repeated till all the equipments satisfy the requirement/ obligations of BHEL to their client and also the relevant statutory authority.

4.8.3 **For the purpose of Chemical Cleaning, Steam blowing, Oil flushing & Hydraulic test of TG piping, contractor shall lay, erect / install necessary temporary piping, tanks, valves, pumps etc with supports as part of scope of erection work. No separate payment shall be made for this work.** This may involve cutting of some portion of existing piping/valves, placing of rubber wedges/ blanks in the valves and other openings, installation of temporary tanks for chemical mixing, temporary access platforms to mixing tanks etc Where required, bends have to be fabricated at site from running length of pipe. Temporary installation itself has to be tested, tried, and subject to non-destructive examinations as per the instructions of BHEL as part of work.

4.8.4 Materials for temporary arrangements of installation etc. will be supplied by BHEL in random sizes/lengths. However, servicing, fabrication, erection, dismantling of the same after completion of the process and returning to BHEL stores will be the responsibility of the contractor.

4.8.5 Fabrication, fit-up, welding, and post-weld-heat treatment if any, of requisite blanks for conduct of hydraulic test is part of work. Similarly, removal of blanks, restoration and normalization of the concerned system/line is to be done as part of work. BHEL will provide the material for blanks free of charge. No separate payment is envisaged for these activities.

4.8.6 Overhauling, cleaning, servicing of tanks, pumps, equipments, valves, during erection and commissioning stages are in the scope of work. Gaskets, packing for replacement will be provided by BHEL.

4.8.7 After chemical cleaning/pickling of lubricating system (including oil piping, oil tank and other fittings) of TG, rotating machines etc, oil flushing for lubricating systems as per instructions of BHEL engineer shall be carried out. Cleaning of oil tank of lubricating oil system before and after oil flushing is in the scope of work.

4.8.8 Receipt & handling of oil barrels for entire operations of flushing, Fresh filling & topping up during commissioning and post commissioning activities, returning of flushed oil, fresh oil filled/ empty barrels, Chemicals etc. to BHEL /Customer Stores after completion of operations shall be the part the scope of work. Similarly, for various pre-commissioning/ commissioning activities/processes mentioned in various clauses, transport of chemicals from BHEL/ customer's stores, charging of chemicals into the system and returning of remaining and/or the empty containers of the chemicals to customer/BHEL stores is the responsibility of the contractor. No separate payment either for Handling or any other account shall be made for above works.

4.8.9 During pre-commissioning/commissioning, replacing/changing mechanical/ other seals of equipments, pumps, removal and cleaning/replacing of filters etc are within the scope of work. Spare parts required for replacement/ change will be provided by BHEL free of cost in case the damage is not attributable to the contractor.

4.8.10 In case any defect is noticed during tests, trial runs of STG sets and their auxiliaries 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 BHEL engineer's instructions. Claim, if any, for these works from the contractor shall be governed by clauses 13.1 to 13.8.

4.8.11 Contractor shall cut/open work, if needed, as per BHEL engineer's instructions during commissioning for inspection, checking and make good the works after inspection is over.

I) Similarly, during the course of erection, if certain portion of equipment's erected by the contractor has to be undone for enabling other contractors/agencies of BHEL/customer to carry out their work, contractor shall carry out such jobs expeditiously and promptly and make good the job after completion of work by other contractor's/ agencies of BHEL/customer as per BHEL engineer's/agencies of BHEL/customers instructions. Claims, if any, in this regard shall be governed as per clauses 13.1 to 13.8.

4.8.12 During this period, though BHEL/ client's staff will also be associated in the work, the contractor's responsibility will be to arrange for complete

requirement of men and required tools and plants, consumables, scaffolding and

4.8.13 Commissioning activities will continue till the completion of trial run/PG test. During this period contractor shall make available the services of separate dedicated labour-force comprising of suitable skilled and semi/un-skilled hands along with necessary tools and plants, consumables etc

4.8.14 It shall be specifically noted that the contractor may have to work round the clock during the pre-commissioning and commissioning period along with BHEL engineers and hence considerable overtime payment is involved. The contractor's quoted rates shall be inclusive of all these factors.

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

4.8.16 Assistance for PG Test

The contractor shall provide assistance for conducting Performance Guarantee (PG) Test to BHEL as a part of his regular scope of work. This shall include manpower assistance, small T&P, providing access platforms/ scaffolding/ladders, lighting arrangements and other enabling facilities associated with typical PG Test activity. Contractor shall install all necessary tapping points, instruments etc.

4.9 **Final Painting**

4.9.1 The contractor shall carry out the preservation, touch up and final painting by Spray / with manual process by brush etc. The surfaces before painting will be thoroughly cleaned by water washing, brushing, cleaning agents etc. as per requirement and satisfaction of customer to get the required surface finish. Contractor shall also put Colour bands, name of equipments/lines, flow-direction arrow, inscription etc., identification and specification of various equipments & pipelines shall be as decided by BHEL/ Customer at site with colour Code/Colour shed as approved by Customer/BHEL Engineer at site.

4.9.2 All exposed metal parts of the equipment including main equipments under the scope of this tender specification, piping, supports, structures, railing, tanks/vessels etc, as applicable shall be painted after thoroughly cleaning the surface from dust, rust, grease, oils, scales, etc, by wire brush, scrapping, etc as required. The above parts shall then be painted with two coats of synthetic enamel paint over the existing shop primer/paint. Also, where the shop primer/paint has peeled off, the affected area shall be cleaned thoroughly by suitable method to obtain clean metal surface and coated with two coats of Primer and two coats of Finish Paint. Similarly, certain components may be supplied without any primer/paint coat from shop. The surface of such items shall be cleaned and painted as specified above. The dry film thickness after final coat should be as per specification. The colour shade etc shall be as instructed by the BHEL engineer in charge. Primer and Finish Paints shall be sourced only from

BHEL approved manufacturers/their authorized dealers. Suggestive list of approved manufacturers is as under.

1) Berger Paints (I) Ltd.
2) Asian Paints Ltd.
3) Goodlass Nerolac Paint Ltd.
4) Jenson & Nicholson Ltd.
5) Shalimar Paints Ltd.

In order to have consistency in painting system, it is preferable that all the supplies are sourced from one single manufacturer.

The primer shall be compatible with the final paint schedule.

Manufacturer's test certificate for each batch of primer/ paint shall be submitted prior to use. Non-compliance to this requirement will lead to the prohibition from use and rejection of that particular batch of supplies.

4.10 General Responsibility of the Contractor

4.10.1 The contractor shall have total responsibility for all equipment and materials in his custody at contractor's stores, loose, semi-assembled, assembled or erected by him at site. He shall effectively protect the finished works from action of weather and from damages or defacement and shall also cover the finished parts immediately on completion of work as per BHEL engineer's instructions. The machine surfaces/finished surfaces should be greased and covered.

4.10.2 **Preservation & Protection of Components**

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

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

4.10.4 Contractor shall collect all scrap materials periodically from various area of work site, deposit the same at one place earmarked at site or shift the same to a place earmarked in BHEL/ client's stores. In case of failure of contractor in compliance of this requirement, BHEL will make suitable arrangement at contractor's risk and cost.

4.10.5 The entire surplus, damaged, unused materials, package materials/ containers, special transporting frames, gunny bags, etc, shall be returned to BHEL stores by the contractor.

4.10.6 The contractor shall not waste any materials issued to him. In case it is observed at any stage that the wastage/excess utilization of materials is not within the permissible limits, recovery for the excess quantity used

or wasted will be effected with departmental charges from the contractor. Decision of BHEL on this will be final and binding on the contractor.

4.10.7 For any class of work for which no specifications have been laid down in these specifications, work shall be executed as per the instructions of BHEL.

4.11 **General requirements**

4.11.1 Steam piping, Extraction piping, Drain line, Oil line, Service air piping, Instrument air piping, Cooling and Service water lines between the BHEL supplied equipments/ auxiliaries and battery limits of customer is in the scope of this tender specification.

4.11.2 It may be specifically noted that it should not be construed or claimed by the contractor that with the technical specification and "exclusions and/or inclusions" detailed in this tender specification, BHEL has covered the entire scope of work and/or the details thereof to be executed by the Contractor.

4.11.3 All welded joints should be painted with anticorrosive paint immediately after completion of radiography and stress relieving works. Necessary paints and other consumables for the above work are in the scope of the contractor.

4,11.4 Hangers & suspensions, supports etc for tubes, piping, & ducts etc., will be supplied in running / random lengths / sizes which shall be cut to suitable sizes and adjusted as required.

4.11.5 Spring suspension/constant load hangers may have to be pre-assembled for required load and erection carried out as per instructions of BHEL. Adjustments, removal of temporary arrests/locks, cutting of excess thread length of hanger tie-rod etc, have to be carried out as and when required. Load setting of spring hangers, as per BHEL's documents/instructions, during various stages of erection & testing and after floating of piping/ducting during cold and hot condition will have to be done. This exercise may have to be repeated till satisfactory results are achieved.

4.11.6 Layout of field routed/ small bore piping 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.

4.11.7 Welding of necessary instrumentation tapping points, thermocouple pads, root valves, condensing vessels, flow metering & measurement devices, and control valves to be provided on TG & its auxiliaries, integral & external pipe lines covered within the scope of this specification, will also be the responsibility of the contractor and shall be done as per the instructions of BHEL site engineer. The installation of all the above items will be contractor's responsibility even if the :

I. Items are not specifically indicated under the respective product groups as given in the technical specifications.

II. Items are supplied by an agency other than BHEL.

NDE, and post weld heat treatment for above shall be done as per the specifications as part of work.

4.11.8 Certain instrumentation like pressure switches, air sets, filters, regulators, pressure gauges, junction boxes, power cylinders, dial thermometers, flow meters, valve actuators, flow indicators, centrifugal/speed switches of motors, accumulators etc. are received in assembled condition as an integral part of equipments. Contractor shall dismount such instruments for calibration and storage/re-erection. Calibration is also included in the scope of work.

4.11.9 Fixing and seal welding of thermo-wells & plugs before hydro test/ steam blowing of equipment or other piping system is within the scope of work. Contractor shall also remove the seal welded plugs by process of grinding and fix and seal weld thermo-wells after hydro test/steam blowing of lines as part of work.

4.11.10 Actuators/drives of valves, dampers, gates, powered vanes etc. may have to be serviced, lubricated, before erection, during pre-commissioning & commissioning, including carrying out minor adjustments required as incidental to the works.

4.11.11 The intent of specification is to provide services according to the most modern and proven techniques and codes. The omission of specific reference to any method, equipment or material necessary for proper and efficient execution of this work shall not relieve the contractor of the responsibility of providing such facilities to complete the work without any extra compensation.

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

4..11.13 The work shall be executed under the usual conditions affecting major power plant construction and in conjunction with numerous other operations at site. The contractor and his personnel shall cooperate with personnel of **BHEL**, **BHEL**'s customer, customer's consultants and other contractors, coordinating his work with others and proceed in a manner that shall not delay or hinder the progress of work of the project as a whole.

4.11.14 The work covered under this specification is of highly sophisticated nature, requiring the best quality workmanship, supervision, engineering and construction management. The contractor should ensure proper planning and successful & timely completion of the work to meet the overall project schedule. The contractor must deploy adequate quantity of tools & plants, modern / latest construction aids etc. He must also

deploy adequate trained, qualified and experienced supervisory staff and skilled personnel.

4.11.15 Contractor shall erect and commission all the equipments and auxiliaries as per the sequence & methodology prescribed by **BHEL** depending upon the technical requirements. Availability of materials and fronts will decide this. **BHEL** Engineer's decision regarding correctness of the work and method of working shall be final and binding on the contractor. No claims for extra payment from the contractor will be entertained on the ground of deviation from the methods / sequence adopted in erection of similar sets elsewhere.

4.11.16 All necessary certificates and licenses, permits & clearances required to carry out this work from the respective statutory authorities are to be arranged by the contractor at his cost in time to ensure smooth progress of work.

4.11.17 The work shall conform to dimensions and tolerances specified in the various drawings / documents that will be provided during various stages of erection. If any portion of work is found to be defective in workmanship, not conforming to drawings or other stipulations due to contractor's fault, the contractor shall dismantle and re-do the work duly replacing the defective materials at his cost, failing which the work will be got done by **BHEL** and recoveries will be effected from the contractor's bills towards expenditure incurred including cost of materials and departmental overheads of **BHEL**.

4.11.18 The contractor shall perform any services, tests etc. Which may not be specified but nevertheless required for the completion of work within quoted rates.

4.11.19 All necessary certificates and licenses required for carrying out this work are to be arranged by the contractor expeditiously.

4.11.20 The contractor shall execute the work in the most substantial and workmanlike manner. The stores shall be handled with care and diligence.

4.11.21 BHEL reserves right to recover from the contractor any loss, which arises out of undue delay/discrepancy/shortage/damage, or any other causes due to contractor's lapse during any stage of work. Any loss to **BHEL** l due to contractor's lapse shall have to be made good by the contractor.

4.11.22 During the course of erection, testing and commissioning certain rework / modification / rectification / repair / fabrication etc., may become necessary on account of feedback / revision of drawing. This will also include modifications / re-works suggested by BHEL / customer / other inspection group. Contractor shall carry out such rework / modification / rectification / fabrication / repair etc., promptly and expeditiously. Daily log sheets signed by BHEL Engineer and indicating the details of work carried out, man-hours etc. shall be maintained by the contractor for

such reworks. Claim of contractor if any, for such works will be governed by clauses 13.1 to 13.8.

4.11.23 All works such as cleaning, levelling, aligning, trial assembly, dismantling of certain equipments / components for checking and cleaning, surface preparation, fabrication of sheets, tubes and pipes as per general engineering practice and as per BHEL Engineer's instructions at site, cutting, gouging, weld depositing, grinding, straightening, chamfering, filing, chipping, drilling, reaming, scrapping, lapping, fitting up etc., as may be applicable in such erection works and which are treated incidental to the erection works and necessary to complete the work satisfactorily, shall be carried out by the contractor as part of the work within the quoted rates.

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

4.11.25 The contractor shall take delivery of the components, equipments, chemicals, lubricants etc from the BHEL stores/ storage area after getting the approval of **BHEL** engineer on standard indent forms of BHEL. Complete and detailed account of the materials and equipments after usage shall be submitted to the **BHEL** and reconciled periodically.

4.11.26 Contractor shall plan and transport equipments, components from storage to erection site and erect them in such a manner and sequence that material accumulation at site does not lead to congestion at site of work. Materials shall be stacked neatly, preserved and stored in the contractor's shed and at work areas in an orderly manner. In case it is necessary to shift and re-stack the materials kept at work areas/ site to enable other agencies to carry out their work or for any other reason, same shall be done by contractor most expeditiously. No claim for extra payment for such work will be entertained.

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

4.11.28 The tentative details of equipments and scope to be erected under this contract are generally as per the weight schedule given in relevant **Appendix.** These details are approximate and meant only to give a general idea to the tenderer about the magnitude of the work involved. Actual quantum and type of equipments will be based on the erection documents, which will be furnished in the course of erection and the weight and quantity as per the relevant

4.11.29 On receipt, unloading, Stacking, Verification of materials for STG & Auxiliaries including Electrical & Instrument items payment will be made as per quoted material handling rate. However for taking delivery of materials/loading & transportation to site of work for erection by using

contractor's own T&P, no separate payment will be made for such handling and same shall be treat as part of scope of erection work.

4.12 Thermal Insulation

4.12.1 Application of wool insulation, sheet metal cladding, welding of studs/hooks/ supports/fixing components to hold insulation covered under this contract for STG shall include, but not limited to, the following :-

A) Removable type of insulation to be provided for valves, expansion joints, etc As per the drawings or as directed by BHEL engineer.

B) Welding of fixing components and application of insulation (mineral wool) as part of work. Fabrication and fixing of Aluminium/GI cladding is also the part of work. Coating of aluminium sheet/ GI Sheet with Epoxy Bituminous Black Coaltar, wherever required shall be carried out contractor.

C) Wool insulation are received at site as bonded and un-bonded mattresses in standard sizes. These are to be dressed/cut to suit work .

D) Application of insulation work and sheet metal cladding as given in various drawings/ specifications of BHEL.

E) Aluminium/GI sheet cladding by fabrication of aluminium/GI sheets to the sizes and shapes specified in drawings, beading, swaging, bevelling of sheets, crowning the sheets, if necessary, fixing the same to supports, over wool insulation with screws/retainers

F) Welding of studs/hooks/supports on equipment and piping to support wool insulation, as per the drawings or as instructed by BHEL engineers.

G) Painting the inner side of aluminium cladding, with anti-corrosive paint as specified

H) The contractor shall leave certain gaps and openings while doing the work as per the instructions of BHEL engineer to facilitate inspection or during commissioning to fix gauges, fittings and instruments. These gaps will have to be finished as per drawings at a later date by the contractor at no extra cost to BHEL.

I) A logbook shall be maintained by the contractor for taking clearance of the location for application of refractory and insulation.

I) **Wastage Allowance For Insulation & Cladding**

Wastage allowance on net issued quantity for refractory & insulation shall be as follows:

i)	Wool mattresses and cladding sheets	2%
ii)	Iron & other retainers/fasteners components	2%

Net issued quantity is the gross quantity issued less the useable quantity returned to BHEL. Acceptance of any material as useable will be at absolute discretion of BHEL engineer.

4.13 Piping Installation

4.13.1 The work on piping systems (Air, Water, Oil, Steam, Gas etc.) will include fabrication, laying, edge preparation, fixing & welding of the elbows/fittings/ valves etc On the line, fixing & adjustment of supports/angles shock absorbers and carrying out all other activities/work to complete the erection and also carrying out all pre-commissioning/commissioning operations mentioned in the specification as per BHEL engineers instructions and/or as per approved drawings/documents.

4.13.2 Fittings like bends tees, elbows, reducers, flanges etc, will be supplied as loose items which shall be matched with the corresponding piping. Bends of tube size up to OD 65mm will have to be fabricated at site at no extra cost.

4.13.3 All pipes & tubes shall be sent from units in commercially available lengths. Certain adjustments in length may be necessary while erecting pipelines. The contractor should remove the extra lengths/add extra lengths to suit the final layout after preparing edges both for IBR & Non-IBR pipes and adopting specified heat treatment procedure at no extra cost.

4.13.4 Minor adjustments like removal of ovality in pipes and opening and closing of the bends of pipe by process of heat or correction of any other method approved by BHEL engineer to suit the layout, with specified heat treatment procedure, are in the scope of work.

4.13.5 Flame cutting of piping, where required shall be done as per BHEL Engineers instructions.

4.13.6 All drains/ vents/ relief/ escape/ safety valve piping to various tanks/ sewage/ drain canal/ flash box / sump / atmosphere etc From the stubs on the piping and equipments erected by the contractor is completely covered in the scope of work.

4.13.7 Connection (either flanged/bolted or welded) of piping to the terminal points/equipments etc are in the scope of work even though such terminal point/equipment may not form part of this work. All NDE including radiography of joints so made, post-weld-heat-treatment if any, is also within the scope of work/specification. Terminal points works of various piping schemes with customer lines and other contractor's lines. The terminal points work is inclusive of cutting of existing lines, edge preparation, welding/blanking and hook up work.

4.13.8 Erection, Welding & UT/radiography test of BHEL supplied flow nozzles in customer terminal/tapping points is the part of scope of works. Same will be carried out as per BHEL engineer's instruction at site and shall be binding on Contractor.

4.13.9 Drilling, welding of stubs for drains, vents, instrument tapping points, Welding of attachments for supports etc is part of the work. No additional payment is envisaged for this work.

4.13.10 Erection, installation and commissioning of Motorised valves & Control Valves shall be treated as part of piping work. No separate rate on this account will be payable.

4.13.11 **Assembly, Erection, welding, NDT, supporting of lube oil piping, Jacking oil piping, Control oil piping, Governing oil piping with valves, supports and fittings of Steam Turbine and Generator including Over Head Tank oil piping Both Carbon steel & Stainless steel will be treated as part piping work and payment will be made on agreed tonnage piping rate of rate schedule.**

4.13.12 Instrument & Service Air Piping (GI Pipe)

Laying of GI pipe for instrument air line shall include air blowing, cutting from the running meter length, threading, welding, installation of elbows/ tee/reducer/ moisture traps/auto drain pot/check valves/isolating valves, supporting clamping, conducting leak test etc Threaded joints of air pipeline shall be made leak proof by using teflon tapes or sealing compound. Seal welding of threaded joints may be called for if required. This shall be done within the quoted rate.

4.14 House Keeping

4.14.1 Contractor shall take utmost interest in house keeping and shall maintain the working area neat & clean. Contractor shall cleaning of area and remove wastes materials left over after use like cleaning cloths, cotton wastes, emery papers etc and erection scraps materials like packages/containers, transport frames , gunny bags and scrap steel etc daily. The scraps shall kept at identified place as decided by BHEL/Customer at site. Failure of contractor on this account, BHEL Engineer at site shall take suitable action to get the area cleaned through other agency at the risk & cost of contractor.

4.15 Exclusions

The following works are specific exclusions from the scope of work / specification:

1. Control and Instrumentation jobs including Panels placement, Erection/mounting of instruments & their Calibration, Cabling, Cable trays except those which are specifically included.
2. Testing of Motors. However any assistance required for testing & commissioning of these motors will be provided by Contractor
3. Pneumatic copper tubing and fittings thereof.
4. Application of thermal insulation of Steam Turbine.
5. Turbine enclosure
6. Main Steam piping up to Emergency stop valve .

Section-5
Special Conditions of Contract

5.0 Obligations of the Contractor (Tools, Tackles, Consumables Etc)

5.1 Labour Colony

Contractor shall make his own arrangements for accommodation of labour, including lighting, Drinking water and suitable medical facilities.

5.2 **Tools and Tackles, MMD**

5.2.1 In addition to the T&P being provided by BHEL/Client free of charges, the contractor shall provide all other required Tools & Plants for material handling, transportation, erection, lifting & placement to required foundation/elevation, testing, commissioning for entire equipments/systems including handling & transportation arrangements for heavier assemblies/equipments/Components **like Condenser, Turbine, Generator, Deaeartor with FST, Main oil Tank, Overhead Oil tank, Drain Cooler, HP & LP Heaters etc** and other auxiliaries, inspection, measuring, testing, calibration instruments required to carry out & complete the materials handling, erection, testing and commissioning of works covered under this tender specification.

5.2.2 All tools and tackles to be deployed by the contractor for the work shall have the prior approval of BHEL engineer with regard to brand, quality and specification.

5.2.3 Timely deployment of adequate quantity of T&P is the responsibility of the contractor. The contractor shall be prepared to augment the T&P at short notice to match the planned programme and to achieve the milestones.

5.2.4 Contractor shall maintain and operate his tools and plants in such a way that major breakdowns are avoided. In the event of major breakdown, contractor shall make alternate arrangements expeditiously so that the progress of work is not hampered.

5.2.5 In the event of contractor failing to arrange the required tools, plants, machinery, equipment, material or non-availability of the same owing to breakdown, BHEL will make the alternate arrangement at the risk and cost of the contractor.

5.2.6 The T&P to be arranged by the contractor shall be in proper working condition. The operation shall not lead to unsafe condition. The movements of cranes, and other equipment should be such that no damage/breaking occur to foundation, equipment, material and men. All arrangements for the movement of his T&P etc, shall be the contractor's responsibility.

5.2.7 Normally, for welding only the use of welding generators may be permitted. The use of welding transformers/rectifiers will be subject to the approval of BHEL engineer.

5.2.8 The contractor at his cost shall carry out periodical testing of his construction equipments and calibration of measuring instruments (MMD) and tests. Test/ calibration certificates shall be furnished to BHEL. MMD shall be calibrated only at accredited laboratory as per the list available with BHEL or any other laboratory approved by BHEL.

5.2.9 Contractor shall provide chemical cleaning pump set with necessary drive motor starter etc.

5.3 Consumables

5.3.1 The contractor shall provide all consumables including TG special consumables like Prussian blue, Molykote, Hylomar, Bricosit Stag-B, Greases and sealing compound for threaded joints of GI Piping etc. as required for carrying out the work covered under these specifications.

5.3.2 All consumables to be used for the work shall have prior approval of BHEL engineer with regard to brand and quality specifications. Test reports/ certificates in respect of these consumables, wherever applicable, shall be submitted to BHEL engineer.

5.3.3 In addition to the lube oil and preservatives provided by BHEL free of charges, other lubricants and chemicals as required for testing, preservation, chemical cleaning / acid cleaning will be arranged by contractor.

5.3.4 Primer Paints etc.

5.3.4.1 The contractor shall provide the Cleaning Agents, Primers, Thinner and Paints etc. for various applications of touch up / Preservation Painting and Final Painting. Contractor shall arrange Synthetic Enamel Paint (IS: 2932), ROZC Prime (IS: 2074) and compatible thinner for such activities.

5.3.4.2 Epoxy Bituminous Black Coal tar for application inside condenser water box shall be supplied by contractor.

5.3.4.3 Supply and Application of Heat Resistant Bituminous Black paint as required for inside painting of GI / Aluminium Sheet before cladding will be done by the Contractor.

5.4 Welding Electrodes, Filler Wires for TIG Welding and Gases

5.4.1 All the required welding electrodes, including Stainless Steel and special electrodes, as approved by BHEL shall be arranged by contractor at his cost. It shall be the responsibility of the contractor to obtain prior approval of BHEL, before procurement, regarding manufacturer, type of electrodes etc On receipt of the electrodes at site, it shall be subject to inspection and approval by BHEL regarding type of electrodes, batch number, date of expiry etc Batch test certificates shall be made available for verification & record.

BHEL reserves the right to reject the use of any electrodes, if found non-acceptable because of bad quality, deterioration in quality due to improper storage, shelf life expiry, unapproved type/brand etc

5.4.2 BHEL will not supply any filler wires for TIG welding. The contractor shall provide all types of filler wires in adequate quantity for TIG welding involved with this work.

5.4.3 All the required gases like argon, oxygen, acetylene etc Shall be arranged by the contractor at his cost.

5.4.4 If at any time during the execution of work, it is noticed that the work is suffering on account of non-availability of consumables from the contractor's side BHEL will make alternate arrangements at the risk and cost of contractor. The expenditure incurred with overheads will be recovered from the contractor.

5.5 Field Office

5.5.1 Customer will provide open space for office & stores. Contractor shall make his own arrangements for further construction of field office, stores to accommodate the contractor's necessary equipments, tools room etc. necessary for execution of the work.

5.5.2 On completion of work, all the temporary installations, 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 , the same will be arranged to be removed and expenditure thereof will be recovered from the contractor. The decision of BHEL engineer in this regard shall be final. However, the scope of dismantling and leveling the area is limited only to the contractor's site office, yard and other spaces occupied by the contractor.

5.6 Area Lighting

5.6.1 Contractor shall arrange adequate floodlights, hand lamps and area lighting. Provision of distribution lines for lighting from the single 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 including all the materials like cables, fuses, switch boards etc

5.7.0 Construction Power & Water

5.7.1 Construction power (415v/440v) will be provided free of cost by BHEL's customer at one single point within the project area. All necessary cables, fuses, switches, switchboards, energy meters etc, and any other installation as specified by statutory authority in this regard for further drawl of power and distribution to required locations shall be provided by the contractor. Obtaining approvals, payment of necessary fees, duties etc. towards the clearance of such installations, prior to their being put to use or as may be specified, shall be the responsibility of the contractor.

5.7.2 It shall be the responsibility of the contractor to provide and maintain the complete installation on the load side of the supply with due regard to the safety requirements at site. All cabling and installations shall comply in all respects with the appropriate statutory requirements.

5.7.3 The customer will provide water for construction purpose at a single point near the site. Further distribution, if permitted by the customer, has to be arranged by the contractor at his cost.

5.7.4 In case of non-availability of customer supplied power and/or water, it is the responsibility of the contractor to make alternate arrangements. Contractor shall be adequately equipped to arrange standby diesel welding generators in the event of construction power failure. Essential welding jobs shall not be stopped on account of main construction power failure.

5.7.5 BHEL is not responsible for any loss or damage to the contractor's equipment as a result of variations in voltage or frequency or interruptions in power supply.

5.8 **Contract Labour**

5.8.1 The contractor in the event of his engaging 10 or more workmen will obtain independent license under the contract labour (regulations and abolition) act 1970 from the concerned authorities based on the certificate (Form–V) issued by the principal employer/customer.

5.8.2 Provident Fund

Contractor will deduct the necessary amount from his employees towards provident fund and contribute equal amount as per Government Of India labour laws. This amount will be deposited by contractor regularly to the provident fund commissioner and get the account code. Contractor shall submit the account code duly certified by pf commissioner to BHEL project in-charge.

5.8.3 Contractor shall also comply with the provisions of ESIS act in vogue and submit evidence thereof to BHEL site in-charge. Also all other employees benefits to be borne by the contractor as per the labour laws. Contractor shall produce necessary certificates towards their compliance with such statutes and payment of all statutory dues.

5.8.4 Contractor shall also comply with the requirements of local authorities/ project authorities calling for police verification of antecedents of the workmen, staff etc

5.8.5 Where applicable, provisions of workman compensation act shall be adhered to.

5.8.6 BHEL/customer may insist upon witnessing the regular payment to the labour. They may also like to verify the relevant records for compliance with statutory requirements. Contractor shall enable such facilities to BHEL/ customer.

5.9 TAXES, DUTIES, LEVIES

Refer to Clause 2.8.4 of General Conditions of Contract. Notwithstanding anything contained therein, the following provisions shall be applicable for this contract.

5.9.1

The contractor shall pay all (save the specific exclusions as enumerated in this contract) taxes, fees, license charges, deposits, duties, tools, royalty, commissions or other charges which may be levied on the input goods & services consumed and output services delivered in course of his operations in executing the contract. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

5.9.2 Service Tax & Cess on Service Tax

Service Tax and Cess on Service Tax as applicable on output Services are excluded from contractor's scope; therefore contractor's price/rates shall be **exclusive** of Service Tax and Cess on Output Services. In case, it becomes mandatory for the contractor under provisions of relevant act/law to collect the Service Tax & Cess from BHEL and deposit the same with the concerned tax authorities, such applicable amount will be paid by BHEL. Contractor shall submit to BHEL documentary evidence of Service Tax registration and remittance record of such tax immediately after depositing the tax with concerned authorities. Contractor shall obtain prior written consent from BHEL before billing the amount towards such taxes.

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 and Service Tax paid on Input Services that are used for providing the output services can be taken credit of against the Service Tax payable on output services. However BHEL may opt for availing the abatement provision in which case cenvat credit may not be available on input duty.

5.9.3 VAT/WCT

As regards Sales Tax on transfer of property in goods involved in Works Contract applicable as per local laws, the price quoted by the contractor shall be **exclusive** of the same. Where such taxes are required to be paid by the contractor, this will be reimbursed on production of proof of payment made to the authorities by the Contractor. In any case the Contractor shall register himself with the respective Sales Tax authorities of the state and submit proof of such registration to BHEL along with the first RA bill. The contractor has to take all necessary steps to **minimize tax on input goods** by purchasing the materials from any registered dealer of the concerned state only. In case contractor opts for composition, it will be with the prior express consent of BHEL. Deduction of tax at source shall be made as per the provisions of law unless otherwise found exempted. In case tax is deducted at source as per the provisions of law, this is to be construed as an advance tax paid by the contractor and no reimbursement thereof will be made unless specifically agreed to.

5.9.4 Modalities of Tax Incidence on BHEL

Wherever the relevant tax laws permit more than one option or methodology for discharging the liability of tax/levy/duty, BHEL will have the right to adopt the appropriate one considering the amount of tax liability on BHEL/Client as well as procedural simplicity with regard to assessment of the liability. The option chosen by BHEL shall be binding on the Contractor for discharging the obligation of BHEL in respect of the tax liability to the Contractor.

5.9.5 New Taxes/Levies

In case the Government imposes any new levy/tax on the output service/ goods/work after award of the contract, the same shall be reimbursed by BHEL at actual.

In case any new tax/levy/duty etc. becomes applicable after the date of Bidder's offer, the Bidder/Contractor must convey its impact on his price

duly substantiated by documentary evidence in support of the same **before opening of Price Bid**. Claim for any such impact after opening the Price Bid will not be considered by BHEL for reimbursement of tax or reassessment of offer.

No reimbursement/recovery on account of increase/reduction in the rate of taxes, levies, duties etc. on input goods/services/work shall be made. Such impact shall be taken care of by the Price Variation/Adjustment Clause (PVC) if any. In case PVC is not applicable for the contract, Bidder has to make his own assessment of the impact of future variation if any, in rates of taxes/duties/ levies etc. in his price bid.

5.10 **Submission of Periodical Reports**

Contractor shall submit periodical reports in respect of following aspects of operation:

1) Consumption of welding electrodes and gases
2) Consumption of Construction Power
3) Manpower reports
4) Progress reports - periodically
5) Field calibration reports

BHEL at site will inform formats for these reports.

5.11 It is the responsibility of the contractor to arrange gate pass for all his employees, T&P etc. necessary co-ordination with customer officials is the responsibility of the contractor. Contractor to follow all the procedures laid down by the customer for making gate passes. Where permitted, by customer/ BHEL, to work beyond normal working hours, the contractor shall arrange necessary work permit for working beyond normal working hours.

5.12 **Compliance with Requirements of Statutory/Mandatory Authorities**

5.12.1 Refer section-8 for contractor's responsibilities regarding the work related inspection by statutory authorities.

5.12.2 The responsibilities of contractor with regard to compliance with requirements of statutory/mandatory authorities have been specified in various clauses of the specification. However, in addition to those specified already, the requirements of any other authority viz. factory inspector, provident fund commissionerate, labour commissionerate etc, in connection with this work has to be complied with by the contractor.

Section-6

Special Conditions

6.0 Contractor's Obligation in Regard to Employment of Supervisory Staff and Workmen

6.1 The contractor shall deploy all the skilled/semiskilled/ unskilled labour including highly skilled workmen like high pressure welders etc These workmen should have previous experience on similar job. They shall hold valid certificates wherever necessary. BHEL reserves the right to insist on removal of any employee of the contractor at any time if he is found to be unsuitable and the contractor shall forthwith remove him. Contractor should furnish a tentative deployment plan of his manpower as required vide Appendix-IV. Also the actual deployment will be so as to satisfy the erection and commissioning targets set by BHEL.

6.2 It is the responsibility of the contractor to engage his workmen in shifts and or on overtime basis for achieving the targets set by BHEL. This target may be set to suit BHEL's commitments to its customer or to advance date of completion of events or due to other reasons. The decision of BHEL in regard to setting the erection and commissioning targets will be final and binding on the contractor.

6.3 Contractor shall deploy only qualified and experienced engineers/ supervisors. They shall have professional approach in executing the work.

6.4 The contractor's supervisory staff shall execute the work in the most professional manner in the stipulated time. Accuracy of work and aesthetic finish are essential part of this contract. They shall be responsible to ensure that the assembly and workmanship conform to dimensions and tolerances given in the drawings/instructions given by BHEL engineer from time to time.

6.5 The supervisory staff employed by the contractor shall ensure proper out-turn of work and discipline on the part of the labour put on the job by the contractor. Also in general they should see that the works are carried out in a safe and proper manner and in coordination with other labour and staff employed directly by BHEL or other contractors of BHEL or BHEL's client.

6.6 **Industrial Relations and Labour Laws**

An industrial relations supervisor shall coordinate for the implementation of local labour laws, maintenance of records as required by contract labour (regulation and abolition) act and also coordinate with the local labour authorities and any other such authorities under whom this work falls.

6.7 If at any time, it is found that the contractor is not in a position to deploy the required engineers/supervisors/workmen due to any reason, BHEL shall have the option to make alternate arrangements at the contractor's risk and cost.

6.8 Site Organization

The contractor shall provide adequate staffing in the following major areas separately for STG works.

- Planning, Monitoring and Control
- Materials Management
- Condenser & Auxiliaries
- Turbine & Auxiliaries
- Generator and Auxiliaries
- Pumps & Auxiliaries
- Deaerator and Piping
- Welding and NDT
- Insulation & Cladding
- Quality Assurance and Control
- Safety
- Industrial relations and welfare

Contractor shall furnish an organisation chart indicating the staffing pattern for the above functions. Contractor shall provide the names and details of engineer/supervisors at the time of mobilization to BHEL as per the proposed organization chart.

Section-7

Special Conditions of Contract

7.0 **Obligations Of BHEL**

7.1 **Facilities Provided By BHEL**

7.1.1 **Space For Field Office**

Refer section-5 in this regard.

7.1.2 **Construction Water**

Refer section-5 in this regard.

7.1.3 **Construction Power**

Refer section-5 in this regard.

7.1.4 **Other Materials and Consumables:**

7.1.4.1 BHEL will provide the cleaning/flushing agents/protective oil that are required for preservation of components lying in BHEL stores.

7.1.4.2 BHEL will provide free of cost Steam Washable paints for condenser inner surface if necessary for preservation in stores as well as after installation.

7.1.4.3 BHEL will provide free of cost the necessary pipes, fittings, valves, support materials etc. that are required for flushing/cleaning/steam blowing operations.

7.2. **Test Blanks (Plates & Pipes)**

BHEL will provide only temporary pipes & valves for steam blowing / chemical cleaning & oil flushing. All the temporary plates & dummy/blank flanges required to carry out above test will be arranged by Contractor at his own cost.

7.3 **Filler Wire for TIG Welding**

Refer Section-5 in this regard.

7.4 **Equipments – Tools & Plants**

7.4.1 Facility of 35 MT capacity EOT crane inside the TG hall will be extended free of hire charges for erection of TG equipments, subject to its availability and accessibility. No other cranes/equipments will be provided by BHEL for the work under the scope of this tender specification.

7.4.2 All arrangements, including providing & laying of sleeper beds, backfilling of approaches wherever necessary for safe movement of the cranes, any boom reduction, extension for their use and restoration to previous stage of Crane as provided by Customer for Stator lifting shall be the responsibility of the contractor. The contractor shall provide sleepers for this purpose.

7.4.3 For Generator Stator lifting within TG hall Customer will provide suitable capacity mobile Crane OR any other suitable alternate arrangements (like four-point lifting system with Strand and Jack, or any other method). Contractor shall have to extend and provide all necessary manpower and assist T& P including providing & laying of sleeper beds, backfilling of approaches wherever necessary for safe movement of the cranes, any boom reduction, extension for their use and restoration to previous stage. In case client provides alternative arrangement to crane, the Contractor in

addition to the aforesaid responsibilities, shall also collect the materials/ items from Customer stores/ storage yard, transport to site, assemble at site, dismantle after use and transport back to customer stores/identified place as normal scope of work.

7.4.5.1 Operator for Customer's EOT Crane in TG hall will be provided by customer and its services shall be on sharing basis.

7.4.5.2 Customer/BHEL will provide the fuel and operator for mobile crane of suitable capacity within a TG hall.

7.4.6 Special tools which are supplied by BHEL as part of maintenance tools to be handed over to customer under regular DU/DESS numbers in various product groups may be issued to the contractor free of charges for specific activities, at the discretion of BHEL. Contractor shall return them after the completion of the specific activity, for which the tools were spared, in good working order.

7.4.7 The contractor must not use these equipments for any purpose other than what they are intended for. Misuse, if any, will result in penalty.

7.4.8 If the above items issued to contractor are found not utilized/not maintained to the satisfaction of BHEL engineer or misused, these will be withdrawn and no replacement will be done for such items.

7.5.0 **Chemicals and Lubricants for Pre-Commissioning and Commissioning**

7.5.1 BHEL/Customer will provide only Lube Oil for Flushing, Fresh Filling and subsequent topping up in Lube Oil Systems of all permanent plant equipments/systems. BHEL/client will issue used and re-cycled oil for the purpose of flushing. Contractor must take care to ensure that such oil does not get mixed up with fresh oil.

Section-8

Special Conditions of Contract

8.0 Inspection/Quality Assurance/Quality Control/ Statutory Inspection

8.1 Various inspection/quality control/quality assurance procedures/ methods at various stages of erection and commissioning will be as per BHEL/customer quality control procedure/codes/IBR and other statutory provisions and as per BHEL engineer's instructions.

8.2 Preparation of quality assurance log sheets and protocols with customer/ consultants/statutory authority, welding logs, NDE and post weld heat treatment records, testing & calibration records and other quality control and quality assurance documentation as per BHEL engineer's instructions, is within the scope of work/specification. These records shall be submitted to BHEL/customer for approval from time to time.

8.3 A daily logbook of all measurements and testing/calibration should be maintained by contractor on the job for detailing inspection details of various equipments.

8.4 The performance of HP welders will be reviewed from time to time as per the BHEL/IBR standards. High-pressure welders' performance record shall be furnished periodically. Corrective action as informed by BHEL shall be taken in respect of those welders not conforming to these standards. This may include removal/ discontinuance of concerned welder(s). Contractor shall arrange for the alternate welders immediately.

8.5 All the welders including HP welders shall carry identity cards as per the pro-forma prescribed by BHEL only welders duly authorised by BHEL/boiler inspector/customer/consultant shall be engaged on the work.

8.6 Contractor shall provide all the inspection, measurement and monitoring devices (MMD) required for completion of the work satisfactorily. These MMD shall conform to job requirement in respect of measurement range, accuracy level & any other specification. The list will be reviewed by BHEL and the contractor shall meet any augmentation needed.

8.7 The MMD deployed by the contractor shall, at all stages of work, have valid and current calibration. The calibration of these MMD shall be got done from the agencies accredited/ approved by BHEL. Copy of calibration certificates in respect of these MMD has to be submitted to BHEL. Periodical status report regarding validity of calibration has to be submitted to BHEL. Re-calibration/ re-validation shall be done periodically as per BHEL specifications. Contractor shall conform to the specifications of BHEL regarding storage of the MMD.

8.8 Re-work necessitated on account of use of invalid MMD shall be entirely to the contractor's account. He shall be responsible to take all corrective

actions, including resource augmentation if any, as specified by BHEL to make-up for the loss of time.

8.9 In the course of work BHEL may counter/ finally check the measurements with their own MMD. Contractor shall render all assistance in conduct of such counter/final measurements.

8.10 Vibration indicators/vibration recorders/vibration analysers will be provided by BHEL for checking and analysing vibration levels of rotating equipments with necessary operators. Contractor shall be provided necessary labour for carrying out such tests. Similarly, BHEL will provide the oscilloscope for any specific requirement.

8.11 Total quality is the watchword of the work and contractor shall strive to achieve the quality standards, procedures laid down by BHEL. He shall follow all the instructions as per BHEL drawings and quality standards. Contractor shall provide for the services of quality assurance engineer.

8.12 **Stage Inspection By FES/QA Engineers**

8.12.1 Apart from day-to-day inspection by BHEL engineers stationed at site and also by customer's engineers, stage inspection of equipments under erection and commissioning at various stages of erection and commissioning by teams of engineers from field engineering services of BHEL's manufacturing units and quality assurance teams from field quality assurance factory quality assurance and commissioning engineers from technical services of BHEL will also be conducted. Contractor shall arrange all labour, tools and tackles etc, for such stage inspections as part of work.

8.13 **Statutory Inspection of Work**

8.13.1 The work to be executed under these specifications has to be offered for inspection, at appropriate stages of work completion, to various relevant statutory authorities to show compliance with applicable regulations.

8.13.2 The work related statutory inspections, though not limited to, are as under:

1) Inspectorate of steam boilers and smoke nuisance
2) Any other authority connected to this work.

The scope includes getting the approvals from the statutory authorities, which includes arranging for inspection visits of statutory authority periodically as per BHEL engineer's instructions, submitting documents, radiographs etc And following up the matter with them. Contractor shall also make all arrangements for offering the products/systems for inspection, as applicable, to the concerned authority.

8.13.3 The contractors shall pay all fees connected with testing of his welders/workers and testing, inspection & calibration of his MMD and T&P.

8.13.4 It shall be contractor's responsibility to obtain approval of statutory authorities, whenever applicable, for the conducting of any work which comes under the purview of these authorities. Any cost arising from this shall be contractor's account.

8.13.5 BHEL will pay fees for visits, inspection fees etc Of these statutory authorities. All other expenses shall be borne by the contractor. In case these inspections have to be repeated due to default/fault of the contractor and fees have to be paid again, the contractor has to bear the charges.

8.13.6 Contractor should be qualified to execute pressure parts & piping work coming under the purview of IBR, for which he should register himself with CIB concerned state. Similarly it is the responsibility of contractor to obtain license from chief electrical inspector, concerned state for carrying out high voltage work. Contractor also should be aware of the latest IBR regulations and electricity act, including the amendments thereof.

8.14.0 The quality management system of BHEL, Power Sector – Western Region (PS-WR) has already been certified and accredited under I.S.O. 9002 standards in this regard. The basic philosophy of the quality management system is to define the organizational responsibility, work as per documented procedures, verify the output with respect to acceptance norms, identify the non-conforming product/ procedure and take corrective action for removal of non-conformance specifying the steps for avoiding recurrence of such non-conformities, & maintain the relevant quality records. The non-conformities are to be identified through the conduct of periodical audit of implementation of quality systems at various locations/stages of work. Suppliers/vendors of various products/services contributing in the work are also considered as part of the quality management system. .as such the contractor is expected not only to conform to the quality management system of BHEL but also it is desirable that they themselves are accredited under any quality management system standard.

Section-9

Special Conditions of Contract

Safety, Occupational Health and Environmental Management

BHEL PSWR has been certified for Environmental Management under ISO 14001:1996 standard and Occupational Health & Safety under OHSAS 18001 by DNV. In order to comply with the above standards, it shall be the endeavour of BHEL and all its subcontractors to meet and implement the requirements by following the guidelines issued under Environmental, Occupational Health and Safety Management (EHS) manual a copy of which will be available with the BHEL Site-in-charge.

Contractor shall also enter into a "Memorandum of Understanding" as given in clause 9.9 in case of award of contract.

9.0 Responsibility Of The Contractor In Respect Of Safety Of Men, Equipment, Material and Environment.

9.1 The Contractor Shall

9.1.1 Abide by the Safety Regulations applicable for the Site/Project and in particular as mentioned in the booklet "Safe Work Practices" issued by BHEL. Contractors are also to ensure that their employees and workmen use safety equipments as stipulated in the Factories Act (Latest Revision) during the execution of the work. Failure to use safety equipment as required by BHEL Engineer will be a sufficient reason for issuance of memo, which shall become part of Safety evaluation of the contractor at the end of the Project. Also all site work may be suspended if it is found that the workmen are employing unsafe working practice and all the costs/losses incurred due to suspension of work shall be borne by contractor. A comprehensive list of National Standards from which the contractor can draw references for complying with various requirements under this section is given under 9.10

9.1.2 Hold BHEL harmless and indemnified from and against all claims, cost and charges under Workmen's Compensation Act 1923 and 1933 and any amendment thereof and the contractor shall be solely responsible for the same.

9.1.3 Abide by the Procedure governing entry/exit of the contractor's personnel within the Customer/Client premises. All the contractors employees shall be permitted to enter only on displaying of authorized Photo passes or any other documents as authorised by the Customer/Client

9.1.4 Be fully responsible for the identity, conduct and integrity of the personnel/ workers engaged by them for carrying out the contract work and ensure that none of them are ever engaged in any anti national activity

9.1.5.1 Prepare a signboard giving the following information and display it near work site:

- Name of Contractor
- Name of Contractor Site-in-charge & Telephone number
- Job Description in short
- Date of start of job
- Date of expected completion
- Name of BHEL Site-in-charge.

9.1.5 Abide by the rules and regulations existing during the contract period as applicable for the contractors at the Project premises.

9.1.6 Observe the timings of work as advised by BHEL Engineer-in-charge for carrying out the contract work.

9.2 **SPECIAL CONDITIONS**

9.2.1 **Safety**

9.2.1.1 **Safety Plan**

Before commencing the work, contractor shall submit a "safety plan" to the authorised BHEL official. The safety plan shall indicate in detail the measures that would be taken by the contractor to ensure safety to men, equipment, material and environment during execution of the work. The plan shall take care to satisfy all requirements specified hereunder.

The contractor shall submit "safety plan" before start of work. During negotiations, before placing of work order and during execution of the contract, BHEL shall have right to review and suggest modifications in the safety plan. Contractor shall abide by BHEL's decision in this respect.

9.2.1.2 The contractor shall take all necessary safety precautions and arrange for appropriate appliances and/or as per direction of BHEL or it's authorised person to prevent loss of human lives, injuries to men engaged and damage to property and environment.

9.2.1.3 The contractor shall provide to his work force and also ensure the use of Personnel Protection Equipment (PPE) as found necessary and/or as directed and advised by BHEL officials without which permission is liable to be denied.

- Safety helmets conforming to IS 2925/1984 (1990)
- Safety belts conforming to IS 3521/1989
- Safety shoes conforming to IS 1989 part-II /1986(1992)
- Eye and face protection devices conforming to IS 2573/1986(1991), IS 6994 (1973), part-I (1991), IS 8807/1978 (1991), IS 8519/1977(1991).
- Other job specific PPEs of standard ISI make as may be prescribed

9.2.1.4 All tools, tackles, lifting appliances, material handling equipment, scaffolds, cradles, cages, safety nets, ladders, equipment, etc used by the contractor shall be of safe design and construction. These shall be tested and certificate of fitness obtained before putting them to use and from time to time as instructed by authorised BHEL official who shall have the right to ban the use of any item found to be unsafe

9.2.1.5 All electrical equipment, connections and wiring for construction power, its distribution and use shall conform to the requirements of Indian Electricity Act and Rules. Only electricians licensed by the appropriate statutory authority shall be employed by the contractor to carryout all types of electrical works. All electrical appliances including portable electric tools used by the contractor shall have safe plugging system to source of power and be appropriately earthed.

9.2.1.6 The contractor shall not use any hand lamp energised by electric power with supply voltage of more than 24 volts. For work in confined spaces, lighting shall be arranged with power source of not more than 24 volts.

9.2.1.7 The contractor shall adopt all fire safety measures as per relevant Indian Standards

9.2.1.8 Where it becomes necessary to provide and/or store petroleum products, explosives, chemicals and liquid or gaseous fuel or any other substance that may cause fire or explosion, the contractor shall be responsible for carrying out such provisions and/or storage in accordance with the rules and regulations laid down by the relevant government acts, such as petroleum act, explosives act, petroleum and carbides of calcium manual of the chief controller of explosives, Government of India etc. The contractor in all such matters shall also take prior approval of the authorised BHEL official at the site.

9.2.1.9 Proper means of access must be used e.g. ladders, scaffolds, platforms etc. No makeshift access such as oil drums or pallets shall be used. Design of these will be in accordance with relevant standards and certified by competent persons before use.

9.2.1.10 Temporary arrangements made at Site for lifting , platforms, approach,
access etc should be properly designed and approved before being put to use.

9.2.1.11 All excavations and openings must be securely and adequately fenced/barricaded and warning signs erected when considered necessary as per relevant code of practice.

9.2.1.12 No persons shall remove guard rails, covers or protective devices unless authorised by a responsible supervisor and alternative precautions have been taken

9.2.1.13 Access ways, means of escape and fire exits shall be clearly marked, kept clear and unobstructed at all times

9.2.1.14 Only authorised persons holding relevant license will drive and operate site plant and equipments eg cranes, dumpers, excavators, transport vehicles etc

9.2.1.15 Only authorised personnel are allowed to repair, commission electrical equipments.

9.2.1.16 Gas cylinders shall be handled and stored as per Gas Cylinder Rules and relevant safe working practices

9.2.1.17 All wastes generated at Site shall be segregated and collected in a designated place so as to prevent spillage/contamination/scattering

at Site, until the waste is lifted for disposal to designated disposal area as advised by BHEL official.

9.2.1.18 The contractor shall arrange at his cost (wherever not specified) appropriate illumination at all work spots for safe working when natural day light is not adequate for clear visibility.

9.2.1.19 The contractor shall train adequate number of workers/supervisors for administering "FIRST AID". List of competent first aid administers should be prominently displayed.

9.2.1.20 The contractor shall display at strategic places and in adequate numbers the following in fluorescent markings

- Emergency telephone numbers
- Exit, Walkways
- Safe working load charts for wire ropes, slings, D shackles etc
- Warning signs

9.2.1.21 The contractor shall be held responsible for any violation of statutory regulations (local, state or central) and BHEL instructions that may endanger safety of men, equipment, material and environment in his scope of work or other contractors or agencies. Cost of damage, if any, to life and property arising out of such violation of statutory regulations and BHEL instructions shall be borne by the contractor.

9.2.1.22 In case of a fatal or disabling injury/accident to any person at construction sites due to lapses by the contractor, the victim and/or his/her dependents shall be compensated by the contractor as per statutory requirements. However, if considered necessary, BHEL shall have the right to impose appropriate financial penalty on the contractor and recover the same from payments due to the contractor for suitably compensating the victim and/or his/her dependents. Before imposing any such penalty, appropriate enquiry shall be held by BHEL giving opportunity to the contractor to present his case.

9.2.1.23 In case of any damage to property due to lapses by the contractor, BHEL shall have the right to recover cost of such damages from payments due to the contractor after holding an appropriate enquiry.

9.2.1.24 In case of any delay in the completion of a job due to mishaps attributable to lapses by the contractor, BHEL shall have the right to recover cost of such delay from payments due to the contractor after notifying the contractor suitably and giving him opportunity to present his case.

9.2.1.25 If the contractor fails to improve the standards of safety in its operation to the satisfaction of BHEL after being given a reasonable opportunity to do so, and/or if the contractor fails to take appropriate safety precautions or to provide necessary safety devices and equipment or to carry out instructions regarding safety issued by the

authorised BHEL official, BHEL shall have the right to take corrective steps at the risk and cost of the contractor after giving a notice of not less than seven days indicating the steps that would be taken by BHEL.

Emergency Response

BHEL will have an Emergency Response Plan for each Project Site in consultation with the Owner as the case may be, detailing the procedure for mobilisation of personnel and equipment, and defining the responsibilities of the personnel indicated, in order to prepare for any emergency that may arise in order to ensure the priorities of

- Safeguard of life
- Protect assets under construction or neighbouring
- Protect environment
- Resumption of normal operations as soon as the emergency condition is called off

All Contractors shall also be part of the Emergency response Plan and the personnel so nominated shall be aware of their duties and responsibilities in an emergency response situation.

9.2.1.26 At least 5% Contractors supervisors and workmen shall undergo training in administering 'First Aid'. The trained persons should represent for all categories of work and for all areas of work. Adequate number of trained persons should be available for each shift. These first aiders shall be included in the emergency response team. Contractor employees and workmen are encouraged to participate in first aid training programmes whenever organised by BHEL.

9.2.2 OCCUPATIONAL HEALTH

9.2.2.1 Specific occupational health hazards will be identified through the hazard evaluation processes in consultation with BHEL engineers and the necessary prevention/reduction/elimination methods implemented.

9.2.2.2 All personnel working in an activity with a potential risk to health shall be made aware of all those risks and the actions they must take to reduce/control/eliminate the risk

9.2.2.3 Safety coordinator shall conduct periodic checks to ensure that every group of workers engaged in similar activities are aware of potential risks to health and the actions required to be taken to mitigate the risk

9.2.2.4 In order to protect personnel from associated health hazards, the following main areas will be focussed

- Issue of approved Personnel Protective Equipment
- Verification that the PPEs are adequate/maintained and worn by all staff involved in operations that are potentially hazardous to their health
- Ensure that the personnel deployed are physically fit for the operation/work concerned

- Provide hygienic and sanitary working conditions

9.2.2.5 Contractor workers employees engaged in noise risk areas shall be issued with hearing protection aids and the use of the same will be enforced. Further, these workers will be educated on the hazards of noise

9.2.2.6 Contractor workers engaged in dust environment shall be issued with necessary dust protection aids and the use of the same shall be enforced.

9.2.2.7 Workers engaged in exposure to bright light/rays as in welding or radiation shall be issued with eye protection devices and the use of the same shall be enforced

9.2.2.8 Adequate arrangements shall be made to provide safe drinking water

9.2.2.9 Health monitoring records on at least sample basis for contractor employees & workmen shall be maintained for persons engaged in specified categories of work. These shall include

- Noise induced hearing loss
- Lung Function test
- Ergonomic Test
- Eye Test for Welders, Grinders, Drivers etc

9.2.3.0 HYGIENE and HOUSEKEEPING

9.2.3.1 Good house keeping and proper hygiene is one of the key requirements of Occupational Health Safety and Environment management. Towards this the contractor shall encourage his workers and supervisors to maintain cleanliness in their area of work.

9.2.3.2 The Contractor shall arrange to place waste bins/chutes at convenient locations for the collection of scrap and other wastes. The bins shall be clearly marked and segregated for metal, non-metal, hazardous and non hazardous wastes.

9.2.3.3 BHEL may take up appropriate remedial measures at the cost of the contractors if the contractors fail in good housekeeping and if there is an imminent ris k of pollution

9.2.4 ENVIRONMENT MANAGEMENT

9.2.4.1 BHEL has a sound environmental management system, which is to be maintained and implemented by all the contractors. The system allows for project specific objectives to be set and developed sensitive to client requirements, applicable environmental legislation and BHEL's own objectives and policy. BHEL engineers will assess and monitor the environmental impact of their work and lay out objectives for their minimisation. The contractors shall implement the objectives for

continual improvement of environmental performance. BHEL shall regularly audit environmental impacts and their improvements.

9.2.4.2 WASTE MANAGEMENT

9.2.4.3.1 The objective of waste management is to ensure the safe and responsible disposal of waste, ensuring that it is correctly disposed of and being able to audit the process to ensure compliance.

9.2.4.3.2 Chemical wastes if any shall be collected separately and disposed of to BHEL designated refuse yard as per BHEL advise

9.2.4.3.3 No dangerous chemicals, noxious waste products or materials will be disposed off on or off site without approval obtained through BHEL.

9.2.4.3.4 All disposal of wastes generated during construction shall be in accordance with all relevant legislation.

9.2.4.3.5 Acid and alkali cleaning wastes shall be neutralised to acceptable norms before disposal to the designated area.

9.2.4.3.6 All necessary measures shall be taken to ensure safe collection and disposal of waste oils. In particular to ensure the prevention of their discharge into surface waters, ground waters, coastal waters or drainages

9.3 SUPERVISION

9.3.1 Contractor must provide at least one full time on site safety coordinator when the manpower engaged is in excess of 50 for the contract activities in the premises. If the manpower is less than 50, the on site safety coordination responsibilities shall be assumed by any one of the contractor's other supervisory staff; however in both the cases, the contractor must specify in writing the name of such persons to the BHEL Engineer in Charge .

9.3.2 Contractor's safety coordinator or his supervisor responsible for safety as the case may be shall conduct at his work site, and document formal safety inspection and audits at least once in a week. Such documents are to be submitted to BHEL Engineer in Charge for his review and record

Contractor, supervisor must attend all schedule safety meetings as would be intimated to him by the BHEL Engineer in Charge.

9.3.3 Before starting work under any contract, the contractor must ensure that a job specific safety procedures/field practices as required over and above the safety permit conditions are prepared and followed .He should also ensure that all supervisors and workers involved understand and follow this procedures /field practices.

9.3.4 Contractor must ensure that in his work site appropriate display boards are put displaying signs for site safety , potential hazards and precautions required

9.4.0 **TRAINING & AWARENESS**

9.4.1 Contractor shall deploy experienced supervisors and other manpower who are well conversant with the safety and environment regulations of the Project. The electricians to be deployed on the job should have wireman license.

9.4.2 All Supervisors & Workmen of the Contractor shall undergo Fire safety training/demonstration whenever arranged by BHEL with the help of either Customer's Fire and Safety department or outside faculty so as to acquire knowledge of fire prevention and also to be able to make use of appropriate fire extinguishers.

9.4.3 Contractor must familiarize himself from BHEL Engineer in Charge about all known potential fire, explosion or toxic release hazards related to the contract. He in turn will ensure that same information has been passed to the supervisors and workmen

9.4.4 Contractor must ensure that all his supervisors are properly trained and each employee has received and understood from his supervisor necessary training and briefing about the safety requirement. Necessary document as a means to verify that employees have understood the training is to be maintained.

9.4.5 The contractor supervisors shall also give a small safety briefing to all the workmen under his charge before undertaking any new work and specially understand the safety requirements that are mandatory

9.5.0 **REPORTING**

9.5.1 The contractor shall submit report of all accidents, fires and property damage, dangerous occurrences to the authorised BHEL official immediately after such occurrence but in any case not later than twelve hours of the occurrence. Such report shall be furnished in the manner prescribed by BHEL and also to meet statutory requirement.

9.5.2 Any injury sustained by any of the contractor's employees within the Project premises must be reported to BHEL supervisor and FIRST AID should be immediately administered. The Contractor shall be responsible for keeping and maintaining proper records of Accidents to his personnel.

9.5.3 Contractor must arrange to immediately investigate, properly document and report any injury, accident or near miss involving any of his employees and take appropriate follow up action. He must furnish within 12 hours of the incident a written report to BHEL Engineer in charge and the Safety Section.

9.5.4 According to the Factory Act and the Employees state Insurance Act & regulation, any person sustaining any injury within the project premises and absenting himself from work for more than 46 hours, his accident report has to be sent to the respective Government Authorities. Therefore contractor shall

inform the owner's representative such matter immediately for their needful action.

9.5.5 In addition, contractor shall submit periodic reports on safety to the authorised BHEL official from time to time as prescribed.

9.5.6 Before commencing the work, the contractor shall appoint/nominate a responsible officer to supervise implementation of all safety measures and liaison with his counterpart of BHEL.

9.6 AUDIT REVIEW AND INSPECTION

9.6.1 BHEL shall conduct audit on the contractor performance and compliance with the project specific requirements of the Environment and Occupational Health & Safety Management systems. The programme of audit shall cover all activities under the contract but will focus particularly on high-risk activities. The Construction Manager shall decide the schedule of audit. The audit findings shall be communicated to the contractors and necessary remedial action as advised by BHEL Engineers shall be under taken within the stipulated time.

9.6.2 Inspections shall be carried out regularly by the contractors and by BHEL Engineers on activities, facilities, equipment, documentation, to cover the following aspects.

- Compliance with procedures and systems
- Availability, condition and use of PPEs
- Condition of maintenance tools, equipments, facilities
- Availability of fire fighting equipments and its condition
- Use of fire fighting equipments and first aid kit
- Awareness of occupational health hazard
- Awareness of safe working practices
- Presence of quality supervision
- Housekeeping

The Safety Co-ordinator shall visit and inspect work sites daily. All unsafe acts, unsafe conditions that have imminent potential for causing harm/injury/damage will be immediately corrected. He shall maintain a daily logbook giving details of unsafe acts or conditions observed and the corrective action taken and recommendations for preventing recurrence. Adequacy of corrective actions will be verified

The contractor shall take remedial measures as per the findings of each inspection

Besides the above, the contractor shall be required to carry out the following inspections

SN	Equipment	Scope of inspection	Inspection by	Schedule
1	Hand tools	To identify unsafe/defective tool	User	Daily
2	Power tools	To identify	User	Daily

SN	Equipment	Scope of inspection	Inspection by	Schedule
		unsafe/defective tool		
3	Fire Extinguishers	To check pressure and any defect	User / Safety Coordinator	Daily Every month
4	Lifting equipment/ tackles	To check for defects and efficacy of brakes	User Third party	Daily Every Year
5	PPE	To check for defects	User	Daily

9.7 **NON COMPLIANCE**:-

9.7.1 NONCONFORMITY OF SAFETY RULES AND SAFETY APPLIANCES WILL BE VIEWED SERIOUSLY AND THE BHEL HAS RIGHT TO IMPOSE FINES ON THE CONTRACTOR AS UNDER **for every instance of violation noticed**:

SN	Violation of Safety Norm	Fine (Rs.)
01	Not Wearing Safety Helmet	50/-
02.	Not wearing Safety Belt	100/-
03.	Grinding Without Goggles	50/-
04.	Not using 24 V Supply For Internal Work	500/-
05.	Electrical Plugs Not used for hand Machine	100/-
06.	Not Slinging property	200/-
07.	Using Damaged Sling	200/-
08.	Lifting Cylinders Without Cage	500/-
09.	Not Using Proper Welding Cable With Lot of Joints And Not Insulated Property.	200/-
10.	Not Removing Small Scrap From Platforms	200/-
11.	Gas Cutting Without Taking Proper Precaution or Not Using Sheet Below Gas Cutting	200/-
12.	Not Maintaining Electric Winches Which are Operated Dangerously	500/-
13.	Improper Earthing Of Electrical T&P	500/-
14.	Accident Resulting in Partial Loss in Earning Capacity	25,000/- per victim
15.	Fatal Accident/Accidents Resulting in total loss in Earning Capacity	1,00,000/- per victim

Any other non-conformity noticed not listed above will also be fined as deemed fit by BHEL. The decision of BHEL engineer is final on the above. The amount will be deducted from running bills of the contractor. The amount collected above will be utilised for giving award to the employees who could avoid accident by following safety rules. Also the amount will be spent for purchasing the safety appliances and supporting the safety activity at site.

9.8 **CITATION:**-If safety record of the contractor in execution of the awarded job is to the satisfaction of safety department of BHEL, issue of an appropriate certificate to recognise the safety performance of the contractor may be considered by BHEL after completion of the job

9.9 Memorandum of Understanding

After Award Of Work, Contractors Are Required To Enter Into A Memorandum Of Understanding As Given Below:

Memorandum of Understanding

BHEL, PSWR is committed to Health, Safety and Environment Policy (EHS Policy) as given in the booklet titled " Safe Working Practices" issued to all contractors.

M/s _____ do hereby also commit to the same EHS Policy while executing the Contract Number _____

M/s _____ shall ensure that safe work practices not limited to the above booklet are followed by all construction workers and supervisors. Spirit and content therein shall be reached to all workers and supervisors for compliance.

BHEL will be carrying out EHS audits twice a year and M/s _____ shall ensure to close any non-conformity observed/reported within fifteen days.

Signed by authorised representative of M/s ----------

Name :

Place & Date:

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

IS No	YEAR	Amd upto	DESCRIPTION
IS 10204	1982		PORTABLE FIRE EXTINGUISHERS MECHANICAL FOAM TYPE
IS 10245	1994		SPECIFICATION FOR BREATHING APPARATUS
IS 10291	1982		SAFETY CODE FOR DRESS DRIVERS IN CIVIL ENGINEERING WORKS
IS 10658	1983		HIGHER CAPACITY DRY POWDER FIRE EXTINGUISHERS (TROLLEY MOUNTED)
IS 10662	1992		COLOUR TELEVISION
IS 10667	1983		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF FOOT AND LEG
IS 11037	1984		ELECTRONIC FAN REGULATORS
IS 11057	1984		INDUSTRIAL SAFETY NETS
IS 11451	1998		RECOMMENDATION FOR SAFETY AND HEALTH REQUIREMENT RELATING TO OCCUPATION EXPOSURE TO ASBESTOS
IS 1169	1967		PEDESTAL FANS
IS 1179	1967		SPECIFICATION FOR EQUIPMENT FOR EYE AND FACE PROTECTION DURING WELDING
IS 11833	1986		DRY POWDER FIRE EXTINGUISHERS FOR METAL FIRES
IS 11972	1987		CODE OF PRACTICE FOR SAFETY PRECAUTION TO BE TAKEN WHEN ENTERING A SEWARAGE SYSTEM
IS 1287	1986		ELECTRIC TOASTER
IS 13063	1991		STRUCTURAL SAFETY OF BUILDINGS ON SHALLOW FOUNDATIONS ON ROCKS
IS 13385	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE WHEEL MOUNTED WATER TYPE (GAS CARTRIDGES)
IS 13386	1992		SPECIFICATIONS FOR FIRE EXTINGUISHERS 50 LITRE MECHANICAL FOAM TYPE
IS 13415	1992		CODE OF SAFETY FOR PROTECTIVE BARRIERS IN AND AROUND BUILDINGS
IS 13416	1992		RECOMMENDATIONS FOR PREVENTIVE MEASURES AGAINST HAZARDS AT WORKING PLACE PART 1 TO PART 5
IS 13430	1992		CODE OF PRACTICE FOR SAFETY DURING ADDITIONAL CONSTRUCTION AND ALTERATION TO EXISTING BUILDINGS
IS 13849	1993		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CONSTANT PRESSURE)
IS 1446	1985		CLASSIFICATION OF DANGEROUS GOODS (FIRST REVISION)
IS 1476	1979		REFRIGERATORS
IS 1641	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): GENERAL PRINCIPLES OF FIRE GRADING AND CLASSIFICATION
IS 1642	1989		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS- DETAILS OF CONSTRUCTION
IS 1643	1988		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): EXPOSURE HAZARD

IS No	YEAR	Amd upto	DESCRIPTION
IS 1646	1997		CODE OF PRACTICE FOR FIRE SAFETY OF BUILDINGS (GENERAL): ELECTRICAL INSTALLATIONS
IS 1904	1986		CODE OF PRACTICE FOR DESIGN AND CONSTRUCTION OF FOUNDATIONS IN SOIL
IS 1905	1987		STRUCTURAL SAFETY OF BUILDINGS MASONARY WALLS
IS 2082	1985		ELECTRICAL GEYSERS
IS 2171	1985		PORTABLE FIRE EXTINGUISHERS DRY POWDER TYPE (CARTRIDGE)
IS 2309	1989		PRACTICE FOR THE PROTECTION OF BUILDINGS AND ALLIED BUILDINGS AGAINST LIGHTENING
IS 2312	1967		EXHAUST FANS
IS 2361	1994		SPECIFICATION FOR BUILDING GRIPS - FIRST REVISION
IS 2418	1977		TUBULAR FLUORSCENT LAMPS IS 2418 (FT-1)
IS 2750	1964		STEEL SCAFFOLDINGS
IS 2762	1964		SAFE WORKING LOADS IN KGS FOR WIRE ROPE SLINGS
IS 2878	1986		FIRE EXTINGUISHERS CARBON DIOXIDE TYPE (PORTABLE AND TROLLEY MOUNTED)
IS 2925	1984		SPECIFICATION FOR INDUSTRIAL SAFETY HELMETS
IS 3016	1982		CODE OF PRACTICE FOR FIRE PRECAUTIONS IN WELDING AND CUTTING OPERATIONS - FIRST REVISION
IS 3315	1974		DESERT COOLERS
IS 3521	1989		INDUSTRIAL SAFETY BELTS AND HARNESS
IS 368	1983		IMMERSION WATER HEATERS
IS 3696	1991		SAFETY CODE OF SCAFFOLDS AND LADDERS PART 1 TO 2
IS 3737	1996		LEATHER SAFETY BOOTS FOR WORKERS IN HEAVY METAL INDUSTRIES
IS 374	1979		CEILING FANS INCLUDING REGULATORS
IS 3764	1992		EXCAVATION WORK - CODE OF SAFETY
IS 3786	1983		METHOD FOR COMPUTATION OF FREQUENCY AND SEVERITY RATES FOR INDUSTRIAL INJURIES AND CLASSIFICATION OF INDUSTRIAL ACCIDENTS
IS 3935	1966		CODE OF PRACTICE FOR COMPOSITE CONSTRUCTION
IS 4014	1967		CODE OF PRACTICE FOR STEEL TUBULAR SCAFFOLDING
IS 4081	1986		SAFETY CODE FOR BLASTING AND RELATED DRILLING OPERATIONS
IS 4082	1977	1996	STACKING AND STORAGE OF CONSTRUCTION MATERIALS AND COMPONENTS AT SITE
IS 4130	1991		DEMOLITION OF BUILDINGS - CODE OF SAFETY PART 1 TO 2
IS 4138	1977		SAFETY CODE FOR WORKING IN COMPRESSED AIR (FIRST REVISION)
IS 4155	1966		GLOSSARY OF TERMS RELATING TO CHEMICAL AND RADIATION HAZARDS AND HAZARDOUS CHEMICALS
IS 4209	1967		CODE OF SAFETY FOR CHEMICAL LABORATORY

IS No	YEAR	Amd upto	DESCRIPTION
IS 4250	1980		FOOD MIXERS
IS 4262	1967		CODE OF SAFETY FOR SULFURIC ACID
IS 4756	1978		SAFETY CODE FOR TUNNELING WORK
IS 4912	1978		SAFETY REQUIREMENTS FOR FLOOR AND WALL OPENINGS, RAILINGS AND TOE BOARDS
IS 5121	1969		SAFETY CODE FOR PILING AND OTHER DEEP FOUNDATIONS
IS 5182	1969	1982	METHODS FOR MEASUREMENT OF AIR POLLUTION
IS 5184	1969		CODE OF SAFETY FOR HYDROFLUORIC ACID
IS 5216	1982	2000	RECOMMENDATIONS ON SAFETY PROC EDURES AND PRACTICE IN ELECTRICAL WORK PART I AND II
IS 555	1979		TABLE FANS
IS 5557	1995		INDUSTRIAL AND SAFETY LINED RUBBER BOOTS (SECOND REVISION)
IS 5916	1970		SAFETY CODE FOR CONSTRUCTION INVOLVING USE OF HOR BITUMINOUS MATERIALS
IS 5983	1980		SPECIFICATION FOR EYE PROTECTORS - FIRST REVISION
IS 6234	1986		PORTABLE FIRE EXTINGUISHERS WATER TYPE (STORED PRESSURE)
IS 692	1994		CRITERIA FOR SAFETY AND DESIGN OF STRUCTURES SUBJECTED TO UNDERGROUND BLASTS
IS 6994	1973		SPECIFICATION FOR SAFETY GLOVES
IS 7155	1986		CODE OF RECOMMENDED PRACTICE FOR CONVEYOR SAFETY (PART 1 TO 8)
IS 7205	1974		SAFETY CODE FOR ERECTION OF STRUCTURAL STEEL WORK
IS 7293	1974		SAFETY CODE FOR WORKING WITH CONSTRUCTION MACHINERY
IS 7323	1994		GUIDELINES FOR OPERATIONS OF RESERVOIRS
IS 7812	1975		CODE OF SAFETY FOR MERCURY
IS 7969	1975		SAFETY CODE FOR HANDLING AND STORAGE OF BUILDING MATERIALS
IS 8089	1976		CODE OF SAFE PRACTICE FOR LAYOUT OF OUTSIDE FACILITIES IN AN INDUSTRIAL PLANT
IS 8091	1976		CODE OF PRACTICE FOR INDUSTRIAL PLANT LAYOUT
IS 8095	1976		ACCIDENTS PREVENTION TAGS
IS 818	1968	1997	CODE OF PRACTICE FOR SAFETY AND HEALTH REQUIREMENTS IN ELECTRIC AND GAS WELDING, AND CUTTING OPERATIONS
IS 8448	1989		AUTOMATIC LINE VOLTAGE CORRECTOR (STABILISER)
IS 8519	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR BODY PROTECTION
IS 8520	1977		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR EYE, FACE AND EAR PROTECTION
IS 875	1987		STRUCTURAL SAFETY OF BUILDING: LOADING STANDARD PART 1 TO 5

IS No	YEAR	Amd upto	DESCRIPTION
IS 8807	1978		GUIDE FOR SELECTION OF INDUSTRIAL SAFETY EQUIPMENT FOR PROTECTION OF ARMS AND HANDS
IS 8978	1985		INSTANTANEOUS WATER HEATERS
IS 8989	1978		SAFETY CODE FOR ERECTION OF CONCRETE FRAMED STRUCTURES
IS 940	1989		PORTABLE FIRE EXTINGUISHERS WATER TYPE (GAS CARTRIDGE)
IS 9457	1980		SAFETY COLOURS AND SIGNS
IS 9679	1980		CODE OF SAFETY FOR WORK ENVIRONMENTAL MONITORING
IS 9706	1997		CODE OF PRACTICE FOR THE CONSTRUCTION OF AERIAL RPEWAYS FOR THE TRANSPORTATION OF MATERIAL
IS 9759	1981		GUIDELINES FOR DEWATERING DURING CONSTRUCTION
IS 9815	1989		SERVO MOTOR OPERATED LINE VOLTAGE CORRECTOR (SERVO STABILISER)
IS 9944	1992		RECOMMENDATIONS ON SAFE WORKING LOAD FOR NATURAL AND MAN-MADE FIBRE ROPE SLINGS
IS 996	1979		SINGLE PHASE ELECTRIC MOTORS
ISO 3873	1977		SAFETY HELMET

Section-10

Special Conditions of Contract

10.0 Drawings and Documents

10.1
The detailed drawings, specifications available with BHEL engineers will also form part of this tender specification. Revision of drawings/documents may take place due to various considerations as is normal in such large project. Work will have to be carried out as per revised drawings/ documents. These documents will be made available to the contractor during execution of work atsite.

10.2
One set of necessary drawings/documents to carry out the erection work will be furnished to the contractor by BHEL on loan that shall be returned to BHEL after completion of the work. Contractor's personnel shall take care of these documents given to them.

10.3
The data furnished in various sections and appendices and the drawings enclosed with this tender specification describe the equipment to be installed, tested and commissioned under this specification, briefly. However, the changes in the design and in the quantity may be expected to occur as is usual in any such large scale of works.

10.4
If any error or ambiguity is discovered in the specification/information contained in the documents/ drawings and tender, the contractor shall forthwith bring the same to the notice of BHEL before submission of offer.

10.5
In case an ambiguity is detected after award of work, the same must be brought to the notice of bhel before commencement of the work/activity. BHEL's interpretation in such cases will be final and binding on the contractor.

10.6
In case of any conflict between general instructions to tenderers, general conditions of contract contained in sections 1 & 2 respectively and special conditions of contract contained in sections 4 to 15 and appendices, provisions contained in special conditions of contract in sections 4 to 15 and appendices shall prevail.

10.7
In case of discrepancy between quoted item rate and corresponding amount in the rate schedule, the **quoted item rates shall be reckoned as correct and amount recalculated**. Quoted item rates shall also prevail for arriving at the total price quoted for offer evaluation. Total price of all the items of Price Bid shall be reckoned for evaluation of tender.

10.8
Bank Guarantees to be furnished by the Contractor towards Security Deposit and Performance Guarantee (Last 5% payment against Workmanship Warranty/Defect Liability) shall have a claim period of six months over and above the validity period required for the case.

Section-11

Special Conditions of Contract

Time Schedule, Mobilisation, Progress and Monitoring, Completion, Variation etc.

11.1 The Commissioning Schedule of Unit-1 is 30.10.2006 and of Unit-2 is 31.01.2007 in all respect. Contractor has to mobilise his resources and work force in such a manner that the entire work is completed to achieve the above schedule. However the tentative schedule for completion of unit-1 intermittent milestone activities / schedules from the date of start of Erection work at site will be as follows:

(A) Unit-1 STG Works:

Activity	Schedule of completion
Lifting & placement of Condenser on foundation	Within 2 weeks
Lifting & placement of Generator & Steam turbine on foundation	Within 3 weeks
Placement, Assembly and box up of Steam Turbine	Within 4 weeks
Placement of Mechanical Auxiliaries on foundation	Within 4 weeks
Alignment of Generator & Turbine coupling.	Within 5 weeks
C.E.P. erection completion	Within 5 weeks
BFP erection completion	Within 5 weeks
Piping works completion	Within 5 weeks
Insulation works completion	Within 7 weeks
Oil flushing completion	Within 6 weeks
Barring gear operation	Within 7 weeks
Rolling & Synchronization	Within 8 weeks
Trial operation completion and Assistance for PG Test	As per requirement.

1. Unit # 2 STG activities will follow accordingly to achieve the above commissioning schedule.

11.2 The contractor shall mobilise his resources within a week time after receipt of Letter of Intent for material handling and will mobilise to commence the

erection work as per directions of BHEL engineer. Mutually agreed programme shall be drawn by the contractor primarily to achieve the schedules as above, taking into account available and anticipated materials inflow, and other inputs. These may have to be further fine tuned with shorter duration programmes as the case may be.

11.3 The date of start of Contract Period shall be reckoned from the date of erection of the first equipment or first component on it's designated and permanent position / foundation. However the contractor shall mobilize resources as necessary prior to this event for other services like those at stores, materials management, watch & ward and other miscellaneous services under the scope of this contract.

The total contract period will be 6 (Six) months. A grace period of 2 (Two) months beyond the contract period shall be applicable for this contract.

11.4 **Progress Monitoring, Contract Extension and Overrun**

11.4.1 **Progress Monitoring**

Progress will be reviewed periodically including month end review vis-à-vis the plans drawn as above. The contractor shall submit periodical progress reports, and other reports/ information including manpower, consumables etc, as desired by BHEL.

11.4.2 **Ascertaining and Establishing the Reasons for Shortfall**

The onus probandi that the causes leading to extension in the contract period is not due to any reasons attributable to the contractor is on him (the contractor). Review of the performance as stated vide Cl. 11.4.1 above will be made considering the availability of components to be erected and other constraints over which the contractor has no control. The programme will be reviewed area-wise and the following facts will be recorded in case of shortfall at the end of every month:

A) Erection/commissioning programme not achieved owing to non-availability of fronts.

B) Erection/commissioning programme not achieved owing to non-availability of materials.

C) Erection/commissioning programme not achieved owing to non-availability of tools and plants, manpower and consumables by the contractor or any other reason attributable to the contractor.

11.4.3 **Contract Extension**

If the completion of work as detailed in these specification gets delayed beyond the end of contract period and grace period then depending on the balance work left out, BHEL at its discretion may extend the contract.

11.4.4 A joint programme shall be drawn for the work to be completed during the extended contract period. Review of the program and record of shortfall as describe vide clause no. 11.4.2 shall be done during the extended period. The over run charges will be paid in proportion to the achievement of the respective month vis-à-vis the plan for the month (for assessing the performance, the agreed plan shall be reduced by shortfall attributable to the BHEL). BHEL may disallow contractor's claim for over run charges if the monthly programme as mentioned here not made by him.

11.4.5 The part of extension attributable to the contractor, if any, in total contract extension shall be exhausted first i.e. immediately after end of grace period. This shall be followed by the extension on account of force majeure conditions, if any, and then on account of BHEL.

11.4.6 **Overrun Compensation**

If the contract is extended for any reason other than those attributable to the contractor or force majeure conditions, the contractor will be compensated by payment of over run charges at the rate of Rs.25,000/- (Rupees Twenty Five Thousand Only) per month. Overrun compensation will be paid for the extension attributable to BHEL. No overrun compensation will be payable for the extension on account of reasons attributable to contractor and/or force majeure conditions.

11.5 **Price Variation**

No price variation is applicable under this contract. Accordingly, the clause no. 2.15 of general conditions of contract shall not be applicable.

11.6 **Additional/Extra Payment on Account of Variation in Quantities**

Quantities indicated in this Tender Specification are tentative and likely to vary. Payment shall be made based on actual quantities executed in respect of items for which unit rate has been envisaged in the Price Bid. The agreed item rates for such items shall remain firm irrespective of any variations. However, no additional/extra payment or recovery will be made on account of any variation of quantities in respect of Lumpsum rate as applicable in the Price Bid (e.g., Turbine-Generator).

11.7 **WELD JOINTS (IBR and NON-IBR for CS & GI , AS, SS piping) :** The quantity of Site weld joints and their NDT requirement including heat treatment shall be as per drawing requirement, suiting to site lay out and BHEL Site Engineer's instruction for entire Carbon Steel & GI, Alloy Steel and Stainless Steel piping tonnage weight actually erected. The required drawings/documents will be furnished at site. No any extra claim on account of weld joints will be entertained.

11.8 **Variation in Quantities**

Quantities indicated in this Tender Specification are tentative and likely to vary. Payment shall be made based on actual quantities executed in respect of items for which unit rate has been envisaged in the Price Bid. However, no additional/extra payment will be made on account of any

variation of quantities in respect of Lump sum rate (per set) as applicable in the Price Bid.

11.9 INTEREST BEARING RECOVERABLE ADVANCE

Interest bearing (@ 12% per annum interest on monthly reducing balance basis) recoverable advance limited to 5% of the contract value may be paid by BHEL at its discretion depending on the merit of the case against receipt & acceptance of bank guarantee from the contractor for the amount sought. This Bank Guarantee (BG) shall be valid at least for one year or the recovery duration, whichever is less. In case recovery of dues does not get completed within the aforesaid BG validity period, the Contractor must renew the validity of BG or submit fresh BG for the outstanding amount and remaining recovery period. BHEL is entitled to make recovery of the entire outstanding amount in case the Contractor fails to comply with the BG requirement as above.

Recovery of dues will be made minimum @ 10% of the admitted gross running bill amount from the first applicable running bill onwards till entire due (principal plus interest) is recovered. In the event sufficient time duration is not left for recovery @10%, the rate of recovery shall be suitably enhanced so that entire due is recovered within the contract period (including extensions granted or foreclosure if any).

11.10 Definition of Work Completion

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

SECTION-12

SPECIAL CONDITIONS OF CONTRACT

TERMS OF PAYMENT

12.0 GENERAL

12.0.1
THE CONTRACTOR SHOULD SUBMIT HIS MONTHLY R.A. BILLS WITH ALL THE DETAILS REQUIRED BY BHEL ON SPECIFIED DATE EVERY MONTH COVERING PROGRESS OF WORK IN ALL RESPECTS AND AREAS FROM THE 25 OF PREVIOUS CALENDAR MONTH TO 24TH OF THE CURRENT MONTH.

12.0.2
CLAUSE 2.6 OF GENERAL CONDITIONS OF CONTRACT SHALL BE REFERRED TO AS REGARDS MODE OF PAYMENT, AND MEASUREMENT OF THE WORK COMPLETED.

12.0.3
RELEASE OF PAYMENT IN EACH RUNNING BILL WILL BE RESTRICTED TO 95% OF THE VALUE OF WORK ADMITTED, AS PER THE PERCENTAGE BREAK-UP FOR THE STAGE OF WORK COMPLETION STIPULATED VIDE CLAUSES HEREINAFTER. THE 5% THUS REMAINING SHALL BE TREATED AS AMOUNT PAYABLE BUT NOT DUE AND SHALL BE ON ACCOUNT OF WORKMANSHIP GUARANTEE OF WORK EXECUTED. THE SAME SHALL BE RELEASED AFTER COMPLETION OF THE GUARANTEE PERIOD OF 12 MONTHS FROM THE DATE OF COMPLETION OF ENTIRE WORK AS CERTIFIED BY BHEL ENGINEER. HOWEVER THIS AMOUNT MAY BE RELEASED ON SUBMISSION OF BANK GUARANTEE OF EQUAL AMOUNT AND TENURE IN BHEL'S PRESCRIBED FORMAT.

12.0.4
THE PAYMENT FOR RUNNING BILLS WILL NORMALLY BE RELEASED WITHIN 30 DAYS OF SUBMISSION OF RUNNING BILL. CONTRACTOR SHALL MAKE HIS OWN ARRANGEMENT FOR MAKING PAYMENT OF IMPENDING LABOUR WAGES AND OTHER DUES IN THE MEANWHILE.

12.1 STAGES OF PROGRESSIVE PRO-RATA PAYMENTS

12.1.1 MATERIAL HANDLING AND MATERIALS MANAGEMENT (RATE SCHEDULE: SECTIONS – A)

i) **55%** OF RATE SHALL BE PAID ON PRO-RATA BASIS AS SOON AS THE MATERIALS ARE UNLOADED, AND VERIFIED AS PER LWB/PWB SUBJECT TO FURNISHING FOLLOWING INFORMATION ALONG WITH THE BILL.

A) SHORTAGE REPORT/ OPEN DELIVERY TAKEN W.R.T. LWB/PWB, IF ANY AND ACCEPTANCE THEREOF BY TRANSPORTERS.

B) PROOF OF THE CLAIM LODGED WITH TRANSPORTERS IN RESPECT OF ABOVE SHORTAGE / OPEN DELIVERY.

C) MATERIAL MANAGEMENT FORMS DULY FILLED AND CERTIFIED BY BHEL ENGINEER.

ii) **45%** OF THE RATE SHALL BE PAID ON PRO-RATA BASIS AFTER THE MATERIALS ARE DULY VERIFIED AS PER PACKING LIST / LOADING ADVICE SLIP AFTER OPENING THE PACKAGES / BOXES / CRATES WHEREEVER NECESSARY, REPACKING AFTER VERIFICATION, STACKING, PREPARATION OF NECESSARY RECORDS OF INSPECTION AND LOCATION OF STACKING ETC. WHEREVER NECESSARY. PAYMENT WILL BE RELEASED ON SUBMISSION OF INFORMATION AS PER MATERIALS MANAGEMENT FORMS BY THE CONTRACTOR IMMEDIATELY AFTER VERIFICATION OF MATERIALS AND CERTIFIED BY BHEL ENGINEERS. THE REQUISITE PROFORMA WOULD BE

SUPPLIED BY SITE ENGINEER. NORMALLY, IT IS EXPECTED THAT THE TIME LAG BETWEEN RECEIPT OF MATERIAL AND VERIFICATION BE KEPT AT BAREST MINIMUM POSSIBLE.

NOTE: IN RESPECT OF THE MATERIALS ALREADY UNLOADED BY OTHER PARTY, BUT THE PRESENT CONTRACTOR SHALL HAVE TO CARRY OUT VERIFICATION, STACKING, PRESERVATION ETC, THE PAYMENT FOR THE ACTUALLY EXECUTED QUANTUM OF WORK WILL BE RELEASED IN ACCORDANCE TO PERCENTAGE BREAK UP (i.e. 45% OF THE CONTRACT ITEM RATE ON PRO-RATA BASIS) GIVEN IN CLAUSE NO. 12.1.1. (ii) HEREIN.

12.1.2 CARBON STEEL & GI (INSTRUMENT AIR PIPIN), ALLOY STEEL PIPING, STAINLESS STEEL PIPING (INCLUDING THE TG LUBE OIL, JACKING OIL, CONTROL OIL, GOVERNING OIL PIPING CS & SS), INSULATION & CLADDING FOR STG PACKAGE PER UNIT.

SN	Part of the Ac tivity Completed	Percentage Of Accepted Item Rates on pro-rata basis	
		CS & GI, AS, SS Piping	Insulation & Cladding
A	Transport to work site & Erection / Placement in position	35%	85%
B	Alignment, Fit-up & Welding	40%	N.A.
C	NDT	5%	N.A.
D	Post weld Heat Treatment	5%	N.A.
E	Hydraulic Test of Pipeline	5%	N.A.
F	Chemical Cleaning of Pipeline	2%	5%
G	Steam Blowing of pipeline	3%	5%
H	Synchronization	2%	2%
I	Trial Operation Completion	2%	2%
J	Assistance for PG Test	1%	1%
	Total	100%	100%

12.1.3 PROGRESSIVE PAYMENT FOR SURFACE CONDENSER, STEAM TURBINE, GENERATOR AND AUXILIARIES WITH THEIR ACCESSORIES AND FITTINGS ETC. FOR EACH UNIT.

Sl. No.	Description	%
1.	**Surface Condenser (16%)**	
1.1	Foundation preparation & matching.	1.0
1.2	Placement & levelling of condenser on foundation	4.0
1.3	Fit up, welding and radiography of hotwell	2.0
1.4	Condenser tube insertion & expansion.	3.0
1.5	Assy. , Welding and NDT of DOM	1.0
1.6	Erection and welding with NDT of SS bellows, Connecting pipes and connection with Turbine exhaust Hood	2.5
1.7	Erection and welding of Stand & surge pipes	1.5
1.8	Water fill test & Hydraulic test of condenser	1.0
	Total of 1.0	**16.0**
2.0	**Turbine (20%)**	
2.1	Preparation of foundation, matching, placement and levelling of sole plates and anchor plates	1.0
2.2	Assy. Placement, levelling & centring of bottom half Turbine casing and related Exhaust hood. of turbine with guide blade carriers.	2.0
2.3	Checking and Trial Assy. Of Turbine Guide Blade carriers	1.0
2.4	Trial assembly of turbine rotor & checking flow path clearances	2.0
2.5	Final Box up of turbine & levelling.	3.0
2.6	Grouting of turbine base plates/frame	2.0
2.7	Placement of Gear Box and its alignment with Turbine rotor	1.0
2.8	Coupling of Turbine Rotor and Gear Box	1.0
2.9	Assembly of regulation system	1.0
2.10	Installation of ESVs./ Control valves, M.S. strainers (internals) etc	2.0

2.11	Turbo-visory works completion	1.0
2.12	Final Boxing up of pedestals	2.0
2.13	Assembly of turning gear device & system.	1.0
	Total of 2.0	**20.0**
3.0	**Turbo Generator (15%)**	
3.1	Foundation preparation & matching.	1.0
3.2	Placement of Generator Stator on foundation & levelling/centring.	2.0
3.3	Threading of Generator Rotor	1.0
3.4	Alignment of generator rotor with Gear Box	1.0
3.5	Adjustment of Air Gap & Magnetic axis.	1.0
3.6	Grouting of Generator foundation base plates/ base frame	2.0
3.7	Reaming & coupling of Generator rotor & Turbine rotor/exciter rotor	2.0
3.8	Final Box up of bearings.	1.0
3.9	Erection of generator air coolers along with frames and exciter air connection.	2.0
3.10	Erection of Co2 system with panels, piping & cylinders	2.0
	Total of 3.0	**15.0**
4.0	**Pumps, Tanks, Vessels and Auxiliaries (32 %)**	
4.1	Erection and alignment of C.E.Ps with accessories and fittings.	3.0
4.2	Erection and alignment of Boiler Feed Pumps with Aux. and lube oil system with accessories and fittings.	6.0
4.3	Erection and alignment of Lube (AC & DC) oil pumps, Jacking oil pumps, Oil coolers, Oil centrifuge, Oil accumulator assy. Vapour extractor fans, Governing console and Duplex oil filter with accessories and fittings etc.	8.0
4.4	Erection and alignment of Main lube oil tank, Over head lube oil tank with accessories and fittings etc.	3.0
4.5	Erection & alignment of GSC and Steam jet air ejectors & auxiliaries	2.0
4.6	Erection & alignment of Deaerator assembly with accessories & fittings etc and approach platform.	5.0

4.7	Erection & alignment of LP Heaters, Drain Cooler, LP Dosing skid with accessories and fittings etc	3.0
4.9	Erection of all other auxiliaries	2.0
	Total of 4.0	**32.0**
5.0	**Final Painting (7%)**	
5.1	Final painting of equipments, Tanks, Vessels and piping.	7.0
	Total of 5.0	**7.0**
6.0	**Commissioning, Trail operation and assistance for PG Test. (10%)**	
6.1	Turbine Oil Flushing Completion.	1.0
6.2	Commng. Of Feed System Including BFPs	1.0
6.3	Commng. Of Condensate System Including CEPs	1.0
6.4	Barring Gear Operation completion of Turbine	1.0
6.5	Commng. of Vacuum System & Steam Ejectors	1.0
6.6	Vacuum Pulling Operation completion	1.0
6.7	Rolling & Synchronisation	2.0
6.8	Completion of Trial operation	1.0
6.9	Completion of PG Test related points and assistance for PG Test	1.0
	Sub Total of 6.0	**10.0**

12.2 MEASUREMENT OF THE WORK COMPLETED

A) WHERE PAYMENT IS TO BE MADE ON THE BASIS OF WEIGHT, THE WEIGHT PER UNIT GIVEN IN THE BHEL DOCUMENT ONLY SHALL BE TAKEN IN TO CONSIDERATION. IN CASE SUCH INFORMATION IS NOT AVAILABLE IN BHEL DOCUMENTS, THEN THE LATEST RELEVANT INDIAN STANDARDS IN THIS REGARD MAY BE APPLIED.

B) SPARES, SURPLUS QUANTITY, ERECTION CONTINGENCY MATERIALS WILL NOT BE PAID FOR UNLESS THE SAME HAS BEEN CONSUMED IN PLACE OF REGULAR ITEM OF MEASURABLE WORK AS PER THE RATE SCHEDULE.

C) WHERE THE PAYMENT IS MADE ON THE BASIS OF ITEM RATE, ACTUAL EXECUTED QUANTITY MEASURED JOINTLY SHALL ONLY BE PAID FOR.

D) IT IS CLARIFIED THAT AS FAR AS WEIGHT CONSTITUTED BY WELDING CONSUMABLES AND OTHER CONSUMABLES SUPPLIED BY BHEL AS WELL

AS BY THE CONTRACTOR, SHALL BE IGNORED FOR THE PURPOSE PAYMENT.

E) BHEL ENGINEER'S DECISION REGARDING STAGE OF PAYMENT CORRESPONDING TO PROGRESS OF WORK, CALCULATION OF WEIGHT ETC. WILL BE FINAL AND BINDING ON THE CONTRACTOR.

F) WASTAGE ALLOWANCE PROVIDED ELSEWHERE ON APPLICATION OF REFRACTORY & INSULATION WILL BE APPLIED ON THE NET ISSUED QUANTITY. THE NET ISSUED QUANTITY IS GROSS ISSUE LESS THE QUANTITY RETURNED. THE WASTAGE ALLOWANCE WILL BE APPLIED AT THE FINAL RECONCILIATION STAGE. THE PAYABLE AMOUNT WILL THEN BE RESTRICTED TO THE NET QUANTITY AFTER WASTAGE ALLOWANCE.

G) NO SEPARATE PAYMENT SHALL BE MADE FOR GROUTING OF EQUIPMENT, STRUCTURES ETC. SPECIFIED ELSEWHERE IN THESE SPECIFICATIONS.

Section -13

Special Conditions of Contract

13.0 Extra Charges for Rectification and Modification

13.1 If extra works (requiring less than **100 man-hours**) for modification, rework, revamping, in brief, any work done to change the state existing to a stage desired and also fabrication, all or any, are needed due to any change in or deviation from the drawings and design of equipment, operation/ maintenance requirements, mismatching, transit damages and other allied works which are not very specifically indicated in the drawings, but are found essential for satisfactory completion of the work, are done, no extra charges will be paid. The tenderers are requested to take this aspect into account and the quoted rate should include all such contingencies.

13.2 It may also be noted that if any such said extra works arise on account of the contractor's fault it will have to be carried out by the contractor free of cost. Under such circumstances, any material and consumable required for this purpose, will also have to be arranged by the contractor at his cost.

13.3 However, BHEL may consider for payment as extra, for such of those works detailed in clause 13.1 which require more than **100 man-hours** and such payment will be regulated by the terms, conditions and stipulations contained in the clauses 13.4 to13.8 and/or 14.2.1 to 14.2.10 as the case may be. It may be specifically noted that the decision of BHEL as to whether such payment is due shall be final and binding on the contractor.

13.4 BHEL may, at their absolute discretion, consider for payment as extra on man-day basis as found by them as justifiable for such of those works specified in clause 13.1 which require major modification/ repair/ reworks/ rectification etc It may also be noted that only those works which are identified as major and warrant extra payment and certified as such by the site engineer and accepted by the designers and/or competent authority of BHEL, will be considered for extra payment.

13.5 For extra works arising out of transit, storage and erection damages, payment, if found due, will be regulated by clauses 14.2.1 to 14.2.10.

13.6 All the extra work should be carried out by a separately identifiable gang, without affecting routine activities. Daily log sheets in the pro-forma prescribed by BHEL should be maintained and shall be signed by the contractor's representative and BHEL engineer. No claim for extra work will be considered/entertained in the absence of the said supporting documents ie. Daily log sheets. It may, however be noted that signing of log sheets by BHEL engineer does not mean the acceptance of such works as extra works. All admissible claims shall be submitted to BHEL

13.7 BHEL retains the right to award or not to award any of the major repair/rework/modification/rectification/fabrication works under clauses 13.1 to 13.8 to the contractor, at their discretion without assigning any reason for the same.

13.8 After eligibility of extra works is established and finally accepted by BHEL engineer/designer, payment will be released on competent authority's approval at the following rate.

Extra charges

Single average man-day rate, including overtime if any, and other site expenses and incidentals, including consumables, tools and tackles, for carrying out any major rework/ repairs/ rectification/ modification/ fabrication of 8 hours as may arise during the course of erection. (refer clauses 13.1 to 13.8 and 14.2.1 to 14.2.10)

Rs. 240/- (Rupees two hundred and forty only)

No payment will be made if an item of work lasts less than 100 man-hours.

SECTION-14

SPECIAL CONDITIONS OF CONTRACT

14.0 Insurance

14.1 Marine, Storage cum Erection (MCE) Insurance and Repairing Damages

14.1.1
BHEL/client has an MCE insurance cover, inter-alia, for all the permanent project equipments/components supplied by BHEL under scope of this work by way of a transit and storage cum erection policy covering liability against damages/ losses etc.

14.2 Reporting Damages and Carrying out Repairs

14.2.1
Checking all components/equipments at siding/site and reporting to transporter and /or insurance authorities of any damages/losses will be done by BHEL.

14.2.2
Contractor shall render all help to BHEL in inspection including handling, re-stacking etc, assessing and preparing estimates for repairs of components damaged during transit, storage and erection, commissioning and preparing estimates for fabrication of materials lost/damaged during transit, storage and erection. Contractor shall help BHEL to furnish all the data required by railways, insurance company or their surveyors.

14.2.3
Contractor shall report to BHEL in writing any damages to equipments/ components on receipt, storing, and during drawl of the materials from stores, in transit to site and unloading at place of work and during erection and commissioning. The above report shall be as prescribed by BHEL site management. Any consequential loss arising out of non-compliance of this stipulation will be borne by contractor.

14.2.4
Contractor shall carry out fabrication of any material lost/damaged as per instructions from BHEL engineer.

14.2.5
BHEL, however, retains the right to award or not to award to the contractor any of the rectification/rework/repairs of damages and also fabrication of components.

14.2.6
All the repairs/rectification/rework of damages and fabrication of materials lost, if any, shall be carried out by a separately identifiable gang for certification of man-hours. Daily log sheets should be maintained for each work separately and should be signed by contractor's representative and BHEL engineer. Signing of log sheets does not necessarily mean the acceptance of these as extra works.

14.2.7

All rectification, repairs, rework and fabrication of components lost, which are minor and incidental to erection work (consuming not more than 100 man-hours on each occasion) shall be treated as part of work without any extra cost.

14.2.8
Insurance cover under this policy will generally be as per clauses 2.10.1 to 2.10.4 of General Conditions of Contract unless and otherwise specified differently in the Special Conditions.

14.2.9
In case the loss/damage is not attributable to the contractor, Payments of all extra works on account of repair / rectification / reworks of damages and fabrication of materials lost will be as per provisions of Section-13 of SCC.

14.2.10
In case the repairs/rectification/rework and fabrication of materials lost, the work has been done by more than one agency including the contractor, the payment towards extra charges will be on pro-rata basis and the decision of BHEL in this regard is final and binding on the contractor.

14.2.11
In case of theft / damage / loss of materials due to **repeated and continued instances of negligence/failure** attributable to the contractor, the expenses incurred on account of repair/ replacement of such components including BHEL's overhead expenses as applicable (presently @ 30%) in excess of the amount realized from the underwriters, if any, shall be recovered from the contractor. Recovery will be limited to Normal Deductible Franchise (DF)/Excess as per applicable Insurance (TAC) tariff guidelines for every incidence of loss/damage.

14.2.12
In case any insurance claim does not become tenable due to **willful** negligence/ damage/loss attributable to the contractor, the total cost of repair/replacement including BHEL overhead expenses shall be recovered from the contractor.

14.3 Insurance by the Contractor and Indemnification of BHEL

14.3.1
BHEL has taken a third party liability insurance, indicating in the proposal for such insurance that sub-contractors will be taking part in the erection work detailed in this tender. However, the bidder has to bear any expenses /consequences over and above the amount that may be reimbursed to BHEL by such coverage of third party liability insurance taken by BHEL.

Such additional liability will be to cover and indemnify BHEL and its customer of all liabilities which may come up and cause harm/damage to other contractors/customer/BHEL properties/ personnel or all or anybody rendering service to BHEL/ customer or is connected with BHEL/ customer's work in any manner whatsoever. The bidders specific attention is also invited to clause 2.10 of General Conditions of Contract.

14.3.2
Contractor shall obtain suit able statutory as well as non-statutory insurance policies for all the properties belonging to him and also for his personnel deployed at project for execution of the contract work.

SECTION-15

Special Condition of Contract

15.0 Earnest Money Deposit & Security Deposit

15.1 Earnest Money Deposit:

EMD for this tender is **Rs. 1,50,000/-** (Rupees One lakhs fifty thousand only). Bidders who have already deposited One Time EMD of Rs. 2.00 lakh will be exempted from submission of any EMD now for this tender.

EMD is to be paid in **cash** (as permissible under Income Tax Act), Pay order or **Demand Draft** only in favour of Bharat Heavy Electricals Limited and payable at Nagpur. **No other form of EMD is acceptable**.

15.1.1 EMD by the Tenderer will be forfeited as per Tender Documents if

i) After opening the tender, the tenderer revokes his tender within the validity period or increases his earlier quoted rates.

ii) The tenderer does not commence the work within the period as per LOI / Contract. In case the LOI / contract is silent in this regard then within 15 days after award of contract.

15.1.2 EMD shall not carry any interest.

15.2 Security Deposit

15.2.1 Security Deposit shall be furnished by the successful tenderer. The rate of Security Deposit will be as below:

SN	Contract Value	Security Deposit Amount
1	Up to Rs. 10 lakhs	10% of Contract Value
2	Above Rs. 10 lakhs upto Rs.50 lakhs	1 lakh + 7.5% of the Contract Value exceeding Rs. 10 lakhs.
3	Above Rs. 50 lakhs	Rs 4 lakhs + 5% of the Contract Value exceeding Rs. 50 lakhs.

The Security Deposit based on award value shall be furnished before start of the work by the contractor. Amount of Security Deposit shall be aligned with the actual executed value at appropriate stages of the contract period if there is variation from the award value.

15.2.2 Security Deposit may be furnished in any one of the following forms

i) Cash (as permissible under the Income Tax Act)

ii) Pay Order, Demand Draft in favour of BHEL.

iii) Local cheques of scheduled banks, subject to realization.

v) Securities available from Post Offices such as National Savings Certificates, Kisan Vikas Patras etc. (Certificates should be held in the name of Contractor furnishing the security and duly pledged in favour of BHEL and discharged on the back).

vi) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act subject to a maximum of 50% of the total security deposit value. The balance 50% has to be remitted either by cash or in the other form of security. The Bank Guarantee format should have the approval of BHEL.

vii) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act. The FDR should be in the name of the contractor, A/C BHEL, duly discharged on the back.

viii) Security Deposit can also be recovered at the rate of 10% of admitted value from the running bills. However in such case, at least 50% of the security deposit should be remitted (by bank guarantee or demand draft) before start of the work and the balance 50% may be recovered from the running bills.

ix) EMD of the successful tenderer shall be converted and adjusted against the Security Deposit excepting the cases with One Time EMD.

x) The security deposit shall not carry any interest.

NOTE: Acceptance of Security Deposit against Sl. No. (iv) and (vi) above will be subject to hypothecation or endorsement on the documents in favour of BHEL. However, BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith.

15.2.3 Security Deposit shall not be refunded to the contractor except in accordance with the terms of the contract.

Appendix-I

Tentative List of Systems & Equipment in Scope of Contract

(AA) Tentative Scope of Equipments/Systems per unit Covered under this Tender Specification for STG of 2x45 MW.

(A) Surface Condenser: Comprising of:-

1. Divided water box.
2. Tubes(Welded Stainless Steel)
3. C.S. Tube Sheets
4. C.S. dome, Shell, Hotwell, Water box
5. Bursting Diaphragm
6. Sacrificial anodes
7. Stainless Steel expansion bellows
8. Surge & Stand pipes
9. Water expansion relief, vent & drain valves.
10. Foundation parts

(B) Steam Turbine & Auxiliaries:

1. Steam Turbine
2. Emergency trip cum stop valve
3. Blanket plate for steam blowing
4. Steam turbine Governing valve
5. Steam strainer built into Stop valve
6. Reduction gearbox between turbine & generator
7. Coupling & coupling guard between turbine & Gear box
8. Coupling & coupling guard between Gear box & Generator
9. Manual Barring Device
10. Electric Turning Device
11. Solenoid valve for remote tripping
12. Turbine sole plates & foundation bolts
13. Bolt heating equipment (Electric)
14. Shaft grounding device
15. Mating flanges for turbine inlet & extraction flanges
16. Gland sealing system including Inlet and Dump Control valves
17. Exhaust hood spray system (Automatic)
18. Vacuum Breaker valve (Motorised)
19. Turbine drain water piping & Integral piping.
20. QUNRV+ Mechanical NRV and motorised valve for bleed steam line in Extraction line –I and Line-II
21. Thermo-Elements for bearings

(C) Oil Supply System:

1. Main oil tank including drain & maintenance openings, Return oil strainer, level indicator, level signalling device, connection for Oil purifier/oil centrifuge.
2. Main oil pump with AC Motor
3. Auxiliary oil pump with AC Motor
4. Emergency Oil pump with DC Motor
5. Jacking oil pump with AC motor

6. Duplex Filter for lube oil
7. Trans-Flow valves for Duplex Oil Filter
8. Oil Coolers 2 Nos.
9. Change over device for oil coolers
10. Vent & drain valves for oil coolers on water and oil sides
11. Oil Mist fan with AC motor
12. Pressure throttles for bearings
13. Complete Lube oil piping (Stainless Steel materials after Filter outlet)
14. Complete Control oil piping (Stainless Steel materials)
15. Overhead Lube oil tank with complete piping (Stainless Steel materials) and supporting structure
16. Oil Accumulators
17. Oil Purifier along with complete oil piping
18. Governing Console consisting of Duplex filter for control oil, Main trip solenoid valve, Electric Hydraulic Converters, Local Gauge Board, solenoid valves for remote engagement of tripping device & other hydraulic components.
19. Integral piping like inter-connection piping between Condenser and SJA Ejector, Turbine exhaust-hood spray piping from CEP discharge to Turbine, Thermal insulation of piping.

(D) Steam Jet Air Ejector: 2x100% , Comprising of:-

1. Running erectors 2X100% to be mounted one above another
2. Starting ejector 1X100%
3. Horizontal Inlet/after condensers 2X100%
4. Steam & air vapour suction headers
5. Shell, water box etc. silencer for starting ejector
6. Strainers, sliding plates and anchor bolts & Foundation parts
7. Isolation valves on steam supply header & Individual ejector
8. Water expansion relief valves
9. Instruments isolation valves
10. Vents & drain valves

(E) **Gland Steam Condenser:** Horizontal Gland Steam Condenser consisting of: Steam jet ejectors 2X100%, Shell, Water Box etc, Sole plates & Anchor bolts, Water expansion relief valve, Stand pipe, Isolation valves for instruments & stand pipes, Vents & drain valves, counter flanges for inlet/outlet branch flanges with fasteners & Gaskets

(F) **Lube oil coolers (2X100 %):** Comprising of Coolers with shell, Tube sheet, Brass Tubes, Bolted end covers, sole plates & anchor bolts, Change over valves, Isolation valves on CW side, Drain & vents valves.

(G) Generator & Auxiliaries:

1. In door mounted closed circuit Air Cooled Generator (VPI) consisting of : Stator with output leads (3phase+3 neutral), Rotor suitable for Overhang BLE (Brushless Excitation), Bearings, Base Frame, Built in RTDs, Bottom mounted air to water Coolers (8 Nos. CACW), Arrangement to attenuate noise level.

2. Air Cooler with shell, Tube supports, CW inlet/outlet headers, Sole plates & Anchor bolts/fasteners, Valves for CW side inlet/outlet for each element and isolation valves for each header.

3. Brush-less exciter with PMG
4. CO2 fire extinguishing equipment for generator

(H) LP Heater & Accessories: Comprising of LP Heater (Horizontal), Foundation Bolts, Orifices, stand pipes, Shell side safety Relief valves, Tube side Relief Valves, vents & drains valves, Thermal Insulation etc.

(I) De-Aerator & Accessories: Spray Cum Tray Deaerator consisting of Horizontal Header, Feed Storage Tank with Saddle supports, Initial heating lines, Stand pipe, Orifice plates, Thermal Insulation, Platform for operation and maintenance, Valves with fittings for Vent & Drain, Isolation, Safety relief and Stand Pipes.

(J) **2x100 % CEPs Along with Drive Motors:** Each Consisting of Condensate Extraction Pump (Vertical), Drive Motor, Base Frame, Suction Strainer, Foundation parts & other accessories.

(K) **3x50 % BFPs Along with Drive Motors:** Each Consisting of Boiler Feed Pump (Barrel Type), Drive Motor, Coupling between Motors & Pumps, ARC Valves, Base Frame, Suction Strainer, Foundation parts & other accessories.

(L) Drain Cooler: Horizontal Drain Cooler Consisting of Shell, Water Box etc., Sole plates & Anchor bolts/fasteners, Valves for water expansion relief valves, Isolation valves for Instrumentation & Stand Pipes, Vents & Drain valves.

(M) Balance of Plant- Mechanical

(i) Auxiliary Steam piping from main steam tap off in TG hall to Ejectors, Deaerator, Gland sealing along with PRDS including Spray water Piping.
(ii) Extraction Steam piping from Steam Turbine to Deaerator and LP Heater.
(iii) Condens ate piping from condensate hot well to outlet of Condenser level control valve.
(iv) Condensate piping from outlet of Condenser level control valve to Deaerator.
(v) Feed water piping from Deaerator outlet to BFP Discharge header.
(vi) Drain piping from GSC, Drain Cooler and LP Heater to Condenser.
(vii) Condensate excess dump piping and condensate make piping within TG Building.
(viii) Vents at safe height.
(ix) CW & ACW piping within battery limit.
(x) Service Air & Instrument Air piping within battery limits.
(xi) LP Dosing system consisting Mixing Tank, 2x100 Dosing pumps including piping from dosing Skid up to Deaerator.
(xii) Thermal Insulation of equipments, Tanks & Vessels and piping.

(xiii) Impulse lines along with fittings, valves etc. with nut & tail along with fittings.
(xiv) GI Instrument Air supply, distribution lines
(xv) De-Super heaters - Auxiliary Steam (2nos.)
(xvi) Safety Relief Valves - Auxiliary Steam after PRDS (2 Nos.)

NOTE:

Above scope is tentative only. Contractor shall carry out all the works as per materials supplied from BHEL and drawings which shall be and as BHEL Site In-charge's instruction with terminal points and battery limits decided.

Appendix – II (A)

Tentative Weight details and Dimensions of Major Equipments Per Unit for 2x45 STG MW

Sl No.	Description / Dimensions (in mm)	Weight (in MT)
(A) FOR ERECTION, TESTING AND COMMISSIONING PER UNIT:		
01	**Surface Condenser:**	
	(i) Main assembly (L12000XW4300XH4100 mm)	60.0
	(ii) Dome (L8300XW3800XH2000 mm)	2.2
	(iii)Hot Well (L6500XW2600XH1900 mm)	4.2
	(iv)S.S. Bellow (L4200XW1500XH1200 mm)	1.0
	(v) S.S. Weld Tubes (OD 22x0.7112X9000 mm, 7350 Nos.)	3.5
	(vi) Connecting piece (L4000XW 1400X H1100, 1 No.)	0.8
	(vii) Stand Pipes Assembly Dia.120XH3500 mm)	2x0.14
	(viii) Surge Pipe assembly Dia.120XH3500 mm, 1 No.)	0.40
02	**Steam Turbine**	
	(i) Outer casing/Upper part (L3600XW2900XH1350 mm)	15.0
	(ii) Outer casing/Lower part (L3400XW2660XH1100 mm)	12.0
	(iii) Exhaust Hood /Upper part (L1900XW4500XH2000 mm)	7.0
	(iv) Exhaust Hood /Lower part (L2000XW4600XH2000 mm)	9.0
	(v) Rotor assembly (Dia 1900X6300 mm)	12.0
	(vi) Front Bearing Housing assy. including Bed plate (size 1300X1150x1100 mm)	7.5
	(vii) Rear Bearing Housing assy. (size 1000X1700x1400 mm)	7.0
	(viii) Steam Chamber (size 500X1000x1000 mm)	1.7
	(ix) Guide blade Carrier-I (Dia.1000x400 mm)	0.8
	(x) Guide blade Carrier-II (Dia.1000x434 mm)	1.0
	(xi) Guide blade Carrier-III (Dia.1250x400 mm)	1.2
	(xii) Guide blade Carrier-IV (Dia.1600x500 mm)	1.3
	(xiii) L.P.Guide blade Carrier (Dia.2110x1100 mm)	9.0
	(xiv) Bed plate under Ex. Hood (2500x1000x150 mm)	2x2.1
	(xv) Support block for Ex.hood (2100x650x1150 mm)	2x1.9
	(xvi) Front Steam Gland (Dia400x225 mm)	0.07
	(xvii) Rear Steam Gland (Dia730x430 mm)	0.5
	(xviii) ESV and Control valves and other loose items etc.	10.0
	(xix) Gear Box (Size2000x2500x2500 mm)	9.0
03	**GENERATOR**	
	(i)Stator (L5000XB3600XH3500 mm)	68.0
	(ii)Rotor (L7250XB920XH920 mm)	16.5
	(iii) Bearings (2 Nos. size 1500X600X1600 mm each)	2X2.3
	(iv) Foundation plates/loose items	8.0
	(v) Closed ckt. Air cooling system & loose items	1.5
	(vi) Exciter Frame and Yoke	1.0
	(vii) Exciter armature and rectifier	1.4
	(viii) Exciter bearing housing (500X500X500 mm)	0.3
	(ix) Loose items,	0.5

(x) Generator Air Coolers-6 Nos. 8X1.0

(L4200XW620XH 440 mm each)

(xi) CO2 System with CO2 cylinders 2.0

04 Pumps, Tanks, Vessels and Auxiliaries:

(i) Condensate extraction pumps with Motor & Canister – 2 sets (Size 900X5650X1150 mm each with pump & canister) 2x3.30

(ii) Boiler Feed Pump (3 Nos.) with Motors (Size 5050X1350X1400 mm each) 3x7.5

(iii) Governing Console (1300X1300X2500 mm) 1.3

(iv) Lube oil tank (4550X2700X3500 mm) 6.5

(v) Lube Oil Over Head tank (Dia. 3150 X H 3000mm) 3.0

(vi) Lube Oil coolers–2 Nos. (Dia800XH4800 mm each) 2x5.0

(vii) Duplex Oil filter – 1set (1850X650X2500 mm) 1.6

(viii) E.O.P. assy. (DC)- 1 No. (size 2100X600X660mm) 1.2

(ix) Lube Oil pump Assy.-2 Nos.(2200X900X1050 mm each) 2x1.6

(x) Jacking Oil Pump assy-(size 900X500X500 mm) 0.4

(xi) Oil vapour extractor fan assembly –2 No. (500X400X500 mm) 2x0.15

(xii) Oil Centrifuge unit (2000X2000X1800 mm) 1.4

(xiii) Oil accumulator assembly (700X500X1765mm) 0.5

(xiv) Steam jet air Ejectors (2 Nos.) & Hogging ejector-1 No (Ejector size L5000XW1300XH1300 mm each) 7.2

(xv) Gland Steam Condenser (GSC) with two set of Ejectors (L2800XW1300XH1400 mm) 2.0

(xvi) Drain Cooler (Dia620XL5200 mm) 1.5

(xvii) LP Heater (1 No.) (Dia 900 XL8500 mm) 5.4

(xviii) **DEAERATOR**

(a) Deaerating Header (L5500XW2400XH2750 mm) 8.6

(b) Feed Storage Tank (L9850XW3500XH3750 mm) 14.0

(c) Platform materials 4.0

(xix) LP Dosing Skid (size 2350X2250X2550 mm) 1.4

05. Piping (TG Integral-i.e. lube oil piping and External System Piping- (both IBR & Non-IBR) per Unit consisting of:

(i) CS pipes with fittings, valves, supports etc.	66.0
(ii) Instrument air piping with valves fittings & supports	1.0
(iii) Alloy steel piping/valves/fittings/supports ETC.	2.5
(iv) Stainless Steel pipes/valves/supports	2.5

06 . Insulation & cladding materials 14.0

(For Equipments/Tanks/Vessels and Piping with Valves & fittings)

(B) FOR MATERIAL HANDLING AND MATERIAL MANAGEMENT FOR TWO UNITS: Tentative weight for Receipt, Unloading at Site / Stores / Storage Yard, Handling at Site / Storage Yard / Stores, Verification, Stacking of materials (including Mechanical equipments/items, Electrical and Control & Instrumentation equipments and items etc.) and their Preservation as part of Material Handling and Material Management services **for both the Units: 900 MT**

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*Above weights & dimensions are tentative and may vary. All equipments & Aux. are to be handled & erected as dispatched from manufacturing units & received at site.

APPENDIX-II(B)

Tentative Schedule of Insulation thickness Per Unit

Sr. No.	Description of system	Pipe size (in Inch)	Length of pipe with valves & fittings in Mtrs	Temperature in degree centigrade	Insulation Thickness in mm
(A)	**Exhaust Piping (SRV Ejec. ETC) (31363**				
1.	3”-VA-11G-272	3	½	100	40
	–do--	1	½	100	25
	–do--	0.5	½	100	25
2.	12’-VA-11K-273	12	14	100	40
	–do--	8	8	100	40
	–do--	6	35	100	40
	–do--	4	15	100	40
	–do--	3	9	100	40
3.	6”-VT-11K-066/067	1	61	250	50
	–do--	0.5	6	250	40
(B)	**BFP-Suction Piping (31317)**				
1.	8”-FW-11G-453(BFP-A)	12	35	160	60
	–do--	8	15	160	60
2.	8”-FW-11G-454(BFP-B)	8	½	160	60
3.	8”-FW-11G-455(BFP-C)	8	½	160	60
4.	12”-FW-11G-452(BFP-SUCTION HEADER)	12	½	160	60
5.	12”-FW-11G-450(HEADER TO STORAGE TANK)	12	½	160	60
	–do--	0.5	1/2	160	40
6.	12”-FW-11G-451	12	½	160	60
7.	1”-HD-12A-311	1	½	160	40
(C)	**BFP-Discharge Piping (31318)**				
1.	6”-FW-51A-456(BFP-A)	8	85	160	60
	–do--	6	30	160	50
	–DO–	2	½	160	40
	–DO–	1	20	160	40
2.	6”-FW-51A-457(BFP-B)	6	1/2	160	50
3.	6”-FW-51A-458(BFP-C)	6	1/2	160	50

4.	8"-FW-51A-459(BFP DISCHARGE HEADER)	8	1/2	160	60
	–DO–	2	1/2	160	40
	–DO–	1	1/2	160	40
5.	8"-FW-51A-461	8	1/2	160	60
6.	1"-FW-51A-460	1	1/2	160	40
(D)	**BFP-RECIRCULATION PIPING (31319)**				
1.	2"-FW-51A-462(BFP A)	2	155	160	40
2.	2"-FW-51A-463(BFP B)	2	½	160	40
3.	2"-FW-51A-464(BFP C)	2	½	160	40
(E)	**BFP-LEAK OFF (31320)**				
1.	2"-FW-11A-465(BFP A)	2	75	160	40
	–DO–	1.5	110	160	40
2.	2"-FW-11A-466(BFP C)	2	½	160	40
	–DO–	1.5	½	160	40
3.	2"-FW-11A-467(BFP C)	2	½	160	40
	–DO–	1.5	½	160	40
(F)	**LP HEATER DRAIN PIPING (31375)**				
1.	4"-DR-11G-501(LP HEATER DRAIN TO DRAIN COOLER)	4	50	160	50
	–DO–	2	7	160	40
2.	4"-DR-11G-502(DRAIN COOLER TO CONDENSER)	4	½	160	50
	–DO–	1	½	160	40
	–DO–	½	¼	160	40
3.	1.5"-VT-11K-503 (LP HEATER VENT TO CONDENSER)	1.5	½	111	40
(G)	**SPRAY WATER PIPE FOR DESUP. HEATER (31324)**				
1.	1"-FW-51A-098	3	2	150	40
	–DO–	1	95	150	25
	–DO–	½	5	150	25
2.	1"-FW-51A-081	1	½	150	25

	–DO–	½	½	150	25
3.	2”-SPRAY WATER TO BOILER AUX.	2	½	160	40
4.	1”-13F	1	4	160	40
(H)	**GLAND STEAM PIPING (31351)**				
1.	1.5”-AUS-21F-087 (SA106 GRB)	1.5	½	350	65
	–DO–	1	½	350	60
2.	6”-GS-11K-051 (CONTROL STATION TO HEADER)	1.5	½	341	100
	–DO–	1	½	341	60
3.	6”-GS-11K-052 (GLAND STEAM HEADER)	6	15	341	100
	–DO–	4	15	341	60
	–DO–	2	15	341	75
	–DO–	1	8	341	60
4.	4”-GS-11K-053 (GLAND STEAM HEADER TO TURBINE)	4	½	341	90
5.	4”-GS-11K-054 (GLAND STEAM HEADER TO TURBINE)	4	½	341	90
6.	1”-GS-11K-055 (GLAND STEAM HEADER TOCONTROL STATION)	1	½	341	60
7.	2”-GS-11K-056 (CONTROL STATION TO CONDENSER)	2	½	341	75
	–DO–	1	½	341	60
(I)	**AUX. STEAM SUP. PIPING INCL. HEADER (31355)**				
1.	3”-MS-53F-071 (A335GRP11)SC80	6	14	488	175
	–DO–	4	7	488	150
	–DO–	3	15	488	150
	–DO–	1	45	488	115
	–DO–	½	20	488	150
2.	2”-MS-53F-091 (A335GRP11)SC80	4	½	488	150
	–DO–	2	14	488	150
	–DO–	1.5	½	488	150
	–DO–	1	½	488	115

	–DO–	½	½	488	100
3.	6”-AS-23F-072 (P11)	6	½	488	175
	–DO–	3	40	488	150
	–DO–	1	½	488	115
4.	6”-AS-23F-073 (P11)	6	½	471	175
5.	8”-VT-11K-074	8	½	400	125
	–DO–	4	½	400	115
	–DO-	1	½	400	90
6.	3”-AS-23F-092 (P11)	6	½	471	175
	–DO–	3	½	471	150
	–DO-	1	½	471	115
7.	3”-AUS-23F-093	3	½	471	150
	–DO–	2	½	471	150
8.	3”-AS-53F-091	3	½	488	150
9.	6”-AS-21F-081	6	7	350	100
	–DO–	4	7	350	90
	–DO-	2	15	350	75
	–DO–	1	25	350	60
	–DO–	½	19	350	60
10.	2”-AUS-21F-082	3	110	350	90
	–DO–	1.5	20	350	65
(J)	**PEGGING & HEATING STEAM TO DEAERATOR (31357)**				
1.	6”-AS-21F-081(cs)	6	½	350	100
2.	2”-AUS-21F-082(SA106GRB)	4	½	350	90
	–DO-	2	½	350	75
	–DO–	1	½	350	60
3.	6”-AS-21F-083(SA106GRB)	6	½	350	100
	–DO–	1	½	350	60
4.	10”-AUS-21F-084(SA106GRB)	6	½	350	115
	–DO–	1	½	350	60
(K)	**EXTRACTION PIPING I (31343)**				
1.	12”-EX-11F-031	12	45	200	60
	–DO-	10	8	200	60
	–DO–	8	7	200	60
	–DO–	1	32	200	40
2.	14”-EX-21F-032	14	20	200	65
3.	EX-11F	1	30	200	40
	–DO–	½	20	200	40

(L)	**GLAND STEAM TO GSC & EXHAUST PIPING(31352)**				
1.	3"-GS-11K-061	4	45	423	125
	--DO-	3	15	423	125
	--DO--	2	15	423	115
	--DO--	1	13	423	90
	--DO--	½	9	423	90
2.	3"-GS-11K-062	3	½	423	125
3.	4"-GS-11K-063	4	½	423	125
4.	4"-GS-11K-064	4	½	423	125
5.	4"-GS-11K-065	4	½	423	125
	--DO-	1	½	423	90
	--DO--	½	½	423	90
6.	6"-VT-11K-066	6	½	423	150
7.	6"-VT-11K-067	6	½	423	150
(M)	**EXTRACTION PIPING(31344)**				
1.	12"-EX-11F-041	12	15	110	60
2.	16"-EX-11F-043	16	15	110	60
	--DO--	1	13	100	25
	--DO--	½	7	100	25
(N)	**Equipments (Total area about 270 Sq. Meters**				
1.	Deaerator with FST				75
2.	LP Heater				75
3.	Gland Steam Condenser				75
4.	Drain Cooler				75
5.	Steam Jet Air Ejector				75
6.	**TURBINE DRAIN PIPING**	As per drawing			

NOTE:

1. Above schedule of insulation & scope mentioned in tentative only. Entire works have to be completed as per BHEL drawings/documents and site engineers instruction.
2. For mentioned Insulation thickness, it will be in multiple layers depending of standard thickness of mattress. Same shall be carried at site as drawings & BHEL site engineers instruction.

Appendix – II (C)

Summary of Tentative Weight Schedule involved per unit of STG works of Tender Specification.

(A) TENTATIVE WEIGHT FOR ERECTION, TESING AND COMMISSINONING (PER UNIT):

Sl.No.	Description	Total Weight Involved (MT)
1.	Surface Condenser & Auxiliaries	73.0
2.	Steam Turbine with associated items	112.0
3.	Generator with associated items	112.0
4.	Pumps, Tanks, Vessels and Auxiliaries .	107.0
5.	**Piping (TG Integral-i.e. lube oil piping and External System Piping-both IBR & Non-IBR) consisting of:**	
	(i) CS pipes with fittings, valves, supports etc.	66.0
	(ii) Instrument air piping with valves fittings & supports	1.0
	(iii) Alloy steel piping/valves/fittings/supports ETC.	2.5
	(iv) Stainless Steel pipes/valves/supports	2.5
6.	Insulation & cladding materials (For Equipments/Tanks/Vessels and Piping with Valves & fittings)	14.0
Total Weight		**490.0 MT**
Total Weight for Erection & Commng. for Both the Units		**980.0 MT**

(B)TENTATIVE WEIGHT FOR MATERIAL HANDLING & MATERIAL MANAGEMENT SERVICES FOR TWO UNITS:

Tentative weight for Receipt, Unloading at Site / Stores / Storage Yard, Handling at Site / Storage Yard / Stores, Verification, Stacking of materials (including Mechanical equipments/items, Electrical and Control & Instrumentation equipments and items etc.) and their Preservation as part of Material Handling and Material Management services **for both the Units: 900 MT**

NOTE:

1. All above weight details given are only tentative and likely to vary. The erection, testing, commissioning has to be carried out for all the Equipments/ Auxiliaries/ Items covered under this tender specification that are necessary for completion of the total system.
2. Site Weld Joints for Piping both for IBR and Non-IBR for Piping (C.S&GI., A.S. and S.S. piping) shall be as per drawing requirement and to suit the site requirement.
3. NDT including radiography and Post/preheat treatment for piping shall also be as specified in the relevant erection documents & by BHEL engineer at site.

Appendix-III

Format for Month-wise Manpower Deployment Plan
(Category-wise numbers to be indicated for each month)

SN	Category	Months						
		1	2	3	4	5	6	7
01	Resident engineer							
02	Erection engineers							
03	Erection supervisors							
04	Quality assurance engineer							
05	Safety engineer							
06	Materials management supervisors							
07	High pressure welders							
08	Structural & other welders							
09 10	Fitters Millwright fitters							
11	Crane operator							
12	Truck/trailer drivers							
13	Store keepers							
14	Electricians							
15	Semiskilled/ unskilled workers							
	Month wise total							

Date:

Signature of bidder

Appendix–I V

Format for deployment plan for major Tools and Plants of contractor

SN	Description & capacity of T&P	Min. Qty	Months quantity						
			1	2	3	4	5	6	7
1.	Mobile Crane of suitable capacity	As reqd.							
2.	Trailer with Tractor of suitable capacity	As reqd.							
3.	TIG welding sets	As reqd.							
4.	Pipe bending m/c electro-hydraulic	As reqd.							
5.	Stress relieving equipment with temperature recorders	As reqd.							
6.	Radiography source & other arrangement	1set							
7.	Electric distribution board with energy meter	1set							
8.	Welding Generators/rectifiers	As reqd.							
9.	Hydraulic test pump cap.250 Kg/cm2	As reqd.							
10.	Chemical cleaning pumps - as per requirement.	As reqd.							
11.	Any other major T&P planned by the contractor	As reqd.							
12.	Tube expander for condenser	As reqd.							
13.	Hydraulic jacks of suitable capacity	As reqd.							
14.	Torque wrench 0-2000n-m capacity	As reqd							
15.	Vacuum cleaner –industrial	As reqd							
16.	Mixer for grouting of eqpt. foundation	As reqd							

17.	Slings for lifting heavy equipments like Condenser, Turbine and generator of suitable capacity	As reqd						
18.	SPANNERS/EYE BOLTS/JACK BOLTS OF ALL SIZES	As reqd						
19.	LONG FEELER GAUGE SET	As reqd						
20.	ELECTRODE BAKING OVEN(BIG,PORTABLE)	As reqd						
21.	SLEEPERS AND TARPAULIN AS PER REQUIREMENT	As reqd						

(*) NOTE:

1. This list is neither exhaustive nor limiting. Quantities indicated above are only the minimum required. Contractor shall deploy all necessary T&P to meet the schedules & as prescribed by BHEL
2. No claim whatsoever will be entertained on this account.

Signature of the bidder

Date:

Appendix-V
Planned workers man-days in various areas

Sl. No.	Description of work	Mandays Planned	Remarks
1.	Planning, Monitoring and Control		
2.	Materials Management		
3.	Condenser & Auxiliaries		
4.	Turbine & Auxiliaries		
5.	Generator and Auxiliaries		
6.	Pumps & Auxiliaries		
7.	Piping & supports		
8.	Welding and NDT		
9.	Insulation & Cladding		
10.	Quality Assurance and Control		
11.	Safety and house keeping		
12.	Industrial relations and welfare		

Appendix-VI

Concurrent Commitments

Sr. No.	Full postal address of client and name of officer in-charge	Description of the work	Value of the contract	Commenc-ement date	Schedu-led comple-tion	% compl-td. As on date	Anticipa-ted compln. Date	Remarks

Signature of the bidder

Date:

Appendix-VII
Analysis of unit rate quoted

Sl. no.	Description	% of quoted rate	Remarks
01	Site facilities viz., electricity, water other infrastructure.		
02	Salary and wages + retrenchment benefits		
03	Consumables		
04	T&P depreciation & maintenance		
05	Establishment & administrative expenses		
06	Overheads		
07	Profit		

Date

Signature of the bidder

APPENDIX–VIII

DETAILS OF SIMILAR WORK DONE DURING THE LAST SEV EN YEARS

S N	FULL POSTAL ADDRESS OF CLIENT & NAME OF OFFICER IN CHARGE	DESCRIP- TION OF WORK	VALUE OF CONTRACT	DATE OF AWARD OF WORK	DATE OF COMMENCE MENT OF WORK	ACTUAL COMPLETION TIME (MONTHS)	DATE OF ACTUAL COMPLETION OF WORK	REMARKS
1								
2								
3								
4								
5								
6								
7								
8								
9								

ERS SHALL ENCLOSE COPIES OF DETAILED WORK ORDER (GIVING BILL OF QUANTITIES AND SCOPE OF WORK) AND COMPLETION CERTIFICATE IN ›ORT OF THIS STATEMENT.

DATE

SIGNATURE OF TENDERER WITH SEAL